Final Work Plan

Remedial Investigation/Feasibility Study
7100 1st Avenue South Site
Seattle, Washington
Agreed Order No. DE 8258

for
Washington State Department of Ecology
on behalf of **7100 1st Avenue S. Seattle, LLC**

February 15, 2013

GeoEngineers
Earth Science + Technology

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GeoEngineers

Plaza 600 Building
600 Stewart Street, Suite 1700
Seattle, Washington 98101
206.728.2674

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File No. 0275-015-01

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Prepared for:

Washington State Department of Ecology
on behalf of
7100 1st Avenue S. Seattle, LLC
18000 International Boulevard, Suite 800
Seattle, Washington 98188-4255

Attention: Rod DeWalt

Prepared by:

GeoEngineers, Inc.
Plaza 600 Building
600 Stewart Street, Suite 1700
Seattle, Washington 98101
206.728.2674

Chris Bailey

Robert S. Trahan
Geologist

Chris Bailey, PE
Environmental Engineer

James A. Miller

James A. Miller, LG, LHG, PE
Senior Principal

CLB:RST:JAM:csv

Four copies submitted

GEOENGINEERS

Table of Contents

LIST OF TABLES

LIST OF FIGURES

APPENDICES

1.0 INTRODUCTION

This document presents a Work Plan for the Remedial Investigation/Feasibility Study (RI/FS) for the 7100 1st Avenue S. Site (the “Site”) located in Seattle, Washington (Vicinity Map, Figure 1). The 7100 1st Avenue S., Seattle LLC (“7100 LLC”) is preparing the RI/FS in accordance with Washington State Department of Ecology’s (Ecology’s) Agreed Order No. DE 8258 (the “Agreed Order”; Ecology, 2011). The Site, as is currently defined in the Agreed Order, is generally located at 7100 2nd Avenue SW, alternatively referred to as 7100 1st Avenue South on the western bank of the Lower Duwamish Waterway (LDW) and is listed in the Ecology Database as Facility Site No. 97573251.

Historical activities at the Site have included filling and industrial operations associated with the loading of barges, a ready-mix concrete facility, transfer of aggregates, and school bus parking and light maintenance facility since the late 1950s/early 1960s. Historical facilities located at the Site have included underground storage tanks (USTs), fueling islands and bus maintenance facilities. Currently, the Site is used as a staging area and auxiliary storage facility for shipping containers, intermittent storage of bulk materials, and as a temporary covered work space for equipment repairs. Previous environmental investigations conducted at the Site by 7100 LLC and other parties have detected metals, polychlorinated biphenyls (PCBs), pesticides, volatile and semi-volatile organic compounds (SVOCs) including polycyclic aromatic hydrocarbons (PAHs), and petroleum hydrocarbons, in soil and/or groundwater.

As part of the Scope of Work defined in the Agreed Order, 7100 LLC is required to prepare and submit a work plan for RI/FS activities planned for the Site. The activities described in this Work Plan will be completed to characterize the nature and extent of soil and groundwater contamination at the Site and to provide sufficient information to select a cleanup action, if necessary. The activities described in this Work Plan also include assessment of catch basin solids to evaluate whether the stormwater collection system at the Site is a potential transport mechanism for contaminants in Site soil and groundwater to the LDW. This Work Plan provides details for implementation of the RI/FS including evaluation of existing Site soil, groundwater, and stormwater solids data, identification of potential data gaps for completion of the RI/FS, description of the proposed field investigation, FS, and schedule.

This Work Plan was prepared in general accordance with the requirements defined by Model Toxics Control Act (MTCA) Regulation (Washington Administrative Code [WAC] 173-340-350) for submittal to Ecology. Appendices to this Work Plan include the following:

- Appendix A - Sampling and Analysis Plan;
- Appendix B - Quality Assurance Project Plan;
- Appendix C - Health and Safety Plan; and
- Appendix D - Public Participation Plan prepared by Ecology for the Site.
- Appendix E – Historic Boring Logs
- Appendix F – Stormwater Pollution Prevention Plan for Site

2.0 BACKGROUND INFORMATION

This section presents background information regarding the Site, including a description of the property's historical, current, and future Site uses; summary of previous environmental investigations; existing data; identification of contaminants of potential concern (COPCs); and evaluation and identification of data gaps for completion of the RI/FS.

2.1. Site Description

The Site is located in the northern portion of the South Park Industrial Area (7100 2nd Avenue Southwest), is triangular in shape and consists of 3.09 acres (Parcel No. 2924049090). The Site is zoned industrial and is bounded to the northeast by the LDW, to the south by the Trotsky Property (Parcel No. 2924049030) and the Early Action Area 2 Inlet (also known as the Trotsky Inlet), and to the west by 1st Avenue South (Site Plan, Figure 2). The 1.2 acre property located between the Site and 1st Avenue South is currently being leased from the Washington State Department of Transportation (WSDOT). In addition to the Site, 7100 LLC also owns a small (0.04 acre) parcel (Parcel No. 6871200035) located on the south side of the Trotsky Inlet (Figure 2). This property is currently vacant, and historic activities at the separate parcel are unrelated to the Site.

The Site is owned by 7100 LLC and is used by Alaska Marine Lines (a subsidiary of Lynden, Inc.) for auxiliary storage of shipping containers and other equipment, transfer of aggregates and miscellaneous marine terminal uses. In addition, a limited area of the southern portion of the Site is leased for the operation of an automobile loading rack. The Site has moorage along the LDW, which is actively used for loading and unloading of barges. The Site has approximately 700 feet of frontage along the LDW and approximately 480 feet along the Trotsky Inlet. A majority of the shoreline is covered with concrete rip-rap. The upland portion of the Site is relatively flat, with a slight downward east to west, and is paved with asphalt and concrete. A soil berm rises above the rip-rap and contains a narrow (approximately 3 to 10 feet wide) riparian zone that is vegetated with grasses, Himalayan blackberry, shrub willow and alder (City of Seattle, 1998). Storm drainage collected from the majority of the property flows to an LDW outfall located at the northern tip of the property, as shown on Figure 2. Stormwater is discharged under Ecology stormwater permit number WAR002471-D. The Stormwater Pollution Prevention Plan for the Site is attached as Apendix F. Storm drainage collected from a limited area in the southwest portion of the property is piped away from the LDW and connects to the City of Seattle sanitary sewer system. Current and historical Site features are shown in Figure 2.

2.2. Historical Operations and Site Use

Prior to 1969, the location of the Site was a part of the LDW tidal marshland. The Site was located near the Pacific Metal and Salvage Company and the Seabell Shipbuilding Company. The Pacific Metal and Salvage Company reportedly specialized in the dismantling, wrecking and salvage of old vessels. The Seabell Shipbuilding Company reportedly specialized in the construction of large wooden vessels. Waste from these historic operations included scrap metal and wood debris being released to LDW in the vicinity of the Site. Between 1960 and 1969 (SAIC, 2008), the location of the Site was filled with dredge materials and construction debris (concrete and brick). An aerial photo of the area from 1969 appears to show the filling project to be nearly complete.

Between approximately 1969 and 1977, the southern portion of the Site was occupied by a ready mix concrete plant, Seattle Ready Mix (Pioneer Title Insurance Company, 1981). The northern portion of the Site was used as a cargo terminal and as a sand and gravel batch plant (SAIC, 2008). Around this time, historical aerial photographs of the Site show a large rectangular building (warehouse or garage) measuring approximately 100 feet long by 60 feet wide. In 1978, a second building was added to the warehouse/garage structure, a storm drainage system was constructed, and the Site and lease area were paved with asphalt/concrete. As part of the paving project, an extruded concrete curb was installed along the bank of the Site (northeast portion of the Site) to serve as a safety measure for vehicular activity and to prevent surface runoff from entering the LDW. Also, in 1978, authorization from the Seattle Building Department was granted to repair the existing bulkhead along the LDW (City of Seattle, 1978) and a Shoreline, Substantial Development Permit (SMA 78-41) granted to construct a 100 foot by 50 foot addition to the existing warehouse/garage building.

Between 1978 and 1984, the Site was primarily used as a school bus parking facility with auxiliary maintenance and servicing. The Site contained three buildings, which included the warehouse/garage, warehouse/garage addition and an office building. Fuel dispensers located at the southeast corner of the warehouse/garage structure were supplied by two 10,000 gallon USTs (USTs T-1 and T-2, Figure 2). A fuel island, located north of the former garage (exact location unknown), was supplied by a 12,000 gallon gasoline UST located within the garage structure (UST T-3, Figure 2).

After 1984, Alaska Marine Lines began operating a barge terminal at the Site. The Site was used as a freight management facility in which shipping containers and bulk aggregates were transferred between barge and truck, and for container and equipment storage. The 12,000 gallon gasoline UST was decommissioned and removed in 1984. In 1991, the two remaining 10,000 gallon USTs located at the Site were decommissioned and removed. Based on aerial photographs of the Site, the 80 foot by 40 foot garage structure located east of the warehouse/garage was demolished between 1984 and 2000. Between 2000 and 2006, the warehouse/garage structure was demolished and removed.

2.3. Subsurface Conditions

2.3.1. Soil Conditions

Based on previous subsurface investigations and review of the Site development history, the stratigraphy of the Site generally consists of fill material overlying native river flood plain and estuary deposits (SAIC, 2009). The upper fill unit ranges in thickness from approximately 5 to 11 feet and generally consists of poorly sorted gray to black sand with gravel, occasional wood, concrete and brick debris. A middle fill unit generally consists of gray to black silty sand and clay with occasional wood debris and ranges in thickness between approximately 1.5 and 5 feet. The lower fill unit generally consists of stiff dark gray clay with occasional wood debris up to approximately 12 feet thick. Figure 18 presents a conceptual site model representing the approximate soil conditions at the site.

Previous investigations indicated that the contact between the fill material and native deposits is difficult to distinguish due to the similarity between the native river sediments and the material that comprises the lowest unit of fill at the property. Most of the soil encountered during previous investigations resulted from filling the tidal marsh area.

2.3.2. Groundwater Conditions

Groundwater at the Site ranges between 7.5 and 12 feet below ground surface (bgs) based on measurements from 11 monitoring wells located at the Site. Previous investigations indicate that groundwater levels are influenced by tidal fluctuations in the LDW and that the shallow groundwater flow direction appears to vary from northeast to southwest (Dames & Moore, 1991). Dames & Moore noted in their 1991 study that groundwater gradients, flow rates, or discharge to the LDW during could not be reliably calculated.

2.4. Future Site Use

The Site is located in an industrialized corridor surrounding the LDW in south Seattle. The Site and adjacent properties are zoned as industrial and are characterized by manufacturing, shipping, warehouses, water transportation and other industrial uses.

The current and anticipated future use of the site will continue to be auxiliary storage, aggregate transfer, barge mooring, barge loading and unloading, and general marine terminal activities.

3.0 SUMMARY OF PREVIOUS INVESTIGATIONS AND EXISTING DATA

The results of the previous environmental studies at the Site are discussed in the following sections. Soil, groundwater and sediment results from previous studies were compared to preliminary screening levels established for the Site. Development of preliminary screening levels is discussed in Section 5.0 and summarized in Tables 1 through 3. Chemical analytical results from previous studies are summarized in Tables 4 through 14. Previous vapor, soil, groundwater and sediment sampling locations are shown relative to the Site on Figures 3 through 17.

3.1. Soil Vapor Survey (Dames & Moore, 1990)

A soil vapor survey was completed by Dames & Moore on August 6 and 7, 1990 to evaluate the presence of organic vapors in shallow soil that may be associated with the 10,000 gallon gasoline UST (T-1) and 10,000 gallon diesel UST (T-2) that were later decommissioned and removed in 1991, and the 12,000 gallon gasoline UST (T-3) that was decommissioned and removed in 1984. Soil vapor probes used for this study consisted of 3-foot long, ¾-inch diameter slotted steel pipes with threaded ends for the attachment of steel conical tips, additional pipe and/or vacuum tubing.

Soil vapor measurements were collected at 32 locations at the Site (Figure 3). Probe location 001, located approximately 75 feet southwest of the USTs, was used to establish a background soil vapor concentration. Probe locations 002 through 023 were completed radiating outward from the USTs at approximately 20-foot spacings until the background level was measured. Soil vapor concentrations were measured between 10 parts per million (ppm) to 368 ppm using a photo ionization detector (PID). Elevated soil vapor concentrations were observed in an area measuring approximately 100 to 150 feet around the location of USTs T-1 and T-2 (Figure 3). In addition, elevated soil vapor concentrations were observed trending northerly from UST location T-3.

Based on the elevated PID readings observed, Dames & Moore concluded that a release from the USTs likely occurred.

3.2. Soil and Groundwater Assessment (Dames & Moore, 1991a)

Dames & Moore completed a soil and groundwater investigation at the Site between October 25 and December 18, 1990 (Figures 4 and 5). The Investigation included the drilling of thirteen soil borings, seven of which were completed as groundwater monitoring wells (MW-1 through MW-7) and one as a vapor extraction well (SG-1). Borings were completed as follows:

- Soil borings SB-1 through SB-4 were completed to depths ranging from 11.5 to 33 feet bgs to evaluate the lateral extent of petroleum contamination in soil at the Site.
- Soil borings SB-4 and SB-5 were both completed to a depth of 33-feet bgs to evaluate the vertical extent of petroleum contaminated soil at the Site.
- Monitoring wells MW-1 through MW-3 were installed to evaluate groundwater conditions resulting from potential release from USTs T-1 and T-2.
- Monitoring wells MW-3 through MW-7 were installed to evaluate groundwater conditions resulting from potential releases from UST T-3. The locations of MW-5 and MW-6 were offset 60 feet inland from the LDW due to the presence of concrete debris encountered in boring locations adjacent to the LDW.

A total of 29 soil samples and 7 groundwater samples obtained from the Site were submitted for chemical analysis of total petroleum hydrocarbons, benzene, ethylbenzene, toluene and xylenes (BETX), polycyclic aromatic hydrocarbons (PAHs) and or volatile organic compounds (VOCs). Boring logs for previous explorations are included in Appendix E. Chemical analytical results for soil and groundwater samples collected by Dames & Moore during this investigation are summarized in Tables 4 through 11 and on Figures 4 through 11. Study results are summarized below. The chemical analytical results are judged to be of adequate quality for their intended use at the time of sampling.

3.2.1. Soil Sample Chemical Analytical Results

Total petroleum hydrocarbons (TPH) were detected in each of the soil samples submitted for chemical analysis. The detected concentrations ranged from 12 to 3,600 milligrams per kilogram (mg/kg). The highest detected concentrations of TPH in soil were in borings SG-1 (2,800 mg/kg at 3.5 feet bgs) and SB-5 (3,600 mg/kg at 18 feet bgs). An evaluation of the laboratory chromatograms by Dames & Moore indicated that the petroleum concentrations detected in the soil samples were primarily oil with a relatively small component of diesel in the samples analyzed.

Concentrations of benzene, toluene and/or xylenes were detected in soil samples obtained from borings MW-2, MW-3, SG-1 and SB-5. The highest benzene (0.097 mg/kg), toluene (0.013 mg/kg), and xylenes (0.018 mg/kg) concentrations were detected in boring SB-3 at a depth of approximately 3.5 feet bgs.

PAHs and VOCs were analyzed in two locations (SB-4 and SB-5). Concentrations of fluoranthene (0.056 mg/kg), phenathrene (0.067 mg/kg), pyrene (0.07 mg/kg), acetone (0.094 mg/kg), and methylene chloride (0.054 mg/kg) were detected in soil boring SB-5 at a depth of 13 feet bgs.

Concentrations of acetone (0.22 mg/kg) and methylene chloride (0.11 mg/kg) were detected in soil boring SB-4 at a depth of 8 feet bgs. PAHs were not detected in samples collected from soil boring SB-4.

3.2.2. Groundwater Sample Chemical Analytical Results

Concentrations of TPH were detected at concentrations ranging from 0.27 to 0.59 milligrams per liter (mg/L) in groundwater samples obtained from monitoring wells MW-1 through MW-4. BETX was detected only in groundwater samples obtained from monitoring wells MW-3 and MW-4. The highest benzene concentration (4.2 mg/L) was detected near the center of the Site in monitoring well MW-4.

3.3. Site Assessment for USTs (Dames & Moore, 1991b)

On January 24, 1991, Dames & Moore observed the closure and decommissioning of a 10,000-gallon gasoline UST (T-1) and a 10,000-gallon diesel UST (T-2) at the Site. An excavation measuring approximately 35 feet long by 20 feet wide by 18 feet deep was completed to remove tanks T-1 and T-2. The upper three feet of excavated soil consisted of fine to medium sand underlain by approximately 2 feet silty sand and clay. Fine sand was observed beneath the layer of silty sand and clay to the base of the excavation. Excavated soil was reported to be stained and emitting petroleum odors.

A single sample (SS-1) was obtained from the base of the excavation and submitted for chemical analysis of total petroleum hydrocarbon analysis using EPA Method 8015-Modified. Total petroleum hydrocarbons were detected at a concentration of 95 mg/kg. Based on the analytical results, excavated soil was used to backfill the excavation. No petroleum-contaminated soil was removed from the site as part of the tank removal project. No additional sampling was completed because of the previous soil and groundwater investigation completed at the Site (results summarized in Section 3.2).

3.4. Quarterly Groundwater Monitoring (Dames & Moore, 1992)

Dames & Moore completed four quarters of groundwater monitoring at the Site between February 1991 and August 1992. Groundwater samples were obtained over a 1-year period between September 1991 through August 1992 from seven monitoring wells previously installed at the Site (Dames & Moore, 1991a) for chemical analysis of gasoline- and diesel-range petroleum hydrocarbons and BETX. Monitoring wells MW-1 through MW-4 and well MW-7 were sampled during four quarterly sampling events, while downgradient monitoring wells MW-5 and MW-6 were only sampled during the final three quarterly events. In addition, permeability tests were completed to estimate groundwater flow directions and velocities, to evaluate confining conditions and to estimate transport rates for petroleum-related contaminants in groundwater. Chemical analytical results for the quarterly groundwater monitoring are summarized in Tables 8 through 11 and discussed below. The chemical analytical results are judged to be of adequate quality for their intended use at the time of sampling.

3.4.1. Groundwater Monitoring Chemical Analytical Results

Petroleum hydrocarbons were detected in groundwater samples obtained from monitoring wells MW-2 through MW-7. Gasoline-range hydrocarbons were detected at concentrations ranging from

140 to 310 micrograms per liter (µg/L) in monitoring wells MW-2 through MW-4. Diesel-range hydrocarbons were detected at concentrations ranging from 280 to 6,600 µg/L in monitoring wells MW-2, MW-3, MW-5 through MW-7. Benzene was detected in monitoring wells MW-2 through MW-4 and MW-7 at concentrations ranging from 1.1 to 4,200 µg/L. Low concentrations of ethylbenzene (1.1 to 16 µg/L), toluene (3 to 12 µg/L), and xylenes (5.3 to 64 µg/L) were detected in monitoring wells MW-3, MW-4 and MW-7. Total petroleum hydrocarbons were not detected in groundwater samples obtained from the Site on January 10 and/or April 9, 1992 in monitoring wells MW-1 through MW-7. However the laboratory quantitation limits (reporting limit) for total petroleum hydrocarbons for these samples are greater than the preliminary groundwater screening levels presented in Table 2.

Groundwater sampling results indicated that the detected concentrations of gasoline and diesel generally decreased over time. Groundwater sampling results indicated that the detected concentrations of toluene, ethylbenzene and xylenes either showed a downward trend over time or remained unchanged. The detected concentrations of benzene in monitoring wells MW-2 and MW-7 remain relatively unchanged over time; however, the detected concentrations of benzene in monitoring wells MW-3 and MW-4 generally increased over time. Dames & Moore concluded that the detected concentrations of benzene in groundwater are due in part to tidal fluctuation and its relatively high solubility in comparison to the other gasoline-related constituents.

3.4.2. Tidal and Hydraulic Gradient Study Results

A tidal study was conducted by Dames & Moore in August 1992 to evaluate tidal influences on groundwater at the Site. During the tidal study, water level measurements for the LDW fluctuated 11.5 feet. Fluctuations in groundwater levels were observed in each of the Site monitoring wells, ranging from 0.7 feet in MW-7 to 0.64 feet in MW-5. Based on the results of the tidal study, groundwater level fluctuations displayed a sinusoidal curve with two peaks that corresponded to the two daily tidal cycles in the LDW, with an apparent lag time of approximately 1 hour. Monitoring wells MW-5 and MW-6 showed the greatest change in groundwater levels, while MW-7 showed the lowest change during the study. Groundwater northeast of MW-7 generally flows toward the LDW while groundwater southwest of MW-7 generally flows toward Trotsky Inlet. Dames & Moore concluded that the net flow of groundwater is toward the LDW.

Dames & Moore determined that the average hydraulic conductivity for the Site is 0.46 feet per day. Assuming an average porosity of 0.35 for fine sand, the contaminant transport rate for Site was estimated at 0.02 to 0.06 feet per day (7 to 22 feet per year). Using these rates, it was estimated that contaminants in groundwater could reach the LDW within 10 years. However, as noted by Dames & Moore, this contaminant transport rate did not take into account the effects of retardation (diffusion, dispersion, and adsorption) and/or natural attenuation factors.

3.5. Summary of Additional Site Characterization Activities (SAIC, 2009)

Under contract to Ecology, Science Applications International Corporation (SAIC) completed an additional sediment investigation on May 4 and 8, 2007. SAIC also completed a soil and groundwater investigation at the Site between June 18 and July 17, 2008. The SAIC investigations included the drilling and installation of five monitoring wells (MW-8 through MW-12) to depths ranging from 21.5 feet to 36.5 feet bgs. A seep sample (SP-1) was collected near the head of the

Trotsky Inlet along the south property line of the Site. Sediment samples (SED-1 through SED-5) were collected within the Trotsky Inlet.

A total of 6 soil samples obtained from borings MW-8 through MW-12, 10 groundwater samples obtained from MW-1 through MW-5 and MW-8 through MW-12, one seep sample (SP-1) and five sediment samples (SED-1 through SED-5) obtained from the Site were submitted for chemical analysis of metals (arsenic, cadmium, chromium, copper, lead, mercury, silver and zinc), polychlorinated biphenyls (PCBs), pesticides, semi-volatile organic compounds (SVOCs), petroleum hydrocarbons and/or volatile organic compounds (VOCs). Chemical analytical results for samples collected by SAIC are summarized in Tables 4 through 14 and are discussed below. Sampling locations for the SAIC investigation are shown relative to the Site on Figures 4 through 14.

3.5.1. Soil Sample Chemical Analytical Results

Metals were detected in each of the SAIC soil samples submitted for chemical analysis. Table 4 presents the results of analysis of soil samples for metals. Several metals were detected in soil at concentrations above respective screening levels, including arsenic, cadmium, copper, lead, mercury, silver, and zinc. Chromium (total) and nickel were not detected above respective screening levels. The soil sample collected from 30 feet bgs at boring MW-08 had the highest detections of metals (with the exception of mercury) at the Site and the largest number of metals exceeding screening levels (arsenic, cadmium, copper, lead, mercury, silver, and zinc). Analytical results for soil samples collected from borings MW-09, MW-10, and MW-12 exceeded screening levels for individual metals. The soil sample collected from a depth of 15 feet bgs at boring MW-11 did not exceed any screening levels for metals. The soil sample locations and associated metals results showing exceedances of screening levels for metals are presented on Figure 4.

PCBs were detected in soil samples from six samples collected from five soil borings at the Site. Individual PCB congeners were detected at concentrations ranging from 0.059 mg/kg to 15 mg/kg. The highest detected concentrations of PCBs were in boring MW-10 at a depth of 20 feet bgs; PCB Aroclor 1254 was detected at an estimated concentration of 15 mg/kg and PCB Aroclor 1260 was detected at an estimated concentration of 12 mg/kg. The highest concentration of an individual PCB congener detected in the remaining five soil samples was an estimated 0.8 mg/kg at 25 feet bgs in boring MW-12. Calculated total detected PCB concentrations ranged from 0.18 mg/kg in a sample collected from 30 feet bgs at boring MW-8 to 27 mg/kg in the 20-feet bgs sample from boring MW-10 described above. Due to the low screening levels for PCBs in soil, detected concentrations of individual PCBs, and the calculated total PCB concentrations, exceed all respective preliminary screening levels. PCB results are presented in Table 5 and on Figure 5.

Petroleum hydrocarbons were detected in each of the SAIC soil samples submitted for chemical analysis. Gasoline-range hydrocarbons were detected in soil samples obtained from borings MW-8 and MW-12 at concentrations ranging from 7.7 to 100 mg/kg. Diesel-range and heavy oil-range hydrocarbons were detected in soil samples obtained from borings MW-8, MW-9, MW-10 and MW-12. Diesel-range hydrocarbons were detected at concentrations ranging from 72 to 670 mg/kg. Heavy oil-range hydrocarbons were detected at concentrations ranging from 100 to 970 mg/kg. Diesel-range hydrocarbons only exceeded the preliminary screening level of 200 mg/kg at boring MW-08 (30 feet bgs) and at boring MW-12 (15 feet bgs). Gasoline-range hydrocarbons exceeded the preliminary screening level of 100 mg/kg at MW-12 (15 feet bgs). No exceedances of heavy-oil range hydrocarbons were observed. Petroleum hydrocarbon results are presented in Table 5 and on Figure 5.

Analysis of soil samples for pesticides resulted in detections of DDT, DDD, and DDE isomers at concentrations exceeding screening levels in all of the samples collected from the five borings installed by SAIC. Other pesticides analyzed (dieldrin and heptachlor) were not detected. Pesticide results are presented in Table 5 and on Figure 5.

SVOCs and cPAHs were detected in all of the soil samples collected by SAIC. The most detectable and highest concentrations of SVOCs were generally observed at boring MW-12 (15 feet bgs), with several SVOC concentrations exceeding respective screening levels. With the exception of the soil sample collected at 15 feet bgs at boring MW-11, SVOCs were detected at concentrations above respective screening levels. In addition, the calculated total cPAH TEQ exceeded the screening level in all soil samples. Results for SVOC and cPAH compounds are presented in Table 6 and on Figure 6.

BTEX compounds commonly associated with petroleum hydrocarbons (benzene, toluene, ethylbenzene, and xylenes) were also detected in several soil samples collected at the borings installed by SAIC. Individual BTEX compounds were detected above respective screening levels at three of the five borings installed by SAIC (MW-08, MW-10, and MW-12). The sample collected from 15 feet bgs at boring MW-12 had the highest concentration of BTEX compounds, with concentrations of benzene (71 mg/kg), ethylbenzene (85 mg/kg), and xylenes (320 mg/kg) exceeding respective screening levels. Several other VOCs were also detected in soil samples collected by SAIC. These additional compounds are generally detected at concentrations below their respective screening levels, with the exception of the soil samples collected from boring MW-12, which had exceedances of screening levels for 1,3,5-trimethylbenzene, 2-butanone, methylene chloride, naphthalene, tetrachloroethene, as well as the BTEX compounds described above. Results for VOCs are presented along with other VOCs in Table 7 and on Figure 7.

3.5.2. Groundwater Sample Chemical Analytical Results

Low level concentrations of total metals were detected in each of the groundwater samples submitted for chemical analysis. Lead and arsenic were detected in Site groundwater above respective screening levels. Lead exceeded its screening level in samples collected from wells MW-5, MW-8, and MW-9, and arsenic was detected above its screening level at well MW-9. Groundwater results for the metals analyses are presented in Table 8 and on Figure 8.

Concentrations of individual PCB arochlors were detected in monitoring well MW-9, MW-10 and MW-12 ranging from 0.034 to 0.11 μg/L. The PCB detections were limited to a single arochlor in each groundwater sample. All of the detections of PCBs in groundwater exceed the respective screening level for the individual congener, as well as the total PCB screening level. Groundwater results for the PCB analyses are presented in Table 9 and on Figure 9.

During the 2008 sampling performed by SAIC, groundwater from wells MW-1, MW-3 through MW-5, and MW-8 through MW-12 were analyzed for petroleum hydrocarbons using the NWTPH-HCID method to identify the presence of detectable concentrations of gasoline, diesel, and residual-range petroleum hydrocarbons in groundwater. The HCID results for groundwater collected from wells MW-1, MW-3, and MW-8 through MW-11 indicated no detectable concentrations of the three hydrocarbon ranges. The HCID analysis indicated detectable concentrations of gasoline-range hydrocarbons in groundwater collected from wells MW-4 and MW-12 and diesel range hydrocarbons at wells MW-4, MW-5, and MW-12. Based on the HDIC results, groundwater from wells MW-4 and MW-12 were further analyzed to quantify gasoline-range hydrocarbon concentrations, resulting in a detectable concentration of 350 µg/L at MW-4, but no detectable gasoline-range hydrocarbons at MW-12. Groundwater from wells MW-4, MW-5, and MW-12 was further analyzed for diesel-range petroleum hydrocarbons, resulting in detectable concentrations ranging from 680 µg/L to 750 µg/L, exceeding screening levels at all three locations. Groundwater results for the petroleum hydrocarbon analyses are presented in Table 9 and on Figure 9.

Groundwater analysis for pesticides resulted in detectable concentrations of dieldrin, heptachlor, and DDT at several wells at the Site (MW-03, MW-05, MW-10, and MW-12). The dieldrin (MW-03 and MW-05) and heptachlor (MW-10) detections exceed respective screening levels. Groundwater results for the pesticides analyses are presented in Table 9 and on Figure 9.

Groundwater was also analyzed for VOCs during the 2008 sampling performed by SAIC. BTEX compounds were not detected at wells MW-1, MW-5, MW-8, and MW-11, and were detected at wells MW-3, MW-4, MW-9, MW-10, and MW-12. Benzene and ethylbenzene exceeded respective groundwater screening levels in groundwater samples collected from wells MW-3, MW-4, MW-10, and MW-12. Detections of VOCs other than BTEX compounds were limited during the 2008 groundwater sampling. Detections of 1,2-dichloroethane, 1,3,5-trimethylbenzene, acetone, chloroform, naphthalene, and n-butylbenzene were observed, with only 1,2-dichloroethene (2.9 µg/L at MW-4) and chloroform (3.6 µg/L at MW-11) exceeding respective screening levels. Groundwater results for VOCs are presented in Table 11 and on Figure 11.

3.5.3. Seep Sample Chemical Analytical Results

Low level concentrations of chromium (0.7 µg/L), copper (1.6 µg/L), lead (0.75 µg/L) and zinc (4.1 µg/L) were detected in the seep samples obtained from the north bank of the Trotsky Inlet (SP-1). The lead detection in water sampled from SP-1 exceeded the screening level. The water sample collected from seep SP-1 was also analyzed for petroleum hydrocarbons (HCID), PCBs and pesticides, with no detections. Seep SP-1 water was also analyzed for SVOCs, cPAHs, VOCs, resulting in detections of acenaphthlene (0.38 µg/L) and chloroform (1.7 µg/L),at concentrations below respective screening levels. Other contaminants were not detected in seep sample SP-1.

A seep located on the south side of the Trotsky Inlet (SEEP-1) was sampled in 2007 by SAIC. Seep water collected from this location was analyzed for metals, PCBs, pesticides, SVOCs, and cPAHs resulting in several detections as well as exceedances of screening levels. The metals arsenic, copper, lead, and mercury were detected at concentrations above screening levels and chromium and cadmium were detected below screening levels. PCB arochlor 1260 and pesticides DDD, DDT, and DDE were detected in water collected from SEEP-1 at concentrations exceeding the respective screening levels. Several SVOCs were detected in the SEEP-1 water sample, but below respective screening levels. Seep samples are presented along with groundwater samples in Tables 8 through 11 and on Figures 8 through 11.

3.5.4. Sediment Sample Chemical Analytical Results

Concentrations of metals, PCBs, pesticides, SVOCs and petroleum hydrocarbons were detected in each of the sediment samples submitted for chemical analysis by SAIC. Sediment results are presented in Tables 12 through 14 and on Figures 12 through 17.

Concentrations of cadmium, chromium, copper, lead, mercury and silver were detected in samples SED-1 and SED-2 at concentrations exceeding preliminary screening levels. Cadmium was detected in sediment samples SED-1 through SED-5 at concentrations ranging from 0.15 to 36.3 mg/kg; chromium (total) was detected at concentrations ranging from 15.1 to 1,680 mg/kg; copper was detected at concentrations ranging from 19.6 to 1,090 mg/kg; lead was detected at concentrations ranging from 39.5 to 10,400 mg/kg; mercury was detected at concentrations ranging from 0.2 to 247 mg/kg; silver was detected at concentrations ranging from 0.13 to 19 mg/kg; and zinc was detected at concentrations ranging from 43.5 to 4,580 mg/kg. Detected concentrations of metals are summarized in Table 12.

Concentrations of total detected PCBs in sediment samples SED-1 through SED-5 ranged from 0.231 to 2.93 mg/kg dry weight. The resulting total PCBs exceed the sediment screening level in all of the samples. Detected concentrations of PCBs are summarized in Table 13.

Concentrations of pesticides, including DDD, DDE and DDT isomers, were detected at concentrations greater than the respective preliminary screening level. Detected DDD isomers ranged from 0.15 to 0.11 mg/kg in sediment samples SED-1 though SED-5. Detected DDE isomers ranged from 0.0036 to 0.21 mg/kg and detected DDT isomers ranged from 0.0058 to 0.15 mg/kg in sediment samples SED-1 though SED-5. Detected concentrations of pesticides are summarized in Table 13.

Concentrations of SVOCs, including 1,2,4-trichlorobenzene, 1,2-dichlorobenzene, 2-methylnaphthalene, benzo(ghi)perylene, bis(2-ethylhexyl) phthalate, butyl benzyl phthalate, dimethyl phthalate, fluoranthene, naphthalene, pentachlorophenol, phenol, pyrene, benz[a]anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, LPAH, HPAH and/or total cPAH TEQ were detected in sediment samples SED-1, SED-2, SED-4 and SED-5. Detected concentrations of SVOCs are summarized in Table 14.

In general, samples SED-1 and SED-2 obtained from the western end of the Trotsky Inlet showed the highest detected concentrations of contaminants.

3.6. Chemicals of Concern in LDW Sediments (Windward, 2010 and Ecology EIM Database)

Several recent environmental studies have been completed as part of the LWD remedial investigation and are summarized in the Lower Duwamish Waterway Remedial Investigation Report (Winward, 2010). As part of this study and previous studies, extensive sediment sampling has been completed in the near vicinity of the Site both within the river channel and the Troksy Inlet. Sediment sample locations are shown relative to the Site on Figures 12 through 17. Surface sediment (upper 10 cm) sample results are presented on Figures 12 through 14 and subsurface sediment (deeper than 10 cm) sample results are presented on Figures 15 through 17. Sediment sample results are summarized in Tables 12 through 14 and discussed below.

3.6.1. Sediment Sample Chemical Analytical Results

In the vicinity of the Site, lead, mercury and zinc have been detected in sediment samples at concentrations exceeding preliminary screening levels (Table 3) at surface sample locations DR-139 and DR157, LDW-SS84 and LDW9086B. In sample LDW-SS84, lead and zinc have been detected at concentrations of 615 and 417 mg/kg, respectively. At sample locations DR-139 and DR157, LDW-SS84 and LDW9086B, mercury has been detected at concentrations of 0.82, 1.6, 2.46 and 0.46 mg/kg, respectively. In addition, other metals including aluminum, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, selenium, silver, tin, vanadium and zinc have been detected in sediment at concentrations less preliminary sediment screening levels. Detected concentrations of metals are summarized in Table 12.

Concentrations of total PCBs have been detected in sediment samples at concentrations exceeding preliminary screening levels at surface sample locations B5A1341, B6A1933, LDW-1335, LDW-2393, LDW9086B, LDW-SS82, LDW-SS84, LDW-SSB6, SPI-128 and TRI-157T at concentrations ranging between 0.153 and 23.1 mg.kg dry weight. At subsurface sediment core sample locations LDW-1335 and LDW9086B, PCBs have been detected at concentrations ranging from 0.15 to 3.44 mg/kg dry weight, which also exceed the preliminary screening levels. At other sediment sample locations, concentrations of PCBs either were not detected or were detected at concentrations less than preliminary screening levels. Detected concentrations of PCBs are summarized in Table 13.

Concentrations of pesticides including DDD, DDE and DDT isomers have also been detected at surface sample locations DR10, B5A1341, B5A-2365 at concentrations exceeding preliminary screening levels. Concentrations of DDD and DDE at these sample locations exceeding preliminary screening levels ranged from 0.013 to 0.034 mg/kg and 0.031 to 0.14 mg/kg, respectively. At sample location B5A1341, DDT was detected at 0.065 mg/kg. In addition, at location DR139, dieldrin was detected at a concentration of 0.017 mg/kg, which also exceeded the preliminary screening level. At other sediment sample locations, concentrations of pesticides either were not detected or were detected at concentrations less than preliminary screening levels. Detected concentrations of pesticides are summarized in Table 13.

SVOCs including 1,1'-biphenyl, 2,4-dimethylphenol, benzyl alcohol, anthracene, bis(2-ethylhexyl), benz[a]anthracene, benzo(ghi)perylene, butyl benzyl phthalate, chrysene, indeno(1,2,3-cd)pyrene, phenanthrene, phthalate, pyrene, fluorene, hexachlorobenzene, HPAH and total cPAHs TEQ have been detected in sediment samples at concentrations exceeding preliminary screening levels at surface sediment sample locations DR10, DR157, DR139, DR136, TRI-157T, SPI-128, LDW-SS84, LDW-8574 and/or B6A1933. In addition, acenaphthene has been detected at one subsurface sediment core location (LDW9086B) at a concentration exceeding preliminary screening levels. At other sediment sample locations, concentrations of SVOCs either were not detected or were detected at concentrations less than preliminary screening levels. Detected concentrations of SVOCs are summarized in Table 14.

At one surface sediment sample location (LDW-SS84), the concentration of dioxins relative to 2,3,7,8-TCDD exceeded the preliminary screening levels. At other sediment sample locations, concentrations of dioxins/furans either were not detected or were detected at concentrations less than preliminary screening levels. Detected concentrations of dioxins are summarized in Table 13.

3.7. Previous Data Interpretation and Technical Quality

Historic Site investigations were completed by Dames & Moore in the early 1990s. As part of these investigations, a soil vapor, soil and groundwater studies were completed. During the soil vapor study, soil samples were collected; however, these samples were not submitted to a testing laboratory for chemical analysis. Additionally, soil vapor samples (gas samples) were not obtained for laboratory testing. As a result, specific contaminant compounds cannot be quantified and measured soil vapor concentrations cannot be directly correlated to contaminant concentrations observed in soil.

Sampling techniques for volatiles analysis have changed since the time that these samples were analyzed. Newer techniques (i.e., Ecology's 5035A sampling method) have been introduced to provide more accurate results by reducing sample volatilization prior to analysis. Additionally, it is no longer the common practice to analyze for total petroleum hydrocarbons. Sample results from the 1990s do not distinguish between gasoline-range, diesel-range and heavy oil-range petroleum hydrocarbons. However, more recent soil, groundwater and sediment studies (completed by SAIC and others as discussed above) have been conducted at the Site utilizing newer sampling techniques and testing methods. Results of the recent studies, including detected contaminants and contaminant concentrations are similar to earlier studies completed by Dames & Moore. Because earlier studies were completed to evaluate Site conditions and not to confirm removal of Site contaminants, the results are considered acceptable for their intended use (evidence of known historic releases). Investigations proposed by this Work Plan are intended to fill data gaps from previous studies and better delineate the vertical and lateral extent of contaminants exceeding preliminary screening levels established for the Site (further discussed in Section 5.2).

4.0 PRELIMINARY CONCEPTUAL SITE MODEL, EXPOSURE PATHWAYS AND RECEPTORS

A preliminary conceptual site model (PCSM) has been developed based on the physical conditions at the Site, potential sources of contamination to Site media, the findings from previous investigations, and evaluation of the potential contaminant transport and exposure pathways. The PCSM is a tool prepared to assist in identifying data gaps, developing an investigation approach to fill the data gaps, and evaluating and identifying potential remedial actions for the Site. The PCSM is presented in Figure 15 and is discussed below.

Fill is present from the surface to a depth of approximately 26 feet bgs. In deeper borings completed at the Site (MW-8 and MW-12), a layer of silt to silty sand (interpolated to be native alluvial and estuary soil) was observed below 26 feet bgs. The depth of the contact between the lowest fill unit (locally derived hydraulic fill) and native soil is indistinct. The source(s) of the uppermost fill materials that were imported to the Site are unknown.

Depth to groundwater is approximately 7.5 to 12 feet bgs. Groundwater flow northeast of MW-7 is generally toward the LDW while groundwater flow southwest of MW-7 is generally toward the Trotsky Inlet. Groundwater levels and flow direction vary with changes in the river level as a result of tidal fluctuations and river flow. Periods of flow reversal during high tides result in the potential to transport LDW surface water and sediment contaminants to near-shore soil and groundwater at the Site.

The LDW sediments that were covered with fill to construct the Site may have been contaminated prior to filling by historic activities on adjacent properties or upriver of the Site. Fill materials imported to the Site in the past could potentially contain contaminants.

4.1. Contaminant Sources and Migration Pathways

Potential contaminant sources and migration pathways for the Site include the following:

- **Direct discharges -** The direct discharge of pollutants to the waterway from commercial, industrial, private, or municipal outfalls may impact surface water and sediment quality, depending on the origin and character of the effluent.
- **Spills, dumping, leaks, and inappropriate housekeeping and management practices -** Spills, dumping and leaks may result in contaminant releases to soil, groundwater, and/or stormwater.
- **Stormwater -** Stormwater pollution is generated when rain contacts pollutants that have accumulated in or on exposed soils and surfaces, or comes from illegal discharges or illicit connections to storm sewers and may enter the LDW waterway via storm drains and pipes, ditches, creeks, or directly from properties adjacent to the waterway. Contaminated solids that collect in storm drains/pipes, ditches or creeks may also be carried to the waterway by stormwater.
- **Groundwater -** Contaminated groundwater may enter directly into the LDW via seeps or it may infiltrate into storm drains/pipes, ditches or creeks that discharge to the waterway.
- **Erosion/Leaching -** Waterway bank soil, contaminated fill, waste piles, and surface impoundments may release contaminants directly to the LDW through erosion, via soil erosion to stormwater, or by leaching to groundwater and subsequent transport to the LDW.
- **Waterway operations and traffic –** Contaminants from riverside docks, wharves and piers, and discharges from vessels (gray, bilge, ballast or other waters), fuel releases and spills may impact surface water and sediments.
- **Air pollution -** Air pollution resulting from loading/unloading of raw materials such as sand, gravel and concrete and/or vehicle emissions can enter the waterway directly or through stormwater.
- **Transport of contaminated sediments -** Transportation of existing contaminated sediments from upstream or downstream of the Site may occur due to significant tidal or flood events, marine traffic, sediment dredging, or other waterway activities.
- **Transport of surface water –** The flow of surface water from the LDW to the Site during high tide periods of groundwater flow reversal may transport surface water or sediment contaminants from the LDW to Site soil and groundwater.

Releases of contaminants may have entered the fill and groundwater at the Site. Past activities at the Site that may have resulted in releases to soil include underground storage of fuel and spills resulting from the school bus maintenance facilities or from equipment used to transfer shipping containers. Contaminants in fill or released to soil may have migrated to groundwater. Groundwater at the Site ultimately discharges to surface water in the LDW and Trotsky Inlet.

Previous investigation activities at the Site have indicated that hydrocarbon-related compounds related to former underground storage areas are present in soil and groundwater at the Site, including gasoline and diesel-range hydrocarbons and BTEX compounds. Other contaminants not associated with known Site activities have also been detected during previous investigation activities, including metals, PCBs, pesticides, and SVOCs. The presence of these contaminants in Site soil and/or groundwater is potentially associated with pre-development contamination of river sediments from upriver sources, contaminants present in imported fill used to construct the Site, or migration to the Site from off-site pathways.

4.2. Potential Receptors

Potential receptors based on current and future Site use and transport pathways include the following:

- Workers at the Site,
- Aquatic and benthic organisms in the LDW or Trotsky Inlet,
- Terrestrial wildlife, and/or
- Humans and wildlife using the LDW or Trotsky Inlet.

A Terrestrial Ecological Evaluation (TEE) will be performed during the RI that will further evaluate the potential for exposure to terrestrial ecological receptors from Site contaminants.

5.0 DATA GAPS

Considerable information exists regarding environmental contaminant conditions at and near the Site. The following section provides identification and evaluation of data gaps and identification of contaminants of potential concern (COPCs) for the Site.

5.1. Data Gap Assessment

The following is a summary of data gaps identified previously by Ecology and Early Action Area 2 investigation activities.

Waste Oil Tank – The Dames & Moore March 6, 1991 Soil and Groundwater Assessment Report references that a buried waste oil tank associated with the former warehouse/garage may still exist on Site. The potential presence of this tank represents a data gap because removal of this tank has not yet been verified.

Groundwater Discharge – Petroleum hydrocarbons and BTEX have been previously identified in soil and groundwater at the Site in the vicinity of three former USTs located in the southern portion of the Site. In addition, PCBs have been detected in groundwater and soil in the southern portion of the Site adjacent to the Trotsky Property (Figures 4 and 5). Recent groundwater samples have not been collected from the Site and some monitoring wells installed by Dames & Moore 20 years ago have become damaged. Replacement of damaged monitoring wells, installation of new monitoring wells adjacent to the LDW, and performing additional sampling of all well locations is necessary to document current Site groundwater conditions associated with releases from the former USTs in the central portion of the Site and PCBs in the southern portion of the Site.

Groundwater Gradients and Flow Conditions – Dames & Moore conducted a tidal and hydraulic conductivity study in the central portion of the Site. However, groundwater gradients and flow conditions have not been fully evaluated for the Trotsky Inlet and surrounding area. Additional information is necessary to more fully evaluate hydraulic conductivity and groundwater gradients, including potential influences as a result of tidal fluctuations and river flow. In conjunction with the groundwater sampling described above, a tidal study is recommended to generate groundwater gradient data that would be used to evaluate potential groundwater transport mechanisms, directions and velocities.

Additional Characterization of Contaminants of Potential Concern (COPCs) in Soil and Groundwater – Additional characterization of the nature and extent of the known Site COPCs is needed to evaluate the need for cleanup action at the Site and to allow development of cleanup action alternatives in the Feasibility Study. Additional soil and groundwater sampling and analysis are necessary to further evaluate the extent and potential sources of Site COPCs.

Stormwater Discharge – The majority of the stormwater conveyance network at the Site has been recently inspected and documented in support of stormwater discharge permitting. The catch basins that collect stormwater that will discharge to the LDW are equipped with filter socks to screen particulate material from discharging stormwater. In addition, collected stormwater is treated by filtration prior to discharge to the LDW. The Stormwater Pollution Prevention Plan (SWPPP) for the facility is included in Appendix F. Several catch basins in the southwest portion of the Site are assumed to be connected to the City of Seattle drainage system, rather than draining to the LDW. A survey of the stormwater system is recommended to document the entire stormwater collection system at the Site and to confirm that the catch basins in the southwest portion of the site do not discharge to the LDW. In addition, stormwater sampling is necessary to evaluate whether contaminants in soil and groundwater are being transferred from Site soils and groundwater into the stormwater system.

Catch Basin Solids – Catch basin solids samples have not been collected and analyzed as part of previous environmental investigations of the Site. Catch basin solids sampling is necessary to evaluate whether contaminants in soil and groundwater are being transferred from Site soils and groundwater into the stormwater system and determine the potential for materials deposited on Site surfaces to enter surface water through the stormwater collection network. Solids that may accumulate in Site catch basins are presently removed twice a year in accordance with the SWPPP.

Surface Runoff – Additional information is needed to determine whether surface contaminants resulting from spills could migrate to the LDW via surface runoff. A Site inspection is necessary to evaluate whether there is a potential for direct surface runoff to enter the LDW or Trotsky Inlet.

Bank Erosion – Fill is known to be present from the surface to depths of approximately 26 feet bgs at the Site. The sources of the fill material are not known. Previous soil and groundwater sampling have provided initial characterization of fill material in the vicinity of the identified USTs. However, no samples of the fill soil have been obtained along the bank of the LDW or Trotsky inlet. Additional sampling of fill material along unarmored shoreline areas is necessary to further characterize the potential for sediment contamination resulting from erosion of upland soil. Areas of unarmored bank soil are generally located along the Trotsky Inlet. Shallow sediment and bank soil within the Trotsky Inlet is expected to be sampled under the scope of remedial investigation activities to be performed under the terms of an existing Agreed Order for the Trotsky Property to the south (DOF, 2010).

Additional Characterization of Sediment – The Trotsky Inlet has been identified as a high priority site for sediment cleanup. Ecology, as the lead agency for source control, is responsible for identifying and reducing ongoing releases of contaminants to prevent recontamination of sediments following cleanup actions. Sampling of surface and subsurface sediment within the Trotsky Inlet is planned to be completed as part of the Remedial Investigation for the Industrial Container Services Site (DOF, 2010), and is expected to address any data gaps associated with Trotsky Inlet sediment. Sufficient sampling and testing of LDW sediments have been completed in earlier studies; no additional LDW sediment sampling is considered necessary.

5.2. Screening Levels for Soil, Groundwater, and Sediment

Site-specific cleanup levels will be developed during the RI and finalized as part of the FS. It is anticipated that cleanup levels developed during the FS will differ from the proposed screening levels based on the results of the RI. For the purposes of screening existing Site data and to identify analytical methods and associated detection limits to be used for the RI sampling and analysis program, a preliminary evaluation of screening levels was performed based on the preliminary conceptual model described in Section 4.0. The evaluation of screening levels included consideration of potentially applicable cleanup levels based on Site use, contaminant transport pathways and potential receptors. Ecology has developed a screening level tool for the LDW study area that includes potential cleanup levels, ARARs, and other potentially applicable screening levels in a spreadsheet that generates screening levels for applicable conditions. The screening levels generated are based on the most stringent levels applicable to the site conditions (i.e., potable or non-potable groundwater, surface water, etc.). This tool was used to generate Site screening levels for soil, sediment, and groundwater, which were used to compare historic Site data and determine COPCs, as well as to assess analytical methods and associated detection limits for soil and groundwater to be used as part of the RI.

5.2.1. Soil

The Site and adjacent properties are zoned for industrial use and are characterized by manufacturing, shipping, warehouses, water transportation and other industrial activities. Access to the property is limited to industrial workers and is not allowed for the general public. The anticipated future use of the site will continue to be auxiliary storage, barge mooring, barge loading and unloading, and equipment maintenance.

Groundwater at the Site is not currently being used and is not expected to be a potential future source of potable water (see discussion in the following section). However, the determination of non-potability is expected to be completed during the RI. Therefore, currently groundwater is considered potable in the context of determining screening levels. Groundwater from the Site discharges to surface water within the LDW. Surface water in the LDW is comprised of marine, brackish and fresh water. Soil screening levels protective of groundwater and surface water were considered.

Based on the current and future use of the Site, site transport pathways, and potential receptors, the following were considered potentially applicable soil screening levels for identification of analytical methods and detection limits:

- Lowest most stringent applicable soil screening level based on Ecology's LDW Draft Preliminary Screening Levels and ARAR Table - V. 14, based on the potable groundwater and non-potable surface water scenario;
- For contaminants without screening levels in the Ecology LDW Table, MTCA Method B soil cleanup levels (standard formula values for carcinogens and non-carcinogens) protective of human health for unrestricted land use (WAC 173-340-740[3]), obtained from Ecology's CLARC database;
- Natural Background Levels from Ecology's LDW Screening Level Table; and
- Method reporting limits obtained from analytical laboratories in accordance with WAC 173-340-709, WAC 173-340-705(6), and WAC 173-340-707.

The preliminary soil screening levels are listed in Table 1. In general, the listed screening levels are the most stringent applicable screening level based on the Ecology LDW Table, or an alternative MTCA criteria for contaminants not in the Ecology Table, The following exceptions were considered:

- **Background:** If the lowest regulatory criterion is less than the background concentration, the preliminary soil screening level was set at the background concentration.
- **Method Reporting Limit:** If the lowest regulatory criterion is less than the method reporting limit, the preliminary soil screening level was set at the method reporting limit, unless the method reporting limit is less than the background concentration. In that case, the preliminary soil screening level was set at the background concentration.

5.2.2. Groundwater

Groundwater at the Site or potentially affected by the Site is not currently being used for drinking water and is not a potential future source of potable or drinking water. Drinking water utilized at the Site is supplied by the City of Seattle. Groundwater at the Site is not considered a potential future source of potable or drinking water due to its proximity to the LDW, which is a mixture of marine and fresh water. Extended periods of groundwater extraction at the Site would likely cause the groundwater to have high salinity content, which would make it unsuitable as potable or drinking water. Additionally, the shallow groundwater beneath the property is also likely to be brackish as a result of mixing with adjacent marine surface water. Based on the conditions described above, a formal determination groundwater potability at the Site will be performed during the RI. In the absence of that determination, screening levels for groundwater were selected based on a potable groundwater scenario.

The Ecology LDW screening tool was used to develop screening levels for Site groundwater based on a potable groundwater and non-potable surface water scenario. The Ecology screening tool considers the most stringent potential screening levels and ARARs based on protection of ecological receptors and human health, protection of surface water, and protection of sediment. For contaminants not included in the Ecology LDW screening tool, generally MTCA Method B groundwater cleanup levels were used for screening levels. The following is a description of the steps used to select screening levels for groundwater at the Site:

- Lowest most stringent potable groundwater screening level based on Ecology's Draft Preliminary Screening Levels and ARAR Table - V. 14.
- Lowest most stringent non-potable surface water screening level based on Ecology's Draft Preliminary Screening Levels and ARAR Table - V. 14.
- For contaminants without screening levels in the Ecology LDW Table, MTCA Method B groundwater cleanup levels (standard formula values for carcinogens and non-carcinogens) protective of human health for unrestricted land use (WAC 173-340-740[3]), obtained from Ecology's CLARC database;
- Natural Background Levels from Ecology's LDW Screening Level Table; and
- Method reporting limits in accordance with WAC 173-340-709, WAC 173-340-705(6), and WAC 173-340-707.

The proposed groundwater screening levels are listed in Table 2. The groundwater screening levels were selected as the lower of the potable groundwater and the non-potable surface water screening levels based on the Ecology LDW Table, or an alternative MTCA criteria for contaminants not listed in the Ecology Table, to identify analytical methods and associated detection limits to be used for the investigation of groundwater at the 7100 Site. The following exceptions were considered:

- **Background:** If the lowest regulatory criterion is less than the background concentration, the preliminary groundwater screening level was set at the background concentration.
- **Method Reporting Limit:** If the lowest regulatory criterion is less than the method reporting limit, the preliminary groundwater screening level was set at the method reporting limit, unless the method reporting limit is less than the background concentration. In that case, the preliminary groundwater screening level was set at the background concentration.

5.2.3. Sediment

Sediment adjacent to the Site has been potentially affected by contaminants present in the LDW and potentially as a result of past Site activities and off-site releases. Screening levels used to evaluate Site sediment data are based on the Ecology LDW screening tool, similar to the process described above for soil and groundwater. Based on the current and future use of the Site, site transport pathways, and potential receptors, the following were considered potentially applicable sediment screening levels for identification of analytical methods and detection limits:

- Lowest most stringent applicable sediment screening level based on Ecology's LDW Draft Preliminary Screening Levels and ARAR Table - V. 14;
- For contaminants without screening levels in the Ecology LDW Table, MTCA Method B soil cleanup levels (standard formula values for carcinogens and non-carcinogens) protective of

human health for unrestricted land use (WAC 173-340-740[3]), obtained from Ecology's CLARC database;

- Natural Background Levels from Ecology's LDW Screening Level Table; and
- Method reporting limits obtained from analytical laboratories in accordance with WAC 173-340-709, WAC 173-340-705(6), and WAC 173-340-707.

The preliminary sediment screening levels are listed in Table 3. In general, the listed screening level is the most stringent applicable screening level based on the Ecology LDW Table, or an alternative MTCA criteria for contaminants not in the Ecology Table, to identify analytical methods and associated detection limits to be used for the investigation of sediment at the 7100 Site. The following exceptions were considered:

- **Background:** If the lowest regulatory criterion is less than the background concentration, the preliminary sediment screening level was set at the background concentration.
- **Method Reporting Limit:** If the lowest regulatory criterion is less than the method reporting limit, the preliminary sediment screening level was set at the method reporting limit, unless the method reporting limit is less than the background concentration. In that case, the preliminary sediment screening level was set at the background concentration.

5.3. Reference Levels for Stormwater and Catch Basin Solids

Samples of stormwater and catch basin solids are proposed to be collected and analyzed to evaluate whether the stormwater conveyance system at the Site is a potential transport mechanism for contaminants present in Site soil or groundwater, or deposited on Site surfaces and transported to surface water through stormwater runoff. Reference levels used for screening the results from analysis of catch basin solids will be the same as the sediment screening criteria described above in Section 5.2.3. These screening values will be used to identify the analytical methods and associated detection limits to be used for evaluation of the results of catch basin solids sample analyses to be performed at the 7100 Site.

Reference levels used for screening the results from analysis of stormwater samples will be the same criteria used for screening groundwater results, as groundwater screening levels used are generally based on protection of surface water.

5.4. Site Contaminants of Potential Concern

The COPCs for Site soil, groundwater, and sediment include contaminants previously detected at the Site at concentrations greater than selected screening criteria and contaminants potentially associated with past Site use.

5.4.1. Petroleum-Related Contaminants of Potential Concern

Petroleum hydrocarbon related compounds are known contaminants of concern in soil and groundwater at the Site. Previous investigation activities associated with removal of the gasoline and diesel USTs in the early 1990s, as well as the characterization activities performed by SAIC in 2008, documented concentrations of TPH and BTEX compounds exceeding respective screening levels. Exceedances of TPH and BTEX compounds were observed in the vicinity of the former USTs, as well as in locations at varying distances away from the former UST locations. As expected from a potential gasoline or diesel contamination source, generally BTEX detections and exceedances in soil are co-located with TPH detections, although the frequency of BTEX exceedances is greater due to more stringent screening levels relative to the TPH analyses. However, there are several instances of TPH soil analyses that exceeded screening levels, without respective detections of BTEX compounds.

In addition to petroleum-related impacts observed in the vicinity of the former USTs, there are also several occurrences of TPH detections in areas that would not be expected to be impacted by releases from the former USTs, such as in deep soil underlying cleaner soil in locations distant from the former USTs. These results are likely indicative of contaminated native soil and LDW sediment underlying fill that was placed during development of the property in the 1960s. Reported releases associated with activities at adjacent properties likely resulted in contamination of the LDW sediment on which the fill was placed, and which is likely represented by the deeper soil samples collected at the Site (SAIC, 2008).

Groundwater results for hydrocarbon analyses generally indicate impacts related to the former USTs, with exceedances of respective screening levels generally limited to an area surrounding the UST locations. Exceedances of benzene in groundwater extend further away from the UST locations, but at concentrations only slightly above the screening level and several orders of magnitude below concentrations observed within the vicinity of the USTs. The most recent groundwater samples are nearly 5 years old, and the original groundwater sampling performed by Dames & Moore is 20 years old. In the instances where the same wells were sampled during the two investigation events, significant attenuation of TPH and BTEX compounds was observed.

The petroleum-related results from previous investigations at the Site leave several data gaps to be filled during the RI. Specifically, the following data gaps are planned to be addressed:

- Extent of contaminated soil in the immediate vicinity of former USTs is not fully characterized – Performing additional sampling focused on characterizing the extent of a potential remaining source associated with the former USTs will allow a more complete evaluation of a potential remedial action associated with the former USTs, if required.
- Original soil and groundwater TPH results were based on an outdated analytical method not represented by current screening levels – Additional soil sampling in vicinity of USTs, as well as analyzing deep soil for TPH using modern NWTPH-G and NWTPH-Dx methods will allow better characterization of respective sources of petroleum-related contamination.
- A more complete monitoring well network is needed – Damaged or unidentified wells that were unable to be sampled by SAIC in 2008 need to be replaced or identified, and unrepresented areas of the Site require coverage by monitoring wells.
- Groundwater samples from all wells at the Site have not been analyzed for TPH and BTEX compounds during a single event and original data are not representative of current conditions – Full Site-wide groundwater sampling events will allow characterization of current groundwater conditions, including the extent of TPH and BTEX compounds in groundwater at the Site.

5.4.2. Other Contaminants of Potential Concern

Other COPCs for the Site include the following constituents:

- **Metals –** Multiple metals have previously been detected in Site soil and groundwater and may be associated with past Site use, natural background concentrations in native soil and material used as fill at the Site, as well as adjacent Site activities. Metals, including arsenic, cadmium, copper, lead, mercury, nickel and zinc have been detected in soil and groundwater samples obtained from the site at concentrations exceeding the proposed screening levels. These metals are therefore considered as COCPs.
- **SVOCs including PAHs –** SVOCs including PAHs have previously been detected in Site soil and groundwater and may be associated with material used to fill the Site and past Site activities. Therefore SVOCs are considered as COPCs.
- **VOCs –** VOCs were previously detected in soil and groundwater and may be associated with past Site activities. VOCs have been detected in soil and groundwater at concentrations exceeding the proposed groundwater screening levels. Therefore, VOCs are considered as COPCs.
- **PCBs –** PCBs were detected in soil and groundwater samples obtained in the southern portion of the Site and may be associated with adjacent Site activities and/or activities that pre-date filling of the Site. Although no known source of PCBs has existed at the Site, PCBs exceed proposed screening levels in soil and groundwater at the Site. Therefore, PCBs are considered as COPCs.
- **Pesticides –** Pesticides were previously detected in soil and groundwater and may be associated with past Site or adjacent activities. Several detected concentrations of pesticides in soil and groundwater exceed proposed screening levels. Therefore, pesticides are considered as COPCs.
- **Refrigerants –** Based on historic Site activities involving refrigeration, common refrigerant compounds, primarily chlorofluorocarbons (CFCs) were considered during review of previous Site data. However, CFCs (dichlorodifluoromethane, CFC-12) have not been detected above soil or groundwater screening levels in samples collected at the Site. Therefore, CFCs are not included as COPCs.

6.0 REMEDIAL INVESTIGATION

The RI will evaluate new and existing soil and groundwater data from the Site to delineate the nature and extent of contamination. New data will be obtained to fill the currently identified data gaps and to complete the characterization of the Site for the purpose of developing and evaluating site-specific cleanup levels and cleanup action alternatives. The scope of the RI will include a soil investigation, groundwater investigation and a stormwater/catch basin solids investigation.

6.1. Geophysical Survey

Documentation for the removal of a waste oil UST associated with maintenance operations in the vicinity of the warehouse/garage at the Site was not identified during our review of historical records and reports. It is uncertain whether or not this UST remains at the Site. A geophysical survey will be completed to evaluate whether the UST remains at the Site. Geophysical methods including ground penetrating radar and/or electromagnetic surveying will be utilized to search for the waste oil UST. The area of the proposed geophysical survey is shown on Figure 19.

6.2. Soil Investigation

The objective of the soil investigation is to fill the data gaps presented in Section 5.1 and to define the nature and extent of contamination in soil, where present at the Site. Soil sampling will be performed at 18 locations (HA-1 through HA-3, MW-2A and MW-13 through MW-18, and DP-1 through DP-8) to collect samples representative of fill and native soil that may have been impacted by past Site activities. The proposed soil sample locations were positioned to address identified data gaps and to provide comprehensive coverage of the Site. Information obtained from previous Site investigations was used to support selection of the proposed soil sample locations. The proposed soil sampling locations are presented in Figure 19. Table 15 presents the soil sampling locations, rationale for sampling locations, sample depths, and anticipated horizons to be sampled.

Soil sampling will be completed at three hand auger borings installed at sampling locations HA-1 through HA-3, at hollow-stem auger (HSA) boring locations MW-2A and MW-13 through MW-18, and at direct-push boring locations DP-1 through DP-8. The hand auger borings installed along the Trotsky Inlet shoreline will be advanced to at least a depth of 2 feet bgs.

Soil sampling will be completed at hollow-stem auger (HSA) boring locations MW-2A and MW-13 through MW-18, Hollow-stem auger borings will be advanced to depths of at least 30 feet bgs. For proposed borings installed adjacent to the LDW, subsurface debris may limit the effectiveness of hollow-stem auger drilling methods. Alternative drilling methods (air rotary, sonic, etc.) will be implemented to complete the borings in the event that hollow-stem auger methods are not successful. A minimum of three soil samples will be collected from each HSA boring for potential chemical analysis. Samples will be collected from the fill horizon as well as the water table and native soil horizons at locations where the exploration depth is sufficient to encounter the water table and native soil. Soil samples submitted for analysis will be obtained from the HSA borings from a sampling interval of approximately 2.5 feet.

Soil sampling will be completed at eight direct-push boring locations (DP-1 through DP-8) surrounding the locations of the former diesel and gasoline USTs. The direct-push borings are intended to characterize vadose zone and capillary fringe soil impacted by releases associated with the former USTs and will be advanced to the estimated low groundwater elevation at the respective sampling locations. Soil samples will be collected using standard direct-push boring sampling methodology from continuous 4-foot long intervals.

Soil samples will be screened in the field for the presence of petroleum-related contamination. Field screening will consist of visual observation for the presence of contamination (i.e., staining, etc.), water sheen testing and organic vapor monitoring. The procedures for field screening are presented in the SAP in Appendix A. In general, samples with the greatest evidence of contamination based on the field screening will initially be submitted for chemical analysis from each location. Samples with no evidence or lesser evidence of contamination will be archived for potential follow-up analysis based on the analytical results from the initial samples. At least three samples from each HSA boring will be submitted for analysis because several of the COPCs are not evident in typical field screening. Analysis will be performed on additional samples from a given investigation location when supplemental data are needed to characterize or delineate contaminants detected in the initial sample(s).

Selected soil samples from each investigation location will be submitted for analysis of COPCs selected based on previous sample results, presence of fill, and proximity to specific past Site activities (i.e., former USTs, Trotsky Inlet, etc.). Table 15, and the SAP in Appendix A, outlines the analyses proposed for each of the different soil sampling methods. Selected soil samples will be submitted for a combination of the following analyses:

- Metals (arsenic (total), chromium (total), cadmium, copper, lead, mercury, nickel, silver, and zinc) by EPA Method 200.8 and 7470.
- SVOCs including PAHs by EPA Method 8270/SIM.
- VOCs by EPA Method 8260 (or BTEX only by EPA Method 8021).
- PCBs by EPA Method 8082.
- Pesticides by GC/MS/MS methods.
- Gasoline-range petroleum hydrocarbons by Ecology Method NWTPH-G.
- Diesel- and heavy oil-range petroleum hydrocarbons by Ecology Method NWTPH-Dx.
- Total organic carbon by EPA Method 9060.

Table 15 presents the proposed soil analyses to be performed at each location. Samples will be submitted to an Ecology-certified laboratory for analysis.

The SAP discusses procedures for completing the borings and soil sample collection (Appendix A). The Quality Assurance Project Plan (QAPP) includes QA procedures for soil sampling and analysis (Appendix B). The Health and Safety Plan (HASP) includes health and safety procedures for the RI fieldwork (Appendix C).

6.3. Groundwater Investigation

The objective of the groundwater investigation is to address the data gaps described in Section 5.1 and to define the nature and extent of contamination in groundwater, where present. Groundwater sampling will be performed at 20 locations to collect samples representative of groundwater conditions at the Site. Information obtained from previous Site investigations was used to support selection of the proposed groundwater sample locations. The proposed groundwater sampling locations are presented on Figure 19.

Samples will be collected from existing Site monitoring wells MW-1 and MW-3 through MW-13, proposed monitoring wells MW-2A and MW-14 through MW-18, and from two seep locations along the Trotsky Inlet. Procedures for monitoring well installation, well development, water level monitoring and groundwater sample collection are described in the SAP presented in Appendix A.

Four quarterly rounds of groundwater sampling will be performed for this RI. Groundwater samples will be obtained during a period of low outgoing tide from the new and existing monitoring wells for chemical analysis. The first round of groundwater samples will be collected after well development and completion of a tidal study that is to be performed to evaluate groundwater flow characteristics, including elevation changes in Site groundwater in response to water level changes in the LDW (see Section 3.4.1). Groundwater samples will be submitted for chemical analysis of COPCs selected based previous sample results, presence of fill, investigation and proximity to specific past Site activities. In addition, groundwater samples will be analyzed for chloride ion to determine the level of mixing between Site groundwater and LDW surface water. Groundwater samples will be submitted for a combination of the following analyses:

- Chloride by EPA 300.0.
- Total dissolved solids by EPA Method 160.1.
- Total and Dissolved Metals (arsenic, chromium, cadmium, copper, lead, nickel, silver and zinc) by EPA Method 200.7/200.8.
- Total and Dissolved mercury by EPA Method 1631-E.
- SVOCs including PAHs by EPA Method 8270/SIM.
- VOCs by EPA Method 8260.
- PCBs by EPA Method 8082.
- Pesticides by EPA Method 8081B
- Gasoline-range petroleum hydrocarbons by Ecology Method NWTPH-G.
- Diesel- and heavy oil-range petroleum hydrocarbons by Ecology Method NWTPH-Dx.

Table 15 presents the proposed groundwater analyses to be performed at each location. Samples will be submitted to an Ecology-certified laboratory for analysis.

The SAP includes procedures for well installation, well development, water level monitoring, and groundwater sample collection (Appendix A). The Quality Assurance Project Plan (QAPP) includes QA procedures for groundwater sampling and analysis (Appendix B). The Health and Safety Plan (HASP) includes health and safety procedures for RI fieldwork (Appendix C).

6.3.1. Hydraulic Conductivity Testing and 72-Hour Tidal Study

The elevations of well casing rims and adjacent ground levels will be determined for new and existing monitoring wells by a licensed surveyor. Hydraulic conductivity testing and a 72-hour tidal study will be performed to characterize groundwater flow characteristics and gradients at the Site. The aquifer hydraulic conductivity will be estimated by conducting slug tests in monitoring wells MW-4, MW-2R and MW-14 at the Site, and by analyzing the results of the tidal study. A 72-hour tidal study will be conducted to evaluate elevation changes in Site groundwater in response to water level changes in the LDW. Water level elevation data will be collected every 15 minutes in monitoring wells MW-4, MW-5, MW-9, MW-11, MW-12, and MW-13 at the Site using electronic data loggers. Electronic data measurements will be confirmed by periodically obtaining manual water level measurements during the study. In addition, elevation and observed flow at shoreline seeps will be measured during low tide periods. Groundwater flow directions determined from the tidal study will be used in conjunction with groundwater monitoring analytical results to better define the nature and extent of groundwater contamination at the Site. Procedures for performing slug tests and the tidal study are presented in the SAP (Appendix A).

6.4. Stormwater System Investigation

The objective of the stormwater system investigation is to evaluate whether the stormwater conveyance system is a potential pathway for contaminant migration from the Site to the LDW. The first step toward characterizing the potential pathways will be to perform a survey of the stormwater conveyance network at the Site. The locations and elevations of all components of the stormwater conveyance system, including catch basins and other access points, will be surveyed and inspected prior to collection of catch basin and stormwater samples. The survey data and inspection results will be incorporated into as-built drawings to be included with the RI report. As a component of the stormwater system survey, the stormwater conveyance lines in the southwestern corner of the facility will also be evaluated to confirm that these lines are connected to the sanitary sewer and do not discharge to the LDW.

Catch basin sampling will be performed at the catch basin location nearest to the discharge point for the system, CB-5, to collect samples representative of the solid materials captured by the catch basin system. The catch basin locations are presented on Figure 19. The investigation and sampling of Site catch basin solids will be performed by obtaining samples from the selected catch basins using a stainless steel spoon or, where necessary, will be obtained using a sampler attached to an extension arm to reach into deeper catch basins.

Catch basin samples will be screened in the field for the presence of contamination. Field screening will consist of visual observation for the presence of contamination (i.e., staining, etc.), water sheen testing and organic vapor monitoring. The procedures for field screening are presented in the SAP in Appendix A.

Stormwater samples will be collected from the existing stormwater discharge outfall using standard stormwater sample collection procedures. A sample of discharging stormwater will be collected as close as possible to the first hour of a storm event. This procedure will be performed once quarterly for one year during the RI (four samples). In addition, if discharge from the stormwater system is observed outside storm events an additional sample will be collected to characterize base flow from the system.

In addition to the stormwater discharge and catch basin solids sampling, sediment samples will be collected from the vicinity of the stormwater discharge outfall to evaluate the potential for stormwater contaminants to impact surrounding LDW sediment. The proposed sediment sampling location is shown on Figure 19. A sample of surface sediment (0 to 10 cm depth) and shallow subsurface sediment (10cm to 60 cm) will be collected and analyzed for the same set of analytes as the samples of catch basin solids to allow comparison.

The stormwater discharge, catch basin solids, and sediment samples from each investigation location will be submitted for analysis for general chemistry and physical parameters and COPCs selected based on previous sample results and past Site activities. Stormwater system samples will be submitted for a combination of the following analyses:

- Total Organic Carbon (TOC) by SW-846 Method 9060.
- Grain size (solids) by Puget Sound Estuary Program methods.
- Total metals (arsenic, chromium, cadmium, copper, lead, mercury, nickel, silver and zinc) by EPA Method 200.8 and 7470.
- SVOCs including PAHs by EPA Method 8270/SIM.
- VOCs by EPA Method 8260.
- PCBs by EPA Method 8082.
- Pesticides by EPA Method 8081B.
- Gasoline-range petroleum hydrocarbons by Ecology Method NWTPH-G.
- Diesel- and heavy oil-range petroleum hydrocarbons by Ecology Method NWTPH-Dx.
- Dioxins/furans by EPA Method 8290A (catch basin solids).

Table 15 presents the proposed analyses to be performed at each catch basin location. Samples will be submitted to an Ecology-certified laboratory for analysis.

The SAP discusses procedures for sample collection (Appendix A). The Quality Assurance Project Plan (QAPP) includes QA procedures for catch basin sampling and analysis (Appendix B). The Health and Safety Plan (HASP) includes health and safety procedures for the RI fieldwork (Appendix C).

7.0 FEASIBILITY STUDY

The RI/FS will be prepared as one document following the field investigation. The RI/FS will develop cleanup levels for the Site and evaluate hazardous substances in soil and groundwater and catch basin solids by comparing analytical results from soil and groundwater analyses to appropriate site-specific cleanup levels and results for catch basin solids to reference levels. Soil and groundwater cleanup criteria will be developed and used in accordance with MTCA. If the RI analytical testing data do not exceed cleanup levels, the FS will be limited to establishment of cleanup levels and points of compliance. If the RI soil and/or groundwater data exceed cleanup levels, then the FS will develop and evaluate cleanup action alternatives for contaminated media so that cleanup actions may be selected. The FS will:

- Develop cleanup levels and points of compliance and, as necessary, establish remediation levels;
- Delineate affected media where evaluation of remedial actions are appropriate;
- Develop remedial action objectives; and
- Screen and evaluate specific cleanup alternatives and recommend a preferred alternative.

The following sections provide the details of the FS process that will be completed for the Site.

7.1. Establishment of Cleanup Levels, Points of Compliance and Remediation Levels

Cleanup standards, including cleanup levels and points of compliance, will be developed for soil and groundwater in accordance with MTCA requirements. Exposure pathways and receptors will be identified as part of cleanup level development. As needed, remediation levels may also be established for specific cleanup alternatives.

Cleanup levels for soil will be protective of human health and groundwater based on current and anticipated future uses of the property. The point of compliance for soil will also be established.

Cleanup levels for groundwater will be based on protection of surface water in the LDW. Groundwater at or potentially affected by the Site is not a current or reasonable future source of drinking water. It is expected that information developed during the RI will be used to demonstrate that groundwater at the property meets the requirements of WAC 173-340-720 for non-potable groundwater. A groundwater point of compliance will be developed. The point of compliance may be conditional, located at or near the groundwater/surface water interface.

7.2. Delineation of Media Requiring Remedial Action

The RI process will determine if soil and groundwater sample results exceed cleanup levels and, if so, identify the locations of the exceedances. Based on any exceedances and the established points of compliance, the FS will identify the extent or volume of soil or groundwater that requires remedial action.

7.3. Development of Remedial Action Objectives

Remedial action objectives (RAOs) that define the goals of the cleanup that must be achieved to adequately protect human health and the environment will be developed for each medium and area identified as requiring remedial action. These RAOs will be action-specific and/or media-specific. Action-specific RAOs are based on actions required for environmental protection that are not intended to achieve a specific chemical criterion. Media-specific RAOs are based on developed cleanup levels. The RAOs will specify the COCs, the potential exposure pathways and receptors, and acceptable contaminant levels or range of levels for each exposure pathway, as appropriate.

7.4. Applicable or Relevant and Appropriate Requirements

In addition to the cleanup standards developed through the MTCA process and presented in Section 6.1, other regulatory requirements must be considered in the selection and implementation of the cleanup action. MTCA requires that the cleanup standards to be “at least as stringent as all applicable state and federal laws” [WAC 173-340-700(6)(a)]. Besides establishing minimum requirements for cleanup standards, applicable state and federal laws may also impose certain technical and procedural requirements for performing cleanup actions. These requirements are described in WAC 173-340-710.

MTCA defines applicable state and federal laws to include legally applicable requirements and those requirements that are relevant and appropriate (ARARs). The primary ARARs will be the MTCA cleanup levels and regulations that address implementation of a cleanup under MTCA. Other potential ARARs may include the following:

- Washington Pollution Control Act and the implementing regulations: Water Quality Standards for Surface Waters of the State of Washington (Chapter 173-201A WAC).
- Washington Hazardous Waste Management Act and the implementing regulations: Dangerous Waste Regulations (Chapter 173-303 WAC), to the extent that any dangerous wastes are discovered or generated during the cleanup action.
- Washington's Shoreline Management Act with respect to construction cleanup activities conducted within 200 feet of the shoreline.
- Archeological and Historical Preservation – The Archeological and Historical Preservation Act (16 USCA 496a-1) would be applicable if any culturally significant materials are discovered during Site grading and excavation activities.
- Health and Safety – Site cleanup-related construction activities would need to be performed in accordance with the requirements of the Washington Industrial Safety and Health Act (RCW 49.17) and the federal Occupational Safety and Health Act (29 CFR 1910, 1926). These applicable regulations include requirements that workers are to be protected from exposure to contaminants and that excavations are to be properly shored.

The FS will identify ARARs that are applicable to the Site cleanup.

7.5. Screening of Cleanup Alternatives

Cleanup alternatives will be developed for each medium of concern. Initially, general remediation technologies will be identified for the purpose of meeting RAOs for each medium. General remediation technologies consist of specific remedial action technologies and process options and will be considered and evaluated based on the media type and the properties of any contaminant(s). These may include no action, institutional controls, containment or other engineering controls, removal, in-situ treatment and natural attenuation.

Specific remedial action technologies are the engineering components of a general remediation technology. Several specific technologies may be identified for each general remediation technology and multiple process options may exist within each specific technology. Specific remedial action technologies and representative process options will be selected for evaluation based on documented development or documented successful use for the particular medium and COPCs. Cleanup alternatives will be developed from the general and specific remedial technologies and process options consistent with Ecology expectations identified in WAC 173-340-370 using best professional judgment and guidance documents as appropriate.

During the development of cleanup alternatives, the current and planned future land use will be considered. For example, where property is already developed, containment alternatives may be given preferential consideration over soil cleanup alternatives that would be disruptive to Site use/structures.

If the RI identifies localized hot spots of contaminants in soil, active cleanup alternatives such as excavation or in-situ treatment may be appropriate for those limited areas. If there are portions of the property with large volumes of materials with relatively low concentrations of hazardous substances, cleanup alternatives including engineering controls or monitored natural attenuation may be developed. Current and anticipated future property uses will be considered during development of cleanup alternatives.

7.6. Evaluation of Cleanup Alternatives

MTCA requires that cleanup alternatives be compared to a number of criteria as set forth in WAC 173-340-360 to evaluate the adequacy of each alternative in achieving the intent of the regulations, and as a basis for comparing the relative merits of the developed cleanup alternatives. Consistent with MTCA, the alternatives will be evaluated with respect to compliance with threshold requirements, permanence, and restoration timeframe, and the results of the evaluation will be documented in the RI/FS report.

8.0 PUBLIC PARTICIPATION

A Public Participation Plan (PPP) was prepared by Ecology for the project that summarizes the RI/FS activities to be conducted at the Site. The PPP is provided in Appendix D. The PPP will be provided to the public to present the opportunity for the public to learn about and provide input on the RI and remedial alternatives, as required under MTCA (WAC) 173-340-600.

9.0 SCHEDULE AND REPORTING

The Agreed Order establishes the RI/FS schedule and reporting requirements. The schedule for specific project milestones is provided in the following table. If at any time during the RI/FS/Draft Cleanup Action Plan (DCAP) process unanticipated conditions or changed circumstances are discovered that might result in a schedule delay, 7100 LLC will bring such information to the attention of Ecology. Any requests for a schedule extension will be undertaken as required by the Agreed Order. Any completion times that fall on a holiday or weekend will be extended to the next working day.

PROJECT DELIVERABLES	COMPLETION SCHEDULE
Draft Data Gap Report	Submitted to Ecology on July 6, 2011
Draft RI/FS Work Plan	Submitted to Ecology on October 17, 2011
Revised Draft RI/FS Work Plan and Draft Sampling and Analysis Plan (SAP) and Quality Assurance Project Plan (QAPP)	Submitted to Ecology on February 6, 2012
Draft Final RI/FS Work Plan and SAP, QAPP and Health and Safety Plan (HASP)	45 calendar days following Ecology's review comments on the draft SAP and QAPP
Completion of RI Field Work	12 months following completion of the Final SAP, QAPP and HASP
Draft RI Report	90 days following receipt of all validated data from RI sampling
Final RI Report	45 calendar days following Ecology's review comments on the Draft RI Report
Draft FS Report	90 days following completion of the Final RI Report

PROJECT DELIVERABLES	COMPLETION SCHEDULE
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's responses to public comments
Final FS Report	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
Progress Reports	The 15th of every month beginning after the completion of the first full month after the effective date of the Agreed Order

10.0 LIMITATIONS

We have prepared this Remedial Investigation/Feasibility Study Work Plan for use by 7100 LLC and Ecology during completion of the RI/FS at the 7100 LLC Site. Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted environmental science practices in this area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood.

11.0 REFERENCES

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TABLES

Table 1

Preliminary Soil Screening Levels

7100 1st Avenue South Site
Seattle, Washington

Analyte	Preliminary Screening Level (LDW Soil Screening Level Protective of Potable GW Where Applicable)[1] mg/kg	Background Concentration[2,4] mg/kg	Preliminary Screening Level (After adjustment for background) mg/kg	PQL[3,4] mg/kg	Soil Screening Level (After adjustment for background and PQL) mg/kg
Metals					
Arsenic (total)	0.00016	7.0	7.0	0.20	7.0
Cadmium	0.00084	1.0	1.0	0.10	1.0
Chromium (total)	42	117	117	0.50	117
Copper	0.49	36	36	0.50	36
Lead	5.4	17	17	0.10	17
Mercury	0.00027	0.070	0.070	0.0250	0.070
Nickel	0.33	38	38	0.50	38
Silver	0.0020	--	0.0020	0.20	0.20
Zinc	2.0	86	86	4.00	86
Volatile Organic Compounds (VOCs)					
1,2,4-Trimethylbenzene	NE	--	NE	0.0010	NE
1,2-Dichloroethane	0.000042	--	0.000042	0.0010	0.0010
1,3,5-Trimethylbenzene	0.045	--	0.045	0.0010	0.045
1,3-Dichlorobenzene	0.28	--	0.28	0.0010	0.28
1,4-Dichlorobenzene	0.00041	--	0.00041	0.0010	0.0010
2-Butanone (MEK)	1.4	--	1.4	0.0050	1.4
2-Chlorotoluene[5]	*1600*	--	1600	0.0010	1,600
2-Hexanone	NE	--	NE	0.0050	NE
4-Chlorotoluene[5]	*1600*	--	1600	0.0010	NE
Acetone	1.7	--	1.7	0.0050	1.7
Benzene	0.00021	--	0.00021	0.0010	0.0010
Bromomethane[5]	*110*	--	110	0.0010	110
Carbon Disulfide[5]	*8,000*	--	8,000	0.0010	8,000
CFC-12[5]	*16000*	--	16000	0.0010	16,000
Chloroform	0.000053	--	0.000053	0.0010	0.0010
Chloromethane	0.0061	--	0.0061	0.0010	NE
Ethylbenzene	0.0014	--	0.0014	0.0010	0.0014
Isopropylbenzene (Cumene)[5]	*8000*	--	8,000	0.0010	8,000
Methylene Chloride (Dichloromethan	0.0012	--	0.0012	0.0020	0.0020
Naphthalene	0.00023	--	0.00023	0.0050	0.0050
n-Butylbenzene	NE	--	NE	0.0010	NE
n-Propylbenzene[5]	*8000*	--	8,000	0.0010	8,000
p-Isopropyltoluene	NE	--	NE	0.0010	NE
Sec-Butylbenzene	NE	--	NE	0.0010	NE
Tetrachloroethene (PCE)	0.000011	--	0.000011	0.0010	0.0010
Toluene	0.55	--	0.55	0.0010	0.55
m-Xylene & p-Xylene[6]	0.20	--	0.20	0.0010	0.20
o-Xylene[6]	0.20	--	0.20	0.0010	0.20
Total Xylenes	0.20	--	0.20	0.0010	0.20
Semivolatile Organic Coumpounds (SVOCs)/Polycyclic Aromatic Hydrocarbons (PAHs)					
1,4-Dichlorobenzene	0.00041	--	0.00041	0.020	0.020
2-Methylnaphthalene	0.014	--	0.014	0.020	0.020
Acenaphthene	0.017	--	0.017	0.020	0.020
Acenaphthylene	0.069	--	0.069	0.020	0.069
Anthracene	0.00025	--	0.00025	0.020	0.020
Benzo(ghi)perlene	0.031	--	0.031	0.020	0.031
Bis(2-Ethylhexyl)Phthalate	0.047	--	0.047	0.020	0.047
Dibenzofuran	0.015	--	0.015	0.020	0.020
Dibutyl phthalate	0.0059	--	0.0059	0.020	0.020
Diethyl phthalate	0.031	--	0.031	0.020	0.031
Fluoranthene	0.0028	--	0.0028	0.020	0.020
Fluorene	0.024	--	0.024	0.020	0.024
Isophorone[5]	*1100*	--	1100	0.020	1100

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Semivolatile Organic Coumpounds (SVOCs)/Polycyclic Aromatic Hydrocarbons (PAHs) (continued)					
Naphthalene[7]	0.00023	--	0.00023	0.0050	0.0050
p-Cresol (4-methylphenol)	0.050	--	0.050	0.020	0.050
Pentachlorophenol	0.00080	--	0.00080	0.100	0.10
Phenanthrene	0.0084	--	0.0084	0.020	0.020
Phenol	0.0012	--	0.0012	0.020	0.020
Pyrene	0.017	--	0.017	0.020	0.020
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)					
benzo[a]anthracene	4.8E-05	--	4.8E-05	0.0050	0.0050
benzo[a]pyrene	5.2E-06	--	5.2E-06	0.0050	0.0050
benzo[b]fluoranthene	4.2E-05	--	4.2E-05	0.0050	0.0050
benzo[k]fluoranthene	4.3E-05	--	4.3E-05	0.0050	0.0050
chrysene	2.6E-04	--	2.6E-04	0.0050	0.0050
indeno[1,2,3-cd]pyrene	6.1E-05	--	6.1E-05	0.0050	0.0050
Total cPAHs TEQ	5.2E-06	--	5.2E-06	n/a	5.2E-06
Polychlorinated Biphenyls (PCBs)					
PCB-aroclor 1016	6.3E-07	--	6.3E-07	0.0040	0.0040
PCB-aroclor 1242	1.7E-08	--	1.7E-08	0.0040	0.0040
PCB-aroclor 1248	6.6E-09	--	6.6E-09	0.0040	0.0040
PCB-aroclor 1254	4.2E-07	--	4.2E-07	0.0040	0.0040
PCB-aroclor 1260	4.8E-06	--	4.8E-06	0.0040	0.0040
Total PCBs (sum of Aroclors)	6.6E-07	--	6.6E-07	0.010	0.010
Pesticides[8]					
2,4'-DDD	3.3E-06	--	3.3E-06	0.00010	0.00010
4,4'-DDD	3.3E-06	--	3.3E-06	0.00010	0.00010
2,4'-DDE	4.4E-06	--	4.4E-06	0.00010	0.00010
4,4'-DDE	4.4E-06	--	4.4E-06	0.00010	0.00010
2,4'-DDT	3.4E-05	--	3.4E-05	0.00010	0.00010
4,4'-DDT	3.4E-05	--	3.4E-05	0.00010	0.00010
Dieldrin	3.2E-07	--	3.2E-07	0.00010	0.00010
Heptachlor	1.8E-07	--	1.8E-07	0.00010	0.00010
Petroleum Hydrocarbons					
Gasoline-Range [9]	30	--	30	5.0	30
Diesel-Range	200	--	200	5.0	200
Heavy Oil-Range	2000	--	2000	10.0	2000
Total Petroleum Hydrocarbons [10]	200	--	200	5.0	200

Notes:

[1] Preliminary Screening Levels based on July 2012 version of Lower Duwamish Waterway (LDW) screening level spreadsheet provided by Ecology. Soil screening levels are the most stringent levels in spreadsheet based on protection of potable groundwater. Screening levels in italics are for analytes not in the Ecology spreadsheet and are based on Method B Standard values from the CLARC database.

[2] Background values based on July 2012 version of Lower Duwamish Waterway (LDW) screening level spreadsheet provided by Ecology.

[3] PQL for all analytes except pesticides are low-level Reporting Limits provided by Analytical Resources, Inc. (Tukwila, WA); pesticides PQLs are from Columbia Analytical (Kelso, Wa).

[4] Yellow shading indicates that background concentration or PQL is higher than preliminary screening level and is basis for screening level.

[5] Screening level based on MTCA Method B standard values.

[6] Screening level based on value for total xylenes.

[7] PQL listed for Naphthalene is based on VOC analysis. PQL for Naphthalene by semivolatile analysis is 0.020 mg/kg.

[8] Screening levels for 2,4 isomers of DDD, DDE, and DDT are based on Ecology table values for 4,4 isomers of the respective compound.

[9] Value for gasoline-range petroleum hydrocarbons if benzene is present. If benzene is not present, screening level is 100 mg/kg.

[10] Screening level for early (1990-1992) Total Petroleum Hydrocarbon analyses based on value for diesel-range hydrocarbons.

NE = No criterion exists

MTCA = Washington State Model Toxics Control Act

PQL = Practical quantitation limit

TEQ = Toxic equivalent concentration

Table 2

Preliminary Groundwater Screening Levels

7100 1st Avenue South Site
Seattle, Washington

Analyte	Preliminary Screening Level (LDW Potable Groundwater Screening Levels[1,2])	Preliminary Screening Level (LDW Non-Potable Surface Water Screening Levels[1,2])	Preliminary Groundwater Screening Level (Most Stringent of Groundwater and Surface Water Screening Levels)	Background Concentration[3,4]	Preliminary Screening Level (After adjustment for background)	PQL[4,5]	Groundwater Screening Level (After adjustment background and PQL)
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Metals							
Arsenic (total)	0.050	0.0054	0.0054	0.87	0.87	0.20	0.87
Cadmium	0.21	0.12	0.12	--	0.12	0.10	0.12
Chromium (total)	50	74	50	--	50	0.50	50
Copper	7.3	3.1	3.1	--	3.1	0.50	3.1
Lead	2.5	0.54	0.54	--	0.54	0.10	0.54
Mercury	0.0052	0.0052	0.0052	--	0.0052	0.0010	0.0052
Nickel	8.2	8.2	8.2	--	8.2	0.50	8.2
Silver	1.5	0.23	0.23	--	0.23	0.20	0.23
Zinc	33	33	33	--	33	4.00	33
Volatile Organic Compounds (VOCs)							
1,2,4-Trimethylbenzene	NE	NE	NE	--	NE	0.20	NE
1,2-Dichloroethane	0.48	3.6	0.48	--	0.48	0.20	0.48
1,3,5-Trimethylbenzene	45	45.2	45	--	45	0.20	45
1,3-Dichlorobenzene	600	960	600	--	600	0.20	600
1,4-Dichlorobenzene	4.0	1.7	1.7	--	1.7	0.20	1.7
2-Butanone (MEK)	4,800	4,800	4,800	--	4,800	5.0	4,800
2-Chlorotoluene	160	NE	160	--	160	0.20	160
2-Hexanone	NE	NE	NE	--	NE	5.0	NE
4-Chlorotoluene	160	NE	160	--	160	0.20	NE
Acetone	6,000	110,107	6,000	--	6,000	5.0	NE
Benzene	0.80	2.028	0.795	--	0.80	0.20	0.80
Bromomethane[6]	*11*	*970*	11	--	11	1.0	11
Carbon Disulfide[6]	*800*	NE	800	--	800	0.20	800
CFC-12[6]	*1,600*	NE	1,600	--	1600	0.20	1,600
Chloroform	4.3	1.8	1.8	--	1.8	0.20	1.8
Chloromethane	190	20	20	--	20	0.50	NE
Ethylbenzene	700	1.7	1.7	--	1.7	0.20	1.7
Isopropylbenzene (Cumene)	800	NE	800	--	800	0.20	800
Methylene Chloride	5.0	61	5.0	--	5.0	1.0	5.0

Table 2

Preliminary Groundwater Screening Levels

7100 1st Avenue South Site
Seattle, Washington

Analyte	Preliminary Screening Level (LDW Potable Groundwater Screening Levels[1,2])	Preliminary Screening Level (LDW Non-Potable Surface Water Screening Levels[1,2])	Preliminary Groundwater Screening Level (Most Stringent of Groundwater and Surface Water Screening Levels)	Background Concentration[3,4]	Preliminary Screening Level (After adjustment for background)	PQL[4,5]	Groundwater Screening Level (After adjustment background and PQL)
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Naphthalene	54	0.11	0.11	--	0.11	0.50	0.50
n-Butylbenzene	NE	NE	NE	--	NE	0.20	NE
n-Propylbenzene[6]	*800*	NE	800	--	800	0.20	800
p-Isopropyltoluene	NE	NE	NE	--	NE	0.20	NE
Sec-Butylbenzene	NE	NE	NE	--	NE	0.20	NE
Tetrachloroethene (PCE)	0.0205	0.021	0.0205	--	0.021	0.20	0.20
Toluene	1,000	1,294	1,000	--	1000	0.20	1,000
m-Xylene & p-Xylene[7]	1,000	1,500	1,000	--	1000	0.40	1,000
o-Xylene[7]	1,000	1,500	1,000	--	1000	0.20	1,000
Total Xylenes	1,000	1,500	1,000	--	1000	0.60	1,000
Semivolatile Organic Coumpounds (SVOCs)/Polycyclic Aromatic Hydrocarbons (PAHs)							
1,4-Dichlorobenzene	4.0	1.7	1.7	--	1.7	1.0	1.7
2-Methylnaphthalene	18	4.2	4.2	--	4.2	1.0	4.2
Acenaphthene	2.6	2.6	2.6	--	2.6	1.0	2.6
Acenaphthylene	11	11	11	--	11	1.0	10.8
Anthracene	11	0.012	0.012	--	0.012	1.0	1.0
Benzo(ghi)perlene	0.012	0.012	0.012	--	0.012	1.0	1.0
Bis (2-ethylhexyl) Phthalate	0.28	0.28	0.28	--	0.28	1.0	1.0
Dibenzofuran	1.3	1.3	1.3	--	1.3	1.0	1.3
Dibutyl phthalate	47	3.4	3.4	--	3.4	1.0	3.4
Diethyl phthalate	484	76	75.9	--	76	1.0	76
Fluoranthene	2.3	0.040	0.040	--	0.040	1.0	1.0
Fluorene	2.0	2.0	2.0	--	2.0	1.0	2.0
Isophorone[6]	*46*	*600*	46	--	46	1.0	46.0
Naphthalene[8]	54	0.11	0.11	--	0.11	0.50	0.50
p-Cresol (4-methylphenol)	77	77	77	--	77	1.0	77
Pentachlorophenol	0.22	0.70	0.2	--	0.22	5.0	5.0
Phenanthrene	4.8	0.40	0.4	--	0.40	1.0	1.0
Phenol	78	4.00	4.0	--	4.0	1.0	4.0
Pyrene	10	0.24	0.24	--	0.24	1.0	1.0

Table 2

Preliminary Groundwater Screening Levels

7100 1st Avenue South Site
Seattle, Washington

Analyte	Preliminary Screening Level (LDW Potable Groundwater Screening Levels[1,2])	Preliminary Screening Level (LDW Non-Potable Surface Water Screening Levels[1,2])	Preliminary Groundwater Screening Level (Most Stringent of Groundwater and Surface Water Screening Levels)	Background Concentration[3,4]	Preliminary Screening Level (After adjustment for background)	PQL[4,5]	Groundwater Screening Level (After adjustment background and PQL)
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)							
benzo[a]anthracene	1.1E-04	2.6E-04	1.1E-04	0.0032	3.2E-03	0.010	0.010
benzo[a]pyrene	6.6E-06	1.5E-05	6.6E-06	0.0032	3.2E-03	0.010	0.010
benzo[b]fluoranthene	5.3E-05	1.2E-04	5.3E-05	0.0032	3.2E-03	0.020	0.020
benzo[k]fluoranthene	5.5E-05	1.3E-04	5.5E-05	0.0032	3.2E-03	0.020	0.020
chrysene	1.1E-03	2.6E-03	1.1E-03	0.0032	3.2E-03	0.010	0.010
indeno[1,2,3-cd]pyrene	2.3E-05	5.2E-05	2.3E-05	0.0032	3.2E-03	0.010	0.010
Total cPAHs TEQ	6.6E-06	1.5E-05	6.6E-06	0.0032	3.2E-03	n/a	0.0032
Polychlorinated Biphenyls (PCBs)							
PCB-aroclor 1016	6.4E-05	2.3E-05	2.3E-05	0.0015	1.5E-03	0.010	0.0100
PCB-aroclor 1242	2.3E-05	2.3E-05	2.3E-05	0.0015	1.5E-03	0.010	0.010
PCB-aroclor 1248	2.3E-05	2.3E-05	2.3E-05	0.0015	1.5E-03	0.010	0.010
PCB-aroclor 1254	5.5E-06	5.5E-06	5.5E-06	0.0015	1.5E-03	0.010	0.01000
PCB-aroclor 1260	2.3E-05	2.3E-05	2.3E-05	0.0015	1.5E-03	0.010	0.010
Total PCBs (sum of Aroclors	2.3E-05	1.5E-05	1.5E-05	0.0015	1.5E-03	0.010	0.010
Pesticides[7]							
2,4'-DDD	3.6E-01	7.1E-05	7.1E-05	--	7.1E-05	0.0012	0.0012
4,4'-DDD	3.6E-01	7.1E-05	7.1E-05	--	7.1E-05	0.0012	0.0012
2,4'-DDE	2.6E-01	5.0E-05	5.0E-05	--	5.0E-05	0.0012	0.0012
4,4'-DDE	2.6E-01	5.0E-05	5.0E-05	--	5.0E-05	0.0012	0.0012
2,4'-DDT	2.6E-01	5.0E-05	5.0E-05	--	5.0E-05	0.0012	0.0012
4,4'-DDT	2.6E-01	5.0E-05	5.0E-05	--	5.0E-05	0.0012	0.0012
Dieldrin	5.5E-03	1.2E-05	1.2E-05	--	1.2E-05	0.0012	0.0012
Heptachlor	4.0E-04	1.8E-05	1.8E-05	--	1.8E-05	0.0012	0.00120

Table 2

Preliminary Groundwater Screening Levels

7100 1st Avenue South Site
Seattle, Washington

Analyte	Preliminary Screening Level (LDW Potable Groundwater Screening Levels[1,2])	Preliminary Screening Level (LDW Non-Potable Surface Water Screening Levels[1,2])	Preliminary Groundwater Screening Level (Most Stringent of Groundwater and Surface Water Screening Levels)	Background Concentration[3,4]	Preliminary Screening Level (After adjustment for background)	PQL[4,5]	Groundwater Screening Level (After adjustment background and PQL)
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Petroleum Hydrocarbons							
Gasoline-Range [8]	800	800	800	--	800	250	800
Diesel-Range	500	500	500	--	500	100	500
Heavy Oil-Range	500	500	500	--	500	200	500
Total Petroleum Hydrocarbo	500	500	500	--	500	--	500

Notes:

[1] Preliminary Screening Levels based on July 2012 version of Lower Duwamish Waterway (LDW) screening level spreadsheet provided by Ecology. Screening levels are the most stringent levels in spreadsheet based on potable groundwater and non-potable marine surface water scenarios. Screening levels in italics are for analytes not in the Ecology spreadsheet and are based on Method B Standard values from the CLARC database.

[2] Yellow shading indicates the lower of the screening level based on groundwater versus surface water to be used as preliminary screening level.

[3] Background values are surface water background values from the July 2012 version of Lower Duwamish Waterway (LDW) screening level spreadsheet provided by Ecology.

[4] Yellow shading indicates that background concentration or PQL is higher than preliminary screening level and is basis for screening level.

[5] PQL is lowest available value from Analytical Resources, Inc. (Tukwila, WA) or Columbia Analytical (Kelso, WA).

[6] Screening level based on MTCA Method B standard values.

[7] Screening level based on value for total xylenes.

[8] PQL listed for Naphthalene is based on VOC analysis. PQL for Naphthalene by semivolatile analysis is 1.0 ug/L.

[9] Screening levels for 2,4 isomers of DDD, DDE, and DDT are based on Ecology table values for 4,4 isomers of the respective compound.

[10] Value for gasoline-range petroleum hydrocarbons if benzene is present. If benzene is not present, screening level is 1,000 µg/L.

-- = No screening criteria available.

µg/L = Micrograms per liter

MTCA = Washington State Model Toxics Control Act

PQL = Practical quantitation limit

TEQ = Toxic equivalent concentration

Screening levels were developed for all constituents analyzed in groundwater.

Screening level is based on lowest of Federal and State marine surface water concentrations protective of aquatic life and human health - consumption of aquatic life (including MTCA Method B standard formula values for carcinogens and non-carcinogens), adjusted for practical quantification limit (PQL).

Yellow shading indicates basis for screening level.

Table 3

Preliminary Sediment Screening Levels

7100 1st Avenue South Site
Seattle, Washington

	Preliminary Sediment Screening Level (LDW Sediment Most Stringent Screening Levels[1])	Background Concentration[2,4]	Preliminary Screening Level (After adjustment for background)	PQL[3,4]	Preliminary Screening Level (After adjustment for background and PQL)
Analyte	**mg/kg DW**	**mg/kg DW**	**mg/kg DW**	**mg/kg**	**mg/kg DW**
Metals					
Aluminum	7,600	32,600	32,600	20.0	32,600
Antimony	3.1	--	3.1	0.20	3.1
Arsenic (Total)	0.39	7.3	7.3	0.20	7.3
Barium	540	--	540	0.50	540
Beryllium	NE	0.60	0.60	0.20	0.60
Cadmium	3.7	0.40	3.7	0.10	3.7
Chromium (total)	1.6	36	36	0.50	36
Cobalt	NE	9.6	9.6	0.20	9.6
Copper	310	25	310	0.50	310
Iron	2,300	--	2,300	20.0	2,300
Lead	40	11	40	0.10	40
Magnesium	NE	--	NE	20.0	NE
Manganese	180	--	180	0.50	180
Mercury	0.41	0.10	0.41	0.025	0.41
Nickel	140	37	140	0.50	140
Selenium	3.0	--	3.0	0.50	3.0
Silver	6.1	--	6.1	0.20	6.1
Thallium	0.52	--	0.52	0.20	0.52
Tin	NE	--	NE	1.0	NE
Vanadium	7.8	43	43	0.20	43
Zinc	410	60	410	4.0	410
Semivolatile Organic Coumpounds (SVOCs)/Polycyclic Aromatic Hydrocarbons (PAHs)					
1,1'-Biphenyl	NE	--	NE	0.10	NE
1,2,4-Trichlorobenzene	0.031	--	0.031	0.0050	0.031
1,2-Dichlorobenzene	0.035	--	0.035	0.0050	0.035
1,4-Dichlorobenzene	0.11	--	0.11	0.0050	0.11
1-Methylphenanthrene	NE	--	NE		NE
2,4-Dimethylphenol	0.029	--	0.029	0.020	0.029
2-Methylnaphthalene	0.67	--	0.67	0.020	0.67
2-Nitroaniline	NE	--	NE	0.10	NE
4-Chloro-3-Methylphenol	NE	--	NE	0.10	NE
Acenaphthene	0.50	--	0.50	0.020	0.5
Acenaphthylene	0.56	--	0.56	0.020	0.56
Anthracene	0.96	--	0.96	0.020	0.96
Benzo(ghi)perlene	0.67	--	0.67	0.020	0.67
Benzoic Acid	0.65	--	0.65	0.40	0.65
Benzyl Alcohol	0.057	--	0.057	0.020	0.057
Bis(2-Ethylhexyl)Phthalate	1.3	--	1.3	0.025	1.3
Butyl benzyl phthalate	0.063	--	0.063	0.0050	0.063
Carbazole	NE	--	NE	0.020	NE
Dibenzofuran	0.54	--	0.54	0.020	0.54
Dibutyl phthalate	NE	--	NE	0.020	NE
Diethyl phthalate	0.20	--	0.20	0.0050	0.20
Dimethyl phthalate	0.071	--	0.071	0.0050	0.071
Di-N-Octyl Phthalate	6.2	--	6.2	0.020	6.2
Fluoranthene	1.7	--	1.7	0.020	1.7

Table 3

Preliminary Sediment Screening Levels

7100 1st Avenue South Site
Seattle, Washington

	Preliminary Sediment Screening Level (LDW Sediment Most Stringent Screening Levels[1])	Background Concentration[2,4]	Preliminary Screening Level (After adjustment for background)	PQL[3,4]	Preliminary Screening Level (After adjustment for background and PQL)
Analyte	**mg/kg DW**	**mg/kg DW**	**mg/kg DW**	**mg/kg**	**mg/kg DW**
Fluorene	0.54	--	0.54	0.020	0.54
Hexachlorobenzene	0.022	--	0.022	0.0050	0.022
Hexachlorobutadiene	0.011	--	0.011	0.0050	0.011
Hexachlorocyclopentadiene	NE	--	NE	0.40	NE
Isophorone	NE	--	NE	0.020	NE
m-Nitroaniline	NE	--	NE	0.10	NE
Naphthalene	2.1	--	2.10	0.020	2.1
Nitrobenzene	NE	--	NE	0.020	NE
N-Nitrosodiphenylamine	0.028	--	0.028	0.020	0.028
o-Cresol	0.063	--	0.063	0.0050	0.063
p-Cresol (4-methylphenol)	0.67	--	0.67	0.010	0.67
Pentachlorophenol	0.36	--	0.36	0.050	0.36
Phenanthrene	1.5	--	1.5	0.020	1.5
Phenol	0.42	--	0.42	0.0050	0.42
Pyrene	2.6	--	2.6	0.020	2.6
Retene	NE	--	NE	0.020	NE
LPAH	5.2	--	5.2	--	5.2
HPAH	12	--	12	--	12
Dibutyltin	NE	--	NE	0.0058	NE
Monobutyltin	NE	--	NE	0.0041	NE
Tributyltin	0.073	--	0.073	0.00386	0.073
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)					
benzo[a]anthracene	0.062	0.00797	0.062	0.0050	0.062
benzo[a]pyrene	0.062	0.00797	0.062	0.0050	0.062
benzo[b]fluoranthene	0.062	0.00797	0.062	0.0050	0.062
benzo[k]fluoranthene	0.062	0.00797	0.062	0.0050	0.062
chrysene	0.062	0.00797	0.062	0.0050	0.062
dibenzo[a,h]anthracene	0.062	0.00797	0.062	0.0050	0.062
indeno[1,2,3-cd]pyrene	0.062	0.00797	0.062	0.0050	0.062
Total cPAHs TEQ	0.062	0.00797	0.062	0.0050	0.062
Polychlorinated Biphenyls (PCBs)					
PCB-aroclor 1016	NE	--	NE	0.0040	NE
PCB-aroclor 1221	NE	--	NE	0.0040	NE
PCB-aroclor 1254	NE	--	NE	0.0040	NE
PCB-aroclor 1260	NE	--	NE	0.0040	NE
PCB-aroclor 1232	NE	--	NE	0.0040	NE
PCB-aroclor 1242	NE	--	NE	0.0040	NE
PCB-aroclor 1248	NE	--	NE	0.0040	NE
PCB-aroclor 1262	NE	--	NE	0.0040	NE
PCB-aroclor 1268	NE	--	NE	0.0040	NE
Total PCBs (sum of Aroclors)	3.9E-06	0.0020	0.0020	0.0040	0.0040

Table 3

Preliminary Sediment Screening Levels

7100 1st Avenue South Site
Seattle, Washington

	Preliminary Sediment Screening Level (LDW Sediment Most Stringent Screening Levels[1])	Background Concentration[2,4]	Preliminary Screening Level (After adjustment for background)	PQL[3,4]	Preliminary Screening Level (After adjustment for background and PQL)
Analyte	**mg/kg DW**	**mg/kg DW**	**mg/kg DW**	**mg/kg**	**mg/kg DW**
Pesticides					
2,4'-DDD	0.016		0.016	0.00010	0.0160
2,4'-DDE	0.0090		0.0090	0.00010	0.0090
2,4'-DDT	0.0012		0.0012	0.00010	0.0012
4,4'-DDD	0.016	--	0.016	0.00010	0.0160
4,4'-DDE	0.0090	--	0.0090	0.00010	0.0090
4,4'-DDT	0.0012	--	0.0012	0.00010	0.0012
Aldrin	0.0095	--	0.0095	0.00010	0.0095
Alpha-Chlordane[4]	NE	--	NE	0.00010	NE
Gamma-Chlordane[4]	NE	--	NE	0.00010	NE
Beta-BHC	NE	--	NE	0.00010	NE
Chlordane[5]	0.0028		0.0028	0.00010	0.0028
Dieldrin	0.0019	--	0.0019	0.00020	0.0019
Endosulfan I[6]	NE	--	NE	0.00020	NE
Endosulfan II[6]	NE	--	NE	0.00020	NE
Endrin[7]	NE	--	NE	0.00020	NE
Hexachlorobenzene	0.022	--	0.022	0.00010	0.022
Gamma-BHC (Lindane)	0.010	--	0.010	0.00010	0.010
Methoxychlor	NE	--	NE	0.00010	NE
Petroleum Hydrocarbons [8]					
Gasoline-Range	30	--	30	5.0	30
Diesel-Range	200	--	200	5.0	200
Heavy Oil-Range	2,000	--	2000	10	2000
Dioxins and Furans					
2,3,7,8-TCDD (Dioxin)	4.0E-06	1.4E-07	4.0E-06	1.0E-06	4.0E-06

Notes:

[1] Preliminary Screening Levels based on July 2012 version of Lower Duwamish Waterway (LDW) screening level spreadsheet provided by Ecology. Screening levels are the most stringent levels in spreadsheet based on potable groundwater and non-potable marine surface water scenarios. Screening levels in italics are for analytes not in the Ecology spreadsheet and are based on Method B Standard values from the CLARC database.

[2] Background values based on July 2012 version of Lower Duwamish Waterway (LDW) screening level spreadsheet provided by Ecology.

[3] PQL for all analytes except pesticides are low-level Reporting Limits provided by Analytical Resources, Inc. (Tukwila, WA);

pesticides PQLs are from Columbia Analytical (Kelso, Wa).

[4] Yellow shading indicates that background concentration or PQL is higher than preliminary screening level and is basis for screening level.

[5] Chlordane value calculated as sum of alpha- and gamma-chlordane.

[6] Endosulfan values used for endosulfan I, endosulfan II, and endosulfan sulfate.

[7] Endrin values used for endrin aldehyde and endrin ketone.

[8] MTCA Method A cleanup values for upland soil used for petroleum hydrocarbons

NE = No criterion exists.

MTCA = Washington State Model Toxics Control Act

PQL = Practical quantitation limit

TEQ = Toxic equivalent concentration

Table 4

Summary of Soil Chemical Analytical Data - Metals and Conventionals

7100 1st Avenue South Site
Seattle, Washington

Sample Identification[1]	**MW-08-30**	**MW-09-15**	**MW-10-20**	**MW-11-15**	**MW-12-15**	**MW-12-25**	**Preliminary Screening Level (mg/kg)**
Sampled By	**SAIC**	**SAIC**	**SAIC**	**SAIC**	**SAIC**	**SAIC**	
Sample Date	**6/18/2008**	**6/18/2008**	**6/18/2008**	**6/19/2008**	**6/19/2008**	**6/19/2008**	
Sample Depth (feet bgs)	**30**	**15**	**20**	**15**	**15**	**25**	
Total Metals by EPA 6000/7000 Series (mg/kg)							
Arsenic (total)	**19.7**	**7.28**	**10.5**	**3.72**	**4.0**	**4.7**	7.0
Cadmium	**1.66 J**	**0.348 J**	**0.16 J**	**0.146**	**0.43**	**0.181**	1.0
Chromium (total)	**69.5**	**20.6**	**22.7**	**13.3**	**16.7**	**12.1**	117
Copper	**42.9**	**28.7**	**37.6**	**17.3**	**23.3**	**18.2**	36
Lead	**562 J**	**11.6 J**	**10.9 J**	**5.81**	**22.5**	**15**	17
Mercury	**0.165**	**0.129**	**0.635**	**0.068**	**0.098**	**0.135**	0.070
Nickel	**0.1**	**0.12**	0.76 U	0.0067 U	0.0059 U	**0.4 J**	38
Silver	**0.303**	**0.231**	**0.112**	**0.087**	**0.065**	**0.056**	0.20
Zinc	**835**	**64.7**	**48.4**	**41.5**	**119**	**40.4**	86
Conventionals (%)							
Total Solids by EPA 160.3	64	70.8	65.9	75.2	84.8	79.3	NE
Total Organic Carbon by EPA 300.0	2.26	0.86	2.29	0.52	1.33	0.3	NE

Notes:

[1] Approximate soil sample locations are shown on Figure 4.

bgs = below ground surface

mg/kg = milligram per kilogram

"--" = not tested

U = analyte not detected above the reported sample practical quantitation limit (PQL)

J = estimated analyte concentration

NE = not established

Bold indicates analyte was detected above reporting level practical quantitation limits.

🟨 Yellow shading indicates analyte was detected above the preliminary soil screening level.

Table 5

Summary of Soil Chemical Analytical Data - PCBs, Pesticides and Petroleum Hydrocarbons

7100 1st Avenue South Site
Seattle, Washington

Sample Identification[1]	**MW-1-3.5**	**MW-1-8.5**	**MW-1-13.5**	**MW-2-3.5**	**MW-2-13.5**	**MW-2-18.5**	**Preliminary Screening Level (µg/kg)**
Sampled By	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	
Sample Date	**10/25/1990**	**10/25/1990**	**10/25/1990**	**10/25/1990**	**10/25/1990**	**10/25/1990**	
Sample Depth (feet bgs)	**3.5**	**8.5**	**13.5**	**3.5**	**13.5**	**18.5**	
Polychlorinated Biphenyls (PCBs) by EPA 8082 (mg/kg)							
PCB-aroclor 1016	--	--	--	--	--	--	0.0040
PCB-aroclor 1242	--	--	--	--	--	--	0.0040
PCB-aroclor 1248	--	--	--	--	--	--	0.0040
PCB-aroclor 1254	--	--	--	--	--	--	0.0040
PCB-aroclor 1260	--	--	--	--	--	--	0.0040
Total PCBs[2]	--	--	--	--	--	--	0.0100
Pesticides by EPA 8081A (mg/kg)							
2,4'-DDD	--	--	--	--	--	--	0.00010
4,4'-DDD	--	--	--	--	--	--	0.00010
2,4'-DDE	--	--	--	--	--	--	0.00010
4,4'-DDE	--	--	--	--	--	--	0.00010
2,4'-DDT	--	--	--	--	--	--	0.00010
4,4'-DDT	--	--	--	--	--	--	0.00010
Dieldrin	--	--	--	--	--	--	0.00010
Heptachlor	--	--	--	--	--	--	0.00010
Petroleum Hydrocarbons by NWTPH-G, Dx or 8015 (mg/kg)							
Gasoline-Range Organics	--	--	--	--	--	--	30
Diesel-Range Organics	--	--	--	--	--	--	200
Heavy Oil-Range Organics	--	--	--	--	--	--	2000
Total Petroleum Hydrocarbons	720	480	820	25	110	350	200

Table 5

Summary of Soil Chemical Analytical Data - PCBs, Pesticides and Petroleum Hydrocarbons

7100 1st Avenue South Site
Seattle, Washington

Sample Identification[1]	**MW-3-3.5**	**MW-3-13.5**	**MW-3-18.5**	**MW-4-3.5**	**SG-1-3.5**	**SG-1-11.5**	**Preliminary Screening Level (mg/kg)**
Sampled By	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	
Sample Date	**10/25/1990**	**10/25/1990**	**10/25/1990**	**10/26/1990**	**10/26/1990**	**10/26/1990**	
Sample Depth (feet bgs)	**3.5**	**13.5**	**18.5**	**3.5**	**3.5**	**11.5**	
Polychlorinated Biphenyls (PCBs) by EPA 8082 (mg/kg)							
PCB-aroclor 1016	--	--	--	--	--	--	0.0040
PCB-aroclor 1242	--	--	--	--	--	--	0.0040
PCB-aroclor 1248	--	--	--	--	--	--	0.0040
PCB-aroclor 1254	--	--	--	--	--	--	0.0040
PCB-aroclor 1260	--	--	--	--	--	--	0.0040
Total PCBs[2]	--	--	--	--	--	--	0.0100
Pesticides by EPA 8081A (mg/kg)							
2,4'-DDD	--	--	--	--	--	--	0.00010
4,4'-DDD	--	--	--	--	--	--	0.00010
2,4'-DDE	--	--	--	--	--	--	0.00010
4,4'-DDE	--	--	--	--	--	--	0.00010
2,4'-DDT	--	--	--	--	--	--	0.00010
4,4'-DDT	--	--	--	--	--	--	0.00010
Dieldrin	--	--	--	--	--	--	0.00010
Heptachlor	--	--	--	--	--	--	0.00010
Petroleum Hydrocarbons by NWTPH-G, Dx or 8015 (mg/kg)							
Gasoline-Range Organics	--	--	--	--	--	--	30
Diesel-Range Organics	--	--	--	--	--	--	200
Heavy Oil-Range Organics	--	--	--	--	--	--	2000
Total Petroleum Hydrocarbons	550	380	540	360	2800	18	200

Table 5

Summary of Soil Chemical Analytical Data - PCBs, Pesticides and Petroleum Hydrocarbons

7100 1st Avenue South Site

Seattle, Washington

Sample Identification[1]	SB-1-3.5	SB-1-11.5	SB-2-3.5	SB-2-8.5	SB-3-3.5	SB-3-11.5	Preliminary Screening Level (mg/kg)
Sampled By	Dames & Moore	Dames & Moore	Dames & Moore	Dames & Moore	Dames & Moore	Dames & Moore	
Sample Date	10/26/1990	10/26/1990	10/26/1990	10/26/1990	10/26/1990	10/26/1990	
Sample Depth (feet bgs)	3.5	11.5	3.5	8.5	3.5	11.5	
Polychlorinated Biphenyls (PCBs) by EPA 8082 (mg/kg)							
PCB-aroclor 1016	--	--	--	--	--	--	0.0040
PCB-aroclor 1242	--	--	--	--	--	--	0.0040
PCB-aroclor 1248	--	--	--	--	--	--	0.0040
PCB-aroclor 1254	--	--	--	--	--	--	0.0040
PCB-aroclor 1260	--	--	--	--	--	--	0.0040
Total PCBs[2]	--	--	--	--	--	--	0.0100
Pesticides by EPA 8081A (mg/kg)							
2,4'-DDD	--	--	--	--	--	--	0.00010
4,4'-DDD	--	--	--	--	--	--	0.00010
2,4'-DDE	--	--	--	--	--	--	0.00010
4,4'-DDE	--	--	--	--	--	--	0.00010
2,4'-DDT	--	--	--	--	--	--	0.00010
4,4'-DDT	--	--	--	--	--	--	0.00010
Dieldrin	--	--	--	--	--	--	0.00010
Heptachlor	--	--	--	--	--	--	0.00010
Petroleum Hydrocarbons by NWTPH-G, Dx or 8015 (mg/kg)							
Gasoline-Range Organics	--	--	--	--	--	--	30
Diesel-Range Organics	--	--	--	--	--	--	200
Heavy Oil-Range Organics	--	--	--	--	--	--	2000
Total Petroleum Hydrocarbons	12	73	57	350	99	31	200

Table 5

Summary of Soil Chemical Analytical Data - PCBs, Pesticides and Petroleum Hydrocarbons

7100 1st Avenue South Site

Seattle, Washington

Sample Identification[1]	**SB-4-8**	**SB-4-13**	**SB-4-18**	**SB-4-23**	**SB-4-28**	**SB-4-33**	**Preliminary Screening Level (µg/kg)**
Sampled By	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	
Sample Date	**12/6/1990**	**12/6/1990**	**12/6/1990**	**12/6/1990**	**12/6/1990**	**12/6/1990**	
Sample Depth (feet bgs)	**8**	**13**	**18**	**23**	**28**	**33**	
Polychlorinated Biphenyls (PCBs) by EPA 8082 (mg/kg)							
PCB-aroclor 1016	--	--	--	--	--	--	0.0040
PCB-aroclor 1242	--	--	--	--	--	--	0.0040
PCB-aroclor 1248	--	--	--	--	--	--	0.0040
PCB-aroclor 1254	--	--	--	--	--	--	0.0040
PCB-aroclor 1260	--	--	--	--	--	--	0.0040
Total PCBs[2]	--	--	--	--	--	--	0.0100
Pesticides by EPA 8081A (mg/kg)							
2,4'-DDD	--	--	--	--	--	--	0.00010
4,4'-DDD	--	--	--	--	--	--	0.00010
2,4'-DDE	--	--	--	--	--	--	0.00010
4,4'-DDE	--	--	--	--	--	--	0.00010
2,4'-DDT	--	--	--	--	--	--	0.00010
4,4'-DDT	--	--	--	--	--	--	0.00010
Dieldrin	--	--	--	--	--	--	0.00010
Heptachlor	--	--	--	--	--	--	0.00010
Petroleum Hydrocarbons by NWTPH-G, Dx or 8015 (mg/kg)							
Gasoline-Range Organics	--	--	--	--	--	--	30
Diesel-Range Organics	--	--	--	--	--	--	200
Heavy Oil-Range Organics	--	--	--	--	--	--	2000
Total Petroleum Hydrocarbons	130	207	460	240	450	55	200

Table 5

Summary of Soil Chemical Analytical Data - PCBs, Pesticides and Petroleum Hydrocarbons

7100 1st Avenue South Site
Seattle, Washington

Sample Identification[1]	SB-5-13	SB-5-18	SB-5-23	SB-5-28	SB-5-33	SS-1-18	Preliminary Screening Level (mg/kg)
Sampled By	Dames & Moore	Dames & Moore	Dames & Moore	Dames & Moore	Dames & Moore	Dames & Moore	
Sample Date	12/6/1990	12/6/1990	12/6/1990	12/6/1990	12/6/1990	1/25/1991	
Sample Depth (feet bgs)	13	18	23	28	33	18	
Polychlorinated Biphenyls (PCBs) by EPA 8082 (mg/kg)							
PCB-aroclor 1016	--	--	--	--	--	--	0.0040
PCB-aroclor 1242	--	--	--	--	--	--	0.0040
PCB-aroclor 1248	--	--	--	--	--	--	0.0040
PCB-aroclor 1254	--	--	--	--	--	--	0.0040
PCB-aroclor 1260	--	--	--	--	--	--	0.0040
Total PCBs[2]	--	--	--	--	--	--	0.0100
Pesticides by EPA 8081A (mg/kg)							
2,4'-DDD	--	--	--	--	--	--	0.00010
4,4'-DDD	--	--	--	--	--	--	0.00010
2,4'-DDE	--	--	--	--	--	--	0.00010
4,4'-DDE	--	--	--	--	--	--	0.00010
2,4'-DDT	--	--	--	--	--	--	0.00010
4,4'-DDT	--	--	--	--	--	--	0.00010
Dieldrin	--	--	--	--	--	--	0.00010
Heptachlor	--	--	--	--	--	--	0.00010
Petroleum Hydrocarbons by NWTPH-G, Dx or 8015 (mg/kg)							
Gasoline-Range Organics	--	--	--	--	--	--	30
Diesel-Range Organics	--	--	--	--	--	--	200
Heavy Oil-Range Organics	--	--	--	--	--	--	2000
Total Petroleum Hydrocarbons	210	3600	110	340	59	120	200

Table 5

Summary of Soil Chemical Analytical Data - PCBs, Pesticides and Petroleum Hydrocarbons

7100 1st Avenue South Site
Seattle, Washington

Sample Identification[1]	MW-08-30	MW-09-15	MW-10-20	MW-11-15	MW-12-15	MW-12-25	Preliminary Screening Level (µg/kg)
Sampled By	**SAIC**	**SAIC**	**SAIC**	**SAIC**	**SAIC**	**SAIC**	
Sample Date	**6/18/2008**	**6/18/2008**	**6/18/2008**	**6/19/2008**	**6/19/2008**	**6/19/2008**	
Sample Depth (feet bgs)	**30**	**15**	**20**	**15**	**15**	**25**	
Polychlorinated Biphenyls (PCBs) by EPA 8082 (mg/kg)							
PCB-aroclor 1016	0.0078 U	0.0071 U	0.76 U	0.0067 U	0.0059 U	0.063 U	0.0040
PCB-aroclor 1242	0.0078 U	0.0071 U	0.76 U	0.0067 U	0.0059 U	0.063 U	0.0040
PCB-aroclor 1248	0.0078 U	0.0071 U	15 **J**	0.0067 U	0.0059 U	0.8 **J**	0.0040
PCB-aroclor 1254	0.080	0.17	12 **J**	0.059	0.24	0.53 **J**	0.0040
PCB-aroclor 1260	0.10	0.12	0.76 U	0.0067 U	0.0059 U	0.4 **J**	0.0040
Total PCBs[2]	0.18	0.29	27	0.059	0.24	1.73	0.0100
Pesticides by EPA 8081A (mg/kg)							
2,4'-DDD	0.0068 **J**	0.0037 U	1.3 **J**	0.0014 U	0.0025 U	0.0085 U	0.00010
4,4'-DDD	0.0027	0.0048	0.16 **J**	0.0013	0.0016	0.014	0.00010
2,4'-DDE	0.0010 **J**	0.0026 U	0.064 U	0.00067 U	0.00059 U	0.00063 U	0.00010
4,4'-DDE	0.0015 **J**	0.0044 U	0.16 **J**	0.00067 U	0.00069 U	0.013 **J**	0.00010
2,4'-DDT	0.0061	0.0094	0.48 **J**	0.0034	0.013 **J**	0.022	0.00010
4,4'-DDT	0.0027 U	0.0019	0.093 **J**	0.0035	0.0096	0.021	0.00010
Dieldrin	0.00078 U	0.0023 U	0.0076 U	0.00067 U	0.001 U	0.0037 U	0.00010
Heptachlor	0.00078 U	0.00071 U	0.0076 U	0.00067 U	0.00059 U	0.00063 U	0.00010
Petroleum Hydrocarbons by NWTPH-G, Dx or 8015 (mg/kg)							
Gasoline-Range Organics	7.7 **J**	20 U	20 U	20 U	100 **J**	20 U	30
Diesel-Range Organics	670 **J**	43 **J**	72 **J**	50 U	410 **J**	90 **J**	200
Heavy Oil-Range Organics	970 **J**	100 **J**	180 **J**	100 U	490 **J**	290 **J**	2000
Total Petroleum Hydrocarbons	--	--	--	--	--	--	200

Table 5

Summary of Soil Chemical Analytical Data - PCBs, Pesticides and Petroleum Hydrocarbons

7100 1st Avenue South Site

Seattle, Washington

Notes:

[1] Approximate soil sample locations are shown on Figure 5.

[2] Total PCBs calculated by summing the individual detected PCB aroclor concentrations. If no individual PCB aroclors are detected, the highest reported PQL is used.

bgs = below ground surface

mg/kg = milligram per kilogram

"--" = not tested

U = analyte not detected above the reported sample practical quantitation limit (PQL)

J = estimated analyte concentration

NE = not established

Bold indicates analyte was detected above reporting level practical quantitation limits.

🟨 Yellow shading indicates analyte was detected above the preliminary soil screening level.

🟦 Blue shading indicates reported analyte quantitation limit is above the preliminary screening level.

Table 6

Summary of Soil Chemical Analytical Data - SVOCs

Remedial Investigation/Feasibility Study

7100 1st Avenue South Site
Seattle, Washington

Sample Identification[1]	SB-4-8	SB-5-13	MW-08-30	MW-09-15	MW-10-20	MW-11-15	MW-12-15	MW-12-25	Preliminary Screening Level (µg/kg)
Sampled By	Dames & Moore	Dames & Moore	SAIC	SAIC	SAIC	SAIC	SAIC	SAIC	
Sample Date	12/6/1990	12/6/1990	6/18/2008	6/18/2008	6/18/2008	6/19/2008	6/19/2008	6/19/2008	
Sample Depth (feet bgs)	8	13	30	15	20	15	15	25	
Semivolatile Organic Compounds (SVOCs) by 7270 or 8270 (µg/kg)									
1,4-Dichlorobenzene	--	--	7.9 U	7.1 U	7.6 U	6.6 U	30 U	6.3 U	20
2-Methylnaphthalene	40 U	50 U	**67**	**6 J**	**54**	**3.8 J**	**2200 J**	**25**	20
Acenaphthene	40 U	50 U	**14**	**2.5 J**	**56**	6.6 U	**37 J**	**2.8 J**	20
Acenaphthylene	40 U	50 U	**5.7** J	**1.3** J	**3.3** J	6.6 U	30 U	**1.5** J	69
Anthracene	40 U	50 U	**14**	**4.6 J**	**18**	**2.2 J**	**21 J**	**6.5**	20
Benzo(ghi)perylene	80 U	100 U	**13**	**7.1 J**	**4.6 J**	6.6 U	30 U	**4.9 J**	31
Bis(2-Ethylhexyl) Phthalate	--	--	**19 J**	**29 J**	**38 J**	**14 J**	**160 J**	**100**	47
Dibenzofuran	40 U	50 U	**9.6**	**4.2 J**	**23**	**1.8** J	**22 J**	**2.4** J	20
Dibutyl phthalate	--	--	16 U	15 U	16 U	14 U	59 U	13 U	20
Diethyl phthalate	--	--	7.9 U	7.1 U	7.6 U	**1.7** J	30 U	6.3 U	31
Fluoranthene	40 U	**56**	**56**	**25**	**260**	**9.1**	**45 J**	**33**	20
Fluorene	40 U	50 U	**19**	**4 J**	**35**	**2 J**	**51 J**	**4.0 J**	24
Isophorone	--	--	7.9 U	7.1 U	7.6 U	6.6 U	30 U	6.3 U	1,100,000
Naphthalene	40 U	50 U	**65**	**3.6 J**	**31**	6.6 **U**	**460 J**	**7.5**	5.0
p-Cresol (4-methylphenol)	--	--	7.9 U	**1.7 J**	**5.1** J	6.6 U	30 U	6.3 U	50
Pentachlorophenol	--	--	79 U	71 U	76 U	66 U	300 U	63 U	100
Phenanthrene	40 U	**67**	**54**	**17**	**65**	**7.6**	**100 J**	**18**	20
Phenol	--	--	24 U	22 U	23 U	20 U	88 U	19 U	20
Pyrene	40 U	**70**	**57**	**22**	**170**	**10**	**48 J**	**27**	20
Carcinogenic PAHs (cPAHs) by 8270 (µg/kg)									
Benzo(a)pyrene	80 U	100 U	**19**	**6 J**	**7.2 J**	**2.5 J**	**15 J**	**6.9**	5.0
Benz[a]anthracene	40 U	50 U	**21**	**10**	**15**	**3.6 J**	**17 J**	**9.8**	5.0
Benzo(b)fluoranthene	80 U	100 U	**25**	**9.3**	**10**	**4 J**	**21 J**	**8.3**	5.0
Benzo(k)fluoranthene	80 U	100 U	**8.3**	**3.2 J**	**3.4 J**	6.6 U	30 U	**2.9 J**	5.0
Chrysene	40 U	50 U	**31**	**14**	**16**	**3.5 J**	**18 J**	**13**	5.0
Indeno(1,2,3-cd)pyrene	80 U	100 U	**14**	**4.3 J**	**5.6 J**	6.6 U	30 U	**5.2 J**	5.0
Total cPAH TEQ[2]	53 U	72.75 U	**26.5**	**9.175**	**11**	**4.3**	**23.5**	**9.965**	0.0052

Table 6

Summary of Soil Chemical Analytical Data - SVOCs

Remedial Investigation/Feasibility Study

7100 1st Avenue South Site
Seattle, Washington

Notes:

[1] Approximate soil sample locations are shown on Figure 6.

[2] Total carcinogenic Polycyclic Aromatic Hydrocarbon (cPAH) calculated using toxic equivalent (TEQ) methodology relative to benzo(a)pyrene. cPAHs that were not detected were assigned a value of one half of the reporting limit for these calculations.

bgs = below ground surface

µg/kg = microgram per kilogram

"--" = not tested

U = analyte not detected above the reported sample practical quantitation limit (PQL)

J = estimated analyte concentration

NE = not established

Bold indicates analyte was detected above reporting level practical quantitation limits.

🟨 Yellow shading indicates analyte was detected above the preliminary soil screening level.

🟦 Blue shading indicates reported analyte quantitation limit is above the preliminary screening level.

Table 7

Summary of Soil Chemical Analytical Data - VOCs

7100 1st Avenue South Site

Seattle, Washington

Sample Identification[1]	MW-1-3.5	MW-1-8.5	MW-1-13.5	MW-2-3.5	MW-2-13.5	MW-2-18.5	Preliminary Screening Level (µg/kg)
Sampled By	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	
Sample Date	**10/25/1990**	**10/25/1990**	**10/25/1990**	**10/25/1990**	**10/25/1990**	**10/25/1990**	
Sample Depth (feet bgs)	**3.5**	**8.5**	**13.5**	**3.5**	**13.5**	**18.5**	
Volatile Organic Compounds (VOCs) by 8260 (µg/kg)							
1,2,4-Trimethylbenzene	--	--	--	--	--	--	NE
1,2-Dichloroethane	--	--	--	--	--	--	1.0
1,3,5-Trimethylbenzene	--	--	--	--	--	--	45
1,3-Dichlorobenzene	--	--	--	--	--	--	275
1,4-Dichlorobenzene	--	--	--	--	--	--	1.0
2-Butanone	--	--	--	--	--	--	1,376
2-Chlorotoluene	--	--	--	--	--	--	1,600,000
2-Hexanone	--	--	--	--	--	--	NE
4-Chlorotoluene	--	--	--	--	--	--	NE
Acetone	--	--	--	--	--	--	1,732
Benzene	2.0 U	2.0 U	5.0 U	2.0 U	**50.0**	2.0 U	1.0
Bromomethane	--	--	--	--	--	--	110,000
Carbon Disulfide	--	--	--	--	--	--	8,000,000
CFC-12	--	--	--	--	--	--	16,000,000
Chloroform	--	--	--	--	--	--	1.0
Chloromethane	--	--	--	--	--	--	NE
Ethylbenzene	2.0 U	2.0 U	5.0 U	2.0 U	2.0 U	2.0 U	1.4
Isopropylbenzene (Cumene)	--	--	--	--	--	--	8,000,000
Methylene Chloride	--	--	--	--	--	--	2.0
Naphthalene	--	--	--	--	--	--	5.0
n-Butylbenzene	--	--	--	--	--	--	NE
n-Propylbenzene	--	--	--	--	--	--	8,000,000.00
p-Isopropyltoluene	--	--	--	--	--	--	NE
Sec-Butylbenzene	--	--	--	--	--	--	NE
Tetrachloroethene	--	--	--	--	--	--	1.0
Toluene	2.0 U	2.0 U	5.0 U	2.0 U	2.0 U	2.0 U	555
m-Xylene & p-Xylene	2.0 U	2.0 U	5.0 U	2.0 U	2.0 U	2.0 U	200
o-Xylene	2.0 U	2.0 U	5.0 U	2.0 U	2.0 U	2.0 U	200

Table 7

Summary of Soil Chemical Analytical Data - VOCs

7100 1st Avenue South Site

Seattle, Washington

Sample Identification[1]	**MW-3-3.5**	**MW-3-13.5**	**MW-3-18.5**	**MW-4-3.5**	**SG-1-3.5**	**SG-1-11.5**	**Preliminary Screening Level (µg/kg)**
Sampled By	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	
Sample Date	**10/25/1990**	**10/25/1990**	**10/25/1990**	**10/26/1990**	**10/26/1990**	**10/26/1990**	
Sample Depth (feet bgs)	**3.5**	**13.5**	**18.5**	**3.5**	**3.5**	**11.5**	
Volatile Organic Compounds (VOCs) by 8260 (µg/kg)							
1,2,4-Trimethylbenzene	–	–	–	–	–	–	NE
1,2-Dichloroethane	–	–	–	–	–	–	1.0
1,3,5-Trimethylbenzene	–	–	–	–	–	–	45
1,3-Dichlorobenzene	–	–	–	–	–	–	275
1,4-Dichlorobenzene	–	–	–	–	–	–	1.0
2-Butanone	–	–	–	–	–	–	1,376
2-Chlorotoluene	–	–	–	–	–	–	1,600,000
2-Hexanone	–	–	–	–	–	–	NE
4-Chlorotoluene	–	–	–	–	–	–	NE
Acetone	–	–	–	–	–	–	1,732
Benzene	**15**	**28.0**	2.0 U	5.0 U	5.0 U	5.0 U	1.0
Bromomethane	–	–	–	–	–	–	110,000
Carbon Disulfide	–	–	–	–	–	–	8,000,000
CFC-12	–	–	–	–	–	–	16,000,000
Chloroform	–	–	–	–	–	–	1.0
Chloromethane	–	–	–	–	–	–	NE
Ethylbenzene	2.0 U	2.0 U	2.0 U	5.0 U	5.0 U	5.0 U	1.4
Isopropylbenzene (Cumene)	–	–	–	–	–	–	8,000,000
Methylene Chloride	–	–	–	–	–	–	2.0
Naphthalene	–	–	–	–	–	–	5.0
n-Butylbenzene	–	–	–	–	–	–	NE
n-Propylbenzene	–	–	–	–	–	–	8,000,000
p-Isopropyltoluene	–	–	–	–	–	–	NE
Sec-Butylbenzene	–	–	–	–	–	–	NE
Tetrachloroethene	–	–	–	–	–	–	1.0
Toluene	**2.3**	2.0 U	2.0 U	5.0 U	5.0 U	5.0 U	555
m-Xylene & p-Xylene	2.0 U	2.0 U	2.0 U	5.0 U	5.0 U	5.0 U	200
o-Xylene	2.0 U	2.0 U	2.0 U	5.0 U	5.0 U	5.0 U	200

Table 7

Summary of Soil Chemical Analytical Data - VOCs

7100 1st Avenue South Site

Seattle, Washington

Sample Identification[1]	**SB-1-3.5**	**SB-1-11.5**	**SB-2-3.5**	**SB-2-8.5**	**SB-3-3.5**	**SB-3-11.5**	**Preliminary Screening Level (µg/kg)**
Sampled By	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	
Sample Date	**10/26/1990**	**10/26/1990**	**10/26/1990**	**10/26/1990**	**10/26/1990**	**10/26/1990**	
Sample Depth (feet bgs)	**3.5**	**11.5**	**3.5**	**8.5**	**3.5**	**11.5**	
Volatile Organic Compounds (VOCs) by 8260 (µg/kg)							
1,2,4-Trimethylbenzene	--	--	--	--	--	--	NE
1,2-Dichloroethane	--	--	--	--	--	--	1.0
1,3,5-Trimethylbenzene	--	--	--	--	--	--	45
1,3-Dichlorobenzene	--	--	--	--	--	--	275
1,4-Dichlorobenzene	--	--	--	--	--	--	1.0
2-Butanone	--	--	--	--	--	--	1,376
2-Chlorotoluene	--	--	--	--	--	--	1,600,000
2-Hexanone	--	--	--	--	--	--	NE
4-Chlorotoluene	--	--	--	--	--	--	NE
Acetone	--	--	--	--	--	--	1,732
Benzene	5.0 U	5.0 U	5.0 U	5.0 U	**97.0**	5.0 U	1.0
Bromomethane	--	--	--	--	--	--	110,000
Carbon Disulfide	--	--	--	--	--	--	8,000,000
CFC-12	--	--	--	--	--	--	16,000,000
Chloroform	--	--	--	--	--	--	1.0
Chloromethane	--	--	--	--	--	--	NE
Ethylbenzene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	1.4
Isopropylbenzene (Cumene)	--	--	--	--	--	--	8,000,000
Methylene Chloride	--	--	--	--	--	--	2.0
Naphthalene	--	--	--	--	--	--	5.0
n-Butylbenzene	--	--	--	--	--	--	NE
n-Propylbenzene	--	--	--	--	--	--	8,000,000
p-Isopropyltoluene	--	--	--	--	--	--	NE
Sec-Butylbenzene	--	--	--	--	--	--	NE
Tetrachloroethene	--	--	--	--	--	--	1.0
Toluene	5.0 U	5.0 U	5.0 U	5.0 U	**13.0**	5.0 U	555
m-Xylene & p-Xylene	5.0 U	5.0 U	5.0 U	5.0 U	**18.0**	5.0 U	200
o-Xylene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	200

Table 7

Summary of Soil Chemical Analytical Data - VOCs

7100 1st Avenue South Site
Seattle, Washington

Sample Identification[1]	**SB-4-8**	**SB-5-13**	**MW-08-30**	**MW-09-15**	**MW-10-20**	**MW-11-15**	**Preliminary Screening Level (µg/kg)**
Sampled By	**Dames & Moore**	**Dames & Moore**	**SAIC**	**SAIC**	**SAIC**	**SAIC**	
Sample Date	**12/6/1990**	**12/6/1990**	**6/18/2008**	**6/18/2008**	**6/18/2008**	**6/19/2008**	
Sample Depth (feet bgs)	**8**	**13**	**30**	**15**	**20**	**15**	
Volatile Organic Compounds (VOCs) by 8260 (µg/kg)							
1,2,4-Trimethylbenzene	--	--	**6.6** J	25 U	**11** J	**0.17** J	NE
1,2-Dichloroethane	1.0 U	1.0 U	6.8 U	6.2 U	7.9 U	5.5 U	1.0
1,3,5-Trimethylbenzene	--	--	**2.6** J	25 U	**4.7** J	22 U	45
1,3-Dichlorobenzene	1.0 U	1.0 U	6.8 U	6.2 U	**0.38** J	5.5 U	275
1,4-Dichlorobenzene	1.0 U	1.0 U	6.8 U	6.2 U	**0.75** J	5.5 U	1.0
2-Butanone	1.0 U	1.0 U	27 U	25 U	32 U	**4.2** J	1,376
2-Chlorotoluene	--	--	27 U	25 U	32 U	22 U	1,600,000.00
2-Hexanone	10 U	10 U	27 U	25 U	32 U	22 U	NE
4-Chlorotoluene	--	--	27 U	25 U	32 U	22 U	NE
Acetone	**220**	**94**	**47**	**32**	**51**	**27**	1,732
Benzene	1.0 U	1.0 U	6.8 U	6.2 U	**52**	5.5 U	1.0
Bromomethane	1.0 U	1.0 U	6.8 U	**1.1** J	**1.2** J	5.5 U	110,000
Carbon Disulfide	1.0 U	1.0 U	**1.4** J	**2** J	**3.4** J	**2.2** J	8,000,000
CFC-12	--	--	6.8 U	6.2 U	7.9 U	5.5 U	16,000,000
Chloroform	1.0 U	1.0 U	6.8 U	6.2 U	7.9 U	5.5 U	1.0
Chloromethane	1.0 U	1.0 U	6.8 U	6.2 U	7.9 U	5.5 U	NE
Ethylbenzene	1.0 U	1.0 U	**2.4** J	**0.25** J	**3.3** J	5.5 U	1.4
Isopropylbenzene (Cumene)	--	--	**7.9** J	25 U	**6.1** J	22 U	8,000,000
Methylene Chloride	**110**	**54**	14 U	**0.33** J	**0.56** J	**0.41** J	2.0
Naphthalene	--	--	**4.9** J	**2.8** J	**7.2** J	**6.8** J	5.0
n-Butylbenzene	--	--	**0.95** J	25 U	**2.6** J	22 U	NE
n-Propylbenzene	--	--	**1.6** J	25 U	**2.8** J	22 U	8,000,000.00
p-Isopropyltoluene	--	--	**1.1** J	25 U	**2.6** J	22 U	NE
Sec-Butylbenzene	--	--	**1.3** J	25 U	**3.4** J	22 U	NE
Tetrachloroethene	1.0 U	1.0 U	6.8 U	6.2 U	7.9 U	5.5 U	1.0
Toluene	1.0 U	1.0 U	**1.0** J	**0.45** J	**1.4** J	**0.7** J	555
m-Xylene & p-Xylene	1.0 U	1.0 U	**4.9** J	6.2 U	**3.4** J	**0.2** J	200
o-Xylene	1.0 U	1.0 U	**2.4** J	6.2 U	**2** J	5.5 U	200

Table 7

Summary of Soil Chemical Analytical Data - VOCs

7100 1st Avenue South Site
Seattle, Washington

Sample Identification[1]	MW-12-15	MW-12-25	Preliminary Screening Level (µg/kg)
Sampled By	SAIC	SAIC	
Sample Date	6/19/2008	6/19/2008	
Sample Depth (feet bgs)	15	25	
Volatile Organic Compounds (VOCs) by 8260 (µg/kg)			
1,2,4-Trimethylbenzene	380	1.5 J	NE
1,2-Dichloroethane	53 U	5.6 U	1.0
1,3,5-Trimethylbenzene	91 J	23 U	45
1,3-Dichlorobenzene	53 U	5.6 U	275
1,4-Dichlorobenzene	53 U	5.6 U	1.0
2-Butanone	2100	6.5 J	1,376
2-Chlorotoluene	210	23 U	1,600,000
2-Hexanone	2100	23 U	NE
4-Chlorotoluene	210	23 U	NE
Acetone	310 J	38	1,732
Benzene	71	14	1.0
Bromomethane	53 U	2.5 J	110,000
Carbon Disulfide	53 U	3.9 J	8,000,000
CFC-12	55	9.7	16,000,000
Chloroform	53 U	5.6 U	1.0
Chloromethane	22 J	0.48 J	NE
Ethylbenzene	85	0.6 J	1.4
Isopropylbenzene (Cumene)	110 J	1 J	8,000,000
Methylene Chloride	95 J	2.3 J	2.0
Naphthalene	1500	9.5 J	5.0
n-Butylbenzene	400	4.7 J	NE
n-Propylbenzene	540	4.8 J	8,000,000
p-Isopropyltoluene	210 U	23 U	NE
Sec-Butylbenzene	120 J	1.5 J	NE
Tetrachloroethene	16 J	5.6 U	1.0
Toluene	180	1.4 J	555
m-Xylene & p-Xylene	320	1.6 J	200
o-Xylene	85	0.49 J	200

Table 7

Summary of Soil Chemical Analytical Data - VOCs

7100 1st Avenue South Site

Seattle, Washington

Notes:

[1] Approximate soil sample locations are shown on Figure 7.

bgs = below ground surface

"–" = not tested

U = analyte not detected above the reported sample practical quantitation limit (PQL)

J = estimated analyte concentration

NE = not established

Bold indicates analyte was detected above reporting level practical quantitation limits.

🟨 Yellow shading indicates analyte was detected above the preliminary soil screening level.

🟦 Blue shading indicates reported analyte quantitation limit is above the preliminary screening level.

Table 8

Summary of Groundwater Chemical Analytical Data - Metals

7100 1st Avenue South Site
Seattle, Washington

Monitoirng Well Identification[1]	**MW-1**	**MW-3**	**MW-4**	**MW-5**	**MW-8**	**MW-9**	**Preliminary Screening Level (µg/L)**
Sampled By	**SAIC** [2]	**SAIC** [2]	**SAIC** [2]	**SAIC** [2]	**SAIC** [2]	**SAIC** [2]	
Sample Date	**7/16/2008**	**7/16/2008**	**7/16/2008**	**7/17/2008**	**7/17/2008**	**7/17/2008**	
Depth to Water (feet bgs)	**12.31**	**12.04**	**10.09**	**10.09**	**11.38**	**10.58**	
Ground Surface Elevation (feet)	**18.06**	**18.34**	**17.87**	**16.56**	**17.51**	**16.92**	
Groundwater Elevation (feet)	**5.23**	**5.42**	**6.63**	**5.58**	**5.78**	**5.89**	
Dissolved Metals by EPA 200.7/200.8/7470/7471 (µg/L)							
Arsenic (total)	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	**5.4**	0.87
Cadmium	0.020 U	0.020 U	0.020 U	**0.040**	0.020 U	**0.030**	0.12
Chromium (total)	**1.3**	**3.5**	**2.4**	**15.1**	**1.3**	**1.2**	50
Copper	**0.30**	**2.00**	**0.30**	**1.6**	**0.50**	**0.90**	3.1
Lead	**0.030**	**0.310**	**0.001**	**1.4**	**1.61**	**0.76**	0.54
Mercury	--	--	--	--	--	--	0.0052
Nickel	--	--	--	--	--	--	8.2
Silver	0.02 U	0.02 U	0.02 U	**0.04**	0.02 U	0.02 U	0.2
Zinc	**0.70**	**6.0**	**1.4**	**13.2**	**6.5**	**4.6**	33

Table 8

Summary of Groundwater Chemical Analytical Data - Metals

7100 1st Avenue South Site
Seattle, Washington

Monitoirng Well Identification[1]	**MW-10**	**MW-11**	**MW-12**	**SEEP-1**	**SP-01**	**Preliminary Screening Level (µg/L)**
Sampled By	**SAIC [2]**	**SAIC [2]**	**SAIC [2]**	**SAIC [2]**	**SAIC [2]**	
Sample Date	**7/17/2008**	**7/17/2008**	**7/16/2008**	**5/4/2007**	**7/18/2008**	
Depth to Water (feet bgs)	**11.32**	**11.27**	**12.20**	**N/A**	**N/A**	
Ground Surface Elevation (feet)	**17.18**	**18.06**	**18.35**	**N/A**	**N/A**	
Groundwater Elevation (feet)	**5.58**	**6.56**	**5.84**	**N/A**	**N/A**	
Dissolved Metals by EPA 200.7/200.8/7470/7471 (µg/L)						
Arsenic (total)	5.0 U	5.0 U	5.0 U	**7.5**	5.0 U	0.87
Cadmium	**0.030**	0.020 U	0.020 U	**0.11**	0.020 U	0.12
Chromium (total)	**0.70**	**0.50**	**1.3**	**4.92**	**0.70**	50
Copper	**0.30**	**0.90**	**0.50**	**7.14**	**1.60**	3.1
Lead	**0.10**	**0.030**	**0.50**	**11.8**	**0.75**	0.54
Mercury	--	--	--	**0.040**	--	0.0052
Nickel	--	--	--	--	--	8.2
Silver	0.020 U	0.020 U	0.020 U	**0.040**	0.020 U	0.23
Zinc	**1.3**	**8.3**	**2.5**	**32.3**	**4.1**	33

Table 8

Summary of Groundwater Chemical Analytical Data - Metals

7100 1st Avenue South Site
Seattle, Washington

Notes:

[1] Approximate groundwater sample locations are shown on Figure 8.

[2] Depth to water and groundwater elevation measured on June 20, 2008

bgs = below ground surface

µg/L = micrograms per liter

"--" = not tested

U = analyte not detected above the reported sample practical quantitation limit (PQL)

J = estimated analyte concentration

N/A = not available

NE = not established

Bold indicates analyte was detected above reporting level practical quantitation limits.

🟨 Yellow shading indicates analyte was detected above the preliminary soil screening level.

🟦 Blue shading indicates reported analyte quantitation limit is above the preliminary screening level.

Table 9

Summary of Groundwater Chemical Analytical Data - PCBs, Pesticides and Petroleum Hydrocarbons

7100 1st Avenue South Site
Seattle, Washington

Monitoirng Well Identification[1]	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	Preliminary Screening Level (µg/L)
Sampled By	Dames & Moore	Dames & Moore	Dames & Moore	Dames & Moore	Dames & Moore	SAIC [2]	
Sample Date	11/1/1990	9/5/1991	1/10/1992	4/9/1992	8/16/1992	7/16/2008	
Depth to Water (feet bgs)	11.97	11.61	11.11	11.1	11.1	12.31	
Ground Surface Elevation (feet)	18.06	18.06	18.06	18.06	18.06	18.06	
Groundwater Elevation (feet)	6.09	6.45	6.95	6.96	6.96	5.23	
Polychlorinated Biphenyls (PCBs) by EPA 8082 (µg/L)							
PCB-aroclor 1016	--	--	--	--	--	0.020 U	0.010
PCB-aroclor 1242	--	--	--	--	--	0.020 U	0.014
PCB-aroclor 1248	--	--	--	--	--	0.020 U	0.014
PCB-aroclor 1254	--	--	--	--	--	0.020 U	0.010
PCB-aroclor 1260	--	--	--	--	--	0.020 U	0.014
Total PCBs[3]	--	--	--	--	--	0.020 U	0.010
Pesticides by EPA 8081A (µg/L)							
2,4'-DDD	--	--	--	--	--	0.00071 U	0.0012
4,4'-DDD	--	--	--	--	--	0.0038 U	0.0012
2,4'-DDE	--	--	--	--	--	0.00050 U	0.0012
4,4'-DDE	--	--	--	--	--	0.00050 U	0.0012
2,4'-DDT	--	--	--	--	--	0.00050 U	0.0012
4,4'-DDT	--	--	--	--	--	0.00050 U	0.0012
Dieldrin	--	--	--	--	--	0.00050 U	0.0012
Heptachlor	--	--	--	--	--	0.00050 U	0.0012
Petroleum Hydrocarbons by NWTPH-HCID[4], G, or Dx or 8015 (µg/L)							
Gasoline-Range Organics	--	--	--	250 U	250 U	250 U	800
Diesel-Range Organics	--	--	--	250 U	250 U	250 U	500
Heavy Oil-Range Organics	--	--	--	--	--	500 U	500
Total Petroleum Hydrocarbons	**590**	10000 U	2000 U	--	--	--	500

Table 9

Summary of Groundwater Chemical Analytical Data - PCBs, Pesticides and Petroleum Hydrocarbons

7100 1st Avenue South Site
Seattle, Washington

Monitoirng Well Identification[1]	**MW-2**	**MW-2**	**MW-2**	**MW-2**	**MW-3**	**MW-3**	**Preliminary Screening Level (µg/L)**
Sampled By	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	
Sample Date	**11/1/1990**	**1/10/1992**	**4/9/1992**	**8/16/1992**	**11/1/1990**	**9/5/1991**	
Depth to Water (feet bgs)	**11.34**	**10.7**	**10.7**	**11.28**	**11.82**	**11.42**	
Ground Surface Elevation (feet)	**17.75**	**17.75**	**17.75**	**17.75**	**18.34**	**18.34**	
Groundwater Elevation (feet)	**6.41**	**7.05**	**7.05**	**6.47**	**6.52**	**6.92**	
Polychlorinated Biphenyls (PCBs) by EPA 8082 (µg/L)							
PCB-aroclor 1016	--	--	--	--	--	--	0.010
PCB-aroclor 1242	--	--	--	--	--	--	0.014
PCB-aroclor 1248	--	--	--	--	--	--	0.014
PCB-aroclor 1254	--	--	--	--	--	--	0.010
PCB-aroclor 1260	--	--	--	--	--	--	0.014
Total PCBs[3]	--	--	--	--	--	--	0.010
Pesticides by EPA 8081A (µg/L)							
2,4'-DDD	--	--	--	--	--	--	0.0012
4,4'-DDD	--	--	--	--	--	--	0.0012
2,4'-DDE	--	--	--	--	--	--	0.0012
4,4'-DDE	--	--	--	--	--	--	0.0012
2,4'-DDT	--	--	--	--	--	--	0.0012
4,4'-DDT	--	--	--	--	--	--	0.0012
Dieldrin	--	--	--	--	--	--	0.0012
Heptachlor	--	--	--	--	--	--	0.0012
Petroleum Hydrocarbons by NWTPH-HCID[4], G, or Dx or 8015 (µg/L)							
Gasoline-Range Organics	--	--	--	250 U	--	--	800
Diesel-Range Organics	--	--	--	250 U	--	--	500
Heavy Oil-Range Organics	--	--	--	--	--	--	500
Total Petroleum Hydrocarbons	**560**	2000 U	**360**	--	**330**	10000 U	500

Table 9

Summary of Groundwater Chemical Analytical Data - PCBs, Pesticides and Petroleum Hydrocarbons

7100 1st Avenue South Site

Seattle, Washington

Monitoirng Well Identification[1]	**MW-3**	**MW-3**	**MW-3**	**MW-3**	**MW-4**[4]	**MW-4**	**Preliminary Screening Level (μg/L)**
Sampled By	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	**SAIC** [2]	**Dames & Moore**	**Dames & Moore**	
Sample Date	**1/10/1992**	**4/9/1992**	**8/16/1992**	**7/16/2008**	**11/1/1990**	**9/5/1991**	
Depth to Water (feet bgs)	**11.9**	**10.9**	**11.48**	**12.04**	**10.97**	**10.33**	
Ground Surface Elevation (feet)	**18.34**	**18.34**	**18.34**	**18.34**	**17.87**	**17.87**	
Groundwater Elevation (feet)	**6.44**	**7.44**	**6.86**	**5.42**	**88.45**	**89.09**	
Polychlorinated Biphenyls (PCBs) by EPA 8082 (μg/L)							
PCB-aroclor 1016	--	--	--	0.020 U	--	--	0.010
PCB-aroclor 1242	--	--	--	0.020 U	--	--	0.014
PCB-aroclor 1248	--	--	--	0.020 U	--	--	0.014
PCB-aroclor 1254	--	--	--	0.020 U	--	--	0.010
PCB-aroclor 1260	--	--	--	0.020 U	--	--	0.014
Total PCBs[3]	--	--	--	0.020 U	--	--	0.010
Pesticides by EPA 8081A (μg/L)							
2,4'-DDD	--	--	--	0.00049 U	--	--	0.0012
4,4'-DDD	--	--	--	0.00049 U	--	--	0.0012
2,4'-DDE	--	--	--	0.00049 U	--	--	0.0012
4,4'-DDE	--	--	--	0.00049 U	--	--	0.0012
2,4'-DDT	--	--	--	0.00049 U	--	--	0.0012
4,4'-DDT	--	--	--	0.00049 U	--	--	0.0012
Dieldrin	--	--	--	**0.00410 J**	--	--	0.0012
Heptachlor	--	--	--	0.00049 U	--	--	0.0012
Petroleum Hydrocarbons by NWTPH-HCID[4], G, or Dx or 8015 (μg/L)							
Gasoline-Range Organics	--	**720**	**310**	250 U	--	--	800
Diesel-Range Organics	--	250 U	**300**	630 U	--	--	500
Heavy Oil-Range Organics	--	--	--	630 U	--	--	500
Total Petroleum Hydrocarbons	2000 U	--	--	--	**270**	10000 U	500

Table 9

Summary of Groundwater Chemical Analytical Data - PCBs, Pesticides and Petroleum Hydrocarbons

7100 1st Avenue South Site
Seattle, Washington

Monitoirng Well Identification[1]	**MW-4**	**MW-4**	**MW-4**	**MW-4**	**MW-5**	**MW-5**	**Preliminary Screening Level (µg/L)**
Sampled By	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	**SAIC [2]**	**Dames & Moore**	**Dames & Moore**	
Sample Date	**1/10/1992**	**4/9/1992**	**8/16/1992**	**7/16/2008**	**1/10/1992**	**4/9/1992**	
Depth to Water (feet bgs)	**10.5**	**10**	**10.45**	**10.09**	**8.84**	**9**	
Ground Surface Elevation (feet)	**17.87**	**17.87**	**17.87**	**17.87**	**16.56**	**16.56**	
Groundwater Elevation (feet)	**88.92**	**89.42**	**88.97**	**6.63**	**7.72**	**7.56**	
Polychlorinated Biphenyls (PCBs) by EPA 8082 (µg/L)							
PCB-aroclor 1016	--	--	--	0.020 U	--	--	0.010
PCB-aroclor 1242	--	--	--	0.020 U	--	--	0.014
PCB-aroclor 1248	--	--	--	0.020 U	--	--	0.014
PCB-aroclor 1254	--	--	--	0.020 U	--	--	0.010
PCB-aroclor 1260	--	--	--	0.020 U	--	--	0.014
Total PCBs[3]	--	--	--	0.020 U	--	--	0.010
Pesticides by EPA 8081A (µg/L)							
2,4'-DDD	--	--	--	0.00050 U	--	--	0.0012
4,4'-DDD	--	--	--	0.00050 U	--	--	0.0012
2,4'-DDE	--	--	--	0.00050 U	--	--	0.0012
4,4'-DDE	--	--	--	0.00050 U	--	--	0.0012
2,4'-DDT	--	--	--	0.00050 U	--	--	0.0012
4,4'-DDT	--	--	--	0.00200 U	--	--	0.0012
Dieldrin	--	--	--	0.00050 U	--	--	0.0012
Heptachlor	--	--	--	0.00050 U	--	--	0.0012
Petroleum Hydrocarbons by NWTPH-HCID[4], G, or Dx or 8015 (µg/L)							
Gasoline-Range Organics	--	**150 J**	**220 J**	**350 J**	--	250 U	800
Diesel-Range Organics	--	250 U	250 U	**730 J**	--	250 U	500
Heavy Oil-Range Organics	--	--	--	520 U	--	--	500
Total Petroleum Hydrocarbons	2000 U	--	--	--	2000 U	--	500

Table 9

Summary of Groundwater Chemical Analytical Data - PCBs, Pesticides and Petroleum Hydrocarbons

7100 1st Avenue South Site
Seattle, Washington

Monitoirng Well Identification[1]	**MW-5**	**MW-5**	**MW-6**	**MW-6**	**MW-6**	**MW-7**	**Preliminary Screening Level (µg/L)**
Sampled By	**Dames & Moore**	**SAIC [2]**	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	
Sample Date	**8/16/1992**	**7/17/2008**	**1/10/1992**	**4/9/1992**	**8/16/1992**	**9/5/1991**	
Depth to Water (feet bgs)	**9.47**	**10.09**	**7.5**	**8.8**	**9.25**	**9.17**	
Ground Surface Elevation (feet)	**16.56**	**16.56**	**n/a**	**n/a**	**n/a**	**n/a**	
Groundwater Elevation (feet)	**7.09**	**5.58**	**n/a**	**n/a**	**n/a**	**n/a**	
Polychlorinated Biphenyls (PCBs) by EPA 8082 (µg/L)							
PCB-aroclor 1016	--	0.020 U	--	--	--	--	0.010
PCB-aroclor 1242	--	0.023 U	--	--	--	--	0.014
PCB-aroclor 1248	--	0.020 U	--	--	--	--	0.014
PCB-aroclor 1254	--	0.024 U	--	--	--	--	0.010
PCB-aroclor 1260	--	0.020 U	--	--	--	--	0.014
Total PCBs[3]	--	0.024 U	--	--	--	--	0.010
Pesticides by EPA 8081A (µg/L)							
2,4'-DDD	--	0.0026 U	--	--	--	--	0.0012
4,4'-DDD	--	0.00050 U	--	--	--	--	0.0012
2,4'-DDE	--	0.00050 U	--	--	--	--	0.0012
4,4'-DDE	--	0.0033 U	--	--	--	--	0.0012
2,4'-DDT	--	0.00050 U	--	--	--	--	0.0012
4,4'-DDT	--	0.0014 U	--	--	--	--	0.0012
Dieldrin	--	**0.0040 J**	--	--	--	--	0.0012
Heptachlor	--	0.00050 U	--	--	--	--	0.0012
Petroleum Hydrocarbons by NWTPH-HCID[4], G, or Dx or 8015 (µg/L)							
Gasoline-Range Organics	250 U	250 U	--	250 U	250 U	--	800
Diesel-Range Organics	**280**	**750 J**	--	**4200**	**1100**	--	500
Heavy Oil-Range Organics	--	500 U	--	--	--	--	500
Total Petroleum Hydrocarbons	--	--	2000 U	--	--	10000 U	500

Table 9

Summary of Groundwater Chemical Analytical Data - PCBs, Pesticides and Petroleum Hydrocarbons

7100 1st Avenue South Site
Seattle, Washington

Monitoirng Well Identification[1]	**MW-7**	**MW-7**	**MW-7**	**MW-8**	**MW-9**	**MW-10**	**Preliminary Screening Level (µg/L)**
Sampled By	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	**SAIC [2]**	**SAIC [2]**	**SAIC [2]**	
Sample Date	**1/10/1992**	**4/9/1992**	**8/16/1992**	**7/17/2008**	**7/17/2008**	**7/17/2008**	
Depth to Water (feet bgs)	**9.06**	**9**	**9.28**	**11.38**	**10.58**	**11.32**	
Ground Surface Elevation (feet)	**n/a**	**n/a**	**n/a**	**17.51**	**16.92**	**17.18**	
Groundwater Elevation (feet)	**n/a**	**n/a**	**n/a**	**5.78**	**5.89**	**5.58**	
Polychlorinated Biphenyls (PCBs) by EPA 8082 (µg/L)							
PCB-aroclor 1016	--	--	--	0.020 U	0.020 U	0.020 U	0.010
PCB-aroclor 1242	--	--	--	0.020 U	0.020 U	**0.110**	0.014
PCB-aroclor 1248	--	--	--	0.020 U	**0.034**	0.020 U	0.014
PCB-aroclor 1254	--	--	--	0.020 U	0.025 U	0.020 U	0.010
PCB-aroclor 1260	--	--	--	0.020 U	0.020 U	0.020 U	0.014
Total PCBs[3]	--	--	--	0.020 U	**0.034**	**0.110**	0.010
Pesticides by EPA 8081A (µg/L)							
2,4'-DDD	--	--	--	0.00050 U	0.00230 U	0.00050 U	0.0012
4,4'-DDD	--	--	--	0.0005 U	0.0005 U	0.0005 U	0.0012
2,4'-DDE	--	--	--	0.00050 U	0.00160 U	0.00062 U	0.0012
4,4'-DDE	--	--	--	0.00050 U	0.00049 U	0.00050 U	0.0012
2,4'-DDT	--	--	--	0.00050 U	0.00049 U	0.00050 U	0.0012
4,4'-DDT	--	--	--	0.00050 U	0.00049 U	0.00050 U	0.0012
Dieldrin	--	--	--	0.00110 U	0.00120 U	0.00050 U	0.0012
Heptachlor	--	--	--	0.00050 U	0.00200 U	**0.00130 J**	0.0012
Petroleum Hydrocarbons by NWTPH-HCID[4], G, or Dx or 8015 (µg/L)							
Gasoline-Range Organics	--	250 U	250 U	250 U	250 U	250 U	800
Diesel-Range Organics	--	**6600**	**730**	630 U	630 U	630 U	500
Heavy Oil-Range Organics	--	--	--	630 U	630 U	630 U	500
Total Petroleum Hydrocarbons	2000 U	--	--	--	--	--	500

Table 9

Summary of Groundwater Chemical Analytical Data - PCBs, Pesticides and Petroleum Hydrocarbons

7100 1st Avenue South Site
Seattle, Washington

Monitoirng Well Identification[1]	MW-11	MW-12	SEEP-1	SP-01	Preliminary Screening Level (µg/L)
Sampled By	SAIC [2]	SAIC [2]	SAIC	SAIC	
Sample Date	7/17/2008	7/16/2008	5/4/2007	7/18/2008	
Depth to Water (feet bgs)	11.27	12.20	n/a	n/a	
Ground Surface Elevation (feet)	18.06	18.35	n/a	n/a	
Groundwater Elevation (feet)	6.56	5.84	n/a	n/a	
Polychlorinated Biphenyls (PCBs) by EPA 8082 (µg/L)					
PCB-aroclor 1016	0.020 U	0.020 U	0.020 U	0.020 U	0.010
PCB-aroclor 1242	0.020 U	**0.100**	0.020 U	0.020 U	0.010
PCB-aroclor 1248	0.020 U	0.020 U	0.020 U	0.020 U	0.010
PCB-aroclor 1254	0.020 U	0.020 U	0.020 U	0.020 U	0.010
PCB-aroclor 1260	0.020 U	0.020 U	**0.500**	0.020 U	0.010
Total PCBs[3]	0.020 U	**0.100**	**0.500**	0.020 U	0.010
Pesticides by EPA 8081A (µg/L)					
2,4'-DDD	0.00050 U	0.00079 U	**0.01600 J**	0.00050 U	0.0012
4,4'-DDD	0.0005 U	0.0005 U	0.0130 U	0.0005 U	0.0012
2,4'-DDE	0.00050 U	**0.00150**	0.01100 U	0.00050 U	0.0012
4,4'-DDE	0.00050 U	0.00050 U	**0.01300 J**	0.00050 U	0.0012
2,4'-DDT	0.00050 U	0.00050 U	**0.01600**	0.00050 U	0.0012
4,4'-DDT	0.00050 U	**0.00240 J**	**0.09000**	0.00050 U	0.0012
Dieldrin	0.00050 U	0.00150 U	0.00053 U	0.00380 U	0.0012
Heptachlor	0.00050 U	0.00050 U	0.00053 U	0.00088 U	0.0012
Petroleum Hydrocarbons by NWTPH-HCID[4], G, or Dx or 8015 (µg/L)					
Gasoline-Range Organics	250 U	250 U	250 U	250 U	800
Diesel-Range Organics	630 U	**680 J**	630 U	630 U	500
Heavy Oil-Range Organics	630 U	500 U	630 U	630 U	500
Total Petroleum Hydrocarbons	--	--	--	--	500

Table 9

Summary of Groundwater Chemical Analytical Data - PCBs, Pesticides and Petroleum Hydrocarbons

7100 1st Avenue South Site
Seattle, Washington

Notes:

[1] Approximate groundwater sample locations are shown on Figure 9.

[2] Depth to water and groundwater elevation measured on June 20, 2008

[3] Total PCBs calculated by summing the individual detected PCB aroclor concentrations.

If no individual PCB aroclors are detected, the highest reported PQL is used.

[4] Groundwater results from 2008 for wells MW-1, MW-3, MW-5, MW-8, MW-9, MW-10, MW-11, and Seep SP-01 include non-detect results from analysis by NWTPH-HCID.

Listed numeric values represent PQL for analysis.

bgs = below ground surface

µg/L = micrograms per liter

"--" = not tested

U = analyte not detected above the reported sample practical quantitation limit (PQL)

J = estimated analyte concentration

NE = not established

Bold indicates analyte was detected above reporting level practical quantitation limits.

🟨 Yellow shading indicates analyte was detected above the preliminary soil screening level.

🟦 Blue shading indicates reported analyte quantitation limit is above the preliminary screening level.

Table 10

Summary of Groundwater Chemical Analytical Data - SVOCs

7100 1st Avenue South Site

Seattle, Washington

Monitoring Well Identification[1]	**MW-1**	**MW-3**	**MW-4**	**MW-5**	**MW-8**	**MW-9**	**Preliminary Screening Level (µg/L)**
Sampled By	**SAIC** [2]	**SAIC** [2]	**SAIC** [2]	**SAIC** [2]	**SAIC** [2]	**SAIC** [2]	
Sample Date	**7/16/2008**	**7/16/2008**	**7/16/2008**	**7/17/2008**	**7/17/2008**	**7/17/2008**	
Depth to Water (feet bgs)	**12.31**	**12.04**	**10.09**	**10.09**	**11.38**	**10.58**	
Ground Surface Elevation (feet)	**18.06**	**18.34**	**17.87**	**16.56**	**17.51**	**16.92**	
Groundwater Elevation (feet)	**5.23**	**5.42**	**6.63**	**5.58**	**5.78**	**5.89**	
Semivolatile Organic Compounds (SVOCs) by 7270 or 8270 (µg/L)							
1,4-Dichlorobenzene	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	1.7
2-Methylnaphthalene	0.19 U	0.26 U	0.20 U	0.20 U	0.20 U	0.20 U	4.2
Acenaphthene	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	**0.28**	2.6
Acenaphthylene	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	11
Anthracene	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	1.0
Benzo(ghi)perylene	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	1.0
Bis(2-Ethylhexyl) Phthalate	0.19 U	0.99 U	0.98 U	1.00 U	0.99 U	1.00 U	1.0
Dibenzofuran	0.19 U	**1.2**	0.20 U	0.20 U	0.20 U	0.20 U	1.3
Dibutyl phthalate	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	3.4
Diethyl phthalate	0.19 U	0.20 U	0.20 U	0.24 U	0.20 U	0.20 U	76
Fluoranthene	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	1.0
Fluorene	0.19 U	**1.8**	0.20 U	0.20 U	0.20 U	0.20 U	2.0
Isophorone	--	--	--	**0.30**	0.2 U	0.2 U	46
Naphthalene	0.19 U	**8.9**	0.20 U	0.20 U	0.20 U	0.20 U	0.5
p-Cresol (4-methylphenol)							77
Pentachlorophenol	0.95 U	0.99 U	0.98 U	1.00 U	0.99 U	1.00 U	5.0
Phenanthrene	0.19 U	**2.0**	0.20 U	0.20 U	0.20 U	0.20 U	1.0
Phenol	0.48 U	**2.2**	**3.0**	0.50 U	0.50 U	0.50 U	4.0
Pyrene	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	1.0
Carcinogenic PAHs (cPAHs) by 8270 (µg/L)							
Benz[a]anthracene	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.010
Benzo(a)pyrene	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.010
Benzo(b)fluoranthene	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.020
Benzo(k)fluoranthene	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.020
Chrysene	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.010
Indeno(1,2,3-cd)pyrene	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.010
Total cPAH TEQ[3]	0.14 **U**	0.15 U	0.15 **U**	0.15 **U**	0.15 **U**	0.15 **U**	3.2E-03

Table 10

Summary of Groundwater Chemical Analytical Data - SVOCs

7100 1st Avenue South Site
Seattle, Washington

Monitoring Well Identification[1]	MW-10	MW-11	MW-12	SEEP-1	SP-01	Preliminary Screening Level (µg/L)
Sampled By	SAIC [1]	SAIC [1]	SAIC [1]	SAIC	SAIC	
Sample Date	7/17/2008	7/17/2008	7/16/2008	5/4/2007	7/18/2008	
Depth to Water (feet bgs)	11.32	11.27	12.20	n/a	n/a	
Ground Surface Elevation (feet)	17.18	18.06	18.35	n/a	n/a	
Groundwater Elevation (feet)	5.58	6.56	5.84	n/a	n/a	
Semivolatile Organic Compounds (SVOCs) by 7270 or 8270 (µg/L)						
1,4-Dichlorobenzene	0.20 U	0.20 U	0.19 U	**1.3**	0.20 U	1.7
2-Methylnaphthalene	0.20 U	0.20 U	**0.30**	0.23 U	0.20 U	4.2
Acenaphthene	**0.68**	0.20 U	0.19 U	0.23 U	**0.35**	2.6
Acenaphthylene	0.20 U	0.20 U	0.19 U	0.23 U	0.20 U	11
Anthracene	0.20 U	0.20 U	0.19 U	0.23 U	0.20 U	1.0
Benzo(ghi)perylene	0.20 U	0.20 U	0.19 U	0.23 U	0.20 U	1.0
Bis(2-Ethylhexyl) Phthalate	0.99 U	1.00 U	0.19 U	1.20 U	1.00 U	1.0
Dibenzofuran	0.20 U	0.20 U	0.19 U	0.23 U	0.20 U	1.3
Dibutyl phthalate	0.20 U	0.20 U	0.19 U	**0.11 J**	0.20 U	3.4
Diethyl phthalate	0.20 U	0.20 U	0.19 U	**0.04 J**	0.20 U	76
Fluoranthene	0.20 U	0.20 U	0.19 U	0.23 U	0.20 U	1.0
Fluorene	0.20 U	0.20 U	0.19 U	0.23 U	0.20 U	2.0
Isophorone	0.2 U	0.2 U	–	–	0.2 U	46
Naphthalene	0.20 U	0.20 U	0.19 U	0.23 U	0.20 U	0.5
						77
Pentachlorophenol	0.99 U	1.00 U	0.95 U	**0.060 J**	1.00 U	5.0
Phenanthrene	0.20 U	0.20 U	0.19 U	0.23 U	0.20 U	1.0
Phenol	0.50 U	0.50 U	0.48 U	0.56 U	0.50 U	4.0
Pyrene	0.20 U	0.20 U	0.19 U	0.23 U	0.20 U	1.0
Carcinogenic PAHs (cPAHs) by 8270 (µg/L)						
Benz[a]anthracene	0.20 U	0.20 U	0.19 U	0.23 U	0.20 U	0.010
Benzo(a)pyrene	0.20 U	0.20 U	0.19 U	0.23 U	0.20 U	0.010
Benzo(b)fluoranthene	0.20 U	0.20 U	0.19 U	0.23 U	0.20 U	0.020
Benzo(k)fluoranthene	0.20 U	0.20 U	0.19 U	0.23 U	0.20 U	0.020
Chrysene	0.20 U	0.20 U	0.19 U	0.23 U	0.20 U	0.010
Indeno(1,2,3-cd)pyrene	0.20 U	0.20 U	0.19 U	0.23 U	0.20 U	0.010
Total cPAH TEQ[3]	0.15 **U**	0.15 **U**	0.14 **U**	0.16 **U**	0.15 **U**	3.2E-03

Table 10

Summary of Groundwater Chemical Analytical Data - SVOCs

7100 1st Avenue South Site
Seattle, Washington

Notes:

[1] Approximate groundwater sample locations are shown on Figure 10.

[2] Depth to water and groundwater elevation measured on June 20, 2008

[3] Total carcinogenic Polycyclic Aromatic Hydrocarbon (cPAH) calculated using toxic equivalent (TEQ) methodology relative to benzo(a)pyrene. cPAHs that were not detected were assigned a value of one half of the reporting limit for these calculations.

bgs = below ground surface

µg/L = micrograms per liter

"--" = not tested

U = analyte not detected above the reported sample practical quantitation limit (PQL)

J = estimated analyte concentration

NE = not established

Bold indicates analyte was detected above reporting level practical quantitation limits.

🟨 Yellow shading indicates analyte was detected above the preliminary soil screening level.

🟦 Blue shading indicates reported analyte quantitation limit is above the preliminary screening level.

Table 11

Summary of Groundwater Chemical Analytical Data - VOCs

7100 1^{st} Avenue South Site
Seattle, Washington

Monitoirng Well Identification[1]	**MW-1**	**MW-1**	**MW-1B**	**MW-1**	**MW-1**	**MW-1**	**Preliminary Screening Level (µg/L)**
Sampled By	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	**SAIC [2]**	
Sample Date	**11/1/1990**	**9/5/1991**	**1/10/1992**	**4/9/1992**	**8/16/1992**	**7/16/2008**	
Depth to Water (feet bgs)	**11.97**	**11.61**	**11.11**	**11.1**	**11.1**	**12.31**	
Ground Surface Elevation (feet)	**18.06**	**18.06**	**18.06**	**18.06**	**18.06**	**18.06**	
Groundwater Elevation (feet)	**6.09**	**6.45**	**6.95**	**6.96**	**6.96**	**5.23**	
Volatile Organic Compounds (VOCs) by 8260 (µg/L)							
1,2,4-Trichlorobenzene	--	--	--	--	--	2.00 U	NE
1,2-Dichloroethane	--	--	--	--	--	0.50 U	0.48
1,3,5-Trimethylbenzene	--	--	--	--	--	2.00 U	45
1,3-Dichlorobenzene	--	--	--	--	--	2.00 U	600
1,4-Dichlorobenzene	--	--	--	--	--	0.50 U	1.7
2-Butanone	--	--	--	--	--	20.00 U	4,800
2-Chlorotoluene	--	--	--	--	--	2.00 U	160
2-Hexanone	--	--	--	--	--	20.00 U	NE
4-Chlorotoluene	--	--	--	--	--	2.00 U	NE
Acetone	--	--	--	--	--	20.00 U	NE
Benzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.50 U	0.80
Bromomethane	--	--	--	--	--	0.50 U	11
Carbon Disulfide	--	--	--	--	--	0.50 U	800
CFC-12	--	--	--	--	--	0.50 U	1,600
Chloroform	--	--	--	--	--	0.50 U	1.8
Chloromethane	--	--	--	--	--	0.50 U	NE
Ethylbenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.50 U	1.7
Isopropylbenzene (Cumene)	--	--	--	--	--	2.00 U	800
Methylene Chloride	--	--	--	--	--	2.00 U	5.0
Naphthalene	--	--	--	--	--	2.00 U	0.50
n-Butylbenzene	--	--	--	--	--	2.00 U	NE
n-Propylbenzene	--	--	--	--	--	2.00 U	800
p-Isopropyltoluene	--	--	--	--	--	2.00 U	NE
Sec-Butylbenzene	--	--	--	--	--	2.00 U	NE
Tetrachloroethene	--	--	--	--	--	2.00 U	0.20
Toluene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	0.50 U	1,000
Xylenes	1.0 U	2.0 U	2.0 U	2.0 U	2.0 U	0.50 U	1,000

Table 11

Summary of Groundwater Chemical Analytical Data - VOCs

7100 1st Avenue South Site
Seattle, Washington

Monitoirng Well Identification[1]	MW-2	MW-2	MW-2	MW-2	MW-2	MW-3	Preliminary Screening Level (µg/L)
Sampled By	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	
Sample Date	**11/1/1990**	**9/5/1991**	**1/10/1992**	**4/9/1992**	**8/16/1992**	**11/1/1990**	
Depth to Water (feet bgs)	**11.34**	**11.26**	**10.7**	**10.7**	**11.28**	**11.82**	
Ground Surface Elevation (feet)	**17.75**	**17.75**	**17.75**	**17.75**	**17.75**	**18.34**	
Groundwater Elevation (feet)	**6.41**	**6.49**	**7.05**	**7.05**	**6.47**	**6.52**	
Volatile Organic Compounds (VOCs) by 8260 (µg/L)							
1,2,4-Trichlorobenzene	--	--	--	--	--	--	NE
1,2-Dichloroethane	--	--	--	--	--	--	0.48
1,3,5-Trimethylbenzene	--	--	--	--	--	--	45
1,3-Dichlorobenzene	--	--	--	--	--	--	600
1,4-Dichlorobenzene	--	--	--	--	--	--	1.7
2-Butanone	--	--	--	--	--	--	4,800
2-Chlorotoluene	--	--	--	--	--	--	160
2-Hexanone	--	--	--	--	--	--	NE
4-Chlorotoluene	--	--	--	--	--	--	NE
Acetone	--	--	--	--	--	--	NE
Benzene	1.0 U	**88**	**110**	**65**	**94**	1.0 U	0.8
Bromomethane	--	--	--	--	--	--	11
Carbon Disulfide	--	--	--	--	--	--	800
CFC-12	--	--	--	--	--	--	1,600
Chloroform	--	--	--	--	--	--	1.8
Chloromethane	--	--	--	--	--	--	NE
Ethylbenzene	1.0 U	1.0 U	1.0 U	1.0 U	**1.1**	**13**	1.7
Isopropylbenzene (Cumene)	--	--	--	--	--	--	800
Methylene Chloride	--	--	--	--	--	--	5.0
Naphthalene	--	--	--	--	--	--	0.50
n-Butylbenzene	--	--	--	--	--	--	NE
n-Propylbenzene	--	--	--	--	--	--	800
p-Isopropyltoluene	--	--	--	--	--	--	NE
Sec-Butylbenzene	--	--	--	--	--	--	NE
Tetrachloroethene	--	--	--	--	--	--	0.20
Toluene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	**3.5**	1,000
Xylenes	1.0 U	2.0 U	2.0 U	2.0 U	**5.3**	**48.4**	1,000

Table 11

Summary of Groundwater Chemical Analytical Data - VOCs

7100 1st Avenue South Site
Seattle, Washington

Monitoirng Well Identification[1]	**MW-3**	**MW-3**	**MW-3**	**MW-3**	**MW-3**	**MW-3**	**Preliminary Screening Level (µg/L)**
Sampled By	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	**SAIC [2]**	
Sample Date	**12/18/1990**	**9/5/1991**	**1/10/1992**	**4/9/1992**	**8/16/1992**	**7/16/2008**	
Depth to Water (feet bgs)	**n/a**	**11.42**	**11.9**	**10.9**	**11.48**	**12.04**	
Ground Surface Elevation (feet)	**18.34**	**18.34**	**18.34**	**18.34**	**18.34**	**18.34**	
Groundwater Elevation (feet)	**n/a**	**6.92**	**6.44**	**7.44**	**6.86**	**5.42**	
Volatile Organic Compounds (VOCs) by 8260 (µg/L)							
1,2,4-Trichlorobenzene	--	--	--	--	--	2.0 U	NE
1,2-Dichloroethane	--	--	--	--	--	2.5 U	0.48
1,3,5-Trimethylbenzene	--	--	--	--	--	2.00 U	45
1,3-Dichlorobenzene	--	--	--	--	--	0.50 U	600
1,4-Dichlorobenzene	--	--	--	--	--	0.50 U	1.7
2-Butanone	--	--	--	--	--	20 U	4,800
2-Chlorotoluene	--	--	--	--	--	2.0 U	160
2-Hexanone	--	--	--	--	--	20 U	NE
4-Chlorotoluene	--	--	--	--	--	2.0 U	NE
Acetone	--	--	--	--	--	20 U	NE
Benzene	**420**	**670**	**500**	**620**	**910**	**89 J**	0.8
Bromomethane	--	--	--	--	--	0.50 U	11
Carbon Disulfide	--	--	--	--	--	0.50 U	800
CFC-12	--	--	--	--	--	0.50 U	1,600
Chloroform	--	--	--	--	--	0.50 U	1.8
Chloromethane	--	--	--	--	--	0.50 U	NE
Ethylbenzene	**13**	**16**	**14**	**9.1**	**9.4**	0.50 U	1.7
Isopropylbenzene (Cumene)	--	--	--	--	--	2.0 U	800
Methylene Chloride	--	--	--	--	--	2.0 U	5
Naphthalene	--	--	--	--	--	13.0 U	0.50
n-Butylbenzene	--	--	--	--	--	2.0 U	NE
n-Propylbenzene	--	--	--	--	--	2.0 U	800
p-Isopropyltoluene	--	--	--	--	--	2.0 U	NE
Sec-Butylbenzene	--	--	--	--	--	2.0 U	NE
Tetrachloroethene	--	--	--	--	--	0.50 U	0.20
Toluene	**3.5**	**3.2**	**3.8**	**3.0**	**3.2**	**0.89**	1,000
Xylenes	**48.4**	**25**	**17**	**18**	**15**	**2.68**	1,000

Table 11

Summary of Groundwater Chemical Analytical Data - VOCs

7100 1st Avenue South Site
Seattle, Washington

Monitoirng Well Identification[1]	MW-4[3]	MW-4[3]	MW-4	MW-4	MW-4	MW-4	Preliminary Screening Level (µg/L)
Sampled By	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	
Sample Date	**11/1/1990**	**12/18/1990**	**9/5/1991**	**1/10/1992**	**4/9/1992**	**8/16/1992**	
Depth to Water (feet bgs)	**10.97**	**n/a**	**10.33**	**10.5**	**10**	**10.45**	
Ground Surface Elevation (feet)	**17.87**	**17.87**	**17.87**	**17.87**	**17.87**	**17.87**	
Groundwater Elevation (feet)	**88.45**	**n/a**	**89.09**	**88.92**	**89.42**	**88.97**	
Volatile Organic Compounds (VOCs) by 8260 (µg/L)							
1,2,4-Trichlorobenzene	--	--	--	--	--	--	NE
1,2-Dichloroethane	--	--	--	--	--	--	0.48
1,3,5-Trimethylbenzene	--	--	--	--	--	--	45
1,3-Dichlorobenzene	--	--	--	--	--	--	600
1,4-Dichlorobenzene	--	--	--	--	--	--	1.7
2-Butanone	--	--	--	--	--	--	4,800
2-Chlorotoluene	--	--	--	--	--	--	160
2-Hexanone	--	--	--	--	--	--	NE
4-Chlorotoluene	--	--	--	--	--	--	NE
Acetone	--	--	--	--	--	--	NE
Benzene	**4200**	**4100**	**2000**	**2700**	**1800**	**3400**	0.80
Bromomethane	--	--	--	--	--	--	11
Carbon Disulfide	--	--	--	--	--	--	800
CFC-12	--	--	--	--	--	--	1,600
Chloroform	--	--	--	--	--	--	1.8
Chloromethane	--	--	--	--	--	--	NE
Ethylbenzene	**2.1**	50 U	**1.0**	**4.1**	**1.0**	**4.6**	1.7
Isopropylbenzene (Cumene)	--	--	--	--	--	--	800
Methylene Chloride	--	--	--	--	--	--	5.0
Naphthalene	--	--	--	--	--	--	0.50
n-Butylbenzene	--	--	--	--	--	--	NE
n-Propylbenzene	--	--	--	--	--	--	800
p-Isopropyltoluene	--	--	--	--	--	--	NE
Sec-Butylbenzene	--	--	--	--	--	--	NE
Tetrachloroethene	--	--	--	--	--	--	0.20
Toluene	**8.3**	50 U	**12**	**11**	**6.2**	**12**	1,000
Xylenes	**5.9**	**64**	**19**	**17**	**5.7**	**19**	1,000

Table 11

Summary of Groundwater Chemical Analytical Data - VOCs

7100 1st Avenue South Site
Seattle, Washington

Monitoirng Well Identification[1]	MW-4	MW-5	MW-5	MW-5	MW-5	MW-5	Preliminary Screening Level (µg/L)
Sampled By	SAIC [2]	Dames & Moore	Dames & Moore	Dames & Moore	Dames & Moore	SAIC [2]	
Sample Date	7/16/2008	12/18/1990	1/10/1992	4/9/1992	8/16/1992	7/17/2008	
Depth to Water (feet bgs)	10.09	8.75	8.84	9	9.47	10.09	
Ground Surface Elevation (feet)	17.87	16.56	16.56	16.56	16.56	16.56	
Groundwater Elevation (feet)	6.63	7.81	7.72	7.56	7.09	5.58	
Volatile Organic Compounds (VOCs) by 8260 (µg/L)							
1,2,4-Trichlorobenzene	2.0 U	--	--	--	--	2.00 U	NE
1,2-Dichloroethane	**2.9**	--	--	--	--	0.50 U	0.48
1,3,5-Trimethylbenzene	**2.3**	--	--	--	--	2.00 U	45
1,3-Dichlorobenzene	0.50 U	--	--	--	--	0.50 U	600
1,4-Dichlorobenzene	0.50 U	--	--	--	--	0.50 U	1.7
2-Butanone	20 U	--	--	--	--	20.00 U	4,800
2-Chlorotoluene	2.0 U	--	--	--	--	2.00 U	160
2-Hexanone	20 U	--	--	--	--	20.00 U	NE
4-Chlorotoluene	2.0 U	--	--	--	--	2.00 U	NE
Acetone	20 U	--	--	--	--	20.00 U	NE
Benzene	**100** J	5.0 U	1.0 U	1.0 U	1.0 U	0.50 U	0.80
Bromomethane	0.50 U	--	--	--	--	0.50 U	11
Carbon Disulfide	0.50 U	--	--	--	--	0.50 U	800
CFC-12	0.50 U	--	--	--	--	0.50 U	1,600
Chloroform	0.50 U	--	--	--	--	0.50 U	1.8
Chloromethane	0.50 U	--	--	--	--	0.50 U	NE
Ethylbenzene	**0.89**	5.0 U	1.0 U	1.0 U	1.0 U	0.50 U	1.7
Isopropylbenzene (Cumene)	2.0 U	--	--	--	--	2.00 U	800
Methylene Chloride	2.0 U	--	--	--	--	2.00 U	5.0
Naphthalene	2.0 U	--	--	--	--	2.00 U	0.50
n-Butylbenzene	**3.5**	--	--	--	--	2.00 U	NE
n-Propylbenzene	2.0 U	--	--	--	--	2.00 U	800
p-Isopropyltoluene	2.0 U	--	--	--	--	2.00 U	NE
Sec-Butylbenzene	2.0 U	--	--	--	--	2.00 U	NE
Tetrachloroethene	0.50 U	--	--	--	--	0.50 U	0.20
Toluene	**3.9**	5.0 U	5.0 U	1.0 U	1.0 U	0.50 U	1,000
Xylenes	**16.6**	5.0 U	2.0 U	2.0 U	2.0 U	0.50 U	1,000

Table 11

Summary of Groundwater Chemical Analytical Data - VOCs

7100 1st Avenue South Site
Seattle, Washington

Monitoirng Well Identification[1]	MW-6	MW-6	MW-6	MW-6	MW-7	MW-7	Preliminary Screening Level (µg/L)
Sampled By	Dames & Moore	Dames & Moore	Dames & Moore	Dames & Moore	Dames & Moore	Dames & Moore	
Sample Date	12/18/1990	1/10/1992	4/9/1992	8/16/1992	12/18/1990	9/5/1991	
Depth to Water (feet bgs)	n/a	7.5	8.8	9.25	n/a	9.17	
Ground Surface Elevation (feet)	n/a	n/a	n/a	n/a	n/a	n/a	
Groundwater Elevation (feet)	n/a	n/a	n/a	n/a	n/a	n/a	
Volatile Organic Compounds (VOCs) by 8260 (µg/L)							
1,2,4-Trichlorobenzene	--	--	--	--	--	--	NE
1,2-Dichloroethane	--	--	--	--	--	--	0.48
1,3,5-Trimethylbenzene	--	--	--	--	--	--	45
1,3-Dichlorobenzene	--	--	--	--	--	--	600
1,4-Dichlorobenzene	--	--	--	--	--	--	1.7
2-Butanone	--	--	--	--	--	--	4,800
2-Chlorotoluene	--	--	--	--	--	--	160
2-Hexanone	--	--	--	--	--	--	NE
4-Chlorotoluene	--	--	--	--	--	--	NE
Acetone	--	--	--	--	--	--	NE
Benzene	5.0 U	1.0 U	1.0 U	1.0 U	5.0 U	**3.4**	0.80
Bromomethane	--	--	--	--	--	--	11
Carbon Disulfide	--	--	--	--	--	--	800
CFC-12	--	--	--	--	--	--	1,600
Chloroform	--	--	--	--	--	--	1.8
Chloromethane	--	--	--	--	--	--	NE
Ethylbenzene	5.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.7
Isopropylbenzene (Cumene)	--	--	--	--	--	--	800
Methylene Chloride	--	--	--	--	--	--	5.0
Naphthalene	--	--	--	--	--	--	0.50
n-Butylbenzene	--	--	--	--	--	--	NE
n-Propylbenzene	--	--	--	--	--	--	800
p-Isopropyltoluene	--	--	--	--	--	--	NE
Sec-Butylbenzene	--	--	--	--	--	--	NE
Tetrachloroethene	--	--	--	--	--	--	0.20
Toluene	5.0 U	1.0 U	1.0 U	1.0 U	5.0 U	**79**	1,000
Xylenes	5.0 U	2.0 U	2.0 U	2.0 U	5.0 U	2.0 U	1,000

Table 11

Summary of Groundwater Chemical Analytical Data - VOCs

7100 1st Avenue South Site
Seattle, Washington

Monitoirng Well Identification[1]	**MW-7**	**MW-7**	**MW-7**	**MW-8**	**MW-9**	**MW-10**	**Preliminary Screening Level (µg/L)**
Sampled By	**Dames & Moore**	**Dames & Moore**	**Dames & Moore**	**SAIC [2]**	**SAIC [2]**	**SAIC [2]**	
Sample Date	**1/10/1992**	**4/9/1992**	**8/16/1992**	**7/17/2008**	**7/17/2008**	**7/17/2008**	
Depth to Water (feet bgs)	**9.06**	**9**	**9.28**	**11.38**	**10.58**	**11.32**	
Ground Surface Elevation (feet)	**n/a**	**n/a**	**n/a**	**17.51**	**16.92**	**17.18**	
Groundwater Elevation (feet)	**n/a**	**n/a**	**n/a**	**5.78**	**5.89**	**5.58**	
Volatile Organic Compounds (VOCs) by 8260 (µg/L)							
1,2,4-Trichlorobenzene	--	--	--	2.0 U	2.0 U	2.0 U	NE
1,2-Dichloroethane	--	--	--	0.50 U	0.50 U	0.50 U	0.48
1,3,5-Trimethylbenzene	--	--	--	2.0 U	2.0 U	2.0 U	45
1,3-Dichlorobenzene	--	--	--	0.50 U	0.50 U	0.50 U	600
1,4-Dichlorobenzene	--	--	--	0.50 U	0.50 U	0.50 U	1.7
2-Butanone	--	--	--	20 U	20 U	20 U	4,800
2-Chlorotoluene	--	--	--	2.0 U	2.0 U	2.0 U	160
2-Hexanone	--	--	--	20 U	20 U	20 U	NE
4-Chlorotoluene	--	--	--	2.0 U	2.0 U	2.0 U	NE
Acetone	--	--	--	20 U	20 U	20 U	NE
Benzene	**1.7**	**1.6**	**1.1**	0.50 U	**0.80**	**1.1**	0.80
Bromomethane	--	--	--	0.50 U	0.50 U	0.50 U	11
Carbon Disulfide	--	--	--	0.50 U	0.50 U	0.50 U	800
CFC-12	--	--	--	0.50 U	0.50 U	0.50 U	1,600
Chloroform	--	--	--	0.50 U	0.50 U	0.50 U	1.8
Chloromethane	--	--	--	0.50 U	0.50 U	0.50 U	NE
Ethylbenzene	1.0 U	1.0 U	1.0 U	0.50 U	0.50 U	0.50 U	1.7
Isopropylbenzene (Cumene)	--	--	--	2.0 U	2.0 U	2.0 U	800
Methylene Chloride	--	--	--	2.0 U	2.0 U	2.0 U	5.0
Naphthalene	--	--	--	2.0 U	2.0 U	2.0 U	0.50
n-Butylbenzene	--	--	--	2.0 U	2.0 U	2.0 U	NE
n-Propylbenzene	--	--	--	2.0 U	2.0 U	2.0 U	800
p-Isopropyltoluene	--	--	--	2.0 U	2.0 U	2.0 U	NE
Sec-Butylbenzene	--	--	--	2.0 U	2.0 U	2.0 U	NE
Tetrachloroethene	--	--	--	0.50 U	0.50 U	0.50 U	0.20
Toluene	**4.2**	1.0 U	**22**	0.50 U	0.50 U	0.50 U	1,000
Xylenes	2.0 U	2.0 U	2.0 U	0.50 U	0.50 U	0.50 U	1,000

Table 11

Summary of Groundwater Chemical Analytical Data - VOCs

7100 1st Avenue South Site
Seattle, Washington

Monitoirng Well Identification[1]	MW-11	MW-12	SP-01	Preliminary Screening Level (µg/L)
Sampled By	SAIC [2]	SAIC [2]	SAIC	
Sample Date	7/17/2008	7/16/2008	7/18/2008	
Depth to Water (feet bgs)	11.27	12.20	n/a	
Ground Surface Elevation (feet)	18.06	18.35	n/a	
Groundwater Elevation (feet)	6.56	5.84	n/a	
Volatile Organic Compounds (VOCs) by 8260 (µg/L)				
1,2,4-Trichlorobenzene	2.0 U	2.0 U	2.0 U	NE
1,2-Dichloroethane	0.50 U	1.5 U	0.50 U	0.48
1,3,5-Trimethylbenzene	2.0 U	2.0 U	2.0 U	45
1,3-Dichlorobenzene	0.50 U	0.50 U	0.50 U	600
1,4-Dichlorobenzene	0.50 U	0.50 U	0.50 U	1.7
2-Butanone	20 U	20 U	20 U	4,800
2-Chlorotoluene	2.0 U	2.0 U	2.0 U	160
2-Hexanone	20 U	20 U	20 U	NE
4-Chlorotoluene	2.0 U	2.0 U	2.0 U	NE
Acetone	20 U	20 U	20 U	NE
Benzene	0.50 U	**59**	0.50 U	0.80
Bromomethane	0.50 U	0.50 U	0.50 U	11
Carbon Disulfide	0.50 U	0.50 U	0.50 U	800
CFC-12	0.50 U	0.50 U	0.50 U	1,600
Chloroform	**3.6**	0.50 U	**1.7**	1.8
Chloromethane	0.50 U	0.50 U	0.50 U	NE
Ethylbenzene	0.50 U	0.50 U	0.50 U	1.7
Isopropylbenzene (Cumene)	2.0 U	2.0 U	2.0 U	800
Methylene Chloride	2.0 U	2.0 U	2.0 U	5.0
Naphthalene	2.0 U	2.0 U	2.0 U	0.50
n-Butylbenzene	2.0 U	2.0 U	2.0 U	NE
n-Propylbenzene	2.0 U	2.0 U	2.0 U	800
p-Isopropyltoluene	2.0 U	2.0 U	2.0 U	NE
Sec-Butylbenzene	2.0 U	2.0 U	2.0 U	NE
Tetrachloroethene	0.50 U	0.50 U	0.50 U	0.20
Toluene	0.50 U	**0.730**	0.50 U	1,000
Xylenes	0.50 U	0.5 U	0.50 U	1,000

Table 11

Summary of Groundwater Chemical Analytical Data - VOCs

7100 1st Avenue South Site
Seattle, Washington

Notes:

[1] Approximate groundwater sample locations are shown on Figure 11.

[2] Depth to water and groundwater elevation measured on June 20, 2008

bgs = below ground surface

µg/L = micrograms per liter

"--" = not tested

U = analyte not detected above the reported sample practical quantitation limit (PQL)

J = estimated analyte concentration

NE = not established

Bold indicates analyte was detected above reporting level practical quantitation limits.

🟨 Yellow shading indicates analyte was detected above the preliminary soil screening level.

🟦 Blue shading indicates reported analyte quantitation limit is above the preliminary screening level.

Table 12

Summary of Sediment Chemical Analytical Data - Metals and Conventionals

7100 1st Avenue South Site
Seattle, Washington

Sample Identification[1]	**DR10**	**WIT280**	**WST345**	**WST346**	**WST347**	**DR135**	**Preliminary Screening Level (mg/kg DW)**
Source	**EIM Database**	**NOAA, 98**	**NOAA, 98**	**NOAA, 98**	**NOAA, 98**	**Weston, 1999**	
Sample Date	**9/30/1985**	**10/3/1997**	**10/9/1997**	**10/9/1997**	**10/6/1997**	**8/13/1998**	
Sample Depth	**0-10 cm**	**0-10 cm**	**0-10 cm**	**0-10 cm**	**0-10 cm**	**0-10 cm**	
Total Metals by EPA 6000/7000 Series (mg/kg DW)							
Aluminum	–	–	–	–	–	**15000**	32,600
Antimony	**8.74**	–	–	–	–	**10** UJ	3.1
Arsenic	**10.3**	–	–	–	–	**10**	7.3
Barium	–	–	–	–	–	**50**	540
Beryllium	–	–	–	–	–	**0.46**	0.60
Cadmium	**0.38**	–	–	–	–	**0.56**	3.7
Chromium	**51** J	–	–	–	–	**22**	35.6
Cobalt	–	–	–	–	–	**7.0**	9.6
Copper	**45.6**	–	–	–	–	**35**	310
Iron	**43300**	–	–	–	–	**19000** J	2300
Lead	**50.1**	–	–	–	–	**46**	40
Magnesium	–	–	–	–	–	**5500**	NE
Manganese	**686** J	–	–	–	–	**190**	180
Mercury	**0.32** J	–	–	–	–	**0.20**	0.41
Nickel	**27.3**	–	–	–	–	**16.0**	140
Selenium	0.11 U	–	–	–	–	**7.00**	3.0
Silver	0.27 J	–	–	–	–	**0.30**	6.1
Thallium	–	–	–	–	–	**0.10**	0.52
Tin	–	–	–	–	–	**3.0**	NE
Vanadium	–	–	–	–	–	**46**	43.3
Zinc	**116** J	–	–	–	–	**74**	410
Conventionals (%)							
Total Solids by EPA 160.3	–	–	–	–	–	–	NE
Total Organic Carbon by EPA 300.0	**4.87**	**1.09**	**1.89**	**2.04**	**1.55**	**2.00**	NE

Table 12

Summary of Sediment Chemical Analytical Data - Metals and Conventionals

7100 1st Avenue South Site
Seattle, Washington

Sample Identification[1]	DR136	DR137ACC	DR137CC	DR137	DR138	DR139	Preliminary Screening Level (mg/kg DW)
Source	Weston, 1999	Weston, 1999	Weston, 1999	Weston, 1999	Weston, 1999	Weston, 1999	
Sample Date	8/13/1998	9/23/1998	9/23/1998	9/23/1998	8/31/1998	9/14/1998	
Sample Depth	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm	
Total Metals by EPA 6000/7000 Series (mg/kg DW)							
Aluminum	19000	21000	20000 J	16000	8700	21000	32,600
Antimony	10 UJ	10.0 UJ	10 UJ	10 UJ	10 UJ	6.0 J	3.1
Arsenic	12	9.0	9.0	5.70	5.2	9.9	7.3
Barium	69	74	69	56	23	74	540
Beryllium	0.54	0.46	0.39 J	0.31	0.14	0.38 J	0.6
Cadmium	0.36	0.43 J	0.31	0.27	0.20 U	0.90	3.7
Chromium	27	27	26 J	24	16	52	35.6
Cobalt	9	10	10 J	7.0	4.0	10	9.6
Copper	44	42	44	39	20	86	310
Iron	25000 J	28000	27000	22000 J	16000 J	32000	2300
Lead	33	29 J	18	53	23	180 J	40
Magnesium	7200	7000	6500	6100	3300	8100	NE
Manganese	260	290	270	210	280	250	180
Mercury	0.17	0.20	0.20 J	0.14	0.050	0.82	0.41
Nickel	23	19	18	16	9.7	24	140
Selenium	6.0	0.90 J	0.90 J	4.0	8.0 J	1.0 U	3.0
Silver	0.23	0.22	0.16	0.19	0.11	1.1	6.1
Thallium	0.10	0.080	0.13 J	0.090	0.030	0.11 J	0.52
Tin	3.0	4.0	4.0 J	4.0	4.0 UJ	10 J	NE
Vanadium	53	53	73	69	50	71	43.3
Zinc	92	79	70	88	57	240	410
Conventionals (%)							
Total Solids by EPA 160.3	--	--	--	--	--	--	NE
Total Organic Carbon by EPA 300.0	2.6	2.5	2.60	2.20	0.47	3.00	NE

Table 12

Summary of Sediment Chemical Analytical Data - Metals and Conventionals

7100 1st Avenue South Site
Seattle, Washington

Sample Identification[1]	DR156	DR157	DR168	DR169	B5A1341	B6A1933	Preliminary Screening Level (mg/kg DW)
Source	Weston, 1999	Weston, 1999	Weston, 1999	Weston, 1999	EIM Database	EIM Database	
Sample Date	8/13/1998	8/31/1998	8/13/1998	8/13/1998	9/24/2004	8/15/2004	
Sample Depth	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm	
Total Metals by EPA 6000/7000 Series (mg/kg DW)							
Aluminum	20000	18000	17000	18000	--	--	32,600
Antimony	10 UJ	10 UJ	10 UJ	10 UJ	0.84	0.90 J	3.1
Arsenic	12	10	9.8	8.0	8.66 J	5.26	7.3
Barium	86	81	--	--	--	--	540
Beryllium	0.54	0.32	--	--	--	--	0.6
Cadmium	0.38	1.2	0.41	0.17	0.31	0.14	3.7
Chromium	28	55	26	26	29	14.9	35.6
Cobalt	10	9.0	9.0	9.0	7.8	4.9	9.6
Copper	48	83	45	34	37.5	25.5	310
Iron	26000 J	27000 J	--	--	--	--	2300
Lead	29	250	31	19	80.3	44.6	40
Magnesium	7800	7700	6700	6800	--	--	NE
Manganese	300	200	270	240	--	--	180
Mercury	0.15	1.6	0.14	0.12	0.16	0.059	0.41
Nickel	23	19	20	24	16.1	12.5	140
Selenium	7.0	14 J	5.0	7.0	0.30 J	0.50	3.0
Silver	0.22	1.1	0.23	0.15	0.20	0.083	6.10
Thallium	0.11	0.10	0.12	0.10	0.069	0.055	0.52
Tin	3.0	9.0	3.0	2.0 UJ	--	--	NE
Vanadium	54	67	50	49	47.5	37.3	43.3
Zinc	92	250	93	70	121	65.6	410
Conventionals (%)							
Total Solids by EPA 160.3	--	--	--	--	68.6	71.2	NE
Total Organic Carbon by EPA 300.0	2.8	5.5	3.1	2.0	1.49	0.89	NE

Table 12

Summary of Sediment Chemical Analytical Data - Metals and Conventionals

7100 1st Avenue South Site
Seattle, Washington

Sample Identification[1]	B5A-2365	C61006	LDW-SS82	LDW-SS84	LDW-SSB6	LDW-1335	Preliminary Screening Level (mg/kg DW)
Source	EIM Database	EIM Database	Windward, 2005b	Windward, 2005a	Windwad, 2005b	EIM Database	
Sample Date	8/16/2004	8/25/2004	3/7/2005	1/19/2005	3/15/2005	2/15/2006	
Sample Depth	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-30 cm	
Total Metals by EPA 6000/7000 Series (mg/kg DW)							
Aluminum	–	–	–	–	–	–	32,600
Antimony	–	**2.04** J	**0.40** UJ	**0.30** UJ	**0.70** J	**6.0** UJ	3.1
Arsenic	–	**5.52**	**9.4**	**12.3**	**17.3**	**9.0**	7.3
Barium	–	–	–	–	–	–	540
Beryllium	–	–	–	–	–	–	0.6
Cadmium	–	**0.12**	**0.40**	**2.0** J	0.30 U	0.30 U	3.7
Chromium	–	**12.0**	**27.7**	**122**	**14.3**	**17.6**	35.6
Cobalt	–	**3.91**	**8.7**	**13.1**	**4.5**	**5.5**	9.6
Copper	–	**22.1**	**59.6**	**117**	**24.5**	**26.9**	310
Iron	–	–	–	–	–	–	2300
Lead	–	**91.5**	**328**	**615**	**24**	**23**	40
Magnesium	–	–	–	–	–	–	NE
Manganese	–	–	–	–	–	–	180
Mercury	–	**0.059**	**0.15**	**2.46**	**0.060**	**0.22**	0.41
Nickel	–	**8.96**	**20**	**39**	**9.0**	**15.0**	140
Selenium	–	**0.40** J	9.0 U	8.0 U	7.0 U	6.0 U	3.0
Silver	–	**0.083**	0.60 U	**1.7**	0.40 U	0.40 U	6.10
Thallium	–	**0.047**	0.40 U	0.30 U	0.30 U	7.0 U	0.52
Tin	–	–	–	–	–	–	NE
Vanadium	–	**45.1**	**63.9**	**55.1**	**41.4**	**58.8**	43.3
Zinc	–	**64.8** J	**150**	**417**	**52.2**	**77.7**	410
Conventionals (%)							
Total Solids by EPA 160.3	**77.3**	**70.2**	**51.6**	**56.6**	**71**	**70.3**	NE
Total Organic Carbon by EPA 300.0	**0.29**	**1.24**	**2.09**	**4.12**	**1.26**	**1.16**	NE

Table 12

Summary of Sediment Chemical Analytical Data - Metals and Conventionals

7100 1st Avenue South Site
Seattle, Washington

Sample Identification[1]	**LDW-1335**	**LDW-1335**	**LDW-1335**	**LDW-2393**	**LDW-2393**	**LDW-2393**	**Preliminary Screening Level (mg/kg DW)**
Source	**EIM Database**	**EIM Database**	**EIM Database**	**EIM Database**	**EIM Database**	**EIM Database**	
Sample Date	**2/15/2006**	**2/15/2006**	**2/15/2006**	**2/23/2006**	**2/23/2006**	**2/23/2006**	
Sample Depth	**30-60 cm**	**60-120 cm**	**120-182 cm**	**0-40 cm**	**40-60 cm**	**60-120 cm**	
Total Metals by EPA 6000/7000 Series (mg/kg DW)							
Aluminum	--	--	--	--	--	--	32,600
Antimony	**7.0** UJ	**6.0** UJ	--	**7.0** UJ	**6.0** UJ	**6.0** UJ	3.1
Arsenic	**7.0**	**14**	--	**7.0**	6.0 U	6.0 U	7.3
Barium	--	--	--	--	--	--	540
Beryllium	--	--	--	--	--	--	0.6
Cadmium	**0.20** UJ	**0.60**	--	**0.30** UJ	0.20 U	0.20 U	3.7
Chromium	**16.1**	**24.7**	--	**14.4**	**17**	**12.4**	35.6
Cobalt	**6.0**	**7.2**	--	**4.3**	**4.6**	**3.8**	9.6
Copper	**29.2**	**34.7**	--	**20.9**	**13.8**	**8.3**	310
Iron	--	--	--	--	--	--	2300
Lead	**35**	**48**	--	**18**	**44**	**2.0**	40
Magnesium	--	--	--	--	--	--	NE
Manganese	--	--	--	--	--	--	180
Mercury	**0.060**	**0.24**	--	**0.050**	0.050 U	0.05 U	0.41
Nickel	**15**	**17**	--	**10**	**15**	**8.0**	140
Selenium	6.0 U	7.0 U	--	7.0 U	6.0 U	6.0 U	3.0
Silver	0.40 U	0.40 U	--	0.40 U	0.40 U	0.40 U	6.10
Thallium	6.0 U	6.0 U	--	6.0 U	7.0 U	6.0 U	0.52
Tin	--	--	--	--	--	--	NE
Vanadium	**45.1**	**51.4**	--	**45.5**	**45.5**	**44.7**	43.3
Zinc	**76.5**	**58.7**	--	**47.4**	**27.4**	**25.1**	410
Conventionals (%)							
Total Solids by EPA 160.3	**82.6**	**67.6**	**57.9**	**73.2**	**80.6**	**82.2**	NE
Total Organic Carbon by EPA 300.0	**0.63**	**1.56**	**2.5**	**0.75**	**0.33**	**0.22**	NE

Table 12

Summary of Sediment Chemical Analytical Data - Metals and Conventionals

7100 1st Avenue South Site
Seattle, Washington

Sample Identification[1]	LDW-8574	LDW9086B	LDW9086B	LDW9086B	SPI-128	TRI-157T	Preliminary Screening Level (mg/kg DW)
Source	EIM Database	EIM Database	EIM Database	EIM Database	EIM Database	EIM Database	
Sample Date	2/20/2006	2/20/2006	2/20/2006	2/20/2006	8/10/2006	8/11/2006	
Sample Depth	91-100 cm	0-30 cm	30-60 cm	60-91 cm	0-10 cm	0-10 cm	
Total Metals by EPA 6000/7000 Series (mg/kg DW)							
Aluminum	–	–	–	–	–	–	32,600
Antimony	**7.0** UJ	**7.0** UJ	**7.0** UJ	**7.0** UJ	0.20 U	0.20 U	3.1
Arsenic	7.0 U	**11**	**10**	**13**	**10.5**	**11.1**	7.3
Barium	–	–	–	–	–	–	540
Beryllium	–	–	–	–	–	–	0.6
Cadmium	0.30 U	0.30 U	0.30 U	**0.50**	**0.32**	**0.38**	3.7
Chromium	**12.4**	**23.4**	**22**	**26.8**	**24.1**	**28.6**	35.6
Cobalt	**6.2**	**7.4**	**6.9**	**6.9**	–	–	9.6
Copper	**20.1**	**34.7**	**31.5**	**38.5**	**44.5**	**50.4**	310
Iron	–	–	–	–	–	–	2300
Lead	**8.0**	**28.0**	**19**	**36**	**23.7**	**69.5**	40
Magnesium	–	–	–	–	–	–	NE
Manganese	–	–	–	–	–	–	180
Mercury	0.050 U	**0.31**	**0.27**	**0.45**	**0.12**	**0.39**	0.41
Nickel	**18**	**15.0**	**14**	**15.0**	**20.9**	**18.1**	140
Selenium	7.0 U	7.0 U	7.0 U	7.0 U	–	–	3.0
Silver	0.40 U	0.40 U	0.40 U	0.40 U	**0.15**	**0.20**	6.10
Thallium	7.0 U	7.0 U	7.0 U	7.0 U	–	–	0.52
Tin	–	–	–	–	–	–	NE
Vanadium	**39.4**	**56.7**	**57.1**	**57.1**	–	–	43.3
Zinc	**30.4**	**64.1**	**54.5**	**76.8**	**96**	**120**	410
Conventionals (%)							
Total Solids by EPA 160.3	**69.1**	**46.7**	**54.9**	**69.6**	**51.2**	**51.4**	NE
Total Organic Carbon by EPA 300.0	**1.3**	**1.95**	**1.37**	**1.50**	**2.23**	**1.69**	NE

Table 12

Summary of Sediment Chemical Analytical Data - Metals and Conventionals

7100 1st Avenue South Site
Seattle, Washington

Sample Identification[1]	SED-1	SED-2	SED-3	SED-4	SED-5	LDW-SS525	Preliminary Screening Level (mg/kg DW)
Source	SAIC, 2009	SAIC, 2009	SAIC, 2009	SAIC, 2009	SAIC, 2009	EIM Database	
Sample Date	5/4/2007	5/4/2007	5/4/2007	5/7/2007	5/8/2007	12/16/2009	
Sample Depth	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm	
Total Metals by EPA 6000/7000 Series (mg/kg DW)							
Aluminum	--	--	--	--	--	--	32,600
Antimony	--	--	--	--	--	--	3.1
Arsenic	48.7	20.1	2.6	3.7	7.8	--	7.3
Barium	--	--	--	--	--	--	540
Beryllium	--	--	--	--	--	--	0.6
Cadmium	36.3	6.69	0.15	0.71	1.13	--	3.7
Chromium	1680	507	15.1	28.5	48.8	--	35.6
Cobalt	--	--	--	--	--	--	9.6
Copper	1090	157	19.6	34.4	146	--	310
Iron	--	--	--	--	--	--	2300
Lead	10400	4280	35.9	137	225	--	40
Magnesium	--	--	--	--	--	--	NE
Manganese	--	--	--	--	--	--	180
Mercury	247 J	59.5 J	0.21 J	0.20 J	0.29 J	--	0.41
Nickel	--	--	--	--	--	--	140
Selenium	--	--	--	--	--	--	3.0
Silver	19 J	0.67 J	0.17 J	0.13 J	0.91 J	--	6.1
Thallium	--	--	--	--	--	--	0.52
Tin	--	--	--	--	--	--	NE
Vanadium	--	--	--	--	--	--	43.3
Zinc	4580	2140	43.5	175	255	--	410
Conventionals (%)							
Total Solids by EPA 160.3	57.7	48.6	85.5	84.1	71.7	74.4	NE
Total Organic Carbon by EPA 300.0	12	6.45	1.07	0.95	1.88	0.67	NE

Table 12

Summary of Sediment Chemical Analytical Data - Metals and Conventionals

7100 1st Avenue South Site
Seattle, Washington

Notes:

[1] Approximate surface (0-10 cm) sediment sample locations are shown on Figure 12. Subsurface (below 10 cm) sediment sample locations are shown on Figure 15.

U = analyte not detected above the reported sample practical quantitation limit (PQL)

J = estimated analyte concentration

mg/kg = milligram per kilogram

DW = dry weight

"--" = not tested

NE = not established

Bold indicates analyte was detected above reporting level practical quantitation limits.

🟨 Yellow shading indicates analyte was detected above the preliminary screening level.

🟦 Blue shading indicates reported analyte quantitation limit is above the preliminary screening level.

Table 13

Summary of Sediment Chemical Analytical Data - PCBs, Pesticides and Petroleum Hydrocarbons

7100 1st Avenue South Site
Seattle, Washington

Sample Identification[1]	DR10	WIT280	WST345	WST346	WST347	DR135	Preliminary Screening Level (mg/kg DW)
Source	EIM Database	NOAA, 98	NOAA, 98	NOAA, 98	NOAA, 98	Weston, 1999	
Sample Date	9/30/1985	10/3/1997	10/9/1997	10/9/1997	10/6/1997	8/13/1998	
Sample Depth	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm	
Polychlorinated Biphenyls (PCBs) by EPA 8082 (mg/kg DW)							
PCB-aroclor 1016	--	--	--	--	--	0.020 UJ	NE
PCB-aroclor 1221	--	--	--	--	--	0.040 U	NE
PCB-aroclor 1232	--	--	--	--	--	0.020 U	NE
PCB-aroclor 1242	--	--	--	--	--	0.020 U	NE
PCB-aroclor 1248	--	--	--	--	--	0.020 U	NE
PCB-aroclor 1254	--	--	--	--	--	0.18	NE
PCB-aroclor 1260	--	--	--	--	--	0.080 J	NE
Total PCBs[2]	--	--	--	--	--	0.26	0.0040
Pesticides by EPA 8081A (mg/kg DW)							
2,4'-DDD	--	--	--	--	--	--	0.016
2,4'-DDE	--	--	--	--	--	--	0.0090
2,4'-DDT	--	--	--	--	--	--	0.0012
4,4'-DDD	0.034	--	--	--	--	--	0.016
4,4'-DDE	0.062	--	--	--	--	--	0.0090
4,4'-DDT	0.065	--	--	--	--	--	0.0012
Aldrin	0.0079 U	--	--	--	--	--	0.0095
alpha-Chlordane (cis)	--	--	--	--	--	--	NE
beta or gamma-Chlordane (trans)	--	--	--	--	--	--	NE
Beta-BHC	0.011 U	--	--	--	--	--	NE
Chlordane (Total)	0.13 U	--	--	--	--	--	0.0028
Dieldrin	0.0075 U	--	--	--	--	--	0.0019
Endosulfan I	--	--	--	--	--	--	NE
Endosulfan II	--	--	--	--	--	--	NE
Endrin	0.010 U	--	--	--	--	--	NE
Hexachlorobenzene	0.024 U	--	--	--	--	0.020 U	0.022
Lindane (Gamma-BHC)	0.0057 U	--	--	--	--	--	0.01
Methoxychlor	--	--	--	--	--	--	NE
Dioxin and Furans (mg/kg DW)							
2,3,7,8-TCDD (Dioxin)	--	--	--	--	--	--	4.0E-06
Petroleum Hydrocarbons by NWTPH-G, Dx or 8015 (mg/kg DW)							
Gasoline-Range Organics	--	--	--	--	--	--	30
Diesel-Range Organics	--	--	--	--	--	--	200
Heavy Oil-Range Organics	--	--	--	--	--	--	2000

Table 13

Summary of Sediment Chemical Analytical Data - PCBs, Pesticides and Petroleum Hydrocarbons

7100 1st Avenue South Site
Seattle, Washington

Sample Identification[1]	DR136	DR137ACC	DR137CC	DR137	DR138	DR139	Preliminary Screening Level (mg/kg DW)
Source	Weston, 1999	Weston, 1999	Weston, 1999	Weston, 1999	Weston, 1999	Weston, 1999	
Sample Date	8/13/1998	9/23/1998	9/23/1998	9/23/1998	8/31/1998	9/14/1998	
Sample Depth	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm	
Polychlorinated Biphenyls (PCBs) by EPA 8082 (mg/kg DW)							
PCB-aroclor 1016	0.0200 UJ	0.020 U	0.020 U	0.020 UJ	0.020 U	0.020 UJ	NE
PCB-aroclor 1221	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	NE
PCB-aroclor 1232	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	NE
PCB-aroclor 1242	0.020 U	0.080 **J**	0.020 U	0.020 U	0.092	0.61	NE
PCB-aroclor 1248	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	NE
PCB-aroclor 1254	0.038	0.023 **J**	0.220 **J**	0.098	0.063	1.1	NE
PCB-aroclor 1260	0.041	0.16 **J**	0.51 **J**	0.08 **J**	0.03	1.2	NE
Total PCBs[2]	0.079	0.26	0.73	0.18	0.19	2.91	0.0040
Pesticides by EPA 8081A (mg/kg DW)							
2,4'-DDD	--	--	--	--	--	--	0.016
2,4'-DDE	--	--	--	--	--	--	0.0090
2,4'-DDT	--	--	--	--	--	--	0.0012
4,4'-DDD	--	0.0080	0.0020 UJ	--	--	0.033	0.016
4,4'-DDE	--	0.010 **J**	0.0010 UJ	--	--	0.140	0.0090
4,4'-DDT	--	0.0020 UJ	0.0020 UJ	--	--	0.011 UJ	0.0012
Aldrin	--	0.0010 UJ	0.0010 UJ	--	--	0.01 UJ	0.0095
alpha-Chlordane (cis)	--	0.0010 U	0.0010 UJ	--	--	0.01 U	NE
beta or gamma-Chlordane (trans)	--	0.0010 U	0.0010 UJ	--	--	0.01 U	NE
Beta-BHC	--	0.0010 U	0.0010 UJ	--	--	0.01 U	NE
Chlordane (Total)	--	0.0010 U	0.0010 U	--	--	0.01 U	0.0028
Dieldrin	--	0.0020 UJ	0.0020 UJ	--	--	0.02 **J**	0.0019
Endosulfan I	--	0.0010 U	0.0010 UJ	--	--	0.01 U	NE
Endosulfan II	--	0.0020 U	0.0020 UJ	--	--	0.01 U	NE
Endrin	--	0.0020 UJ	0.0020 UJ	--	--	0.01 UJ	NE
Hexachlorobenzene	0.020 U	0.020 U	0.020 U	0.02 U	0.02 U	0.02 U	0.022
Lindane (Gamma-BHC)	--	0.0010 UJ	0.0010 UJ	--	--	0.01 UJ	0.01
Methoxychlor	--	0.0010 U	0.0010 UJ	--	--	0.01 U	NE
Dioxin and Furans (mg/kg DW)							
2,3,7,8-TCDD (Dioxin)	--	--	--	--	--	--	4.0E-06
Petroleum Hydrocarbons by NWTPH-G, Dx or 8015 (mg/kg DW)							
Gasoline-Range Organics	--	--	--	--	--	--	30
Diesel-Range Organics	--	--	--	--	--	--	200
Heavy Oil-Range Organics	--	--	--	--	--	--	2000

Table 13

Summary of Sediment Chemical Analytical Data - PCBs, Pesticides and Petroleum Hydrocarbons

7100 1st Avenue South Site
Seattle, Washington

Sample Identification[1]	**DR156**	**DR157**	**DR168**	**DR169**	**B5A1341**	**B6A1933**	**Preliminary Screening Level (mg/kg DW)**
Source	**Weston, 1999**	**Weston, 1999**	**Weston, 1999**	**Weston, 1999**	**EIM Database**	**EIM Database**	
Sample Date	**8/13/1998**	**8/31/1998**	**8/13/1998**	**8/13/1998**	**9/24/2004**	**8/15/2004**	
Sample Depth	**0-10 cm**	**0-10 cm**	**0-10 cm**	**0-10 cm**	**0-10 cm**	**0-10 cm**	
Polychlorinated Biphenyls (PCBs) by EPA 8082 (mg/kg DW)							
PCB-aroclor 1016	**0.020** UJ	0.020 U	**0.020** UJ	**0.020** UJ	0.010 U	0.010 U	NE
PCB-aroclor 1221	0.040 U	0.040 U	0.040 U	0.040 U	0.020 U	0.020 U	NE
PCB-aroclor 1232	0.020 U	0.020 U	0.020 U	0.020 U	0.010 U	0.010 U	NE
PCB-aroclor 1242	0.020 U	**2.4**	0.020 U	0.020 U	0.010 U	0.010 U	NE
PCB-aroclor 1248	0.020 U	0.020 U	0.020 U	0.020 U	**0.60**	0.010 U	NE
PCB-aroclor 1254	**0.051**	**1.3**	**0.074**	**0.035**	**0.63**	**0.15**	NE
PCB-aroclor 1260	**0.041 J**	**0.98**	**0.046**	**0.030**	**0.50**	**0.15**	NE
Total PCBs[2]	**0.092**	**1.3**	**0.12**	**0.065**	**1.73**	**0.30**	0.0040
Pesticides by EPA 8081A (mg/kg DW)							
2,4'-DDD	--	--	**0.0020**	--	0.014 U	0.014 U	0.016
2,4'-DDE	--	--	0.0010 U	--	**0.0028**	**0.0028**	0.0090
2,4'-DDT	--	--	0.0030 U	--	**0.0055**	**0.0055**	0.0012
4,4'-DDD	--	--	--	--	**0.022**	**0.0047 J**	0.016
4,4'-DDE	--	--	--	--	**0.031**	**0.0053 J**	0.0090
4,4'-DDT	--	--	--	--	**0.016**	**0.0093 J**	0.0012
Aldrin	--	--	**0.0010** UJ	--	0.0010 U	0.0010 U	0.0095
alpha-Chlordane (cis)	--	--	0.0020 U	--	**0.0016**	**0.00025 J**	NE
beta or gamma-Chlordane (trans)	--	--	0.0010 U	--	0.016 U	**0.0037** UJ	NE
Beta-BHC	--	--	0.0010 U	--	0.0011 U	0.0010 U	NE
Chlordane (Total)	--	--	0.0010 U	--	**0.0016**	**0.00025 J**	0.0028
Dieldrin	--	--	**0.0020** UJ	--	0.0010 U	0.0010 U	0.0019
Endosulfan I	--	--	0.0010 U	--	0.0010 U	**0.0010** UJ	NE
Endosulfan II	--	--	0.0020 U	--	**0.010**	**0.0010** UJ	NE
Endrin	--	--	0.0060 U	--	**0.0015**	0.0010 U	NE
Hexachlorobenzene	0.020 U	0.020 U	0.020 U	--	**0.00060**	0.0010 U	0.022
Lindane (Gamma-BHC)	--	--	0.0010 U	--	0.0013 U	**0.00018 J**	0.01
Methoxychlor	--	--	0.0010 U	--	0.0031 U	**0.0010** UJ	NE
Dioxin and Furans (mg/kg DW)							
2,3,7,8-TCDD (Dioxin)	--	--	0.00000072 U	--	--	--	4.0E-06
Petroleum Hydrocarbons by NWTPH-G, Dx or 8015 (mg/kg DW)							
Gasoline-Range Organics	--	--	--	--	--	--	30
Diesel-Range Organics	--	--	--	--	--	--	200
Heavy Oil-Range Organics	--	--	--	--	--	--	2000

Table 13

Summary of Sediment Chemical Analytical Data - PCBs, Pesticides and Petroleum Hydrocarbons

7100 1st Avenue South Site
Seattle, Washington

Sample Identification[1]	B5A-2365	C61006	LDW-SS82	LDW-SS84	LDW-SSB6	LDW-1335	Preliminary Screening Level (mg/kg DW)
Source	EIM Database	EIM Database	Windward, 2005b	Windward, 2005a	Windwad, 2005b	EIM Database	
Sample Date	8/16/2004	8/25/2004	3/7/2005	1/19/2005	3/15/2005	2/15/2006	
Sample Depth	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-30 cm	
Polychlorinated Biphenyls (PCBs) by EPA 8082 (mg/kg DW)							
PCB-aroclor 1016	0.010 U	0.0099 U	0.019 U	0.69 U	0.019 U	0.027 U	NE
PCB-aroclor 1221	0.020 U	0.020 U	0.019 U	0.69 U	0.019 U	0.027 U	NE
PCB-aroclor 1232	0.010 U	0.0099 U	0.019 U	0.69 U	0.019 U	0.027 U	NE
PCB-aroclor 1242	0.010 U	0.0099 U	0.019 U	0.69 U	0.019 U	0.027 U	NE
PCB-aroclor 1248	0.061	0.0099 U	0.062	12.0	0.050 U	0.031	NE
PCB-aroclor 1254	0.01 U	0.028	0.084	6.8	0.090	0.086	NE
PCB-aroclor 1260	0.07 J	0.033	0.062	4.3	0.063	0.091	NE
Total PCBs[2]	0.13	0.06	0.21	23.10	0.15	0.21	0.0040
Pesticides by EPA 8081A (mg/kg DW)							
2,4'-DDD	0.013	0.001 U	0.0020 U	0.034 U	0.0020 U	0.0027 U	0.016
2,4'-DDE	0.0010 U	0.0010 U	0.0086 U	0.034 U	0.0020 U	0.0027 U	0.0090
2,4'-DDT	0.011	0.0021	0.0020 U	0.46 U	0.0020 U	0.0027 U	0.0012
4,4'-DDD	0.033	0.00061	0.0031 U	0.54 U	0.0049 U	0.0027 U	0.016
4,4'-DDE	0.011	0.00054	0.0072 U	0.80 U	0.0070 U	0.0027 U	0.0090
4,4'-DDT	0.027	0.0030	0.0020 U	0.034 U	0.0020 U	0.0089 U	0.0012
Aldrin	0.0010 U	0.00039	0.00097 U	0.017 U	0.00098 U	0.0014 U	0.0095
alpha-Chlordane (cis)	0.0010 U	0.00099 U	0.00097 U	0.017 U	0.00098 U	0.0014 U	NE
beta or gamma-Chlordane (trans)	0.0011	0.0011	0.00097 U	0.017 U	0.00098 U	0.0014 U	NE
Beta-BHC	0.00024	0.00099 U	0.00097 U	0.017 U	0.00098 U	0.0014 U	NE
Chlordane (Total)	0.0011	0.0011	0.00097 U	0.017 U	0.00098 U	0.0014 U	0.0028
Dieldrin	0.00082	0.00099 U	0.0046 U	0.034 U	0.00098 U	0.0027 U	0.0019
Endosulfan I	0.00021	0.00029	0.00097 U	0.017 U	0.0020 U	0.0014 U	NE
Endosulfan II	0.00054	0.00099 U	0.0020 U	0.034 U	0.0020 U	0.0027 U	NE
Endrin	0.0010 U	0.00099 U	0.0020 U	0.034 U	0.0020 UJ	0.0027 U	NE
Hexachlorobenzene	0.0010 U	0.00099 U	0.00097 U	0.017 U	0.00098 U	0.0014 U	0.022
Lindane (Gamma-BHC)	0.0010 U	0.00099 U	0.00097 U	0.017 U	0.00098 U	0.0014 U	0.01
Methoxychlor	0.0053	0.00099 U	0.0097 U	0.17 U	0.098 U	0.014 U	NE
Dioxin and Furans (mg/kg DW)							
2,3,7,8-TCDD (Dioxin)	--	--	--	3.06E-05	--	7.54E-07	4.0E-06
Petroleum Hydrocarbons by NWTPH-G, Dx or 8015 (mg/kg DW)							
Gasoline-Range Organics	--	--	--	--	--	--	30
Diesel-Range Organics	--	--	--	--	--	--	200
Heavy Oil-Range Organics	--	--	--	--	--	--	2000

Table 13

Summary of Sediment Chemical Analytical Data - PCBs, Pesticides and Petroleum Hydrocarbons

7100 1st Avenue South Site
Seattle, Washington

Sample Identification[1]	LDW-1335	LDW-1335	LDW-1335	LDW-2393	LDW-2393	LDW-2393	Preliminary Screening Level (mg/kg DW)
Source	EIM Database	EIM Database	EIM Database	EIM Database	EIM Database	EIM Database	
Sample Date	2/15/2006	2/15/2006	2/15/2006	2/23/2006	2/23/2006	2/23/2006	
Sample Depth	30-60 cm	60-120 cm	120-182 cm	0-40 cm	40-60 cm	60-120 cm	
Polychlorinated Biphenyls (PCBs) by EPA 8082 (mg/kg DW)							
PCB-aroclor 1016	0.020 UJ	0.020 UJ	0.0079 UJ	0.020 U	0.0040 UJ	0.0039 UJ	NE
PCB-aroclor 1221	0.040 U	0.020 UJ	0.0079 UJ	0.020 U	0.0040 UJ	0.0039 UJ	NE
PCB-aroclor 1232	0.040 U	0.020 UJ	0.0079 UJ	0.020 U	0.0040 UJ	0.0039 UJ	NE
PCB-aroclor 1242	0.040 U	0.020 U	0.0079 UJ	0.020 U	0.0040 U	0.0039 UJ	NE
PCB-aroclor 1248	0.074	0.042	0.0079 UJ	0.061	0.0040 U	0.0039 UJ	NE
PCB-aroclor 1254	0.19	0.090	0.0079 UJ	0.10 J	0.0040 U	0.0039 UJ	NE
PCB-aroclor 1260	0.18	0.088	0.15	0.040 U	0.0040 U	0.0039 UJ	NE
Total PCBs[2]	0.44	0.22	0.15	0.16			0.0040
Pesticides by EPA 8081A (mg/kg DW)							
2,4'-DDD	0.0020 U	0.0020 U	--	0.0020 U	0.0020 U	0.0020 U	0.016
2,4'-DDE	0.0074 U	0.0020 U	--	0.0020 U	0.0020 U	0.0020 U	0.0090
2,4'-DDT	0.0020 U	0.0020 U	--	0.0020 U	0.0020 U	0.0020 U	0.0012
4,4'-DDD	0.026 U	0.0050 U	--	0.0020 U	0.0020 U	0.0020 U	0.016
4,4'-DDE	0.010 U	0.0069 U	--	0.0047 U	0.0020 U	0.0020 U	0.0090
4,4'-DDT	0.022 U	0.013 U	--	0.0072 U	0.0020 U	0.0020 U	0.0012
Aldrin	0.00098 U	0.00098 U	--	0.0010 U	0.00099 U	0.00098 U	0.0095
alpha-Chlordane (cis)	0.00098 U	0.00098 U	--	0.0010 U	0.00099 U	0.00098 U	NE
beta or gamma-Chlordane (trans)	0.00098 U	0.00098 U	--	0.0010 U	0.00099 U	0.00098 U	NE
Beta-BHC	0.00098 U	0.00098 U	--	0.0010 U	0.00099 U	0.00098 U	NE
Chlordane (Total)	0.00098 U	0.00098 U	--	0.0010 U	0.00099 U	0.00098 U	0.0028
Dieldrin	0.0054 U	0.0020 U	--	0.0020 U	0.0020 U	0.00098 U	0.0019
Endosulfan I	0.00098 U	0.00098 U	--	0.0010 U	0.00099 U	0.0020 U	NE
Endosulfan II	0.0052 U	0.0020 U	--	0.0020 U	0.0020 U	0.0020 U	NE
Endrin	0.0076 U	0.0020 U	--	0.0020 U	0.0020 U	0.0020 U	NE
Hexachlorobenzene	0.00098 U	0.00098 U	--	0.0010 U	0.00099 U	0.00098 U	0.022
Lindane (Gamma-BHC)	0.00098 U	0.00098 U	--	0.0010 U	0.00099 U	0.00098 U	0.01
Methoxychlor	0.0098 U	0.0098 U	--	0.0010 U	0.0099 U	0.0098 U	NE
Dioxin and Furans (mg/kg DW)							
2,3,7,8-TCDD (Dioxin)	4.08E-07	9.20E-07	--	3.98E-07	4.67E-08 U	3.02E-07	4.0E-06
Petroleum Hydrocarbons by NWTPH-G, Dx or 8015 (mg/kg DW)							
Gasoline-Range Organics	--	--	--	--	--	--	30
Diesel-Range Organics	--	--	--	--	--	--	200
Heavy Oil-Range Organics	--	--	--	--	--	--	2000

Table 13

Summary of Sediment Chemical Analytical Data - PCBs, Pesticides and Petroleum Hydrocarbons

7100 1st Avenue South Site
Seattle, Washington

Sample Identification[1]	**LDW-8574**	**LDW9086B**	**LDW9086B**	**LDW9086B**	**SPI-128**	**TRI-157T**	**Preliminary Screening Level (mg/kg DW)**
Source	**EIM Database**	**EIM Database**	**EIM Database**	**EIM Database**	**EIM Database**	**EIM Database**	
Sample Date	**2/20/2006**	**2/20/2006**	**2/20/2006**	**2/20/2006**	**8/10/2006**	**8/11/2006**	
Sample Depth	**91-100 cm**	**0-30 cm**	**30-60 cm**	**60-91 cm**	**0-10 cm**	**0-10 cm**	
Polychlorinated Biphenyls (PCBs) by EPA 8082 (mg/kg DW)							
PCB-aroclor 1016	0.0039 U	0.044 U	0.040 U	0.20 U	**0.020** UJ	**0.26** UJ	NE
PCB-aroclor 1221	0.0039 U	0.044 U	0.040 U	0.20 U	0.010 U	**0.13** UJ	NE
PCB-aroclor 1232	0.0039 U	0.044 U	0.040 U	0.20 U	**0.030** UJ	**0.13** UJ	NE
PCB-aroclor 1242	0.0039 U	0.044 U	0.040 U	0.20 U	**0.024 J**	**0.33** UJ	NE
PCB-aroclor 1248	0.0044 U	**0.13**	**0.23**	**1.3**	**0.047 J**	**0.52** UJ	NE
PCB-aroclor 1254	**0.014**	**0.20**	**0.31**	**1.4**	**0.071 J**	**1.6 J**	NE
PCB-aroclor 1260	0.0039 U	**0.12**	**0.17**	**0.74**	**0.032 J**	**0.21** UJ	NE
Total PCBs[2]	0.014	0.45	0.71	3.44	0.17	1.6	0.0040
Pesticides by EPA 8081A (mg/kg DW)							
2,4'-DDD	--	--	--	--	--	--	0.016
2,4'-DDE	--	--	--	--	--	--	0.0090
2,4'-DDT	--	--	--	--	--	--	0.0012
4,4'-DDD	--	--	--	--	--	--	0.016
4,4'-DDE	--	--	--	--	--	--	0.0090
4,4'-DDT	--	--	--	--	--	--	0.0012
Aldrin	--	--	--	--	--	--	0.0095
alpha-Chlordane (cis)	--	--	--	--	--	--	NE
beta or gamma-Chlordane (trans)	--	--	--	--	--	--	NE
Beta-BHC	--	--	--	--	--	--	NE
Chlordane (Total)	--	--	--	--	--	--	0.0028
Dieldrin	--	--	--	--	--	--	0.0019
Endosulfan I	--	--	--	--	--	--	NE
Endosulfan II	--	--	--	--	--	--	NE
Endrin	--	--	--	--	--	--	NE
Hexachlorobenzene	--	--	--	--	--	--	0.022
Lindane (Gamma-BHC)	--	--	--	--	--	--	0.01
Methoxychlor	--	--	--	--	--	--	NE
Dioxin and Furans (mg/kg DW)							
2,3,7,8-TCDD (Dioxin)	--	--	--	--	--	--	4.0E-06
Petroleum Hydrocarbons by NWTPH-G, Dx or 8015 (mg/kg DW)							
Gasoline-Range Organics	--	--	--	--	--	--	30
Diesel-Range Organics	--	--	--	--	--	--	200
Heavy Oil-Range Organics	--	--	--	--	--	--	2000

Table 13

Summary of Sediment Chemical Analytical Data - PCBs, Pesticides and Petroleum Hydrocarbons

7100 1st Avenue South Site
Seattle, Washington

Sample Identification[1]	SED-1	SED-2	SED-3	SED-4	SED-5	LDW-SS525	Preliminary Screening Level (mg/kg DW)
Source	SAIC, 2009	SAIC, 2009	SAIC, 2009	SAIC, 2009	SAIC, 2009	EIM Database	
Sample Date	5/4/2007	5/4/2007	5/4/2007	5/7/2007	5/8/2007	12/16/2009	
Sample Depth	n/a	n/a	n/a	n/a	n/a	0-10 cm	
Polychlorinated Biphenyls (PCBs) by EPA 8082 (mg/kg DW)							
PCB-aroclor 1016	0.10 U	0.010 U	0.099 U	0.098 U	0.99 U	0.0039 U	NE
PCB-aroclor 1221	0.20 U	0.020 U	0.20 U	0.20 U	2.0 U	0.0039 U	NE
PCB-aroclor 1232	0.10 U	0.010 U	0.099 U	0.098 U	0.99 U	0.0039 U	NE
PCB-aroclor 1242	0.85	0.070	0.21	0.89	0.60 J	0.0039 U	NE
PCB-aroclor 1248	0.10 U	0.010 U	0.099 U	0.10 U	0.99 U	0.0048	NE
PCB-aroclor 1254	1.5	0.12	0.36	0.74	1.3	0.0083	NE
PCB-aroclor 1260	0.58	0.041	0.22	0.30	1.7	0.0065	NE
Total PCBs[2]	2.9	0.23	0.79	1.9	3.6	0.020	0.0040
Pesticides by EPA 8081A (mg/kg DW)							
2,4'-DDD	0.022 U	0.018 U	0.0099 U	0.015 U	0.11 J	--	0.016
2,4'-DDE	0.0010 U	0.0010 U	0.0099 U	0.0098 U	0.0086 U	--	0.0090
2,4'-DDT	0.045 U	0.0059	0.021	0.032 J	0.15 J	--	0.0012
4,4'-DDD	0.015	0.0020	0.0066 J	0.022	0.035	--	0.016
4,4'-DDE	0.016 J	0.0036 J	0.020	0.042 J	0.21	--	0.0090
4,4'-DDT	0.046	0.0058	0.022	0.047	0.0099 U	--	0.0012
Aldrin	0.010 U	0.0010 U	0.0099 U	0.010 U	0.0099 U	--	0.0095
alpha-Chlordane (cis)	--	--	--	--	--	--	NE
beta or gamma-Chlordane (trans)	--	--	--	--	--	--	NE
Beta-BHC	--	--	--	--	--	--	NE
Chlordane (Total)	0.10 U	0.012 U	0.0099 U	0.010 U	0.16 U	--	0.0028
Dieldrin	0.010 U	0.0010 U	0.0099 U	0.010 U	0.0025 U	--	0.0019
Endosulfan I	--	--	--	--	--	--	NE
Endosulfan II	--	--	--	--	--	--	NE
Endrin	--	--	--	--	--	--	NE
Hexachlorobenzene	--	--	--	--	--	--	0.022
Lindane (Gamma-BHC)	0.010 U	0.0010 U	0.0099 U	0.010 U	0.0017 J	--	0.01
Methoxychlor	--	--	--	--	--	--	NE
Dioxin and Furans (mg/kg DW)							
2,3,7,8-TCDD (Dioxin)	--	--	--	--	--	1.13E-07 U	4.0E-06
Petroleum Hydrocarbons by NWTPH-G, Dx or 8015 (mg/kg DW)							
Gasoline-Range Organics	0.020 U	0.20 J	0.020 U	0.02 U	0.020 U	--	30
Diesel-Range Organics	10 J	6.8 J	0.10 J	0.38 J	0.28 J	--	200
Heavy Oil-Range Organics	20 J	15 J	0.40 J	1.5 J	1.2 J	--	2000

Table 13

Summary of Sediment Chemical Analytical Data - PCBs, Pesticides and Petroleum Hydrocarbons

7100 1st Avenue South Site
Seattle, Washington

Notes:

[1] Approximate surface (0-10 cm) sediment sample locations are shown on Figure 13. Subsurface (below 10 cm) sediment sample locations are shown on Figure 16.

[2] Total PCBs calculated by summing the individual detected PCB aroclor concentrations. If no individual PCB aroclors are detected, the highest reported PQL is used.

U = analyte not detected above the reported sample practical quantitation limit (PQL)

mg/kg = milligram per kilogram

DW = dry weight

"--" = not tested

J = estimated analyte concentration

NE = not established

Bold indicates analyte was detected above reporting level practical quantitation limits.

🟨 Yellow shading indicates analyte was detected above the preliminary screening level.

🟦 Blue shading indicates reported analyte quantitation limit is above the preliminary screening level.

Table 14

Summary of Sediment Chemical Analytical Data - SVOCs

7100 1^{st} Avenue South Site
Seattle, Washington

Sample Identification[1]	DR10	WIT280	WST345	WST346	WST347	DR135	Preliminary Screening Level (mg/kg DW)
Sampled By	EIM Database	NOAA, 98	NOAA, 98	NOAA, 98	NOAA, 98	Weston, 1999	
Sample Depth	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm	
Sample Date	9/30/1985	10/3/1997	10/9/1997	10/9/1997	10/6/1997	8/13/1998	
Semivolatile Organic Compounds (SVOCs) by 7270 or 8270 (mg/kg)							
1,1'-Biphenyl	0.029 J	--	--	--	--	--	NE
1,2,4-Trichlorobenzene	--	--	--	--	--	--	0.031
1,2-Dichlorobenzene	--	--	--	--	--	--	0.035
1,4-Dichlorobenzene	--	--	--	--	--	--	0.11
1-Methylphenanthrene	--	100 J	--	--	--	--	NE
2,4-Dimethylphenol	0.0030 U	--	--	--	--	0.020 U	0.029
2-Methylnaphthalene	--	--	--	--	--	--	0.67
2-Nitroaniline	0.039 U	--	--	--	--	0.020 U	NE
4-Chloro-3-Methylphenol	0.0060 U	--	--	--	--	0.040 U	NE
Acenaphthene	0.16 J	--	--	--	--	0.040	0.50
Acenaphthylene	0.015 J	--	--	--	--	0.020 U	0.56
Anthracene	0.37 J	--	--	--	--	0.030	0.96
Benzo(ghi)perylene	0.18 J	--	--	--	--	0.030	0.67
Benzoic Acid	0.035 U	--	--	--	--	0.20 U	0.65
Benzyl Alcohol	0.00011 U	--	--	--	--	0.050 U	0.057
Bis(2-Ethylhexyl) Phthalate	--	--	--	--	--	0.011 UJ	1.3
Butyl benzyl phthalate	0.027 J	--	--	--	--	0.020 U	0.063
Carbazole	0.020	86 J	20 U	340	20 U	0.020	NE
Dibenzofuran	0.092 J	--	--	--	--	0.020	0.54
Dibutyl phthalate	--	--	--	--	--	0.020 U	NE
Diethyl phthalate	--	--	--	--	--	0.020 U	0.20
Dimethyl phthalate	0.024 J	--	--	--	--	0.020 U	0.071
Di-N-Octyl Phthalate	0.013 J	--	--	--	--	0.020 U	6.2
Fluoranthene	0.88 J	--	--	--	--	0.23	1.7
Fluorene	0.17 J	--	--	--	--	0.040	0.54
Hexachlorobenzene	--	--	--	--	--	--	0.022
Hexachlorobutadiene	0.13 U	--	--	--	--	0.020 U	0.011
Hexachlorocyclopentadiene	--	--	--	--	--	0.10 UJ	NE
Isophorone	0.0057 U	--	--	--	--	0.020 U	NE
m-Nitroaniline	--	--	--	--	--	--	NE
Naphthalene	0.056 J	--	--	--	--	0.020 U	2.1
Nitrobenzene	--	--	--	--	--	0.020 U	NE
N-Nitrosodiphenylamine	--	--	--	--	--	0.040 U	0.028
o-Cresol	0.0048 U	--	--	--	--	0.020 U	0.063
p-Cresol (4-methylphenol)	0.038 J	--	--	--	--	0.020 U	0.67
Pentachlorophenol	3.0 U	--	--	--	--	0.10 U	0.36
Phenanthrene	0.20 J	--	--	--	--	0.15	1.5
Phenol	0.022 J	--	--	--	--	0.040	0.42
Pyrene	0.69 J	--	--	--	--	0.17	2.6
Retene	--	--	--	--	--	--	NE
LPAH	0.97					0.30	5.2
HPAH	3.5					0.79	12
Carcinogenic PAHs (cPAHs) by 8270 (mg/kg DW)							
Benz[a]anthracene	0.21 J	--	--	--	--	0.070	0.062
Benzo(a)pyrene	0.27 J	--	--	--	--	0.040	0.062
Benzo(b)fluoranthene	0.39 J	--	--	--	--	0.080	0.062
Benzo(k)fluoranthene	0.35 J	--	--	--	--	0.030	0.062
Chrysene	0.28 J	--	--	--	--	0.090	0.062
Dibenzo(a,h)anthracene	0.08 J	--	--	--	--	0.020 U	0.062
Indeno(1,2,3-cd)pyrene	0.20 J	--	--	--	--	0.030	0.062
Total cPAH TEQ[2]	0.40	--	--	--	--	0.064	0.062
Butyltins							
Dibutyltin	--	--	--	--	--	--	NE
Monobutyltin	--	--	--	--	--	--	NE
Tributyltin	--	--	--	--	--	--	0.073

Table 14

Summary of Sediment Chemical Analytical Data - SVOCs

7100 1st Avenue South Site
Seattle, Washington

Sample Identification[1]	DR136	DR137ACC	DR137CC	DR137	DR138	DR139	Preliminary Screening Level (mg/kg DW)
Sampled By	Weston, 1999	Weston, 1999	Weston, 1999	Weston, 1999	Weston, 1999	Weston, 1999	
Sample Depth	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm	
Sample Date	8/13/1998	9/23/1998	9/23/1998	9/23/1998	8/31/1998	9/14/1998	
Semivolatile Organic Compounds (SVOCs) by 7270 or 8270 (mg/kg)							
1,1'-Biphenyl	--	--	--	--	--	--	NE
1,2,4-Trichlorobenzene	--	--	--	--	--	--	0.031
1,2-Dichlorobenzene	--	--	--	--	--	--	0.035
1,4-Dichlorobenzene	--	--	--	--	--	--	0.11
1-Methylphenanthrene	--	--	--	--	--	--	NE
2,4-Dimethylphenol	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.029
2-Methylnaphthalene	--	--	--	--	--	0.0033	0.67
2-Nitroaniline	0.040	0.020 U	0.020 U	0.020 U	0.020 U	0.070	NE
4-Chloro-3-Methylphenol	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	NE
Acenaphthene	0.15	0.020 U	0.020 U	0.020 U	0.020 U	0.18	0.50
Acenaphthylene	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.56
Anthracene	0.036	0.020 U	0.040	0.080	0.020 U	0.46	0.96
Benzo(ghi)perylene	0.84	0.040	0.090	0.11	0.020 U	0.22	0.67
Benzoic Acid	0.20 U	0.20 U	0.20 U	0.20 U	0.200 U	0.20 U	0.65
Benzyl Alcohol	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.057
Bis(2-Ethylhexyl) Phthalate	0.31 UJ	0.050	0.45 J	0.23 UJ	0.030	2.5	1.3
Butyl benzyl phthalate	0.050	0.020 U	0.030	0.030	0.020 U	0.11	0.063
Carbazole	0.020 U	0.21	0.020	0.070	--	--	NE
Dibenzofuran	0.14	0.020 U	0.020 U	0.020 U	0.020 U	0.060	0.54
Dibutyl phthalate	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.070	NE
Diethyl phthalate	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.20
Dimethyl phthalate	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.040	0.071
Di-N-Octyl Phthalate	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	6.2
Fluoranthene	4.0	0.10	0.31 J	0.43	0.030	0.82	1.7
Fluorene	0.15	0.020 U	0.020 U	0.030	0.020 U	0.14	0.54
Hexachlorobenzene	--	--	--	--	--	--	0.022
Hexachlorobutadiene	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.011
Hexachlorocyclopentadiene	0.10 UJ	0.10 U	0.10 U	0.10 UJ	0.10 UJ	0.10 U	NE
Isophorone	0.020 U	0.020 U	0.020	0.0200 U	0.020 U	0.020 U	NE
m-Nitroaniline	--	--	--	--	--	0.016 U	NE
Naphthalene	0.040	0.020 U	0.020 U	0.020 U	0.020 U	0.060	2.1
Nitrobenzene	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	NE
N-Nitrosodiphenylamine	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.028
o-Cresol	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.063
p-Cresol (4-methylphenol)	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.030	0.67
Pentachlorophenol	0.10 U	0.10 UJ	0.10 UJ	0.10 U	0.10 U	0.10 J	0.36
Phenanthrene	1.6	0.060	0.14 J	0.19	0.020 U	0.36	1.5
Phenol	0.020	0.020 U	0.020 U	0.020 U	0.020 U	0.040	0.42
Pyrene	3.2	0.13	0.66	0.56	0.030	0.87	2.6
Retene	--	--	--	--	--	--	NE
LPAH	2.0	0.16	0.26	0.36	0.12	1.2	5.2
HPAH	17	0.53	2.3	2.5	0.23	4.1	12
Carcinogenic PAHs (cPAHs) by 8270 (mg/kg DW)							
Benz[a]anthracene	1.6	0.040	0.15 J	0.22	0.020 U	0.33	0.062
Benzo(a)pyrene	1.3	0.040	0.20 J	0.20	0.020 U	0.31	0.062
Benzo(b)fluoranthene	1.7	0.040	0.26 J	0.25	0.020	0.51	0.062
Benzo(k)fluoranthene	1.1	0.040	0.19 J	0.19	0.020 U	0.29	0.062
Chrysene	1.8	0.050	0.24 J	0.35	0.030	0.48	0.062
Dibenzo(a,h)anthracene	0.19	0.020 U	0.030 J	0.030	0.020 U	0.080	0.062
Indeno(1,2,3-cd)pyrene	0.94	0.030	0.13 J	0.12	0.020 U	0.22	0.062
Total cPAH TEQ[2]	1.9	0.058	0.278	0.28	0.030	0.46	0.062
Butyltins							
Dibutyltin	--	--	--	--	--	--	NE
Monobutyltin	--	--	--	--	--	--	NE
Tributyltin	--	--	--	--	--	--	0.073

Table 14

Summary of Sediment Chemical Analytical Data - SVOCs

7100 1st Avenue South Site
Seattle, Washington

Sample Identification[1]	DR156	DR157	DR168	DR169	B5A1341	B6A1933	Preliminary Screening Level (mg/kg DW)
Sampled By	Weston, 1999	Weston, 1999	Weston, 1999	Weston, 1999	EIM Database	EIM Database	
Sample Depth	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm	
Sample Date	8/13/1998	8/31/1998	8/13/1998	8/13/1998	9/24/2004	8/15/2004	
Semivolatile Organic Compounds (SVOCs) by 7270 or 8270 (mg/kg)							
1,1'-Biphenyl	--	--	--	--	0.0041	0.0040 J	NE
1,2,4-Trichlorobenzene	--	--	0.020 U	0.020 U	0.0086 UJ	0.020 U	0.031
1,2-Dichlorobenzene	--	--	0.020 U	0.020 U	0.0086 UJ	0.020 U	0.035
1,4-Dichlorobenzene	--	--	0.020 U	0.020 U	0.0086 UJ	0.020 U	0.11
1-Methylphenanthrene	--	--	--	--	0.010	0.011	NE
2,4-Dimethylphenol	0.020 U	0.020 U	0.020 U	0.020 U	0.043 UJ	0.10 UJ	0.029
2-Methylnaphthalene	--	--	0.020 U	0.020 U	0.014	0.015	0.67
2-Nitroaniline	0.020 U	0.10	0.10 U	0.10 U	0.018 UJ	0.040 U	NE
4-Chloro-3-Methylphenol	0.040 U	0.040 U	0.040 U	0.040 U	0.0086 U	0.020 U	NE
Acenaphthene	0.020	0.050	0.020 U	0.10 U	0.0041	0.010	0.50
Acenaphthylene	0.020 U	0.020 U	0.020 U	0.020 U	0.0046	0.010	0.56
Anthracene	0.050	0.16	0.060	0.020 U	0.015	0.022	0.96
Benzo(ghi)perylene	0.12	0.18	0.12	0.12	0.041	0.034	0.67
Benzoic Acid	0.20 U	0.20 U	0.20 U	0.090	0.18 U	0.40 U	0.65
Benzyl Alcohol	0.050 U	0.050 U	0.050 U	0.020 U	0.0082 J	0.020 U	0.057
Bis(2-Ethylhexyl) Phthalate	0.43 UJ	2.3	0.28 UJ	0.040 U	0.052 J	0.061 J	1.3
Butyl benzyl phthalate	0.020 U	0.090	0.020 U	0.16 UJ	0.0074 J	0.016 J	0.063
Carbazole	--	--	0.030	0.020 U	0.0076 J	0.0063 J	NE
Dibenzofuran	0.020 U	0.030	0.020 U	0.020 U	0.0058	0.0079	0.54
Dibutyl phthalate	0.020 U	0.30	0.020	0.020 U	0.0072 J	0.0041 J	NE
Diethyl phthalate	0.020 U	0.020 U	0.020 U	0.020 U	0.0086 UJ	0.0077 J	0.20
Dimethyl phthalate	0.020 U	0.030	0.020 U	0.020 U	0.0034 J	0.0026	0.071
Di-N-Octyl Phthalate	0.020 U	0.020 U	0.020 U	0.020 U	0.018 UJ	0.020 U	6.2
Fluoranthene	0.51	0.68	0.51	0.020 U	0.16	0.020 U	1.7
Fluorene	0.030	0.050	0.030	0.26	0.0065	0.040 U	0.54
Hexachlorobenzene	--	--	0.020 U	0.020 U	0.00060	0.14	0.022
Hexachlorobutadiene	0.020 U	0.020 U	0.020 U	0.020 U	0.0086 UJ	0.0077	0.011
Hexachlorocyclopentadiene	0.10 UJ	0.10 UJ	0.10 U	0.020 U	0.043 UJ	0.0010 U	NE
Isophorone	0.020 U	0.020 U	0.020 U	0.060	0.0086 UJ	0.020 U	NE
m-Nitroaniline	--	--	0.20 U	0.020 U	0.018 UJ	0.029	NE
Naphthalene	0.020 U	0.050	0.020 U	0.20 U	0.010	0.014	2.1
Nitrobenzene	0.020 U	0.020 U	0.020 U	0.020 U	0.0086 UJ	0.020 U	NE
N-Nitrosodiphenylamine	0.040 U	0.040 U	0.040 U	0.040 U	0.0086 UJ	0.020 U	0.028
o-Cresol	0.020 U	0.020 U	0.020 U	0.040 U	0.0086 U	0.020 U	0.063
p-Cresol (4-methylphenol)	0.020 U	0.030	0.020 U	0.020 U	0.0086 U	0.020 U	0.67
Pentachlorophenol	0.10 U	0.30	0.10 U	0.10 U	0.014 J	0.10 U	0.36
Phenanthrene	0.14	0.30	0.18	0.090	0.031	0.038	1.5
Phenol	0.020 U	0.050	0.040	0.020	0.024 J	0.031 U	0.42
Pyrene	0.39	1.4	0.41	0.23	0.13	0.12 U	2.6
Retene	--	--	--	--	--	--	NE
LPAH	0.28	0.63	0.33	0.69	0.071	0.13	5.2
HPAH	2.2	4.7	2.4	0.83	0.63	0.53	12
Carcinogenic PAHs (cPAHs) by 8270 (mg/kg DW)							
Benz[a]anthracene	0.19	0.44	0.21	0.030	0.041	0.038	0.062
Benzo(a)pyrene	0.18	0.32	0.18	0.10	0.037	0.035	0.062
Benzo(b)fluoranthene	0.23	0.48	0.23	0.090	0.054 J	0.053	0.062
Benzo(k)fluoranthene	0.16	0.36	0.21	0.060	0.046	0.041	0.062
Chrysene	0.26	0.68	0.34	0.020 U	0.081	0.083	0.062
Dibenzo(a,h)anthracene	0.030	0.020 U	0.030	0.14	0.0086	0.0062	0.062
Indeno(1,2,3-cd)pyrene	0.12	0.18	0.13	0.020 U	0.036 J	0.10 UJ	0.062
Total cPAH TEQ[2]	0.26	0.47	0.26	0.13	0.056	0.060	0.062
Butyltins							
Dibutyltin	--	--	0.005 U	--	0.010	--	NE
Monobutyltin	--	--	0.019 J	--	0.0052	0.0011 J	NE
Tributyltin	--	--	0.049	--	0.0064	0.0023	0.073

Table 14

Summary of Sediment Chemical Analytical Data - SVOCs

7100 1st Avenue South Site
Seattle, Washington

Sample Identification[1]	B5A-2365	C61006	LDW-SS82	LDW-SS84	LDW-SSB6	LDW-1335	Preliminary Screening Level (mg/kg DW)
Sampled By	EIM Database	EIM Database	Windward, 2005b	Windward, 2005a	Windwad, 2005b	EIM Database	
Sample Depth	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-10 cm	0-30 cm	
Sample Date	8/16/2004	8/25/2004	3/7/2005	1/19/2005	3/15/2005	2/15/2006	
Semivolatile Organic Compounds (SVOCs) by 7270 or 8270 (mg/kg)							
1,1'-Biphenyl	--	--	--	--	--	--	NE
1,2,4-Trichlorobenzene	--	0.0066 U	0.0064 U	0.29 U	0.0066 U	0.0059 UJ	0.031
1,2-Dichlorobenzene	--	0.0066 U	0.0064 U	0.29 U	0.0066 U	0.0059 U	0.035
1,4-Dichlorobenzene	--	0.0066 U	0.0064 U	0.29 U	0.0066 U	0.0059 U	0.11
1-Methylphenanthrene	--	--	--	--	--	0.059 U	NE
2,4-Dimethylphenol	--	0.0066 U	0.0064 U	0.29 U	0.0066 U	0.0059 U	0.029
2-Methylnaphthalene	--	0.0037 J	0.020 U	0.29 U	0.019 U	0.059 U	0.67
2-Nitroaniline	--	0.039 U	0.098 U	1.4 U	0.097 U	0.29 U	NE
4-Chloro-3-Methylphenol	--	0.0064 J	0.098 U	1.4 U	0.097 U	0.29 U	NE
Acenaphthene	--	0.0046 J	0.050 J	0.29 U	0.033	0.059 U	0.50
Acenaphthylene	--	0.0053	0.022	0.29 U	0.019 U	0.059 U	0.56
Anthracene	--	0.017	0.18	0.29 U	0.43	0.058 J	0.96
Benzo(ghi)perylene	--	0.037	0.12	0.23 J	0.019 U	0.043 J	0.67
Benzoic Acid	--	0.089	0.064 U	0.29 U	0.066 U	0.17 UJ	0.65
Benzyl Alcohol	--	0.023	0.033 U	0.29 U	0.019 U	0.029 U	0.057
Bis(2-Ethylhexyl) Phthalate	--	0.055 J	0.22	4.2	0.048	0.045 J	1.3
Butyl benzyl phthalate	--	0.0070 J	0.0064 U	0.29 U	0.0066 U	0.011	0.063
Carbazole		0.0050 J	0.079 J	0.29 U	0.040	--	NE
Dibenzofuran	--	0.0048 J	0.020 U	0.29 U	0.023	0.059 U	0.54
Dibutyl phthalate	--	0.020 U	0.020	0.38	0.019 U	0.059 U	NE
Diethyl phthalate	--	0.007 U	0.0064 U	0.29 U	0.0099	0.059 U	0.20
Dimethyl phthalate	--	0.0066 U	0.0064 U	0.29 U	0.0066 U	0.059 U	0.071
Di-N-Octyl Phthalate	--	0.020 U	0.020 U	0.29 U	0.019 U	0.059 U	6.2
Fluoranthene	--	0.10	1.0	1.1	0.13	1.6	1.7
Fluorene	--	0.0055	0.024	0.29 U	0.080	0.059 U	0.54
Hexachlorobenzene	--	0.0010 U	0.00097 U	0.017 U	0.00098 U	0.0014 U	0.022
Hexachlorobutadiene	--	0.0066 U	0.00097 U	0.017 U	0.00098 U	0.0014 U	0.011
Hexachlorocyclopentadiene	--	0.096 U	0.098 U	1.4 U	0.097 U	0.29 UJ	NE
Isophorone	--	0.020 U	0.020 U	0.29 U	0.019 U	0.059 U	NE
m-Nitroaniline	--	0.039 U	0.098 U	1.4 U	0.097 U	0.059 U	NE
Naphthalene	--	0.0067	0.020 U	0.29 U	0.019 U	0.059 U	2.1
Nitrobenzene	--	0.020 U	0.020 U	0.29 U	0.019 U	0.029 U	NE
N-Nitrosodiphenylamine	--	0.020 U	0.0064 U	0.29 U	0.0066	0.013 U	0.028
o-Cresol	--	0.0066 U	0.0064 U	0.29 U	0.0066 U	0.0059 U	0.063
p-Cresol (4-methylphenol)	--	0.0066 U	0.020 U	0.29 U	0.019 U	0.059 U	0.67
Pentachlorophenol	--	0.033 U	0.032 U	1.4 U	0.033 U	0.029 U	0.36
Phenanthrene	--	0.036	0.42	0.33	0.15	0.14	1.5
Phenol	--	0.012 J	0.020 U	0.29 U	0.019 U	0.059 U	0.42
Pyrene	--	0.087	0.79	0.98	0.11	0.80	2.6
Retene	--	--	--	--	--	--	NE
LPAH		0.075	0.72	1.8	0.73	0.43	5.2
HPAH		0.53	5.1	5.6	0.63	3.9	12
Carcinogenic PAHs (cPAHs) by 8270 (mg/kg DW)							
Benz[a]anthracene	--	0.041	0.57	0.40	0.055	0.21	0.062
Benzo(a)pyrene	--	0.042	0.47	0.51	0.036	0.16	0.062
Benzo(b)fluoranthene	--	0.058	0.65	0.69	0.058	0.27	0.062
Benzo(k)fluoranthene	--	0.047	0.46	0.44	0.048	0.29	0.062
Chrysene	--	0.071	0.80	0.70	0.15	0.43	0.062
Dibenzo(a,h)anthracene	--	0.0075	0.020 U	0.29 U	0.019 U	0.059 U	0.062
Indeno(1,2,3-cd)pyrene	--	0.038	0.17	0.22 J	0.0072	0.056 J	0.062
Total cPAH TEQ[2]		0.062	0.67	0.72	0.056	0.25	0.062
Butyltins							
Dibutyltin	--	--	--	--	--	0.0064	NE
Monobutyltin	--	0.0023	--	--	--	0.00 U	NE
Tributyltin	--	--	--	--	--	0.013	0.073

Table 14

Summary of Sediment Chemical Analytical Data - SVOCs

7100 1st Avenue South Site
Seattle, Washington

Sample Identification[1]	**LDW-1335**	**LDW-1335**	**LDW-1335**	**LDW-2393**	**LDW-2393**	**LDW-2393**	**Preliminary Screening Level (mg/kg DW)**
Sampled By	**EIM Database**	**EIM Database**	**EIM Database**	**EIM Database**	**EIM Database**	**EIM Database**	
Sample Depth	**30-60 cm**	**60-120 cm**	**120-182 cm**	**0-40 cm**	**40-60 cm**	**60-120 cm**	
Sample Date	**2/15/2006**	**2/15/2006**	**2/15/2006**	**2/23/2006**	**2/23/2006**	**2/23/2006**	
Semivolatile Organic Compounds (SVOCs) by 7270 or 8270 (mg/kg)							
1,1'-Biphenyl	--	--	--	--	--	--	NE
1,2,4-Trichlorobenzene	**0.0060** UJ	**0.012** UJ	--	**0.0060** UJ	**0.0059** UJ	**0.0060** UJ	0.031
1,2-Dichlorobenzene	0.0060 U	0.012 U	--	0.0060 U	0.0059 U	0.0060 U	0.035
1,4-Dichlorobenzene	0.0060 U	0.012 U	--	0.0060 U	0.0059 U	0.0060 U	0.11
1-Methylphenanthrene	0.060 U	0.039 U	--	0.020 U	0.020 U	0.020 U	NE
2,4-Dimethylphenol	0.0060 U	0.012 U	--	**0.0060** UJ	**0.0059** UJ	**0.0060** UJ	0.029
2-Methylnaphthalene	0.060 U	0.039 U	--	0.020 U	0.020 U	0.020 U	0.67
2-Nitroaniline	0.30 U	0.20 U	--	0.10 U	0.099 U	0.10 U	NE
4-Chloro-3-Methylphenol	0.30 U	0.20 U	--	0.10 U	0.099 U	**0.10** UJ	NE
Acenaphthene	0.060 U	**0.021 J**	--	0.020 U	0.020 U	0.020 U	0.50
Acenaphthylene	0.060 U	0.039 U	--	0.020 U	0.020 U	0.020 U	0.56
Anthracene	0.060 U	0.039 U	--	**0.032**	0.020 U	0.020 U	0.96
Benzo(ghi)perylene	0.060 U	0.039 U	--	**0.018** J	0.020 U	0.020 U	0.67
Benzoic Acid	**0.14** UJ	**0.12** UJ	--	**0.080** UJ	**0.071** UJ	**0.067** UJ	0.65
Benzyl Alcohol	0.030 U	0.059 U	--	0.030 U	0.030 U	0.030 U	0.057
Bis(2-Ethylhexyl) Phthalate	0.060 U	0.039 U	--	**0.048**	0.020 U	0.020 U	1.3
Butyl benzyl phthalate	0.0060 U	0.012 U	--	**0.010**	0.0059 U	0.006 U	0.063
Carbazole	--	--	--	--	--	--	NE
Dibenzofuran	0.060 U	0.039 U	--	0.020 U	0.020 U	0.020 U	0.54
Dibutyl phthalate	0.060 U	0.039 U	--	0.026 U	0.020 U	0.020 U	NE
Diethyl phthalate	0.060 U	0.039 U	--	0.020 U	0.020 U	0.020 U	0.20
Dimethyl phthalate	0.060 U	0.039 U	--	0.020 U	0.020 U	0.020 U	0.071
Di-N-Octyl Phthalate	0.060 U	0.039 U	--	0.020 U	0.020 U	0.020 U	6.2
Fluoranthene	**0.11**	**0.10**	--	**0.32**	0.020 U	0.020 U	1.7
Fluorene	0.060 U	0.039 U	--	0.020 U	0.020 U	0.020 U	0.54
Hexachlorobenzene	0.00098 U	0.00098 U	--	0.0010 U	0.00099 U	0.0010 U	0.022
Hexachlorobutadiene	0.00098 U	0.00098 U	--	0.0010 U	0.00099 U	0.0010 U	0.011
Hexachlorocyclopentadiene	**0.30** UJ	**0.20** UJ	--	0.10 U	0.10 U	0.10 U	NE
Isophorone	0.060 U	0.039 U	--	0.020 U	0.020 U	0.020 U	NE
m-Nitroaniline	**0.30** UJ	**0.20** UJ	--	0.10 U	0.10 U	0.10 U	NE
Naphthalene	0.060 U	0.039 U	--	0.020 U	0.020 U	0.020 U	2.1
Nitrobenzene	0.030 U	0.039 U	--	0.020 U	0.020 U	0.020 U	NE
N-Nitrosodiphenylamine	0.014 U	0.034 U	--	0.011 U	0.0059 U	0.0060 U	0.028
o-Cresol	0.060 U	0.012 U	--	0.0060 U	0.0059 U	0.0060 U	0.063
p-Cresol (4-methylphenol)	0.060 U	0.039 U	--	0.020 U	0.020 U	**0.020** UJ	0.67
Pentachlorophenol	0.030 U	0.059 U	--	0.030 U	0.030 U	0.030 U	0.36
Phenanthrene	**0.07**	**0.034 J**	--	**0.13**	0.020 U	0.020 U	1.5
Phenol	0.060 U	0.039 U	--	0.020 U	0.020 U	**0.020** UJ	0.42
Pyrene	**0.12**	**0.11**	--	**0.24**	0.020 U	0.020 U	2.6
Retene	--	--	--	--	--	--	NE
LPAH	**0.37**	**0.21**		**0.24**	**0.12**	**0.12**	5.2
HPAH	**0.65**	**0.55**		**0.87**	**0.20**	**0.20**	12
Carcinogenic PAHs (cPAHs) by 8270 (mg/kg DW)							
Benz[a]anthracene	**0.042 J**	**0.037 J**	--	**0.054**	0.020 U	0.020 U	0.062
Benzo(a)pyrene	**0.046 J**	**0.036 J**	--	**0.030**	0.020 U	0.020 U	0.062
Benzo(b)fluoranthene	**0.048 J**	**0.055**	--	**0.041**	0.020 U	0.020 U	0.062
Benzo(k)fluoranthene	**0.054 J**	**0.048**	--	**0.044**	0.020 U	0.020 U	0.062
Chrysene	**0.046 J**	**0.044**	--	**0.085**	0.020 U	0.020 U	0.062
Dibenzo(a,h)anthracene	0.060 U	0.039 U	--	0.020 U	0.020 U	0.020 U	0.062
Indeno(1,2,3-cd)pyrene	**0.060** UJ	**0.039** UJ	--	0.020 U	0.020 U	0.020 U	0.062
Total cPAH TEQ[2]	**0.073**	**0.058**		**0.048**	**0.015**	**0.015**	0.062
Butyltins							
Dibutyltin	--	0.0056 U	--	--	--	--	NE
Monobutyltin	0.0038 U	0.0040 U	--	--	--	--	NE
Tributyltin	0.0036 U	0.0038 U	--	--	--	--	0.073

Table 14

Summary of Sediment Chemical Analytical Data - SVOCs

7100 1st Avenue South Site
Seattle, Washington

Sample Identification[1]	LDW-8574	LDW9086B	LDW9086B	LDW9086B	SPI-128	TRI-157T	Preliminary Screening Level (mg/kg DW)
Sampled By	EIM Database	EIM Database	EIM Database	EIM Database	EIM Database	EIM Database	
Sample Depth	91-100 cm	0-30 cm	30-60 cm	60-91 cm	0-10 cm	0-10 cm	
Sample Date	2/20/2006	2/20/2006	2/20/2006	2/20/2006	8/10/2006	8/11/2006	
Semivolatile Organic Compounds (SVOCs) by 7270 or 8270 (mg/kg)							
1,1'-Biphenyl	--	--	--	--	--	--	NE
1,2,4-Trichlorobenzene	0.0058 UJ	0.0060 UJ	0.0060 UJ	0.0059 UJ	0.010 U	0.013 U	0.031
1,2-Dichlorobenzene	0.0058 U	0.0060 U	0.0060 U	0.0059 U	0.010 U	0.013 U	0.035
1,4-Dichlorobenzene	0.0058 U	0.0060 U	0.0060 U	0.0059 U	0.010 U	0.013 U	0.11
1-Methylphenanthrene	0.020 U	0.020 U	0.020 UJ	0.12 J	0.010 U	0.013 U	NE
2,4-Dimethylphenol	0.097 U	0.0060 U	0.0060 U	0.0059 U	0.058	0.013 U	0.029
2-Methylnaphthalene	0.019 U	0.020 U	0.020 UJ	0.12 J	0.010 U	0.025	0.67
2-Nitroaniline	0.019 U	0.099 U	0.10 UJ	0.098 UJ	--	--	NE
4-Chloro-3-Methylphenol	0.02 U	0.099 U	0.10 UJ	0.098 U	--	--	NE
Acenaphthene	0.097 U	0.020 U	0.013 J	0.81 J	0.010 U	0.013 U	0.50
Acenaphthylene	0.21	0.020 U	0.020 UJ	0.010 J	0.029 J	0.043	0.56
Anthracene	0.019 U	0.020 U	0.020 UJ	0.23 J	0.035	1.01	0.96
Benzo(ghi)perylene	0.0099 J	0.020 U	0.020 UJ	0.020 UJ	0.065	0.158 J	0.67
Benzoic Acid	0.013 J	0.057	0.060 U	0.077 J	0.126 J	0.278 J	0.65
Benzyl Alcohol	0.058	0.030 U	0.030 U	0.030 U	0.072	0.101	0.057
Bis(2-Ethylhexyl) Phthalate	0.019 U	0.022	0.013 J	0.080 J	0.26 UJ	0.672 UJ	1.3
Butyl benzyl phthalate	0.019 U	0.0060 U	0.0060 U	0.010	0.020 J	0.026 U	0.063
Carbazole	--	--	--	--	0.014 J	4.0	NE
Dibenzofuran	0.019 U	0.020 U	0.020 UJ	0.25 J	0.020 U	0.043	0.54
Dibutyl phthalate	0.019 U	0.010 J	0.020 UJ	0.013 J	0.17 UJ	0.596 UJ	NE
Diethyl phthalate	0.012 J	0.020 U	0.020 UJ	0.020 UJ	0.0093	0.024	0.20
Dimethyl phthalate	0.019 U	0.020 U	0.020 UJ	0.020 UJ	0.020 U	0.026 U	0.071
Di-N-Octyl Phthalate	0.019 U	0.020 U	0.020 UJ	0.020 UJ	0.010 U	0.013 U	6.2
Fluoranthene	0.019 U	0.036	0.049 J	1.3 J	0.020 U	0.026 U	1.7
Fluorene	0.036	0.020 U	0.020 UJ	0.29 J	0.22	0.71	0.54
Hexachlorobenzene	0.019 U	0.0060 U	0.0060 U	0.0059 U	0.010 U	0.053	0.022
Hexachlorobutadiene	0.0058 U	0.0060 U	0.0060 U	0.0059 U	0.010 U	0.013 U	0.011
Hexachlorocyclopentadiene	0.0058 U	0.099 U	0.10 UJ	0.098 UJ	0.010 U	0.013 U	NE
Isophorone	0.019 U	0.02 U	0.020 UJ	0.020 UJ	0.010 U	0.013 U	NE
m-Nitroaniline	0.019 U	0.099 U	0.10 UJ	0.098 UJ	--	--	NE
Naphthalene	0.019 U	0.020 U	0.020 UJ	0.330 J	0.010 U	0.037	2.1
Nitrobenzene	0.019 U	0.020 U	0.020 UJ	0.020 UJ	--	--	NE
N-Nitrosodiphenylamine	0.018 U	0.032 U	0.030 U	0.24 U	0.020 UJ	0.026 UJ	0.028
o-Cresol	0.0058 U	0.0060 U	0.0060 U	0.0059 U	0.025	0.044	0.063
p-Cresol (4-methylphenol)	0.019 U	0.020 U	0.020 UJ	0.020 U	0.057	0.090	0.67
Pentachlorophenol	0.029 U	0.030 U	0.030 U	0.026	0.030	0.214 J	0.36
Phenanthrene	0.010 J	0.012 J	0.016 J	0.96 J	0.082	0.575	1.5
Phenol	0.019 U	0.020 U	0.020 UJ	0.020 U	0.116 UJ	0.116 UJ	0.42
Pyrene	0.040	0.038	0.045 J	0.66 J	0.199	0.574	2.6
Retene	--	--	--	--	0.077	0.151	NE
LPAH	0.39	0.11	0.11	2.6	0.38	2.38	5.2
HPAH	0.17	0.20	0.23	2.5	0.88	3.58	12
Carcinogenic PAHs (cPAHs) by 8270 (mg/kg DW)							
Benz[a]anthracene	0.019 U	0.012 J	0.014 J	0.13 J	0.080	1.14	0.062
Benzo(a)pyrene	0.012 J	0.020 U	0.020 UJ	0.039 J	0.092	0.35	0.062
Benzo(b)fluoranthene	0.011 J	0.013 J	0.012 J	0.084 J	0.13	0.20	0.062
Benzo(k)fluoranthene	0.019 U	0.011 J	0.012 J	0.074 J	0.10	0.59	0.062
Chrysene	0.0064	0.012 J	0.013 J	0.13 J	0.14	0.34 J	0.062
Dibenzo(a,h)anthracene	0.012 J	0.020 U	0.020 UJ	0.020 UJ	0.010 U	0.08	0.062
Indeno(1,2,3-cd)pyrene	0.019 U	0.020 U	0.020 UJ	0.020 UJ	0.040	0.12	0.062
Total cPAH TEQ[2]	0.017	0.017	0.028	0.073	0.13	0.56	0.062
Butyltins							
Dibutyltin	--	--	--	--	--	--	NE
Monobutyltin	--	--	--	--	0.013 J	0.040 J	NE
Tributyltin	--	--	--	--	--	--	0.073

Table 14

Summary of Sediment Chemical Analytical Data - SVOCs

7100 1st Avenue South Site
Seattle, Washington

Sample Identification[1]	SED-1	SED-2	SED-3	SED-4	SED-5	LDW-SS525	Preliminary Screening Level (mg/kg DW)
Sampled By	SAIC, 2009	SAIC, 2009	SAIC, 2009	SAIC, 2009	SAIC, 2009	EIM Database	
Sample Depth	n/a	n/a	n/a	n/a	n/a	0-10 cm	
Sample Date	5/4/2007	5/4/2007	5/4/2007	5/7/2007	5/8/2007	12/16/2009	
Semivolatile Organic Compounds (SVOCs) by 7270 or 8270 (mg/kg)							
1,1'-Biphenyl	--	--	--	--	--	--	NE
1,2,4-Trichlorobenzene	0.94 J	2.1 U	0.049 U	1.0 U	1.0 U	--	0.031
1,2-Dichlorobenzene	0.67 J	2.1 U	0.049 U	1.0 U	1.0 U	--	0.035
1,4-Dichlorobenzene	2.0 U	1.1 J	0.049 U	1.0 U	1.0 U	--	0.11
1-Methylphenanthrene	--					0.0048 U	NE
2,4-Dimethylphenol	0.010 U	0.011 U	0.00025 U	0.00050 U	0.00050 U	--	0.029
2-Methylnaphthalene	1.6 J	0.00049 J	0.049 U	0.028 J	0.035 J	0.0048 U	0.67
2-Nitroaniline	--	--	--	--	--	--	NE
4-Chloro-3-Methylphenol	--	--	--	--	--	--	NE
Acenaphthene	0.47 J	2.1 U	0.012 J	0.10 U	0.10 U	0.0048	0.50
Acenaphthylene	0.48 J	2.1 U	0.049 U	0.10 U	0.10 U	0.0048 U	0.56
Anthracene	0.63 J	0.75 J	0.012 J	0.023 J	0.035 J	0.0077	0.96
Benzo(ghi)perylene	0.91 J	2.2	0.020 J	0.088 J	0.10 J	0.015	0.67
Benzoic Acid	40 U	42 U	0.98 U	2.0 U	2.0 U	--	0.65
Benzyl Alcohol	4.0 U	4.2 U	0.98 U	0.20 U	0.20 U	--	0.057
Bis(2-Ethylhexyl) Phthalate	6.5 J	17 J	0.14 J	0.76 J	2.2	--	1.3
Butyl benzyl phthalate	3.3	2.1 U	0.049 U	0.10 U	0.88	--	0.063
Carbazole	--					--	NE
Dibenzofuran	2.0 U	2.1 U	0.0083 J	0.10 U	0.10 U	0.0048	0.54
Dibutyl phthalate	2.0 U	2.1 U	0.049 U	0.10 U	0.12 U	--	NE
Diethyl phthalate	2.0 U	2.1 U	0.049 U	0.10 U	0.10 U	--	0.20
Dimethyl phthalate	0.44 J	2.1 U	0.049 U	0.013 J	0.13	--	0.071
Di-N-Octyl Phthalate	2.0 U	2.1 U	0.049 U	0.10 U	0.10 U	--	6.2
Fluoranthene	1.1 J	7.3	0.054	0.17	0.17	0.088	1.7
Fluorene	0.44 J	2.1 U	0.0098 J	0.10 U	0.019 J	0.0053	0.54
Hexachlorobenzene	2.0 U	2.1 U	0.049 U	0.10 U	0.10 U	--	0.022
Hexachlorobutadiene	2.0 U	2.1 U	0.049 U	0.10 U	0.10 U	--	0.011
Hexachlorocyclopentadiene	--	--	--	--	--	--	NE
Isophorone	--	--	--	--	--	--	NE
m-Nitroaniline	--	--	--	--	--	--	NE
Naphthalene	0.84 J	2.1 U	0.017 J	34 J	35 J	0.0048 U	2.1
Nitrobenzene	--	--	--	--	--	--	NE
N-Nitrosodiphenylamine	2.0 U	2.1 U	0.049 U	0.10 U	0.10 U	--	0.028
o-Cresol	2.0 U	2.1 U	0.049 U	0.10 U	0.10 U	--	0.063
p-Cresol (4-methylphenol)	0.51 J	2.1 U	0.030 J	0.10 U	0.10 U	--	0.67
Pentachlorophenol	14 J	21 U	0.49 U	1.0 U	1.0 U	--	0.36
Phenanthrene	1.4 J	0.72 J	0.032 J	0.057 J	0.097 J	0.043	1.5
Phenol	0.740 J	6.2 U	0.024 J	0.30 U	0.300 U	--	0.42
Pyrene	1.5 J	7.7	0.053	0.19 U	0.22 U	0.051	2.6
Retene	--	--	--	--	--	--	NE
LPAH	4.26	9.9	0.13	34	35.35	0.070	5.2
HPAH	8.5	38	0.30	1.0	1.0	0.30	12
Carcinogenic PAHs (cPAHs) by 8270 (mg/kg DW)							
Benz[a]anthracene	0.53 J	4.2	0.019 J	0.087 J	0.067 J	0.027	0.062
Benzo(a)pyrene	0.94 J	3.3	0.019 J	0.090 J	0.070 J	0.024	0.062
Benzo(b)fluoranthene	1.1 J	4.5	0.031 J	0.14	0.13	0.029 J	0.062
Benzo(k)fluoranthene	0.38 J	2.0 J	0.012 J	0.053 J	0.036 J		0.062
Chrysene	0.92 J	4.8	0.022 J	0.098 J	0.074 J	0.051	0.062
Dibenzo(a,h)anthracene	0.32 J	0.57 J	0.049 U	0.020 J	0.10 U	0.0058	0.062
Indeno(1,2,3-cd)pyrene	0.77 J	1.9 J	0.020 J	0.085 J	0.069 J	0.014	0.062
Total cPAH TEQ[2]	1.26	4.7	0.032	0.13	0.11	0.032	0.062
Butyltins							
Dibutyltin	--	--	--	--	--	--	NE
Monobutyltin	--	--	--	--	--	--	NE
Tributyltin	--	--	--	--	--	--	0.073

Table 14

Summary of Sediment Chemical Analytical Data - SVOCs

7100 1st Avenue South Site
Seattle, Washington

Notes:

[1] Approximate surface (0-10 cm) sediment sample locations are shown on Figure 14. Subsurface (below 10 cm) sediment sample locations are shown on Figure 17.

[2] Total carcinogenic Polycyclic Aromatic Hydrocarbon (cPAH) calculated using toxic equivalent (TEQ) methodology relative to benzo(a)pyrene. cPAHs that were not detected were assigned a value value of one half of the reporting limit for these calculations.

U = analyte not detected above the reported sample practical quantitation limit (PQL)
mg/kg = milligram per kilogram
DW = dry weight
"--" = not tested
J = estimated analyte concentration
NE = not established

Bold indicates analyte was detected above reporting level practical quantitation limits.

🟨 Yellow shading indicates analyte was detected above the preliminary screening level.

🟦 Blue shading indicates reported analyte quantitation limit is above the preliminary screening level.

Table 15

Summary of Sampling Approach, Objectives and Analysis

7100 1st Avenue South Site
Seattle, Washington

Sample Location	Characterization Objectives for Investigation			Soil Investigation Target Depth (feet)	Target Soil Sample Horizons			Initial Soil Sample Analyses[1]		Soil/Catch Basin Solids Analyses										Groundwater/Stormwater Analyses						
	Fill	Former USTs	Stormwater System		Fill	Water Table	Native	Minimum Number of Soil Samples to be Analyzed Initially	Estimated Number of Soil Samples to be Archived	Metals (EPA 200.8/7000)	SVOCs (EPA 8270/SIM)	VOCs (EPA 8260)	BTEX (EPA 8021)	PCBs (EPA 8082)	Pesticides (GC/MS/MS)	TPH-Gas (NWTPH-Gx)	TPH-Diesel (NWTPH-Dx)	TOC (EPA 9060), Grainsize (PSEP)	Dioxins/Furans (EPA 8290A)	Metals (EPA 200.8/1631E)[2]	SVOCs (EPA 8270/SIM)	VOCs (EPA 8260)	PCBs (EPA 8082)	Pesticides (GC/MS/MS)	TPH (NWTPH-Gx, Dx)	Chloride (EPA 300.0), TDS (EPA 160.1)
Hand Auger Borings (Soil)																										
HA-1	■			2	■		■	1	0	■	■	--	--	■	■	--	■	--	--	--	--	--	--	--	--	--
HA-2	■			2	■		■	1	0	■	■	--	--	■	■	--	■	--	--	--	--	--	--	--	--	--
HA-3	■			2	■		■	1	0	■	■	--	--	■	■	--	■	--	--	--	--	--	--	--	--	--
Stormwater System (Solids and Stormwater)																										
OF-1			■	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	■	■	■	■	■	■	--
CB-5			■	NA	--	--	--	--	--	■	■	■	--	■	■	■	■	■	■	--	--	--	--	--	--	--
SED-OF-1			■	NA	--	--	--	2	--	■	■	■	--	■	■	■	■	■	--	--	--	--	--	--	--	--
Direct-Push Boring (Soil)																										
DP-1	■	■			■	■	■	1	1	--	--	--	■	--	--	■	■	--	--	--	--	--	--	--	--	--
DP-2	■	■			■	■	■	1	1	--	--	--	■	--	--	■	■	--	--	--	--	--	--	--	--	--
DP-3	■	■			■	■	■	1	1	--	--	--	■	--	--	■	■	--	--	--	--	--	--	--	--	--
DP-4	■	■			■	■	■	1	1	--	--	--	■	--	--	■	■	--	--	--	--	--	--	--	--	--
DP-5	■	■			■	■	■	1	1	--	--	--	■	--	--	■	■	--	--	--	--	--	--	--	--	--
DP-6	■	■			■	■	■	1	1	--	--	--	■	--	--	■	■	--	--	--	--	--	--	--	--	--
DP-7	■	■			■	■	■	1	1	--	--	--	■	--	--	■	■	--	--	--	--	--	--	--	--	--
DP-8	■	■			■	■	■	1	1	--	--	--	■	--	--	■	■	--	--	--	--	--	--	--	--	--

Table 15

Summary of Sampling Approach, Objectives and Analysis

7100 1st Avenue South Site
Seattle, Washington

Sample Location	Characterization Objectives for Investigation			Soil Investigation Target Depth (feet)	Target Soil Sample Horizons			Initial Soil Sample Analyses[1]		Soil/Catch Basin Solids Analyses										Groundwater/Stormwater Analyses						
	Fill	Former USTs	Stormwater System		Fill	Water Table	Native	Minimum Number of Soil Samples to be Analyzed Initially	Estimated Number of Soil Samples to be Archived	Metals (EPA 200.8/7000)	SVOCs (EPA 8270/SIM)	VOCs (EPA 8260)	BTEX (EPA 8021)	PCBs (EPA 8082)	Pesticides (GC/MS/MS)	TPH-Gas (NWTPH-Gx)	TPH-Diesel (NWTPH-Dx)	TOC (EPA 9060), Grainsize (PSEP)	Dioxins/Furans (EPA 8290A)	Metals (EPA 200.8/1631E)[2]	SVOCs (EPA 8270/SIM)	VOCs (EPA 8260)	PCBs (EPA 8082)	Pesticides (GC/MS/MS)	TPH (NWTPH-Gx, Dx)	Chloride (EPA 300.0), TDS (EPA 160.1)
Hollow Stem Auger Borings/Monitoring Wells (Soil and Groundwater)																										
MW-2R	■	■		~35	■	■	■	3	4	■	■	■	--	■	■	■	■	■	--	■	■	■	■	■	■	■
MW-13	■	■		~35	■	■	■	3	4	■	■	■	--	■	■	■	■	■	--	■	■	■	■	■	■	■
MW-14	■	■		~35	■	■	■	3	4	■	■	■	--	■	■	■	■	■	--	■	■	■	■	■	■	■
MW-15	■	■		~35	■	■	■	3	4	■	■	■	--	■	■	■	■	■	--	■	■	■	■	■	■	■
MW-16	■	■		~35	■	■	■	3	4	■	■	■	--	■	■	■	■	■	--	■	■	■	■	■	■	■
MW-17	■	■		~35	■	■	■	3	4	■	■	■	--	■	■	■	■	■	--	■	■	■	■	■	■	■
MW-18	■	■		~35	■	■	■	3	4	■	■	■	--	■	■	■	■	■	--	■	■	■	■	■	■	■
Existing Monitoring Wells (Groundwater)																										
MW-1	■	■		NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	■	■	■	■	■	■	■
MW-3	■	■		NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	■	■	■	■	■	■	■
MW-4	■	■		NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	■	■	■	■	■	■	■
MW-5	■	■		NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	■	■	■	■	■	■	■
MW-6	■	■		NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	■	■	■	■	■	■	■
MW-7	■	■		NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	■	■	■	■	■	■	■
MW-8	■			NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	■	■	■	■	■	■	■
MW-9	■			NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	■	■	■	■	■	■	■
MW-10	■			NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	■	■	■	■	■	■	■
MW-11	■			NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	■	■	■	■	■	■	■
MW-12	■	■		NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	■	■	■	■	■	■	■

Notes:

[1] Soil samples to initially be submitted for chemical analyses will be selected based on field screening results, location of the groundwater table and/or target soil horizon (i.e., fill or native soil). The remaining samples that are collected will be archived at the laboratory. Subsequent analysis of archived samples will be based on review of the initial sample results and identified data gaps to the characterization of the Site.

[2] Total and dissolved metals analysis. EPA Method 1631E used for total and dissolved mercury in groundwater.

-- = Not applicable

FIGURES

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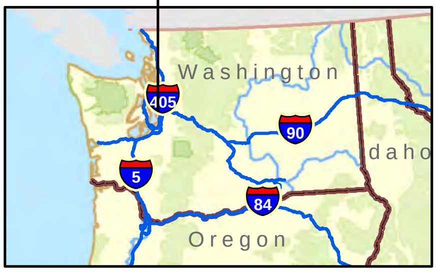
Map Revised: June 28, 2011/tbannister



Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
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Data Sources: ESRI Data & Maps

Projection: NAD 1983 UTM Zone 10N

Vicinity Map

7100 1st Avenue South Site
Seattle, Washington

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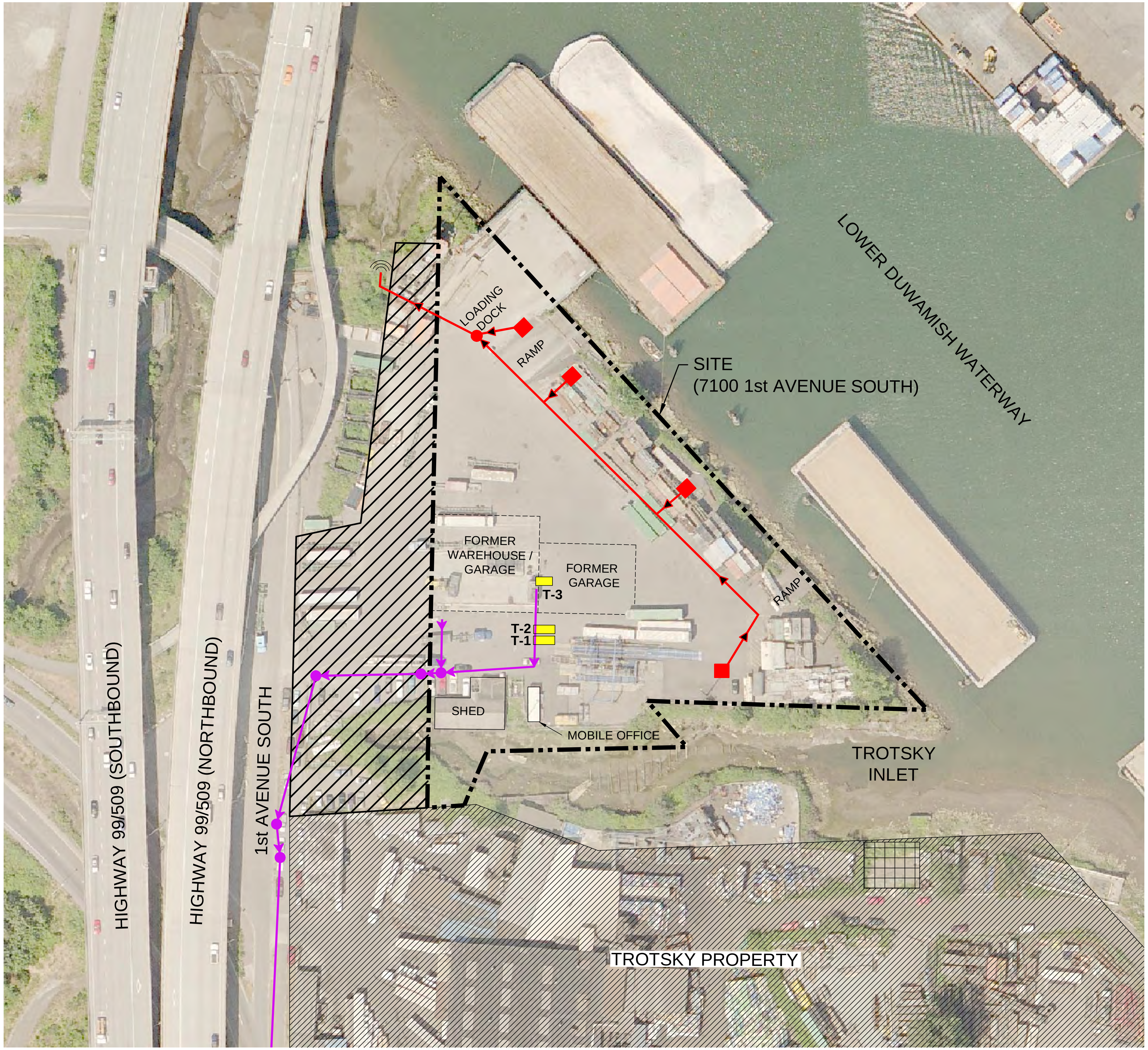
Figure 1

Path: <Sea:0\0275015\01\GIS\027501501VicinityMap.mxd

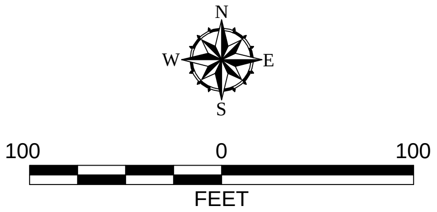
Office: SEA



Legend

- ▬ · ▬ Site Boundary
- ▨ Leased area to 7100 1st Avenue South, Seattle LLC from the Washington State Department of Transportation (WSDOT)
- ▦ 0.04-Acre Parcel Owned by 7100 1st Avenue South, Seattle LLC
- 🟨 Former Underground Storage Tank (Removed)
- ● Storm Drainage (Flows to Sanitary Sewer)
- ● Storm Drainage (Sewer Flows to LDW)
- Proposed Stormwater Outfall Sample Location

LDW = Lower Duwamish Waterway



Notes

1. The locations of all features shown are approximate.
2. Location of drain and conveyance features are unconfirmed and will be evaluated during RI.
3. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Reference: Aerial image from King County GIS, 2007. Storm drainage features from "Lower Duwamish Waterway, Early Action Area 2, Technical Memorandum: DMC Property Update," by Science Applications International Corporation (SAIC) dated April 2008.

Site Plan

7100 1st Avenue South Site
Seattle, Washington

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Figure 2

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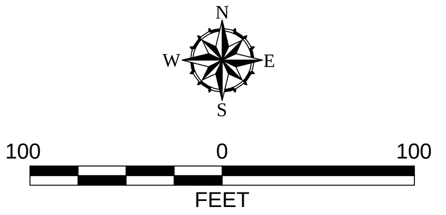
Legend

━ ·· ━	Site Boundary
●	Soil Vapor Probe Location (Dames & Moore, 1990)
—20—	Concentration Contour
▭	Former Underground Storage Tank (Removed)



Notes

1. The locations of all features shown are approximate.
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Reference: Aerial image from King County GIS, 2007..

1990 Soil Vapor Study

7100 1st Avenue South Site
Seattle, Washington

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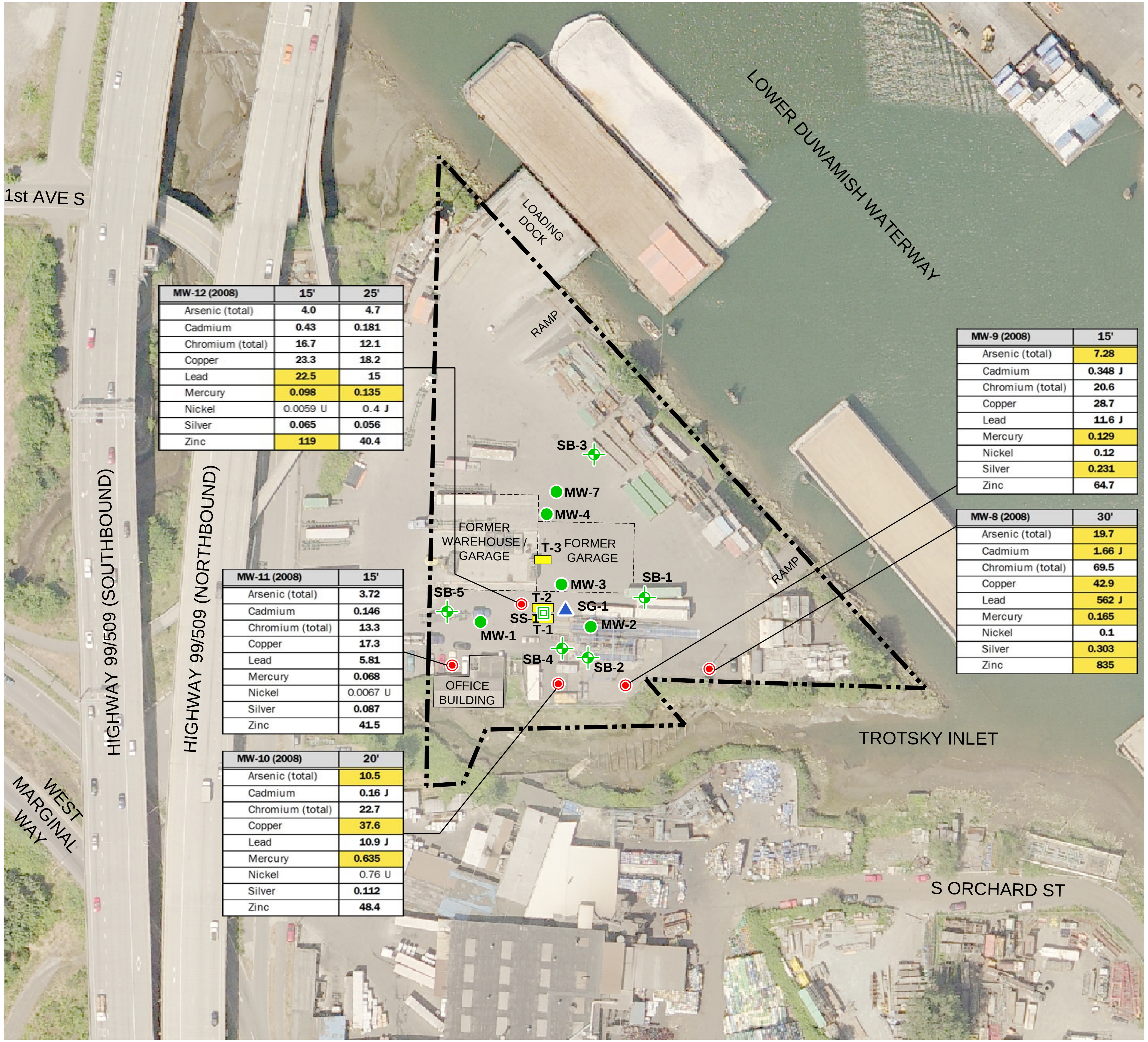
Figure 3

P:\0\0275015\01\CAD\Figures\Ecology Review Document\027501501_Fig 3 Soil Vapor Study.dwg\TAB:Fig 3 modified by tmichaud on Dec 03, 2012 - 10:58



MW-12 (2008)	15'	25'
Arsenic (total)	4.0	4.7
Cadmium	0.43	0.181
Chromium (total)	16.7	12.1
Copper	23.3	18.2
Lead	22.5	15
Mercury	0.098	0.135
Nickel	0.0059 U	0.4 J
Silver	0.065	0.056
Zinc	119	40.4

MW-11 (2008)	15'
Arsenic (total)	3.72
Cadmium	0.146
Chromium (total)	13.3
Copper	17.3
Lead	5.81
Mercury	0.068
Nickel	0.0067 U
Silver	0.087
Zinc	41.5

MW-10 (2008)	20'
Arsenic (total)	10.5
Cadmium	0.16 J
Chromium (total)	22.7
Copper	37.6
Lead	10.9 J
Mercury	0.635
Nickel	0.76 U
Silver	0.112
Zinc	48.4

MW-9 (2008)	15'
Arsenic (total)	7.28
Cadmium	0.348 J
Chromium (total)	20.6
Copper	28.7
Lead	11.6 J
Mercury	0.129
Nickel	0.12
Silver	0.231
Zinc	64.7

MW-8 (2008)	30'
Arsenic (total)	19.7
Cadmium	1.66 J
Chromium (total)	69.5
Copper	42.9
Lead	562 J
Mercury	0.165
Nickel	0.1
Silver	0.303
Zinc	835

Legend

─ · · ─	Site Boundary
▬	Former Underground Storage Tank (Removed)
⊕	Soil Boring (Dames & Moore, 1991b)
●	Monitoring Well (Dames & Moore, 1991b)
▣	Soil Sample Location (Dames & Moore, 1991a)
▲	Soil Vapor Extraction Well (Dames & Moore, 1991b)
◉	Monitoring Well (SAIC, 2009)
bgs	Below Ground Surface

Data Box Explanation:

Sample Location	Sample Depth (feet bgs)
Chemical Constituent	Result (mg/kg)

mg/kg = milligrams per kilogram

🟨 Yellow shading indicates analyte was detected above the preliminary soil screening level.

🟦 Blue shading indicates reported analyte quantitation limit is above the preliminary screening level.

U = analyte not detected above the reported sample practical quantitation limit (PQL)

J = estimated analyte concentration

Notes

1. The locations of all features shown are approximate.
2. For comparative purposes, analytes exceeding preliminary groundwater screening levels are also presented on this Figure (if analyzed)."
3. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Reference: Aerial image from King County GIS, 2007.

Soil Sample Locations and Preliminary Soil Screening Level Exceedance Summary - Metals

7100 1st Avenue South Site
Seattle, Washington

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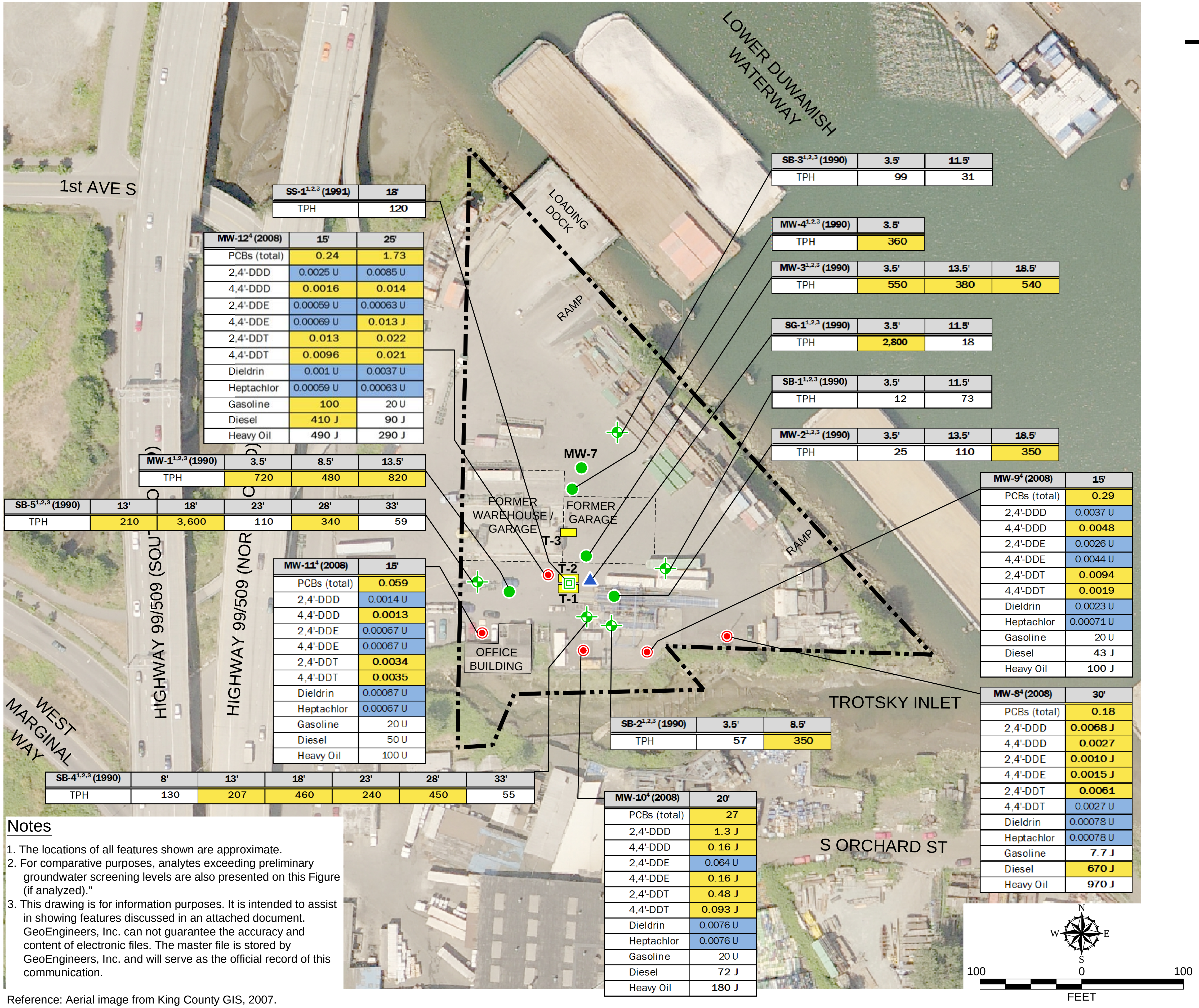
Figure 4

P:\0\0275015\01\CAD\Figures\Ecology Review Document\027501501_Sample Locations_F4-F7.dwg\TAB:Fig 4 - Metals modified by tmichaud on Dec 03, 2012 - 11:09

P:\0\0275015\01\CAD\Figures\Ecology Review Document\027501501_Sample Locations_F4-F7.dwg\TAB:Fig 5 - PCB-TPH-Pesticide modified by tmichaud on Dec 03, 2012 - 11:28



SS-1^{1,2,3} (1991)	18'
TPH	120

MW-12^{4} (2008)	15'	25'
PCBs (total)	0.24	1.73
2,4'-DDD	0.0025 U	0.0085 U
4,4'-DDD	0.0016	0.014
2,4'-DDE	0.00059 U	0.00063 U
4,4'-DDE	0.00069 U	0.013 J
2,4'-DDT	0.013	0.022
4,4'-DDT	0.0096	0.021
Dieldrin	0.001 U	0.0037 U
Heptachlor	0.00059 U	0.00063 U
Gasoline	100	20 U
Diesel	410 J	90 J
Heavy Oil	490 J	290 J

MW-1^{1,2,3} (1990)	3.5'	8.5'	13.5'
TPH	720	480	820

SB-5^{1,2,3} (1990)	13'	18'	23'	28'	33'
TPH	210	3,600	110	340	59

MW-11^{4} (2008)	15'
PCBs (total)	0.059
2,4'-DDD	0.0014 U
4,4'-DDD	0.0013
2,4'-DDE	0.00067 U
4,4'-DDE	0.00067 U
2,4'-DDT	0.0034
4,4'-DDT	0.0035
Dieldrin	0.00067 U
Heptachlor	0.00067 U
Gasoline	20 U
Diesel	50 U
Heavy Oil	100 U

SB-4^{1,2,3} (1990)	8'	13'	18'	23'	28'	33'
TPH	130	207	460	240	450	55

SB-3^{1,2,3} (1990)	3.5'	11.5'
TPH	99	31

MW-4^{1,2,3} (1990)	3.5'
TPH	360

MW-3^{1,2,3} (1990)	3.5'	13.5'	18.5'
TPH	550	380	540

SG-1^{1,2,3} (1990)	3.5'	11.5'
TPH	2,800	18

SB-1^{1,2,3} (1990)	3.5'	11.5'
TPH	12	73

MW-2^{1,2,3} (1990)	3.5'	13.5'	18.5'
TPH	25	110	350

MW-9^{4} (2008)	15'
PCBs (total)	0.29
2,4'-DDD	0.0037 U
4,4'-DDD	0.0048
2,4'-DDE	0.0026 U
4,4'-DDE	0.0044 U
2,4'-DDT	0.0094
4,4'-DDT	0.0019
Dieldrin	0.0023 U
Heptachlor	0.00071 U
Gasoline	20 U
Diesel	43 J
Heavy Oil	100 J

MW-8^{4} (2008)	30'
PCBs (total)	0.18
2,4'-DDD	0.0068 J
4,4'-DDD	0.0027
2,4'-DDE	0.0010 J
4,4'-DDE	0.0015 J
2,4'-DDT	0.0061
4,4'-DDT	0.0027 U
Dieldrin	0.00078 U
Heptachlor	0.00078 U
Gasoline	7.7 J
Diesel	670 J
Heavy Oil	970 J

SB-2^{1,2,3} (1990)	3.5'	8.5'
TPH	57	350

MW-10^{4} (2008)	20'
PCBs (total)	27
2,4'-DDD	1.3 J
4,4'-DDD	0.16 J
2,4'-DDE	0.064 U
4,4'-DDE	0.16 J
2,4'-DDT	0.48 J
4,4'-DDT	0.093 J
Dieldrin	0.0076 U
Heptachlor	0.0076 U
Gasoline	20 U
Diesel	72 J
Heavy Oil	180 J

Legend

- · · -	Site Boundary
🟨	Former Underground Storage Tank (Removed)
⊕	Soil Boring (Dames & Moore, 1991b)
●	Monitoring Well (Dames & Moore, 1991b)
▣	Soil Sample Location (Dames & Moore, 1991a)
▲	Soil Vapor Extraction Well (Dames & Moore, 1991b)
◉	Monitoring Well (SAIC, 2009)
bgs	Below Ground Surface
TPH	Total Petroleum Hydrocarbons
PCB	Polychlorinated Biphenyls

[1] PCBs not analyzed.

[2] Pesticides not analyzed.

[3] Gasoline-, diesel- and heavy oil-rangy petroleum hydrocarbons not analyzed.

[4] Total Petroleum Hydrocarbons not analyzed.

Data Box Explanation:

Sample Location	Sample Depth (feet bgs)
Chemical Constituent	Result (mg/kg)

mg/kg = milligrams per kilogram

🟨	Yellow shading indicates analyte was detected above the preliminary soil screening level.
🟦	Blue shading indicates reported analyte quantitation limit is above the preliminary screening level.

U = analyte not detected above the reported sample practical quantitation limit (PQL)

J = estimated analyte concentration

Notes

1. The locations of all features shown are approximate.
2. For comparative purposes, analytes exceeding preliminary groundwater screening levels are also presented on this Figure (if analyzed)."
3. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Reference: Aerial image from King County GIS, 2007.

Soil Sample Locations and Preliminary Soil Screening Level Exceedance Summary - PCB, TPH and Pesticides

7100 1st Avenue South Site
Seattle, Washington

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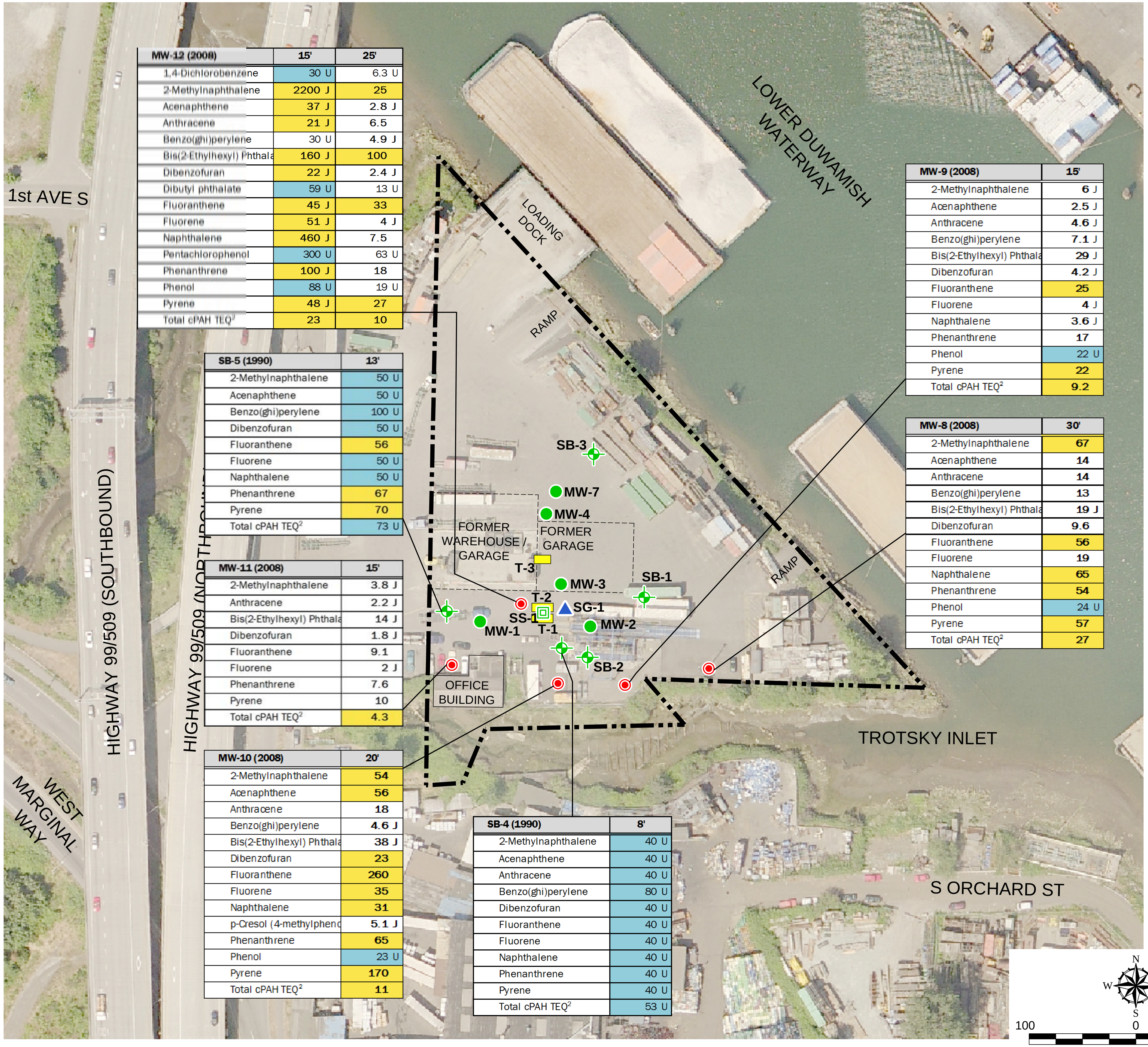
Figure 5



MW-12 (2008)	15'	25'
1,4-Dichlorobenzene	30 U	6.3 U
2-Methylnaphthalene	2200 J	25
Acenaphthene	37 J	2.8 J
Anthracene	21 J	6.5
Benzo(ghi)perylene	30 U	4.9 J
Bis(2-Ethylhexyl) Phthala	160 J	100
Dibenzofuran	22 J	2.4 J
Dibutyl phthalate	59 U	13 U
Fluoranthene	45 J	33
Fluorene	51 J	4 J
Naphthalene	460 J	7.5
Pentachlorophenol	300 U	63 U
Phenanthrene	100 J	18
Phenol	88 U	19 U
Pyrene	48 J	27
Total cPAH TEQ^2	23	10

SB-5 (1990)	13'
2-Methylnaphthalene	50 U
Acenaphthene	50 U
Benzo(ghi)perylene	100 U
Dibenzofuran	50 U
Fluoranthene	56
Fluorene	50 U
Naphthalene	50 U
Phenanthrene	67
Pyrene	70
Total cPAH TEQ^2	73 U

MW-11 (2008)	15'
2-Methylnaphthalene	3.8 J
Anthracene	2.2 J
Bis(2-Ethylhexyl) Phthala	14 J
Dibenzofuran	1.8 J
Fluoranthene	9.1
Fluorene	2 J
Phenanthrene	7.6
Pyrene	10
Total cPAH TEQ^2	4.3

MW-10 (2008)	20'
2-Methylnaphthalene	54
Acenaphthene	56
Anthracene	18
Benzo(ghi)perylene	4.6 J
Bis(2-Ethylhexyl) Phthala	38 J
Dibenzofuran	23
Fluoranthene	260
Fluorene	35
Naphthalene	31
p-Cresol (4-methylpheno	5.1 J
Phenanthrene	65
Phenol	23 U
Pyrene	170
Total cPAH TEQ^2	11

SB-4 (1990)	8'
2-Methylnaphthalene	40 U
Acenaphthene	40 U
Anthracene	40 U
Benzo(ghi)perylene	80 U
Dibenzofuran	40 U
Fluoranthene	40 U
Fluorene	40 U
Naphthalene	40 U
Phenanthrene	40 U
Pyrene	40 U
Total cPAH TEQ^2	53 U

MW-9 (2008)	15'
2-Methylnaphthalene	6 J
Acenaphthene	2.5 J
Anthracene	4.6 J
Benzo(ghi)perylene	7.1 J
Bis(2-Ethylhexyl) Phthala	29 J
Dibenzofuran	4.2 J
Fluoranthene	25
Fluorene	4 J
Naphthalene	3.6 J
Phenanthrene	17
Phenol	22 U
Pyrene	22
Total cPAH TEQ^2	9.2

MW-8 (2008)	30'
2-Methylnaphthalene	67
Acenaphthene	14
Anthracene	14
Benzo(ghi)perylene	13
Bis(2-Ethylhexyl) Phthala	19 J
Dibenzofuran	9.6
Fluoranthene	56
Fluorene	19
Naphthalene	65
Phenanthrene	54
Phenol	24 U
Pyrene	57
Total cPAH TEQ^2	27

Legend

-·-	Site Boundary
🟨	Former Underground Storage Tank (Removed)
⊕	Soil Boring (Dames & Moore, 1991b)
●	Monitoring Well (Dames & Moore, 1991b)
▣	Soil Sample Location (Dames & Moore, 1991a)
▲	Soil Vapor Extraction Well (Dames & Moore, 1991b)
◉	Monitoring Well (SAIC, 2009)
bgs	Below Ground Surface
SVOC	Semi Volatile Organic Compound
cPAHs	Carcinogenic Polycyclic Aromatic Hydrocarbons
TEQ	Toxic Equivalent Methodology

Data Box Explanation:

Sample Location	Sample Depth (feet bgs)
Chemical Constituent	Result (µg/kg)

µg/kg = micrograms per kilogram

🟨	Yellow shading indicates analyte was detected above the preliminary soil screening level.
🟦	Blue shading indicates reported analyte quantitation limit is above the preliminary screening level.

U = analyte not detected above the reported sample practical quantitation limit (PQL)

J = estimated analyte concentration

Notes

1. The locations of all features shown are approximate.
2. For comparative purposes, analytes exceeding preliminary groundwater screening levels are also presented on this Figure (if analyzed)."
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Reference: Aerial image from King County GIS, 2007.

Soil Sample Locations and Preliminary Soil Screening Level Exceedance Summary - SVOCs

7100 1st Avenue South Site
Seattle, Washington

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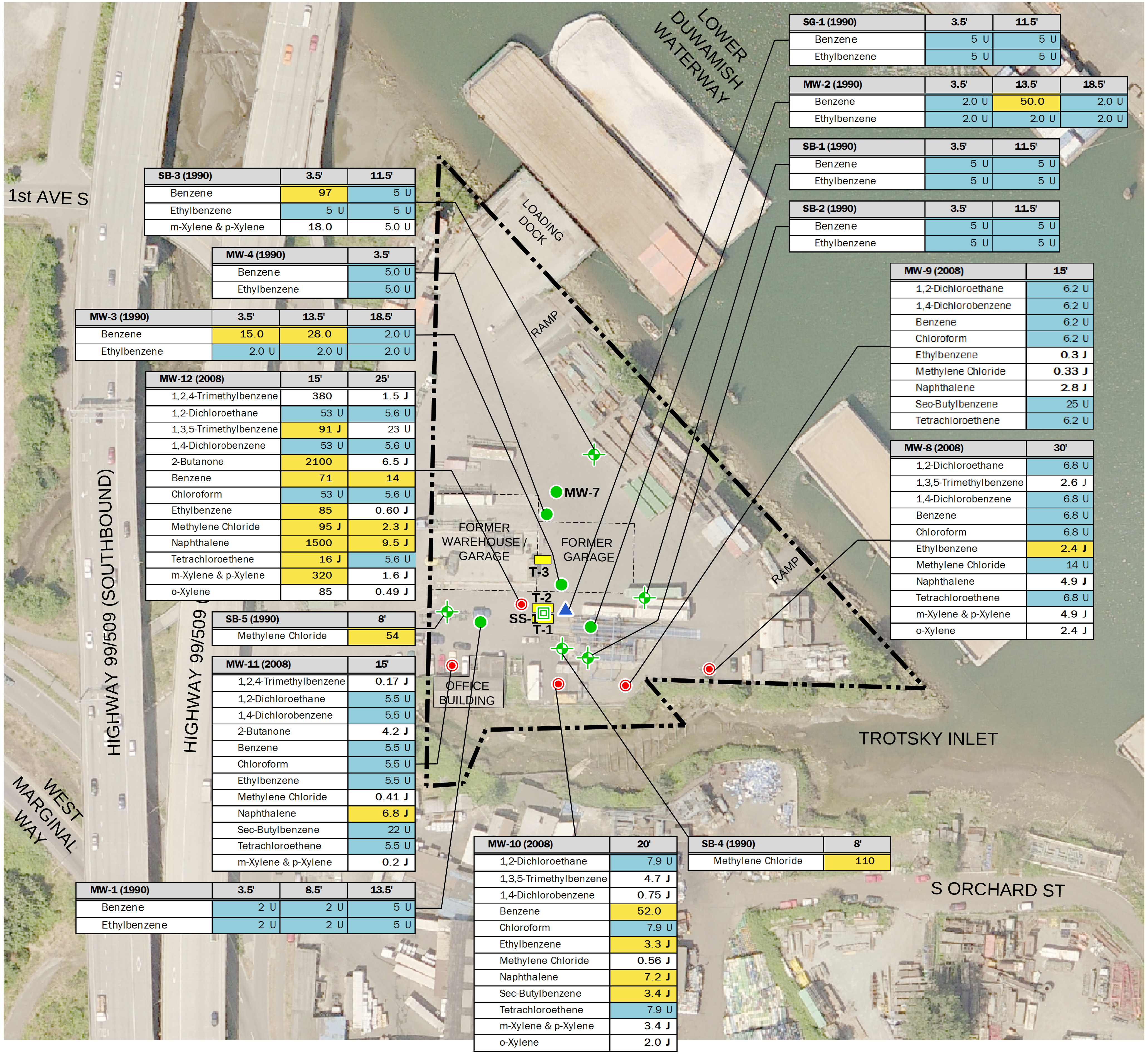
Figure 6

P:\0\0275015\01\CAD\Figures\Ecology Review Document\027501501_Sample Locations_F4-F7.dwg\TAB:Fig 6 - SVOCs modified by tmichaud on Dec 03, 2012 - 11:37

P:\0\0275015\01\CAD\Figures\Ecology Review Document\027501501_Sample Locations_F4-F7.dwg\TAB:Fig 7 - VOCs modified by tmichaud on Dec 03, 2012 - 11:47



SB-3 (1990)	3.5'	11.5'
Benzene	97	5 U
Ethylbenzene	5 U	5 U
m-Xylene & p-Xylene	18.0	5.0 U

MW-4 (1990)	3.5'
Benzene	5.0 U
Ethylbenzene	5.0 U

MW-3 (1990)	3.5'	13.5'	18.5'
Benzene	15.0	28.0	2.0 U
Ethylbenzene	2.0 U	2.0 U	2.0 U

MW-12 (2008)	15'	25'
1,2,4-Trimethylbenzene	380	1.5 J
1,2-Dichloroethane	53 U	5.6 U
1,3,5-Trimethylbenzene	91 J	23 U
1,4-Dichlorobenzene	53 U	5.6 U
2-Butanone	2100	6.5 J
Benzene	71	14
Chloroform	53 U	5.6 U
Ethylbenzene	85	0.60 J
Methylene Chloride	95 J	2.3 J
Naphthalene	1500	9.5 J
Tetrachloroethene	16 J	5.6 U
m-Xylene & p-Xylene	320	1.6 J
o-Xylene	85	0.49 J

SB-5 (1990)	8'
Methylene Chloride	54

MW-11 (2008)	15'
1,2,4-Trimethylbenzene	0.17 J
1,2-Dichloroethane	5.5 U
1,4-Dichlorobenzene	5.5 U
2-Butanone	4.2 J
Benzene	5.5 U
Chloroform	5.5 U
Ethylbenzene	5.5 U
Methylene Chloride	0.41 J
Naphthalene	6.8 J
Sec-Butylbenzene	22 U
Tetrachloroethene	5.5 U
m-Xylene & p-Xylene	0.2 J

MW-1 (1990)	3.5'	8.5'	13.5'
Benzene	2 U	2 U	5 U
Ethylbenzene	2 U	2 U	5 U

MW-10 (2008)	20'
1,2-Dichloroethane	7.9 U
1,3,5-Trimethylbenzene	4.7 J
1,4-Dichlorobenzene	0.75 J
Benzene	52.0
Chloroform	7.9 U
Ethylbenzene	3.3 J
Methylene Chloride	0.56 J
Naphthalene	7.2 J
Sec-Butylbenzene	3.4 J
Tetrachloroethene	7.9 U
m-Xylene & p-Xylene	3.4 J
o-Xylene	2.0 J

SB-4 (1990)	8'
Methylene Chloride	110

SG-1 (1990)	3.5'	11.5'
Benzene	5 U	5 U
Ethylbenzene	5 U	5 U

MW-2 (1990)	3.5'	13.5'	18.5'
Benzene	2.0 U	50.0	2.0 U
Ethylbenzene	2.0 U	2.0 U	2.0 U

SB-1 (1990)	3.5'	11.5'
Benzene	5 U	5 U
Ethylbenzene	5 U	5 U

SB-2 (1990)	3.5'	11.5'
Benzene	5 U	5 U
Ethylbenzene	5 U	5 U

MW-9 (2008)	15'
1,2-Dichloroethane	6.2 U
1,4-Dichlorobenzene	6.2 U
Benzene	6.2 U
Chloroform	6.2 U
Ethylbenzene	0.3 J
Methylene Chloride	0.33 J
Naphthalene	2.8 J
Sec-Butylbenzene	25 U
Tetrachloroethene	6.2 U

MW-8 (2008)	30'
1,2-Dichloroethane	6.8 U
1,3,5-Trimethylbenzene	2.6 J
1,4-Dichlorobenzene	6.8 U
Benzene	6.8 U
Chloroform	6.8 U
Ethylbenzene	2.4 J
Methylene Chloride	14 U
Naphthalene	4.9 J
Tetrachloroethene	6.8 U
m-Xylene & p-Xylene	4.9 J
o-Xylene	2.4 J

Legend

‒ · · ‒	Site Boundary
▭	Former Underground Storage Tank (Removed)
⌖	Soil Boring (Dames & Moore, 1991b)
●	Monitoring Well (Dames & Moore, 1991b)
▣	Soil Sample Location (Dames & Moore, 1991a)
▲	Soil Vapor Extraction Well (Dames & Moore, 1991b)
◉	Monitoring Well (SAIC, 2009)
bgs	Below Ground Surface
VOCs	Volatile Organic Compounds

Data Box Explanation:

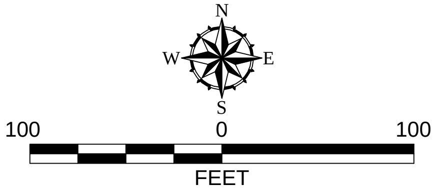
Sample Location	Sample Depth (feet bgs)
Chemical Constituent	Result (µg/kg)

µg/kg = micrograms per kilogram

🟨	Yellow shading indicates analyte was detected above the preliminary soil screening level.
🟦	Blue shading indicates reported analyte quantitation limit is above the preliminary screening level.

U = analyte not detected above the reported sample practical quantitation limit (PQL)

J = estimated analyte concentration



Notes

1. The locations of all features shown are approximate.
2. For comparative purposes, analytes exceeding preliminary groundwater screening levels are also presented on this Figure (if analyzed)."
3. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Reference: Aerial image from King County GIS, 2007.

Soil Sample Locations and Preliminary Soil Screening Level Exceedance Summary - VOCs

7100 1st Avenue South Site
Seattle, Washington

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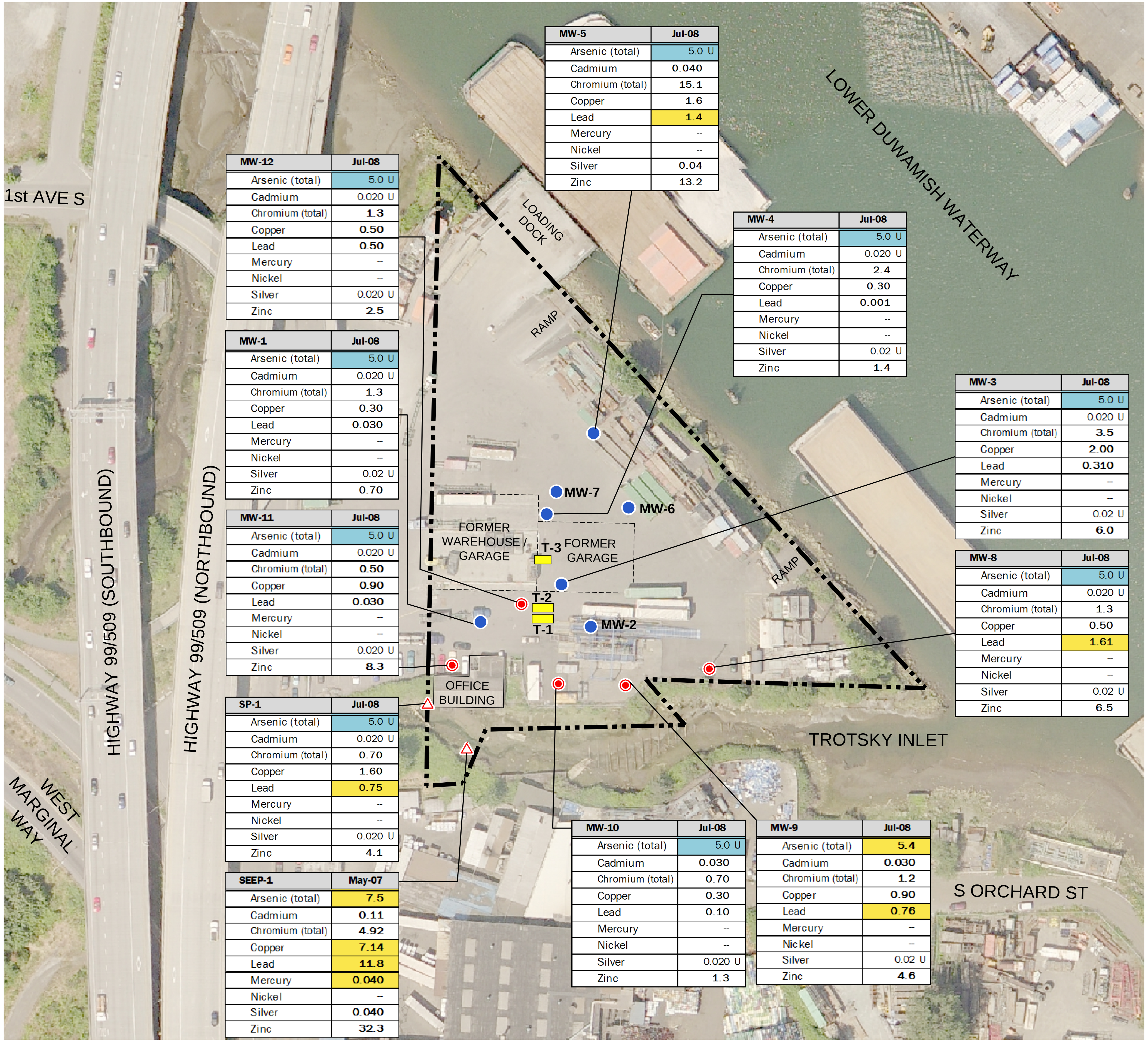
Figure 7



MW-5	Jul-08
Arsenic (total)	5.0 U
Cadmium	0.040
Chromium (total)	15.1
Copper	1.6
Lead	1.4
Mercury	--
Nickel	--
Silver	0.04
Zinc	13.2

MW-12	Jul-08
Arsenic (total)	5.0 U
Cadmium	0.020 U
Chromium (total)	1.3
Copper	0.50
Lead	0.50
Mercury	--
Nickel	--
Silver	0.020 U
Zinc	2.5

MW-4	Jul-08
Arsenic (total)	5.0 U
Cadmium	0.020 U
Chromium (total)	2.4
Copper	0.30
Lead	0.001
Mercury	--
Nickel	--
Silver	0.02 U
Zinc	1.4

MW-1	Jul-08
Arsenic (total)	5.0 U
Cadmium	0.020 U
Chromium (total)	1.3
Copper	0.30
Lead	0.030
Mercury	--
Nickel	--
Silver	0.02 U
Zinc	0.70

MW-3	Jul-08
Arsenic (total)	5.0 U
Cadmium	0.020 U
Chromium (total)	3.5
Copper	2.00
Lead	0.310
Mercury	--
Nickel	--
Silver	0.02 U
Zinc	6.0

MW-11	Jul-08
Arsenic (total)	5.0 U
Cadmium	0.020 U
Chromium (total)	0.50
Copper	0.90
Lead	0.030
Mercury	--
Nickel	--
Silver	0.020 U
Zinc	8.3

MW-8	Jul-08
Arsenic (total)	5.0 U
Cadmium	0.020 U
Chromium (total)	1.3
Copper	0.50
Lead	1.61
Mercury	--
Nickel	--
Silver	0.02 U
Zinc	6.5

SP-1	Jul-08
Arsenic (total)	5.0 U
Cadmium	0.020 U
Chromium (total)	0.70
Copper	1.60
Lead	0.75
Mercury	--
Nickel	--
Silver	0.020 U
Zinc	4.1

SEEP-1	May-07
Arsenic (total)	7.5
Cadmium	0.11
Chromium (total)	4.92
Copper	7.14
Lead	11.8
Mercury	0.040
Nickel	--
Silver	0.040
Zinc	32.3

MW-10	Jul-08
Arsenic (total)	5.0 U
Cadmium	0.030
Chromium (total)	0.70
Copper	0.30
Lead	0.10
Mercury	--
Nickel	--
Silver	0.020 U
Zinc	1.3

MW-9	Jul-08
Arsenic (total)	5.4
Cadmium	0.030
Chromium (total)	1.2
Copper	0.90
Lead	0.76
Mercury	--
Nickel	--
Silver	0.02 U
Zinc	4.6

Legend

-··-	Site Boundary
▭	Former Underground Storage Tank (Removed)
●	Monitoring Well (Dames & Moore, 1991b)
◉	Monitoring Well (SAIC, 2009)
△	Seep Sample (SAIC, 2009)
bgs	Below Ground Surface

Data Box Explanation:

Sample Location	Sample Depth (feet bgs)
Chemical Constituent	Result (µg/L)

µg/L = micrograms per liter

🟨	Yellow shading indicates analyte was detected above the preliminary groundwater screening level.
🟦	Blue shading indicates reported analyte quantitation limit is above the preliminary screening level.

U = analyte not detected above the reported sample practical quantitation limit (PQL)

J = estimated analyte concentration

Notes

1. The locations of all features shown are approximate.
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Reference: Aerial image from King County GIS, 2007.

Groundwater Sample Locations and Preliminary Groundwater Screening Level Exceedance Summary - Metals

7100 1st Avenue South Site
Seattle, Washington

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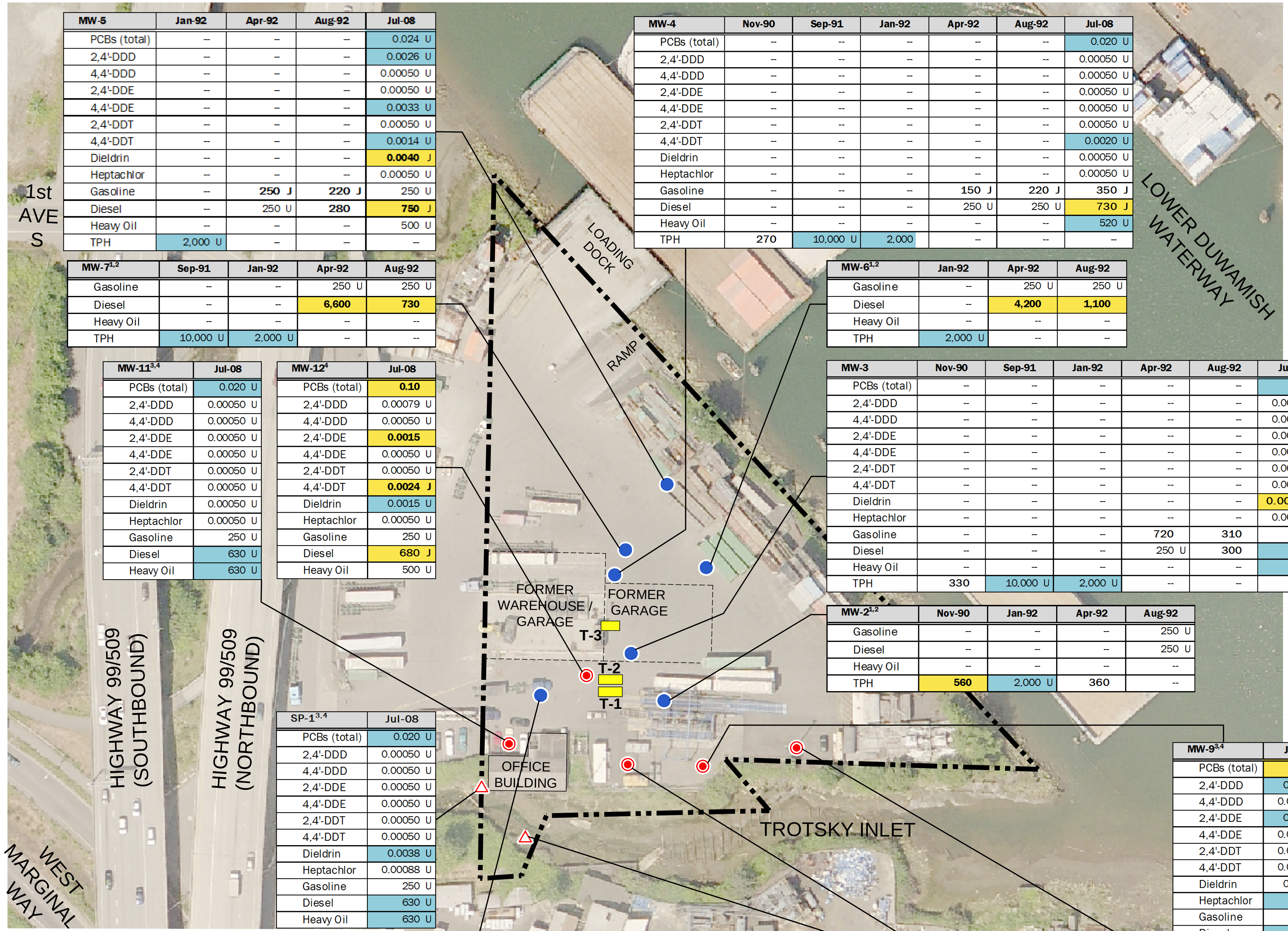
Figure 8

P:\0\0275015\01\CAD\Figures\Ecology Review Document\027501501_Sample Locations_F8-F11.dwg\Tab:Fig 9 - PCB-TPH-Pesticide modified by tmichaud on Jan 14, 2013 - 13:52



MW-5	Jan-92	Apr-92	Aug-92	Jul-08
PCBs (total)	--	--	--	0.024 U
2,4'-DDD	--	--	--	0.0026 U
4,4'-DDD	--	--	--	0.00050 U
2,4'-DDE	--	--	--	0.00050 U
4,4'-DDE	--	--	--	0.0033 U
2,4'-DDT	--	--	--	0.00050 U
4,4'-DDT	--	--	--	0.0014 U
Dieldrin	--	--	--	**0.0040** J
Heptachlor	--	--	--	0.00050 U
Gasoline	--	**250** J	**220** J	250 U
Diesel	--	250 U	**280**	**750** J
Heavy Oil	--	--	--	500 U
TPH	2,000 U	--	--	--

MW-7[1,2]	Sep-91	Jan-92	Apr-92	Aug-92
Gasoline	--	--	250 U	250 U
Diesel	--	--	**6,600**	**730**
Heavy Oil	--	--	--	--
TPH	10,000 U	2,000 U	--	--

MW-11[3,4]	Jul-08
PCBs (total)	0.020 U
2,4'-DDD	0.00050 U
4,4'-DDD	0.00050 U
2,4'-DDE	0.00050 U
4,4'-DDE	0.00050 U
2,4'-DDT	0.00050 U
4,4'-DDT	0.00050 U
Dieldrin	0.00050 U
Heptachlor	0.00050 U
Gasoline	250 U
Diesel	630 U
Heavy Oil	630 U

MW-12[4]	Jul-08
PCBs (total)	**0.10**
2,4'-DDD	0.00079 U
4,4'-DDD	0.00050 U
2,4'-DDE	**0.0015**
4,4'-DDE	0.00050 U
2,4'-DDT	0.00050 U
4,4'-DDT	**0.0024** J
Dieldrin	0.0015 U
Heptachlor	0.00050 U
Gasoline	250 U
Diesel	**680** J
Heavy Oil	500 U

MW-4	Nov-90	Sep-91	Jan-92	Apr-92	Aug-92	Jul-08
PCBs (total)	--	--	--	--	--	0.020 U
2,4'-DDD	--	--	--	--	--	0.00050 U
4,4'-DDD	--	--	--	--	--	0.00050 U
2,4'-DDE	--	--	--	--	--	0.00050 U
4,4'-DDE	--	--	--	--	--	0.00050 U
2,4'-DDT	--	--	--	--	--	0.00050 U
4,4'-DDT	--	--	--	--	--	0.0020 U
Dieldrin	--	--	--	--	--	0.00050 U
Heptachlor	--	--	--	--	--	0.00050 U
Gasoline	--	--	--	**150** J	**220** J	**350** J
Diesel	--	--	--	250 U	250 U	**730** J
Heavy Oil	--	--	--	--	--	520 U
TPH	**270**	10,000 U	2,000	--	--	--

MW-6[1,2]	Jan-92	Apr-92	Aug-92
Gasoline	--	250 U	250 U
Diesel	--	**4,200**	**1,100**
Heavy Oil	--	--	--
TPH	2,000 U	--	--

MW-3	Nov-90	Sep-91	Jan-92	Apr-92	Aug-92	Jul-08
PCBs (total)	--	--	--	--	--	0.02 U
2,4'-DDD	--	--	--	--	--	0.00049 U
4,4'-DDD	--	--	--	--	--	0.00049 U
2,4'-DDE	--	--	--	--	--	0.00049 U
4,4'-DDE	--	--	--	--	--	0.00049 U
2,4'-DDT	--	--	--	--	--	0.00049 U
4,4'-DDT	--	--	--	--	--	0.00049 U
Dieldrin	--	--	--	--	--	0.0041
Heptachlor	--	--	--	--	--	0.00049 U
Gasoline	--	--	--	**720**	**310**	250 U
Diesel	--	--	--	250 U	**300**	630 U
Heavy Oil	--	--	--	--	--	630 U
TPH	**330**	10,000 U	2,000 U	--	--	--

MW-2[1,2]	Nov-90	Jan-92	Apr-92	Aug-92
Gasoline	--	--	--	250 U
Diesel	--	--	--	250 U
Heavy Oil	--	--	--	--
TPH	**560**	2,000 U	**360**	--

SP-1[3,4]	Jul-08
PCBs (total)	0.020 U
2,4'-DDD	0.00050 U
4,4'-DDD	0.00050 U
2,4'-DDE	0.00050 U
4,4'-DDE	0.00050 U
2,4'-DDT	0.00050 U
4,4'-DDT	0.00050 U
Dieldrin	0.0038 U
Heptachlor	0.00088 U
Gasoline	250 U
Diesel	630 U
Heavy Oil	630 U

MW-9[3,4]	Jul-08
PCBs (total)	**0.034**
2,4'-DDD	0.0023 U
4,4'-DDD	0.00049 U
2,4'-DDE	0.0016 U
4,4'-DDE	0.00049 U
2,4'-DDT	0.00049 U
4,4'-DDT	0.00049 U
Dieldrin	0.0012 U
Heptachlor	0.002 U
Gasoline	250 U
Diesel	630 U
Heavy Oil	630 U

MW-1	Nov-90	Sep-91	Jan-92	Apr-92	Aug-92	Jul-08
PCBs (total)	--	--	--	--	--	0.020 U
2,4'-DDD	--	--	--	--	--	0.00071
4,4'-DDD	--	--	--	--	--	0.0038 U
2,4'-DDE	--	--	--	--	--	0.00050 U
4,4'-DDE	--	--	--	--	--	0.00050 U
2,4'-DDT	--	--	--	--	--	0.00050 U
4,4'-DDT	--	--	--	--	--	0.00050 U
Dieldrin	--	--	--	--	--	0.00050 U
Heptachlor	--	--	--	--	--	0.00050 U
Gasoline	--	--	--	250 U	250 U	250 U
Diesel	--	--	--	250 U	250 U	250 U
Heavy Oil	--	--	--	--	--	500 U
TPH	**590**	10,000 U	2,000 U	--	--	--

SEEP-1[4]	Jul-08
PCBs (total)	**0.50**
2,4'-DDD	**0.02** J
4,4'-DDD	0.013 U
2,4'-DDE	0.0110 U
4,4'-DDE	**0.01** J
2,4'-DDT	**0.016**
4,4'-DDT	**0.090**
Dieldrin	0.00053 U
Heptachlor	0.00053 U
Gasoline	630 U
Diesel	250 U
Heavy Oil	630 U

MW-10[3,4]	Jul-08
PCBs (total)	**0.110**
2,4'-DDD	0.00050 U
4,4'-DDD	0.00050 U
2,4'-DDE	0.00062 U
4,4'-DDE	0.00050 U
2,4'-DDT	0.00050 U
4,4'-DDT	0.00050 U
Dieldrin	0.00050 U
Heptachlor	**0.0013** J
Gasoline	250 U
Diesel	630 U
Heavy Oil	630 U

MW-8[3,4]	Jul-08
PCBs (total)	0.02 U
2,4'-DDD	0.00050 U
4,4'-DDD	0.00050 U
2,4'-DDE	0.00050 U
4,4'-DDE	0.00050 U
2,4'-DDT	0.00050 U
4,4'-DDT	0.00050 U
Dieldrin	0.0011 U
Heptachlor	0.00050 U
Gasoline	250 U
Diesel	630 U
Heavy Oil	630 U

Legend

━ ▪ ▪ ━	Site Boundary
🟨	Former Underground Storage Tank (Removed)
●	Monitoring Well (Dames & Moore, 1991b)
◉	Monitoring Well (SAIC, 2009)
△	Seep Sample (SAIC, 2009)
bgs	Below Ground Surface
PCB	Polychlorinated Biphenyls

[1] PCBs not analyzed.

[2] Pesticides not analyzed.

[3] Gasoline-, diesel- and heavy oil-range petroleum hydrocarbons not analyzed.

[4] Total Petroleum Hydrocarbons not analyzed.

TPH = Total Petroleum Hydrocarbons

U = analyte not detected above the reported sample practical quantitation limit (PQL)

J = estimated analyte concentration

Data Box Explanation:

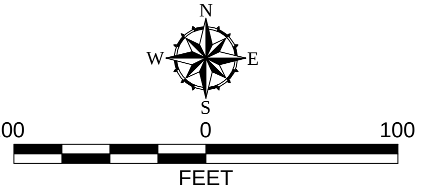
Sample Location	Sample Depth (feet bgs)
Chemical Constituent	Result (µg/L)

µg/L = micrograms per liter

🟨	Yellow shading indicates analyte was detected above the preliminary groundwater screening level.
🟦	Blue shading indicates reported analyte quantitation limit is above the preliminary screening level.

U = analyte not detected above the reported sample practical quantitation limit (PQL)

J = estimated analyte concentration



Notes

1. The locations of all features shown are approximate.
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3. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Reference: Aerial image from King County GIS, 2007.

Groundwater Sample Locations and Preliminary Groundwater Screening Level Exceedance Summary - PCB, TPH and Pesticides

7100 1st Avenue South Site
Seattle, Washington

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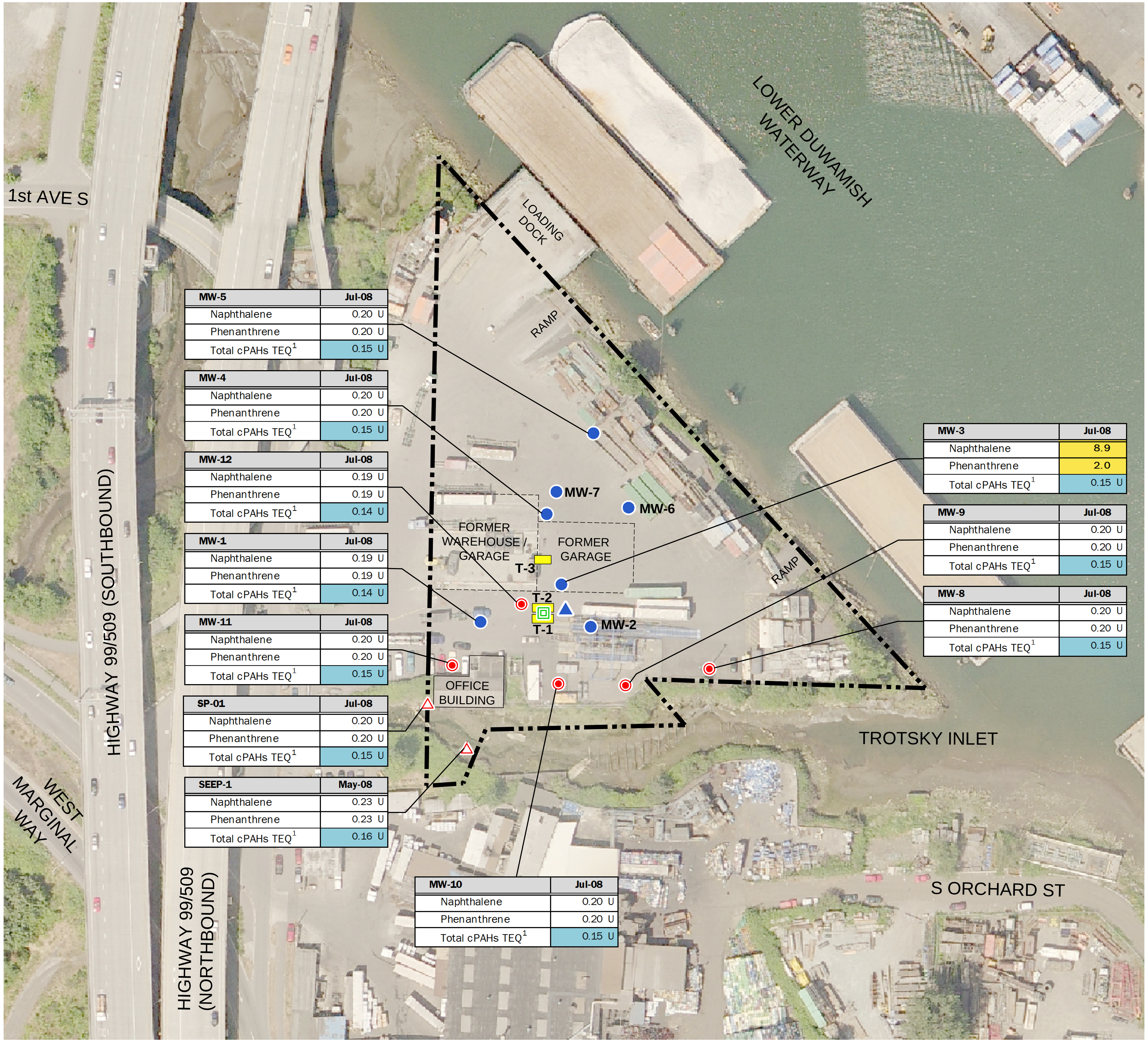
Figure 9



MW-5	Jul-08
Naphthalene	0.20 U
Phenanthrene	0.20 U
Total cPAHs TEQ[1]	0.15 U

MW-4	Jul-08
Naphthalene	0.20 U
Phenanthrene	0.20 U
Total cPAHs TEQ[1]	0.15 U

MW-12	Jul-08
Naphthalene	0.19 U
Phenanthrene	0.19 U
Total cPAHs TEQ[1]	0.14 U

MW-1	Jul-08
Naphthalene	0.19 U
Phenanthrene	0.19 U
Total cPAHs TEQ[1]	0.14 U

MW-11	Jul-08
Naphthalene	0.20 U
Phenanthrene	0.20 U
Total cPAHs TEQ[1]	0.15 U

SP-01	Jul-08
Naphthalene	0.20 U
Phenanthrene	0.20 U
Total cPAHs TEQ[1]	0.15 U

SEEP-1	May-08
Naphthalene	0.23 U
Phenanthrene	0.23 U
Total cPAHs TEQ[1]	0.16 U

MW-10	Jul-08
Naphthalene	0.20 U
Phenanthrene	0.20 U
Total cPAHs TEQ[1]	0.15 U

MW-3	Jul-08
Naphthalene	8.9
Phenanthrene	2.0
Total cPAHs TEQ[1]	0.15 U

MW-9	Jul-08
Naphthalene	0.20 U
Phenanthrene	0.20 U
Total cPAHs TEQ[1]	0.15 U

MW-8	Jul-08
Naphthalene	0.20 U
Phenanthrene	0.20 U
Total cPAHs TEQ[1]	0.15 U

Legend

▬ · · ▬	Site Boundary
▭	Former Underground Storage Tank (Removed)
●	Monitoring Well (Dames & Moore, 1991b)
◉	Monitoring Well (SAIC, 2009)
△	Seep Sample (SAIC, 2009)
bgs	Below Ground Surface
PCB	Polychlorinated Biphenyls
SVOC	Semi Volatile Organic Compound
cPAHs	Carcinogenic Polycyclic Aromatic Hydrocarbons
TEQ	Toxic Equivalent Methodology

[1] cPAHs not detected above the quantitation limit. Reported analyte quantitation limit is above the preliminary screening level.

Data Box Explanation:

Sample Location	Sample Depth (feet bgs)
Chemical Constituent	Result (µg/L)

µg/L = micrograms per liter

🟨 Yellow shading indicates analyte was detected above the preliminary groundwater screening level.

🟦 Blue shading indicates reported analyte quantitation limit is above the preliminary screening level.

U = analyte not detected above the reported sample practical quantitation limit (PQL)

J = estimated analyte concentration

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Notes

1. The locations of all features shown are approximate.
2. For comparative purposes, analytes exceeding preliminary soil screening levels are also presented on this Figure (if analyzed)."
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Reference: Aerial image from King County GIS, 2007.

Groundwater Sample Locations and Preliminary Groundwater Screening Level Exceedance Summary - SVOCs

7100 1st Avenue South Site
Seattle, Washington

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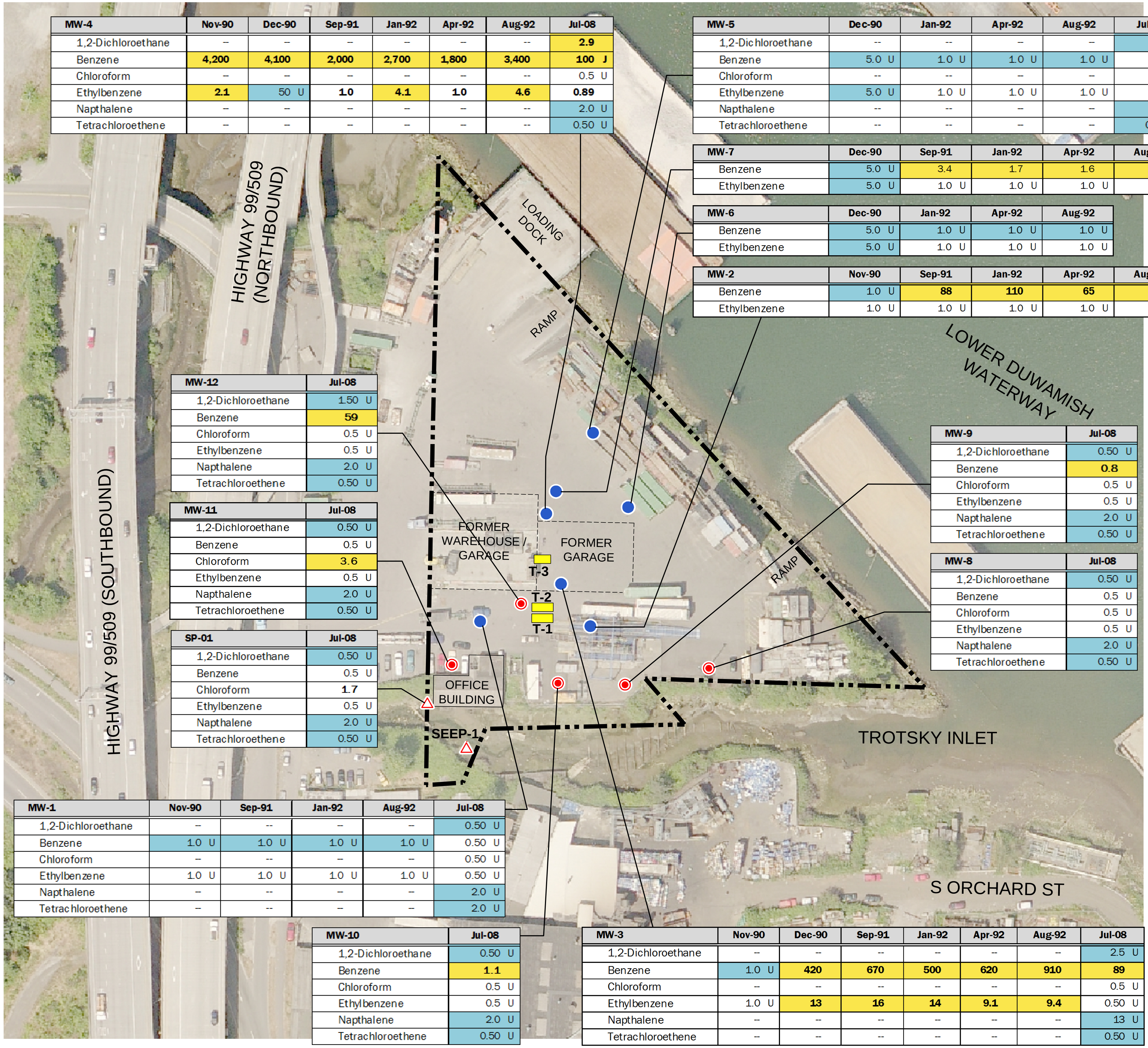
Figure 10



MW-4	Nov-90	Dec-90	Sep-91	Jan-92	Apr-92	Aug-92	Jul-08
1,2-Dichloroethane	--	--	--	--	--	--	2.9
Benzene	4,200	4,100	2,000	2,700	1,800	3,400	100 J
Chloroform	--	--	--	--	--	--	0.5 U
Ethylbenzene	2.1	50 U	1.0	4.1	1.0	4.6	0.89
Napthalene	--	--	--	--	--	--	2.0 U
Tetrachloroethene	--	--	--	--	--	--	0.50 U

MW-5	Dec-90	Jan-92	Apr-92	Aug-92	Jul-08
1,2-Dichloroethane	--	--	--	--	0.5 U
Benzene	5.0 U	1.0 U	1.0 U	1.0 U	0.5 U
Chloroform	--	--	--	--	0.5 U
Ethylbenzene	5.0 U	1.0 U	1.0 U	1.0 U	2 U
Napthalene	--	--	--	--	2.0 U
Tetrachloroethene	--	--	--	--	0.50 U

MW-7	Dec-90	Sep-91	Jan-92	Apr-92	Aug-92
Benzene	5.0 U	3.4	1.7	1.6	1.1
Ethylbenzene	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U

MW-6	Dec-90	Jan-92	Apr-92	Aug-92
Benzene	5.0 U	1.0 U	1.0 U	1.0 U
Ethylbenzene	5.0 U	1.0 U	1.0 U	1.0 U

MW-2	Nov-90	Sep-91	Jan-92	Apr-92	Aug-92
Benzene	1.0 U	88	110	65	94
Ethylbenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.1

MW-12	Jul-08
1,2-Dichloroethane	1.50 U
Benzene	59
Chloroform	0.5 U
Ethylbenzene	0.5 U
Napthalene	2.0 U
Tetrachloroethene	0.50 U

MW-11	Jul-08
1,2-Dichloroethane	0.50 U
Benzene	0.5 U
Chloroform	3.6
Ethylbenzene	0.5 U
Napthalene	2.0 U
Tetrachloroethene	0.50 U

SP-01	Jul-08
1,2-Dichloroethane	0.50 U
Benzene	0.5 U
Chloroform	1.7
Ethylbenzene	0.5 U
Napthalene	2.0 U
Tetrachloroethene	0.50 U

MW-9	Jul-08
1,2-Dichloroethane	0.50 U
Benzene	0.8
Chloroform	0.5 U
Ethylbenzene	0.5 U
Napthalene	2.0 U
Tetrachloroethene	0.50 U

MW-8	Jul-08
1,2-Dichloroethane	0.50 U
Benzene	0.5 U
Chloroform	0.5 U
Ethylbenzene	0.5 U
Napthalene	2.0 U
Tetrachloroethene	0.50 U

MW-1	Nov-90	Sep-91	Jan-92	Aug-92	Jul-08
1,2-Dichloroethane	--	--	--	--	0.50 U
Benzene	1.0 U	1.0 U	1.0 U	1.0 U	0.50 U
Chloroform	--	--	--	--	0.50 U
Ethylbenzene	1.0 U	1.0 U	1.0 U	1.0 U	0.50 U
Napthalene	--	--	--	--	2.0 U
Tetrachloroethene	--	--	--	--	2.0 U

MW-10	Jul-08
1,2-Dichloroethane	0.50 U
Benzene	1.1
Chloroform	0.5 U
Ethylbenzene	0.5 U
Napthalene	2.0 U
Tetrachloroethene	0.50 U

MW-3	Nov-90	Dec-90	Sep-91	Jan-92	Apr-92	Aug-92	Jul-08
1,2-Dichloroethane	--	--	--	--	--	--	2.5 U
Benzene	1.0 U	420	670	500	620	910	89
Chloroform	--	--	--	--	--	--	0.5 U
Ethylbenzene	1.0 U	13	16	14	9.1	9.4	0.50 U
Napthalene	--	--	--	--	--	--	13 U
Tetrachloroethene	--	--	--	--	--	--	0.50 U

Legend

━ · · ━	Site Boundary
▭	Former Underground Storage Tank (Removed)
●	Monitoring Well (Dames & Moore, 1991b)
◉	Monitoring Well (SAIC, 2009)
△	Seep Sample (SAIC, 2009)
bgs	Below Ground Surface
PCB	Polychlorinated Biphenyls
VOCs	Volatile Organic Compounds

Data Box Explanation:

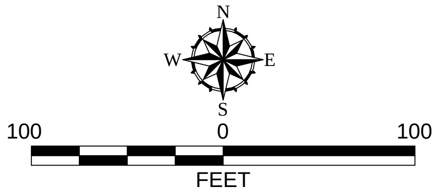
Sample Location	Sample Depth (feet bgs)
Chemical Constituent	Result (µg/L)

µg/L = micrograms per liter

🟨	Yellow shading indicates analyte was detected above the preliminary groundwater screening level.
🟦	Blue shading indicates reported analyte quantitation limit is above the preliminary screening level.

U = analyte not detected above the reported sample practical quantitation limit (PQL)

J = estimated analyte concentration



Notes

1. The locations of all features shown are approximate.
2. For comparative purposes, analytes exceeding preliminary soil screening levels are also presented on this Figure (if analyzed)."
3. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Reference: Aerial image from King County GIS, 2007.

Groundwater Sample Locations and Preliminary Groundwater Screening Level Exceedance Summary - VOCs

7100 1st Avenue South Site
Seattle, Washington

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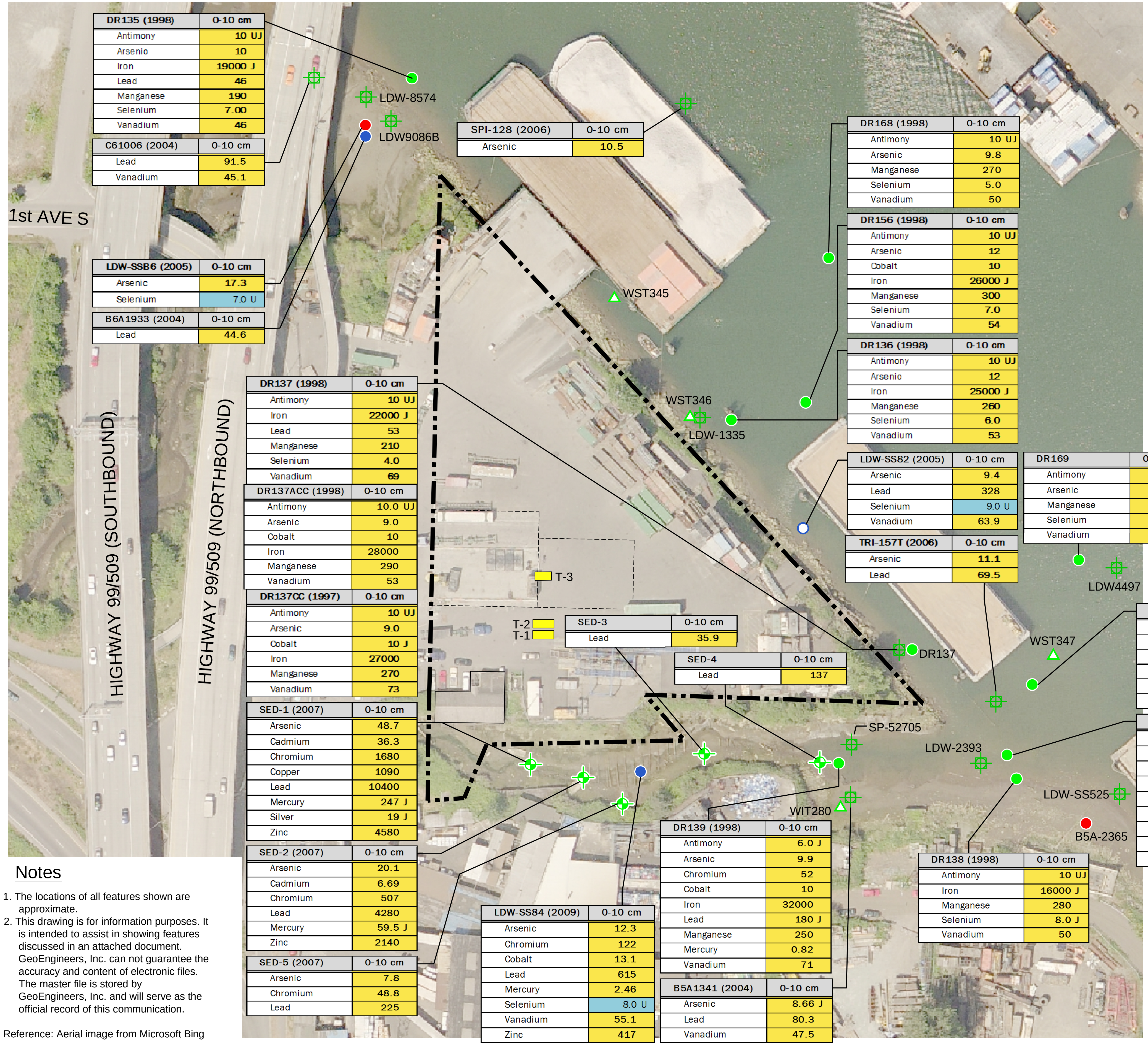
Figure 11

P:\0\0275015\01\CAD\Figures\Ecology Review Document\0275015_01_Sample Locations_F8-F11.dwg\TAB:Fig 11 - VOCs modified by tmichaud on Dec 03, 2012 - 11:52



DR135 (1998)	0-10 cm
Antimony	10 UJ
Arsenic	10
Iron	19000 J
Lead	46
Manganese	190
Selenium	7.00
Vanadium	46

C61006 (2004)	0-10 cm
Lead	91.5
Vanadium	45.1

LDW-SSB6 (2005)	0-10 cm
Arsenic	17.3
Selenium	7.0 U

B6A1933 (2004)	0-10 cm
Lead	44.6

SPI-128 (2006)	0-10 cm
Arsenic	10.5

DR137 (1998)	0-10 cm
Antimony	10 UJ
Iron	22000 J
Lead	53
Manganese	210
Selenium	4.0
Vanadium	69

DR137ACC (1998)	0-10 cm
Antimony	10.0 UJ
Arsenic	9.0
Cobalt	10
Iron	28000
Manganese	290
Vanadium	53

DR137CC (1997)	0-10 cm
Antimony	10 UJ
Arsenic	9.0
Cobalt	10 J
Iron	27000
Manganese	270
Vanadium	73

SED-1 (2007)	0-10 cm
Arsenic	48.7
Cadmium	36.3
Chromium	1680
Copper	1090
Lead	10400
Mercury	247 J
Silver	19 J
Zinc	4580

SED-2 (2007)	0-10 cm
Arsenic	20.1
Cadmium	6.69
Chromium	507
Lead	4280
Mercury	59.5 J
Zinc	2140

SED-5 (2007)	0-10 cm
Arsenic	7.8
Chromium	48.8
Lead	225

SED-3	0-10 cm
Lead	35.9

SED-4	0-10 cm
Lead	137

LDW-SS84 (2009)	0-10 cm
Arsenic	12.3
Chromium	122
Cobalt	13.1
Lead	615
Mercury	2.46
Selenium	8.0 U
Vanadium	55.1
Zinc	417

DR139 (1998)	0-10 cm
Antimony	6.0 J
Arsenic	9.9
Chromium	52
Cobalt	10
Iron	32000
Lead	180 J
Manganese	250
Mercury	0.82
Vanadium	71

B5A1341 (2004)	0-10 cm
Arsenic	8.66 J
Lead	80.3
Vanadium	47.5

DR168 (1998)	0-10 cm
Antimony	10 UJ
Arsenic	9.8
Manganese	270
Selenium	5.0
Vanadium	50

DR156 (1998)	0-10 cm
Antimony	10 UJ
Arsenic	12
Cobalt	10
Iron	26000 J
Manganese	300
Selenium	7.0
Vanadium	54

DR136 (1998)	0-10 cm
Antimony	10 UJ
Arsenic	12
Iron	25000 J
Manganese	260
Selenium	6.0
Vanadium	53

LDW-SS82 (2005)	0-10 cm
Arsenic	9.4
Lead	328
Selenium	9.0 U
Vanadium	63.9

DR169	0-10 cm
Antimony	10 UJ
Arsenic	8.0
Manganese	240
Selenium	7.0
Vanadium	49

TRI-157T (2006)	0-10 cm
Arsenic	11.1
Lead	69.5

DR10 (1985)	0-10 cm
Antimony	9
Arsenic	10
Chromium	51 J
Iron	43300
Lead	50
Manganese	686 J

DR157 (1998)	0-10 cm
Antimony	10 UJ
Arsenic	10
Chromium	55
Iron	27000 J
Lead	250
Manganese	200
Mercury	1.6
Selenium	14 J
Vanadium	67

DR138 (1998)	0-10 cm
Antimony	10 UJ
Iron	16000 J
Manganese	280
Selenium	8.0 J
Vanadium	50

Legend

━ ▪ ━	Site Boundary
🟨	Former Underground Storage Tank (Removed)
△	Sediment Sample (NOAA, 1998)
●	Sediment Sample (Weston, 1999)
🔴	Sediment Sample (Winward, 2004)
○	Sediment Sample (Winward, 2005b)
🔵	Sediment Sample (Winward, 2005a)
⌖	Sediment Sample (EIM Database)
◉	SAIC Investigation - DMCSITE (April 2007)
✛	Sediment Sample (SAIC, 2009)
⊙	Proposed Existing Monitoring Well Sample Location

Data Box Explanation:

🟨	Yellow shading indicates analyte was detected above the preliminary soil screening level.
🟦	Blue shading indicates reported analyte quantitation limit is above the preliminary screening level.

U = analyte not detected above the reported sample practical quantitation limit (PQL)

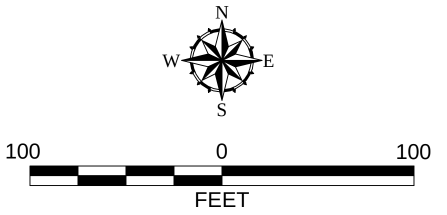
J = estimated analyte concentration

mg/kg = milligrams per kilogram

DW = Dry Weight

DNE = Analyte did not exceed screening level(s)

Sample Location	Sample Depth (feet bgs)
Chemical Constituent	Result (mg/kg DW)



Notes

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

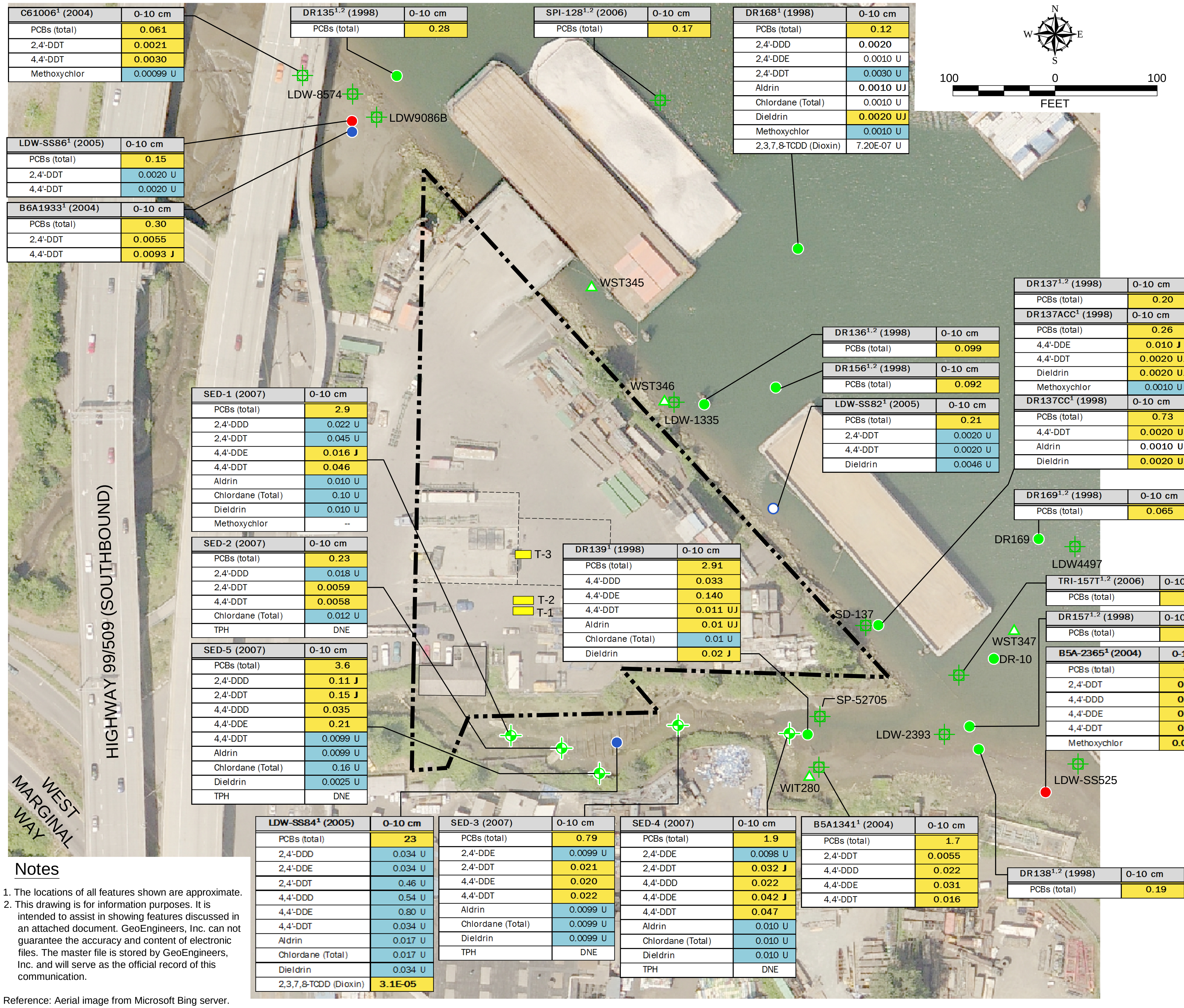
Reference: Aerial image from Microsoft Bing server.

Surface Sediment Sample Locations and Preliminary Sediment Screening Level Exceedance Summary - Metals

7100 1st Avenue South Site
Seattle, Washington

GeoEngineers

Figure 12



C61006[1] (2004)	0-10 cm
PCBs (total)	0.061
2,4'-DDT	0.0021
4,4'-DDT	0.0030
Methoxychlor	0.00099 U

LDW-SS86[1] (2005)	0-10 cm
PCBs (total)	0.15
2,4'-DDT	0.0020 U
4,4'-DDT	0.0020 U

B6A1933[1] (2004)	0-10 cm
PCBs (total)	0.30
2,4'-DDT	0.0055
4,4'-DDT	0.0093 J

DR135[1,2] (1998)	0-10 cm
PCBs (total)	0.28

SPI-128[1,2] (2006)	0-10 cm
PCBs (total)	0.17

DR168[1] (1998)	0-10 cm
PCBs (total)	0.12
2,4'-DDD	0.0020
2,4'-DDE	0.0010 U
2,4'-DDT	0.0030 U
Aldrin	0.0010 UJ
Chlordane (Total)	0.0010 U
Dieldrin	0.0020 UJ
Methoxychlor	0.0010 U
2,3,7,8-TCDD (Dioxin)	7.20E-07 U

DR137[1,2] (1998)	0-10 cm
PCBs (total)	0.20

DR137ACC[1] (1998)	0-10 cm
PCBs (total)	0.26
4,4'-DDE	0.010 J
4,4'-DDT	0.0020 UJ
Dieldrin	0.0020 UJ
Methoxychlor	0.0010 U

DR137CC[1] (1998)	0-10 cm
PCBs (total)	0.73
4,4'-DDT	0.0020 UJ
Aldrin	0.0010 UJ
Dieldrin	0.0020 UJ

DR136[1,2] (1998)	0-10 cm
PCBs (total)	0.099

DR156[1,2] (1998)	0-10 cm
PCBs (total)	0.092

LDW-SS82[1] (2005)	0-10 cm
PCBs (total)	0.21
2,4'-DDT	0.0020 U
4,4'-DDT	0.0020 U
Dieldrin	0.0046 U

SED-1 (2007)	0-10 cm
PCBs (total)	2.9
2,4'-DDD	0.022 U
2,4'-DDT	0.045 U
4,4'-DDE	0.016 J
4,4'-DDT	0.046
Aldrin	0.010 U
Chlordane (Total)	0.10 U
Dieldrin	0.010 U
Methoxychlor	--

SED-2 (2007)	0-10 cm
PCBs (total)	0.23
2,4'-DDD	0.018 U
2,4'-DDT	0.0059
4,4'-DDT	0.0058
Chlordane (Total)	0.012 U
TPH	DNE

SED-5 (2007)	0-10 cm
PCBs (total)	3.6
2,4'-DDD	0.11 J
2,4'-DDT	0.15 J
4,4'-DDD	0.035
4,4'-DDE	0.21
4,4'-DDT	0.0099 U
Aldrin	0.0099 U
Chlordane (Total)	0.16 U
Dieldrin	0.0025 U
TPH	DNE

DR139[1] (1998)	0-10 cm
PCBs (total)	2.91
4,4'-DDD	0.033
4,4'-DDE	0.140
4,4'-DDT	0.011 UJ
Aldrin	0.01 UJ
Chlordane (Total)	0.01 U
Dieldrin	0.02 J

DR169[1,2] (1998)	0-10 cm
PCBs (total)	0.065

TRI-157T[1,2] (2006)	0-10 cm
PCBs (total)	1.60

DR157[1,2] (1998)	0-10 cm
PCBs (total)	1.3

B5A-2365[1] (2004)	0-10 cm
PCBs (total)	0.13
2,4'-DDT	0.011
4,4'-DDD	0.033
4,4'-DDE	0.011
4,4'-DDT	0.027
Methoxychlor	0.0053

LDW-SS84[1] (2005)	0-10 cm
PCBs (total)	23
2,4'-DDD	0.034 U
2,4'-DDE	0.034 U
2,4'-DDT	0.46 U
4,4'-DDD	0.54 U
4,4'-DDE	0.80 U
4,4'-DDT	0.034 U
Aldrin	0.017 U
Chlordane (Total)	0.017 U
Dieldrin	0.034 U
2,3,7,8-TCDD (Dioxin)	3.1E-05

SED-3 (2007)	0-10 cm
PCBs (total)	0.79
2,4'-DDE	0.0099 U
2,4'-DDT	0.021
4,4'-DDE	0.020
4,4'-DDT	0.022
Aldrin	0.0099 U
Chlordane (Total)	0.0099 U
Dieldrin	0.0099 U
TPH	DNE

SED-4 (2007)	0-10 cm
PCBs (total)	1.9
2,4'-DDE	0.0098 U
2,4'-DDT	0.032 J
4,4'-DDD	0.022
4,4'-DDE	0.042 J
4,4'-DDT	0.047
Aldrin	0.010 U
Chlordane (Total)	0.010 U
Dieldrin	0.010 U
TPH	DNE

B5A1341[1] (2004)	0-10 cm
PCBs (total)	1.7
2,4'-DDT	0.0055
4,4'-DDD	0.022
4,4'-DDE	0.031
4,4'-DDT	0.016

DR138[1,2] (1998)	0-10 cm
PCBs (total)	0.19

Legend

▬ ▪ ▪ ▬	Site Boundary
🟨	Former Underground Storage Tank (Removed)
△	Sediment Sample (NOAA, 1998)
🟢	Sediment Sample (Weston, 1999)
🔴	Sediment Sample (Winward, 2004)
○	Sediment Sample (Winward, 2005b)
🔵	Sediment Sample (Winward, 2005a)
⌖	Sediment Sample (EIM Database)
◉	SAIC Investigation - DMCSITE (April 2007)
⊕	Sediment Sample (SAIC, 2009)
⊙	Proposed Existing Monitoring Well Sample Location

[1] PCBs not analyzed.

[2] Pesticides not analyzed.

[3] Gasoline-, diesel- and heavy oil-rangy petroleum hydrocarbons not analyzed.

[4] Total Petroleum Hydrocarbons not analyzed.

Data Box Explanation:

🟨	Yellow shading indicates analyte was detected above the preliminary soil screening level.
🟦	Blue shading indicates reported analyte quantitation limit is above the preliminary screening level.

PCB = Polychlorinated Biphenyls

TPH = Total Petroleum Hydrocarbons

U = analyte not detected above the reported sample practical quantitation limit (PQL)

J = estimated analyte concentration

mg/kg = milligrams per kilogram

DW = Dry Weight

DNE = Analyte did not exceed screening level(s)

Sample Location	Sample Depth (feet bgs)
Chemical Constituent	Result (mg/kg DW)

Notes

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Reference: Aerial image from Microsoft Bing server.

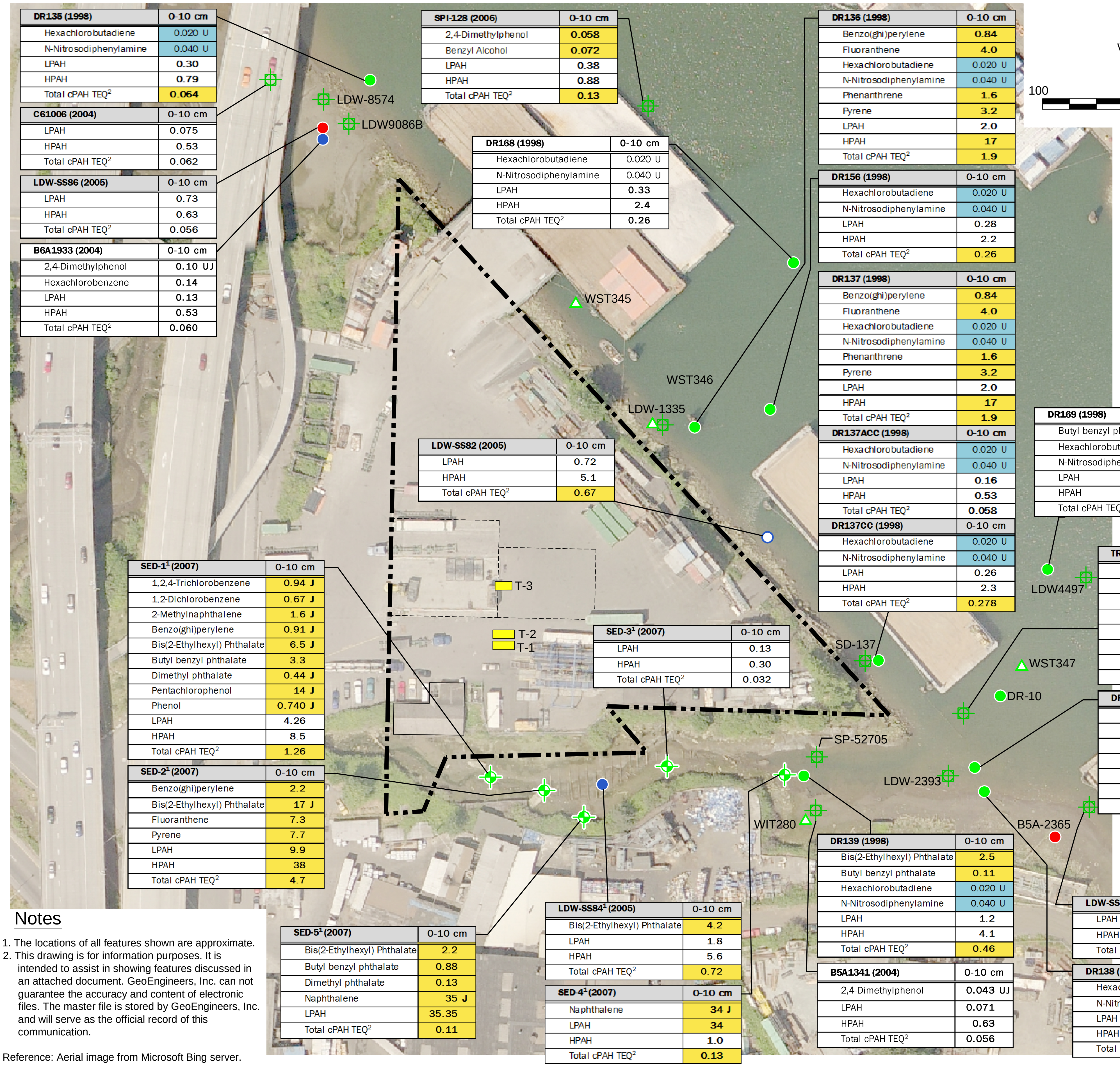
Surface Sediment Sample Locations and Preliminary Sediment Screening Level Exceedance Summary - PCBs, TPH, and Pesticides

7100 1st Avenue South Site
Seattle, Washington

GeoEngineers

Figure 13

P:\0\0275015\01\CAD\Figures\Ecology Review Document\027501501_Sample Locations_F12-14.dwg\TAB:PCB-TPH-Pesticide - Fig 13 modified by tmichaud on Dec 03, 2012 - 13:30



DR135 (1998)	0-10 cm
Hexachlorobutadiene	0.020 U
N-Nitrosodiphenylamine	0.040 U
LPAH	0.30
HPAH	0.79
Total cPAH TEQ^2	0.064

C61006 (2004)	0-10 cm
LPAH	0.075
HPAH	0.53
Total cPAH TEQ^2	0.062

LDW-SS86 (2005)	0-10 cm
LPAH	0.73
HPAH	0.63
Total cPAH TEQ^2	0.056

B6A1933 (2004)	0-10 cm
2,4-Dimethylphenol	0.10 UJ
Hexachlorobenzene	0.14
LPAH	0.13
HPAH	0.53
Total cPAH TEQ^2	0.060

SPI-128 (2006)	0-10 cm
2,4-Dimethylphenol	0.058
Benzyl Alcohol	0.072
LPAH	0.38
HPAH	0.88
Total cPAH TEQ^2	0.13

DR168 (1998)	0-10 cm
Hexachlorobutadiene	0.020 U
N-Nitrosodiphenylamine	0.040 U
LPAH	0.33
HPAH	2.4
Total cPAH TEQ^2	0.26

DR136 (1998)	0-10 cm
Benzo(ghi)perylene	0.84
Fluoranthene	4.0
Hexachlorobutadiene	0.020 U
N-Nitrosodiphenylamine	0.040 U
Phenanthrene	1.6
Pyrene	3.2
LPAH	2.0
HPAH	17
Total cPAH TEQ^2	1.9

DR156 (1998)	0-10 cm
Hexachlorobutadiene	0.020 U
N-Nitrosodiphenylamine	0.040 U
LPAH	0.28
HPAH	2.2
Total cPAH TEQ^2	0.26

DR137 (1998)	0-10 cm
Benzo(ghi)perylene	0.84
Fluoranthene	4.0
Hexachlorobutadiene	0.020 U
N-Nitrosodiphenylamine	0.040 U
Phenanthrene	1.6
Pyrene	3.2
LPAH	2.0
HPAH	17
Total cPAH TEQ^2	1.9
DR137ACC (1998)	**0-10 cm**
Hexachlorobutadiene	0.020 U
N-Nitrosodiphenylamine	0.040 U
LPAH	0.16
HPAH	0.53
Total cPAH TEQ^2	0.058
DR137CC (1998)	**0-10 cm**
Hexachlorobutadiene	0.020 U
N-Nitrosodiphenylamine	0.040 U
LPAH	0.26
HPAH	2.3
Total cPAH TEQ^2	0.278

DR169 (1998)	0-10 cm
Butyl benzyl phthalate	0.16 UJ
Hexachlorobutadiene	0.020 U
N-Nitrosodiphenylamine	0.040 U
LPAH	0.69
HPAH	0.83
Total cPAH TEQ^2	0.13

LDW-SS82 (2005)	0-10 cm
LPAH	0.72
HPAH	5.1
Total cPAH TEQ^2	0.67

SED-1^1 (2007)	0-10 cm
1,2,4-Trichlorobenzene	0.94 J
1,2-Dichlorobenzene	0.67 J
2-Methylnaphthalene	1.6 J
Benzo(ghi)perylene	0.91 J
Bis(2-Ethylhexyl) Phthalate	6.5 J
Butyl benzyl phthalate	3.3
Dimethyl phthalate	0.44 J
Pentachlorophenol	14 J
Phenol	0.740 J
LPAH	4.26
HPAH	8.5
Total cPAH TEQ^2	1.26

SED-2^1 (2007)	0-10 cm
Benzo(ghi)perylene	2.2
Bis(2-Ethylhexyl) Phthalate	17 J
Fluoranthene	7.3
Pyrene	7.7
LPAH	9.9
HPAH	38
Total cPAH TEQ^2	4.7

SED-3^1 (2007)	0-10 cm
LPAH	0.13
HPAH	0.30
Total cPAH TEQ^2	0.032

TRI-157T (2006)	0-10 cm
Anthracene	1.01
Benzyl Alcohol	0.101
Fluorene	0.71
Hexachlorobenzene	0.053
Hexachlorobutadiene	0.013 U
LPAH	2.38
HPAH	3.58
Total cPAH TEQ^2	0.56

DR157 (1998)	0-10 cm
Bis(2-Ethylhexyl) Phthalate	2.3
Butyl benzyl phthalate	0.090
Hexachlorobutadiene	0.020 U
N-Nitrosodiphenylamine	0.040 U
LPAH	0.63
HPAH	4.7
Total cPAH TEQ^2	0.47

SED-5^1 (2007)	0-10 cm
Bis(2-Ethylhexyl) Phthalate	2.2
Butyl benzyl phthalate	0.88
Dimethyl phthalate	0.13
Naphthalene	35 J
LPAH	35.35
Total cPAH TEQ^2	0.11

LDW-SS84^1 (2005)	0-10 cm
Bis(2-Ethylhexyl) Phthalate	4.2
LPAH	1.8
HPAH	5.6
Total cPAH TEQ^2	0.72

SED-4^1 (2007)	0-10 cm
Naphthalene	34 J
LPAH	34
HPAH	1.0
Total cPAH TEQ^2	0.13

DR139 (1998)	0-10 cm
Bis(2-Ethylhexyl) Phthalate	2.5
Butyl benzyl phthalate	0.11
Hexachlorobutadiene	0.020 U
N-Nitrosodiphenylamine	0.040 U
LPAH	1.2
HPAH	4.1
Total cPAH TEQ^2	0.46

B5A1341 (2004)	0-10 cm
2,4-Dimethylphenol	0.043 UJ
LPAH	0.071
HPAH	0.63
Total cPAH TEQ^2	0.056

LDW-SS525 (2009)	0-10 cm
LPAH	0.070
HPAH	0.30
Total cPAH TEQ^2	0.032

DR138 (1998)	0-10 cm
Hexachlorobutadiene	0.020 U
N-Nitrosodiphenylamine	0.040 U
LPAH	0.36
HPAH	2.5
Total cPAH TEQ^2	0.28

Legend

▬ ▪ ▪ ▬	Site Boundary
🟨	Former Underground Storage Tank (Removed)
△	Sediment Sample (NOAA, 1998)
🟢	Sediment Sample (Weston, 1999)
🔴	Sediment Sample (Winward, 2004)
○	Sediment Sample (Winward, 2005b)
🔵	Sediment Sample (Winward, 2005a)
⌖	Sediment Sample (EIM Database)
◉	SAIC Investigation - DMCSITE (April 2007)
⊕	Sediment Sample (SAIC, 2009)
⊙	Proposed Existing Monitoring Well Sample Location

[1] Numerous SVOC compounds were not detected, but the analyte quantitation limit exceeded the preliminary screening level. See Table 14 for full sediment SVOC results.

Data Box Explanation:

🟨	Yellow shading indicates analyte was detected above the preliminary soil screening level.
🟦	Blue shading indicates reported analyte quantitation limit is above the preliminary screening level.

U = analyte not detected above the reported sample practical quantitation limit (PQL)

J = estimated analyte concentration

PCB = Polychlorinated Biphenyls

SVOC = Semi Volatile Organic Compound

cPAHs = Carcinogenic Polycyclic Aromatic Hydrocarbons

TEQ = Toxic Equivalent Methodology

DW = Dry Weight

DNE = Analyte did not exceed screening level(s)

Results in mg/kg

Sample Location	Sample Depth (feet bgs)
Chemical Constituent	Result (mg/kg DW)

Notes

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Reference: Aerial image from Microsoft Bing server.

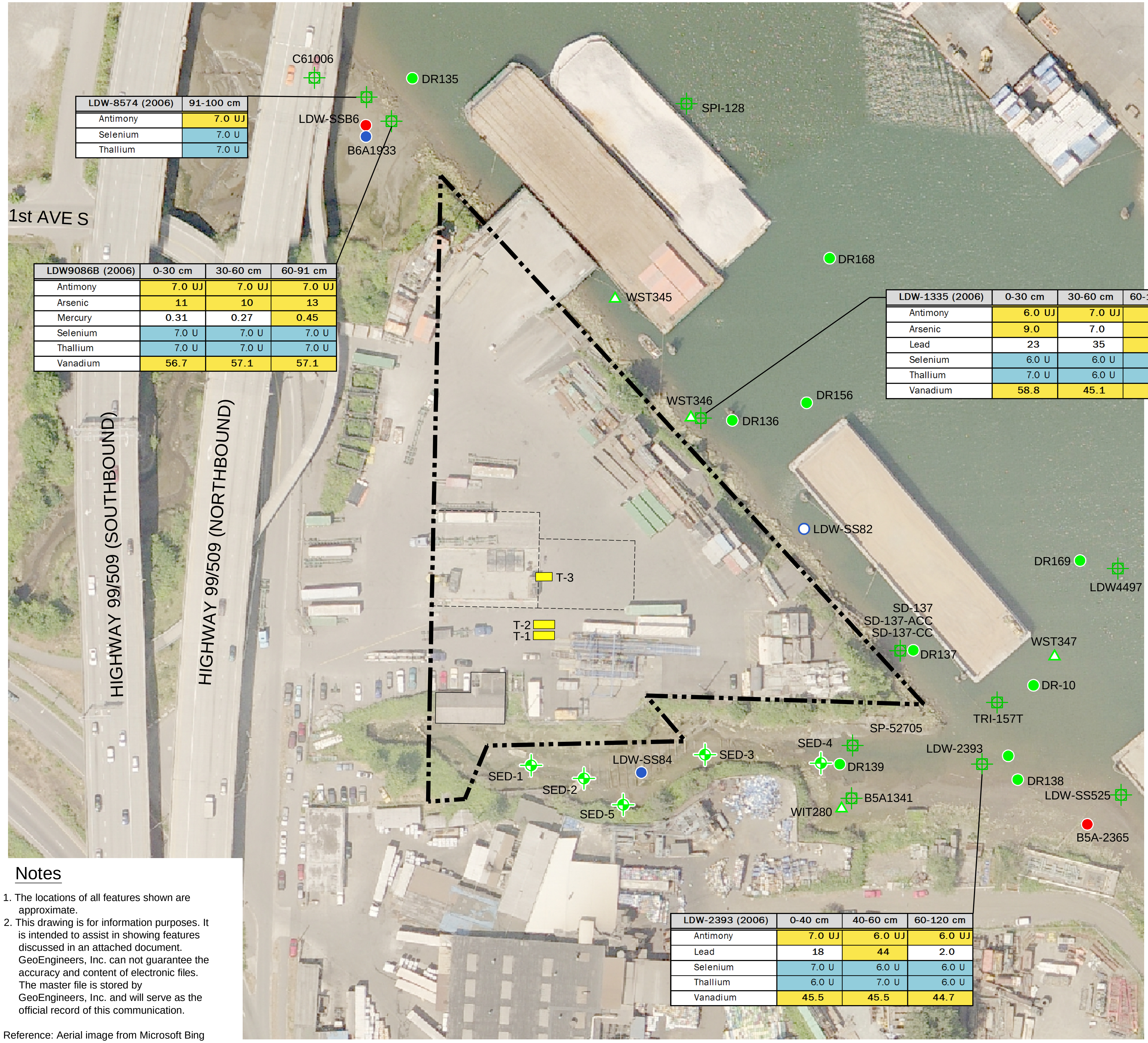
Surface Sediment Sample Locations and Preliminary Sediment Screening Level Exceedance Summary - SVOCs

7100 1st Avenue South Site
Seattle, Washington

GeoEngineers

Figure 14

P:\0\0275015\01\CAD\Figures\Ecology Review Document\027501501_Sample Locations_F12-14.dwg\TAB:SVOCs - Fig 14 modified by tmichaud on Dec 03, 2012 - 13:44



LDW-8574 (2006)	91-100 cm
Antimony	7.0 UJ
Selenium	7.0 U
Thallium	7.0 U

LDW9086B (2006)	0-30 cm	30-60 cm	60-91 cm
Antimony	7.0 UJ	7.0 UJ	7.0 UJ
Arsenic	11	10	13
Mercury	0.31	0.27	0.45
Selenium	7.0 U	7.0 U	7.0 U
Thallium	7.0 U	7.0 U	7.0 U
Vanadium	56.7	57.1	57.1

LDW-1335 (2006)	0-30 cm	30-60 cm	60-120 cm
Antimony	6.0 UJ	7.0 UJ	6.0 UJ
Arsenic	9.0	7.0	14
Lead	23	35	48
Selenium	6.0 U	6.0 U	7.0 U
Thallium	7.0 U	6.0 U	6.0 U
Vanadium	58.8	45.1	51.4

LDW-2393 (2006)	0-40 cm	40-60 cm	60-120 cm
Antimony	7.0 UJ	6.0 UJ	6.0 UJ
Lead	18	44	2.0
Selenium	7.0 U	6.0 U	6.0 U
Thallium	6.0 U	7.0 U	6.0 U
Vanadium	45.5	45.5	44.7

Notes

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Reference: Aerial image from Microsoft Bing server.

Legend

▬ · · ▬	Site Boundary
🟨	Former Underground Storage Tank (Removed)
△	Sediment Sample (NOAA, 1998)
🟢	Sediment Sample (Weston, 1999)
🔴	Sediment Sample (Winward, 2004)
○	Sediment Sample (Winward, 2005b)
🔵	Sediment Sample (Winward, 2005a)
⌖	Sediment Sample (EIM Database)
◉	SAIC Investigation - DMCSITE (April 2007)
✛	Sediment Sample (SAIC, 2009)
⊙	Proposed Existing Monitoring Well Sample Location

Data Box Explanation:

🟨	Yellow shading indicates analyte was detected above the preliminary soil screening level.
🟦	Blue shading indicates reported analyte quantitation limit is above the preliminary screening level.

U = analyte not detected above the reported sample practical quantitation limit (PQL)

J = estimated analyte concentration

mg/kg = milligrams per kilogram

DW = Dry Weight

DNE = Analyte did not exceed screening level(s)

Sample Location	Sample Depth (feet bgs)
Chemical Constituent	Result (mg/kg DW)

N
W E
S

100 0 100
FEET

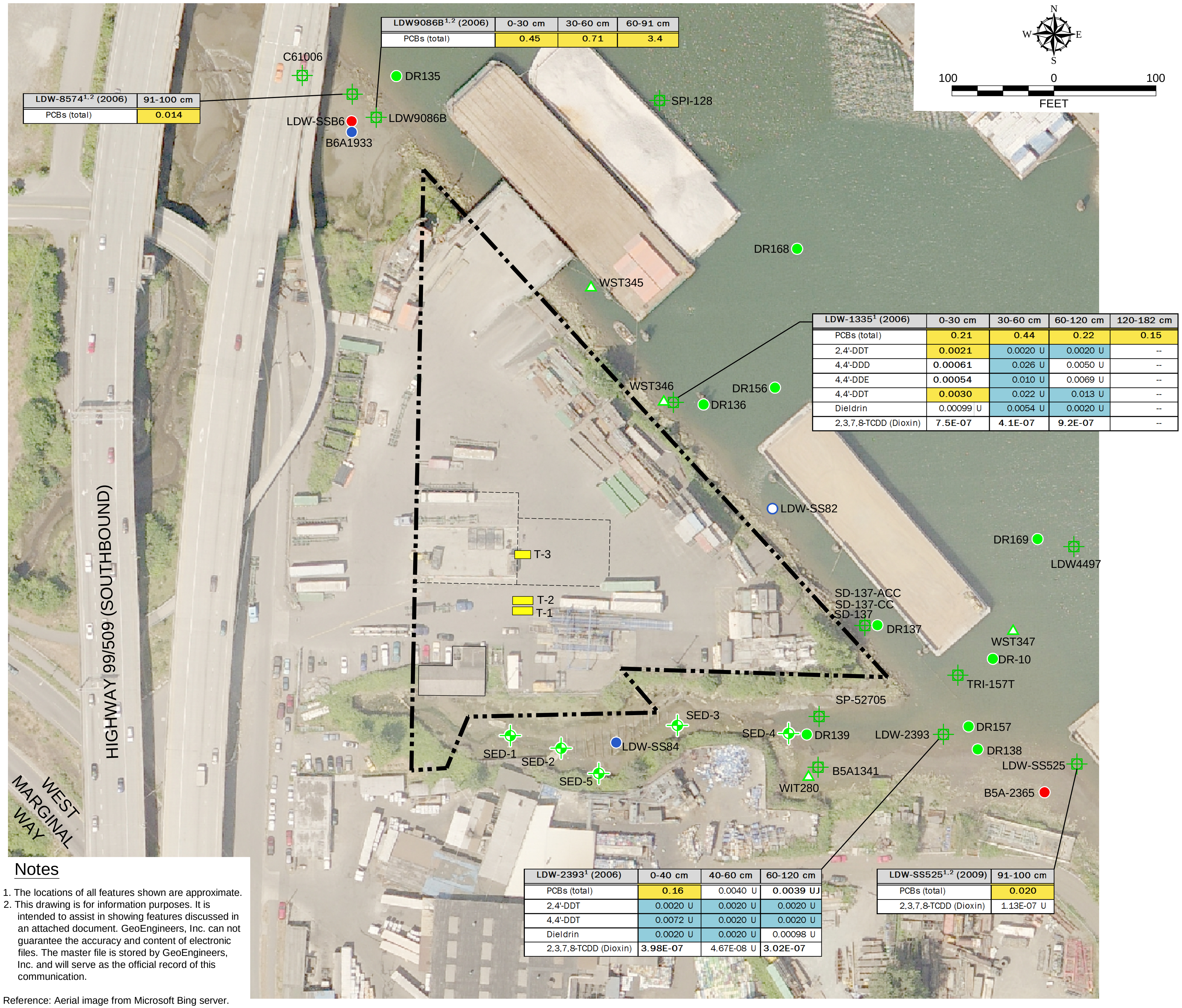
Subsurface Sediment Sample Locations and Preliminary Sediment Screening Level Exceedance Summary - Metals

7100 1st Avenue South Site
Seattle, Washington

GeoEngineers

Figure 15

P:\0\0275015\01\CAD\Figures\Ecology Review Document\027501501_Sample Locations_F15-17.dwg\TAB:Metals - Fig 15 modified by tmichaud on Dec 03, 2012 - 13:57



LDW9086B[1,2] (2006)	0-30 cm	30-60 cm	60-91 cm
PCBs (total)	0.45	0.71	3.4

LDW-8574[1,2] (2006)	91-100 cm
PCBs (total)	0.014

LDW-1335[1] (2006)	0-30 cm	30-60 cm	60-120 cm	120-182 cm
PCBs (total)	0.21	0.44	0.22	0.15
2,4'-DDT	0.0021	0.0020 U	0.0020 U	--
4,4'-DDD	0.00061	0.026 U	0.0050 U	--
4,4'-DDE	0.00054	0.010 U	0.0069 U	--
4,4'-DDT	0.0030	0.022 U	0.013 U	--
Dieldrin	0.00099 U	0.0054 U	0.0020 U	--
2,3,7,8-TCDD (Dioxin)	7.5E-07	4.1E-07	9.2E-07	--

LDW-2393[1] (2006)	0-40 cm	40-60 cm	60-120 cm
PCBs (total)	0.16	0.0040 U	0.0039 UJ
2,4'-DDT	0.0020 U	0.0020 U	0.0020 U
4,4'-DDT	0.0072 U	0.0020 U	0.0020 U
Dieldrin	0.0020 U	0.0020 U	0.00098 U
2,3,7,8-TCDD (Dioxin)	3.98E-07	4.67E-08 U	3.02E-07

LDW-SS525[1,2] (2009)	91-100 cm
PCBs (total)	0.020
2,3,7,8-TCDD (Dioxin)	1.13E-07 U

Notes

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Reference: Aerial image from Microsoft Bing server.

Legend

▬ · · ▬	Site Boundary
▭	Former Underground Storage Tank (Removed)
△	Sediment Sample (NOAA, 1998)
●	Sediment Sample (Weston, 1999)
●	Sediment Sample (Winward, 2004)
○	Sediment Sample (Winward, 2005b)
●	Sediment Sample (Winward, 2005a)
⊕	Sediment Sample (EIM Database)
⊙	SAIC Investigation - DMCSITE (April 2007)
⊕	Sediment Sample (SAIC, 2009)
⊙	Proposed Existing Monitoring Well Sample Location

[1] PCBs not analyzed.

[2] Pesticides not analyzed.

[3] Gasoline-, diesel- and heavy oil-rangy petroleum hydrocarbons not analyzed.

[4] Total Petroleum Hydrocarbons not analyzed.

Data Box Explanation:

🟨	Yellow shading indicates analyte was detected above the preliminary soil screening level.
🟦	Blue shading indicates reported analyte quantitation limit is above the preliminary screening level.

PCB = Polychlorinated Biphenyls

TPH = Total Petroleum Hydrocarbons

U = analyte not detected above the reported sample practical quantitation limit (PQL)

J = estimated analyte concentration

mg/kg = milligrams per kilogram

DW = Dry Weight

DNE = Analyte did not exceed screening level(s)

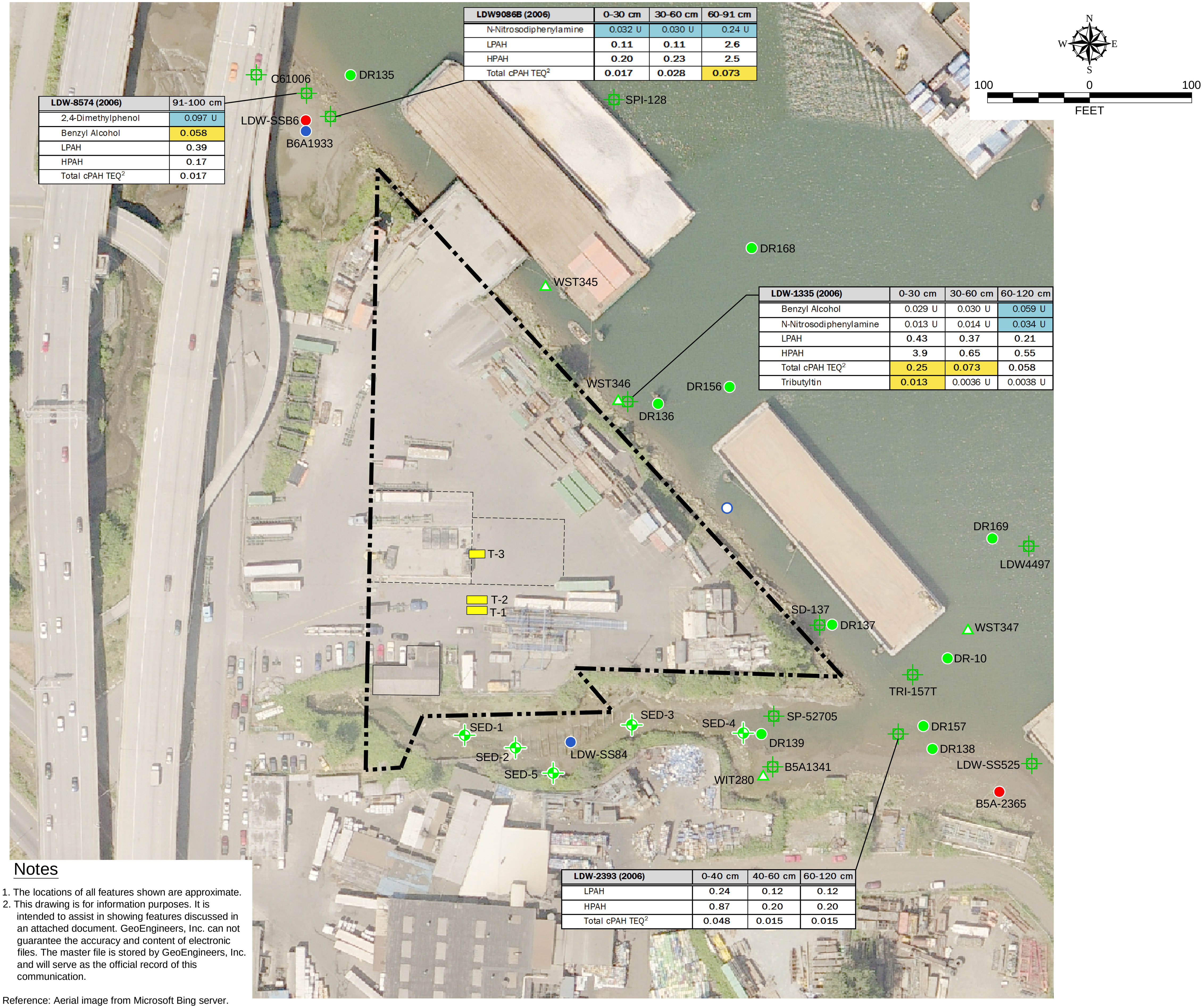
Sample Location	Sample Depth (feet bgs)
Chemical Constituent	Result (mg/kg DW)

Subsurface Sediment Sample Locations and Preliminary Sediment Screening Level Exceedance Summary - PCBs, TPH, and Pesticides

7100 1st Avenue South Site
Seattle, Washington

GEOENGINEERS

Figure 16



LDW9086B (2006)	0-30 cm	30-60 cm	60-91 cm
N-Nitrosodiphenylamine	0.032 U	0.030 U	0.24 U
LPAH	0.11	0.11	2.6
HPAH	0.20	0.23	2.5
Total cPAH TEQ^2	0.017	0.028	0.073

LDW-8574 (2006)	91-100 cm
2,4-Dimethylphenol	0.097 U
Benzyl Alcohol	0.058
LPAH	0.39
HPAH	0.17
Total cPAH TEQ^2	0.017

LDW-1335 (2006)	0-30 cm	30-60 cm	60-120 cm
Benzyl Alcohol	0.029 U	0.030 U	0.059 U
N-Nitrosodiphenylamine	0.013 U	0.014 U	0.034 U
LPAH	0.43	0.37	0.21
HPAH	3.9	0.65	0.55
Total cPAH TEQ^2	0.25	0.073	0.058
Tributyltin	0.013	0.0036 U	0.0038 U

LDW-2393 (2006)	0-40 cm	40-60 cm	60-120 cm
LPAH	0.24	0.12	0.12
HPAH	0.87	0.20	0.20
Total cPAH TEQ^2	0.048	0.015	0.015

Notes

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Reference: Aerial image from Microsoft Bing server.

Legend

━ · ━	Site Boundary
🟨	Former Underground Storage Tank (Removed)
△	Sediment Sample (NOAA, 1998)
●	Sediment Sample (Weston, 1999)
●	Sediment Sample (Winward, 2004)
○	Sediment Sample (Winward, 2005b)
●	Sediment Sample (Winward, 2005a)
⌖	Sediment Sample (EIM Database)
◉	SAIC Investigation - DMCSITE (April 2007)
✛	Sediment Sample (SAIC, 2009)
◎	Proposed Existing Monitoring Well Sample Location

Data Box Explanation:

🟨	Yellow shading indicates analyte was detected above the preliminary soil screening level.
🟦	Blue shading indicates reported analyte quantitation limit is above the preliminary screening level.

U = analyte not detected above the reported sample practical quantitation limit (PQL)

J = estimated analyte concentration

PCB = Polychlorinated Biphenyls

SVOC = Semi Volatile Organic Compound

cPAHs = Carcinogenic Polycyclic Aromatic Hydrocarbons

TEQ = Toxic Equivalent Methodology

DW = Dry Weight

DNE = Analyte did not exceed screening level(s)

Results in mg/kg

Sample Location	Sample Depth (feet bgs)
Chemical Constituent	Result (mg/kg DW)

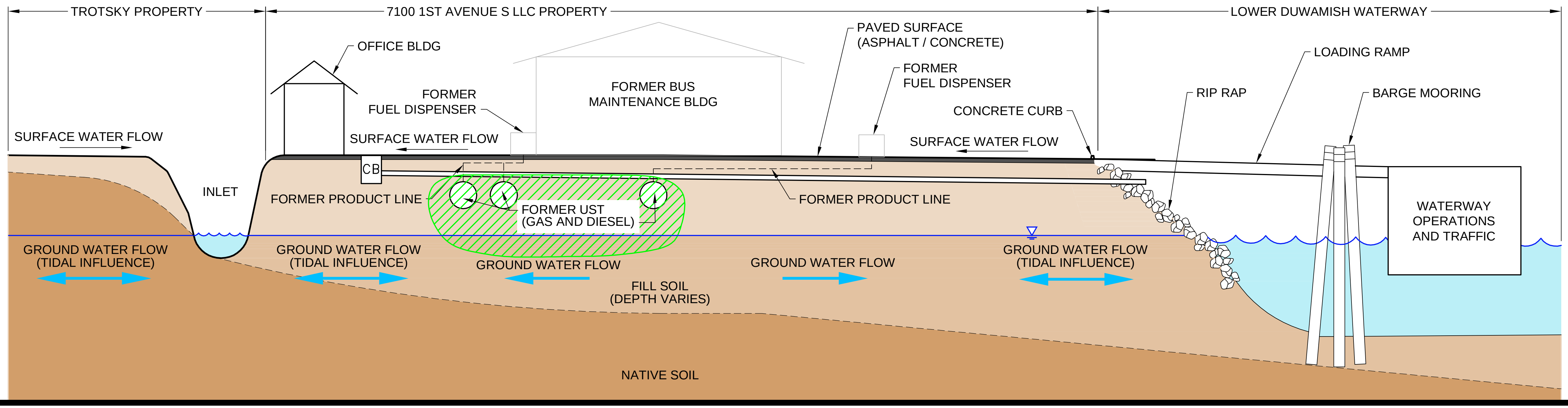
Subsurface Sediment Sample Locations and Preliminary Sediment Screening Level Exceedance Summary - SVOCs

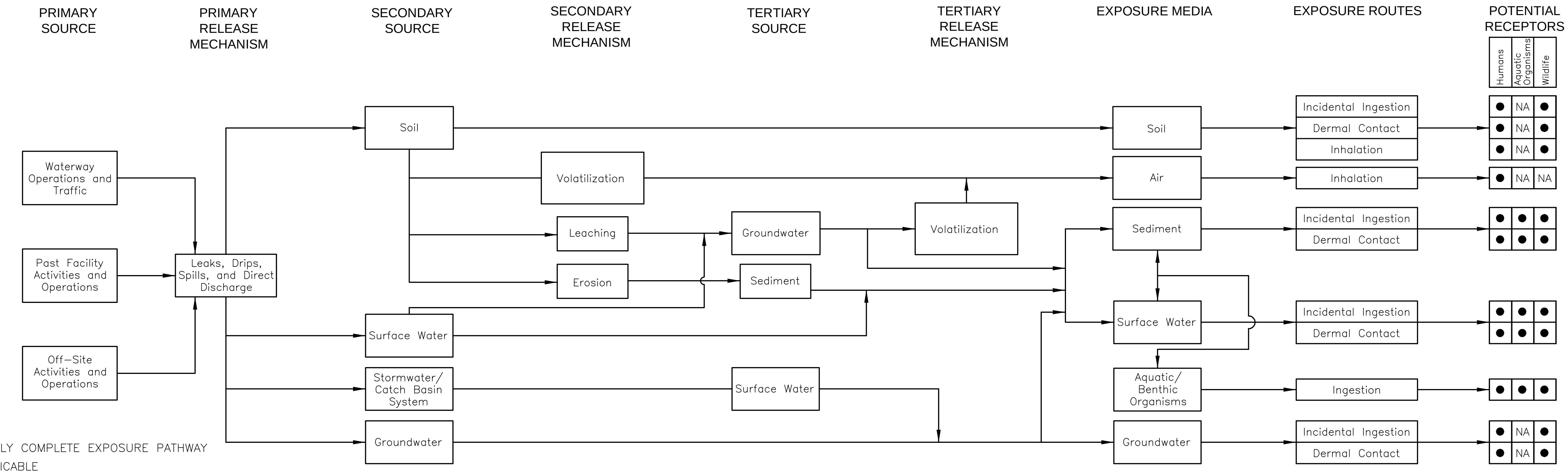
7100 1st Avenue South Site
Seattle, Washington

GeoEngineers

Figure 17

SEAT:IHW : CMV:SCY





EXPOSURE MEDIA	EXPOSURE ROUTES	POTENTIAL RECEPTORS		
		Humans	Aquatic Organisms	Wildlife
Soil	Incidental Ingestion	●	NA	●
	Dermal Contact	●	NA	●
	Inhalation	●	NA	●
Air	Inhalation	●	NA	NA
Sediment	Incidental Ingestion	●	●	●
	Dermal Contact	●	●	●
Surface Water	Incidental Ingestion	●	●	●
	Dermal Contact	●	●	●
Aquatic/ Benthic Organisms	Ingestion	●	●	●
Groundwater	Incidental Ingestion	●	NA	●
	Dermal Contact	●	NA	●

EXPLANATION:

●	POTENTIALLY COMPLETE EXPOSURE PATHWAY
NA	NOT APPLICABLE

Notes

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Reference: Sketch provided by GeoEngineers staff, March 2011.

Legend

UST	Underground storage tank
CB ☐	Catch basin
⊻	Groundwater level
→	Approximate groundwater flow direction
▨	Conceptual Extent of Petroleum Related Contamination in Soil and/or Groundwater

Note: Conceptual Diagram - Not to Scale

Preliminary Conceptual Site Model

7100 1st Avenue South
Seattle, Washington

GEOENGINEERS

Figure 18

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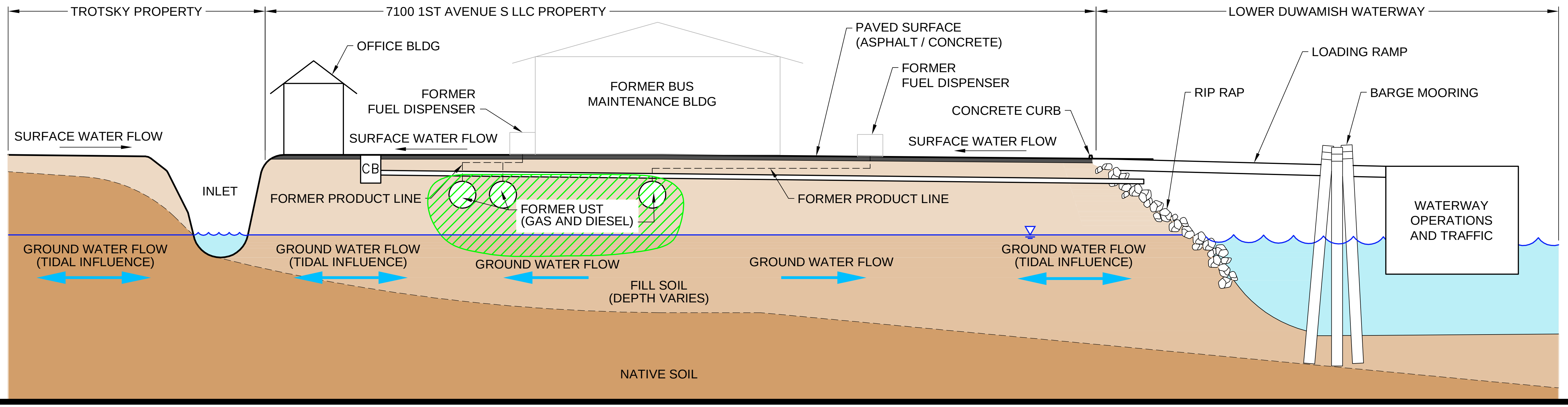
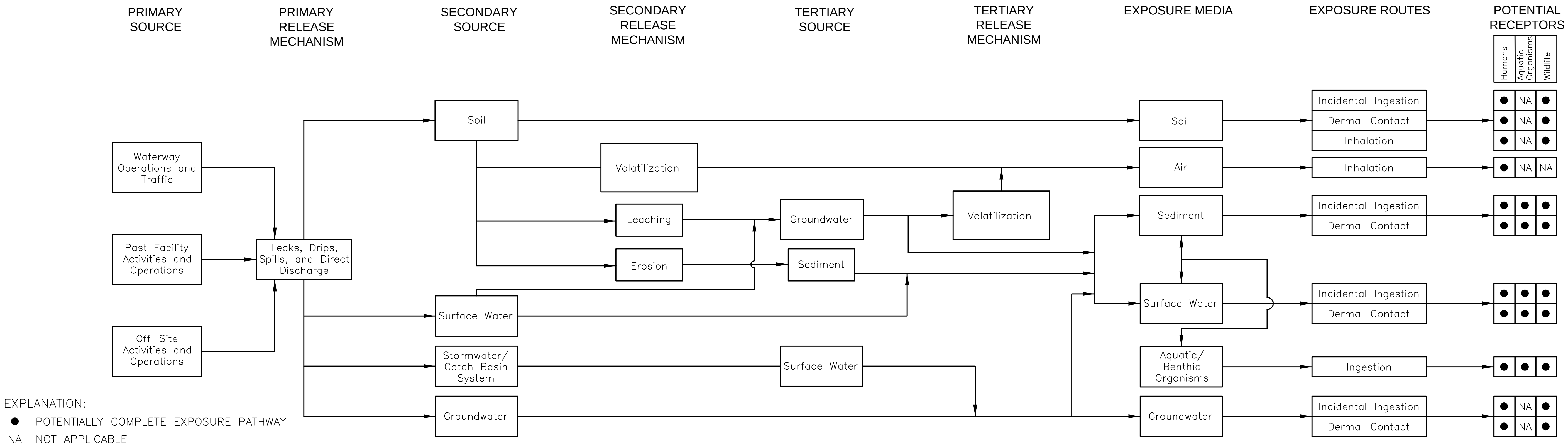
SEAT:IHW : CMV:SCY

P:\0\0275015\01\CAD\Figures\Ecology Review Document\027501501_Fig 18 Conceptual Site Model.dwg\TAB:F17 modified on Dec 03, 2012 - 2:03pm





Legend

UST Underground storage tank

CB ☐ Catch basin

▽ Groundwater level

→ Approximate groundwater flow direction

▨ Conceptual Extent of Petroleum Related Contamination in Soil and/or Groundwater

Note: Conceptual Diagram - Not to Scale

Notes

1. The locations of all features shown are approximate.
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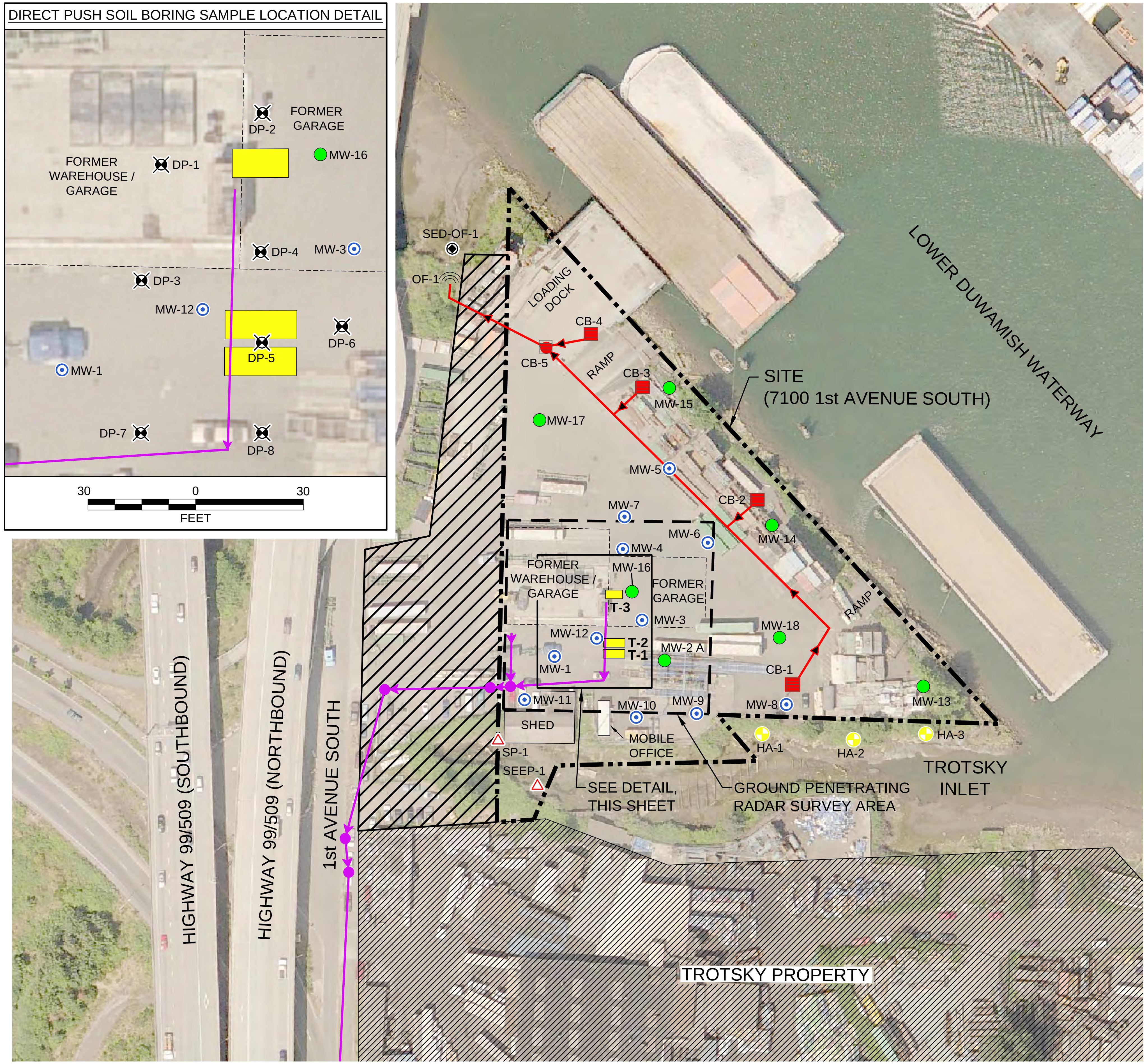
Reference: Sketch provided by GeoEngineers staff, March 2011.

Preliminary Conceptual Site Model

7100 1st Avenue South
Seattle, Washington

GEOENGINEERS

Figure 18



Legend

	— · · —	Site Boundary
	▨	Leased area to 7100 1st Avenue South, Seattle LLC from the Washington State Department of Transportation (WSDOT)
	🟨	Former Underground Storage Tank (Removed)
	—●◄—	Storm Drainage (Flows to Sanitary Sewer)
	—●— 🟥	Storm Drainage (Sewer Flows to LDW)
		LDW = Lower Duwamish Waterway
MW-1	⊙	Existing Monitoring Well
MW-1	●	Proposed Soil Boring/Monitoring Well
HA-1	◐	Proposed Hand Auger Boring Location
DP-1	⊗	Proposed Direct-Push Soil Boring Location
CB-1	▤	Proposed Catch Basin Sampling Location
OF-1	◠	Proposed Stormwater Outfall Sample Location
SP-1	△	Proposed Seep Sample Location
SED-OF-1	◉	Proposed Surface Sediment Sample Location
	⬚	Approximate Limits of Ground Penetrating Radar Survey

N
W E
S

100 0 100
FEET

Notes

1. The locations of all features shown are approximate.
2. Location of drain and conveyance features are unconfirmed and will be evaluated during RI.
3. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Reference: Aerial image from King County GIS, 2007. Storm drainage features from "Lower Duwamish Waterway, Early Action Area 2, Technical Memorandum: DMC Property Update," by Science Applications International Corporation (SAIC) dated April 2008.

Proposed Sampling Locations

7100 1st Avenue South Site
Seattle, Washington

GEOENGINEERS

Figure 19

P:\0\0275015\01\CAD\FIGURES\ECOLOGY REVIEW DOCUMENT\027501501_FIG 19 PROPOSED SAMPLING LOCATIONS.DWG\TAB:FIG 18 MODIFIED BY TMICHAUD ON JAN 14, 2013 - 14:03

APPENDICES

APPENDIX A
Sampling and Analysis Plan

Appendix A
Final Sampling and Analysis Plan (SAP)

Remedial Investigation/Feasibility Study
7100 1st Avenue South Site
Agreed Order No. DE 8258

for
Washington State Department of Ecology
***on behalf of* 7100 1st Avenue S. Seattle, LLC**

February 15, 2013

GeoEngineers

Plaza 600 Building
600 Stewart Street, Suite 1700
Seattle, Washington 98101
206.728.2674

Table of Contents

LIST OF TABLES

LIST OF FIGURES

1.0 INTRODUCTION

This Sampling and Analysis Plan (SAP) has been developed for Remedial Investigation (RI) sampling and analysis activities to be performed at the 7100 1st Avenue South Site (the "Site") located in Seattle, Washington (Figure A-1). The RI is being conducted by the 7100 1st Avenue S., Seattle LLC ("7100 LLC") to satisfy the requirements of an Agreed Order (No. DE 8258) issued for the Site by the Washington State Department of Ecology (Ecology). The objectives of the RI are discussed in the Remedial Investigation/Feasibility Study (RI/FS) Work Plan (Work Plan; GeoEngineers, 2013).

This SAP serves as the primary guide for standard operating procedures for field work into RI activities and has been completed general accordance with guidelines presented in the Washington Administrative Code (WAC 173-340-820). A description of the laboratory methodology and quality assurance and quality control procedures that will be used to complete the investigation of the site is presented in a quality assurance project plan (QAPP; Appendix B of the Work Plan). A Site-specific Health and Safety Plan (HASP) will be used for RI field activities and is presented in Appendix C of the Work Plan.

2.0 BACKGROUND

2.1. Problem Definition

Historical activities at the Site have included filling and industrial operations associated with sand and gravel batch production, school bus parking with auxiliary maintenance, servicing and fueling facilities and, cargo storage and freight management. Facilities located at the Site have included warehouse/garage and office buildings, fuel dispensers and underground storage tanks (USTs). Additionally, filling and industrial activities have also been performed on nearby properties to the south. Previous environmental investigations conducted at the Site by the 7100 LLC and other parties have identified detected concentrations of metals, volatile and semi-volatile organic compounds (VOCs and SVOCs) including polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and petroleum hydrocarbons, in soil and/or groundwater at the Site. Environmental studies completed by others within the adjacent Lower Duwamish Waterway (LDW) and Trotsky Inlet have identified detected concentrations of metals, SVOCs, PCBs, and petroleum hydrocarbons in sediments.

Soil and groundwater investigations will be completed to characterize the nature and extent of soil and groundwater contamination at the Site and to provide sufficient information to select a cleanup action, if necessary. A stormwater system investigation will also be completed to evaluate whether the storm water collection system at the Site is a potential transport mechanism for contaminants in Site soil and groundwater to the LDW.

2.2. Site Description and History

The Site is located in the northern portion of the South Park Industrial Area (7100 2nd Avenue Southwest), is triangular in shape and consists of 3.09 acres (Parcel No. 2924049090). The Site is zoned industrial and is bounded to the northeast by the LDW, to the south by the Trotsky Property (Parcel No. 2924049030) and the Early Action Area 2 Inlet (also known as the Trotsky

Inlet), and to the west by 1st Avenue South (Figure 1). The 1.2 acre property located between the Site and 1st Avenue South is currently being leased from the Washington State Department of Transportation (WSDOT). In addition to the Site, 7100 LLC also owns a small (0.04 acre) parcel (Parcel No. 6871200035) located on the south side of the Trotsky Inlet (Figure A-1). This property is currently vacant, and historic activities at the separate parcel are unrelated to the Site.

Additional information regarding Site conditions and history is presented in the Work Plan (GeoEngineers 2013).

3.0 REMEDIAL INVESTIGATION

Field investigations during the RI will be completed to evaluate new and existing soil and groundwater data from the Site to delineate the nature and extent of contamination. New data will be obtained to supplement existing information, to fill identified data gaps, and to complete the characterization of the Site for the purpose of developing and evaluating site-specific cleanup levels and cleanup action alternatives.

3.1. Overall Design

Field investigations during the RI will consist primarily of the following:

- Advancing borings and obtaining soil samples for chemical analysis.
- Installation of shallow groundwater monitoring wells.
- Collection of water samples from new and existing groundwater monitoring wells for chemical analysis.
- Collection of solids samples from existing Site catch basins for chemical analysis.
- Collection of water samples from the existing catch basin system outfall for chemical analysis.
- Perform slug tests and a tidal study to measure hydraulic conductivity, water table gradients under variable tidal conditions, and groundwater follow direction(s).

3.2. Chemical Analytes

Selected samples will be submitted for chemical analysis to Analytical Resources Inc. (ARI) located in Tukwila, Washington and/or Columbia Analytical Services in Kelso, Washington for one or more of the following:

- Total Organic Carbon (TOC) by SW-846 Method 9060.
- Grain size (solids) by Puget Sound Estuary Program methods (catch basin solids and sediment only).
- Chloride by EPA 300.0 (groundwater only).
- Total dissolved solids by EPA Method 160.1 (groundwater only).
- Total and/or Dissolved Metals (arsenic (total), chromium (total), cadmium, copper, lead, mercury (soil), nickel, silver and zinc) by EPA Method 200.8 and 7470.

- Total and dissolved Mercury in water by EPA Method 1631-E.
- SVOCs including PAHs by EPA Method 8270/SIM.
- VOCs by EPA Method 8260 (or BTEX only by EPA Method 8021).
- PCBs by EPA Method 8082.
- Pesticides by GC/MS/MS methods.
- Gasoline-range petroleum hydrocarbons by Ecology Method NWTPH-G.
- Diesel- and heavy oil-range petroleum hydrocarbons by Ecology Method NWTPH-Dx.
- Dioxins/Furans by EPA Method 8290A (catch basin solids).

The chemical analyses to be performed at each proposed sampling location is presented in Table 1. Project objectives, procedures, organization, functional activities, and specific quality assurance and quality control activities designed to achieve data quality goals established for the project are outlined in the QAPP.

3.3. Sampling Locations

Soil and groundwater sampling and analysis will be performed at the Site to provide sufficient information to select a cleanup action, if necessary. The activities also include catch basin solids and catch basis system outfall sampling to evaluate whether the stormwater collection system at the Site is a potential transport mechanism for contaminants in Site soil and groundwater to the Lower Duwamish Waterway. The rationale for the proposed sampling locations is presented in the Work Plan. The proposed sample locations are shown on Figure A-1 and include:

- Completion of three hand auger borings at locations HA-1 through HA-3,
- Completion of six hollow-stem auger borings at locations MW-2A and MW-13 through MW-18,
- Collection of four quarterly rounds of groundwater samples from existing monitoring wells MW-1 and MW-3 through MW-12, from new monitoring wells MW-2A and MW-14 through MW-16, and from two seep locations adjacent to the Trotsky Inlet (SP-1 and SEEP-1),
- Catch basin solids sampling within catch basins CB-1 through CB-5,
- Stormwater collection system outfall sampling at Outfall-1, and
- Sediment sampling in the vicinity of the stormwater discharge outfall.

3.4. Project Schedule

Investigation activities will be completed within 12 months following Ecology's approval of the Final RI/FS Work Plan.

4.0 FIELD METHODS AND PROCEDURES

4.1. Soil Investigation

Soil sampling will be performed at seven locations (three hand auger and four hollow-stem auger boring locations) to collect samples representative of soil conditions at the Site. Information obtained from previous Site investigations was used to support selection of the proposed soil sample locations. The proposed soil sampling locations are shown on Figure A-1.

Samples will be collected from proposed hand auger boring locations HA-1 through HA-3 and hollow-stem auger boring locations MW-2A and MW-14 through MW-16. MW-1 through MW-10 and GMW-25 through GMW-27 and submitted for chemical analysis. Procedures for soil sample collection are described below.

4.1.1. Hand Auger Explorations and Soil Sampling

Hand auger explorations HA-1 through HA-3 (see Figure A-1) for obtaining soil samples will be completed along the Trotsky Inlet shoreline and will be advanced to at least a depth of 2 feet below ground surface (bgs) by a representative from GeoEngineers' staff. Exploration locations may be modified in the field from the locations shown on Figure A-1, based on access to the proposed sample locations, tide levels at the time of sampling and obstructions encountered.

Soil samples will be obtained from the stainless steel hand auger barrel will be visually classified in general accordance with American Society of Testing and Materials (ASTM) D-2488 and screened in the field for the presence of contamination. Field screening will consist of visual observation for the presence of contamination (i.e., staining, etc.), water sheen testing, and organic vapor monitoring. Observations of soil and groundwater conditions and soil field screening results for each exploration will be included on a boring log. Field screening procedures are presented in Section 4.6. Exploration logging procedures are presented in Section 4.5.

A minimum of three soil samples will be collected from each hand auger exploration for potential chemical analysis. In general, samples will be generally collected at the ground surface, 1 foot bgs and 2 feet bgs. Soil samples for chemical analysis will be obtained from a depth interval of approximately 0.5-foot. A portion of the soil sample removed from the sampler from each sample depth interval will be placed into laboratory-supplied containers, lightly packed, and capped with a plastic lid (with the exception of sample aliquots for VOCs analysis, which will be collected using EPA Method 5035A). The sand-sized and finer fractions of the soil will be targeted for collection. Each sample container will be labeled and placed in a cooler with ice immediately upon collection as described in the Work Plan QAPP.

Samples with the greatest evidence of contamination based on the field screening will initially be submitted for chemical analysis from each location. Samples with no evidence or lesser evidence of contamination will be archived for potential follow-up analysis based on the analytical results from the initial samples. Analysis will be performed on additional samples from a given investigation location when supplemental data are needed to characterize or delineate contaminants detected in the initial sample(s). Table 1 presents the proposed chemical analyses to be performed at each location.

4.1.2. Hollow-Stem Auger Borings and Soil Sampling

Hollow-stem auger (HSA) explorations (MW-2A and MW-14 through MW-16) will be completed using a truck-mounted drill rig. Alternative drilling methods (air rotary, sonic, etc.) will be implemented to complete the borings in the event that HSA drilling methods are not successful. The HSA borings will be advanced to a target depth of 30 feet bgs in each boring. HSA borings will be completed by a licensed driller in the state of Washington. Continuous soil core samples will be obtained from the HSA borings using a 2.5-inch-diameter split-barrel sampler. The split-barrel sampler will be driven into undisturbed soil by a 140 pound or 300-pound hammer falling a vertical distance of approximately 30 inches. The number of hammer blows required to advance the sampler the final 18 inches will be recorded on the boring logs.

Soil samples obtained from the borings will be visually classified in general accordance with American Society of Testing and Materials (ASTM) D-2488 and screened in the field for the presence of contamination. Field screening will consist of visual observation for the presence of contamination (i.e., staining, etc.), water sheen testing, and organic vapor monitoring. Observations of soil and groundwater conditions and soil field screening results for each exploration will be included on a boring log. Field screening procedures are presented in Section 4.6. Borehole logging procedures are presented in Section 4.5.

A minimum of three soil samples will be collected from each HSA boring for potential chemical analysis. In general, samples will be collected from the fill unit, at the water table (where the exploration depth is sufficient to encounter the water table), the base of the fill unit (where distinguishable), and/or where there is field screening evidence of contamination. Soil samples for chemical analysis will be obtained from a depth interval of approximately 1-foot thick. Soil samples removed from the sampler will be placed into laboratory-supplied containers, lightly packed, and capped with a plastic lid (with the exception of sample aliquots for VOCs analysis, which will be collected using EPA Method 5035A). The sand-sized and finer fractions of the soil will be targeted for collection. Each sample container will be labeled and placed in a cooler with ice immediately upon collection as described in the Work Plan QAPP.

Soil samples to initially be submitted for chemical analyses will be selected based on field screening results, location of the groundwater table and/or target soil horizon (i.e., fill or native soil). Samples with the greatest evidence of contamination based on the field screening will initially be submitted for chemical analysis from each location. Samples with no evidence or lesser evidence of contamination will be archived for potential follow-up analysis based on the analytical results from the initial samples. Analysis will be performed on additional samples from a given investigation location when supplemental data are needed to characterize or delineate contaminants detected in the initial sample(s). Table 1 presents the proposed chemical analyses to be performed at each location.

4.2. Groundwater Investigation

Groundwater sampling will be performed at 15 locations to collect samples representative of groundwater conditions at the Site. Information obtained from previous Site investigations was used to support selection of the proposed groundwater sample locations. The groundwater sampling locations are presented on Figure A-1.

Samples will be collected from existing Site monitoring wells MW-1 and MW-3 through MW-13 and proposed monitoring wells MW-2A and MW-14 through MW16 and submitted for chemical analysis. Procedures for monitoring well installation, well development, water level measurement and groundwater sample collection are described below.

4.2.1. Monitoring Well Construction

Drilling and construction of the monitoring wells will be conducted by a Washington State licensed driller in accordance with the Minimum Standards for Construction and Maintenance of Wells (Chapter 173-160 Washington Administrative Code [WAC]; Ecology, 2006). Notices of intent to construct wells (start cards) will be submitted to Ecology prior to installing any new monitoring well. Prior to beginning drilling activities, the drill rig will be inspected by a GeoEngineers representative to ensure that it has been cleaned and decontaminated before entering the work area, to prevent potential cross-contamination from other sites. The drill rig shall not leak any fluids that may enter the borehole or contaminate equipment placed in the borehole. The use of rags or absorbent materials to absorb leaking fluids is unacceptable. Any leaks found on the drill rig will be repaired prior to starting or resuming drilling activities. Installation of the monitoring wells, including material used and well depths will be included on a boring log. Borehole logging procedures are presented in Section 4.5.

Wells will be constructed of 2-inch-diameter, flush-threaded Schedule 40 polyvinyl chloride (PVC) casing with machine-slotted PVC screen (0.010-inch). The top of the well screens will be located approximately 5 feet above the observed groundwater level, or within 2 feet of the ground surface, whichever is deeper. The wells' location and the potential for influence on groundwater levels in the well from changes in water levels in the Lower Duwamish Waterway will be considered when placing the well screen. The well screen intervals may be modified based on field screening results or variations in soil type. Screened intervals of approximately 15-foot length are anticipated.

Following placement of the well screen and casing in the borehole, a filter pack will be installed around the well screen. The filter pack will extend from the bottom of the well to a minimum of 1 foot above the top of the screen. Filter pack material will consist of commercially prepared 10-20 silica sand.

A bentonite seal at least 1 foot thick will be placed above the sand pack to about 1.5 feet bgs. The surface of each well will be completed with a concrete seal and surface pad extending from the top of the bentonite seal to slightly above the ground surface. Locking steel flush-mount monuments will be cemented in place from the surface to a depth of about 1.5 feet bgs.

4.2.2. Monitoring Well Development

Each monitoring well will be developed to remove water introduced into the well during drilling (if any), stabilize the filter pack and formation materials surrounding the well screen, and restore the hydraulic connection between the well screen and the surrounding soil. The well screen will be gently surged with a decontaminated stainless steel bailer several times after installation. Development will continue until a minimum of 5 casing volumes of water have been removed and turbidity of the discharged water is relatively low. The goal of well development will be to reduce the turbidity content of the water to approximately 25 nephelometric turbidity units (NTU). Up to 10 well volumes of water will be removed from the wells in an effort to attain the 25 NTU goal. The removal rate and volume of groundwater removed will be recorded during well development procedures. Water that is removed from the well during well development activities will be stored on Site in labeled 55-gallon drums, pending off-site disposal. Depths to water in the monitoring wells will be measured prior to development.

4.2.3. Water Level Measurements

Water level measurements will be obtained at each monitoring well prior to purging and sample collection. All water levels will be measured using an electronic water level indicator and will be recorded to the nearest 0.01 foot. Measurements will be taken from the top of the well casing.

4.2.4. Groundwater Sampling

Groundwater samples will be obtained during an outgoing low tide on the day of sampling using low-flow/low-turbidity sampling techniques to minimize the suspension of sediment in the samples. Groundwater samples will be obtained from monitoring wells using a peristaltic pump and disposable polyethylene tubing. Groundwater will be pumped at approximately 0.5 liter per minute using a peristaltic pump attached to tubing placed within the screened interval. A water quality measuring unit (Horiba U-22 or similar) with a flow-through cell will be used to monitor the following water quality parameters during purging: electrical conductivity, dissolved oxygen, pH, salinity, turbidity, oxidation-reduction potential and temperature. Ambient groundwater conditions will have been reached once these parameters vary by less than 10 percent on three consecutive measurements. The stabilized field measurements will be documented on the field log (for subsequent use in the RI). Following well purging, the flow-through cell will be disconnected and groundwater samples will be collected in laboratory-prepared containers. Table 1 presents the proposed chemical analyses to be performed at each location.

Samples to be analyzed for VOCs will be obtained using EPA guidance for using peristaltic pumps to collect VOC samples. EPA recommends using the “soda straw” method, which involves allowing the flexible tubing to fill by either lowering it into the water column (Method A) or by filling it with suction applied to the pump head (Method B). For Method A, the tubing is removed from the well after filling and the sample is allowed to drain into the sample vial. For Method B, after running the pump and filling the tubing with sample, the pump speed is reduced and the flow direction is reversed to push the sample out of the tubing into the sample vials. The samples will be placed into a cooler with ice and logged on the chain-of-custody form using the procedures described in the Work Plan QAPP.

Purge water removed from the monitoring wells and decontamination water generated during all sampling activities will be stored on Site in labeled and sealed 55-gallon drums. The drums will be stored temporarily at a secure location on the property pending receipt of analytical results and off-site disposal at a permitted facility.

4.2.5. Survey

Each monitoring well location, casing rim elevation, and adjacent ground surface elevation will be surveyed relative to a temporary or permanent benchmark. Elevations will be surveyed using a laser level which has an accuracy of 0.01 foot. Monitoring well location positions will be surveyed with equipment that has an accuracy of 0.1 foot.

4.2.6. Tidal Study

Water levels in monitoring wells will be recorded using a combination of pressure transducers with internal data loggers and an electronic water level indicator. The data collection will include continuous (every 15 minutes) transducer-based water level measurements in wells MW-4, MW-5, MW-9, MW-11, MW-12, MW-13 and in the Lower Duwamish Waterway. The data logger will be programmed to automatically convert pressure changes to water levels. If possible, a vented transducer will be used that internally corrects for fluctuations in atmospheric pressure. Procedures for conducting the tidal study are summarized below:

- At each monitoring well, a pressure transducer will be lowered into the well and securely fastened to the top of the well casing for the duration of the monitoring period. A transducer will also be established in the Lower Duwamish Waterway at a secure location.
- The transducers will be set to record the height of the water column above the transducer at 15-minute intervals.
- Pressure transducers will be rated to a minimum 15 pounds per square inch (psi) range capable of measuring a water level change of 23 feet with a resolution of 0.01 foot.
- Depth to water will also be measured from the top of the well casing to the nearest 0.01 foot with a manual electronic water level indicator. Depth-to-water level will be manually measured a minimum of four times during the monitoring period.
- At the end of the monitoring period (14 days), the pressure transducers will be removed and the water level data will be uploaded to a computer.

Similar procedures will be used to monitor surface water levels in the Lower Duwamish Waterway.

4.2.7. Hydraulic Conductivity Testing

The groundwater hydraulic conductivity at the Site will be estimated using slug tests. Slug tests will be performed in selected monitoring wells to identify the range of hydraulic conductivities present. Slug tests can be performed prior to or following the 72-hour tidal study. The well location and tidal stage will be considered when performing and interpreting the slug tests to minimize the interference of tidal fluctuations on the aquifer and the determination of the hydraulic conductivities.

Slug tests will be performed using a PVC slug rod, a down-hole pressure transducer as described above, and a water level indicator in general accordance with ASTM D 4044-99. The general procedure for conducting the slug tests in monitoring wells is summarized below:

- At each monitoring well, the static depth of groundwater will be measured prior to placing the pressure transducer near the bottom of the well.
- After stabilization of the groundwater level (from the displacement of the transducer) the slug rod will be quickly lowered into the well until it is submerged in Hellthe water column.
- The recovery of the perturbed water level will be monitored until it has returned to within 95 percent of the initial head indicated by the transducer prior to the introduction of the slug rod.
- Once the water level has re-equilibrated, the slug rod will be quickly removed from the water column and the groundwater level will be monitored for recovery.
- After the water level has recovered to within tolerance (95 percent) depth to groundwater will be manually measured again and the transducer will be removed and the well secured.

The slug test response data will be analyzed using the Bouwer and Rice Method (Bouwer and Rice 1976, Bouwer, 1989).

4.3. Stormwater System Investigation

Catch basin solids and outfall water will be sampled to evaluate whether the stormwater conveyance system is a potential pathway for contaminant migration from the Site to the Lower Duwamish Waterway. Catch basin solids will be sampled at the most down-stream location of the stormwater collection system; location CB-5 shown on Figure A-1. Additional catch basin solids samples will be collected from the storm water collection network in the southwest corner of the Site if it is not possible to confirm that the storm drain network in that area of the Site is connected to the City sanitary sewer collection system. One stormwater sample will be collected after precipitation events from the existing stormwater discharge outfall (Outfall-1) quarterly for four quarters. In addition to the stormwater discharge and catch basin solids sampling, a sample of surface sediment will be collected from the vicinity of the stormwater discharge outfall to evaluate the potential for stormwater contaminants to impact surrounding LDW sediment. The proposed sampling locations are shown on Figure A-1.

4.3.1. Catch Basin Solids Sampling

The sampling of Site catch basin solids will be performed by obtaining a solids sample from catch basin CB-5 using a stainless steel spoon or, where necessary, will be obtained using a sampler attached to an extension arm to reach into deeper catch basins. One sample will be collected for chemical analysis. In addition to the catch basin solids sample, sediment samples will be collected from the vicinity of the stormwater discharge outfall. The proposed sediment sampling location is shown on Figure A-1. A sample of surface sediment (0 to 10 cm depth) and shallow subsurface sediment (10cm to 60 cm) will be collected and analyzed for the same set of analytes as the samples of catch basin solids to allow comparison. Table 1 presents the proposed chemical analyses to be performed.

Samples will be placed into laboratory-supplied containers, lightly packed, and capped with a plastic lid (with the exception of sample aliquots for VOCs analysis, which will be collected using EPA Method 5035A). The sand-sized and finer fractions of the soil will be targeted for collection. Each sample container will be securely capped, labeled, and placed in a cooler with ice immediately upon collection as described in the Work Plan QAPP.

Catch basin samples will be visually classified in general accordance with American Society of Testing and Materials (ASTM) D-2488 and screened in the field for the presence of contamination. Field screening will consist of visual observation for the presence of contamination (i.e., staining, etc.), water sheen testing, and organic vapor monitoring. Field screening procedures are presented in Section 4.6.

4.3.2. Stormwater Outfall Sampling

Stormwater outfall sampling will be completed by obtaining a grab sample during a storm event once per quarter during the RI field investigation. A sample will be collected as close as possible to the first hour of a storm event. Samples will be obtained directly from the outfall by placing the laboratory-supplied containers such that the stormwater directly enters the bottle. Sample bottles will be filled to about ½ inch of the top to ensure that no preservative is lost. Each sample container will be securely capped, labeled, and placed in a cooler with ice immediately upon collection as described in the Work Plan QAPP. Table 2 presents the proposed chemical analyses to be performed at the stormwater outfall.

4.4. Underground Utilities Clearance

Prior to the start of any intrusive activities (i.e., drilling/well installation, direct push borings), exploration locations will be marked in the field using stakes, white marking paint, or similar techniques. The following general procedures will be followed for utility clearances. First, the locations of proposed explorations will be visually inspected to determine whether debris or other objects may need to be removed to allow access to the subsurface. Next, the location coordinates of the proposed explorations will be determined using a portable global positioning system (GPS) unit. A commercial utility locating service will then inspect the proposed exploration locations and mark any underground utilities in the vicinity. In addition, a call will be placed to the Utilities Underground Location Center (1-800-424-5555) at least 48 hours prior to intrusive activities to arrange for location of municipal and commercial utility lines that may be present. The exploration locations may be modified if necessary to stay clear of utilities.

4.5. Borehole Logging

A log of exploration activities will be documented in field reports. Information in the field reports will include dates/times of field work and sample collection, exploration locations, personnel and equipment present, down time, materials used, samples collected, measurements taken, and any other observations or information that would be necessary to generally reconstruct field activities at a later date. At the end of each day of drilling, the drilling supervisor shall complete a daily drilling/field log.

The lithology/stratigraphy encountered in drilled borings and direct push explorations will be logged by the field geologist or engineer on field forms. At drilled boring locations, unconsolidated samples for lithologic description will generally be obtained at 2.5-foot intervals during drilling and/or at depths specified for analytical (physical and/or chemical) sample collection. Information on the boring/test pit logs will include the exploration location; general information about drilling/excavation field activities; sampling information such as sample intervals/depths, sample recoveries (for dilled borings), and drilling hammer blow counts; and sample description information. Lithologies encountered will generally be described in accordance with ASTM D2488 Standard Practice for Description and Identification of Soils (Visual-Manual Procedure). In addition, identification of the Unified Soil Classification System (USCS) group symbol will be recorded on the field logs.

Additional information (if observed) that will be recorded on the field logs include depth to groundwater/saturated soil, extent of borehole/test pit caving or sloughing, the presence of heaving sand, changes in drilling rate, and other noteworthy observations or conditions, such as the apparent depths of lithologic contacts or zones of apparent soil contamination.

4.6. Field Screening

Soil samples will be field-screened for evidence of possible contamination. Field screening results will be recorded on the field logs and the results will be used as a general guideline to delineate areas of possible contamination. Screening results will be used to aid in the selection of soil samples that will be submitted for chemical analysis, but will not serve as the only criteria; other factors to be considered include sample locations relative to other known or suspected contamination in the area. The following field screening methods will be used: (1) visual screening, (2) water sheen screening, and (3) headspace vapor screening.

4.6.1. Visual Screening

The soil will be observed for unusual color or staining that may be indicative of contamination.

4.6.2. Water Sheen Screening

This is a qualitative field screening method that can help identify the presence or absence of petroleum hydrocarbons. A portion of the soil sample will be placed in a black plastic pan containing distilled water. The water surface will be observed for signs of sheen.

The following sheen classifications will be used:

Classification	Identifier	Description
No Sheen	(NS)	No visible sheen on the water surface
Slight Sheen	(SS)	Light, colorless, dull sheen; spread is irregular, not rapid; sheen dissipates rapidly
Moderate Sheen	(MS)	Light to heavy sheen; may have some color/iridescence; spread is irregular to flowing, may be rapid; few remaining areas of no sheen on the water surface
Heavy Sheen	(HS)	Heavy sheen with color/iridescence; spread is rapid; entire water surface may be covered with sheen

4.6.3. Headspace Vapor Screening

This is a semi-quantitative field screening method that can help identify the presence or absence of volatile chemicals. As soon as possible after collecting a soil sample, a portion of the sample is placed in a resealable plastic bag for headspace vapor screening. Ambient air is captured in the bag; the bag is sealed, left for approximately 5 minutes, and then shaken gently for approximately 10 seconds to expose the soil to the air trapped in the bag. Vapors present within the sample bag's headspace are measured by inserting the probe of a photoionization detector (PID) through a small opening in the bag. A PID measures the concentration of organic vapors ionizable by a 10.6 electron volt lamp (standard) in parts per million (ppm) and quantifies organic vapor concentrations in the range between 0.1 ppm and 2,000 ppm (isobutylene-equivalent) with an accuracy of 1 ppm between 0 ppm and 100 ppm. The maximum ppm value will be recorded on the field report for each sample. The PID will be calibrated to 100 ppm isobutylene.

4.7. Decontamination

Whenever possible, disposable sampling equipment will be used to minimize the need for decontaminating equipment in the field. Prior to and between sample collection, reusable sampling equipment that comes in contact with soil, pipe contents, sediment, surface water, or groundwater will be decontaminated. Reusable sampling equipment may include split-barrel soil samplers, groundwater sampling pumps, sounding tapes, surface water samplers, trowels, spoons, and other hand tools or sampling/measuring devices. Decontaminated procedures are further described in the Work Plan QAPP.

4.8. Sample Handling

Samples will be retained in GeoEngineers' custody until samples are delivered to the analytical laboratory. Samples will be stored in coolers with ice. Sample containers will be clearly labeled with waterproof black ink at the time of sampling. Chain of custody (COC) procedures will be used to document the transfer of custody of samples from the field to the laboratory. Each sample sent to the laboratory for analysis will be recorded on a COC form. Sample handling procedure and field documentation are further described in the Work Plan QAPP.

4.9. Disposal of Investigation-Derived Materials

4.9.1. Soil

Soil cuttings from borings completed during the investigation will be placed in labeled and sealed 55-gallon drums. The drums will be temporarily stored on Site at a secure location pending receipt of analytical results and off-site disposal at a permitted facility. Each drum will be labeled with the following information:

- Material/media (i.e., soil, water, etc.) contained in the drum;
- Source of the material in the drum (i.e., investigation locations and depths where appropriate);
- Date material was generated; and
- Name and telephone number of GeoEngineers contact person.

4.9.2. Groundwater and Decontamination Water

Development and purge water removed from the monitoring wells and decontamination water generated during all sampling activities will be placed in labeled and sealed 55-gallon drums. The drums will be temporarily stored on Site at a secure location pending receipt of analytical results and off-site disposal at a permitted facility.

4.9.3. Disposition of Incidental Waste

Incidental waste generated during sampling activities includes items such as gloves, plastic sheeting, sample tubing, paper towels and similar expended and discarded field supplies. These materials are considered *de minimis* and will be disposed of in a local trash receptacle or county disposal facility.

5.0 QUALITY ASSURANCE AND QUALITY CONTROL

Quality assurance/quality control (QA/QC) procedures and standards that will be implemented during RI activities are presented in the Work Plan QAPP. The purpose of this document is to describe analysis and quality control procedures that will be implemented to produce chemical and field data that are representative, valid and accurate for use in evaluating the cleanup action alternatives.

6.0 REFERENCES

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Table A-1

Sampling and Analysis Plan - Soil and Catch Basin Solids

Remedial Investigation/Feasibility Study

7100 1st Avenue S Site
Seattle, Washington

Sample Location[1]	Investigation Target Depth (feet)	Sample Interval (feet)	Minimum Number of Samples for Analysis[2]	Sampling Rationale	Metals[3]								SVOCs[4]	VOCs[5]	Pesticides[6]	PCBs[7]	Petroleum Hydrocarbons[8]			Dioxins/Furans[9]	TOC, Grainsize[10]
					Arsenic	Cadmium	Copper	Lead	Mercury	Nickel	Silver	Zinc					Gasoline - Range	BTEX	Diesel/ Heavy Oil - Range		
Hand Auger Borings (Soil)																					
HA-1	2	1	1	Hand auger borings to be performed on bank above Trotsky Inlet to characterize near-surface soil with potential for transport to the LDW through erosion.	X	X	X	X	X	X	X	X	X		X	X			X		
HA-2	2	1	1		X	X	X	X	X	X	X	X	X		X	X			X		
HA-3	2	1	1		X	X	X	X	X	X	X	X	X		X	X			X		
Stormwater System (Solids)																					
CB-5	NA	--	1	Stormwater solids will be sampled to characterize the potential for solids within the stormwater system to migrate to the LDW. Catch basins are presently cleaned twice a year.	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X
SED-OF-1	0.5 (0 - 10 cm) and 0.5 - 2 (10 cm - 60 cm	0.5	2	Surface and shallow subsurface sediment in the vicinity of stormwater outfall will be sampled to characterize the potential for stormwater discharge to impact LDW sediments.	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X
Direct-Push Borings (Soil)																					
DP-1 through DP-8	20	5	1 each	Direct-push borings are planned in the vicinity of the former USTs to characterize extent of hydrocarbon-related contaminants in soil.													X	X	X		
Hollow Stem Auger (Soil)																					
MW-2R	30	2.5	3	Soil boring and monitoring well MW-2R is intended to replace damaged well MW-2.	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X
MW-13	30	2.5	3	Soil borings MW-13, MW-14, MW-15 are planned to characterize soil at the site limits adjacent to the LDW.	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X
MW-14	30	2.5	3		X	X	X	X	X	X	X	X	X	X	X	X	X		X		X
MW-15	30	2.5	3		X	X	X	X	X	X	X	X	X	X	X	X	X		X		X
MW-16	30	2.5	3	Soil boring MW-16 is intended to better characterize soil in the vicinity of the former USTs.	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X
MW-17	30	2.5	3	Soil Boring and well MW-17 is planned to characterize soil and groundwater in the northern section of the site.	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X
MW-18	30	2.5	3	Soil Boring MW-18 is planned to characterize soil in the area of the site between the former USTs and the LDW.	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X
Total Number of Environmental Field Samples					27	27	27	27	27	27	27	27	27	24	27	27	32	8	35	1	11
Total Number of Duplicate Field Samples[11]					3	3	3	3	3	3	3	3	3	3	3	3	4	1	4	0	1

Notes:

[1] Sample locations are shown on Figure 1.

[2] Soil samples initially submitted for chemical analyses will be selected based on field screening results, location of the groundwater table and/or target soil horizon (i.e., fill or native soil). The remaining samples that are collected will be archived at the laboratory. Subsequent analysis of archived samples will be based on review of the initial sample results and identified data gaps to the characterization of the site.

[3] Metals by EPA Method 6000/7000 series.

[4] Semivolatile organic compounds (SVOCs) by EPA Method 8270 SIM.

[5] Volatile Organic Compounds (VOCs) by EPA Method 8260.

[6] Polychloriated biphenyls (PCBs) by EPA Method 8280.

[7] Pesticides by EPA Method 8081B

[8] Petroleum hydrocarbons by NWTPH-Dx for diesel and heavy oil range, NWTPH-G for gasoline-range, and/or EPA Method 8021 for BTEX compounds.

[9] Dioxins/Furans by EPA Method 8290A

[10] Total Organic Carbon (TOC) by SW-846 Method 9060, and grainsize by Puget Sound Esturay Program methods.

[11] Field duplicate samples will be obtained at a frequency of one duplicate sample per ten soil samples. A minimun of one duplicated sample will be submitted from each type of investigation (i.e., hand auger, catch basin and hollow-stem auger).

Table A-2

Sampling and Analysis Plan - Stormwater and Groundwater

Remedial Investigation/Feasibility Study

7100 1st Avenue S Site
Seattle, Washington

Sample Location[1]	Sampling Rationale	Metals[2]								SVOCs[4]	VOCs[5]	PCBs[6]	Pesticides[7]	Petroleum Hydrocarbons[8]		Chloride, TDS[9]
		Arsenic	Cadmium	Copper	Lead	Mercury[3]	Nickel	Silver	Zinc					Gasoline - Range	Diesel/ Heavy Oil - Range	
Stormwater System (Outfall)																
OF-1	The outfall sample is intended to characterize contaminants present in stormwater discharging to surface water.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Seeps																
SP-01	Seep location SP-01 is intended to characterize shallow groundwater flowing into the Trotsky Inlet at low tide in a location on the north side of the inlet.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Seep-1	Seep location Seep-1 is intended to characterize shallow groundwater flowing into the Trotsky Inlet at low tide in a location on the south side of the inlet.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Groundwater Monitoring Wells (New and Existing Wells)																
MW-1	Monitoring well MW-1 is intended to characterize groundwater in the apparent upgradient direction of the former USTs.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MW-2R	Monitoring wells MW-2R, MW-3, and MW-4 are intended to characterize groundwater in the vicinity of, and immediately downgradient from, the location of the former USTs. Well MW-2R is a proposed new well to replace damaged well MW-2.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MW-3		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MW-4		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MW-5	Monitoring wells MW-5, MW-6, and MW-7 are intended to characterize groundwater downgradient from the location of the former USTs, as well as provide general site-wide groundwater chemistry and hydrogeology characterization.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MW-6		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MW-7		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MW-8	Monitoring wells MW-8, MW-9, and MW-10 are intended to characterize groundwater adjacent to the Trotsky inlet, as well as provide general site-wide groundwater chemistry and hydrogeology characterization.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MW-9		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MW-10		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MW-11	Monitoring well MW-11 is intended to characterize groundwater adjacent to the Trotsky Inlet as well as general site-wide groundwater chemistry and hydrogeology characterization. This well may also serve as an upgradient well.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MW-12	Monitoring well MW-12 is intended to characterize groundwater in the vicinity of the former USTs.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MW-13	Monitoring wells MW-13, MW-14, MW-15 are planned to characterize groundwater at the site limits adjacent to the LDW.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MW-14		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MW-15		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Table A-2

Sampling and Analysis Plan - Stormwater and Groundwater
Remedial Investigation/Feasibility Study

7100 1st Avenue S Site
Seattle, Washington

Sample Location[1]	Sampling Rationale	Metals[2]								SVOCs[4]	VOCs[5]	PCBs[6]	Pesticides[7]	Petroleum Hydrocarbons[8]		Chloride, TDS[9]
		Arsenic	Cadmium	Copper	Lead	Mercury[3]	Nickel	Silver	Zinc					Gasoline - Range	Diesel/ Heavy Oil - Range	
MW-16	Monitoring well MW-16 is intended to characterize groundwater in the vicinity of, and immediately downgradient from, the location of the former USTs.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MW-17	Monitoring well MW-17 is planned to characterize groundwater in the northern section of the site, as well as general site-wide groundwater chemistry and hydrogeology characterization. This well may also serve as an upgradient.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MW-18	Monitoring well MW-18 is planned to characterize groundwater in the area of the site between the former USTs and the LDW, as well as general site-wide groundwater chemistry and hydrogeology characterization.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Total Number of Environmental Field Samples per sampling round (four quarterly rounds)		21	21	21	21	21	21	21	21	21	21	21	21	21	21	20
Total Number of Duplicate Field Samples[10]		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

Notes:

[1] Sample locations are shown on Figure 1.

[2] Metals by EPA Method 200.7/ 200.8

[3] Mercury to be analyzed by EPA Method 1631E

[4] Semivolatile organic compounds (SVOCs) by EPA Method 8270 SIM.

[5] Volatile organic compounds (VOCs) by EPA Method 8260.

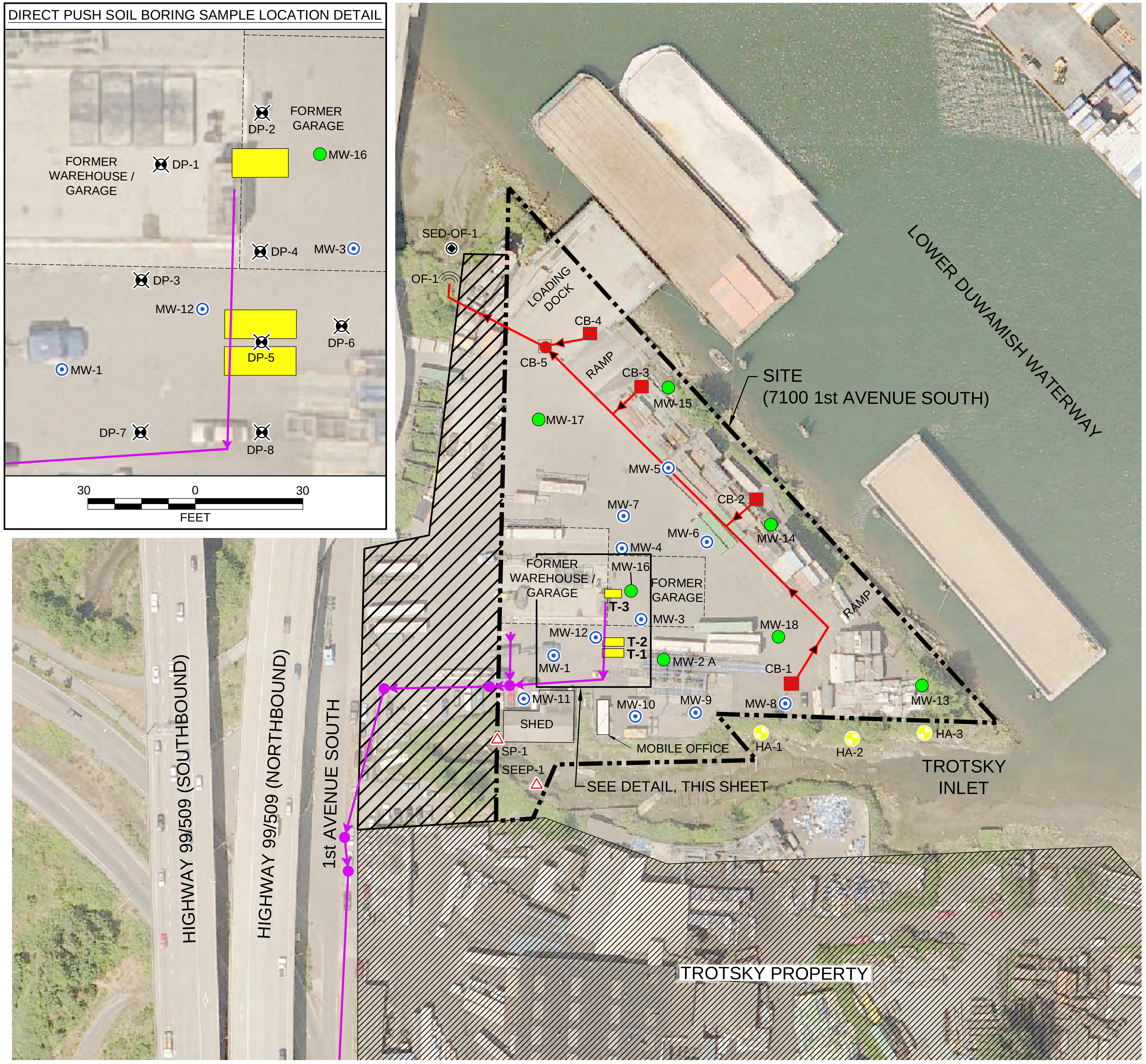
[6] Polychlorinated biphenyl's (PCBs) by EPA Method 8280.

[7] Pesticides by EPA Method 8081B

[8] Petroleum hydrocarbons by NWTPH-G for gasoline-range and/or NWTPH-Dx for diesel and heavy oil range.

[9] Chloride by EPA 300.0 and total dissolved solids by EPA 160.1.

[10] Field duplicate samples will be obtained at a frequency of one duplicate sample per ten water samples. A minimum of one duplicated sample will be submitted from each type of investigation (i.e., groundwater and stormwater).



Legend

Site Boundary

▨ Leased area to 7100 1st Avenue South, Seattle LLC from the Washington State Department of Transportation (WSDOT)

Former Underground Storage Tank (Removed)

Storm Drainage (Flows to Sanitary Sewer)

Storm Drainage (Sewer Flows to LDW)

LDW = Lower Duwamish Waterway

MW-1 ◉ Existing Monitoring Well

MW-1 ● Proposed Soil Boring/Monitoring Well

HA-1 Proposed Hand Auger Boring Location

DP-1 Proposed Direct-Push Soil Boring Location

CB-1 Proposed Catch Basin Sampling Location

OF-1 Proposed Stormwater Outfall Sample Location

SP-1 △ Proposed Seep Sample Location

SED-OF-1 ◉ Proposed Surface Sediment Sample Location

N
W E
S

100 0 100
FEET

Notes

1. The locations of all features shown are approximate.
2. Location of drain and conveyance features are unconfirmed and will be evaluated during RI.
3. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Reference: Aerial image from King County GIS, 2007. Storm drainage features from "Lower Duwamish Waterway, Early Action Area 2, Technical Memorandum: DMC Property Update," by Science Applications International Corporation (SAIC) dated April 2008.

Proposed Sampling Locations

7100 1st Avenue South Site
Seattle, Washington

GEOENGINEERS

Figure A-1

P:\0\0275015\01\CAD\Figures\027501501_Fig A-1 Work_Plan_SAP.dwg\TAB:Fig 18 modified by tmichaud on Dec 03, 2012 - 16:56

APPENDIX B
Quality Assurance Project Plan

Appendix B
Quality Assurance Project Plan (QAPP)

Remedial Investigation/Feasibility Study
7100 1st Avenue South Site
Agreed Order No. DE 8258

for
Washington State Department of Ecology
***on behalf of* 7100 1st Avenue S. Seattle, LLC**

February 15, 2013

GeoEngineers

Plaza 600 Building
600 Stewart Street, Suite 1700
Seattle, Washington 98101
206.728.2674

Table of Contents

LIST OF TABLES

LIST OF FIGURES

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) was developed for the Remedial Investigation (RI) sampling and analysis activities to be performed at the 7100 1st Avenue South Site (the "Site") located in Seattle, Washington (Figure B-1). This QAPP serves as the primary guide for the integration of quality assurance (QA) and quality control (QC) functions into the RI sampling and analysis activities. The QAPP presents the objectives, procedures, organization, and specific quality assurance and quality control activities designed to achieve data quality goals established for the project. Environmental measurements will be conducted to produce data that are scientifically valid, of known and acceptable quality and that meet established objectives. QA/QC procedures will be implemented so that the precision, accuracy, representativeness, completeness and comparability (PARCC) of the data generated meet the specified data quality objectives.

The RI is being conducted by 7100 1st Avenue S., Seattle LLC ("7100 LLC") to satisfy requirements of an Agreed Order (No. DE 8258) issued for the Site by the Washington State Department of Ecology (Ecology). The objectives of the RI are discussed in the Remedial Investigation/Feasibility Study (RI/FS) Work Plan (Work Plan; GeoEngineers, 2013). Sampling procedures are outlined in the Sampling and Analysis Plan (SAP) included as Appendix A of the Work Plan. A Site-specific Health and Safety Plan (HASP) will be used for RI field activities and is presented in Appendix C of the Work Plan.

The QAPP was prepared following the EPA Requirements for Quality Assurance Project Plans (EPA QA/R-5), Guidance for Quality Assurance Project Plans (USEPA, 2002), EPAs Contract Laboratory Program (USEPA, 2004) and guidelines and Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies (Ecology, 2004).

This QAPP is organized into the following sections:

- Section 1 – Introduction
- Section 2 – Project Management
- Section 3 – Problem Definition and Background
- Section 4 – Quality Objectives and Criteria
- Section 5 – Documentation and Records
- Section 6 – Data Generation and Acquisition
- Section 7 – Assessment and Oversight
- Section 8 – Data Validation and Usability
- Section 9 - References

2.0 PROJECT MANAGMENT

2.1. Project Organization and Responsibilities

Descriptions of the responsibilities, lines of authority and communication for the key positions providing quality assurance and quality control are shown in Figure 2-1. The project organization facilitates the efficient production of project work, allows for an independent quality review, and permits resolution of any QA issues.

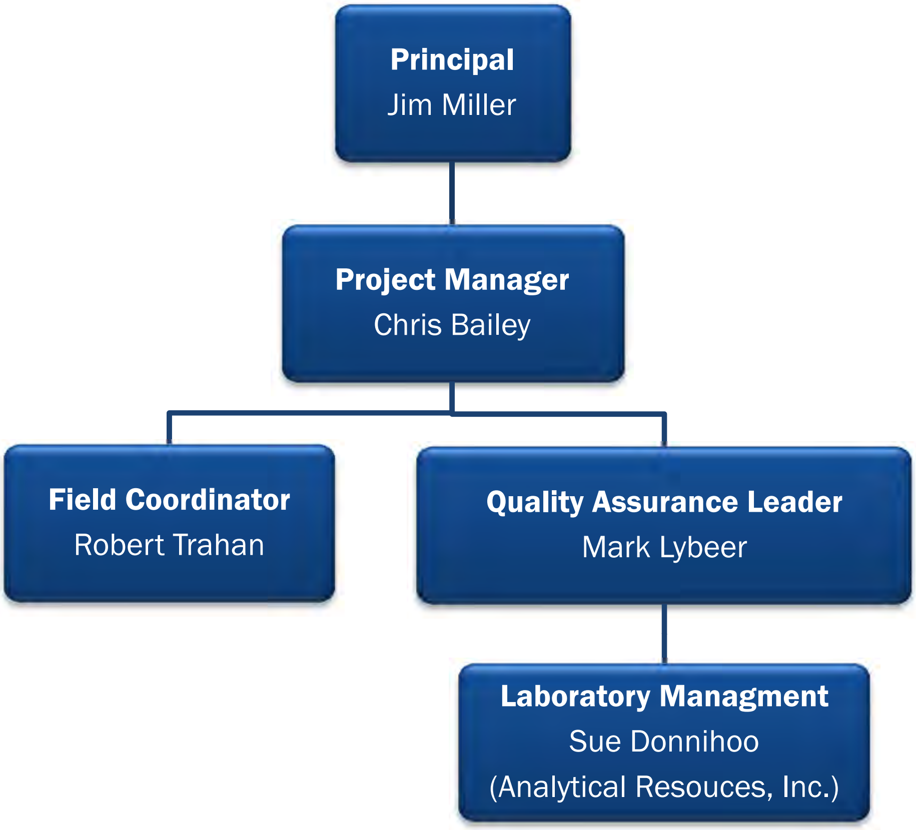


Figure 2-1. Project Organization Chart

2.1.1. Project Leadership and Management

The Principal–in-Charge is responsible for fulfilling contractual and administrative control of the project. The Principal-in-Charge's duties include defining the project approach and tasks, selecting project team members, establishing budgets and schedules, and technical review of deliverables. Jim Miller (425.861.6063) is the Principal-in Charge.

The Project Manager's duties consist of implementing the project approach and tasks, overseeing project team members during performance of project tasks, adhering to and communicating the status of budgets and schedules to the Principal-in-Charge, providing technical oversight, and providing overall production and review of project deliverables. Chris Bailey (206.239.3246) is the Project Manager for this RI.

2.1.2. Field Coordinator

The Field Coordinator is responsible for the daily management of activities in the field. Specific responsibilities include the following:

- Provides technical direction to the field staff.
- Coordinates data collection activities to be consistent with information requirements.
- Supervises the collection of field data and submittal of samples for laboratory analysis.
- Assures that field information is correctly and completely reported.
- Implements and oversees field investigations and sampling activities in accordance with commitments made in the RI Work Plan.
- Supervises field personnel.
- Coordinates work with on-site subcontractors.
- Schedules sample shipment with the analytical laboratory.
- Monitors that appropriate sampling, testing, and measurement procedures are followed.
- Coordinates the transfer of field data, sample tracking forms, and log books to the Project Manager for data reduction and validation.
- Participates in QA corrective actions as required.

The Field Coordinator for RI exploration activities at the Site is Robert Trahan (206.239.3253).

2.1.3. Quality Assurance Leader

The GeoEngineers project Quality Assurance Leader is under the direction of Chris Bailey and Jim Miller, who are responsible for the project’s overall QA. The Project QA Leader is responsible for coordinating QA/QC activities as they relate to chemical analytical data. The QA Leader has the following responsibilities:

- Serves as the official contact for laboratory data QA concerns.
- Reviews the implementation of the QAPP and the adequacy of the data generated from a quality perspective.
- Maintains the authority to implement corrective actions as necessary.
- Reviews and approves the laboratory QA Plan.
- Evaluates the laboratory's final QA report for any condition that adversely impacts data generation.
- Ensures that appropriate sampling, testing, and analysis procedures are followed and that correct quality control checks are implemented.
- Monitors laboratory compliance with data quality requirements.

The Project QA Leader is Mark Lybeer (206.239.3227).

2.1.4. Laboratory Management

The subcontracted laboratories conducting sample analyses for this project are required to obtain approval from the QA Leader before the initiation of sample analysis to assure that the laboratory QA plan complies with the project QA objectives. The Laboratory's QA Coordinator administers the Laboratory QA Plan and is responsible for QC. Specific responsibilities of this position include:

- Ensure implementation of the QA Plan.
- Serve as the laboratory point of contact.
- Activate corrective action for out-of-control events.
- Issue the final QA/QC report.
- Administer QA sample analysis.
- Ensure that the laboratory Method Reporting Limits (MRLs) are equal to or less than the Site-specific cleanup levels.
- Comply with the specifications established in the project plans as related to laboratory services.
- Participate in QA audits and compliance inspections.

The chemical analytical laboratory Quality Assurance Coordinators are Sue Donnihoo of Analytical Resources, Inc. (ARI; 206.695.3240) and Howard Holmes of Columbia Analytical Services (CAS; 360-577-7222).

2.1.5. Health and Safety

A Site-specific health and safety plan (HASP) will be used for RI field activities and is presented in Appendix C of the Work Plan. The Field Coordinator will be responsible for implementing the HASP during sampling activities. The Project Manager will discuss and evaluate health and safety issues with the Field Coordinator on a regular basis during the completion of field activities.

The Field Coordinator will conduct a tailgate safety meeting each morning before beginning daily field activities. The Field Coordinator will terminate any work activities that do not comply with the HASP. Companies providing services for this project on a subcontracted basis will be responsible for developing and implementing their own HASP, in conformance with the health and safety objectives contained in GeoEngineers' HASP.

3.0 PROBLEM DEFINITION AND BACKGROUND

Historical activities at the Site have included filling and industrial operations associated with sand and gravel batch production, school bus parking with auxiliary maintenance, servicing and fueling facilities and, cargo storage and freight management. Facilities located at the Site have included warehouse/garage and office buildings, fuel dispensers and underground storage tanks (USTs). Additionally, filling and industrial activities have also been performed on south adjacent properties.

Previous environmental investigations conducted at the Site by the 7100 LLC and other parties have identified detected concentrations of metals, volatile and semi-volatile organic compounds (VOCs and SVOCs) including polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and petroleum hydrocarbons, in soil and/or groundwater at the Site. Environmental studies completed by others within the adjacent Lower Duwamish Waterway (LDW) and Trotsky Inlet have identified detected concentrations of metals, SVOCs, PCBs, and petroleum hydrocarbons in sediments,

Soil and groundwater investigations will be completed to characterize the nature and extent of soil and groundwater contamination at the Site and to provide sufficient information to select a cleanup action, if necessary. A stormwater system investigation will also be completed to evaluate whether the storm water collection system at the Site is a potential transport mechanism for contaminants in Site soil and groundwater to the LDW.

3.1. Site Description and History

The Site is located in the northern portion of the South Park Industrial Area (7100 2nd Avenue Southwest), is triangular in shape and consists of 3.09 acres (Parcel No. 2924049090). The Site is zoned industrial and is bounded to the northeast by the LDW, to the south by the Trotsky Property (Parcel No. 2924049030) and the Early Action Area 2 Inlet (also known as the Trotsky Inlet), and to the west by 1st Avenue South (Figure B-1). The 1.2 acre property located between the Site and 1st Avenue South is currently being leased from the Washington State Department of Transportation (WSDOT). In addition to the Site, 7100 LLC also owns a small (0.04 acre) parcel (Parcel No. 6871200035) located on the south side of the Trotsky Inlet (Figure B-1). This property is currently vacant, and historic activities at the separate parcel are unrelated to the Site.

Additional information regarding Site conditions and history is presented in the Work Plan (GeoEngineers 2013).

3.2. Project Description and Schedule

Investigation activities will be completed within 12 months following Ecology's approval of the Final RI/FS Work Plan. Sampling and analysis at the Site will be performed to characterize the nature and extent of soil and groundwater contamination at the Site and to provide sufficient information to select a cleanup action, if necessary. The activities also include assessment of catch basin solids to evaluate whether the storm water collection system at the Site is a potential transport mechanism for contaminants in Soil and groundwater to the LDW. Proposed sample locations are shown on Figure 6 of the Work Plan. Selected samples will be submitted for chemical analysis to Analytical Resources Inc. (ARI) located in Tukwila, Washington and/or Columbia Analytical Services (CAS) for one or more of the following:

- Total and/or Dissolved Metals (arsenic, cadmium, copper, lead, mercury (soil), nickel, silver and zinc) by EPA Method 6000/7000 series, 200.7/200.8, 7470/7471.
- Total and dissolved Mercury in water by EPA Method 1631-E.
- SVOCs including PAHs by EPA Method 8270/SIM.

- VOCs by EPA Method 8260 (or BTEX only by EPA Method 8021).
- PCBs by EPA Method 8082.
- Pesticides by GS/MS/MS methods.
- Gasoline-range petroleum hydrocarbons by Ecology Method NWTPH-G.
- Diesel- and heavy oil-range petroleum hydrocarbons by Ecology Method NWTPH-Dx.Total organic carbon by EPA Method 9060.
- Chloride by EPA 300.0.
- Total dissolved solids by EPA Method 160.1.
- Dioxins/Furans by EPA Method 8290A (catch basin solids).

The chemical analyses to be performed are presented in Table 15 of the Work Plan. Sampling procedures are outlined in the SAP (Appendix B of the Work Plan).

4.0 QUALITY OBJECTIVES AND CRITERIA

The quality assurance objective for technical data is to collect environmental monitoring data of known, acceptable, and documentable quality. The QA objectives established for the project are:

- Implement the procedures outlined herein for field sampling, sample custody, equipment operation and calibration, laboratory analysis, and data reporting that will facilitate consistency and thoroughness of data generated.
- Achieve the acceptable level of confidence and quality required so that data generated are scientifically valid and of known and documented quality. This will be performed by establishing criteria for precision, accuracy, representativeness, completeness, and comparability, and by testing data against these criteria.

The sampling design, field procedures, laboratory procedures, and QC procedures are established to provide high-quality data for use in this project. Specific data quality factors that may affect data usability include quantitative factors (bias, detection limits, precision, accuracy and completeness) and qualitative factors (representativeness and comparability). The measurement quality objectives (MQO) associated with the data quality factors are summarized in Table B-1 and are discussed below.

4.1. Detection Limits

Analytical methods have quantitative limitations at a given statistical level of confidence that are often expressed as the method detection limit (MDL). Although results reported near the MDL provide insight to Site conditions, quality assurance dictates that analytical methods achieve a consistently reliable level of detection known as the practical quantitation limit (PQL), which is typically demonstrated with the lowest point of a linear calibration. The contract laboratory will provide numerical results for all analytes and report them as detected above the PQL or undetected at the PQL.

The reporting limits for Site Chemicals of Potential Concern (COPCs) are presented in Table B-2 for soil and catch basin solids and Table B-3 for groundwater. These reporting limits were obtained from an Ecology-certified laboratory (ARI and CAS.). The reporting limits presented in Tables B-2 and B-3 are the laboratory PQLs that are considered target reporting limits (TRLs) because several factors may influence final reporting limits. First, moisture and other physical conditions of soil affect detection limits. Second, analytical procedures may require sample dilutions or other practices to quantify a particular analyte at concentrations above the range of the instrument. The effect is that other analytes could be reported as undetected but at a value higher than a specified TRL. Data users must be aware that high non-detect values, although correctly reported, can bias statistical summaries and careful interpretation is required to correctly characterize Site conditions.

4.2. Precision

Precision is the measure of mutual agreement among replicate or duplicate measurements of an analyte from the same sample. The closer the measured values are to each other, the more precise the measurement process. Precision error may affect data usefulness. Good precision is indicative of relative consistency and comparability between different samples. Precision will be expressed as the relative percent difference (RPD) for spike sample comparisons of various matrices and field duplicate comparisons for soil and catch basin solids and water samples. This value is calculated by:

Where $$RPD(\%) = \frac{|D_1 - D_2|}{(D_1 + D_2)/2} X\ 100,$$

D_1 = Concentration of analyte in sample.

D_2 = Concentration of analyte in duplicate sample.

The calculation applies to split samples, replicate analyses, duplicate spiked environmental samples (matrix spike duplicates), and laboratory control duplicates. The RPD will be calculated for samples and compared to the applicable criteria. Precision can also be expressed as the percent difference (%D) between replicate analyses. Persons performing the evaluation must review one or more pertinent documents (USEPA, 1999; USEPA, 2004) that address criteria exceedances and courses of action. Project RPD goals for all analyses are 35 percent for water samples and 50 percent for soil and catch basin solids samples, unless the primary and duplicate sample results are less than 5 times the MRL, in which case RPD goals will not apply for data quality assessment purposes.

4.3. Accuracy

Accuracy is a measure of bias in the analytic process. The closer the measurement value is to the true value, the greater the accuracy. This measure is defined as the difference between the reported values versus the actual value and is often measured with the addition of a known compound to a sample. The amount of known compound reported in the sample, or percent recovery, assists in determining the performance of the analytical system in correctly quantifying the compounds of interest. Since most environmental data collected represent one point spatially and temporally rather than an average of values, accuracy plays a greater role than precision in assessing the results. In general, if the percent recovery is low, non-detect results may indicate that compounds of interest are not present when in fact these compounds are present. Detected compounds may be biased low or reported at a value less than actual environmental conditions. The reverse is true when recoveries are high; non-detect values are considered accurate while detected results may be higher than the true value.

For this project, accuracy will be expressed as the percent recovery of a known surrogate spike, matrix spike, or laboratory control sample (blank spike), concentration:

$$Recovery\,(\%) = \frac{Spiked\ Result - Unspiked\ Result}{Known\ Spike\,Concentration}\ X\ 100$$

Persons performing the evaluation must review one or more pertinent documents (USEPA, 1999; USEPA, 2004) that address criteria exceedances and courses of action. Accuracy criteria for surrogate spikes, matrix spikes, and laboratory control spikes are found in Table B-1 of this QAPP.

4.4. Representativeness

Representativeness expresses the degree to which data accurately and precisely represent the actual Site conditions. The determination of the representativeness of the data will be performed by completing the following:

- Comparing actual sampling procedures to those delineated within the SAP and this QAPP.
- Comparing analytical results of field duplicates to evaluate variations in the analytical results.
- Invalidating non-representative data or identifying data to be classified as questionable or qualitative.

Only representative data will be used in subsequent data reduction, validation, and reporting activities.

4.5. Completeness

Completeness establishes whether a sufficient amount of valid measurements were obtained to meet project objectives. The number of samples and results expected establishes the comparative basis for completeness. Completeness goals are 90 percent useable data for samples/analyses planned. If the completeness goal is not achieved an evaluation will be made to determine if the data are adequate to meet study objectives.

$$Completeness = \frac{number\ of\ valid\ measurements}{total\ number\ of\ data\ points\ planned}\ x\ 100$$

4.6. Comparability

Comparability expresses the confidence with which one set of data can be compared to another. Although numeric goals do not exist for comparability, a statement on comparability will be prepared to determine overall usefulness of data sets, following the determination of both precision and accuracy.

4.7. Holding Times

Holding times are defined as the time between sample collection and extraction, sample collection and analysis, or sample extraction and analysis. Some analytical methods specify a holding time for analysis only. For many methods, holding times may be extended by sample preservation techniques in the field. If a sample exceeds a holding time, then the results may be biased low. For example, if the extraction holding time for volatile analysis of soil sample is exceeded, then the possibility exists that some of the organic constituents may have volatilized from the sample or degraded. Results for that analysis would be qualified as estimated to indicate that the reported results may be lower than actual Site conditions. Holding times are presented in Table B-4.

4.8. Blanks

According to the *National Functional Guidelines for Organic Data Review* (USEPA, 1999), "The purpose of laboratory (or field) blank analysis is to determine the existence and magnitude of contamination resulting from laboratory (or field) activities. The criteria for evaluation of blanks apply to any blank associated with the samples (e.g., method blanks, instrument blanks, trip blanks, and equipment blanks)." Trip blanks are placed with samples during shipment and travel with samples from the laboratory to the field and back to the laboratory. Method blanks are created during sample preparation and follow samples throughout the analysis process.

Analytical results for blanks will be interpreted in general accordance with *National Functional Guidelines for Organic Data Review* (USEPA, 1999) and professional judgment.

4.9. Special Training Requirements/Certification

The Superfund Amendments and Reauthorization Act of 1986 required the Secretary of Labor to issue regulations providing health and safety standards and guidelines for workers engaged in hazardous waste operations. Occupational Safety and Health Administration (OSHA) regulations (29 CFR 1910.120) require training to provide employees with the knowledge and skills necessary to enable them to perform their jobs safely and with minimum risk to their personal health. All sampling personnel will have completed the 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training course and 8-hour refresher courses, as necessary, to meet OSHA regulations.

5.0 DOCUMENTATION AND RECORDS

5.1. Field observations

Field documentation provides important information about potential problems or special circumstances surrounding sample collection. Field personnel will maintain daily field logs. The field logs will be prepared on field report forms or in a bound logbook. Entries in the field logs and associated sample documentation forms will be made in waterproof ink, and corrections will consist of line-out deletions that are initialed and dated. Individual logbooks will become part of the project files at the conclusion of the field work.

At a minimum, the following information will be recorded during the collection of each sample or group of samples.

- Sample location and description
- Site or sampling area sketch showing sample location and measured distances
- Sampler's name(s)
- Date and time of sample collection
- Designation of sample as composite or discrete
- Sample matrix (soil, catch basin solids, or water)
- Type of sampling equipment used
- Field instrument (e.g., PID) readings
- Field observations and details that are pertinent to the integrity/condition of the samples (e.g., weather conditions, performance of the sampling equipment, sample depth control, sample disturbance, etc.)
- Preliminary sample descriptions (e.g., lithologies, field screening results)
- Sample preservation
- Sample transport/shipping arrangements
- Name of recipient laboratory

In addition to the sampling information, the following specific information also will be recorded in the field log for each day of sampling.

- Sampling team members
- Time of arrival/entry on Site and time of Site departure
- Other personnel present at the Site
- Summary of pertinent meetings or discussions with regulatory agency or contractor personnel
- Deviations from sampling plans, QAPP procedures, and HASP
- Changes in field personnel and responsibilities with reasons for the changes
- Levels of safety protection
- Calibration readings for any field instruments used

The handling, use, and maintenance of field log books are the Field Coordinator's responsibility.

5.2. Analytical chemistry records

Laboratories will be responsible for internal checks on data reporting and will correct errors identified during the QA review. All laboratories must be accredited by Ecology for the required analytical methods. Close contact will be maintained with the laboratories to resolve any quality control problems in a timely manner. The laboratories will be required to provide the following:

- **Project narrative –** This summary, in the form of a cover letter, will present any problems encountered during any aspect of analysis. The summary will include, but not be limited to, a discussion of QC, sample shipment, sample storage, and analytical difficulties. Any problems encountered by the laboratory, and their resolutions, will be documented in the project narrative.
- **Records –** Legible copies of the chain-of-custody (COC) forms will be provided as part of the data package. This documentation will include the time of receipt and the condition of each sample received by the laboratory. Additional internal tracking of sample custody by the laboratory will also be documented.
- **Sample results –** The data package will summarize the results for each sample analyzed. The summary will include the following information, as applicable:
    - Field sample identification code and the corresponding laboratory identification code
    - Sample matrix
    - Date of sample extraction/digestion
    - Date and time of analysis
    - Weight and/or volume used for analysis
    - Final dilution volumes or concentration factor for the sample
    - Total solids in the samples
    - Identification of the instruments used for analysis
    - Method detection limits (MDLs) and reporting limits (RLs)
    - All data qualifiers and their definitions
- **QA/QC summaries –** These summaries will contain the results of all QA/QC procedures. Each QA/QC sample analysis will be documented with the same information as that required for the sample results (see above). The laboratory will make no recovery or blank corrections. The required summaries are listed below.
    - The calibration data summary will contain the concentrations of the initial calibration and daily calibration standards and the date and time of analysis. The response factor, percent standard deviation (%RSD), RPDs, and retention time for each analyte will be listed, as appropriate. Results for standards analyzed at the RL to determine instrument sensitivity will be reported.
    - The internal standard area summary will report the internal standard areas, as appropriate.
    - The method blank analysis summary will report the method blank analysis associated with each sample and the concentrations of all compounds of interest identified in these blanks.

- The surrogate spike recovery summary will report all surrogate spike recovery data for organic analyses. The names and concentrations of all compounds added, percent recoveries, and QC limits will be listed.
- The matrix spike (MS) recovery summary will report the MS or MS duplicate (MSD) recovery data for analyses, as appropriate. The names and concentrations of all compounds added, percent recoveries, and QC limits will be included in the data package. The RPD for all MS/MSD analyses will be reported.
- The laboratory replicate summary will report the RPD for all laboratory replicate analyses. The QC limits for each compound or analyte will be listed.
- The laboratory control sample (LCS) analysis summary will report the results of the analyses of the LCS. The QC limits for each compound or analyte will be included in the data package.
- The relative retention time summary will report the relative retention times for the primary and confirmational columns of each analyte detected in the samples, as appropriate.

EQuIS four-file format electronic data deliverables will be obtained from the laboratory and data will be submitted into Ecology's Environmental Information Management (EIM) system after data quality assessments are completed.

5.3. Data reduction

Data reduction is the process by which original data are converted or reduced to a specified format or unit to facilitate the analysis of the data. For example, a final analytical concentration may need to be calculated from a diluted sample result. Data reduction requires that all aspects of sample preparation that could affect the test result, such as sample volume analyzed or dilutions required, be taken into account in the final result. The laboratory personnel will reduce the analytical data for review by the Quality Assurance Leader and Project Manager.

During chemical analysis, samples are occasionally diluted after the initial analysis if the estimated concentration curve for one or more of the target analytes is above the calibration curve. In these instances, concentrations from the initial analysis will be identified as the "best result" for all target analytes other than the chemical(s) that was originally above the calibration range. The "best result" for this qualified analyte(s) will be taken from the diluted sample.

6.0 DATA GENERATION AND ACQUISITION

6.1. Sample Process Design

6.1.1. Soil Investigation

The objectives of the soil investigation are to fill the data gaps presented in Section 5.0 of the Work Plan and to define the nature and extent of contamination in soil, where present at the Site. Soil sampling will be performed at 18 locations to collect samples representative of fill and/or native soil that may have been impacted by past Site activities. The proposed soil sample locations were positioned to collect soil samples to address identified data gaps and to provide comprehensive coverage of the Site. Information obtained from previous Site investigations was used to support selection of the proposed soil sample locations. The soil sampling locations are presented in Figure 19 of the Work Plan.

6.1.2. Groundwater Investigation

The objective of the groundwater investigation is to address the data gaps described in Section 5.0 of the Work Plan and to define the nature and extent of contamination in groundwater, where present. Groundwater sampling will be performed at 18 wells and 2 seep locations to collect samples representative of groundwater condition at the Site. Samples will be collected from existing Site monitoring wells MW-1 and MW-3 through MW-12 and proposed monitoring wells MW-2A and MW-13 through MW18 and submitted for chemical analysis. Samples of seep water will be collected at two locations (SP-1 and SEEP-1) along the Trotsky Inlet. Groundwater samples will be obtained using low-flow/low-turbidity sampling techniques to minimize the suspension of sediment in the samples. Procedures for monitoring well installation, well development, water level measurement and groundwater sample collection are described in the Sampling and Analysis Plan (Appendix A of the Work Plan).

Information obtained from previous Site investigations was used to support selection of the proposed groundwater sample locations. The groundwater sampling locations are presented in Figure 19 of the Work Plan.

6.1.2.1. HYDRAULIC CONDUCTIVITY TESTING AND 72-HOUR TIDAL STUDY

Hydraulic conductivity testing and a 14-day tidal study will be performed to characterize groundwater flow characteristics and gradients at the Site. The aquifer hydraulic conductivity will be estimated by conducting slug tests in selected monitoring wells at the Site. The 14-day tidal study will be conducted to evaluate elevation changes in Site groundwater in response to water level changes in the LDW. Water level elevation data will be collected every 15 minutes in selected monitoring wells at the Site.

6.1.3. Stormwater System Investigation

The objective of the stormwater system investigation is to evaluate whether the stormwater conveyance system (liquids and solids) is a potential pathway for contaminant migration from the Site to the LDW. Catch basin sampling will be performed at a minimum of one catch basin location (CB-5) to collect samples representative of material captured by the catch basin system. The catch basin locations are presented in Figure 19 of the Work Plan. In addition to the catch basin solids sampling, a sample of surface sediment will be collected from the vicinity of the stormwater discharge outfall to evaluate the potential for stormwater contaminants to impact surrounding LDW sediment. A sample of surface sediment (0 to 10cm depth) will be collected and analyzed for the same set of analytes as the samples of catch basin solids to allow comparison.

6.1.3.1. STORMWATER OUTFALL SAMPLING

The objective of the catch basin investigation is to evaluate whether the stormwater conveyance system (liquids and solids) is a potential pathway for contaminant migration from the Site to the LDW. Catch basin sampling will be performed at at least one catch basin location (CB-5) to collect samples representative of material captured by the catch basin system. The catch basin locations are presented in Figure 19 of the Work Plan. In addition to the catch basin solids sampling, a sample of surface sediment will be collected from the vicinity of the stormwater discharge outfall to evaluate the potential for stormwater contaminants to impact surrounding LDW sediment. A sample of surface sediment (0 to 10cm depth) and shallow subsurface sediment (10cm to 60cm depth) will be collected and analyzed for the same set of analytes as the samples of catch basin solids to allow comparison.

6.2. Sample Methods

6.2.1. Sampling Equipment and Decontamination Procedures

Soil samples will be collected using coring/drilling equipment (i.e., hollow stem auger) and hand tools including hand augers, stainless steel spoons and stainless steel mixing bowls. Groundwater samples will be collected from monitoring wells using submersible or peristaltic pumps and low-flow sampling procedures. Catch basin solids samples will be obtained using a stainless steel spoon or, where necessary, will be obtained using a sampler attached to an extension arm to reach into deeper catch basins.

Reusable sampling equipment that comes in contact with soil, catch basin solids or groundwater will be decontaminated before each use. Decontamination procedures for this equipment will consist of the following:

1. Washing with a brush and non-phosphate detergent solution (e.g., Liqui-Nox and distilled water),
2. Rinsing with distilled water, and
3. Wrapping or covering the decontaminated equipment with aluminum foil. Field personnel will limit cross-contamination by changing gloves between sampling locations.

Drilling equipment (auger and sample barrel) which comes into contact with soil will be decontaminated before each use. Decontamination procedures for this equipment will consist of the following:

1. Washing with pressurized hot-water,
2. Wash with brush and non-phosphate detergent solution, and
3. Rinse with potable water.

Wash water used to decontaminate the reusable sampling equipment will be collected and stored on-site in 55-gallon drums.

6.2.2. Field Screening Procedures

The potential presence of contamination in soil samples will be evaluated using field screening techniques. Field screening results will be recorded on the field logs and the results will be used as a general guideline to delineate areas of possible contamination. In addition, screening results will be used as a basis for selecting soil samples for chemical analysis. The following screening methods will be used: (1) visual screening; (2) water sheen screening; and (3) headspace vapor screening.

6.2.2.1. VISUAL SCREENING

The soil will be observed for unusual color and/or staining indicative of possible contamination.

6.2.2.2. WATER SHEEN SCREENING

Water sheen screening involves placing a portion of the soil sample in a pan containing distilled water, and observing the water surface for signs of sheen. This is a relatively sensitive, qualitative field screening method that can help identify the presence or absence of petroleum hydrocarbons and other contaminants, sometimes at concentrations lower than regulatory cleanup guidelines. The following sheen classifications will be used:

Classification	Identifier	Description
No Sheen	(NS)	No visible sheen on the water surface.
Slight Sheen	(SS)	Light, colorless, dull sheen; spotty to globular; spread is irregular, not rapid; sheen dissipates rapidly; areas of no sheen remain.
Moderate Sheen	(MS)	Light to heavy sheen; may have some color/iridescence; globular to stringy; spread is irregular to flowing, may be rapid; few remaining areas of no sheen on the water surface.
Heavy Sheen	(HS)	Heavy sheen with color/iridescence; stringy; spread is rapid; entire water surface may be covered with sheen; sheen flows off the sample.

6.2.2.3. HEADSPACE VAPOR SCREENING

This is a semi-quantitative field screening method that can help identify the presence or absence of volatile organic compounds (VOCs) in soil samples. A portion of the soil sample will be placed in a resealable plastic bag. The bag will then be sealed capturing air in the bag. The bag is then shaken gently to expose the soil to the air trapped in the bag. The bag will remain closed for approximately 5 minutes at ambient temperature before the headspace vapors are measured. Vapors present within the sample bag's headspace will be measured by inserting the probe of a photoionization detector (PID) through a small opening in the bag, taking care not to clog the probe with soil. The maximum PID reading (in parts per million [ppm]) and the ambient air temperature will be recorded on the field log for each sample. The PID will be calibrated to 100 ppm isobutylene each day prior to soil sampling. No soil sample used for headspace screening will be submitted to the laboratory for chemical analysis.

6.2.3. Sample Containers and Labeling

The Field Coordinator will establish field protocol to manage field sample collection, handling, and documentation. Soil,, catch basin solids and groundwater samples will be placed in appropriate laboratory-prepared containers. Sample containers and preservatives are listed in Table B-4.

Sample containers will be labeled with the following information at the time of sample collection:

- Project name and number
- Type of sample preservative used (where applicable)
- Sample name, which will include a reference to date and sampling depth (if applicable)
- Date and time of collection

The sample collection activities will be noted in the field log books. The Field Coordinator will monitor consistency between sample containers/labels, field log books, and chain-of-custody (COC) forms.

6.3. Sample Handling and Custody

6.3.1. Sample Storage

Samples will be placed in a cooler with ice after they are collected. The objective of the cold storage will be to attain a sample temperature of 2 to 6 degrees Celsius. Holding times (Table B-4) will be observed during sample storage.

6.3.2. Sample Shipment

Samples will be transported and delivered to the analytical laboratory in the sample coolers. The samples will either be transported by field personnel, laboratory personnel, or by courier service. The Field Coordinator will ensure that the cooler has been properly secured using clear plastic tape and custody seals.

6.3.3. Chain-of-Custody Records

Field personnel are responsible for the security of samples from the time the samples are collected until the samples have been received by the courier service or laboratory personnel. A COC form will be completed for each group of samples being shipped to the laboratory. Information to be included on the COC form includes:

- Project name and number;
- Sample identification numbers;
- Date and time of sampling;
- Sample matrix (soil, catch basin solids and groundwater), preservative, and number of containers for each sample;
- Analyses to be performed;
- Names of sampling personnel;
- Project manager name and contact information including phone number; and
- Shipping information including shipping container number, if applicable.

The original COC form will be signed by a member of the field team. Field personnel will retain copies and place the original and remaining copies in a plastic bag. The plastic bag containing the COC form will be placed in the cooler before sealing the cooler for transport to the laboratory.

6.3.4. Laboratory Custody Procedures

The laboratory will follow their standard operating procedures (SOPs) to document sample handling from time of receipt (sample log-in) to reporting. Documentation will include, at a minimum, the analyst's name or initials, time, and date.

6.4. Analytical Methods

The methods of chemical analysis are identified in Table B-2 and B-3. All methods selected represent standard methods used for the analysis of these analytes in soil, catch basin solids and groundwater. The laboratory project manager will determine the remedy to be used if the project RLs cannot be attained, in consultation with GeoEngineers Quality Assurance Leader.

6.5. Quality Control

Table B-5 summarizes the types and frequency of QC samples to be analyzed, including both field QC and laboratory QC samples.

6.5.1. Field Quality Control

Field QC samples serve as a control and check mechanism to monitor the consistency of field sampling methods and the potential influence of off-site factors on project samples. Examples of off-site factors include airborne VOCs and contaminants that may be present in potable water used during drilling activities. Table B-5 summarizes the types and frequency of field QC samples to be analyzed and the following sections discuss field QC samples.

6.5.1.1. FIELD DUPLICATES

Field duplicates serve as a measure for precision. Under ideal field conditions, field duplicates (sometimes referred to as splits), are created by thoroughly mixing a volume of the sample matrix, placing aliquots of the mixed sample in separate containers, and identifying one of the aliquots as the primary sample and the other as the duplicate sample. Field duplicates measure the precision and consistency of laboratory analytical procedures and methods, as well as the consistency of the sampling techniques used by field personnel.

One field duplicate will be collected for every ten soil samples obtained for each method of sample collection (i.e., direct-push, hollow-stem auger, and hand auger sampling). One field duplicate will be collected for every ten water samples for each method of sample collection (i.e., monitoring well and outfall samples). For catch basin samples, one field duplicate will be collected.

6.5.1.2. TRIP BLANKS

Trip blanks consist of samples of reagent water that accompany samples to be analyzed for VOCs during sample storage in coolers and transport to the laboratory. They are used to assess potential contamination of samples during collection and transport due to the presence of VOCs in ambient air.

Trip blanks will be analyzed on a one per cooler basis for groundwater samples only.

6.5.2. Laboratory Quality Control

Laboratory QC procedures will be evaluated through a formal data quality assessment process. The analytical laboratory will follow standard analytical method procedures that include specified QC monitoring requirements. These requirements will vary by method, but generally include:

- Method blanks
- Internal standards

- Instrument calibrations
- Matrix spike/matrix spike duplicates (MS/MSD)
- Laboratory control samples/laboratory control sample duplicates (LCS/LCSD)
- Laboratory replicates or duplicates
- Surrogate/Labeled compounds

6.5.2.1. LABORATORY BLANKS

Laboratory procedures utilize several types of blanks, but the most commonly used blanks for QC monitoring are method blanks. Method blanks are laboratory QC samples that consist of either a soil-like material having undergone a contaminant destruction process, or reagent (contaminant-free) water. Method blanks are extracted and analyzed with each batch of environmental samples undergoing analysis. Method blanks are particularly useful during volatiles analysis since VOCs can be transported in the laboratory through the vapor phase. If a substance is detected in a method blank, then one (or more) of the following occurred:

- Sample containers, measurement equipment, and/or analytical instruments were not properly cleaned and contained contaminants.
- Reagents used in the process were contaminated with a substance(s) of interest.
- Volatile substances in ambient laboratory air with high solubility or affinities toward the sample matrix contaminated the samples during preparation or analysis.

It is difficult to determine which of the above scenarios took place if blank contamination occurs. However, it is assumed that the conditions that affected the blanks also likely affected the project samples. If target analytes are detected in method blanks, data validation guidelines assist in determining which substances in project samples are considered “real,” and which ones are attributable to the analytical process. Furthermore, the guidelines state, “. . . there may be instances where little or no contamination was present in the associated blank, but qualification of the sample is deemed necessary. Contamination introduced through dilution water is one example.”

6.5.2.2. CALIBRATIONS

Several types of instrument calibrations are used, depending on the analytical method, to assess the linearity of the calibration curve and to assure that the sample results reflect accurate and precise measurements. The main calibrations used are initial calibrations, daily calibrations, and continuing calibration verification.

6.5.2.3. MATRIX SPIKE/MATRIX SPIKE DUPLICATES (MS/MSD)

MS/MSD samples are used to assess influences or interferences caused by the physical or chemical properties of the sample itself. For example, extreme pH can affect the results for semivolatile organic compounds. Or, the presence of a particular compound may interfere with accurate quantitation of another analyte. MS/MSD data is reviewed in combination with other QC monitoring data to determine matrix effects. In some cases, matrix effects cannot be determined due to dilution and/or high concentrations of related substances in the sample. A matrix spike is evaluated by spiking a project sample with a known amount of one or more of the target analytes, ideally at a concentration that is 5 to 10 times higher than the sample result. A percent recovery is then calculated by subtracting the un-spiked sample result from the spiked sample result, dividing by the known concentration of the spike, and multiplying by 100.

MS/MSD samples will be analyzed at a frequency of one MS/MSD per analytical batch. The samples for the MS/MSD analyses should be collected from a boring or sampling location that is believed to have only low-level contamination. A sample from an area of low-level contamination is needed because the objective of MS/MSD analyses is to determine the presence of matrix interferences, which can best be achieved with low levels of contaminants. Additional sample volume will be collected for the MS/MSD analyses as required by the laboratory.

6.5.2.4. LABORATORY CONTROL SAMPLE/ LABORATORY CONTROL SAMPLE DUPLICATES (LCS/LCSD)

Also known as blanks spikes, laboratory control samples (LCS) are similar to MS samples in that a known amount of one or more of the target analytes are spiked into a prepared sample medium, and a percent recovery of the spiked substances is calculated. The primary difference between LCS and MS samples is that the LCS uses a contaminant-free sample medium. For example, reagent water is typically used for LCS water analyses. The purpose of an LCS is to help assess the overall accuracy and precision of the analytical process including sample preparation, instrument performance, and analyst performance.

6.5.2.5. LABORATORY REPLICATES/DUPLICATES

Laboratories utilize MS/MSDs, LCS/LCSDs, and/or replicates to assess precision. Replicates are a second analysis of a field-collected environmental sample. Replicates can be split at varying stages of the sample preparation and analysis process and most commonly consist of a second analysis on the extracted media.

6.5.2.6. SURROGATES/LABELED COMPOUNDS

Surrogate spikes are used to verify proper extraction procedures and the accuracy of the analytical instrument. Surrogates are substances with characteristics similar to the target analytes. A known concentration of surrogate is added to the project sample and passed through the instrument and the percent recovery is calculated. Each surrogate used has acceptance limits (i.e., an acceptable range) for percent recovery. If a surrogate recovery is low, sample results may be biased low and depending on the recovery value, a possibility of false negatives may exist. Conversely, when recoveries are above the specified acceptance limits, a possibility of false positives exist, although non-detect results are considered accurate.

6.6. Instrument Testing, Inspection and Maintenance

The field coordinator will be responsible for overseeing the testing, inspection, and maintenance of all field equipment. The laboratory project manager will be responsible for laboratory equipment testing, inspection, and maintenance requirements. The calibration methods used in calibrating the analytical instrumentation are described in the following section.

6.7. Instrument Calibration and Frequency

6.7.1. Field Instrumentation

Field instrument calibration and calibration checks facilitate accurate and reliable field measurements. The calibration of field instruments used on the project will be checked and adjusted as necessary in general accordance with the manufacturer's recommendations. Methods and intervals of calibration checks and instrument maintenance will be based on the type of instrument, stability characteristics, required accuracy, intended use, and environmental conditions. The basic calibration check frequencies are described below.

The calibration of the PID used for headspace vapor screening will be checked at the start of each day it is used. If necessary (based on the calibration check results), the instrument will be calibrated in general accordance with the manufacturer's specifications. Calibration check and calibration results will be recorded in the field logbook.

6.7.2. *Laboratory Instrumentation*

For chemical analytical testing, calibration procedures will be performed in general accordance with the analytical methods used and the laboratory's SOPs. Calibration documentation will be retained at the laboratory.

All instrument calibrations and their appropriate chemical standards are to comply with the specific methods within EPA SW-846, Test Methods for Evaluating Solid Waste, Physical and Chemical Methods, 3rd Edition, December 1996 and the Laboratory SOPs. Calibration documentation, initial (ICALs) and continuing (CCALs), will be retained at the Laboratory.

6.8. Inspection of Supplies and Consumables

Supplies and consumables for the field sampling effort will be inspected upon delivery and accepted if the condition of the supplies is satisfactory. For example, jars will be inspected to ensure that they are the correct size and quantity and were not damaged in shipment.

6.9. Data Management

Laboratories will report data in formatted hardcopy and digital formats. Analytical laboratory measurements will be recorded in standard formats that display, at a minimum, the field sample identification, the laboratory identification, reporting units, data qualifiers, analytical method, analyte tested, analytical result, extraction and analysis dates, and quantitation limits. Each sample delivery group will be accompanied by sample receipt forms and a case narrative identifying data quality issues. Laboratory electronic data deliverable (EDD) requirements will be established by GeoEngineers, Inc. with the contract laboratory. The laboratory will send final analytical testing results to the Project Manager.

Chromatograms will be provided for samples analyzed using Ecology Method NWTPH-Gx, NWTPH-Dx. The laboratory will assure that the full height of all peaks appear on the chromatograms and that the same horizontal time scale is used to allow for comparisons to other chromatograms.

7.0 ASSESSMENT AND OVERSIGHT

7.1. Assessment and Response Actions

7.1.1. Review of Field Documentation and Laboratory Receipt Information

Documentation of field sampling data will be reviewed periodically for conformance with project QC requirements described in this QAPP. At a minimum, field documentation will be checked for proper documentation of the following:

- Sample collection information (date, time, location, matrices, etc.);
- Field instruments used and calibration data;
- Sample collection protocol;
- Sample containers, preservation, and volume;
- Field QC samples collected at the frequency specified;
- COC protocols; and
- Sample shipment information.

Sample receipt forms provided by the laboratory will be reviewed for QC exceptions. The final laboratory data package will describe (in the case narrative) the effects that any identified QC exceptions have on data quality. The laboratory will review transcribed sample collection and receipt information for correctness prior to delivering the final data package.

7.1.2. Response Actions for Field Sampling

The Field Coordinator, or a designee, will be responsible for correcting equipment malfunctions throughout the field sampling effort and resolving situations in the field that may result in nonconformance or noncompliance with the QAPP. All corrective measures will be documented in the field logbook.

7.1.3. Corrective Action for Laboratory Analyses

Laboratories are required to comply with their current written standard operating procedures. The laboratory project manager will be responsible for ensuring that appropriate corrective actions are initiated as required for conformance with this QAPP. All laboratory personnel will be responsible for reporting problems that may compromise the quality of the data to the laboratory project manager. A narrative describing the anomaly, the steps taken to identify and correct it, and the treatment of the relevant sample batch (i.e., recalculation, reanalysis, re-extraction) will be submitted with the data package.

8.0 DATA VALIDATION AND USABILITY

8.1. Data Review, Verification and Validation

The data validation and usability elements of the QAPP as detailed below address the QA/QC activities that occur after data collection and/or data generation is complete. Implementation of these elements ensures that the data conform to the specified criteria and will achieve the project objectives

The data are not considered final until validated. All data, including laboratory and field QC sample results, will be summarized in a data validation report. The data validation report will focus on data that did not meet the MQOs specified in Table B-1. The data validation reports will be included as an appendix to the final RI report. The data report will also describe any deviations from this QAPP and actions taken to address those deviations.

Level III laboratory data packages will be obtained for all soil, catch basin solids, groundwater and stormwater samples. These data will be reviewed for the following QC parameters:

- Holding times and sample preservation
- Method blanks
- MS/MSD analyses
- LCS/LCSD analyses
- Surrogate spikes
- Duplicates/replicates
- Field/Lab duplicates
- Calibrations (Initial and Continuing)
- Internal Standards
- Instrument Tunes

In addition to these QC parameters, other documentation such as sample receipt forms and case narratives will be reviewed to evaluate laboratory QA/QC.

Level IV laboratory data packages will be obtained for 10 percent of the samples submitted for chemical analysis for the 7100 Site RI investigation. These data will be validated in general conformance with EPA functional guidelines for data validation.

8.2. Verification and Validation Methods

Hard-copy laboratory reports will be method detection limit (MDL)-generated providing the analysis-specific information including final sample analytical results, reportable field and laboratory QA/QC analytical results, MDLs and MRLs. The laboratory data will also be reported via electronic media using the tabular outputting capabilities of standard software formats.

The term “reporting limit” will be used interchangeably with “quantitation limit” to mean the lowest concentration at which an analyte can be quantified subject to the quality control criteria of the analytical method. These terms are different from “MDL,” which refers to the lowest concentration that the analytical method can ideally detect.

Data validation qualifiers including “U,” “J,”, and “R” will be used following the reported laboratory results to explain data quality issues affecting the laboratory data to the data user. These qualifiers are explained as follows:

- “U” indicates that a compound was analyzed for but not detected. The associated numerical value is the estimated sample quantitation limit, which is corrected for dilution and percent moisture.
- “J” indicates that a compound was detected below the reporting limit and the value is estimated or the value was estimated by the validator because the of instrument bias reasons.
- If any target analytes are found in a laboratory method blank, it will be regarded as blank contamination. In these cases, the result of a given analyte in the method blank will be compared to any positive result of the same analyte in the associated field samples. If a field sample result is less than five times (ten times for common laboratory contaminants like acetone, phthalates, etc.) the result that is reported in the method blank, the result will be considered blank contamination. Accordingly, the result will be qualified as not-detected “U” at the elevated reporting limit.
- If there are two analyses reported by the laboratory for one sample (as in the case of dilutions), the validator will make a decision as to which analysis to use in the final assessment. As there should be only one reported result per analyte for a given sample, any extraneous results will be qualified as not-reportable “R” and will not be used.

8.3. Reconciliation with User Requirements

A data quality assessment will be conducted by the project Quality Assessment Leader to identify cases where the projects MQOs were not met.

9.0 REFERENCES

Science Applications International Corporation (SAIC), “Lower Duwamish Waterway, Early Action Area 2, Technical Memorandum: DMC Property Update,” April 2008.

City of Seattle, “Recommendation for Approval of Shoreline Substantial Development Permit Application No. SMA 78-41, Application by Robert Slater (Lynden Transport) for building addition for repair shop at 7100 2nd Avenue S.W., Seattle, WA,” City of Seattle Department of Community Development, Environmental Management Division, August 9, 1978.

GeoEngineers, Inc., (Draft Work Plan, Remedial Investigation/Feasibility Study, 7100 1st Avenue South Site, Ecology Agreed Order No. DE 8258,” GEI File No. 0275-015-01, February 6, 2012.

U.S. Environmental Protection Agency (USEPA). “USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review,” EPA-540/R-99/008, Office of Emergency and Remedial Response, US Environmental Protection Agency, Washington, DC, dated October 1999.

U.S. Environmental Protection Agency (USEPA). “Guidance for Quality Assurance Project Plans, EPA QA/R-5,” EPA-240/R-02/009, Office of Emergency and Remedial Response, US Environmental Protection Agency, Washington, DC, dated December 2002.

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Washington State Department of Ecology (Ecology), “Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies,” 04-03-030, dated July 2004.

Washington State Department of Ecology (Ecology), Agreed Order No. DE 8258. State of Washington Department of Ecology v. 7100 1st Ave S., LLC. Filed January 26, 2011.

Table B-1

Measurement Quality Objectives

Quality Assurance Project Plan

7100 1st Avenue S Site
Seattle, Washington

Laboratory Analysis	Reference Method[1]	Laboratory Control Sample (LCS) %R Limits[2,3]		Matrix Spike (MS) %R Limits[3]		Surrogate Standards (SS) %R Limits[2,3,4]	MS Duplicate Samples or Lab Duplicate RPD Limits[5]		Field Duplicate Samples RPD Limits[5]	
		Soil/Solids	**Water**	**Soil/Solids**	**Water**	**Soil/Solids/Water**	**Soil/Solids**	**Water**	**Soil/Solids**	**Water**
Total Metals[6]	EPA 200.8, 7470/7471	80%-120%	80%-120%	75%-125%	75%-125%	NA	≤20%	≤20%	≤50%	≤35%
Mercury in Water	EPA 1631-E [7]	NA	77%-123%	NA	71%-125%	NA	NA	≤24%	NA	≤24%
SVOCs	EPA 8270/SIM	30%-160%	30%-160%	30%-160%	30%-160%	30%-160%	≤40%	≤40%	≤40%	≤40%
VOCs	EPA 8260	30%-160%	30%-160%	30%-160%	30%-160%	30%-160%	≤40%	≤40%	≤40%	≤40%
PCB Aroclors	EPA 8082-Low Level	30%-160%	30%-160%	30%-160%	30%-160%	30%-160%	≤40%	≤40%	≤40%	≤40%
Gasoline-Range Hydrocarbons	Ecology NWTPH-Gx	50%-150%	50%-150%	NA	NA	50%-150%	≤30%	≤30%	≤50%	≤35%
Diesel- and Motor oil-range Hydrocarbons	Ecology NWTPH-Dx with acid/silica gel cleanup	50%-150%	50%-150%	50%-150%	50%-150%	50%-150%	≤40%	≤40%	≤50%	≤40%
Pesticides	GC/MS/MS[8]	50%-120%	50%-120%	50%-120%	50%-120%	NA	≤40%	≤30%	NA	NA
Conventionals (total organic carbons, grainsize, total dissolved solids, chloride)	PSEP, 1986/EPA 9060, SM 2540-D, EPA 300.0	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

[1] Method numbers refer to EPA SW-846 Analytical Methods or Washington State Department of Ecology (Ecology) recommended analytical methods.

[2] Recovery ranges are estimates. Actual ranges will be provided by the laboratory when contracted.

[3] Percent recovery limits are expressed as ranges based on laboratory control limits. Limits will vary for individual analytes.

[4] Individual surrogate recoveries are compound-specific

[5] RPD control limits are only applicable if the primary and duplicate sample concentrations are greater than 5 times the method reporting limit (MRL). For results less than 5 times the MRL, the difference between the primary and duplicate samples must be less than 2X the MRL for soils/sediments and 1X the MRL for waters.

[6] Metals to be analyzed include arsenic, cadmium, copper, lead, mercury, nickel, and zinc.

[7] Mercury in water to be analyzed by Columbia Analytical Services of Kelso Washington using EPA 1631-E Method.

[8] Organochlorine pesticides to be analyzed by Columbia Analytical Services of Kelso Washington using low level GC/MS/MS method.

SVOC = Semivolatile organic compounds

VOCs = Volatile organic compounds

PCBs = Polychlorinated biphenyls

PSEP = Puget Sound Estuary Program

PSEP = Puget Sound Estuary Program

GC/MS/MS = Gas Chromatograph/ Mass Spectroscopy/Mass Spectroscopy

Table B-2

Method of Analysis, Target Reporting and Quality Control Limits - Soil Samples and Catch Basin Solids

Quality Assurance Project Plan

7100 1st Avenue S Site
Seattle, Washington

Analyte	CAS Number	Analytical Method	Target Practical Quantitation Limit (PQL)[1]	Target Method Detection Limits (MDL)[1]
Metals (mg/kg)				
Arsenic	7440-38-2	EPA 200.8	0.20	0.0001
Cadmium	7440-43-9	EPA 200.8	0.10	0.00005
Chromium	7440-47-3	EPA 200.8	0.50	0.00025
Copper	7440-50-8	EPA 200.8	0.50	0.00025
Lead	7439-92-1	EPA 200.8	0.10	0.00005
Mercury	7439-97-6	EPA 7470/7471	0.025	0.0021
Nickel	7440-02-0	EPA 200.8	0.50	0.00025
Silver	7440-22-4	EPA 200.8	0.20	0.0001
Zinc	7440-66-6	EPA 200.8	4.00	0.002
Semivolatile Organic Compounds (SVOCs; mg/kg)				
1,2,4-Trichlorobenzene	120-82-1	EPA 8270	0.020	0.0038
1,2-Dichlorobenzene	95-50-1	EPA 8270	0.020	0.00296
1,2-Diphenylhydrazine	122-66-7	EPA 8270	0.02	0.00324
1,3-Dichlorobenzene	541-73-1	EPA 8270	0.020	0.0027
1,4-Dichlorobenzene	106-46-7	EPA 8270	0.020	0.0027
1-Methylnaphthalene	90-12-0	EPA 8270D-SIM	0.005	0.0017
2,3,4,6-Tetrachlorophenol	58-90-2	EPA 8270	0.020	0.00485
2,4,5-Trichlorophenol	95-95-4	EPA 8270	0.10	0.0211
2,4,6-Trichlorophenol	88-06-2	EPA 8270	0.10	0.0114
2,4-Dichlorophenol	120-83-2	EPA 8270	0.10	0.0183
2,4-Dimethylphenol	105-67-9	EPA 8270	0.020	0.0080
2,4-Dinitrophenol	51-28-5	EPA 8270	0.20	0.0499
2,4-Dinitrotoluene	121-14-2	EPA 8270	0.10	0.0194
2,6-Dinitrotoluene	121-14-2	EPA 8270	0.10	0.0151
2-Chloronaphthalene	91-58-7	EPA 8270	0.020	0.00292
2-Chlorophenol	95-57-8	EPA 8270	0.020	0.00479
2-Methylnaphthalene	91-57-6	EPA 8270D-SIM	0.005	0.00136
2-Methylphenol (o-Cresol)	95-48-7	EPA 8270	0.020	0.00534
2-Nitroaniline	88-74-4	EPA 8270	0.10	0.0187
2-Nitrophenol	88-75-5	EPA 8270	0.020	0.0095
3,3'-Dichlorobenzidine	91-94-1	EPA 8270	0.10	0.0543
3-Nitroaniline	99-09-2	EPA 8270	0.10	0.0252
4,6-Dinitro-2-methylphenol	534-52-1	EPA 8270	0.20	0.0412
4-Bromophenyl-phenylether	101-55-3	EPA 8270	0.020	0.00379
4-Chloro-3-methylphenol	59-50-7	EPA 8270	0.10	0.0152
4-Chloroaniline	106-47-8	EPA 8270	0.10	0.0244
4-Chlorophenyl-phenylether	7005-72-3	EPA 8270	0.020	0.00296
4-Methylphenol (p-Cresol)	106-44-5	EPA 8270	0.020	0.0048
4-Nitroaniline	100-01-6	EPA 8270	0.10	0.0229
4-Nitrophenol	100-02-7	EPA 8270	0.10	0.0281
Acenaphthene	83-32-9	EPA 8270D-SIM	0.0050	0.00208
Acenaphthylene	208-96-8	EPA 8270D-SIM	0.0050	0.0011
Aniline	62-53-3	EPA 8270	0.020	0.0018
Anthracene	120-12-7	EPA 8270	0.020	0.00437
Benzidine	92-87-5	EPA 8270	0.20	
Benzo[a]anthracene	56-55-3	EPA 8270D-SIM	0.0050	0.00137

Table B-2

Method of Analysis, Target Reporting and Quality Control Limits - Soil Samples and Catch Basin Solids

Quality Assurance Project Plan

7100 1st Avenue S Site
Seattle, Washington

Analyte	CAS Number	Analytical Method	Target Practical Quantitation Limit (PQL)[1]	Target Method Detection Limits (MDL)[1]
Benzo[a]pyrene	50-32-8	EPA 8270D-SIM	0.0050	0.94
Benzo[b]fluoranthene	205-99-2	EPA 8270D-SIM	0.0050	0.0025
Benzo[g,h,i]perylene	191-24-2	EPA 8270D-SIM	0.0050	0.004
Benzo[k]fluoranthene	207-08-9	EPA 8270D-SIM	0.0050	0.0025
Benzoic acid	65-85-0	EPA 8270	0.20	0.0426
Benzyl alcohol	100-51-6	EPA 8270	0.10	0.0461
Bis(2-chloro-1-methylethyl)ether	108-60-1	EPA 8270	0.020	0.0030
bis(2-Chloroethoxy)methane	111-91-1	EPA 8270	0.020	0.0024
bis(2-chloroethyl)ether	111-44-4	EPA 8270	0.020	0.00527
bis(2-Chloroisopropyl)ether	39638-32-9	EPA 8270	0.020	0.00295
bis(2-Ethylhexyl)phthalate	117-81-7	EPA 8270	0.020	0.00873
Butylbenzylphthalate	85-68-7	EPA 8270	0.020	0.00411
Carbazole	86-74-8	EPA 8270	0.020	0.00238
Chrysene	218-01-9	EPA 8270D-SIM	0.0050	0.00169
Dibenz[a,h]anthracene	53-70-3	EPA 8270D-SIM	0.0050	0.004
Dibenzofuran	132-64-9	EPA 8270	0.020	0.00315
Diethylphthalate	84-66-2	EPA 8270	0.020	0.00375
Dimethylphthalate	131-11-3	EPA 8270	0.020	0.00372
Di-n-butylphthalate	84-74-2	EPA 8270	0.020	0.00468
Di-n-octylphthalate	117-84-0	EPA 8270	0.020	0.00522
Fluoranthene	206-44-0	EPA 8270	0.020	0.00438
Fluorene	86-73-7	EPA 8270D-SIM	0.0050	0.00126
Hexachlorobenzene	118-74-1	EPA 8270	0.020	0.00338
Hexachlorobutadiene	87-68-3	EPA 8270	0.020	0.0029
Hexachlorocyclopentadiene	77-47-4	EPA 8270	0.10	0.0124
Hexachloroethane	67-72-1	EPA 8270	0.020	0.0049
Indeno[1,2,3-c,d]pyrene	193-39-5	EPA 8270D-SIM	0.0050	0.004
Isophorone	78-59-1	EPA 8270	0.020	0.0027
Naphthalene	91-20-3	EPA 8270D-SIM	0.0050	0.00168
n-Decane	124-18-5	EPA 8270	0.020	0.0033
Nitrobenzene	98-95-3	EPA 8270	0.020	0.0038
n-Nitrosodimethylamine	62-75-9	EPA 8270	0.020	0.0128
n-Nitroso-di-n-propylamine	621-64-7	EPA 8270	0.020	0.0028
n-Nitrosodiphenylamine	86-30-6	EPA 8270	0.020	0.0128
n-Octadecane	593-45-3	EPA 8270	0.020	0.0043
Pentachlorophenol	87-86-5	EPA 8270	0.10	0.0274
Phenanthrene	85-01-8	EPA 8270D-SIM	0.0050	0.00163
Phenol	108-95-2	EPA 8270	0.020	0.0038
Pyrene	129-00-0	EPA 8270D-SIM	0.0050	0.00106
Pyridine	110-86-1	EPA 8270	0.10	0.0200
Volatile Organic Compounds (VOCs; mg/kg)				
1,1,1,2-Tetrachloroethane	630-20-6	EPA 8260C	0.0010	0.000233
1,1,1-Trichloroethane	71-55-6	EPA 8260C	0.0010	0.000226
1,1,2,2-Tetrachloroethane	79-34-5	EPA 8260C	0.0010	0.000253
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	EPA 8260C	0.0020	0.000287
1,1,2-Trichloroethane	79-00-5	EPA 8260C	0.0010	0.000286
1,1-Dichloroethane	75-34-3	EPA 8260C	0.0010	0.000203

Table B-2

Method of Analysis, Target Reporting and Quality Control Limits - Soil Samples and Catch Basin Solids

Quality Assurance Project Plan

7100 1st Avenue S Site
Seattle, Washington

Analyte	CAS Number	Analytical Method	Target Practical Quantitation Limit (PQL)[1]	Target Method Detection Limits (MDL)[1]
1,1-Dichloroethene	75-35-4	EPA 8260C	0.0010	0.000336
1,1-Dichloropropene	563-58-6	EPA 8260C	0.0010	0.000312
1,2,3-Trichlorobenzene	87-61-6	EPA 8260C	0.0050	0.000305
1,2,3-Trichloropropane	96-18-4	EPA 8260C	0.0020	0.000517
1,2,4-Trichlorobenzene	120-82-1	EPA 8260C	0.0050	0.000332
1,2,4-Trimethylbenzene	95-63-6	EPA 8260C	0.0010	0.00023
1,2-Dibromo-3-Chloropropane	96-12-8	EPA 8260C	0.0050	0.000586
1,2-Dibromoethane	106-93-4	EPA 8260C	0.0010	0.000176
1,2-Dichlorobenzene	95-50-1	EPA 8260C	0.0010	0.000293
1,2-Dichloroethane	107-06-2	EPA 8260C	0.0010	0.000191
1,2-Dichloropropane	78-87-5	EPA 8260C	0.0010	0.000162
1,3,5-Trimethylbenzene	108-67-8	EPA 8260C	0.0010	0.000254
1,3-Dichlorobenzene	541-73-1	EPA 8260C	0.0010	0.000227
1,3-Dichloropropane	142-28-9	EPA 8260C	0.0010	0.000209
1,4-Dichlorobenzene	106-46-7	EPA 8260C	0.0010	0.000232
2,2-Dichloropropane	594-20-7	EPA 8260C	0.0010	0.000292
2-Butanone*	78-93-3	EPA 8260C	0.0050	0.000513
2-Chloroethyl Vinyl Ether	110-75-8	EPA 8260C	0.0050	0.000276
2-Chlorotoluene	95-49-8	EPA 8260C	0.0010	0.0003
2-Hexanone*	591-78-6	EPA 8260C	0.0050	0.000439
4-Chlorotoluene	106-43-4	EPA 8260C	0.0010	0.000277
4-Isopropyl Toluene	99-87-6	EPA 8260C	0.0010	0.000236
4-Methyl-2-Pentanone*	108-10-1	EPA 8260C	0.0050	0.00042
Acetone*	67-64-1	EPA 8260C	0.0050	0.000482
Acrolein*	107-02-8	EPA 8260C	0.050	0.003809
Acrylonitrile	107-13-1	EPA 8260C	0.0050	0.001026
Benzene	71-43-2	EPA 8260C	0.0010	0.000296
Bromobenzene	108-86-1	EPA 8260C	0.0010	0.000153
Bromochloromethane	74-97-5	EPA 8260C	0.0010	0.000323
Bromodichloromethane	75-27-4	EPA 8260C	0.0010	0.000254
Bromoethane	3675-63-6	EPA 8260C	0.0020	0.00044
Bromoform	75-25-2	EPA 8260C	0.0010	0.000297
Bromomethane	74-83-9	EPA 8260C	0.0010	0.000187
Carbon Disulfide	75-15-0	EPA 8260C	0.0010	0.000559
Carbon Tetrachloride	56-23-5	EPA 8260C	0.0010	0.000213
Chlorobenzene	108-90-7	EPA 8260C	0.0010	0.000219
Chloroethane	75-00-3	EPA 8260C	0.0010	0.000462
Chloroform	67-66-3	EPA 8260C	0.0010	0.000234
Chloromethane	74-87-3	EPA 8260C	0.0010	0.000263
cis-1,2-Dichloroethene	156-59-2	EPA 8260C	0.0010	0.00024
cis-1,3-Dichloropropene	10061-01-5	EPA 8260C	0.0010	0.000226
Dibromochloromethane	124-48-1	EPA 8260C	0.0010	0.000266
Dibromomethane	74-95-3	EPA 8260C	0.0010	0.000147
Dichlorodifluoromethane	75-71-8	EPA 8260C	0.0010	0.000207

Table B-2

Method of Analysis, Target Reporting and Quality Control Limits - Soil Samples and Catch Basin Solids

Quality Assurance Project Plan

7100 1st Avenue S Site
Seattle, Washington

Analyte	CAS Number	Analytical Method	Target Practical Quantitation Limit (PQL)[1]	Target Method Detection Limits (MDL)[1]
Ethyl Benzene	100-41-4	EPA 8260C	0.0010	0.000202
Hexachloro-1,3-Butadiene	87-68-3	EPA 8260C	0.0050	0.00041
Iodomethane	74-88-4	EPA 8260C	0.0010	0.000215
Isopropyl Benzene	98-82-8	EPA 8260C	0.0010	0.000233
m,p-Xylene	179601-23-1	EPA 8260C	0.0010	0.000392
Methylene Chloride	75-09-2	EPA 8260C	0.0020	0.000635
Methyl-t-butyl ether (MTBE)	1634-04-4	EPA 8260C	0.0010	0.000231
Naphthalene	91-20-3	EPA 8260C	0.0050	0.000429
n-Butylbenzene	104-51-8	EPA 8260C	0.0010	0.000262
n-Propyl Benzene	103-65-1	EPA 8260C	0.0010	0.000272
o-Xylene	95-47-6	EPA 8260C	0.0010	0.000224
s-Butylbenzene	135-98-8	EPA 8260C	0.0010	0.00024
Styrene	100-42-5	EPA 8260C	0.0010	0.000138
t-Butylbenzene	98-06-6	EPA 8260C	0.0010	0.000306
Tetrachloroethene	127-18-4	EPA 8260C	0.0010	0.000257
Toluene	108-88-3	EPA 8260C	0.0010	0.000151
trans-1,2-Dichloroethene	156-60-5	EPA 8260C	0.0010	0.000266
trans-1,3-Dichloropropene	10061-02-6	EPA 8260C	0.0010	0.000216
trans-1,4-Dichloro-2-Butene	110-57-6	EPA 8260C	0.0050	0.000437
Trichloroethene	79-01-6	EPA 8260C	0.0010	0.000212
Trichlorofluoromethane	75-69-4	EPA 8260C	0.0010	0.000266
Vinyl Acetate	108-05-4	EPA 8260C	0.0050	0.000381
Vinyl Chloride	75-01-4	EPA 8260C	0.0010	0.000235
Polychlorinated Biphenyls (PCBs; mg/kg)				
Aroclor 1016	12674-11-2	EPA 8082-Low Level	0.0040	0.0020
Aroclor 1242	53469-21-9	EPA 8082-Low Level	0.0040	0.0020
Aroclor 1248	12672-29-6	EPA 8082-Low Level	0.0040	0.0020
Aroclor 1254	11097-69-1	EPA 8082-Low Level	0.0040	0.0020
Aroclor 1260	11096-82-5	EPA 8082-Low Level	0.0040	0.0020
Total PCBs (sum of Aroclors)	12767-79-2	EPA 8082-Low Level	0.0100	na
Total Petroleum Hydrocarbons (mg/kg)				
Gasoline-Range	NA	NWTPH-G	0.0050	0.0025
Diesel-Range	NA	NWTPH-Dx	5.0	0.742
Heavy Oil-Range	NA	NWTPH-Dx	10.0	1.31

Table B-2

Method of Analysis, Target Reporting and Quality Control Limits - Soil Samples and Catch Basin Solids

Quality Assurance Project Plan

7100 1st Avenue S Site
Seattle, Washington

Analyte	CAS Number	Analytical Method	Target Practical Quantitation Limit (PQL)^1	Target Method Detection Limits (MDL)^1
Pesticides (mg/kg)				
2,4'-DDD	53-19-0	GC/MS/MS	0.00010	0.000040
2,4'-DDE	3424-82-6	GC/MS/MS	0.00010	0.000040
2,4'-DDT	789-02-6	GC/MS/MS	0.00010	0.000040
4,4'-DDD	72-54-8	GC/MS/MS	0.00010	0.000040
4,4'-DDE	72-55-9	GC/MS/MS	0.00010	0.000040
4,4'-DDT	50-29-3	GC/MS/MS	0.00010	0.000040
alpha-BHC	319-84-6	GC/MS/MS	0.00010	0.000040
Aldrin	309-00-2	GC/MS/MS	0.00010	0.000040
alpha-Chlordane	5103-71-9	GC/MS/MS	0.00010	0.000040
beta-BHC	319-85-7	GC/MS/MS	0.00010	0.000040
Chlorpyrifos	2921-88-2	GC/MS/MS	0.00010	0.000040
cis-Nonachlor	5103-73-1	GC/MS/MS	0.00020	0.000040
delta-BHC	319-86-8	GC/MS/MS	0.00010	0.000040
Dieldrin	60-57-1	GC/MS/MS	0.00020	0.000200
Endosulfan I	959-98-8	GC/MS/MS	0.00020	0.000200
Endosulfan II	33213-65-9	GC/MS/MS	0.00020	0.000200
Endosulfan Sulfate	1031-07-8	GC/MS/MS	0.00010	0.000040
Endrin	72-20-8	GC/MS/MS	0.00020	0.000200
Endrin Aldrhyde	7421-93-4	GC/MS/MS	0.00020	0.000200
Endrin Ketone	53494-70-5	GC/MS/MS	0.00020	0.000200
gamma-BHC	58-89-9	GC/MS/MS	0.00010	0.000040
gamma-Chlordane	5566-34-7	GC/MS/MS	0.00010	0.000040
Heptachlor	76-44-8	GC/MS/MS	0.00010	0.000040
Heptachlor Epoxide	1024-57-3	GC/MS/MS	0.00010	0.000040
Hexachlorobenzene	118-74-1	GC/MS/MS	0.00010	0.000040
Isodrin	465-73-6	GC/MS/MS	0.00010	0.000040
Methoxychlor	72-43-5	GC/MS/MS	0.00010	0.000040
Mirex	2385-85-5	GC/MS/MS	0.00010	0.000040
Octachlorostyrene	29082-74-4	GC/MS/MS	0.00010	0.000040
Oxychlordane	27304-13-8	GC/MS/MS	0.00020	0.000200
trans-Nonachlor	39765-80-5	GC/MS/MS	0.00010	0.000040

Notes:

[1] Quantitation limits for metals, VOCs, PAHs, PCBs and petroleum hydrocarbons are provided by Analytical Resources Inc. of Tukwila, Washington.

Quantitation limits for pesticides and mercury are provided by Columbia Analytical of Kelso, Washington.

EPA = U.S. Environmental Protection Agency
SIM = Selective ion monitoring
PCBs = Polychlorinated biphenyls
GC/MS/MS = Gas Chromatograph/ Mass Spectroscopy/Mass Spectroscopy
mg/kg = Milligrams per kilogram
ug/kg = Micrograms per kilogram

Table B-3

Method of Analysis, Target Reporting and Quality Control Limits - Groundwater and Surface Water Samples

Quality Assurance Project Plan

7100 1st Avenue S Site
Seattle, Washington

Analyte	CAS Number	Analytical Method	Target Practical Quantitation Limit (PQL)[1]	Target Method Detection Limits (MDL)[1]
Metals (μg/L)				
Arsenic	7440-38-2	EPA 200.8	0.20	0.048
Cadmium	7440-43-9	EPA 200.8	0.10	0.01
Chromium	7440-47-3	EPA 200.8	0.50	0.045
Copper	7440-50-8	EPA 200.8	0.50	0.158
Lead	7439-92-1	EPA 200.8	0.10	0.046
Mercury	7439-97-6	EPA 1631-E	0.0010	0.00006
Nickel	7440-02-0	EPA 200.8	0.50	0.079
Silver	7440-22-4	EPA 200.8	0.20	0.008
Zinc	7440-66-6	EPA 200.8	4.0	0.497
Semivolatile Organic Compounds (SVOCs; ug/L)				
1,2,4,5-Tetrachlorobenzene	95-94-3	EPA 8270	1.0	0.178
1,2,4-Trichlorobenzene	120-82-1	EPA 8270	1.0	0.479
1,2-Dichlorobenzene	95-50-1	EPA 8270	1.0	0.400
1,3-Dichlorobenzene	541-73-1	EPA 8270	1.0	0.406
1,4-Dichlorobenzene	106-46-7	EPA 8270	1.0	0.418
1,4-Dioxane**	123-91-1	EPA 8270	2.0	0.211
1-methylnaphthalene	90-12-0	EPA 8270D-SIM	0.010	0.00443
2,2'-oxybis(1-Chloropropane)	540-54-5	EPA 8270	1.0	0.541
2,3,4,6-Tetrachlorophenol	58-90-2	EPA 8270	1.0	0.153
2,4,5-Trichlorophenol	95-95-4	EPA 8270	5.0	0.665
2,4,6-Trichlorophenol	88-06-2	EPA 8270	5.0	0.845
2,4-Dichlorophenol	120-83-2	EPA 8270	5.0	0.965
2,4-Dimethylphenol	105-67-9	EPA 8270	1.0	0.176
2,4-Dinitrophenol	51-28-5	EPA 8270	10.0	1.147
2,4-Dinitrotoluene	121-14-2	EPA 8270	5.0	1.025
2,6-Dinitrotoluene	606-20-2	EPA 8270	5.0	0.922
2-Benzyl-4-Chlorophenol	120-32-1	EPA 8270	1.0	0.111
2-Chloronaphthalene	91-58-7	EPA 8270	1.0	0.507
2-Chlorophenol	95-57-8	EPA 8270	1.0	0.254
2-Methylnaphthalene	91-57-6	EPA 8270D-SIM	0.010	0.00689
2-Methylphenol	95-48-7	EPA 8270	1.0	0.227
2-Nitroaniline	88-74-4	EPA 8270	5.0	0.680
2-Nitrophenol	88-75-5	EPA 8270	5.0	1.059
3,3'-Dichlorobenzidine	91-94-1	EPA 8270	5.0	0.946
3-Nitroaniline	99-09-2	EPA 8270	5.0	0.851
3,4,5-Trichloroguaiacol	57057-83-7	EPA 8270	1.0	0.178
3,4,6-Trichloroguaiacol	60712-44-9	EPA 8270	1.0	0.0740
3,4-Dichloroguaiacol	77102-94-4	EPA 8270	1.0	0.238
4,5,6-Trichloroguaiacol	2668-24-8	EPA 8270	1.0	0.0930
4,5-Dichloroguaiacol	2460-49-3	EPA 8270	1.0	0.557
4,6-Dichloroguaiacol	16766-31-7	EPA 8270	1.0	0.486
4,6-Dinitro-2-methylphenol	534-52-1	EPA 8270	10.0	1.04
4-Bromophenyl-phenylether	101-55-3	EPA 8270	1.0	0.397
4-Chloro-3-methylphenol	59-50-7	EPA 8270	5.0	0.962
4-Chloroaniline	106-47-8	EPA 8270	5.0	0.850
4-Chloroguaiacol	16766-30-6	EPA 8270	0.50	0.126

Table B-3

Method of Analysis, Target Reporting and Quality Control Limits - Groundwater and Surface Water Samples

Quality Assurance Project Plan

7100 1st Avenue S Site
Seattle, Washington

Analyte	CAS Number	Analytical Method	Target Practical Quantitation Limit (PQL)[1]	Target Method Detection Limits (MDL)[1]
4-Chlorophenyl-phenylether	7005-72-3	EPA 8270	1.0	0.176
4-Methylphenol	106-44-5	EPA 8270	1.0	0.185
4-Nitroaniline	100-01-6	EPA 8270	5.0	1.041
4-Nitrophenol	100-02-7	EPA 8270	5.0	0.568
Acenaphthene	83-32-9	EPA 8270D-SIM	0.010	0.00671
Acenaphthylene	208-96-8	EPA 8270D-SIM	0.010	0.00128
Acetophenone	98-86-2	EPA 8270	1.0	0.502
alpha-Terpineol	10482-56-1	EPA 8270	1.0	0.420
Aniline	62-53-3	EPA 8270	1.0	0.228
Anthracene	120-12-7	EPA 8270D-SIM	0.010	0.00280
Azobenzene (1,2-DP-Hydrazine)	103-33-3	EPA 8270	1.0	0.189
Benzidine	92-87-5	EPA 8270	3.230	10.0
Benzo(a)anthracene	56-55-3	EPA 8270D-SIM	0.010	0.00320
Benzo(a)pyrene	50-32-8	EPA 8270D-SIM	0.010	0.00505
Benzo(g,h,i)perylene	191-24-2	EPA 8270D-SIM	0.010	0.00508
Benzofluoranthene(s)	207-08-9	EPA 8270D-SIM	0.020	0.00496
Benzoic acid	65-85-0	EPA 8270	10.0	0.819
Benzyl alcohol	100-51-6	EPA 8270	5.0	0.652
Biphenyl	92-52-4	EPA 8270	1.0	0.184
Bis(2-Chloroethoxy)methane	111-91-1	EPA 8270	1.0	0.420
Bis(2-Chloroethyl)ether	111-44-4	EPA 8270	1.0	0.456
bis(2-Ethylhexyl)phthalate	117-81-7	EPA 8270	1.0	0.152
Butylbenzylphthalate	85-68-7	EPA 8270	1.0	0.153
Butyl Diphenyl Phosphate	2752-95-6	EPA 8270	1.0	0.267
Butylatedhydroxytoluene (BHT)	128-37-0	EPA 8270	1.0	0.285
Carbaryl	63-25-2	EPA 8270	2.0	0.142
Carbazole	86-74-8	EPA 8270	1.0	0.103
Chrysene	218-01-9	EPA 8270D-SIM	0.010	0.0037
Dibenzo(a,h)anthracene	53-70-3	EPA 8270D-SIM	0.010	0.00159
Dibenzofuran	132-64-9	EPA 8270D-SIM	0.010	0.0057
Dibutyl Phenyl Phosphate	2528-36-1	EPA 8270	1.0	0.188
Diethylphthalate	84-66-2	EPA 8270	1.0	0.417
Dimethylphthalate	131-11-3	EPA 8270	1.0	0.408
Di-n-butylphthalate	84-74-2	EPA 8270	1.0	0.189
Di-n-octylphthalate	117-84-0	EPA 8270	1.0	0.194
Diphenyl Oxide	101-84-8	EPA 8270	1.0	0.196
Fluoranthene	206-44-0	EPA 8270D-SIM	0.010	0.0093
Fluorene	86-73-7	EPA 8270D-SIM	0.010	0.0062
Guaiacol	90-05-1	EPA 8270	1.0	0.119
Hexachlorobenzene	118-74-1	EPA 8270	1.0	0.194
Hexachlorobutadiene	87-68-3	EPA 8270	1.0	0.348
Hexachlorocyclopentadiene	77-47-4	EPA 8270	5.0	0.854
Hexachloroethane	67-72-1	EPA 8270	1.0	0.392
Indeno(1,2,3-cd)pyrene	193-39-5	EPA 8270D-SIM	0.010	0.0034
Isophorone	78-59-1	EPA 8270	1.0	0.215
Naphthalene	91-20-3	EPA 8270 SIM	0.010	0.0076
n-Decane	124-18-5	EPA 8270	1.0	0.225
Nitrobenzene	98-95-3	EPA 8270	1.0	0.551

Table B-3

Method of Analysis, Target Reporting and Quality Control Limits - Groundwater and Surface Water Samples

Quality Assurance Project Plan

7100 1st Avenue S Site
Seattle, Washington

Analyte	CAS Number	Analytical Method	Target Practical Quantitation Limit (PQL)[1]	Target Method Detection Limits (MDL)[1]
N-Nitrosodimethylamine	62-75-9	EPA 8270	5.0	0.980
N-Nitroso-di-n-propylamine	621-64-7	EPA 8270	1.0	0.449
N-Nitrosodiphenylamine	86-30-6	EPA 8270	1.0	0.497
n-Octadecane	593-45-3	EPA 8270	1.0	0.166
p-Benzoquinone	78919-13-8	EPA 8270	1.0	0.543
Pentachlorobenzene	608-93-5	EPA 8270	1.0	0.450
Pentachlorophenol	87-86-5	EPA 8270	5.0	0.647
Phenanthrene	85-01-8	EPA 8270D-SIM	0.010	0.0188
Phenol	108-95-2	EPA 8270	1.0	0.163
Pyrene	129-00-0	EPA 8270D-SIM	0.010	0.0089
Pyridine	110-86-1	EPA 8270	5.0	1.073
Retene	483-65-8	EPA 8270	1.0	0.160
Tetrachloroguaiacol	2539-17-5	EPA 8270	2.0	0.248
Tributyl Phosphate	126-73-8	EPA 8270	1.0	0.151
Triphenyl Phosphate	115-86-6	EPA 8270	1.0	0.224
Volatile Organic Compounds (VOCs; µg/L)				
1,1,1,2-Tetrachloroethane	630-20-6	EPA 8260C	0.20	0.040
1,1,1-Trichloroethane	71-55-6	EPA 8260C	0.20	0.041
1,1,2,2-Tetrachloroethane	79-34-5	EPA 8260C	0.20	0.060
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	EPA 8260C	0.20	0.043
1,1,2-Trichloroethane	79-00-5	EPA 8260C	0.20	0.129
1,1-Dichloroethane	75-34-3	EPA 8260C	0.20	0.053
1,1-Dichloroethene	75-35-4	EPA 8260C	0.20	0.054
1,1-Dichloropropene	563-58-6	EPA 8260C	0.20	0.034
1,2,3-Trichlorobenzene	87-61-6	EPA 8260C	0.50	0.110
1,2,3-Trichloropropane	96-18-4	EPA 8260C	0.50	0.131
1,2,4-Trichlorobenzene	120-82-1	EPA 8260C	0.50	0.107
1,2,4-Trimethylbenzene	95-63-6	EPA 8260C	0.20	0.024
1,2-Dibromo 3-Chloropropane	96-12-8	EPA 8260C	0.50	0.366
1,2-Dibromoethane	106-93-4	EPA 8260C	0.20	0.075
1,2-Dichlorobenzene	95-50-1	EPA 8260C	0.20	0.036
1,2-Dichloroethane	107-06-2	EPA 8260C	0.20	0.072
1,2-Dichloropropane	78-87-5	EPA 8260C	0.20	0.035
1,3,5-Trimethyl Benzene	108-67-8	EPA 8260C	0.20	0.015
1,3-Dichlorobenzene	541-73-1	EPA 8260C	0.20	0.036
1,3-Dichloropropane	142-28-9	EPA 8260C	0.20	0.062
1,4-Dichlorobenzene	106-46-7	EPA 8260C	0.20	0.040
2,2-Dichloropropane	594-20-7	EPA 8260C	0.20	0.052
2-Butanone	78-93-3	EPA 8260C	5.0	0.814
2-Chloro Toluene	95-49-8	EPA 8260C	0.20	0.024
2-Chloroethylvinyl Ether	110-75-8	EPA 8260C	1.0	0.250
2-Hexanone	591-78-6	EPA 8260C	5.0	0.902
4-Chloro Toluene	106-43-4	EPA 8260C	0.20	0.016
4-Isopropyl Toluene	99-87-6	EPA 8260C	0.20	0.026
4-Methyl-2-Pentanone	108-10-1	EPA 8260C	5.0	0.974

Table B-3

Method of Analysis, Target Reporting and Quality Control Limits - Groundwater and Surface Water Samples

Quality Assurance Project Plan

7100 1st Avenue S Site
Seattle, Washington

Analyte	CAS Number	Analytical Method	Target Practical Quantitation Limit (PQL)[1]	Target Method Detection Limits (MDL)[1]
Acetone	67-64-1	EPA 8260C	5.0	2.057
Acrolein	107-02-8	EPA 8260C	5.00	2.476
Acrylonitrile	107-13-1	EPA 8260C	1.0	0.604
Benzene	71-43-2	EPA 8260C	0.20	0.027
Bromobenzene	108-86-1	EPA 8260C	0.20	0.060
Bromochloromethane	74-97-5	EPA 8260C	0.20	0.061
Bromodichloromethane	75-27-4	EPA 8260C	0.20	0.051
Bromoethane	74-96-4	EPA 8260C	0.20	0.041
Bromoform	75-25-2	EPA 8260C	0.20	0.062
Bromomethane	74-83-9	EPA 8260C	1.0	0.252
Carbon Disulfide	75-15-0	EPA 8260C	0.20	0.037
Carbon Tetrachloride	56-23-5	EPA 8260C	0.20	0.044
Chlorobenzene	108-90-7	EPA 8260C	0.20	0.023
Chloroethane	75-00-3	EPA 8260C	0.20	0.086
Chloroform	67-66-3	EPA 8260C	0.20	0.027
Chloromethane	74-87-3	EPA 8260C	0.50	0.095
cis 1,3-dichloropropene	156-59-2	EPA 8260C	0.20	0.061
cis-1,2-Dichloroethene	10061-01-5	EPA 8260C	0.20	0.043
Dibromochloromethane	124-48-1	EPA 8260C	0.20	0.048
Dibromomethane	74-95-3	EPA 8260C	0.20	0.145
Dichlorodifluoromethane	75-71-8	EPA 8260C	0.20	0.052
Ethyl Benzene	100-41-4	EPA 8260C	0.20	0.037
Hexachloro-1,3-Butadiene	87-68-3	EPA 8260C	0.50	0.073
Iodomethane	74-88-4	EPA 8260C	1.0	0.227
iso-propyl Benzene	98-82-8	EPA 8260C	0.20	0.021
m,p-xylene	179601-23-1	EPA 8260C	0.40	0.052
Methylene Chloride	75-09-2	EPA 8260C	1.0	0.485
Methyl-tert-butyl ether	1634-04-4	EPA 8260C	0.50	0.073
Naphthalene	91-20-3	EPA 8260C	0.50	0.118
n-Butyl Benzene	104-51-8	EPA 8260C	0.20	0.025
n-Propyl Benzene	103-65-1	EPA 8260C	0.20	0.023
o-Xylene	95-47-6	EPA 8260C	0.20	0.035
sec-Butyl Benzene	135-98-8	EPA 8260C	0.20	0.024
Styrene	100-42-5	EPA 8260C	0.20	0.045
tert-Butyl Benzene	98-06-6	EPA 8260C	0.20	0.026
Tetrachloroethene	127-18-4	EPA 8260C	0.20	0.047
Toluene	108-88-3	EPA 8260C	0.20	0.040
trans 1,3-Dichloropropene	10061-02-6	EPA 8260C	0.20	0.081
trans-1,2-Dichloroethene	156-60-5	EPA 8260C	0.20	0.048
trans-1,4-Dichloro 2-Butene	110-57-6	EPA 8260C	1.0	0.324
Trichloroethene	79-01-6	EPA 8260C	0.20	0.049
Trichlorofluoromethane	75-69-4	EPA 8260C	0.20	0.037
Vinyl Acetate	108-05-4	EPA 8260C	0.20	0.069

Table B-3

Method of Analysis, Target Reporting and Quality Control Limits - Groundwater and Surface Water Samples

Quality Assurance Project Plan

7100 1st Avenue S Site
Seattle, Washington

Analyte	CAS Number	Analytical Method	Target Practical Quantitation Limit (PQL)[1]	Target Method Detection Limits (MDL)[1]
Vinyl Chloride	75-01-4	EPA 8260C	0.20	0.057
Polychlorinated Biphenyls (PCBs; µg/L)				
Aroclor 1016	12674-11-2	EPA 8082-Low Level	0.010	0.005
Aroclor 1242	53469-21-9	EPA 8082-Low Level	0.010	0.005
Aroclor 1248	12672-29-6	EPA 8082-Low Level	0.010	0.005
Aroclor 1254	11097-69-1	EPA 8082-Low Level	0.010	0.005
Aroclor 1260	11096-82-5	EPA 8082-Low Level	0.010	0.005
Total PCBs (sum of Aroclors)	12767-79-2	EPA 8082-Low Level	0.010	na
Total Petroleum Hydrocarbons (µg/L)				
Gasoline-Range	NA	NWTPH-G	250	125
Diesel-Range	NA	NWTPH-Dx	100	16
Heavy Oil-Range	NA	NWTPH-Dx	200	49
Pesticides (µg/L)				
2,4'-DDD	53-19-0	GC/MS/MS	0.00050	0.00011
2,4'-DDE	3424-82-6	GC/MS/MS	0.00050	0.00011
2,4'-DDT	789-02-6	GC/MS/MS	0.00050	0.00009
4,4'-DDD	72-54-8	GC/MS/MS	0.00050	0.00010
4,4'-DDE	72-55-9	GC/MS/MS	0.00050	0.00008
4,4'-DDT	50-29-3	GC/MS/MS	0.00050	0.00009
alpha-BHC	319-84-6	GC/MS/MS	0.00050	0.00015
Aldrin	309-00-2	GC/MS/MS	0.0010	0.00046
alpha-Chlordane	5103-71-9	GC/MS/MS	0.00050	0.00013
beta-BHC	319-85-7	GC/MS/MS	0.00050	0.00013
Chlorpyrifos	2921-88-2	GC/MS/MS	0.00050	0.00014
cis-Nonachlor	5103-73-1	GC/MS/MS	0.00050	0.00017
delta-BHC	319-86-8	GC/MS/MS	0.00050	0.00027
Dieldrin	60-57-1	GC/MS/MS	0.0050	0.00074
Endosulfan I	959-98-8	GC/MS/MS	0.0020	0.00080
Endosulfan II	33213-65-9	GC/MS/MS	0.0010	0.00046
Endosulfan Sulfate	1031-07-8	GC/MS/MS	0.00050	0.00008
Endrin	72-20-8	GC/MS/MS	0.0020	0.00063
Endrin Aldrhyde	7421-93-4	GC/MS/MS	0.0010	0.00038
Endrin Ketone	53494-70-5	GC/MS/MS	0.0010	0.00024
gamma-BHC	58-89-9	GC/MS/MS	0.00050	0.00030
gamma-Chlordane	5566-34-7	GC/MS/MS	0.00050	0.00017
Heptachlor	76-44-8	GC/MS/MS	0.0010	0.00012
Heptachlor Epoxide	1024-57-3	GC/MS/MS	0.0010	0.00016
Hexachlorobenzene	118-74-1	GC/MS/MS	0.00050	0.00027
Isodrin	465-73-6	GC/MS/MS	0.0020	0.00038
Methoxychlor	72-43-5	GC/MS/MS	0.00050	0.00010
Mirex	2385-85-5	GC/MS/MS	0.0010	0.00008
Octachlorostyrene	29082-74-4	GC/MS/MS	0.0010	0.00026
Oxychlordane	27304-13-8	GC/MS/MS	0.0020	0.00200

Table B-3

Method of Analysis, Target Reporting and Quality Control Limits - Groundwater and Surface Water Samples

Quality Assurance Project Plan

7100 1st Avenue S Site
Seattle, Washington

Analyte	CAS Number	Analytical Method	Target Practical Quantitation Limit (PQL)[1]	Target Method Detection Limits (MDL)[1]
trans-Nonachlor	39765-80-5	GC/MS/MS	0.00050	0.00012

Notes:

[1] Detection limits for metals, VOCs, PAHs, PCBs and petroleum hydrocarbons are provided by Analytical Resources Inc. of Tukwila, Washington.

Detection limits for pesticides are provided by Columbia Analytical of Kelso, Washington.

EPA = U.S. Environmental Protection Agency

SIM = Selective ion monitoring

GC/MS/MS = Gas Chromatograph/ Mass Spectroscopy/Mass Spectroscopy

PCBs = Polychlorinated biphenyls

μg/L = micrograms per liter

Table B-4

Test Methods, Sample Containers, Preservation and Holding Times

Quality Assurance Project Plan

7100 1st Avenue S Site
Seattle, Washington

Analysis	Method	Soil/Solids				Groundwater/Stormwater			
		Minimum Sample Size	Sample Containers	Sample Preservation	Holding Times^{1}	Minimum Sample Size	Sample Containers	Sample Preservation	Holding Times^{1}
Metals^{2}	EPA 200.8/7040	100 g	4 or 8 oz glass wide mouth with Teflon-lined lid	≤6°C	180 days	500 mL	1 L poly bottle	HNO_3 - pH<2 (Dissolved metals preserved after filtration)	180 days
Mercury in Water	EPA 1631-E^{2}	NA	NA	NA	NA	500 ml	500 ml poly bottle	≤6°C, HCl to pH < 2	90 days
SVOCs	EPA 8270/SIM	100 g	4 or 8 oz glass wide mouth with Teflon-lined lid	≤6°C	14 days to extraction, 40 days from extraction to analysis	1 L	1 liter amber glass with Teflon-lined lid	≤6°C	7 days to extraction 40 days from extraction to analysis
VOCs	EPA 8260	10 g	Three 40mL glass vial (VOA)	≤6°C	14 days	40mL	Three 40mL glass vial (VOA)	≤6°C	7 days
PCBs	EPA 8082 Low level	100 g	4 or 8 oz glass wide mouth with Teflon-lined lid	≤6°C	None	1 L	1 liter amber glass with Teflon-lined lid	≤6°C	None
Gasoline-Range Hydrocarbons	NWTPH-G	10 g	40mL glass vial (VOA)	≤6°C	14 days	40 mL	40mL glass vial (VOA)	≤6°C, HCl to pH < 2	14 days
Diesel- and Oil-Range Hydrocarbons	Ecology NWTPH-Dx with acid/silica gel cleanup	100 g	8 or 16 oz amber glass wide-mouth with Teflon-lined lid	≤6°C	14 days to extraction, 40 days from extraction to analysis	1 L	1 liter amber glass with Teflon-lined lid	≤6°C	7 days to extraction 40 days from extraction to analysis
Pesticides	GC/MS/MS^{4}	100 g	8 or 16 oz amber glass wide-mouth with Teflon-lined lid	≤6°C	14 days to extraction, 40 days from extraction to analysis	2x 1 L Bottles	1 L amber glass with Teflon-lined lid	≤6°C	7 days to extraction 40 days from extraction to analysis
Soil Conventionals (total organic carbon, grainsize, chloride)	EPA 9060, Puget Sound Estuary Program	25 g, 300 g, 50 g	4 oz glass wide mouth with Teflon-line lid, 16 oz glass wide mouth with Teflon-lid	≤6°C	14 days; 6 months; 28 days	NA	NA	NA	NA
Water Conventionals (chloride, total dissolved solids)	EPA 300.0, SM 2540-D	NA	NA	NA	NA	250 ml; 1 liter	One 250 mL poly bottle; One 1L poly bottle.	≤6°C	28 days for Chloride; 7 days for total solids.

Notes:

[1] Holding times are based on elapsed time from date of collection.

[2] Metals to be analyzed include arsenic, cadmium, total chromium, copper, lead, nickel, mercury, silver, and zinc.

[3] Mercury in water to be analyzed by Columbia Analytical Services of Kelso, Washington using EPA 1631-E .

[4] Pesticides to be analyzed by Columbia Analytical Services of Kelso, Washington using GC/MS/MS low-level analysis.

VOC = Volatile organic compound
SVOC = Semivolatile organic compound
PCBs = Polychlorinated biphenyls
HCl = Hydrochloric acid
HNO_3 = Nitric acid
oz = Ounce
mL = Milliliter
L = Liter
g = Gram

Table B-5

Quality Control Samples - Types and Frequency

Quality Assurance Project Plan

7100 1st Avenue S Site
Seattle, Washington

Parameter	Field QC		Laboratory QC			
	Field Duplicates	**Trip Blanks**	**Method Blanks**	**LCS**	**MS / MSD**	**Lab Duplicates**
Metals	1/10 groundwater, stormwater, soil, solids samples	NA	1/batch	1/batch	1 set/batch	1/batch
SVOCs	1/10 groundwater, stormwater, soil, solids samples	NA	1/batch	1/batch	1 set/batch	NA
VOCs	1/10 groundwater, stormwater, soil, solids samples	1/cooler	1/batch	1/batch	1 set/batch	NA
PCBs	1/10 groundwater, stormwater, soil, solids samples	NA	1/batch	1/batch	1 set/batch	NA
Gasoline-Range Hydrocarbons	1/10 groundwater, stormwater, soil, solids samples	1/cooler	1/batch	1/batch	NA	1/batch
Diesel and Heavy Oil-Range Hydrocarbons	1/10 groundwater, stormwater, soil, solids samples	NA	1/batch	1/batch	NA	1/batch
Conventionals (total organic carbons, grainsize, total dissolved solids, chloride)	1/10 groundwater, soil, solids samples	NA	1/batch	1/batch	NA	NA
Pesticides	1/10 groundwater, stormwater, soil, solids samples	NA	1/batch	1/batch	1/batch	1/batch

Notes:

An analytical lot or batch is defined as a group of samples taken through a preparation procedure and sharing a method blank, LCS, and MS/MSD (or MS and lab duplicate). No more than 20 field samples can be contained in one batch.

QC = Quality control

LCS = Laboratory control sample

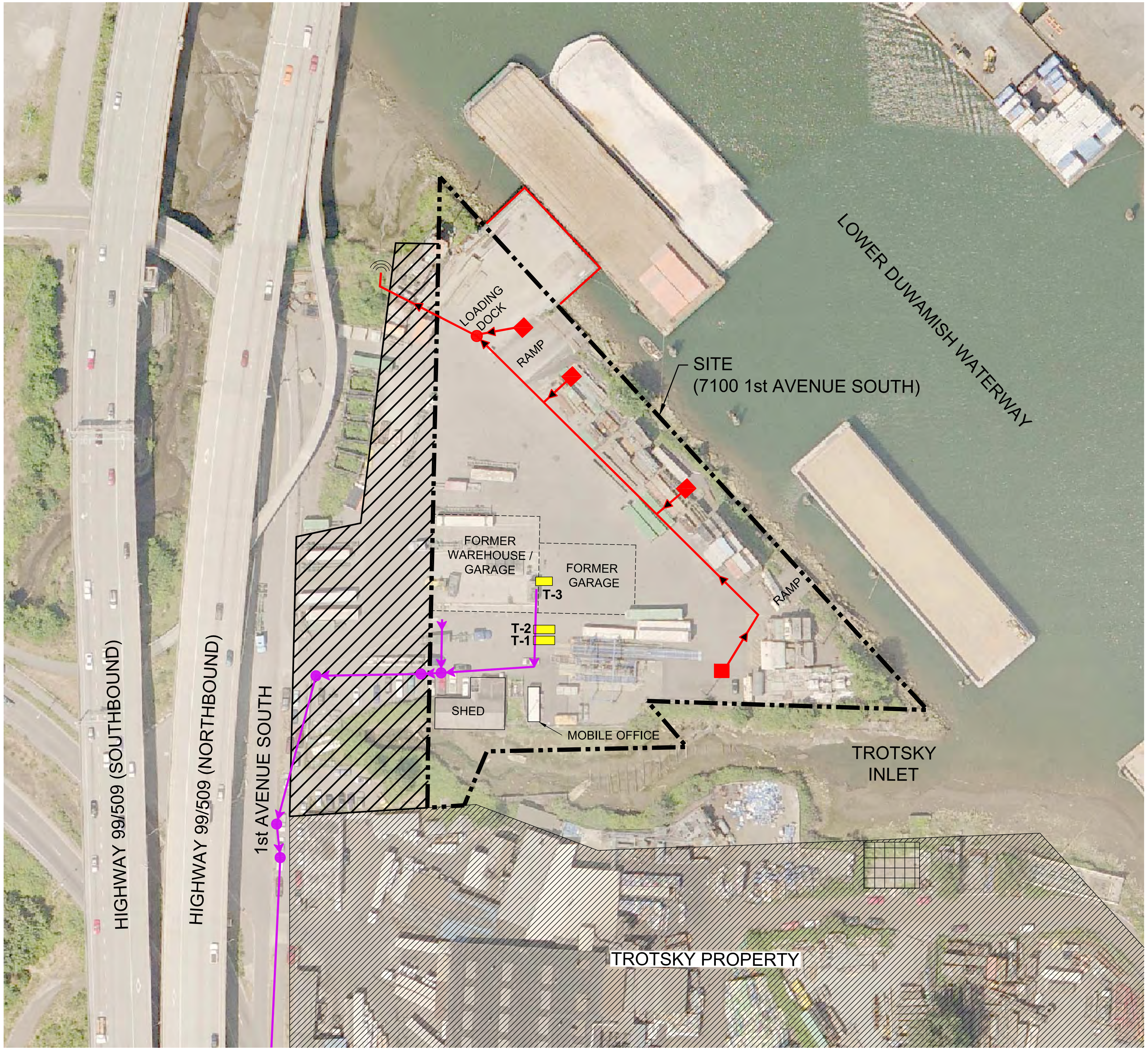
MS = Matrix spike sample

MSD = Matrix spike duplicate sample

VOCs = Volatile organic compounds

SVOCs = Semivolatile organic compounds

PCBs = polychlorinated biphenyls



Legend

- Site Boundary
- ▨ Leased area to 7100 1st Avenue South, Seattle LLC from the Washington State Department of Transportation (WSDOT)
- ▦ 0.04-Acre Parcel Owned by 7100 1st Avenue South, Seattle LLC
- 🟨 Former Underground Storage Tank (Removed)
- Storm Drainage (Flows to Sanitary Sewer)
- Storm Drainage (Sewer Flows to LDW)
- Proposed Stormwater Outfall Sample Location

LDW = Lower Duwamish Waterway

N
W E
S

100 0 100
FEET

Notes

1. The locations of all features shown are approximate.
2. Location of drain and conveyance features are unconfirmed and will be evaluated during RI.
3. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Reference: Aerial image from King County GIS, 2007. Storm drainage features from "Lower Duwamish Waterway, Early Action Area 2, Technical Memorandum: DMC Property Update," by Science Applications International Corporation (SAIC) dated April 2008.

Site Plan

7100 1st Avenue South Site
Seattle, Washington

GEOENGINEERS

Figure B-1

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APPENDIX C

Health and Safety Plan

Appendix C
Health and Safety Plan (HASP)

Remedial Investigation/Feasibility Study
7100 1st Avenue South Site
Agreed Order No. DE 8258

for
Washington State Department of Ecology
***on behalf of* 7100 1st Avenue S. Seattle, LLC**

February 15, 2013

GeoEngineers

Plaza 600 Building
600 Stewart Street, Suite 1700
Seattle, Washington 98101
206.728.2674

Table of Contents

SITE HEALTH AND SAFETY PLAN
7100 1ST AVENUE SOUTH SITE
SEATTLE, WASHINGTON

This HASP is to be used in conjunction with the GeoEngineers Safety Program Manual. Together, the written safety programs and this HASP constitute the Site safety plan for this Site. This plan is to be used by GeoEngineers personnel on this Site and must be available on-site. If the work entails potential exposures to other substances or unusual situations, additional safety and health information will be included, and the plan will need to be approved by the GeoEngineers Health and Safety Manager. All plans are to be used in conjunction with current standards and policies outlined in the GeoEngineers Health and Safety Program Manual.

Liability Clause: If requested by subcontractors, this Site safety plan may be provided for informational purposes only. In this case, Form C-3 shall be signed by the subcontractor. Please be advised that this Site Safety Plan is intended for use by GeoEngineers Employees only. Nothing herein shall be construed as granting rights to GeoEngineers' subcontractors or any other contractors working on this Site to use or legally rely on this Site Safety Plan. GeoEngineers specifically disclaims any responsibility for the health and safety of any person not employed by them.

1.0 GENERAL PROJECT INFORMATION

Project Name:	7100 1st Avenue South Site
Project Number:	0275-015-01
Type of Project:	Soil, groundwater, catch basin solids and surface water sampling, and monitoring well installation.
Start/Completion:	Within 12 Months following Ecology's approval of the Final RI/FS Work Plan
Subcontractors:	Utility Locate Contractor Drilling Contractor Survey Contractor

2.0 WORK PLAN

GeoEngineers will conduct an environmental investigation at the 7100 1st Avenue South Site (Site). The purpose of the investigation is to characterize the nature and extent of soil and groundwater contamination at the Site and to provide sufficient information to select a cleanup action, if necessary. The activities also include assessment of catch basin solids and stormwater to evaluate whether the stormwater collection system at the Site is a potential transport mechanism for contaminants in Site media to the Lower Duwamish Waterway (LDW). As part of the investigation, our scope includes:

- Hand auger and hollow stem auger explorations, soil sampling, and submitting samples to a laboratory for testing of metals, VOCs, SVOCs, PCBs, gasoline-range, diesel-range, and/or heavy oil-range petroleum hydrocarbons as presented in the Sampling and Analysis Plan (Appendix A).
- Installation and development of groundwater monitoring wells at locations presented in the Sampling and Analysis Plan (Appendix A).
- Groundwater sampling from monitoring wells and submitting samples to a laboratory for testing of metals, VOCs, SVOCs, PCBs, gasoline-range, diesel-range, and/or heavy oil-range petroleum hydrocarbons as presented in the Sampling and Analysis Plan (Appendix A).
- Catch basin solids sampling, and submitting samples to a laboratory for testing of metals, SVOCs, PCBs, gasoline-range, diesel-range, and/or heavy oil-range petroleum hydrocarbons as presented in the Sampling and Analysis Plan (Appendix A).
- Stormwater outfall sampling, and submitting samples to a laboratory for testing of metals, VOCs, SVOCs, PCBs, gasoline-range, diesel-range, and/or heavy oil-range petroleum hydrocarbons as presented in the Sampling and Analysis Plan (Appendix A).
- A tidal study (down-well recording of water levels in a subset of monitoring wells over several tidal cycles).
- Site surveying.

2.1. Site Description

The Site is located in the northern portion of the South Park Industrial Area (7100 2nd Avenue Southwest), is triangular in shape and consists of 3.09 acres (Parcel No. 2924049090). The Site is zoned industrial and is bounded to the northeast by the LDW, to the south by the Trotsky Property (Parcel No. 2924049030) and the Early Action Area 2 Inlet (also known as the Trotsky Inlet), and to the west by 1st Avenue South (Figure B-1). The south border of the property (the north side of Trotsky Inlet) consists of a relatively steep slope that is covered locally with a dense growth of blackberry bushes. The 1.2 acre property located between the Site and 1st Avenue South is currently being leased from the Washington State Department of Transportation (WSDOT). In addition to the Site, 7100 LLC also owns a small (0.04 acre) parcel (Parcel No. 6871200035) located on the south side of the Trotsky Inlet (Figure B-1). This property is currently vacant, and historic activities at the separate parcel are unrelated to the Site.

The Site is currently owned by 7100 LLC and is used by Alaska Marine Lines (a subsidiary of Lynden, Inc.) for auxiliary storage of shipping containers, transfer of aggregates and miscellaneous marine terminal uses. In addition, a limited area of the southern portion of the Site is leased for the operation of an automobile loading rack. The Site has moorage along the LDW, which is actively used for loading and unloading of barges. The Site has approximately 700 feet of frontage along the LDW and approximately 480 feet along the Trotsky Inlet. A majority of the shoreline is covered with concrete rip-rap. The upland portion of the Site is relatively flat, slightly downward east to west and is paved with asphalt and concrete. A soil berm rises above the rip-rap and contains a narrow (approximately 3 to 10 feet wide) riparian zone that is vegetated with grasses, Himalayan blackberry, shrub willow and alder (City of Seattle, 1998). Storm drainage collected from the majority of the property flows to an LDW outfall located at the northern tip of the property.

Storm drainage collected from a limited area in the southwest portion of the property is piped away from the LDW and connects to the City of Seattle sanitary sewer drainage system.

2.2. Site History

Prior to 1969, the location of the Site was a part of the LDW tidal marshland. Between 1960 and 1969 (SAIC, 2008), the location of the Site was filled with dredge materials and construction debris (concrete and brick).

Between approximately 1969 and 1977, the southern portion of the Site was occupied by a ready mix concrete plant, Seattle Ready Mix (Pioneer Title Insurance Company, 1981). The northern portion of the Site was used as a cargo terminal and as a sand and gravel batch plant (SAIC, 2008). Around this time, historical aerial photographs of the Site show a large rectangular building (warehouse or garage) measuring approximately 100 feet long by 60 feet wide. In 1978, a second building was added to the warehouse/garage structure, a storm drainage system was constructed, and the Site and lease area were paved with asphalt/concrete. As part of the paving project, an extruded concrete curb was installed along the bank of the Site (northeast portion of the Site) to serve as a safety measure for vehicular activity and to prevent surface runoff from entering the LDW. Also, in 1978, authorization from the Seattle Building Department was granted to repair the existing bulkhead along the LDW (City of Seattle, 1978) and a Shoreline, Substantial Development Permit (SMA 78-41) granted to construct a 100 foot by 50 foot addition to the existing warehouse/garage building.

Between 1978 and 1984, the Site was primarily used as a school bus parking facility with auxiliary maintenance and servicing. The Site contained three buildings, which included the warehouse/garage, warehouse/garage addition and an office building. Fuel dispensers located at the southeast corner of the warehouse/garage structure were supplied by two 10,000 gallon USTs (tanks T-1 and T-2, Figure B-1). A; and a three-pump fuel island of unknown location was supplied by a 12,000 gallon gasoline UST located within the garage structure (tank T-3, Figure B-1). A six-pump fuel island was located at the southeast corner of the warehouse/garage structure. The location of the three-pump fuel island is unknown.

After 1984, Alaska Marine Lines began operating a barge terminal at the Site. The Site was used as a freight management facility in which shipping containers and bulk aggregates were transferred between barge and truck, and for container and equipment storage. The 12,000 gallon gasoline UST was decommissioned and removed in 1984. In 1991, the two remaining 10,000 gallon USTs located at the Site were decommissioned and removed. Based on aerial photographs of the Site, the 80 foot by 40 foot garage structure located east of the warehouse/garage was demolished between 1984 and 2000. Between 2000 and 2006, the warehouse/garage structure was demolished and removed.

2.3. List of Field Activities

Check the activities to be completed during the project

X Site reconnaissance

X Exploratory Borings

___ Construction Monitoring

X Field Screening of Soil Samples

___ Vapor Measurements

X Groundwater Sampling

X Surveying
____ Test Pit Exploration
X Monitoring Well Installation
X Monitoring Well Development
X Soil Sample Collection
____ Remediation System Monitoring
X Groundwater Depth and Free Product Measurement
____ Product Sample Collection
____ Soil Stockpile Testing
____ Remedial Excavation
____ Paving
____ Landscaping/Wetland Restoration

3.0 LIST OF FIELD PERSONNEL AND TRAINING

Anticipated field personnel include the following:

- Fasih Khan
- Abhijit Joshi
- Robert Trahan
- Brian Anderson
- Robert Miyahira

Field personnel will have appropriate training and up to date certifications. Copies of these documents are available upon request.

4.0 CHAIN OF COMMAND

Chain of Command	Title	Name	Telephone Numbers
1	Project Manager	Chris Bailey	(o) 206.239.3246 (c) 206.325.4035
2	HAZWOPER Supervisor	Robert Trahan	(o) 206.239.3253 (c) 206.240.2300
3	Field Engineer/Geologist	Fasih Khan Abhijit Joshi Brian Anderson Robert Miyahira	(c) 425.444.3295 (c) 425.223.9028 (c) 425.750.1326 (c) 425.941.2055
4	Site Safety and Health Supervisor*	TBD	TBD
5	Client Assigned Site Supervisor	TBD	TBD
6	Health and Safety Program Manager	Wayne Adams	(o) 253.383.4940 (c) 253.350.4387

Chain of Command	Title	Name	Telephone Numbers
N/A	Subcontractor(s)	TBD	TBD
N/A	Current Owner	7100 LLC	TBD

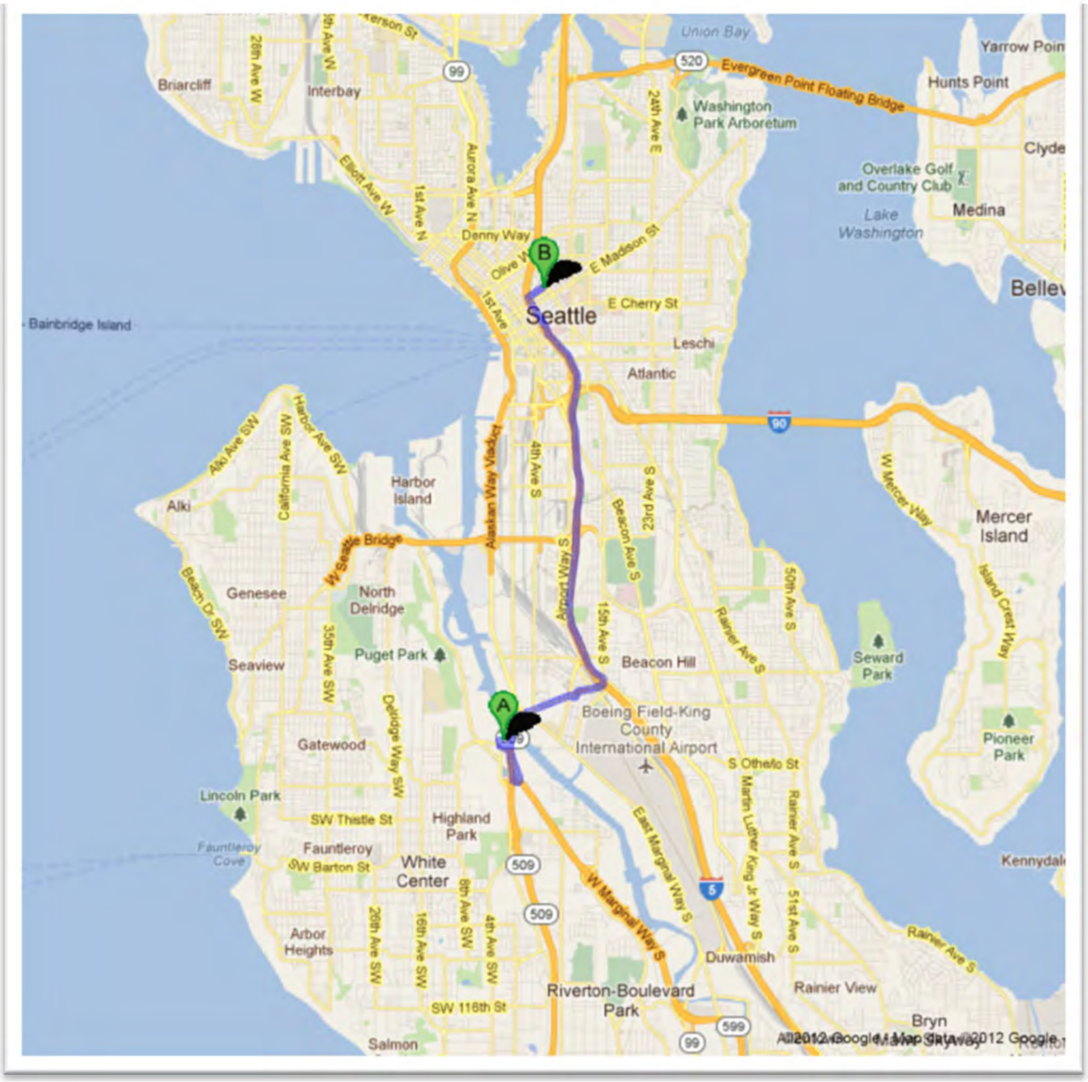
* **Site Safety and Health Supervisor** -- The individual present at a hazardous waste Site responsible to the employer and who has the authority and knowledge necessary to establish the Site-specific health and safety plan and verify compliance with applicable safety and health requirements.

5.0 EMERGANCY INFORMATION

Hospital Name and Address:	**Virginia Mason Hospital** 925 Seneca Street Seattle, WA 98101-2798
Phone Numbers (Hospital ER):	Phone: (206) 233-6600
Distance:	6.9 Miles

Directions:

1. Head west on SW Michigan St toward 2nd Ave SW
2. Turn left onto 2nd Ave SW
3. Turn left onto Highland Park Way SW
4. Continue onto W Marginal Way S go 0.2 mi
5. Take the WA-99 N/E Marginal Way ramp to I-5
6. Merge onto WA-509 N/WA-99 N
7. Take the Michigan St exit toward I-5
8. Slight left onto S Michigan St
9. Continue onto S Bailey St
10. Turn left onto the Interstate 5 ramp
11. Keep left at the fork, follow signs for I-5 N/Vancouver BC and merge onto I-5 N
12. Take exit 164A for Dearborn St toward James St/Madison St
13. Follow signs for I-5 N
14. Follow signs for Madison St/Convention Pl and merge onto 7th Ave
15. Turn right onto Seneca St
16. Destination will be on the right



6.0 STANDARD EMERGENCY PROCEDURES

- **Get help**
    - Send another worker to phone 9-1-1 (if necessary)
    - As soon as feasible, notify GeoEngineers' Project Manager
- **Reduce risk to injured person**
    - Turn off equipment
    - Move person from injury location (if in life-threatening situation only)
    - Keep person warm
    - Perform CPR (if necessary)
- **Transport injured person to medical treatment facility (if necessary) -**
    - By ambulance (if necessary) or GeoEngineers vehicle
    - Stay with person at medical facility

- Keep GeoEngineers manager apprised of situation and notify Human Resources Manager of situation

7.0 HAZARD ANALYSIS

A hazard assessment will be completed at every Site prior to beginning field activities. Updates will be included in the daily log. This list is a summary of hazards listed on the form.

7.1. Physical Hazards

____X____ Drill rigs
_________ Backhoe
_________ Trackhoe
____X____ Fork lifts and trucks operated by site owner
_________ Front End Loader
_________ Excavations/trenching (1:1 slopes for Type B soil)
_________ Shored/braced excavation if greater than 4 feet of depth
_________ Overhead hazards/power lines
____X____ Tripping/puncture hazards (debris on-site, steep slopes or pits)
____X____ Unusual traffic hazard – Truck and Trailer traffic
____X____ Heat/Cold, Humidity
____X____ Utilities/utility locate

- Work areas will be marked with reflective cones, barricades and/or caution tape. High-visibility vests will be worn by on-site personnel to ensure they can be seen by vehicle and equipment operators.
- Field personnel will be aware at all times of the location and motion of heavy equipment in the area of work to ensure a safe distance between personnel and the equipment. Personnel will be visible to the operator at all times and will remain out of the swing and/or direction of the equipment apparatus. Personnel will approach operating heavy equipment only when they are certain the operator has indicated that it is safe to do so through hand signal or other acceptable means.
- Heavy equipment and/or vehicles used on this Site will not work within 20 feet of overhead utility lines without first ensuring that the lines are not energized. This distance may be reduced to 10 feet depending on the client and the use of a safety watch.
- Personnel will avoid tripping hazards, steep slopes, pits and other hazardous encumbrances. If it becomes necessary to work within 6 feet of the edge of a pit, slope or other potentially hazardous area, appropriate fall protection measures will be implemented by the Site Safety and Health Supervisor in accordance with OSHA/DOSH regulations and the GeoEngineers Health and Safety Program.
- Cold stress control measures will be implemented according to the GeoEngineers Health and Safety Program to prevent frost nip (superficial freezing of the skin), frost bite (deep tissue

freezing), or hypothermia (lowering of the core body temperature). Heated break areas and warm beverages shall be available during periods of cold weather.

- Heat stress control measures required for this Site will be implemented according to GeoEngineers Health and Safety Program with water provided on-site.
- Excessive levels of noise (exceeding 85 dBA) are anticipated during drilling. Personnel potentially exposed will wear ear plugs or muffs with a noise reduction rating (NRR) of at least 25 dB whenever it becomes difficult to carry on a conversation 3 feet away from a co-worker or whenever noise levels become bothersome. (Increasing the distance from the source will decrease the noise level noticeably.)

7.2. Engineering Controls

_______ Trench shoring (1:1 slope for Type B Soils)
___X___ Location work spaces upwind/wind direction monitoring
_______ Other soil covers (as needed)
_______ Other (specify):

7.3. Chemical Hazards

CHEMICAL HAZARDS (POTENTIALLY PRESENT AT SITE)

SUBSTANCE	PATHWAYS
Petroleum Products Gasoline Diesel Heavy oil Waste oil Aromatic hydrocarbons (benzene, ethylbenzene, toluene, xylenes [BETX]) Naphthalenes	Air/Soil/Water
Polycyclic aromatic hydrocarbons (PAHs)	Air/Soil/Water
Metals Arsenic Cadmium Copper Lead Mercury Nickel Silver Zinc	Air/Soil/Water
Polychlorinated Biphenyl’s (PCBs)	Soil/Water

SUBSTANCE	PATHWAYS
Pesticides DDD DDE DDT Deildren Hetachlor	Soil/Water
Chloroflorocarbons (CFCs)	Soil/Water

SPECIFIC CHEMICAL HAZARDS AND EXPOSURES (POTENTIALLY PRESENT AT SITE)

COMPOUND/ DESCRIPTION	EXPOSURE LIMITS/IDLH	EXPOSURE ROUTES	SYMPTOMS/HEALTH EFFECTS
Arsenic	PEL 0.05 mg/m^3 IDLH 5.0 mg/m^3	Inhalation, skin absorption, skin and eye contact, ingestion	Ulceration of nasal septum; dermatitis; GI disturbances; peripheral neuropathy; respiratory irritation; hyperpigmentation of skin
Copper	PEL 1 mg/m^3 IDLH 100 mg/m^3	Inhalation, ingestion, skin and eye contact	Irritated eyes, nose, pharynx; nasal septum perforation; metallic taste; dermatitis
Cadmium	IDLH 9 mg/m^3	Inhalation, ingestion,	Pulmonary edema, dyspnea (breathing difficulty), cough, chest tightness, substernal (occurring beneath the sternum) pain; headache; chills, muscle aches; nausea, vomiting, diarrhea; anosmia (loss of the sense of smell), emphysema, proteinuria, mild anemia; [potential occupational carcinogen]
Lead	PEL 0.05 mg/m^3 IDLH 100 mg/m^3	Inhalation, ingestion, skin and eye contact	Lassitude; insomnia; facial pallor; abnormalities; weight loss, malnutrition, constipation, abdominal pain; colic; anemia; gingival lead line; tremors; paralysis of the wrist and ankles; encephalopathy; kidney disease; irritated eyes; hypertension

COMPOUND/ DESCRIPTION	EXPOSURE LIMITS/IDLH	EXPOSURE ROUTES	SYMPTOMS/HEALTH EFFECTS
Mercury	PEL 0.05 mg/m^3 IDLH 10 mg/m^3	Inhalation, skin absorption, skin and eye contact, ingestion	Irritated eyes, skin; cough, chest pain, dyspnea, bronchitis, pneumonia; tremors, insomnia, irritability, indecision, headache, lassitude; stomatitis, salivation; GI disturbances, abnormalities, low weight; proteinuria
Nickel	IDLH 10 mg/m^3	Inhalation, skin and eye Contact	Sensitization dermatitis, allergic asthma, pneumonitis; [potential occupational carcinogen]
Silver	PEL 0.01 mg/m^3 IDLH 10 mg/m^3	Inhalation, skin and eye contact	Blue-gray eyes, nasal septum, throat, skin; irritation, ulceration skin; gastrointestinal disturbance
Zinc	TLV/PEL none Treat as particles not otherwise specified and maintain levels below 3 mg/m3 respirable and 10 mg/m3 inhalable	Inhalation	Metal fume fever (usually onsets at 77-600 mg zinc/m3)
Gasoline (Unleaded) — clear liquid with a characteristic odor	PEL 300 ppm TLV 300 ppm STEL 500 ppm	Ingestion, inhalation, skin absorption, skin and eye contact	Irritated eyes, skin, and mucous membrane; fatigue; blurred vision; dizziness; slurred speech; confusion; convulsions; headache; dermatitis
Diesel Fuel — liquid with a characteristic odor	None established by OSHA, but ACGIH has adopted 100 mg/m3 for a TWA (as total hydrocarbons)	Ingestion, inhalation, skin absorption, skin and eye contact	Irritated eyes, skin, and mucous membrane; fatigue; blurred vision; dizziness; slurred speech; confusion; convulsions; headache; dermatitis
Waste oil – may contain metals, gas, antifreeze and PAHs	Depends on the ancillary contaminants	Ingestion, inhalation, skin absorption, skin and eye contact	Depends on the ancillary contaminants.
Lube Oil/Mineral Oil – as a mist	The current OSHA PEL for mineral oil mist is 5 mg/m3 of air as an 8-hr TWA	If the oil is not a mist, then route of exposure is skin and eye contact	Exposure to oil mists can cause eye, skin and upper respiratory tract irritation.

COMPOUND/ DESCRIPTION	EXPOSURE LIMITS/IDLH	EXPOSURE ROUTES	SYMPTOMS/HEALTH EFFECTS
Benzene	OSHA PEL 1 ppm Short term: 5 ppm ACGIH PEL 0.5 ppm	Inhalation, skin absorption, ingestion, skin and/or eye contact	Irritated eyes, skin, nose, respiratory system; dizziness; headache, nausea, staggered gait; anorexia, lassitude (weakness, exhaustion); dermatitis; bone marrow depression; [potential occupational carcinogen]
Toluene	PEL 100 ppm IDLH 500 ppm	Inhalation, absorption, ingestion, direct contact	Irritation to eyes, nose, exhaustion, confusion, dizziness, headaches, dilated pupils, euphoria, anxiety, teary eyes, muscle fatigue, insomnia, paresthesia, dermatitis, liver and kidney damage.
Ethyl benzene	PEL 100 ppm IDLH 800 ppm	Inhalation, ingestion, direct contact	Irritation to eyes, skin, respiratory system, burning
Xylenes	PEL 100 ppm IDLH 900 ppm	Inhalation, skin absorption, ingestion, direct contact	Irritation to eyes, skin, nose, throat, dizziness, excitement, drowsiness, incoordination, staggering gait, corneal vacuolization, anorexia, nausea, vomiting, abdominal
Polycyclic aromatic hydrocarbons (PAH) as coal tar pitch volatiles	PEL 0.2 mg/m^3 TLV 0.2 mg/m^3 REL 0.1 mg/m^3 IDLH 80 mg/m^3	Inhalation, ingestion, skin and/or eye contact	Dermatitis, bronchitis, potential carcinogen
PCBs (as Arochlor 1254)—colorless to pale-yellow viscous liquid with a mild, hydrocarbon odor	PEL 0.5 mg/m^3 TLV 0.5 mg/m^3 REL 0.001 mg/m^3 IDLH 5.0 mg/m^3	Inhalation (dusts or mists), skin absorption, ingestion, skin and/or eye contact	Irritated eyes, chloracne, liver damage, reproductive effects, potential carcinogen
DDD, DDE, DDT	PEL for DDT is 1 mg/m^3 for an 8-hour average with a skin notation	Inhalation, skin absorption, ingestion, skin and/or eye contact.	Irritation to eyes, skin; paresthesia in the tongue, lips, face; tremor; anxiety, dizziness, confusion, malaise (vague feeling of discomfort), headache, lassitude (weakness, exhaustion); convulsions; paresis in the hands; vomiting; [potential occupational carcinogen].

COMPOUND/ DESCRIPTION	EXPOSURE LIMITS/IDLH	EXPOSURE ROUTES	SYMPTOMS/HEALTH EFFECTS
Dieldrin	PEL 0.25 mg/m³ REL 0.25 mg/m³ IDLH 50 mg/m³	inhalation, skin absorption, ingestion, skin and/or eye contact	Headache, dizziness; nausea, vomiting, malaise (vague feeling of discomfort), sweating; myoclonic limb jerks; clonic, tonic convulsions; coma; [potential occupational carcinogen]; in animals: liver, kidney damage
Heptachlor	PEL 0.5 mg/m³ REL 0.5 mg/m³ IDLH 35 mg/m³	inhalation, skin absorption, ingestion, skin and/or eye contact	In animals: tremor, convulsions; liver damage; [potential occupational carcinogen]

Notes:

IDLH = immediately dangerous to life or health
OSHA = Occupational Safety and Health Administration
ACGIH = American Conference of Governmental Industrial Hygienists
mg/m³ = milligrams per cubic meter
TWA = time-weighted average (Over 8 hrs.)
PEL = permissible exposure limit
TLV = threshold limit value (over 10 hrs)
STEL = short-term exposure limit (15 min)
ppm = parts per million

Groundwater Sampling: Splash hazard associated with groundwater extraction and sample collection. Possible corrosion hazard associated with sample preservatives. Wear protective clothing and eye protection and chemical-resistant gloves are required when handling samples.

Sample handling, packaging, and processing: Skin contact with contaminated media and preservative acids. Wear modified Level D PPE.

Decontamination of equipment: Inhalation or eye contact or skin contact with airborne mists or vapors, or contaminated liquids. Wear safety glasses; decontaminate clothing and skin prior to eating, drinking or other hand to mouth contact.

8.0 BIOLOGICAL HAZARDS AND PROCEDURES

Y/N	Hazard	Procedures
Y	Blackberries or other vegetation	Hard hat, gloves and long sleeve shirt
Y	Insects or snakes	Hard hat, gloves and long sleeve shirt
N	Used hypodermic needs or other infectious Hazards	Do not pick up or contact
	Others:	

8.1. Additional Hazards

Update in Daily Report. Include evaluation of:

- Physical Hazards (excavations and shoring, equipment, on-site traffic for business operations, tripping or loss of footing on slopes above waterway, heat stress, cold stress and others)
- Chemical Hazards (odors, spills, free product, airborne particulates and others present)
- Biological Hazards (snakes, spiders, other animals, discarded needles, blackberry bushes, pollen, bees/wasps and others present)

9.0 AIR MONITORING PLAN

Work upwind if at all possible.

Check instrumentation to be used:

__X__ Photoionization Detector (PID)

_____ Other (i.e., detector tubes): ____

Check monitoring frequency/locations and type (specify: work space, borehole, breathing zone):

__X__ 15 minutes - Continuous during soil disturbance activities or handling samples

_____ 15 minutes

_____ 30 minutes

_____ Hourly (in breathing zone during excavations, drilling, sampling)

Additional personal air monitoring for specific chemical exposure:

Dust/Metals/Pesticides/Herbicides

If drilling or excavation activities generate visible dust, the Site Safety and Health Supervisor will be notified immediately to assess the need for air monitoring and lab analysis for inhalable and respirable particulates.

AIR MONITORING ACTION LEVELS

Contaminant	Activity	Monitoring Device	Frequency of Monitoring Breathing Zone	Action Level	Action
Organic Vapors	Environmental Remedial Actions	PID	Start of shift; prior to excavation entry; every 30 to 60 minutes and in event of odors	Background to 5 ppm in breathing zone	Use Level D or Modified Level D PPE

Contaminant	Activity	Monitoring Device	Frequency of Monitoring Breathing Zone	Action Level	Action
Organic Vapors	Environmental Remedial Actions	PID	Start of shift; prior to excavation entry; every 30 to 60 minutes and in event of odors	5 to 25 ppm in breathing zone	Upgrade to Level C PPE
Organic Vapors	Environmental Remedial Actions	PID	Start of shift; prior to excavation entry; every 30 to 60 minutes	> 25 ppm in breathing zone	Stop work and evacuate the area. Contact Health and Safety Manager for guidance.
Combustible Atmosphere	Environmental Remedial Actions	PID	Start of shift; prior to excavation entry; every 30 to 60 minutes	>10% LEL or >1,000 ppm	Depends on contaminant. The PEL is usually exceeded before the lower explosive limit (LEL).
Combustible Atmosphere	Environmental Remedial Actions	PID or 4-gas meter	Start of shift; prior to excavation entry; every 30 to 60 minutes	>10% LEL or >1,000 ppm	Stop work and evacuate the Site. Contact Health and Safety Manager for guidance.
Oxygen Deficient/ Enriched Atmosphere	Environmental Remedial Actions Confined Spaces	Oxygen meter or 4-gas meter	Start of shift; prior to excavation entry; every 30 to 60 minutes	<19.5>23.5%	Continue work if inside range. If outside range, evacuate area and contact Health and Safety Manager.

10.0 SITE CONTROL PLAN

10.1. Traffic or Vehicle Access Control Plans

Traffic or vehicle access control plans are not expected to be needed for the investigation work. If interim actions will be conducted, Traffic or vehicle access control plans will be prepared as necessary.

10.2. Site Work Zones

In general, exclusion zones will be established around each sampling location and remedial construction work area, as applicable. These locations/areas are depicted on figures contained in the associated work plans.

In general, hot zones/exclusion zones will be located around each exploration. Only persons with the appropriate training will enter this perimeter while work is being conducted there.

A contamination reduction zone will be established just outside the exclusion zone for the decontamination of sampling equipment. Care will be taken to prevent the spread of contamination. Equipment and personnel decontamination are discussed in the following sections, and the following types of equipment will be available to perform these activities:

- Scrub brushes;
- Spray rinse applicator;
- Plastic garbage bags; and
- Container of Alconox/water solution and Alconox powder.

Method of delineation/excluding non-site personnel

_______ Fence

___X___ Survey Tape

___X___ Traffic Cones

_______ Other

10.3. Buddy System

Personnel on-site should use the buddy system (pairs), particularly whenever communication is restricted. If only one GeoEngineers employee is on-site, a buddy system can be arranged with subcontractor/ contractor personnel.

10.4. Site Communication Plan

Positive communications (within sight and hearing distance or via radio) should be maintained between pairs on-site, with the pair remaining in proximity to assist each other in case of emergencies. The team should prearrange hand signals or other emergency signals for communication when voice communication becomes impaired (including cases of lack of radios or radio breakdown). In these instances, you should consider suspending work until communication can be restored; if not, the following are some examples for communication:

1. Hand gripping throat: Out of air, can't breathe.
2. Gripping partner's wrist or placing both hands around waist: Leave area immediately, no debate.
3. Hands on top of head: Need assistance.
4. Thumbs up: Okay, I'm all right: or I understand.
5. Thumbs down: No, negative.

10.5. Decontamination Procedures

Decontamination consists of removing outer protective Tyvek clothing and washing soiled boots and gloves using bucket and brush provided on-site in the contamination reduction zone. Inner gloves and respirator will then be removed, hands and face will be washed in either a portable wash station or a bathroom facility in the support zone. Employees will perform decontamination procedures and wash prior to eating, drinking or leaving the Site.

Sampling equipment will be decontaminated using wet decontamination procedures:

- Wash and scrub equipment with Alconox/Liquinox and tap water solution
- Rinse with tap water
- Rinse with distilled water
- Repeat entire procedure or any parts of the procedure as necessary.

In addition to wet decontamination procedures, other measures will be taken to prevent cross contamination.

These measures include changing out disposable gloves between each sampling location, using fresh paper towels at each sample location, and maintaining a clean work area. Downhole drilling equipment will be decontaminated using a hot-water, high-pressure washer. Decontamination water will be stored on-site in 55-gallon drums.

10.6. Waste Disposal or Storage

PPE disposal (specify): Used PPE to be placed in on-site drums pending characterization and disposal.

Drill cutting/excavated sediment disposal or storage:

______ On-site, pending analysis and further action
__X__ Secured (list method) 55-Gallon Drums
______ Other (describe destination, responsible parties): Stockpiling, landfill disposal (see EDR)

11.0 PERSONAL PROTECTIVE EQUIPMENT

PPE will consist of standard Level D equipment.

Air monitoring will be conducted to determine the level of respiratory protection.

- Half-face combination organic vapor/high efficiency particulate air (HEPA) or P100 cartridge respirators will be available on-site to be used as necessary. P100 cartridges are to be used only if PID measurements are below the Site action limit. P100 cartridges are used for protection against dust, metals and asbestos, while the combination organic vapor/HEPA cartridges are protective against both dust and vapor. Ensure that the PID or TLV will detect the chemicals of concern on-site.

- Level D PPE unless a higher level of protection is required will be worn at all times on the Site. Potentially exposed personnel will wash gloves, hands, face and other pertinent items to prevent hand-to-mouth contact. This will be done prior to hand-to-mouth activities including eating, smoking, etc.
- Adequate personnel and equipment decontamination will be used to decrease potential ingestion and inhalation.

Check applicable personal protection gear to be used:
X Hardhat (if overhead hazards, or client requests)
X Steel-toed boots (if crushing hazards are a potential or if client requests)
X Safety glasses (if dust, particles, or other hazards are present or client requests)
X Hearing protection (if it is difficult to carry on a conversation 3 feet away)
X Rubber boots (if wet conditions)
X Life Jackets (for work near/over water)

Gloves (specify):
X Nitrile
X Latex
Liners
X Leather

Protective clothing:
Tyvek (if dry conditions are encountered, Tyvek is sufficient)
Saranex (personnel shall use Saranex if liquids are handled or splash may be an issue)
X Cotton
X Rain gear (as needed)
X Layered warm clothing (as needed)

Inhalation hazard protection:
X Level D
Level C (respirators with organic vapor/HEPA or P100 filters)

11.1. Personal Protective Equipment Inspections

PPE clothing ensembles designated for use during Site activities shall be selected to provide protection against known or anticipated hazards. However, no protective garment, glove, or boot is entirely chemical-resistant, nor does any PPE provide protection against all types of hazards. To obtain optimum performance from PPE, Site personnel shall be trained in the proper use and inspection of PPE. This training shall include the following:

- Inspect PPE before and during use for imperfect seams, non-uniform coatings, tears, poorly functioning closures or other defects. If the integrity of the PPE is compromised in any manner, proceed to the contamination reduction zone and replace the PPE.

- Inspect PPE during use for visible signs of chemical permeation such as swelling, discoloration, stiffness, brittleness, cracks, tears or other signs of punctures. If the integrity of the PPE is compromised in any manner, proceed to the contamination reduction zone and replace the PPE.
- Disposable PPE should not be reused after breaks unless it has been properly decontaminated.

11.2. Respirator Selection, Use and Maintenance

If respirators are required, Site personnel shall be trained before use on the proper use, maintenance and limitations of respirators. Additionally, they must be medically qualified to wear a respiratory protection in accordance with 29 CFR 1910.134. Site personnel who will use a tight-fitting respirator must have passed a qualitative or quantitative fit test conducted in accordance with an OSHA-accepted fit test protocol. Fit testing must be repeated annually or whenever a new type of respirator is used. Respirators will be stored in a protective container.

11.2.1. Respirator Cartridges

If Site personnel are required to wear air-purifying respirators, the appropriate cartridges shall be selected to protect personnel from known or anticipated Site contaminants. The respirator/cartridge combination shall be certified and approved by the National Institute for Occupational Safety and Health (NIOSH). A cartridge change-out schedule shall be developed based on known Site contaminants, anticipated contaminant concentrations and data supplied by the cartridge manufacturer related to the absorption capacity of the cartridge for specific contaminants. Site personnel shall be made aware of the cartridge change-out schedule prior to the initiation of Site activities. Site personnel shall also be instructed to change respirator cartridges if they detect increased resistance during inhalation or detect vapor breakthrough by smell, taste or feel, although breakthrough is not an acceptable method of determining the change-out schedule.

11.2.2. Respirator Inspection and Cleaning

The Site Safety and Health Supervisor shall periodically (weekly) inspect respirators at the project Site. Site personnel shall inspect respirators prior to each use in accordance with the manufacturer’s instructions. In addition, Site personnel wearing a tight-fitting respirator shall perform a positive and negative pressure user seal check each time the respirator is donned, to ensure proper fit and function. User seal checks shall be performed in accordance with the GeoEngineers respiratory protection program or the respirator manufacturer’s instructions.

11.2.3. Facial Hair and Corrective Lenses

Site personnel with facial hair that interferes with the sealing surface of a respirator shall not be permitted to wear respiratory protection or work in areas where respiratory protection is required. Normal eyeglasses cannot be worn under full-face respirators because the temple bars interfere with the sealing surface of the respirator. Site personnel requiring corrective lenses will be provided with spectacle inserts designed for use with full-face respirators. Contact lenses should not be worn with respiratory protection.

12.0 ADDITIONAL ELEMENTS

12.1. Cold Stress Prevention

Working in cold environments presents many hazards to Site personnel and can result in frost nip (superficial freezing of the skin), frost bite (deep tissue freezing), or hypothermia (lowering of the core body temperature).

The combination of wind and cold temperatures increases the degree of cold stress experienced by Site personnel. Site personnel shall be trained on the signs and symptoms of cold-related illnesses, how the human body adapts to cold environments, and how to prevent the onset of cold-related illnesses. Heated break areas and warm beverages shall be provided during periods of cold weather.

12.2. Heat Stress Prevention

State and federal OSHA regulations provide specific requirements for handling employee exposure to heat stress. GeoEngineers' program complies with these requirements and will be implemented in all areas where heat stress is identified as a potential health issue.

General requirements for preventing heat stress apply to outdoor work environments from May 1 through September 30, annually, only when employees are exposed to outdoor heat at or above an applicable temperature listed in Table 1. To determine which temperature applies to each worksite, select the temperature associated with the general type of clothing or personal protective equipment (PPE) each employee is required to wear.

HEAT STRESS

Type of Clothing	Outdoor Temperature Action Levels (Degrees Fahrenheit)
Nonbreathing clothes including vapor barrier clothing or PPE such as chemical resistant suits	52°
Double-layer woven clothes including coveralls, jackets and sweatshirts	77°
All other clothing	89°

Keeping workers hydrated in a hot outdoor environment requires that more water be provided than at other times of the year. GeoEngineers is prepared to supply at least one quart of drinking water per employee per hour. When employee exposure is at or above an applicable temperature listed in Table 1, Project Managers shall ensure that:

- A sufficient quantity of drinking water is readily accessible to employees at all times; and
- All employees have the opportunity to drink at least one quart of drinking water per hour.

12.3. Emergency Response

Indicate what Site-specific procedures you will implement.

- Personnel on-site should use the "buddy system" (pairs).
- Visual contact should be maintained between "pairs" on-site, with the team remaining in proximity to assist each other in case of emergencies.
- If any member of the field crew experiences any adverse exposure symptoms while on-site, the entire field crew should immediately halt work and act according to the instructions provided by the Site Safety and Health Supervisor.
- Wind indicators visible to all on-site personnel should be provided by the Site Safety and Health Supervisor to indicate possible routes for upwind escape. Alternatively, the Site Safety and Health Supervisor may ask on-site personnel to observe the wind direction periodically during Site activities.
- The discovery of any condition that would suggest the existence of a situation more hazardous than anticipated should result in the evacuation of the field team, contact of the PM, and reevaluation of the hazard and the level of protection required.
- If an accident occurs, the Site Safety and Health Supervisor and the injured person are to complete, within 24 hours, an Accident Report for submittal to the PM, the Health and Safety Program Manager and Human Resources. The PM should ensure that follow-up action is taken to correct the situation that caused the accident or exposure.

12.4. Personnel Medical Surveillance

GeoEngineers employees are not in a medical surveillance program because they do not fall into the category of “Employees Covered” in OSHA 1910.120(f)(2), which states a medical surveillance program is required for the following employees:

1. All employees who are or may be exposed to hazardous substances or health hazards at or above the permissible exposure limits or, if there is no permissible exposure limit, above the published exposure levels for these substances, without regard to the use of respirators, for 30 days or more a year;
2. All employees who wear a respirator for 30 days or more a year or as required by state and federal regulations;
3. All employees who are injured, become ill or develop signs or symptoms due to possible overexposure involving hazardous substances or health hazards from an emergency response or hazardous waste operation; and Members of HAZMAT teams.

12.5. Sampling, Managing and Handling Drums and Containers

Drums and containers used during the cleanup shall meet the appropriate Department of Transportation (DOT), OSHA and U.S. Environmental Protection Agency (EPA) regulations for the waste that they contain. Site operations shall be organized to minimize the amount of drum or container movement. When practicable, drums and containers shall be inspected and their integrity shall be ensured before they are moved. Unlabeled drums and containers shall be considered to contain hazardous substances and handled accordingly until the contents are positively identified and labeled. Before drums or containers are moved, all employees involved in the transfer operation shall be warned of the potential hazards associated with the contents.

Drums or containers and suitable quantities of proper absorbent shall be kept available and used where spills, leaks or rupture may occur. Where major spills may occur, a spill containment program shall be implemented to contain and isolate the entire volume of the hazardous substance being transferred. Fire extinguishing equipment shall be on hand and ready for use to control incipient fires.

12.5.1. Spill Containment Plans (Drum and Container Handling)

Drums will be fitted with secure lids to limit the potential for spills. A spill containment plan will be prepared if required by the client.

12.6. Sanitation

Washrooms are assumed to be present in on-site buildings. If necessary, portable toilets will be provided during work activities.

12.7. Lighting

Field work will be generally conducted during daylight hours; artificial lighting is not anticipated to be necessary.

13.0 DOCUMENTATION TO BE COMPLETED FOR HAZWOPER PROJECTS

The following forms are required for Hazardous Waste Operations and Emergency Response (HAZWOPER) projects:

- Field Log
- Health and safety pre-entry briefing acknowledgment (Form C-1)
- Health and Safety Plan acknowledgment by GeoEngineers employees (Form C-2)
- Contractor's Health and Safety Plan Disclaimer (Form C-3)
- Conditional forms available at GeoEngineers office: Accident Report

The Field Log is to contain the following information:

- Updates on hazard assessments, field decisions, conversations with subcontractors, client or other parties, etc.;
- Air monitoring/calibration results, including: personnel, locations monitored, activity at the time of monitoring, etc.;
- Actions taken;
- Action level for upgrading PPE and rationale; and
- Meteorological conditions (temperature, wind direction, wind speed, humidity, rain, snow, etc.).

14.0 APPROVALS

1. Plan Prepared

Signature Date

2. Plan Approval

PM Signature Date

3. Health & Safety Officer

Wayne Adams

Health & Safety Program Manager Date

FORM C-1
HEALTH AND SAFETY PRE-ENTRY BRIEFING
7100 1ST AVENUE SOUTH SITE
FILE NO. 0275-015-01

Inform employees, contractors and subcontractors or their representatives about:

- The nature, level and degree of exposure to hazardous substances they're likely to encounter;
- All Site-related emergency response procedures; and
- Any identified potential fire, explosion, health, safety or other hazards.

Conduct briefings for employees, contractors and subcontractors, or their representatives as follows:

- A pre-entry briefing before any Site activity is started; and
- Additional briefings, as needed, to make sure that the Site-specific HASP is followed.

Make sure all employees working on the Site are informed of any risks identified and trained on how to protect themselves and other workers against the Site hazards and risks

Update all information to reflect current sight activities and hazards.

All personnel participating in this project must receive initial health and safety orientation. Thereafter, brief tailgate safety meetings will be held as deemed necessary by the Site Safety and Health Supervisor.

The orientation and the tailgate safety meetings shall include a discussion of emergency response, Site communications and Site hazards.

Company Employee

Date	Topics	Attendee	Name	Initials

FORM C-2
SITE SAFETY PLAN – GEOENGINEERS' EMPLOYEE ACKNOWLEDGMENT
7100 1st Avenue South Site
File No. 0275-015-01

(All GeoEngineers' Site workers shall complete this form, which should remain attached to the Safety Plan and filed with other project documentation).

I hereby verify that a copy of the current Safety Plan has been provided by GeoEngineers, Inc., for my review and personal use. I have read the document completely and acknowledge an understanding of the safety procedures and protocol for my responsibilities on site. I agree to comply with all required, specified safety regulations and procedures.

Print Name	**Signature**	**Date**

FORM C-3
SUBCONTRACTOR AND SITE VISITOR SITE SAFETY FORM
7100 1st Avenue South Site
File No. 0275-015-01

I verify that a copy of the current Site Safety Plan has been provided by GeoEngineers, Inc. to inform me of the hazardous substances on site and to provide safety procedures and protocols that will be used by GeoEngineers' staff at the Site. By signing below, I agree that the safety of my employees is the responsibility of the undersigned company.

Print Name **Signature** **Firm** **Date**

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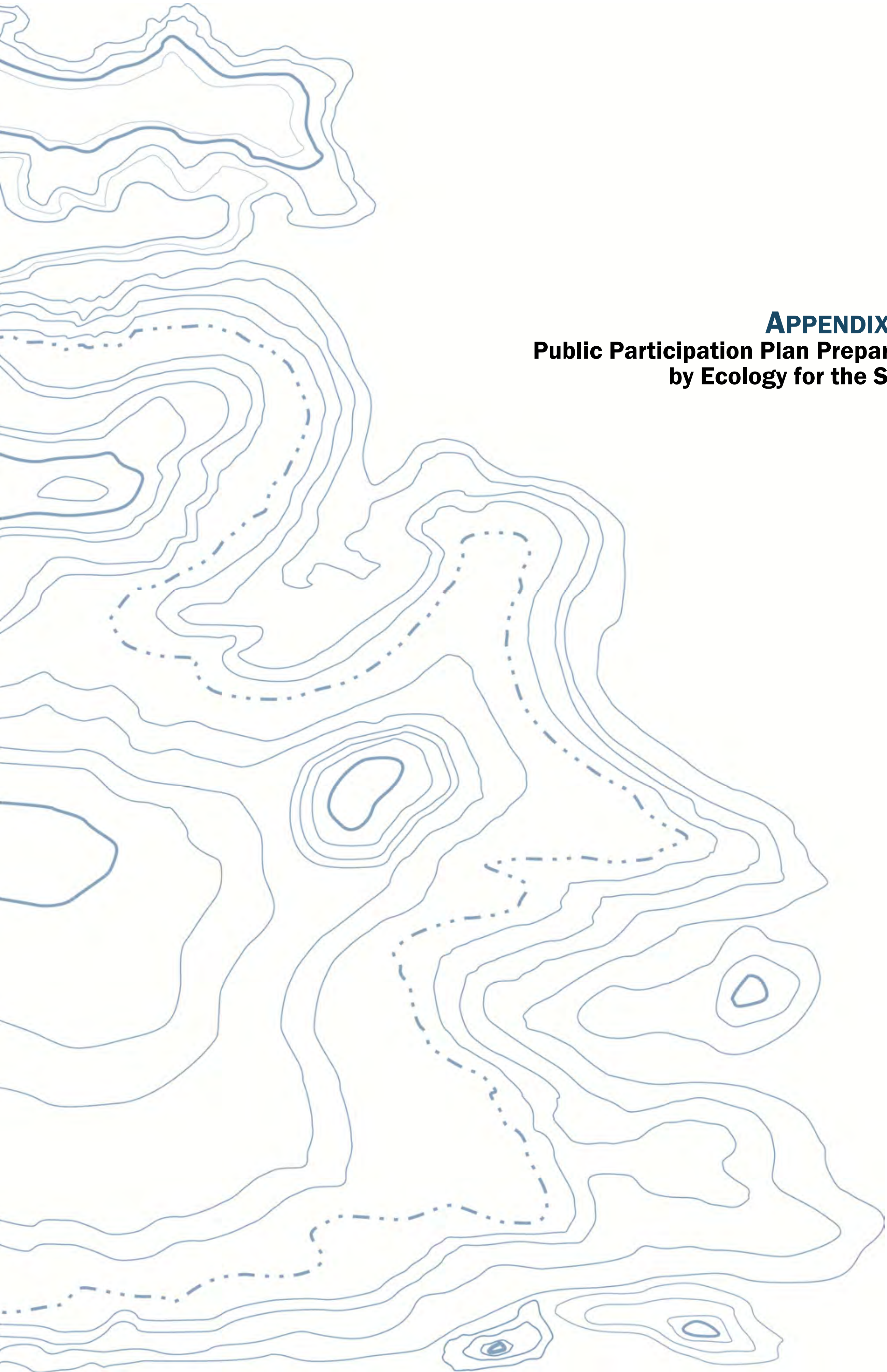
APPENDIX D
Public Participation Plan Prepared by Ecology for the Site



DEPARTMENT OF
ECOLOGY
State of Washington

DRAFT PUBLIC PARTICIPATION PLAN

Douglas Management Dock
SEATTLE, WASHINGTON

Prepared by
Washington State Department of Ecology
3190 160th Avenue SE
Bellevue, WA 98008-5452

March 2011

Table of Contents

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 remedial investigation of the Douglas Management Dock site. 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), 7100 1st Ave. S, Seattle, LLC, have negotiated a legal agreement, called an Agreed Order, to begin cleanup of contamination on the property located at 7100 1st Avenue in Seattle, WA. Under the Agreed Order, the PLPs will conduct a Remedial Investigation (RI) and Feasibility Study (FS) and prepare a Draft Cleanup Action Plan (CAP). 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. The draft CAP will be prepared to propose a cleanup action 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 actions as interim actions under the existing Agreed Order.

Project Description

Location

This site is located at 7100 1st Ave. S in Seattle, Washington on the west side of the Duwamish River (see figure on page eight). It is bordered on the northeast by the

Duwamish River, on the south by the Early Action Area 2 (Trotsky) inlet and the Industrial Container Services – WA, LLC (former Northwest Cooperage Co.) site, and on the west by First Avenue S. The final site boundaries will be defined by the extent of contamination determined during the RI.

Site Background

The Douglas Management Dock site, a 3.1-acre triangle-shaped parcel of land, makes up the northern boundary of the Early Action Area 2 inlet. Early Action Area 2 is an inlet within the LDW Superfund site that was identified during the LDW remedial investigation as an high-priority for sediment cleanup. Early Action Area 2 (EAA-2) is approximately 2.2 miles from the south end of Harbor Island on the west side of the Lower Duwamish Waterway (LDW) Superfund site and just south of the First Avenue S. Bridge in King County, Washington.

EAA-2 consists of a small inlet, approximately 80 feet wide at its mouth and tapering to a narrow stream at its head. The inlet was once part of a large tidal marsh that encompassed the lower 6 miles of the Duwamish River. Sediments in the inlet have accumulated chemical contaminants from numerous sources, both historical and potentially ongoing. Ecology, as the lead agency for source control, is responsible for identifying and reducing ongoing releases of pollutants in order to prevent sediments from being recontaminated once cleanup has been undertaken.

In addition to Douglas Management Dock on the north, the property immediately adjacent to EAA-2 on the south side is currently owned by Herman and Jacqualine Trotsky. The Trotsky property is the current location of Industrial Container Services – WA, LLC (ICS-WA), a steel drum reconditioning facility. Most of the submerged portion of the EAA-2 inlet is owned by Herman and Jacqualine Trotsky, therefore it is often referred to as the Trotsky inlet. Industrial Container Services – WA, LLC is currently under an Agreed Order to conduct a Remedial Investigation, Feasibility Study, and Draft Cleanup Action Plan.

The current location of the Douglas Management Dock property was part of Duwamish Turning Basin No. 2, and aerial photos indicate that the triangular parcel that comprises the Douglas Management Dock site was filled sometime between 1960 and 1969. Prior to the Douglas Management Dock site being filled, the area was the location of Pacific Metal and Salvage Company and Seabell Shipbuilding Company. Pacific Metal and Salvage Company specialized in dismantling, wrecking, and salvaging old boats. Seabell Shipbuilding Company engaged in construction of large wooden vessels. The wooden timbers still present across the EAA-2 inlet were likely associated with this operation.

A sand and gravel batch plant operated at this site for six to nine months in 1977, and from 1977 to1984 it was used for school bus parking and light maintenance. From 1984 to 1993 it was used as a barge terminal, and then entered its current use as an equipment storage yard and barge mooring facility and related activities such as marine cargo handling. The property has frequently been used to transfer gravel imported by barge.

The Douglas Management Dock site is currently used for storage of equipment and shipping containers and as a general transfer facility. The facility has a moorage along the Duwamish Waterway, which is actively used. 7100 1st Ave. S, Seattle, LLC, is the property owner.

Contaminants of Concern

Contamination at this site is due to historical activities. The contaminants of concern in the soil are:

- Heavy metals
- Petroleum hydrocarbons
- Polychlorinated biphenyls (PCBs)

The contaminants of concern in the groundwater are:

- Arsenic
- PCBs
- Petroleum hydrocarbons

The contaminants of concern in the inlet sediments are:

- Polychlorinated biphenyls (PCBs),
- Metals,
- Dioxins and furans,
- Volatile organic compounds.

The contaminants of concern in the adjacent Duwamish River sediments are:

- PCBs
- Polynuclear aromatic hydrocarbons (PAHs)

Previous Cleanup Work

In the early 1990's, samples were collected from soil and groundwater because underground petroleum storage tanks had leaked. Investigations revealed petroleum hydrocarbons in the soil and groundwater. The cleanup action was limited to tank removal.

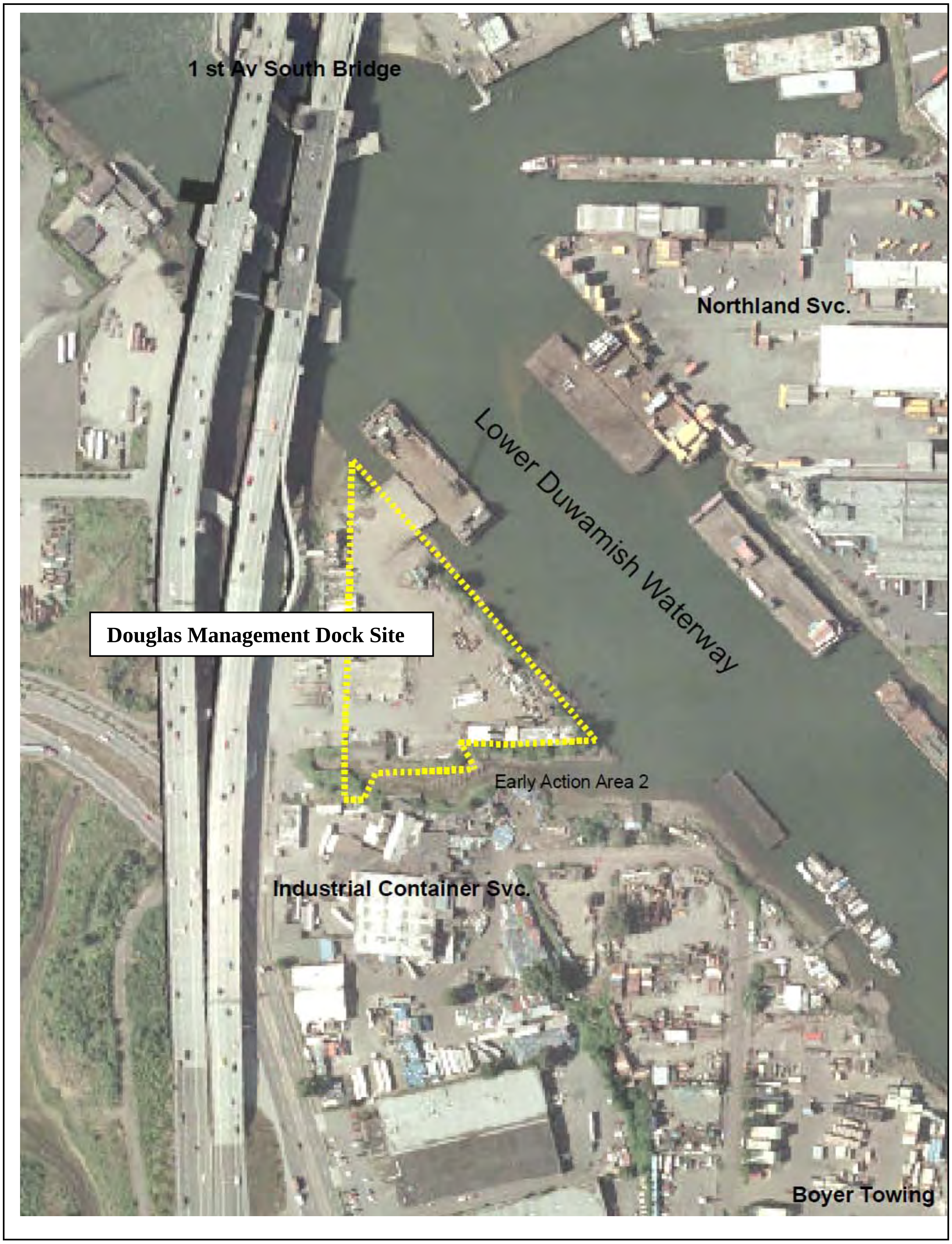
An Ecology contractor, Science Applications International Corporation (SAIC), performed site characterization activities at Douglas Management Dock in June 2008. Five groundwater monitoring wells were installed and four existing site wells were redeveloped and sampled. Soil samples were collected from the borings, and seep and groundwater samples were collected.

Results of the investigation indicated the presence of metals (arsenic, chromium, lead), PCBs, benzene, and petroleum hydrocarbons at concentrations above MTCA cleanup levels in the soil. High concentrations of benzene (59 to 100 μg/L) were detected in groundwater near the center of the Douglas Management Company property in the vicinity of former underground fuel storage tanks and a fuel dispensing location. A report (*Summary of Additional Site Characterization Activities: Trotsky and Douglas Management Company Properties*) was completed in May 2009.

Current Activity

The proposed Agreed Order requires that 7100 1st Ave. S, Seattle, LLC complete a:

- Work Plan
- Remedial Investigation (RI)
- Feasibility Study (FS), and
- A Draft Cleanup Action Plan (DCAP).


1 st Av South Bridge
Northland Svc.
Lower Duwamish Waterway
Douglas Management Dock Site
Early Action Area 2
Industrial Container Svc.
Boyer Towing

Lower Duwamish Waterway (LDW) Site Cleanup

The Douglas Management Dock 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 Douglas Management Dock is located and is known as the Early Action Area 2. 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/biblio/0709002.html

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 Douglas Management Dock 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 Douglas Management Dock 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 site 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 Douglas Management Dock 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:
XXXX

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 Linda Thompson at (360) 407-6069 or by e-mail at ltho461@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 Site Manager, 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 Douglas Management Dock 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 Douglas Management Dock 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.

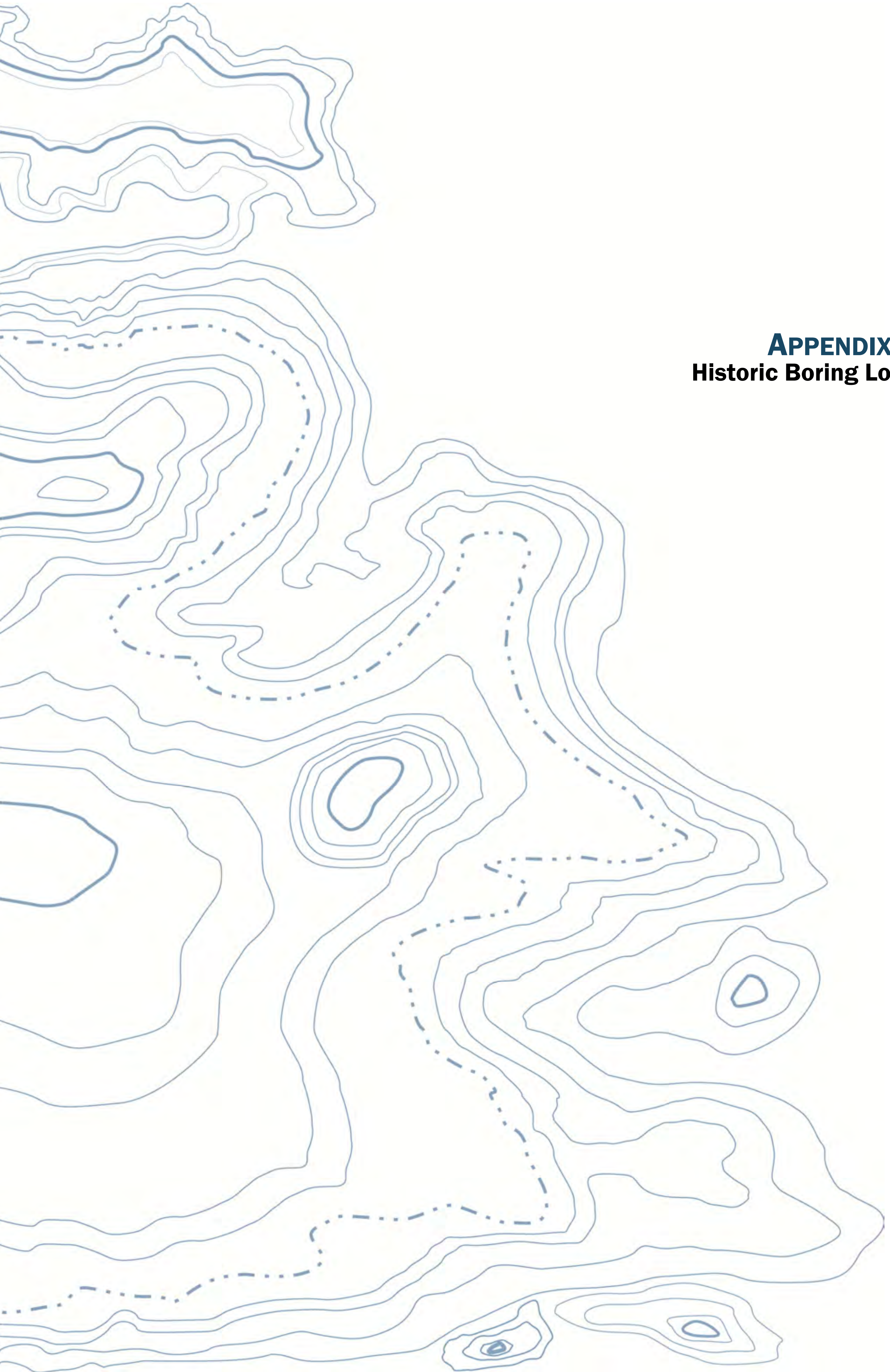
Superfund: The federal government's program to clean up the nation's uncontrolled hazardous waste sites.

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.

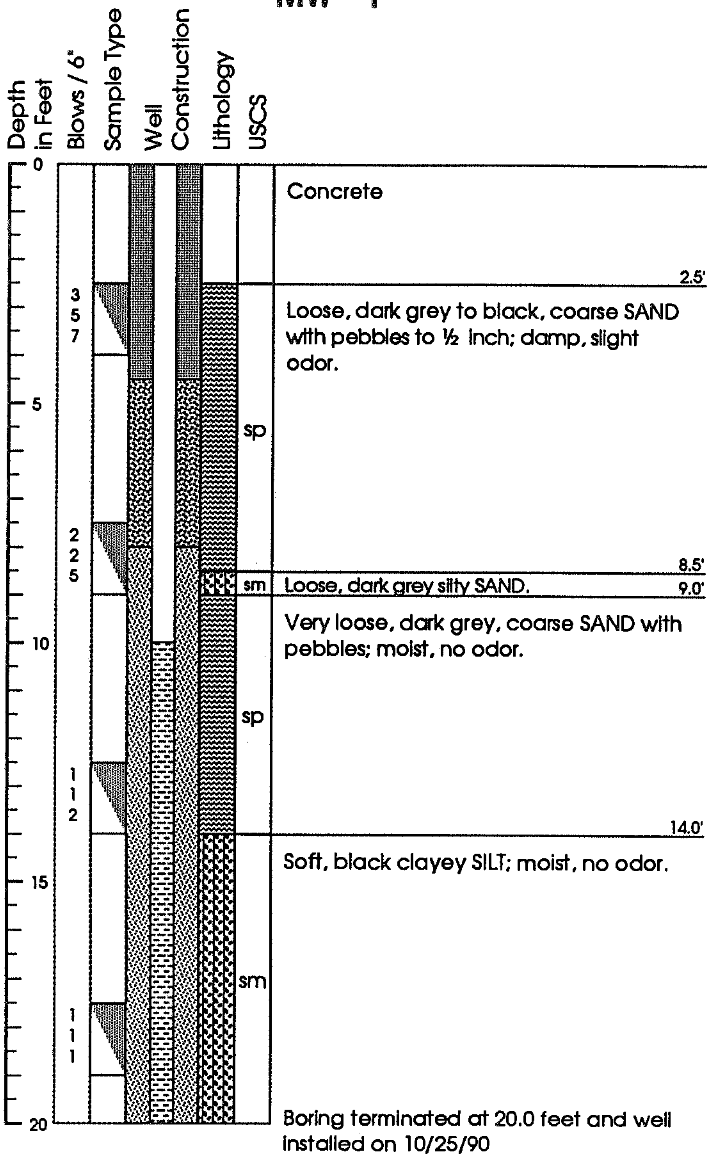
Zinc: Zinc is a metallic chemical element; it has a white color with a bluish tinge. It has a high resistance to atmospheric corrosion. A major use is as a protective coating for iron and steel sheet and wire. Excess zinc in the body interferes with the metabolism of other minerals in the body.



APPENDIX E
Historic Boring Logs

Monitoring Well Construction and Geological Boring Log

MW - 1



Concrete

2.5' Loose, dark grey to black, coarse SAND with pebbles to ½ inch; damp, slight odor.

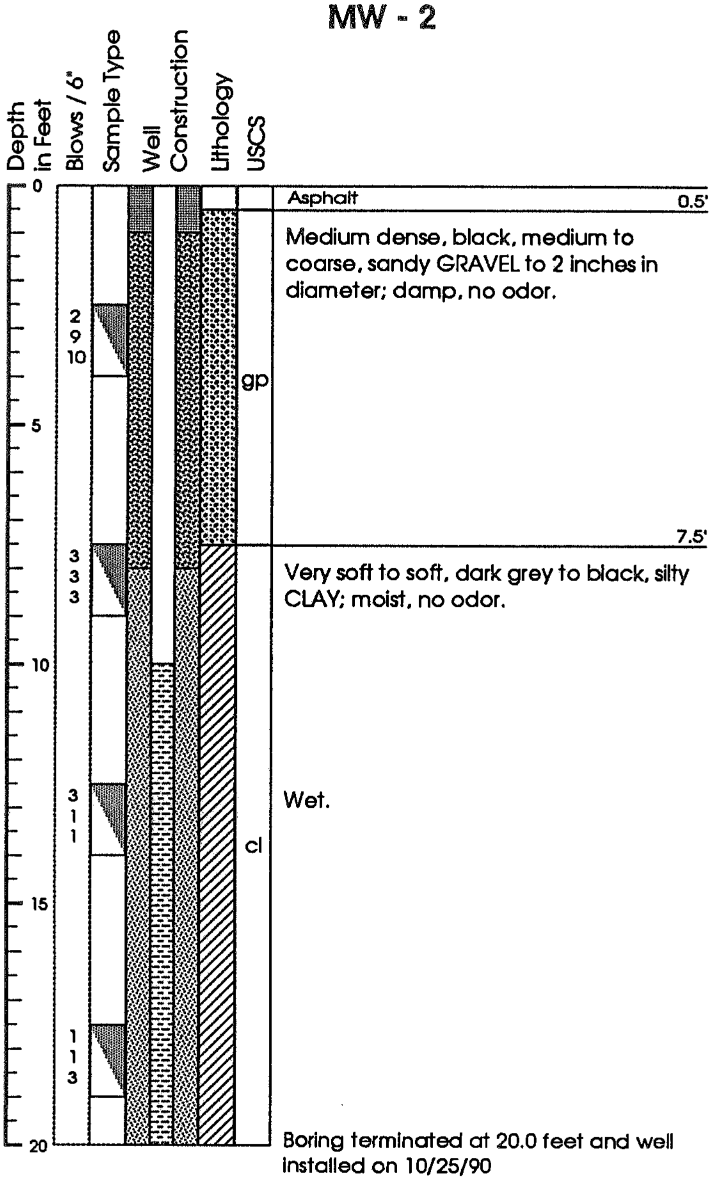
8.5' Loose, dark grey silty SAND.

9.0' Very loose, dark grey, coarse SAND with pebbles; moist, no odor.

14.0' Soft, black clayey SILT; moist, no odor.

Boring terminated at 20.0 feet and well installed on 10/25/90

MW - 2



Asphalt 0.5'

Medium dense, black, medium to coarse, sandy GRAVEL to 2 inches in diameter; damp, no odor.

7.5' Very soft to soft, dark grey to black, silty CLAY; moist, no odor.

Wet.

Boring terminated at 20.0 feet and well installed on 10/25/90

Notes:

Client Name: Alaska Marine Lines
Project Name: 7100 2ND Ave.
Logged By: SW

Drilling Co.: GeoBoring & Development, Inc.
Drilling Method: Hollow-Stem Auger
Reference Elevation: MW - 1 99.84'
MW - 2 99.52'

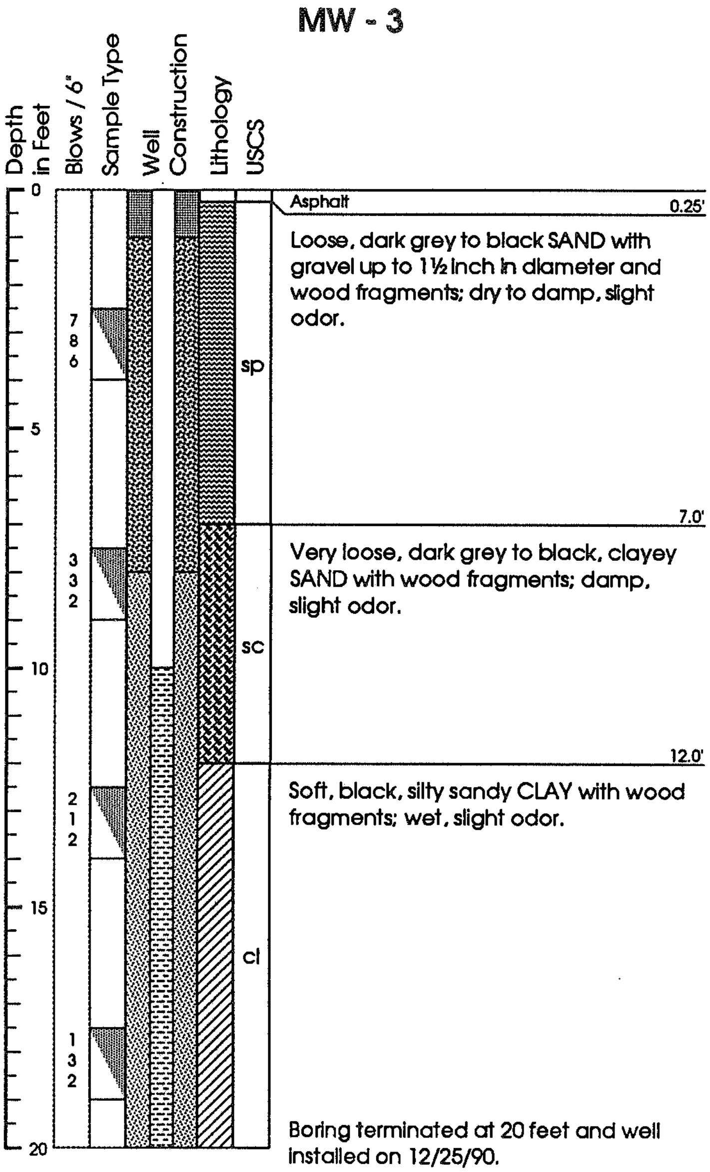
Well Description

Surface Casing: Flush Mounted
Surface Seal: Concrete
Well Casing: 4" Sched. 40, PVC
Well Screen: 0.01" slots, Sched 40, PVC

Filter Pack: 10 - 20 Silica Sand
Seal: Bentonite
Grout: Concrete

Monitoring Well Construction and Geological Boring Log

MW - 3



Asphalt

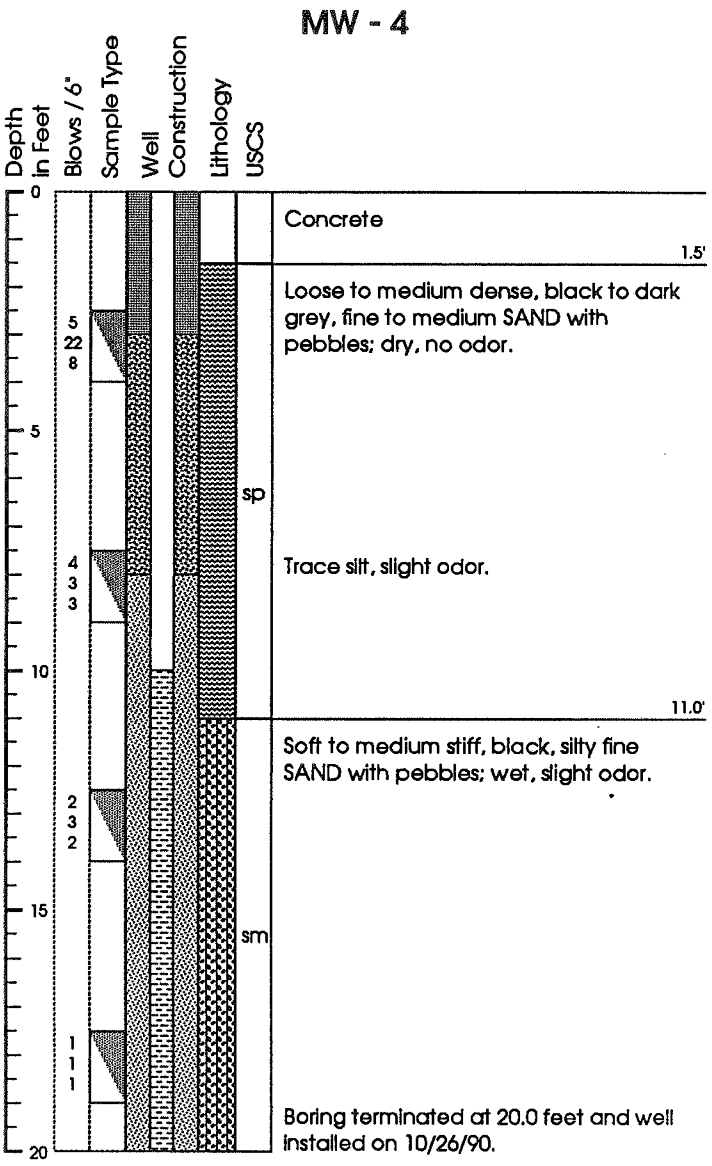
Loose, dark grey to black SAND with gravel up to 1½ inch in diameter and wood fragments; dry to damp, slight odor.

Very loose, dark grey to black, clayey SAND with wood fragments; damp, slight odor.

Soft, black, silty sandy CLAY with wood fragments; wet, slight odor.

Boring terminated at 20 feet and well installed on 12/25/90.

MW - 4



Concrete

Loose to medium dense, black to dark grey, fine to medium SAND with pebbles; dry, no odor.

Trace silt, slight odor.

Soft to medium stiff, black, silty fine SAND with pebbles; wet, slight odor.

Boring terminated at 20.0 feet and well installed on 10/26/90.

Notes:

Client Name: Alaska Marine Lines
Project Name: 7100 2ND Ave.
Logged By: MAC

Drilling Co.: GeoBoring & Development, Inc.
Drilling Method: Hollow-Stem Auger
Reference Elevation: MW - 3 99.71'
MW - 4 99.42'

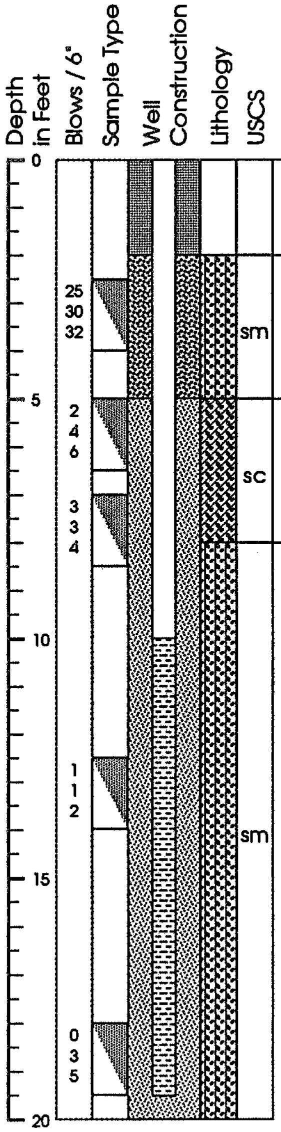
Well Description

Surface Casing: Flush Mounted
Surface Seal: Concrete
Well Casing: 4" Sched. 40, PVC
Well Screen: 0.01" slots, Sched 40, PVC

Filter Pack: 10 - 20 Silica Sand
Seal: Bentonite
Grout: Concrete

Monitoring Well Construction and Geological Boring Log

MW - 5



Asphalt

2.0'

Loose, dark brown to black, silty fine to coarse SAND; dry, slight odor, blow counts are high because of brick debris.

5.0'

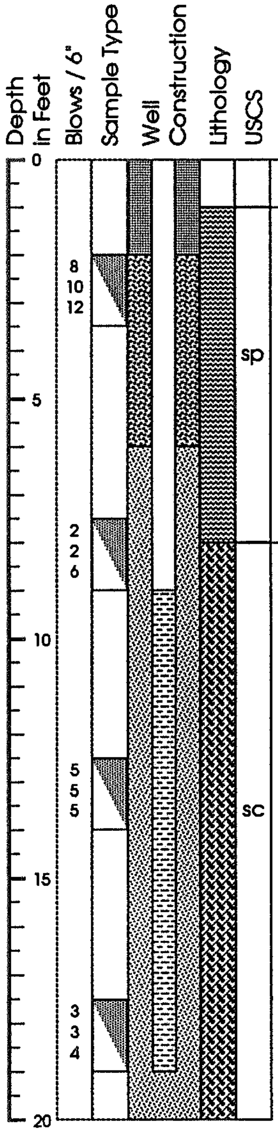
Medium stiff, grey, clayey fine SAND with wood particles; moist, no odor.

8.0'

Very loose to loose, black, silty fine SAND; moist, no odor.

Boring terminated at 20.0 feet and well installed on 1/22/91.

MW - 6



Asphalt

1.0'

Medium dense, black, fine SAND with some coarse grains; dry, no odor.

8.0'

Loose, black, clayey fine SAND with occasional lenses of wood fragments; moist, no odor.

Loose, black, interbedded clayey fine SAND and CLAY; moist, no odor.

Boring terminated at 20.0 feet and well installed on 1/23/91.

Notes:

Client Name: Alaska Marine Lines
Project Name: 7100 2ND Ave.
Logged By: IMW

Drilling Co.: GeoBoring & Development, Inc.
Drilling Method: Hollow-Stem Auger
Reference Elevation: MW - 5 98.32'
MW - 6 98.43'

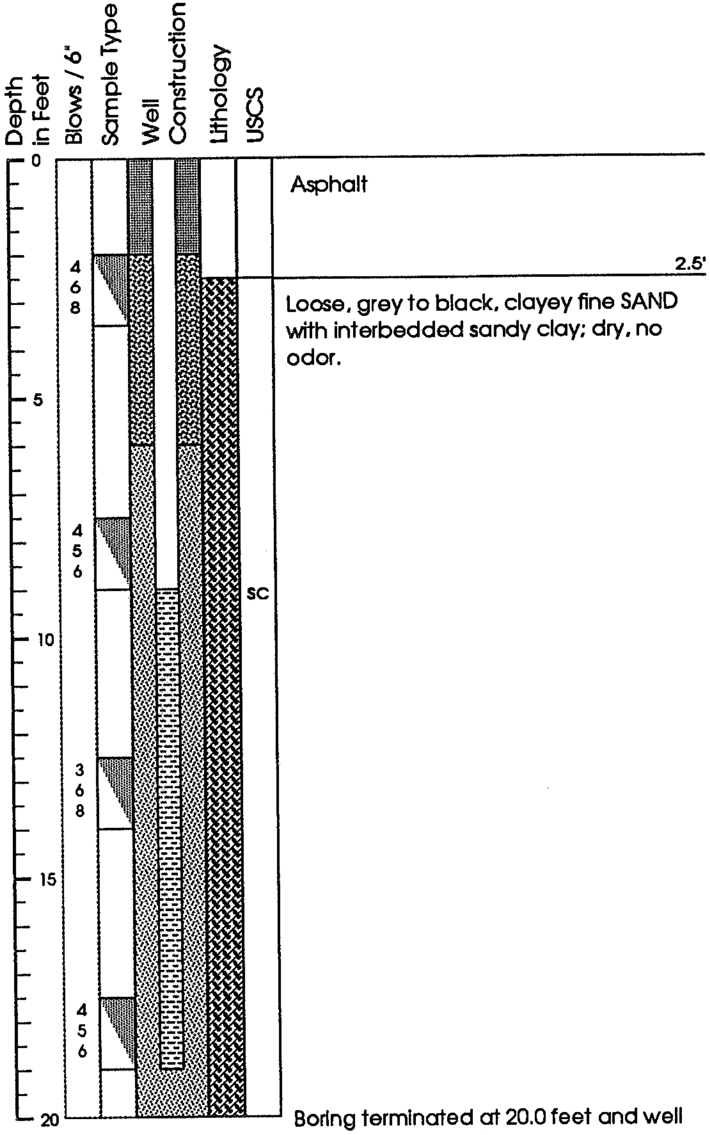
Well Description

Surface Casing: Flush Mounted
Surface Seal: Concrete
Well Casing: 4" Sched. 40, PVC
Well Screen: 0.01" slots, Sched 40, PVC

Filter Pack: 10-20 Silica Sand
Seal: Bentonite
Grout: Concrete

Monitoring Well Construction and Geological Boring Log

MW - 7

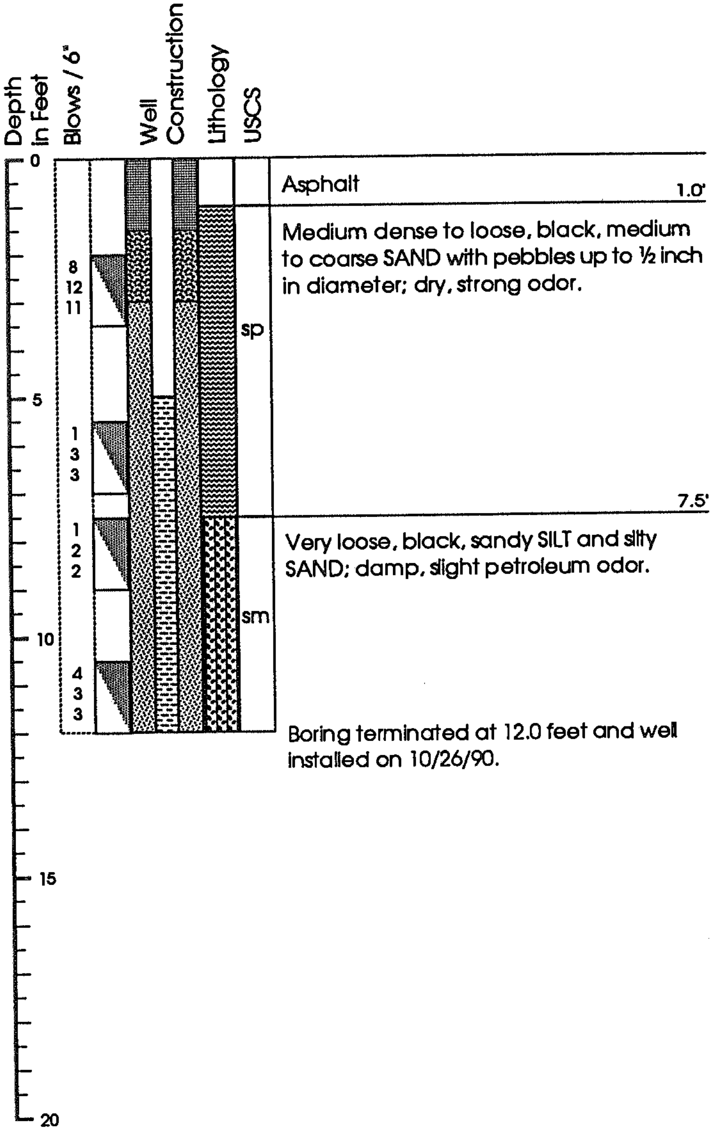


Asphalt

Loose, grey to black, clayey fine SAND with interbedded sandy clay; dry, no odor.

Boring terminated at 20.0 feet and well installed on 1/23/91.

SG - 1



Asphalt

Medium dense to loose, black, medium to coarse SAND with pebbles up to ½ inch in diameter; dry, strong odor.

Very loose, black, sandy SILT and silty SAND; damp, slight petroleum odor.

Boring terminated at 12.0 feet and well installed on 10/26/90.

Notes:

Client Name:	Alaska Marine Lines	Drilling Co.:	GeoBoring & Development, Inc.
Project Name:	7100 2 ND Ave.	Drilling Method:	Hollow-Stem Auger
Logged By:	IMW	Reference Elevation:	MW - 7 99.48'

Well Description

Surface Casing:	Flush Mounted	Filter Pack:	10 - 20 Silica Sand
Surface Seal:	Concrete	Seal:	Bentonite
Well Casing:	4" Sched. 40, PVC	Grout:	Concrete
Well Screen:	0.01" slots, Sched 40, PVC		

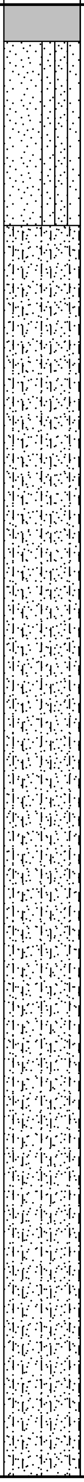
Monitoring Well: MW-8

Project: DMC
Client: Dept of Ecology
Location: Seattle, WA
Logged By: TMK

Date Started: 6/18/2008
Date Completed: 6/18/2008
Driller: Cascade Drilling, INC
Drill Method: Post Hole Dig and HSA

Total Boring Depth: 36.5 ft
Hole Diameter: 8.25 in.
Well Depth: 20 ft
TOC Elevation: ft

Well Diameter: 2 in
Well Screen: 0.010 Slot ft
Filter Pack: 2/12 Sand
Well Casing: Schedule 40 PVC



MOISTURE CONTENT	ORGANIC VAPOR (ppm)	BLOWS/6"	SAMP. INTERVAL	ANALYTICAL SAMPLE	U.S.C.S. SYMBOL	GRAPHIC LOG	DEPTH (ft)	LITHOLOGY/DESCRIPTION	WELL DIAGRAM
								6 inches ASPHALT. Post hole dig to 5 feet below ground surface.	
							1	(SP-SM) Brown fine to medium SAND with silt and ocassional gravel (Fill). Loose, no odor, slight sheen.	
					SP-SM		2		
							3		
							4		
Moist	0.0	6 14 15	☒				5	(SM) Dark brown silty medium to coarse SAND with fine sand and gravel (Fill). Medium dense, no odor slight sheen.	
							6		
							7		
					SM		8		
							9		
Moist	0.0	1 1 2	☒				10	(SM) Dark brown silty fine SAND (Fill). High silt content Loose, no odor, no sheen.	
							11		
							12		
					SM		13		
							14		
Moist	0.0	1 1 2	☒				15	(SM) Black silty fine SAND (Fill). Very loose, no odor, no sheen.	
							16		
							17		
					SM		18		▼
							19		
							20		

Monitoring Well: MW-8

Project: DMC
Client: Dept of Ecology
Location: Seattle, WA
Logged By: TMK

Date Started: 6/18/2008
Date Completed: 6/18/2008
Driller: Cascade Drilling, INC
Drill Method: Post Hole Dig and HSA

Total Boring Depth: 36.5 ft
Hole Diameter: 8.25 in.
Well Depth: 20 ft
TOC Elevation: ft

Well Diameter: 2 in
Well Screen: 0.010 Slot ft
Filter Pack: 2/12 Sand
Well Casing: Schedule 40 PVC

MOISTURE CONTENT	ORGANIC VAPOR (ppm)	BLOWS/6"	SAMP. INTERVAL	ANALYTICAL SAMPLE	U.S.C.S. SYMBOL	GRAPHIC LOG	DEPTH (ft)	LITHOLOGY/DESCRIPTION	WELL DIAGRAM
Wet	0.0	2 2 2	☒					(SM) Black silty fine to medium SAND with shells (Fill). Loose, no odor, no sheen.	
							21		
							22		
					SM		23		
							24		
Wet	0.0	1 3 4	☒				25		
							26	(ML) Black SILT with trace fine sand and shells (Fill). Soft, no odor, no sheen.	
							27		
					ML		28		
							29		
Wet	5.0	2 2 2	☒	MW-08-30			30	(ML) Black SILT with fine sand and ocassional medium to coarse sand and shells (Fill). Very soft, no odor, moderate sheen.	
					ML		31		
							32		
							33	(SM) Black silty fine to medium SAND (likely sluff from above), heaving sands. Very loose, slight odor, no sheen.	
							34		
Wet	0.0	1 2 2	☒		SM		35		
							36		
								Bottom of borehole at 36.5 feet.	
							37		
							38		
							39		
							40		

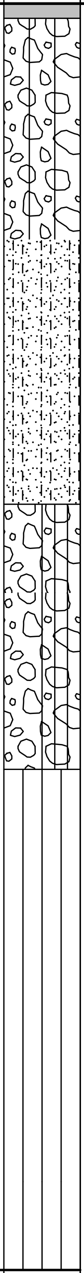
Monitoring Well: MW-9

Project: DMC
Client: Dept of Ecology
Location: Seattle, WA
Logged By: TMK

Date Started: 6/18/2008
Date Completed: 6/18/2008
Driller: Cascade Drilling, INC
Drill Method: Post Hole Dig and HSA

Total Boring Depth: 21.5 ft
Hole Diameter: 8.25 in.
Well Depth: 20 ft
TOC Elevation: ft

Well Diameter: 2 in
Well Screen: 0.010 Slot ft
Filter Pack: 2/12 Sand
Well Casing: Schedule 40 PVC



MOISTURE CONTENT	ORGANIC VAPOR (ppm)	BLOWS/6"	SAMP. INTERVAL	ANALYTICAL SAMPLE	U.S.C.S. SYMBOL	GRAPHIC LOG	DEPTH (ft)	LITHOLOGY/DESCRIPTION	WELL DIAGRAM
								3 iinches ASPHALT. Post hole dig to 4 feet below ground surface.	
							1		
							2		
							3		
Moist	0.0	2 3 3	☒				4	(SM) Tan silty SAND with with gravel (suspect shore stabilization grouting) (Fill). Very dense, no odor, no sheen.	
							5		
					SM		6		
							7		
							8		
							9		
Moist	0.0	6 9 10	☒				10	(GP-GM) Brown sandy GRAVEL with silt and ocassional cobbles and concrete (Fill). Medium dense, no odor, no sheen.	
					GP-GM		11		
							12		
							13		
							14		
Moist	0.0	1 3 3	☒	MW-9-15			15	(ML) Dark brown SILT with organics and trace fine sand. (Fill?). Medium stiff, no odor, no sheen.	
							16		
					ML		17		
							18		▼
							19		
Wet	2.1	2 3 4	☒				20	Same as above.	
							21		
							22	Bottom of borehole at 21.5 feet.	
							23		
							24		
							25		

SAIC
From Science to Solutions

Monitoring Well: MW-10

Project: DMC
Client: Dept of Ecology
Location: Seattle, WA
Logged By: TMK

Date Started: 6/18/2008
Date Completed: 6/18/2008
Driller: Cascade Drilling, INC
Drill Method: Post Hole Dig and HSA

Total Boring Depth: 21.5 ft
Hole Diameter: 8.25 in.
Well Depth: 20 ft
TOC Elevation: ft

Well Diameter: 2 in
Well Screen: 0.010 Slot ft
Filter Pack: 2/12 Sand
Well Casing: Schedule 40 PVC

MOISTURE CONTENT	ORGANIC VAPOR (ppm)	BLOWS/6"	SAMP. INTERVAL	ANALYTICAL SAMPLE	U.S.C.S. SYMBOL	GRAPHIC LOG	DEPTH (ft)	LITHOLOGY/DESCRIPTION	WELL DIAGRAM
Moist	0.0							7 inches ASPHALT. Post hole dig to 5 feet below ground surface.	
					GM		1	(GM) Brown sandy GRAVEL with silt (Base coarse-Fill). Very dense, no odor, no sheen.	
Moist	0.0	1 2 50	☒		ML		2 3 4 5 6 7	(ML) Gray-white SILT with ocassional fine gravel and sand (Fill). Hard, no odor, slight sheen.	
Moist	0.0	8 22 23	☒		GP		8 9 10 11 12	(GP) Tan-gray sandy GRAVEL with silt (Fill?). Very dense, no odor, no sheen.	
Wet	0.0	3 1 1	☒		ML		13 14 15 16 17 18 19	(ML) Black SILT with ocassional gravel and trace organics (Fill?). Very soft, musty odor, no sheen.	▼
Wet	6.0	2 2 1	☒	MW-10-20	ML		20 21	(ML) Same as above.	
							22 23 24 25	Bottom of borehole at 21.5 feet.	

Monitoring Well: MW-11

Project: DMC
Client: Dept of Ecology
Location: Seattle, WA
Logged By: TMK

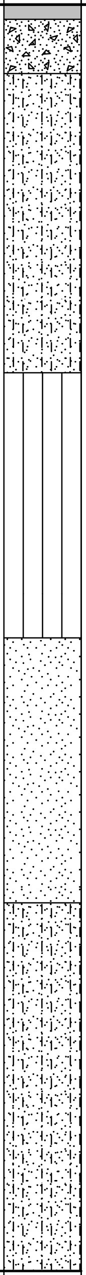
Date Started: 6/19/2008
Date Completed: 6/19/2008
Driller: Cascade Drilling, INC
Drill Method: Post Hole Dig and HSA

Total Boring Depth: 21.5 ft
Hole Diameter: 8.25 in.
Well Depth: 20 ft
TOC Elevation: ft

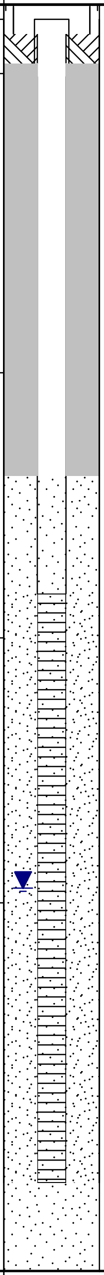
Well Diameter: 2 in
Well Screen: 0.010 Slot ft
Filter Pack: 2/12 Sand
Well Casing: Schedule 40 PVC

MOISTURE CONTENT	ORGANIC VAPOR (ppm)	BLOWS/6"	SAMP. INTERVAL	ANALYTICAL SAMPLE	U.S.C.S. SYMBOL	DEPTH (ft)	LITHOLOGY/DESCRIPTION
							3 inches ASPHALT. Post hole dig to 5 feet below ground surface.
						1	8 inches CONCRETE.
						2 3 4	2 inch root in boring at approximately 5 feet below ground surface.
Moist	0.01	4 3 2	☒		SM	5	(SM) Brown silty fine to medium SAND with coarse sand and ocassional gravel (Fill). Loose, no odor, slight sheen.
					ML	6 7 8 9	(ML) Light brown fine sandy SILT with trace large gravel (Fill). Soft, no odor, slight sheen.
Moist	0.03	4 4 4	☒			10	Same as above.
					SP	11 12 13 14	(SP) Brown medium SAND with trace silt (Fill?). Loose, no odor, slight sheen.
Wet	0.01/0.02	1 1 1	☒	MW-11-15		15	Same as above. Grades to wet.
					SM	16 17 18 19	(SM) Dark brown to black silty fine SAND (Fill?). Very loose, no odor, no sheen.
Wet	0.04	1 1 1	☒		SM	20 21	(SM) Black silty fine SAND with trace organics (Fill?). Very loose, no odor, no sheen.
						22 23 24 25	Bottom of borehole at 21.5 feet.

GRAPHIC LOG



WELL DIAGRAM



Monitoring Well: MW-12

Project: DMC
Client: Dept of Ecology
Location: Seattle, WA
Logged By: TMK

Date Started: 6/19/2008
Date Completed: 6/19/2008
Driller: Cascade Drilling, INC
Drill Method: Post Hole Dig and HSA

Total Boring Depth: 36.5 ft
Hole Diameter: 8.25 in.
Well Depth: 20 ft
TOC Elevation: ft

Well Diameter: 2 in
Well Screen: 0.010 slot ft
Filter Pack: 2/12 Sand
Well Casing: Schedule 40 PVC

MOISTURE CONTENT	ORGANIC VAPOR (ppm)	BLOWS/6"	SAMP. INTERVAL	ANALYTICAL SAMPLE	U.S.C.S. SYMBOL	GRAPHIC LOG	DEPTH (ft)	LITHOLOGY/DESCRIPTION	WELL DIAGRAM
								12 inches ASPHALT. Post hole dig to 4 feet below ground surface.	
Moist	3.7		✋		GP		1 2 3	(GP) Gray-brown fine to coarse sandy GRAVEL with silt (Likely UST fill). Dense, no odor, slight sheen.	
Moist	2.5	50	☒		GP		4 5 6 7 8 9	(GP) Same as above. Grades to very dense. Likely UST fill. Very little recovery.	
Moist	3.6	5 4 5	☒		GP		10 11 12	(GP) Same as above. Valid sample questionable, based on blow count comparison from above. Likely UST fill. Very little recovery. Possible beginning transition into different soil content.	
Wet	28.6/2.1	2 2 1	☒	MW-12-15	SM		13 14 15 16 17 18 19 20	(SM) Brown silty fine to coarse SAND with ocassional gravel (Fill). Loose, slight odor, slight sheen. Very little portion of sample to collect. Black silty fine SAND (Fill?). Very loose, no odor, no sheen.	▼

Monitoring Well: MW-12

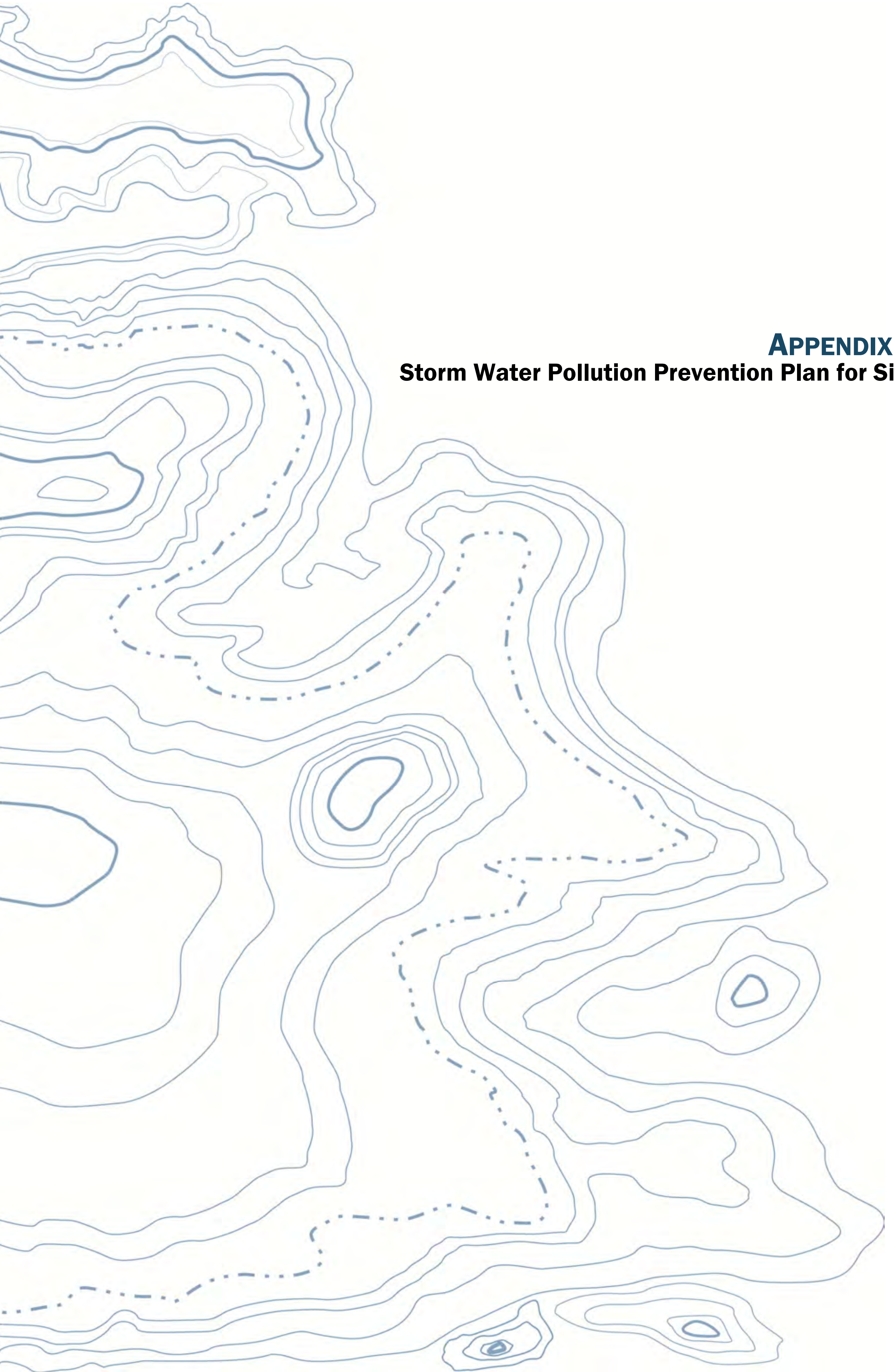
Project: DMC
Client: Dept of Ecology
Location: Seattle, WA
Logged By: TMK

Date Started: 6/19/2008
Date Completed: 6/19/2008
Driller: Cascade Drilling, INC
Drill Method: Post Hole Dig and HSA

Total Boring Depth: 36.5 ft
Hole Diameter: 8.25 in.
Well Depth: 20 ft
TOC Elevation: ft

Well Diameter: 2 in
Well Screen: 0.010 slot ft
Filter Pack: 2/12 Sand
Well Casing: Schedule 40 PVC

MOISTURE CONTENT	ORGANIC VAPOR (ppm)	BLOWS/6"	SAMP. INTERVAL	ANALYTICAL SAMPLE	U.S.C.S. SYMBOL	GRAPHIC LOG	DEPTH (ft)	LITHOLOGY/DESCRIPTION	WELL DIAGRAM
Wet	1.1	2 2 2	☒		SM		21 22 23 24	(SM) Same as above.	
Wet	13.2	1 1 2	☒	MW-12-25	SM		25 26 27	(SM) Black silty fine to medium SAND with organics (Native?). Loose, slight odor, moderate sheen.	
					SP-SM		28 29		
Wet	3.3	4 5 6	☒				30 31 32 33 34	(SP-SM) Black fine to medium SAND with silt. Medium dense, no odor, slight sheen.	
Wet	3.6	6 28 50	☒		SP-SM		35 36	(SP-SM) Same as above.	
							37 38 39 40	Bottom of borehole at 36.5 feet.	



APPENDIX F

Storm Water Pollution Prevention Plan for Site

STORMWATER POLLUTION PREVENTION PLAN

DOCK 2
T-107

September 2012

Prepared by:
Alaska Marine Lines, Inc., and
Freer Consulting Company

TABLE OF CONTENTS

1.0 FACILITY DESCRIPTION AND CONTACT INFORMATION

Alaska Marine Lines, Inc., (AML) provides marine and land transportation services to various ports in Alaska, Canada, and Washington. This permit and SWPPP applies to two locations on the Duwamish Waterway in Seattle, Washington: (1) Dock 2, a transfer point for cargo transported by barge and truck, predominantly dry and refrigerated cargo in 20, 24, 40 and 53-foot containers; and (2) T-107, a satellite storage area for truck trailers and trailer chasses.

1.1 Facility Information

Name of Facility:	**Dock 2**	**T-107**
Operator:	Alaska Marine Lines, Inc	Alaska Marine Lines, Inc
Owner:	Lynden	Port of Seattle
Address:	7100 1st Avenue S Seattle, Washington 98106	5402 W. Marginal Way SW Seattle, Washington 98106
Tax Parcel #:	2924049090	Portion of 1924049103
County:	King	King
Latitude:	47º 32’ 23.86” N	47º 33’ 24.02” N
Longitude	122º 20’ 01.45” W	122º 20’ 59.90” W
Business Hours:	6:00 am to 5:00 pm Monday through Friday	same
SIC Code:	4491 Marine Cargo Handling	
Permit #:	WAR002471-D	WAR002471-D
Estimated area of industrial activity at site exposed to stormwater:	3.1 acres	2.3 acres

1.2 Stormwater Discharge Information

The following stormwater discharge information applies to both Dock 2 and T-107:

Does this facility discharge stormwater into an MS4? ☐ Yes ☒ No

Does this facility discharge stormwater into surface waters? ☒ Yes ☐ No

Name(s) of water(s) that receive stormwater from your facility: Duwamish Waterway

Are any of your discharges directly into any segment of an “impaired” water? ☒ Yes ☐ No

Do you discharge into a receiving water designated as a Tier 2 (or Tier 2.5) water? ☐ Yes ☒ No

1.3 Contact Information/Responsible Parties

Facility Operator

Name: Mark Gaska
Alaska Marine Lines, Inc.
Address: 5615 West Marginal Way SW
Seattle, WA 98106

Telephone Number: (206) 396-1298

Email Address: mgaska@aml.lynden.com

Facility Owner

Facility:	Dock 2	T-107
Name:	7100 1st Ave S. Seattle LLC	Port of Seattle
Address:	18000 International Blvd, Suite 800 Seattle, WA 98188	PO Box 1209 Seattle, WA 98111
Telephone Number:		

SWPPP Contact

Name: Andrew Heuscher
Alaska Marine Lines, Inc.

Telephone Number: (907) 463-9325

Email Address: andrewh@aml.lynden.com

1.4 Stormwater Pollution Prevention Team

The GFS Stormwater Pollution Prevention Team consists of the following members:

Name, Title	**Phone**	**Responsibilities**
Andrew Heuscher	O: (907) 321-1305 Cell: (907) 463-9325	Signatory authority, coordinate all stages of development, implementation, training, recordkeeping and reporting for SWPPP.
Mark Gaska	O: (206) 768-3537 Cell: (206) 396-1298	SWPPP point of contact and lead for execution of BMPs and communication of operational changes that may affect SWPPP.
Eric Linde	O: (206) 768.3551 Cell: (206) 396-1704	Seattle Terminal point of contact for M & R Facility.
Carrie Salters Matt Sneddon Freer Consulting Co.	Cell: (206) 953-4103 Cell: (206) 992-9313	Consultation on all phases of SWPPP development, implementation, reporting, and maintenance.

1.5 General Location Map

The locations of Dock 2 (7100 1st Avenue S.) and T-107 (5402 W. Marginal Way SW) in Seattle, Washington are shown in Figure 1 below:

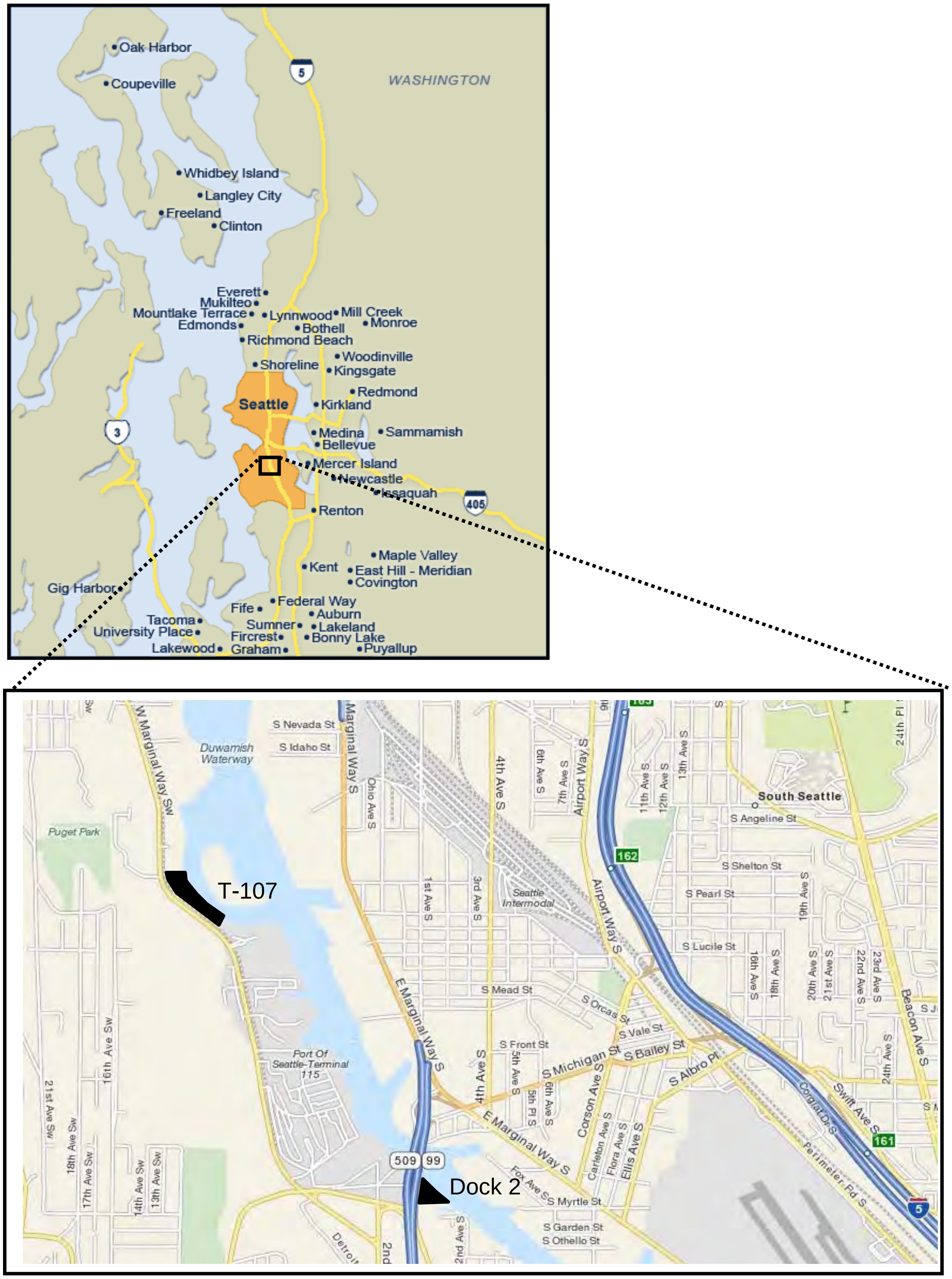


Figure 1: AML Dock 2 and T-107 site location map

1.6 Description of Stormwater Drainage System

Dock 2

Nearly all of the 3.1 acre Dock 2 area is impervious surface. The bulk of the site is paved asphalt, and a small building and mobile office add about 1,940 ft^2 of composite roofing. Some small vegetated areas border the site, particularly where the stormwater outfall discharges to the Duwamish Waterway. See the Site Map and Stormwater Flow diagram below.

An evaluation of AKART methods was conducted for the site. Based on the evaluation, stormwater runoff from paved areas is collected in a stormwater catchment basin network. The catch basins are equipped with filter socks to screen particulate matter from contaminating the stormwater discharge. In addition, the stormwater flows from the catch basins into a Stormwater RX Aquip filtration unit before being discharged into the Duwamish River.

T-107

The T-107 chassis storage yard is approximately 95% hard-packed dirt and gravel. Access to the storage yard from West Marginal Way is paved, and the site is bordered by a narrow strip of trees and other vegetative cover.

Any stormwater runoff from the storage yard drains to the vegetative border areas for infiltration.

1.7 Site Map Showing Stormwater Drainage System

See Appendix A.

2.0 FACILITY ASSESSMENT

2.1 Facility Description

Dock 2

Dock 2 is a staging area for the transfer of cargo and materials to and from trucks, ships, and barges. Loading and unloading of containers with forklifts and trucks constitute the primary industrial activity at Dock 2. Liquid transfers (liquid asphalt) take place on a 40 ft. by 100 ft. cement pad. The pad has ecology-block containment walls, and is graded to prevent spills from contaminating the surrounding area. The liquid asphalt transfers are not conducted by AML but by specialized contractors. Shipping containers are temporarily stored on site, and often stacked to conserve space. Structures at the facility include a permanent office and maintenance building, a mobile office trailer, and several cargo containers that serve as storage sheds.

Regular business hours at AML are Monday through Friday, from 6 am to 5 pm.

T-107

The T-107 has no structures and serves only as a chassis storage area.

2.2 Industrial Activity, Materials Inventory, and Associated Pollutants

Dock 2

Vehicle traffic, and the loading, unloading, and storage of cargo are the primary sources of stormwater contamination at Dock 2. AML periodically utilizes mobile fueling for forklifts onsite by contractors, but diesel trucks are fueled at offsite locations. AML performs only light maintenance associated with unexpected equipment failures, such as changing a flat tire or repairing a damaged container. No vehicle washing is performed on site. A general layout of buildings, storage of raw materials, and vehicular traffic are shown in the Site Map.

All areas associated with industrial activities or exposed materials that are potential sources of pollutants are listed below:

Table 1: Inventory of Potential Stormwater Pollutants

Industrial Activity/ Exposed Materials	Quantity	Location	Materials Exposed?	Associated Pollutants
Light maintenance services	Oil; 12 pints Antifreeze; 6 gallons Hydraulic fluid; 1 gallon Lubricants and grease; 25 lb keg	Dock 2: maintenance onsite as needed; materials stored in cargo containers.	No	Spills associated with maintenance, including, oil and various lubricants, antifreeze, transmission fluid, hydraulic fluid, and windshield wiper fluid.
Mobile fueling	Diesel; 2000 - 3000 gallons	Dock 2: Paved transfer areas where forklifts operate.	No	Source of potential diesel spills.

Industrial Activity/ Exposed Materials	**Quantity**	**Location**	**Materials Exposed?**	**Associated Pollutants**
Liquid transfers	Liquid asphalt; 6 x 1000 gal tanks	Dock 2: Concrete liquid asphalt transfer pad.	No	Source of potential liquid spills.
Galvanized fences and roofs		Dock 2 and T-107: Galvanized fences border entire property except along waterline.	Yes	Source of zinc.
Recycling and waste disposal storage	1 x dumpster	Dock 2: Dumpster near liquid transfer pad.	Partially	Source of potential petroleum-based contaminants, chemicals, food waste, depending on container contents.
Vehicle and equipment parking and storage	Various	Dock 2 and T-107: Various	Yes	Minor leaks from tractors, forklifts, and other vehicles stored on site can be a source of diesel fuel, gasoline, brake fluid, transmission fluid, windshield wiper fluid, lubricants, motor oil, antifreeze, and hydraulic fluid. Tire wear and dust can be a source of zinc and other pollutants found on roadways.
Wood dunnage	Est. 2000 lbs	Dock 2: Various points in yard.	Yes	Potential leaching of chemicals used for treating wood, debris.
Used Tires	4 - 10 tires	Dock 2: Used tires near mobile office, loading ramp.	Yes Yes	Tire wear and dust can be a source of zinc and other pollutants found on roadways.
Scrap metal, metal parts, heavy chains, marine platforms.	Various	Dock 2: Various points in all zones.	Yes	Source of detergents, oils, grease, debris and heavy metals.
Hard pack gravel and dirt areas	2.3 acres	T-107	Yes	Source of sediment, turbidity, and potential leaks from equipment storage.

2.3 Spills and Leaks

Table 2: Areas of Site Where Potential Spills and Leaks Could Occur

Industrial Activity	**Materials**	**Location**	**Outfall**
Maintenance services	New oil Waste oil Hydraulic fluid Antifreeze	Dock 2: Storage in cargo containers.	Dock 2: Outfall #1
Mobile fueling	Tanker truck (variable sizes)	Dock 2: Paved transfer areas where forklifts operate.	Dock 2: Outfall #1
Liquid transfers	Liquid asphalt	Dock 2: Concrete transfer pad.	Dock 2: contained at pad.
Recycling and waste disposal storage	Plastics, glass, aluminum cans, paper, and other garbage.	Dock 2: Dumpster by concrete transfer pad.	Dock 2: Outfall #1
Vehicle parking and storage	Employee parking Forklifts Tractors, chasses and other heavy equipment	Various Various	Dock 2: Outfall #1 T-107: off-site sheet flow

AML records indicate no Reportable Quantity (RQ) spills or leaks have occurred in the past at Dock 2 or at the T-107 satellite area. If future RQ spills or leaks are discovered by GFS they shall be documented according to standard operating procedures and recorded in the SWPPP Spill Log.

3.0 BEST MANAGEMENT PRACTICES

Ecology's *Stormwater Management Manual for Western Washington* defines Best Management Practices (BMPs) as schedules of activities, prohibitions of practices, maintenance procedures, and structural and/or managerial practices, that when used singly or in combination, prevent or reduce the release of pollutants and other adverse impacts to waters of Washington State. Ecology outlines BMPs in terms of three categories: Operational Source Control, Structural Source Control and Treatment. These BMPs are intended to keep stormwater discharges to waters of the state under benchmarks set by the Industrial Stormwater General Permit for the State of Washington (Ecology, 2010).

The three subsections below describe BMPs currently implemented at AML. These BMPs conform with AML's Standard Operating Procedures. Visual monitoring (self-inspection) may identify BMPs that are inadequate or pollutant sources that are not identified or poorly described in the SWPPP. When visual monitoring identifies inadequacies in the SWPPP, it will be modified accordingly.

In addition to the general BMPs specified as mandatory in the ISGP, BMPs associated with eleven industrial-specific activities as listed in Appendix E of Ecology's SWPPP guidelines are applicable to AML, including:

a) Dust Control at Disturbed Land Areas and Unpaved Roadways and Parking Lots
b) Loading and Unloading Areas for Liquid or Solid Material
c) Maintenance and Repair of Vehicles and Equipment
d) Maintenance of Stormwater Drainage and Treatment Systems
e) Mobile Fueling of Vehicles and Heavy Equipment
f) Parking and Storage of Vehicles and Equipment
g) Roof/Building Drains at Manufacturing and Commercial Buildings
h) Soil Erosion and Sediment Control at Industrial Sites
i) Spills of Oil and Hazardous Substances
j) Storage of Liquid, Food Waste, or Dangerous Waste Containers
k) Storage or Transfer of Solid Raw Materials, By-products, or Finished Products

3.1 Operational Source Control BMPs

3.1.1 Good Housekeeping

AML maintains the following good housekeeping practices as part of a stormwater contamination prevention policy:

- Paved surfaces are vacuumed at least once per quarter with a vacuum sweeper (or a sweeper with a vacuum attachment) to remove accumulated pollutants.
- All on-site sources of dust have been identified and controlled to minimize stormwater contamination from the deposition of dust on areas exposed to precipitation.
- All dumpsters are covered with a lid that must remain closed when not in use.

Note: There are no baghouses at either the Dock 2 or T-107 areas, so the required inspections and cleaning of dust from baghouses do not apply.

3.1.2 Industry-Specific Operational Source Control BMPs

a) Operational Source Control BMPs for Dust Control at Disturbed Land Areas and Unpaved Roadways and Parking Lots:

These BMPs apply only to the T-107 area, which is mostly (95%) gravel and dirt, aside from a paved entry/exit area that connects to West Marginal Way. The T-107 area is used as a trailer chassis storage area. During the dry season, AML inspects the storage yard at T-107 for excessive dust build-up, and implements the following BMPs:

- When necessary, the T-107 yard is sprinkled with water for dust control. Care is taken during dust abatement operations to avoid any runoff to the nearby Duwamish River.
- AML uses only water rather than dust suppressant chemicals or motor oil for dust control.
- Generally stormwater from the T-107 does not drain off the site, and there is no conveyance of stormwater TSS into storm drains or receiving waters.

b) Operational Source Control BMPs for Loading and Unloading Areas for Liquid or Solid Material:

Liquid and solid material transfers at Dock 2 include break-bulk operations, cargo in intermodal containers, periodic transfers of liquid asphalt and maintenance items. Areas where liquid or solid materials are transferred include the main transfer yard and the liquid transfer area. Whenever the loading and unloading of liquid and solid materials occurs at the cargo transfer yard or any other part of the site, AML personnel are instructed to carry out the following practices:

- Sweep loading and unloading areas frequently to remove debris or material that could otherwise be washed off by stormwater.
- In cases where outdoor transfers of liquids are made, place drip pans, or other appropriate temporary containment device, at locations where leaks or spills may occur such as hose connections, hose reels and filler nozzles. Drip pans shall always be used when making and breaking connections. Check loading/unloading equipment such as valves, pumps, flanges, and connections regularly for leaks and repair as needed. See mobile fueling BMPs for specific guidelines for fuel transfers.
- Follow AML procedures for loading and unloading to minimize risk of accidental spills, and all provisions of Section 3.1.4 Spill Prevention and Emergency Cleanup.
- Ensure that all loading and unloading procedures at Dock 2 comply with U.S. Coast Guard requirements where applicable.

c) Operational Source Control BMPs for Maintenance and Repair of Vehicles and Equipment:

Regular maintenance and repair is not performed at either Dock 2 or the T-107 area. In the event light maintenance is performed to deal with equipment failure, employees at AML are instructed to carry out the following source control practices for any maintenance and repair of vehicles conducted outside:

- Inspect for leaks all incoming vehicles, parts, 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.
- Remove batteries and liquids from vehicles and equipment in designated areas designed to prevent stormwater 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.

- Do not pour/convey wash water, liquid waste, or other pollutant into storm drains or to surface water.
- Do not connect maintenance and repair shop floor drains to storm drains or to surface water.

d) <u>Operational Source Control BMPs for Maintenance of Stormwater Drainage and Treatment Systems</u>:

AML maintains the following practices related to the maintenance of the stormwater drainage and treatment systems:

- Catch basins and conveyance systems are inspected and cleaned as needed, and assessed for whether improvements in operations and maintenance are needed.
- Where practical, warning signs ("Dump No Waste - Drains to Stream") have been stenciled near storm drains or stamped in catch basin covers.
- Prompt repair of any deterioration threatening the structural integrity of the storm drain system, including replacement of clean-out gates and catch basin lids.
- Where and whenever feasible, ensure that storm sewer capacities are not exceeded and that heavy sediment discharges to the sewer system are prevented.
- Clean woody debris from catch basins as frequently as needed to ensure proper operation of the catch basin.
- Certified liquid vacuum trucks are contracted to dispose of sediments and liquids from the catch basins.
- See 3.1.2 Preventative Maintenance for further BMPs related to the stormwater drainage and treatment system.

e) <u>Operational Source Control BMPs for Mobile Fueling of Vehicles and Heavy Equipment</u>:

Mobile fueling at Dock 2 is carried out by contractors. All mobile fueling operations at AML are approved by the local fire department and comply with local and Washington State fire codes, and are in compliance with all 49 CFR 178 requirements for DOT 406 cargo tanker, with Department of Transportation (DOT) Registered Inspector documentation available onsite as proof of compliance. Mobile fueling does not occur at the T-107 area.

Standard mobile fueling procedures require the presence and the constant observation and monitoring of the driver/operator at the fuel transfer location at all times during fuel transfer and abide by the following procedures at all fuel transfer locations:

- If possible, mobile fuel transfers are carried out at least 25 feet from the nearest storm drain; in the event mobile fueling occurs less than 25 feet from a storm drain, drain covers are used to ensure spilled or leaked fuel does not enter the storm drainage system.
- Take care to avoid any drips, spills or leaks at the fuel transfer point, and use absorbents as proscribed in spill response procedures to clean up even the smallest spills. Place drip pans (liquid tight) or absorbent pads (at least 5 gallon capacity) under each fueling location prior to and during all dispensing operations.
- Make sure surfaces where fuel transfers occur are impervious and kept in good repair.
- Make sure that during the handling and operation of fuel transfer hoses and nozzle, drip pan(s), absorbent pads, and any spills/leaks of fuel are prevented from reaching the ground, storm drains, and receiving waters.

- Use appropriate visual markers such as conspicuously placed fluorescent traffic cones to prevent any traffic from crossing extended fueling hoses across traffic lanes.
- Use automatic shutoff nozzles for dispensing the fuel.
- Do not allow automatic shutoff fueling nozzles to be locked in the open position. Remove the fill nozzle and cessation of filling when the automatic shut-off valve engages.
- Do not "top off" the fuel receiving equipment.
- Replace automatic shut-off nozzles as recommended by the manufacturer.
- Maintain and replace equipment on fueling vehicles, particularly hoses and nozzles, at established intervals to prevent failures.

AML requires that all contractor fueling vehicles are equipped with:

- Adequate flashlights or other mobile lighting to view fill openings with poor accessibility in accordance with fire department lighting requirements.
- Two-way communication with his/her home base.
- Annual training in spill prevention and cleanup measures and emergency procedures.
- A spill kit in all fueling vehicles comprised of:
    - Non-water absorbents capable of absorbing 15 gallons of diesel fuel;
    - A storm drain plug or cover kit;
    - A non-water absorbent containment boom of a minimum 10 feet in length with a 12-gallon absorbent capacity;
    - A non-metallic shovel; and,
    - Two five-gallon buckets with lids.
- A "call down list" of contacts and phone numbers to expedite proper response in the event of a spill, including the local fire department (911), the appropriate regional office of the Department of Ecology, and spill response contractors available in the area if the rapid removal of significant product spillage is needed to prevent contamination of the stormwater drainage system.

The fueling operating procedures described above are signed and dated by the responsible manager, covered in spill prevention training, distributed to the operators, retained in the organization files, and are available when requested by authorized government agencies.

f) <u>Operational Source Control BMPs for Parking and Storage of Vehicles and Equipment</u>:

- All cleaning (sweeping) of parking or storage areas is performed by a contractor and not routed to storm drains.
- Parking and storage areas are not hosed down to a storm drain. Parking lots, storage areas, and driveways are swept regularly to collect dirt, waste, and debris.

g) <u>Operational Source Control BMPs for Roof/Building Drains at Manufacturing and Commercial Buildings:</u>

- If leachates and/or emissions from buildings are suspected sources of stormwater pollutants, AML will sample and analyze the stormwater draining from buildings on site.
- If a roof/building stormwater pollutant source is identified, appropriate source control measures will be implemented.

h) Operational Source Control BMPs for Soil Erosion and Sediment Control at Industrial Sites:

There are very few potential areas for soil erosion and sediment control at the Dock 2 facility. Most pervious areas have some form of vegetative cover, such as trees, shrubs and grass. Catch basins have filter inserts and sumps to capture and settle sediment, and a rock pit is used at the outfall to disperse stormwater discharge and prevent erosion.

The T-107 area is primarily pervious, flat, hard-packed dirt and gravel. Sediment in any sheet runoff is controlled by vegetative strips along the site borders.

i) Operational Source Control BMPs for Spills of Oil and Hazardous Substances:

To guide response to spills of oil or hazardous substances, AML has prepared an Emergency Spill Control Plan (SCP) which includes:

- A description of the facility including the owner's name and address;
- The nature of the activity at the facility;
- Cleanup procedures;
- Notification procedures to be used in the event of a spill, such as notifying key personnel. Agencies such as Ecology, local fire department, Washington State Patrol, and the local Sewer Authority, shall be notified; and
- The name of the designated person with overall spill cleanup and notification responsibility.

The Spill Control Plan is available in the spill kit at Dock 2. AML spill prevention training includes review and implementation of the Emergency SCP. As described in the Emergency SCP, in the event of a spill AML personnel will:

- Immediately notify Ecology and the local Sewer Authority if a spill may reach sanitary or storm sewers, ground water, or surface water, in accordance with federal and Ecology spill reporting requirements; and
- Immediately clean up spills, without emulsifiers for cleanup unless an appropriate disposal method for the resulting oily wastewater is implemented. Absorbent material shall not be washed down a floor drain or storm sewer.

The emergency spill containment and cleanup kit(s) is located near the liquid asphalt transfer pad. The contents of the kit are appropriate for the responding to liquid asphalt spills and other oil spills.

j) Operational Source Control BMPs for Storage of Liquid, Food Waste, or Dangerous Waste Containers:

Storage of petroleum products, hydraulic fluids, and fuel additives are considered dangerous wastes under WAC 173-303. AML stores these materials in compliance with all state regulations and the Uniform Fire Code. Liquids and dangerous wastes are not stored in areas exposed to precipitation. AML maintains the following operational source controls for storage of liquid, food waste, and dangerous wastes as part of a stormwater contamination prevention policy:

- Tight-fitting lids are placed on all containers.
- Drip pans are placed beneath all mounted container taps and at all potential drip and spill locations during filling and unloading of containers in exposed areas or areas that may drain to stormwater catch basins.

  - Container storage areas are inspected regularly for corrosion, structural failure, spills, leaks, overfills, and failure of piping systems, and checked daily for leaks or spills. Containers are replaced and drums tightened as needed.
  - Drums owned by AML are not stored in an area where unauthorized persons may gain access, and secured in a manner that prevents accidental spillage, pilferage, or any unauthorized use.
  - All dumpsters are either maintained with closed lids or kept under cover to prevent the entry of stormwater. Vendors are notified of leaking garbage dumpsters for replacement or repair.
  - If ever drained, dumpsters and/or dumpster pads are not drained to the stormwater drainage system.

k) Operational Source Control BMPs for Storage or Transfer of Solid Raw Materials, By-Products, or Finished Products:

  - The container storage and stockpile areas are not hosed down to a storm drain or to a receiving water.

3.1.3 Preventative Maintenance

Employees at AML are instructed to carry out the following preventative maintenance practices:

- Clean storm drain catch basins when the depth of debris reaches 60% of the sump depth and keep the debris surface at least 6 inches below the outlet pipe whenever design of the catch basin permits.
- Inspect all equipment and vehicles during monthly site inspection for leaking fluids such as oil, antifreeze, etc. Take leaking equipment and vehicles out of service or prevent leaks from spilling on the ground until repaired.
- Immediately clean up spills and leaks (e.g., using absorbents, vacuuming, etc.) to prevent the discharge of pollutants.
- Do not connect floor drains in potential pollutant source areas to storm drains, surface water, or to the ground.

3.1.4 Spill Prevention and Emergency Cleanup

In addition to the following, refer to the Emergency Spill Control Plan available in AML’s standard operating procedures.

- A spill containment and cleanup kit is stored at the liquid asphalt transfer pad, and in each other the contractor’s mobile fueling trucks.
- Immediately upon discovery, stop, contain, and clean up all spills.
- For spills that have reached or may reach a sanitary or storm drain, notify Ecology at (425) 649-7000 and King County (206) 296-7392 immediately. Notification must also comply with federal spill reporting requirements. See also record keeping and BMPs for Spills of Oil and Hazardous Substances.
- Do not flush absorbent materials or other spill cleanup materials to a storm drain. Collect the contaminated absorbent material as a solid and place in appropriate disposal containers.
- Maintain a spill log that includes the following information for chemical and petroleum spills: date, time, amount, location, and reason for spill; date/time clean-up completed, notifications made and staff involved. See Appendix C: Spill Log.

3.1.5 Employee Training

AML shall conduct annual SWPPP training for all employees and will maintain records of employee training. In particular, this will concentrate on pollution prevention strategies such as spill response, good housekeeping, maintenance requirements, material management practices, stormwater run-off characteristics, and environmental impacts of contaminated run-off. Additional informal SWPPP discussions shall be included in the regularly scheduled Safety Meetings.

All personnel who handle hazardous materials or assist in the containment of a spill must be trained in the provisions of the Local Emergency Response Plan. Training of plant personnel involved with the handling/use of hazardous materials shall occur as soon as possible after employment or assignment made to a substantially different position at the facility and in no case, later than six months after employment.

Annual training shall be provided for designated plant personnel including:

a. Procedures for using, inspecting, repairing and replacing plant emergency response equipment and equipment used in monitoring materials.

b. Familiarity with emergency shut-down procedures for fueling operations, aircraft servicing, and any other potential generator of pollution.

c. Communication procedures or alarm systems.

d. Response procedures for releases, fires or explosions.

e. Prevention of ground water contamination incidents.

f. Familiarity with materials safety data sheets consistent with hazard communication program.

g. First-aid training.

h. Personal Protection Equipment.

A record of annual employee stormwater training shall be maintained in Appendix B of the SWPPP.

3.1.6 Inspections

See Section 4.2 for a description of inspections conducted by AML in accordance with ISGP requirements.

3.1.7 Reporting and Record Keeping

See Section 4.3 for a description of reporting and record keeping specified by ISGP requirements.

3.1.8 Illicit Discharges

There is no generation of wash water, process wastewater or noncontact cooling water at the AML Dock 2 facility or T-107 area. To prevent any other illicit discharge at the site, monthly site inspections are conducted to look for signs of illicit discharges including the presence of floating materials, visible oil sheen, discoloration, turbidity, and odor. AML follows a policy of eliminating any unpermitted wastewater discharges to storm drains, ground water, or surface waters.

3.2 Structural Source Control BMPs

Source Control BMPs at AML target freight transfer operations, vehicle and equipment parking and storage, and aim at minimizing exposure to precipitation and runoff as outlined in the *Stormwater Management Manual for Western Washington* and the Industrial Stormwater General Permit guidelines.

Structural Source Control BMPs at AML include:

- Wherever feasible, AML uses grading and curbing to prevent runoff of contaminated flows and divert run-on away from material storage areas, loading and unloading, cleaning, maintenance, and fueling operations. The nature of terminal operations, with extensive areas of the site dedicated to temporary container storage and loading and unloading cargo, makes it difficult to control the flow of runoff and run-on in these areas. Note: no processing or manufacturing takes place at AML.
- Any cleaning operations associated with vehicle and equipment maintenance takes place in a covered area.
- Prohibition against washing vehicles, cargo, and equipment in any way that may co-mingle with stormwater or enter the stormwater drainage system.

In addition to the mandatory BMPs specified in the ISGP, structural BMPs associated with industrial activities that apply to AML as listed in Appendix E of Ecology's SWPPP guidelines are included below:

a) Structural Source Control BMPs for Loading and Unloading Areas for Liquid or Solid Material:

The Dock 2 facility primarily handles the loading and unloading of dry freight in 20, 24, 40 and 53-foot cargo containers. While freight transfer occurs primarily outside, materials are generally not exposed to precipitation. Any occasional loading and unloading of small quantities of liquids (oil, hydraulic fluid, etc.) needed for the maintenance is carried out in a manner consistent with the Uniform Fire Code, and is conducted under covered areas.

- Outside loading and unloading areas are sloped to prevent the pooling of water.
- Catchment basins are located near the loading docks to capture stormwater that would otherwise flow to the shoreline.
- Use of catch basins in the central storage areas has been minimized to avoid being covered by containers or other storage items.

All transfers to above-ground storage tanks (liquid asphalt) are made in the bermed, concrete transfer area.

Loading and unloading operations are not carried out at the T-107 area.

b) Structural Source Control BMPs for Maintenance and Repair of Vehicles and Equipment:

Regular maintenance services are not performed at Dock 2; only occasional light maintenance is performed in outdoor areas when necessary.

- For some light maintenance of vehicles, such as changing tires and minor work on refrigeration generators, it is not practical to conduct in covered areas. These operations generally do not pose a threat to stormwater contamination and are conducted in accordance with operational and treatment BMPs described in this plan.
- All maintenance of refrigeration equipment is conducted with due caution to avoid the release of engine or refrigeration fluids to storm drains or surface waters.
- Large mobile equipment, including mobile fueling tank trucks, tow tractors, and mobile power units are parked in designated areas whenever possible. Due to the immediate response time

needed for cargo loading and unloading, these designated parking areas are not contained and frequently change as operations demand.

c) Structural Source Control BMPs for Mobile Fueling of Vehicles and Heavy Equipment:

Mobile fueling at the Dock 2 facility is carried out by a contractor. Contractors are required to have both:

- Automatic fuel transfer shut-off nozzles; and,
- An adequate lighting system at the filling point.

d) Structural Source Control BMPs for Storage of Liquid, Food Waste, or Dangerous Waste Containers:

Liquid and dangerous wastes are not stored in significant quantities at AML.

- All containers with dangerous wastes or other potential pollutant liquids are kept inside covered areas. Food wastes are not stored onsite but deposited in lidded dumpsters for regular removal.
- Containers are stored in designated covered areas (inside cargo containers) with impervious, curbed floors to contain leaks and spills.

e) Structural Source Control BMPs for Storage or Transfer (Outside) of Solid Raw Materials, By-Products, or Finished Products:

Some materials and products are stored outside at Dock 2 in open bins and piles, such as wood dunnage, heavy chains, cordage, and metal fasteners associated with container transfer operations. Due to the need for immediate access to many of these materials, it is not feasible to cover all these storage areas. Potential erosion and transit of stockpiled materials through stormwater discharge is controlled with filter inserts.

3.3 Treatment Control BMPs

Filter inserts are used in catch basins to treat the stormwater discharge at the Dock 2 facility. Because it is used solely as a chassis storage yard, only BMPs for b) Parking and Storage of Vehicles and Equipment apply to the T-107 area. Additional treatment BMP requirements of relevant industrial activities specified in Appendix E of the Ecology SWPPP guidelines are discussed below:

a) Treatment BMPs for Maintenance and Repair of Vehicles and Equipment

There are no designated and regular maintenance areas at Dock 2 – only light maintenance is performed as needed.

b) Treatment BMPs for Parking and Storage of Vehicles and Equipment

Neither the Dock 2 terminal nor the T-107 area meet the vehicle traffic intensity thresholds for a "high-use" site as defined in the Ecology SWPPP guidelines.

c) Treatment BMPs for Storage of Liquid, Food Waste, or Dangerous Waste Containers

Waste containers are stored in covered areas and not exposed to precipitation. There is no opportunity for contamination of stormwater in waste containment areas.

Prior of any construction or installation, AML will seek Ecology approval of future BMPs that require chemicals to provide treatment.

Tables 4a-b: Treatment BMPs Data Tables

Table 4a:

Treatment BMP:	Catchment Basin Filter Socks		
Date of Implementation:	2009		
Discharge Point:	Duwamish Waterway		
Area Treated:	All Dock 2 drainage zones.		
Pollutants Removed:	Particulate matter, debris.		
Maintenance Requirements:	Cleaning and sediment/debris removal.	Frequency:	As determined by monthly inspections.

Table 4b:

Treatment BMP:	StormwateRX Aquip filtration unit		
Date of Implementation:	2011		
Discharge Point:	Duwamish Waterway		
Area Treated:	All Dock 2 drainage zones.		
Pollutants Removed:	Particulate matter, debris, heavy metals.		
Maintenance Requirements:	Cleaning and sediment/debris removal.	Frequency:	As determined by monthly inspections.

3.4 Erosion and Sediment Control BMPs

The AML Dock 2 facility is largely impervious surfaces, with few potential areas of erosion. In accordance with mandatory BMPs,

- Areas that are not paved are covered with grass, trees, and shrubs to prevent soil erosion.
- Sediment is removed from catch basins during regular cleaning.
- Sock filters are used to control sediment in stormwater runoff.

The AML T-107 area is largely pervious, hard-packed dirt and gravel. In accordance with mandatory BMPs, vegetated filter strips along the site borders are used to minimize sediment loads in stormwater discharges. There are no catch basins or other stormwater collection elements at this site.

4.0 SAMPLING AND MONITORING PLAN

AML conducts stormwater sampling from the designated discharge point at least once per quarter and during the first fall storm event each year in accordance with Ecology requirements. AML conducts monthly visual inspections and records the observations in the visual inspection report forms provided by Ecology – an example is attached in Appendix B.

4.1 Sampling

4.1.1 Discharge Location

Stormwater discharges from the AML Dock 2 facility at one outfall as shown on the Site Map and identified in the table below:

Table 5: Discharge Outfalls

Discharge ID	Common Description	Discharge Type	Comments
Outfall #1	Dock 2 stormwater drainage outfall	Surface Water	Duwamish Waterway

Stormwater does not have a specific discharge point at the T-107 area, but any runoff flows to vegetative strips on site borders for infiltration to ground.

4.1.2 Sampling Location

Sampling occurs at Sampling Point #1 at the Dock 2 facility as shown on the Site Map and identified in the table below:

Table 6: Sampling Locations

Sampling ID	Location	Industrial Activities in Drainage Area
SP-1	Outfall #1 to Duwamish at northwest corner of Dock 2 facility.	Equipment and container storage, vehicle parking lots, mobile fueling, cargo transfer operations.

4.1.3 Substantially Identical Outfall Exception

Stormwater outfall #1 was selected as the stormwater sample locations because it is the sole discharge point, and represents the stormwater discharge and treatment controls at the site. Stormwater is not sampled at the T-107 area under the provisions of Condition S4.B.2 because it infiltrates to ground and does not discharge to surface waters of the state.

4.1.4 Staff Responsible for Sampling

Currently sampling at AML is conducted by an authorized consultant, Freer Consulting Co., as listed in the Pollution Prevention Team.

4.1.5 Sample Collection and Handling

- All samples will be taken as close to the point of discharge as reasonably practical and can be achieved safely.
- AML and/or authorized consultant shall follow Ecology guidelines for sampling. After collecting the samples an authorized AML representative and/or consultant takes the samples to an accredited lab in a lab provided insulated container with ice.
- Sampling is conducted to capture stormwater with the greatest exposure to significant sources of pollution based on an onsite survey. The designated sample point is representative of all stormwater drainage areas.
- If a sample is taken but one or more of the criteria listed above are not met, AML may submit the sample results but must include an explanation with the monitoring report identifying what criteria were not met and why.

4.1.6 Frequency

AML will sample stormwater discharge from the designated location (Outfall #1 – Dock 2) at least once per quarter and submit the laboratory test results in an Ecology approved discharge monitoring report (DMR) format according to the following schedule:

Table 7: Sampling and DMR Submission Schedule

Reporting Period	Months	DMR Due Date
Q1	January – March	May 15
Q2	April – June	August 14
Q3	July – September	November 14
Q4	October – December	February 14

- AML will sample the stormwater discharge from the first fall storm event each year, defined as the first time after October 1st of each year that precipitation occurs and results in a stormwater discharge from the facility.
- All grab samples will be taken within the first 12 hours of stormwater discharge, or as soon as practicable after the first 12 hours, and documentation will be maintained explaining why a sample could not be collected within the first 12 hours.
- AML is not required to sample outside of regular business hours or during unsafe conditions, or during quarters where there is no discharge, but will submit a Discharge Monitoring Report each reporting period.

For submitting sample results to Ecology, see Section 4.3 Reporting and Record Keeping Requirements below.

4.1.7 Sampling Parameters

Sampling is required quarterly as shown below for the duration of the permit unless reported values are in “consistent attainment” – equal to or less than benchmark values for four consecutive quarters.

Table 8: Sampling Parameters and Benchmarks

Parameter	**Units**	**Benchmark Value**	**Analytical Method**	**Laboratory Quantitation Level**	**Minimum Sampling Frequency**
Turbidity	NTU	25	EPA 180.1	0.5	1/quarter
pH	S.U.	5.0-9.0	SM 4500-H+B	0.1	1/quarter
Oil Sheen	Yes/No	No visible oil sheen	N/A	N/A	1/quarter
Copper, Total	µg/L	14	EPA 200.8	2.5	1/quarter
Zinc, Total	µg/L	117	EPA 200.8	25	1/quarter
TSS*	mg/L	30*	SM 2540D	2.0	1/quarter
Lead	µg/L	81.6	EPA 200.8	0.5	1/quarter

* Value for TSS is an effluent limit specified by Condition S6.C of the 2010 Ecology ISWGP for discharges to a 303(d) listed surface water (Duwamish Waterway is 303(d) listed for sediment at the point of discharge.)

**HNO_3 is used as a preservative for testing parameters copper, lead, and zinc.

Holding times for each parameter are as follows: turbidity, 48 hrs.; pH, 15 min.; copper/lead/zinc, 6 mos.; TSS, 7 days.

There are no TMDL requirements for any of the parameters for which the Permittee must test.

Stormwater sampling for Copper, Lead and Hardness was triggered under the previous permit for exceeding benchmarks for Zinc and continued under the new permit until Corrective Actions and consistent attainment eliminate the requirement.

The Industrial General Permit for the State of Washington (Ecology, January 2010) requires adaptive management in the event a notice from Ecology, facility changes, self-inspection, or if monitoring valves exceed benchmark values. If benchmarks are exceeded, the three levels of response are:

Level One Response – Each time a sample exceeds a benchmark, a facility inspection is conducted to identify and evaluate possible sources responsible for the benchmark exceedance. The SWPPP is updated to identify and evaluate additional *Operational Source Control* methods to address the benchmark exceedance. Level One corrective actions are summarized in the Annual Report.

Level Two Response – Whenever an applicable benchmark is exceeded for a single parameter for any two quarters during the calendar year, in addition to the Level One Response, a *Structural Source Control* study is conducted to identify and evaluate possible Structural Source Control BMPs to address the benchmark exceedance. Level Two corrective actions are summarized in the Annual Report.

Level Three Response – Whenever an applicable benchmark is exceeded for a single parameter for any three quarters during the calendar year, in addition to the SWPPP will be reviewed and revised for including appropriate Treatment BMPs with the goal of achieving the applicable benchmarks value in future discharges. A licensed professional engineer, geologist, hydrogeologist, or Certified Professional in Storm Water Quality (except in cases where a waiver is obtained) shall design and stamp the portion of the SWPPP that address stormwater treatment structures or processes. Level Three corrective actions are summarized in the Annual Report.

4.2 Inspections

Qualified personnel at AML will conduct and document visual inspections of the site each month. Each inspection will include the following:

1. Observations made at the stormwater sampling location and all other stormwater drainage areas.
2. Observations for the presence of floating materials, visible oil sheen, discoloration, turbidity, odor, etc. in the stormwater drainage areas and discharge.
3. Observations for the presence of illicit discharges such as domestic wastewater, noncontact cooling water, or process wastewater (including leachate).
4. If an illicit discharge is discovered, Ecology will be notified within seven days.
5. The illicit discharge will be eliminated within 30 days.
6. A verification that the description of potential pollutant sources required under this permit are accurate.
7. A verification that the site map in the SWPPP reflects current conditions.
8. An assessment of all BMPs that have been implemented, noting all of the following:
9. Effectiveness of BMPs inspected.
10. Locations of BMPs that need maintenance.
11. Reason maintenance is needed and a schedule for maintenance.
12. Locations where additional or different BMPs are needed and the rationale for the additional or different BMPs.
13. Freer Consulting Co. personnel and/or supervisory AML personnel will check AML servers for electronic copies of monthly inspections and will follow up with inspecting personnel regarding any problems described in monthly inspection reports.

See Appendix B for the Industrial Stormwater Monthly Inspection Report Form used at AML.

4.2.1 Inspection Results

AML records the results of each inspection in an inspection report or checklist and keeps the records on-site for review. A trend analysis spreadsheet is updated each quarter to monitor sampling results. Each inspection report documents the required observations, verifications and assessments listed above, including:

1. Time and date of the inspection.
2. Locations inspected.
3. Statements that, in the judgment of 1) the person conducting the site inspection and 2) a responsible corporate officer, the site is either in compliance or out of compliance with the terms and conditions of the SWPPP and the permit.
4. A summary report and a schedule of implementation of the remedial actions that will be taken if the site inspection indicates that the site is out of compliance. Remedial actions taken will meet the requirements of the SWPPP and the permit.
5. Name, title, and signature of the person conducting the site inspection attesting to the statement that “I certify that this report is true, accurate, and complete, to the best of my knowledge and belief.”

6. Certification and signature of a responsible corporate officer, or a duly authorized representative of AML.

Monthly follow up action items as a result of the inspection are tracked in a log.

4.3 Reporting and Recordkeeping Requirements

4.3.1 Discharge Monitoring Reports

The first reporting period begins on the effective date of permit coverage. Discharge Monitoring Reports (DMRs) are submitted to Ecology no later than 45 days after the end of each quarter. DMRs are submitted to Ecology at the address below by Freer Consulting Company:

Department of Ecology
Water Quality Program - Industrial Stormwater
P.O. Box 47696
Olympia, WA 98504-7696

4.3.2 Reports of Non-Compliance

AML will prepare a detailed written report of non-compliance identified during an inspection and submit it to Ecology within 30 days. The report will contain:

1. A description of the noncompliance, including exact dates and times.
2. Whether the noncompliance has been corrected and, if not, when the noncompliance will be corrected.
3. The steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

4.3.3 Spill Reporting

Reports on spills of oil or hazardous substances in greater than Reportable Quantities (Code of Federal Regulations Title 40 Parts 302.4 and 117) (including oil, gasoline, or diesel fuel) that causes a violation of the State of Washington's Water Quality Standards or that causes a film or sheen upon or discoloration of the waters of the State or adjoining shorelines or causes a sludge or emulsion to be deposited beneath the surface of the water or upon adjoining shorelines.

To report a spill or to determine if a spill is a substance of a Reportable Quantity, call your Ecology regional office and ask for an oil spill operations or a hazardous waste specialist at (425) 649-7000. Also report any RQ or hazardous waste spills that contaminate stormwater to City of Seattle and King County Stormwater divisions.

4.3.4 Annual Reports

AML will submit a complete and accurate Annual Report to the Department of Ecology no later than May 15th of each year using a form provided by or otherwise approved by Ecology. The report will include corrective action documentation unless it is not yet completed. If not completed, a description of any outstanding corrective action will be included. Each annual report will include the following information:

1. Identification of the condition triggering the need for corrective action review.
2. A description of the problem(s) and the dates they were discovered.
3. A summary of any Level 1, 2 or 3 corrective actions completed during the previous calendar year and the dates of completion for the corrective actions.

4. A description of the status of any Level 2 or 3 corrective actions triggered during the previous calendar year, and the expected date of completion for the corrective actions.

4.3.5 Records Retention

AML shall retain the following reports for a minimum of five years:

- A copy of the Ecology Industrial Stormwater Permit.
- A copy of the permit coverage letter.
- Records of all sampling information specified in S4.B.3 of the permit.
- Inspection reports including documentation specified in S7 of the permit.
- Any other documentation of compliance with permit requirements.
- All BMP maintenance records.
- Copies of all laboratory reports as described in S3.B.4 of the permit.
- Copies of all annual reports, and any other report required by the permit.
- Records of all data used to complete the application for the ISGP.

AML will extend the period of records retention during the course of unresolved litigation regarding the discharge of pollutants or when requested by Ecology. AML will make all documents and records required by this permit immediately available to Ecology or the local jurisdiction upon request; or within 14 days of a written request by Ecology. AML will also make available to members of the public a copy of the SWPPP within 14 days of a written request.

5.0 SWPPP CERTIFICATION

Is this SWPPP certification in response to a Level 1, 2 or 3 Corrective Action? ☐Yes ☐No

If <u>Yes</u>:

- Type of Corrective Action?: ☐Level 1 ☐Level 2 ☐Level 3
- Date SWPPP update/revision completed: <u>9/11/2012 .</u>

Principal Executive Officer Signature

“I certify under penalty of law that this SWPPP 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 information to determine compliance with the Industrial Stormwater General Permit. Based on my inquiry of the person or persons who are responsible for stormwater management at my facility, this SWPPP is, to the best of my knowledge and belief, true, accurate, and complete, and in full compliance with Permit Conditions S3 and S8, including the correct Best Management Practices from the applicable Stormwater Management Manual. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.”

Printed Name * ____________________ Title ____________________

Signature ____________________ Date ____________________

***** Federal regulations require this document to be signed as follows:

For a corporation, by a principal executive officer of at least the level of vice president;

For a partnership or sole proprietorship, by a general partner or the proprietor, respectively; or

For a municipality, state, federal, or other public facility, by either a principal executive officer or ranking elected official.

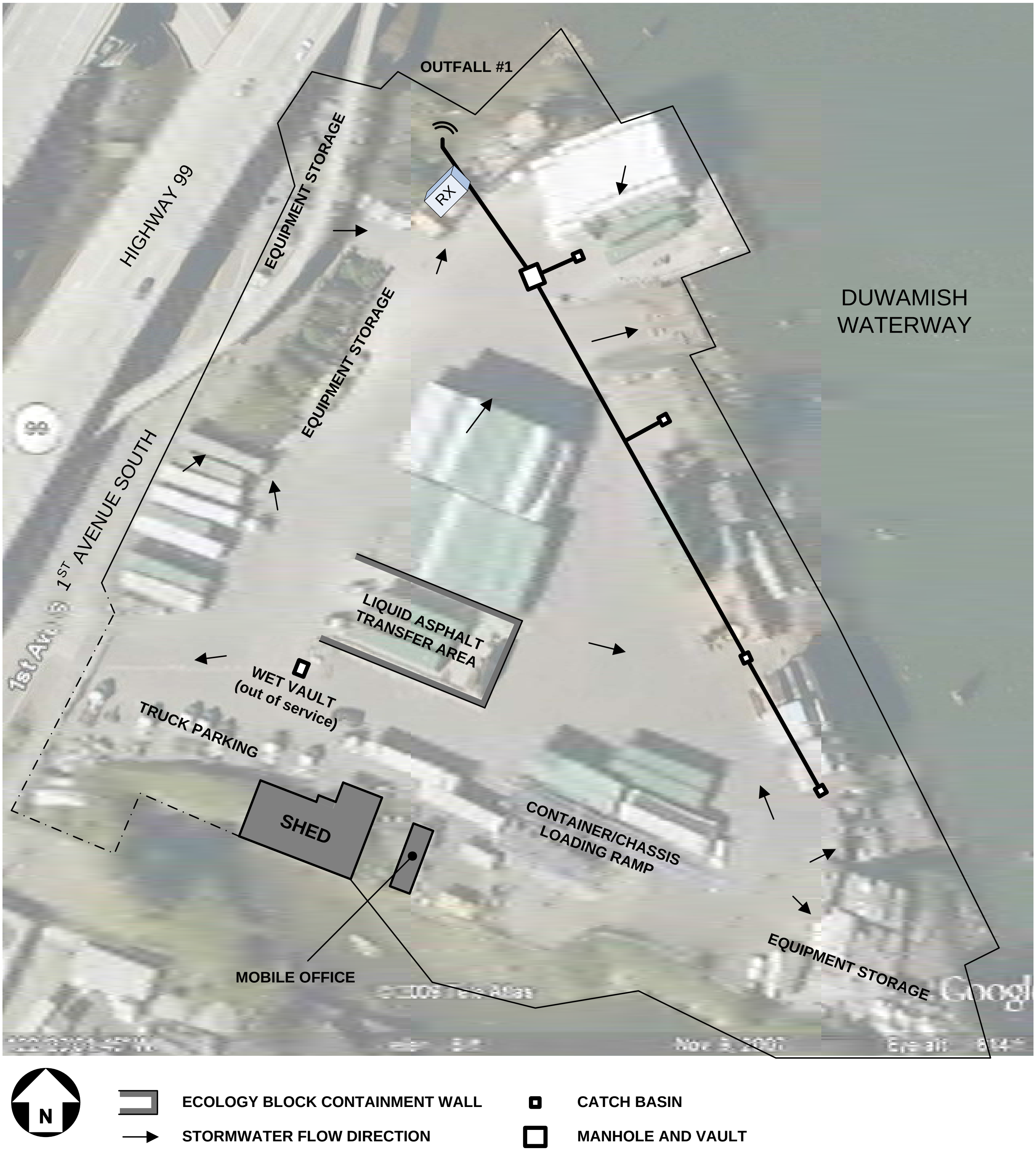
6.0 DOCUMENT REVISION HISTORY

If the facility expands, experiences any significant production increases or process modifications, or changes any significant material handling or storage practices which could impact stormwater, the SWPPP will be amended appropriately. The amended SWPPP will have a description of the new activities that contribute to the increased pollutant loading and planned source control activities.

The SWPPP will also be amended if the state or federal compliance inspection officer determines that it is ineffective in controlling stormwater pollutants discharged to waters.

Date	Preparer	Company	Revision	Corporate Officer/Duly Authorized Official
12/06	Andrew Heuscher	AML	Annual review and revision of SWPPP.	
12/07	Andrew Heuscher	AML	Annual review and revision of SWPPP.	
12/08	Andrew Heuscher	AML	Annual review and revision of SWPPP.	
1/15/10	Andrew Heuscher, Carrie Salters	AML, Freer Consulting	Updated SWPPP to match 2010 Ecology ISGP requirements.	
4/14/10	Matt Sneddon	Freer Consulting	Changed SWPPP format to match 2010 Ecology template.	
4/11/12	Brian Schefke	Freer Consulting	Annual Review; updated site map in App A to include Stormwater RX Unit	
9/11/12	Andrew Heuscher, Carrie Salters	AML, Freer Consulting	Reviewed and approved revisions.	

APPENDIX A – SITE MAP AND STORMWATER DRAINAGE SYSTEM



APPENDIX B – INDUSTRIAL STORMWATER MONTHLY INSPECTION REPORT

Inspections must be conducted by a person with the knowledge and skills to assess conditions and activities that could impact stormwater quality at the facility, and evaluate the effectiveness of best management practices required by this permit. Retain a copy of the completed and signed form in accordance with Permit Condition S9.C.

FACILITY NAME:	**INSPECTION TIME:**	**DATE:**

WEATHER INFORMATION:

- Description of Weather Conditions (e.g. sunny, cloudy, raining, snowing, etc.):
- Was stormwater (e.g. runoff from rain and snowmelt) flowing at outfalls and/or discharge areas shown on the Site Map during the inspection? ☐ Yes ☐ No

Comments:

I. POTENTIAL POLLUTANT SOURCE AREA INSPECTION AND BEST MANAGEMENT PRACTICES EVALUATION

SWPPP and Site Map: Have a copy of the SWPPP and site map with you during the inspection so that you can ensure they are current and accurate. Use it as an aide in recording the location of any issues you identify during the inspection.		**Findings and Remedial Action Documentation:** Describe any findings below and the schedule for remedial action completion including the date initiated and date completed or expected to be completed.
• Is the Site Map current and accurate?	☐ Yes ☐ No	
• Is the SWPPP inventory of activities, materials and products current?	☐ Yes ☐ No	

Any new potential pollutant sources must be added to the map and reflected in the *SWPPP Facility Assessment & Tables 2, 2A, 3 and 5.*

Vehicle/Equipment Areas: ***Equipment cleaning:*** *Check NA if not performed on-site. Skip section.*				**Findings and Remedial Action Documentation:**
Is equipment washed and/or cleaned only in designated areas?	☐ Yes	☐ No	☐ N/A	
• Observe washing: Is all wash water captured and properly disposed of?	☐ Yes	☐ No	☐ N/A	
Equipment fueling: *Check NA if not performed on-site. Skip section.*				
• Are all fueling areas free of contaminant buildup and evidence of chronic leaks/spills?	☐ Yes	☐ No	☐ N/A	
• Are all chemical liquids, fluids, and petroleum products, on an impervious surface that is surrounded with a containment berm or dike that is capable of containing 10% of the total enclosed tank volume or 110% of the volume contained in the largest tank, whichever is greater?	☐ Yes	☐ No	☐ N/A	
• Are structures in place to prevent precipitation from accumulating in containment areas?	☐ Yes	☐ No	☐ N/A	
o If not, is there any water or other fluids accumulated within the containment area? o Note: If containment areas are not covered to prevent water from accumulating, the SWPPP must include a plan describing how accumulated water will be managed and disposed of.	☐ Yes	☐ No	☐ N/A	

Equipment maintenance:				
• Are maintenance tools, equipment and materials stored under shelter, elevated and covered?	☐ Yes	☐ No	☐ N/A	
• Are all drums and containers of fluids stored with proper cover and containment?	☐ Yes	☐ No	☐ N/A	
• Are exteriors of containers kept outside free of deposits?	☐ Yes	☐ No	☐ N/A	
• Are any vehicles and/or equipment leaking fluids? Identify leaking equipment.	☐ Yes	☐ No	☐ N/A	
• Is there evidence of leaks or spills since last inspection? Identify and address.	☐ Yes	☐ No	☐ N/A	
• Are materials, equipment, and activities located so that leaks are contained in existing containment and diversion systems (confine the storage of leaky or leak-prone vehicles and equipment awaiting maintenance to protected areas)?	☐ Yes	☐ No	☐ N/A	

Add any additional site-specific BMPs:

Good Housekeeping BMPs:				**Findings and Remedial Action Documentation:**
1. Are paved surfaces free of accumulated dust/sediment and debris? • Date of last quarterly vacuum/sweep :	☐ Yes	☐ No	☐ N/A	
• Are there areas of erosion or sediment/dust sources that discharge to storm drains?	☐ Yes	☐ No	☐ N/A	
Are all waste receptacles located outdoors: • In good condition?	☐ Yes	☐ No	☐ N/A	
• Not leaking contaminants?	☐ Yes	☐ No	☐ N/A	
• Closed when is not being accessed?	☐ Yes	☐ No	☐ N/A	
• External surfaces and area free of excessive contaminant buildup?	☐ Yes	☐ No	☐ N/A	
2. Are the following areas free of accumulated dust/sediment, debris, contaminants, and/or spills/leaks of fluids? • External dock areas	☐ Yes	☐ No	☐ N/A	
• Pallet, bin, and drum storage areas	☐ Yes	☐ No	☐ N/A	
• Maintenance shop(s)	☐ Yes	☐ No	☐ N/A	
• Equipment staging areas (loaders, tractors, trailers, forklifts, etc)	☐ Yes	☐ No	☐ N/A	
• Around bag-house(s)	☐ Yes	☐ No	☐ N/A	
• Around bone yards	☐ Yes	☐ No	☐ N/A	
• Other areas of industrial activity:	☐ Yes	☐ No	☐ N/A	

Spill Response and Equipment:		**Findings and Remedial Action Documentation:**
Are spill kits available, in the following locations? • Fueling stations • Transfer and mobile fueling units • Vehicle and equipment maintenance areas	 ☐ Yes ☐ No ☐ N/A ☐ Yes ☐ No ☐ N/A ☐ Yes ☐ No ☐ N/A	
Do the spill kits contain all the permit required items? • Oil absorbents capable of absorbing 15 gallons of fuel. • A storm drain plug or cover kit. • A non-water containment boom, a minimum of 10 feet in length with a 12 gallon absorbent capacity. • A non-metallic shovel. • Two five-gallon buckets with lids.	☐ Yes ☐ No ☐ N/A	
Are contaminated absorbent materials properly disposed of?	☐ Yes ☐ No ☐ N/A	

General Material Storage Areas:		**Findings and Remedial Action Documentation:**
• Are damaged materials stored inside a building or another type of storm resistance shelter?	☐ Yes ☐ No ☐ N/A	
• Are all uncontained material piles stored in a manner that does not allow discharge of impacted stormwater?	☐ Yes ☐ No ☐ N/A	
• Are scrap metal bins covered?	☐ Yes ☐ No ☐ N/A	
• Are outdoor containers covered?	☐ Yes ☐ No ☐ N/A	

Stormwater BMPs and Treatment Structures: Visually inspect all stormwater BMPs and treatment structures devices, discharge areas infiltration and outfalls shown on the Site Map.		**Findings and Remedial Action Documentation:**
• Are BMPs and treatment structures in good repair and operational?	☐ Yes ☐ No ☐ N/A	
• Are BMPs and treatment structures free from debris buildup that may impair function?	☐ Yes ☐ No ☐ N/A	
• The permit requires Permittees to clean catch basins when the depth of debris reaches 60% of the sump depth. In addition, the Permittee must keep the debris surface at least 6 inches below the outlet pipe. Based on this, do catch basins need to be cleaned?	☐ Yes ☐ No ☐ N/A	
• Are berms, curbing or other methods used to divert and direct discharges adequate and in good condition?	☐ Yes ☐ No ☐ N/A	

Observation of Stormwater Discharges:		**Findings and Remedial Action Documentation:**
• Is the discharge free of floating materials, visible oil sheen, discoloration, turbidity, odor, foam or any other signs of contamination?	☐ Yes ☐ No ☐ N/A	
• Water from washing vehicles or equipment, steam cleaning and/or pressure washing is considered process wastewater and is not allowed to comingle with stormwater or enter storm drains. Is process water comingling with stormwater or entering storm drains?	☐ Yes ☐ No ☐ N/A	
• Illicit discharges include domestic wastewater, noncontact cooling water, or process wastewater (including leachate). Were any illicit discharges observed during the inspection?	☐ Yes ☐ No ☐ N/A	

II. CORRECTIVE ACTION AND SWPPP MODIFICATIONS DESCRIPTIONS: Additional space to describe inspection findings and corrective actions if needed. Provide brief explanation of the general location and the rationale for the additional or different BMPs.

III. CERTIFICATION STATEMENTS AND SIGNATURES:

Inspector’s Name - Printed	Inspector’s Signature	Inspector’s Title	Date

Permittee – Certification: This section must be completed by the person who conducted the site inspection prior to submitting this form to the person with signature authority (see Permit Condition G2) or a duly authorized representative of that person.

☐ The facility is in compliance with the terms and conditions of the SWPPP and the Industrial Stormwater General Permit.

☐ The facility is out of compliance with the terms and conditions of the SWPPP and the Industrial Stormwater General Permit. This report includes the remedial actions that must be taken to meet the requirements of the SWPPP and permit, including a schedule of implementation of the remedial actions.

“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.”

PRINTED NAME of person with **Signature Authority** (permit condition G2.A) or a **Duly Authorized Representative**[1]	SIGNATURE of person with **Signature Authority** (permit condition G2.A) or a **Duly Authorized Representative**[1]	DATE

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[1] A person is duly authorized representative only if 1) the authorization is made in writing by a person described in Permit Condition G2.A and submitted to Ecology, and 2) the authorization specifies either an individual or a position having responsibility for the overall operation of the regulated *facility*, such as the position of plant manager, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters.

APPENDIX C – SPILL LOG

SPILL LOG

Completed by:______________________________

Title:______________________________

Date:______________________________

List all chemical and petroleum spills and leaks:

Date and Time	Location	Description				Response Procedure		Comments
		Amount	Type of Material	Source, If Known	Reason for Spill/Leak	Notifications Made	Staff Involved	

APPENDIX D – EMPLOYEE STORMWATER TRAINING LOG

Training Topics

STANDARD FOR SITE OPERATIONS PERSONNEL

- Spill Prevention and Response
- Good Housekeeping
- Material Management Practices
- Best Management Practices

POLLUTION PREVENTION TEAM

- SWPPP Implementation
- Monitoring Procedures

Attendee	Type		Date	Initials
	Standard	P2 Team		

APPENDIX E – SAMPLE DOCUMENTATION FORM

FACILITY NAME: Alaska Marine Lines – Dock 2	**SAMPLE DATE:**
SAMPLE LOCATION: SP- 1 Outfall to Duwamish Waterway.	**SAMPLE TIME:**

I. SAMPLE INFORMATION

Sample procedures: follow site specific sampling guidelines when taking stormwater samples.

- Sample method: ☒ Grab ☐ Composite ☐ Other
- Was sample collected within the first 12 hours of a stormwater discharge event? ☐ Yes ☐ No

If not, explanation why:

- Did sample have visible oil sheen? ☐ Yes ☐ No

If yes, what appeared to be the source of oil?

- Samples preserved with ice or cold pack? ☐ Yes ☐ No

II. AUTHORIZATION

PRINTED NAME of sampler	SIGNATURE of sampler	DATE

Note: Per Stormwater General Permit Condition S.4

a. Permittees shall sample the stormwater discharge from the first fall storm event each year. “First fall storm event” means the first time after October 1st of each year that precipitation occurs and results in a stormwater discharge from the facility.

b. Permitees shall collect samples within the first 12 hours of a stormwater discharge event. If it is not possible to collect a sample within the first 12 hours of a stormwater discharge event, the Permittee must collect the sample as soon as practicable after the first 12 hours. This form shall serve as documentation of the explanation why the sample could not be collected within the first 12 hours.

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