Port of Seattle
Lora Lake Apartments Site

Remedial Investigation/ Feasibility Study

Volume II

Appendix F
Lora Lake Apartments Parcel Remedial Investigation Data Report

FINAL

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List of Abbreviations/Acronyms

Abbreviation/ Acronym	Definition
AO	Agreed Order
ARI	Analytical Resources, Inc.
bgs	Below ground surface
BTEX	Benzene, toluene, ethylbenzene, and xylenes
cPAH	Carcinogenic polycyclic aromatic hydrocarbon
1,2-DCA	1,2-Dichloroethane
trans-1,2-DCE	trans-1,2-Dichloroethene
cis-1,2-DCE	cis-1,2-Dichloroethene

Abbreviation/ Acronym	Definition
DMCA	Dredged Material Containment Area
DNAPL	Dense non-aqueous phase liquid
DNR	Do not report
Golder	Golder Associates
LCS/LCSD	Laboratory control sample/laboratory control sample duplicate
LL	Lora Lake
MS/MSD	Matrix spike/matrix spike duplicate
MTCA	Model Toxics Control Act
NAPL	Non-aqueous phase liquid
NTU	Nephelometric turbidity unit
PCE	Tetrachloroethene
PCOC	Preliminary contaminant of concern
PCP	Pentachlorophenol
PID	Photoionization detector
Port	Port of Seattle
ppm	Parts per million
PSB	Primary soil boring
QC	Quality control
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
RPD	Relative percent difference
SR 518	State Route 518
STIA	Seattle-Tacoma International Airport
SVOC	Semivolatile organic compound
TCE	Trichloroethene
TEQ	Toxic equivalency quotient
TOC	Total organic carbon
TPH	Total petroleum hydrocarbons
TSS	Total suspended solids
USEPA	U.S. Environmental Protection Agency
USCS	United Soil Classification System
VOC	Volatile organic compound
WAC	Washington Administrative Code
WSDOE	Washington State Department of Ecology

1.0 Introduction

This data report presents the results of data collection activities conducted according to the Remedial Investigation/Feasibility Study (RI/FS) Work Plan (Floyd|Snider 2010a) for the Lora Lake Apartments Site (Site), located at 15001 Des Moines Memorial Drive in Burien, Washington (Figure F.1), near the northwest corner of Seattle-Tacoma International Airport (STIA). The Site, as defined by the Model Toxics Control Act (MTCA) 173-340-200, includes the Lora Lake Apartments property and areas beyond the property boundary where contamination may have come to be located. The remedial investigations described in this data report focus on the Lora Lake Apartments Parcel (LL Apartments Parcel). Subsequent phases of remedial investigation work were conducted downgradient of the LL Apartments Parcel, at the Lora Lake Parcel (LL Parcel) and the 1982 Dredged Material Containment Area (DMCA). The subsequent work is described in the separate data reports for the LL Parcel and the DMCA in Appendices G and H, respectively.

The LL Apartments Parcel is currently owned by the Port of Seattle (Port) and occupies approximately 8.3 acres of vacant land. The LL Apartments Parcel is bounded to the north by State Route 518 (SR 518), to the east and southeast by Des Moines Memorial Drive, to the west by 8th Avenue South, and to the south by an open area including the former Seattle City Light Sunnydale Substation and other open land parcels that have been cleared from prior commercial land use (Figure F.1).

Historical activities at the LL Apartments Parcel include a barrel-washing facility, an auto wrecking yard, and apartment residences (Lora Lake Apartments). Construction of the Lora Lake Apartments was completed in 1987. Prior to construction, environmental investigations identified soil contamination in the central portion of the site near the former barrel washing operation (Golder 1987). This soil was excavated for off-site disposal, and the Washington State Department of Ecology (WSDOE) determined that no additional investigation was required at that time. In 2007 to 2008, during property transfer transactions with the Port, additional investigations were conducted to prepare for demolition of the Lora Lake Apartments and potential property redevelopment. These investigations identified potential residual contamination at the LL Apartments Parcel. In response to these findings, the Port and WSDOE entered into Agreed Order (AO) No. DE 6703 on July 10, 2009 (WSDOE 2009). The AO Scope of Work requires the Port to prepare an RI/FS Work Plan, conduct a Remedial Investigation (RI) and Feasibility Study (FS), and prepare a RI/FS Report pursuant to Washington Administrative Code (WAC) 173-340-350 in a manner that complies with requirements of the Model Toxics Control Act (MTCA) cleanup regulation, Chapter 173-340 WAC (WSDOE 2007).

This investigation was designed to fill existing data gaps regarding the nature and extent of soil and groundwater contamination at the LL Apartments Parcel. The data collection activities are described in the following sections and were conducted in accordance with the RI/FS Work Plan and Sampling and Analysis Plan/Quality Assurance Project Plan (SAP/QAPP), the supplemental Deep Monitoring Well

Installation Technical Memorandum and SAP, and the Additional Shallow Dioxin Soil Sampling Technical Memorandum (Floyd|Snider 2010a, 2010b, and 2011).

1.1 PHYSICAL SETTING AND PREVIOUS INVESTIGATIONS

The LL Apartments Parcel perimeter is directly by roadways on three sides, with some open lots to the south that have recently been cleared of commercial buildings. The LL Apartments Parcel topography gradually slopes to the southeast with steeper slopes located adjacent to Des Moines Memorial Drive and from the SR 518 embankment to the north, as shown on Figure F.2. The existing LL Apartments Parcel topography was created during construction of the apartment building complex in 1987. To the southeast of the existing property boundary, the topography continues to gradually slope towards Lora Lake.

An active City of Burien stormwater system runs through the LL Apartments Parcel, with a main stormwater line, which also conveys stormwater drainage from the upgradient City of Burien drainage network, entering on the west side and exiting to the east. A second, smaller sub-system drains the northeast portion of the LL Apartments Parcel and conveys water through smaller pipes. This system connects to the adjacent Des Moines Memorial Drive drainage system downgradient of the property and discharges to an outfall located in Lora Lake.

In 2009, following vacancy of the Lora Lake Apartments, all remaining aboveground site structures were demolished and removed from the property. Ground surface coverings such as poured concrete foundations and paved parking areas remain in place. The perimeter of the LL Apartments parcel is secured with a chain-link and razor wire fence with locked gates; access is controlled by the Port with no public access permitted.

Results of previous environmental investigations conducted at the LL Apartments Parcel, as summarized below, are described in detail in Section 4.1 of the RI/FS and are used in conjunction with recent RI results for the evaluation of the nature and extent of contamination at the LL Apartments Parcel and remedial alternatives.

Prior to the construction of the Lora Lake Apartments in 1986, Golder Associates (Golder) identified contaminated material in a concrete waste pit located in the central portion of the parcel, and directly west of the waste pit. The impacted soils were excavated and removed from the site in 1987. In 2007, GeoScience Management conducted a focused soil and groundwater investigation to further evaluate the area previously remediated by Golder in 1987 (GeoScience 2008). Results of the GeoScience Management investigation documented limited exceedances of the selected site screening levels, with soil and groundwater samples generally containing low levels of metals, total petroleum hydrocarbons (TPHs), volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and dioxins/furans.

AECOM, Inc. completed a site-wide sampling and investigation program in March 2008 and a supplemental investigation in August 2008 to further delineate soil, groundwater, and evaluate sub-slab soil vapor contamination (AECOM 2009). Generally, soil and

groundwater samples contained elevated concentrations of metals, TPH, carcinogenic polycyclic aromatic hydrocarbons (cPAHs), and pentachlorophenol (PCP). Limited detections of trichloroethene (TCE) and tetrachloroethene (PCE) were also observed.

1.2 OVERVIEW OF FIELD INVESTIGATION ACTIVITIES

The purpose of the LL Apartments Parcel remedial investigation is to conduct a comprehensive site-wide evaluation by collecting sufficient data to close identified data gaps and provide a complete characterization of the nature and extent of contamination that will allow for recommendation of a cleanup alternative that will meet MTCA criteria and be consistent with the Port's future redevelopment goals for the LL Apartments Parcel. Specific activities completed as part of this field investigation include the following:

- Installation of 13 shallow soil borings by hand auger (SSB-1 to SSB-10 and HA-1 through HA-3) to collect dioxin/furan soil samples.
- Installation of 27 Geoprobe borings site-wide throughout the LL Apartments Parcel (PSB-1 to PSB-8), from within the Central and Eastern Source Areas in the vicinity of the former barrel-washing operations (PSB-9 to PSB-21, PSB-25 to PSB-27), and from within the Northeast Corner (PSB-22 to PSB-24) to collect soil samples for analysis of all site preliminary contaminants of concern (PCOCs).
- Installation of 3 shallow groundwater monitoring wells in the Northeast Corner (MW-12, MW-13, and MW-14) to collect soil and groundwater samples for analysis of all site PCOCs.
- Installation of 3 deep groundwater monitoring wells (MW-15, MW-16, and MW-17) to collect soil and groundwater samples for analysis of select PCOCs and to identify a hydrogeologic confining layer.
- Completion of hydrogeologic slug testing at selected monitoring wells.
- Collection and analysis of groundwater samples from 3 rounds of groundwater monitoring from all monitoring wells (MW-1 to MW-17).

The soil and groundwater sampling locations are shown on Figure F.3.

1.3 REPORT ORGANIZATION

The remaining sections of this report are organized as follows:

- **Section 2.0, Soil Investigation Procedures.** Describes field methods, documentation procedures, and minor work plan deviations for soil investigation activities including soil borings, shallow monitoring well installation, and deep monitoring well installation.

- **Section 3.0, Soil Analytical Results.** Describes laboratory analytical methods and requirements, data quality objectives and compliance, and provides a summary of soil analytical results.
- **Section 4.0, Groundwater Investigation Procedures.** Describes field methods, procedures, and minor work plan deviations for groundwater investigation activities including monitoring well development and sampling.
- **Section 5.0, Groundwater Analytical Results.** Describes laboratory analytical methods and requirements, data quality objectives and compliance, and presents a summary of groundwater analytical results.
- **Section 6.0, Survey Methods and Results.** Describes survey activities completed for soil and groundwater investigation locations.
- **Section 7.0, Hydrogeologic Testing Procedures.** Describes hydrogeologic testing methods, procedures, and minor work plan deviations for hydrogeologic testing, and presents a summary of the hydrogeologic testing results.
- **Section 8.0, Investigation-derived Waste Management.** Provides a summary of investigation-derived waste handling and disposal.
- **Section 9.0, References.** Provides reference information for materials cited in this document.

2.0 Soil Investigation Procedures

Soil investigation activities included soil sample collection and analysis for each area of investigation throughout the LL Apartments Parcel.

The Shallow Soil Dioxin Investigation collected soil samples, for dioxin/furan analysis only, at 18 boring locations, as shown on Figure F.3. The scope of this investigation included:

- Advancement of 8 on-property soil borings via Geoprobe (PSB-1 through PSB-8) to a maximum depth of 6 feet below ground surface (bgs).
- Advancement of 4 on-property archive soil borings via hand auger (SSB-7 through SSB-10) to a maximum depth of 2 feet bgs.
- Advancement of 6 off-property archive soil borings via hand auger (SSB-1 through SSB-6) to a maximum depth of 2 feet bgs, and 3 off-property soil borings via hand auger (HA-1, HA-2, and HA-3) to a maximum depth of 4 feet bgs.

Soil samples were collected at specific depth intervals at each boring location, and were either immediately analyzed for dioxins/furans or archived for potential future analysis using the tiered analysis approach in accordance with the LL Apartments RI/FS Work Plan (Floyd|Snider 2010a).

The Central and Eastern Source Areas Investigation installed and collected soil samples from 16 primary subsurface Geoprobe borings (PSB-9 through PSB-21, PSB-25, PSB-26, and PSB-27) to determine the nature and extent of soil contamination in these areas of the LL Apartments Parcel (Figure F.3).

The Northeast Corner Petroleum Hydrocarbon Investigation installed and collected soil samples from three primary on-property Geoprobe soil borings (PSB-22, PSB-23, and PSB-24), and three groundwater monitoring wells surrounding and upgradient of MW-6 to identify a potential source of the petroleum hydrocarbons detected in groundwater in this area, and to delineate the lateral extents of groundwater contamination in MW-6 (Figure F.3).

Soil samples were also collected from the installation of three deep groundwater monitoring wells installed within the central area of the LL Apartments Parcel (Figure F.3). The deep monitoring wells were installed on the property in order to provide further information regarding subsurface geologic and hydrogeologic conditions, and also to assess the potential for dense non-aqueous phase liquid (DNAPL) contamination at depths below the vertical extents of previous LL Apartments Parcel investigations.

These activities are described in detail below based on the soil procedures used for sample collection. The chemical analyses performed on the collected soil samples and the results of chemical analyses are discussed in Section 3.0.

2.1 PRIMARY SOIL BORING GEOPROBE SOIL SAMPLING

Twenty-seven primary soil borings (PSBs) were installed by Geoprobe for soil sample collection. The rationale for these borings varied by area, as described below:

- Delineation of shallow dioxin/furan contamination in on-property soils (PSB-1 through PSB-8)
- Delineation of multiple PCOCs in soil in the Central and Eastern Source Areas (PSB-9 through PSB-21 and PSB-25 through PSB-27)
- Investigation of potential sources of TPH contamination to Northeast Corner groundwater (PSB-22 through PSB-24)

The following sections describe the methods and procedures implemented for all PSB soil boring installations.

2.1.1 Field Procedures

Soil borings were installed using direct-push technology (e.g., Geoprobe) by Cascade Drilling of Woodinville, Washington, between July 28, 2010 and August 25, 2010. Borings were advanced from the ground surface until saturated soils were encountered below the water table, generally at a depth between 10 and 20 feet bgs. Samples were collected continuously in 4- or 5-foot-long disposable sample tubes for geologic logging in accordance with the procedures described in the RI/FS Work Plan (Floyd|Snider 2010a). Soil samples were described and classified according to the United Soil Classification System (USCS) and photographed. Soil sample locations are shown in Figure F.3. Boring logs are included in Attachment F.1.

At each boring location, samples were collected for laboratory analytical testing. Sample intervals varied depending on the location and rationale for the boring location. For locations PSB-1 through PSB-8, only shallow soil samples were collected for the analysis of dioxins/furans. The analytical sample intervals at each location are: 0 to 0.5 feet bgs, 1.5 to 2.0 feet bgs, 2.0 to 4.0 feet bgs, and 4.0 to 6.0 feet bgs. For the Central and Eastern Source Areas (PSB-9 through PSB-21), in addition to the intervals listed above, soil samples were collected at the geologic contact between fill and native soils, and at the groundwater table. Borings PSB-25, PSB-26, and PSB-27 were added to the sampling plan in the field to provide additional delineation of metals and TPH concentrations in the Central and Eastern Source Areas. In these borings, samples were collected from the four shallow intervals as listed above, as well as at the groundwater table, and immediately above and below the groundwater table. In the Northeast Corner (PSB-22, PSB-23, and PSB-24), samples were collected from the intervals listed above for both the shallow dioxin soil samples, and the Central and Eastern Source Areas and additionally samples were collected in the vadose zone above the groundwater table, and in saturated soils a few feet below the groundwater table for evaluation of petroleum in the vadose zone.

Field screening was conducted to identify areas of potential contamination according to the methods described in the RI/FS Work Plan (Floyd|Snider 2010a). Soil samples were field-screened to identify intervals potentially contaminated with volatile constituents using a photoionization detector (PID). PID screening involved placing soils into a sealed Ziploc bag, and agitating the sample. The PID monitor was then placed in the sealed bag to measure volatile concentrations in the sample headspace. PID readings were recorded on the boring logs. Visual observations of contamination, such as staining and sheen, were also monitored and documented on the boring logs. The presence of sheen was screened by placing a small volume of soil in a stainless-steel bowl of water. Sheens forming on the surface of the water were then recorded. Visual and olfactory indications of contamination were also recorded on the boring logs.

Analytical sample collection followed the procedures outlined in the RI/FS Work Plan (Floyd|Snider 2010a). Soil was removed from the disposable sampling tube within the sample interval of interest (e.g., 2 to 4 feet bgs) and placed into a decontaminated stainless-steel bowl for homogenization. Following homogenization, the sample material was placed into laboratory-supplied glass sample containers, with the lid tightly sealed, labeled, and immediately placed in a cooler maintained at a temperature of approximately 4º C using crushed ice. If a particular sample was to be analyzed for VOCs, samples were collected directly from the sampling tube using U.S. Environmental Protection Agency (USEPA) Method 5035A for VOC compounds prior to sample homogenization. Samples were delivered on ice to Analytical Resources, Inc. (ARI) in Tukwila, Washington, under standard chain-of-custody procedures.

2.1.2 Field Observations and Documentation

As part of sample collection, the following information was recorded on the Soil Boring Logs:

- Date, time, and name of the person logging the sample
- Weather conditions
- Sample location number
- Soil sample depth and soil description
- Sample recovery
- Presence of debris
- Presence of sheen or any other indications of contamination

Generally, soils were dry to damp, silty sands with gravels. Occasional clay lenses were observed in some borings. Black staining was observed in several borings (PSB-6, PSB-9, PSB-9A, PSB-11, PSB-15, PSB-16, PSB-23, and PSB-25) at depths ranging from 1 foot to 15 feet bgs. Some debris was also observed, including a small piece of concrete debris observed in PSB-5, small brick and cinder pieces in PSB-12 at 9 feet bgs, and a small brick fragment in PSB-15 at 2.5 feet bgs.

In addition to staining and debris, hydrocarbon odors and/or sheens were observed in the following borings:

- PSB-9A—very slight sheen between 8.75 and 9.1 feet bgs.
- PSB-10—slight hydrocarbon odor at 7 feet bgs.
- PSB-11—hydrocarbon odor and very slight sheen at 3.5 feet and slight hydrocarbon odor from 0 to 5 and 15 to 20 feet bgs.
- PSB-16—very slight odor and sheen at 1 and 10 feet bgs.
- PSB-15—slight chemical odor from 12 to 23 feet bgs.

2.1.3 Minor Work Plan Deviations

Minor deviations from the work plan occurred during installation of the Geoprobe borings. Additional soil borings were installed, sampling procedures were modified based on recovery issues, and there was incomplete analytical sample collection resulting from a field error. These minor deviations are discussed below.

Three additional soil borings (PSB-25, PSB-26, and PSB-27) were installed in the Central and Eastern Source Areas, following preliminary evaluation of field data, to assist with delineating the identified main source area near the location of the former barrel-washing operations (Figure F.3). Soil samples were collected generally at the same depth intervals as the other primary soil borings to be analyzed for: metals in the 0 to 0.5 feet bgs, 1.5 to 2 feet bgs, and 2 to 4 feet bgs intervals; metals, diesel, and heavy oil range TPH at 4 to 6 feet bgs; and TPH only in intervals deeper than 6 feet. This additional sampling protocol was determined necessary to further delineate metals and TPH concentrations in this area after evaluating the preliminary soil analytical results from the surrounding PSB locations.

In one location, PSB-9, the target penetration depth could not be achieved at the selected sampling location. Refusal occurred at 10 feet bgs, and was likely a result of the boring location on the uphill side of a rock retaining wall. The boring was abandoned at 10 feet bgs, and relocated approximately 35 feet to the east of the target location, on the downslope side of the rock retaining wall. This new boring location was identified as PSB-9A. Samples were collected from PSB-9A in accordance with the RI/FS Work Plan. Samples were collected from location PSB-9 and held in archive, with the exception of a sample from the 8.5 to 9.5 feet bgs interval that exhibited staining and was analyzed for metals, cPAHs, PCP, and TPH. Boring logs for PSB-9 and PSB-9A are included in Attachment F.1. All other soil borings were located and installed in accordance with the work plan.

In the majority of boring locations, the large sample volume required for analytical testing necessitated multiple Geoprobe penetrations to obtain sufficient sampling volume. When multiple boring installations were required, material from all comparable boring intervals was homogenized in a stainless-steel bowl prior to sample collection. At the following locations, modification to the sample collection intervals was required to

obtain sufficient sample volume where multiple co-located borings did not produce enough soil for complete sample suite collection:

- PSB-14—4 to 6 feet bgs interval was collected from 4 to 7 feet.
- PSB-19—top two intervals collected from 0 to 1 foot bgs and 1 to 2 feet bgs. No sample collected from 4 to 6 feet due to repeated recovery issues in this interval.
- PSB-25—top two intervals collected from 0 to 1 foot bgs and 1 to 2 feet bgs.
- PSB-26—shallow soil samples collected from 0 to 2 feet bgs, 2 to 4 feet bgs, and 4 to 7 feet bgs.

Due to field error during sample collection, the following deviations from the RI/FS Work Plan (Floyd|Snider 2010a) occurred:

- PSB-5—sample collected from 4 to 5 feet bgs interval rather than 4 to 6 feet bgs interval.
- PSB-11—no VOC sample collected from 23 to 24 feet bgs.
- PSB-16—additional sample collected for metals, cPAH, PCP, and heavy oil range TPH from the 9.5 to 10 feet bgs interval where soils exhibited oxide staining.
- PSB-22, PSB-23, and PSB-24—additional diesel and heavy oil range TPH samples collected from 0 to 0.5 feet bgs, 1.5 to 2 feet bgs, 2 to 4 feet bgs, and 4 to 6 feet bgs intervals (scope of RI/FS Work Plan included intervals surrounding groundwater table only).
- PSB-23 and PSB-24—no VOC samples collected from 0 to 0.5 feet bgs, 1.5 to 2 feet bgs, 2 to 4 feet bgs, and 4 to 6 feet bgs intervals.

2.2 SECONDARY SOIL BORING HAND AUGER SOIL SAMPLING

2.2.1 Field Procedures

Eight off-property soil borings (SSB-1 through SSB-6, HA-2, and HA-3) and five on-property soil borings (SSB-7 through SSB-10, HA-1) were installed to delineate lateral extents of shallow dioxin contamination in soils. These shallow borings were installed using a hand auger, with samples collected at two depth intervals (0 to 0.5 feet and 1.5 to 2.0 feet bgs) for the “SSB-” boring series and at three depth intervals (0 to 0.5 feet, 1.5 to 2 feet, and 2 to 4 feet bgs) for the “HA-” boring series. The hand auger has a cutting end (bit) that advances the device through the subsurface as it is manually turned. A disturbed soil sample was collected and lifted within the auger to the surface where the sample was transferred to a decontaminated stainless-steel bowl for description, field screening, and sample collection. Soil sampling locations are shown in Figure F.3.

The soil samples were visually classified in accordance with USCS, and consistent with the procedures used during Geoprobe and auger soil sampling. Soil descriptions were recorded on a Soil Boring Log (Attachment F.1) and photographed.

Prior to analytical sample collection, soil samples were homogenized until uniform in color and texture. Samples collected for dioxin analysis from the hand-auger boring locations were placed in laboratory-provided glass jars. Sample containers were filled, tightly capped, labeled, and immediately placed in a cooler maintained at a temperature of approximately 4º C using crushed ice. Samples were delivered to ARI in Tukwila, Washington under standard chain-of-custody procedures.

2.2.2 Field Observations and Documentation

As part of sample collection, field observations were described on Soil Boring Logs as described in Section 2.1.2. No sheen, odors, or other indications of contamination were observed in any of the hand-auger boring soil samples (SSB-1 through SSB-10, HA-1 through HA-3). Generally, soil types consisted of dry, silty sands with gravels. Subsurface debris in the form of paper was observed in the relocated SSB-2 (discussed in Section 2.2.3 below), and decayed wood chips (i.e., garden mulch) were observed in SSB-8. Small debris, such as marbles, and other small discarded items were encountered in Boring SSB-9, and scraps of plastic geotextile-type material were encountered in HA-1.

2.2.3 Minor Work Plan Deviations

In one location, SSB-2, the required penetration depth could not be achieved at the selected sampling location. Refusal occurred at 0.5 feet bgs. The boring was abandoned and relocated within 10 feet of the target location. Refusal occurred again at 1.5 feet bgs. At this location, due to refusal, soil samples were collected from 0 to 0.5 feet bgs and 1 to 1.5 feet bgs. Soil samples from the original boring location were not collected for laboratory analysis. The relocated boring location was recorded in the field logbook, and is shown in Figure F.3. All other shallow hand auger soil borings were completed in accordance with the RI/FS Work Plan and the Additional Shallow Dioxin Soil Sampling Technical Memorandum (Floyd|Snider 2011).

2.3 SHALLOW WELL INSTALLATION SOIL SAMPLING

2.3.1 Field Procedures

2.3.1.1 Well Installation

Three shallow monitoring wells (MW-12, MW-13, and MW-14) were installed in the northeast corner of the LL Apartments Parcel on August 2, 2010 following the “Minimum Standards for Construction and Maintenance of Wells” from WAC 173-160 and procedures described in the RI/FS Work Plan (WSDOE 2008, Floyd|Snider 2010a). Well locations are shown in Figure F.3. Well installation was completed by Cascade Drilling

of Woodinville, Washington, using standard hollow-stem auger (HSA) techniques. The well screen placement was determined in the field based on inferred groundwater elevations at each well location. The monitoring wells were constructed with screen intervals of 10 to 15 feet. Screens were set such that the bottom of the screened interval would remain submerged during seasonal groundwater table lows and the top of the screen would remain above the groundwater table during seasonal highs.

All wells were constructed of 2-inch diameter, flush-threaded, Schedule 40 PVC well casing and screen. Well screen assemblies consisted of a 10-foot to 15-foot length of 0.020-inch (20-slot), flush-threaded, machine-slotted, Schedule 40 PVC set in a 10/20 sand or equivalent silica sand filter pack. The sand pack in each well extended 2 feet above the top of the screened interval. The remainder of the annular space was then sealed with hydrated bentonite chips to within 2 feet of the ground surface. Quick-setting cement was used to bring the well completion to grade and seal the monument.

The monitoring wells were secured with flush-to-ground locking steel protective monuments and labeled with a permanent marker on the well cover. All installed monitoring wells were surveyed by a Port-licensed surveyor (refer to Section 6.0). During installation, well construction details were recorded on the Well Installation Logs, which are included in Attachment F.2.

2.3.1.2 Soil Sampling

Split-spoon soil samples were collected during the installation of the three shallow monitoring wells described above. During sampling, soil samples were described and classified according to the USCS and photographed. Spilt-spoon soil samples were collected continuously from the ground surface to a depth of 6 feet, then every 2.5 feet continuing until saturated soils were encountered below the water table, generally at a depth of approximately 20 to 25 feet bgs.

Field screening was conducted to identify areas of potential contamination according to the methods described in the RI/FS Work Plan. Soil samples were field-screened to identify intervals potentially contaminated with volatile constituents using a PID, as well as with visual observations as described above in Section 2.1.2. Visual and olfactory indications of contamination were also recorded on the well installation logs.

Soil samples for chemical analysis were generally collected from the intervals 0 to 0.5 feet bgs, 1.5 to 2.0 feet bgs, 2.0 to 4.0 feet bgs, and 4.0 to 6.0 feet bgs, depending on the soil recovery in the sampler. Additional samples were collected at the groundwater table and at the depth with the highest indication of hydrocarbon contamination based on visual observations, sheen tests, and PID readings. In total, eight samples were collected from MW-12, seven from MW-13, and five from MW-14. Soil sample collection information is documented on the Well Installation Logs (refer to Attachment F.2). For analytical sample collection, soil was removed from the split-spoon sampler and placed into a decontaminated stainless-steel bowl for homogenization. Prior to sample homogenization, soil samples were collected directly from the split-spoon sampler using USEPA Method 5035A for VOC compounds. Following

homogenization, sample containers were filled, tightly capped, labeled, and immediately placed in a cooler maintained at a temperature of approximately 4º C using crushed ice. Samples were delivered to ARI in Tukwila, Washington, on ice and under standard chain-of-custody procedures.

2.3.2 Field Observations and Documentation

As part of sample collection, field observations were recorded as described in Section 2.1.2. The soils in the MW-12 boring were composed primarily of silty sand, grading to sand close to the water table with a 3-inch silt lens at 11 feet bgs. No odors or sheen were observed. MW-13 had less silt content in shallower samples than MW-12, with significant gravels and interbedded lenses of silt at depth. No odors or sheen were observed. MW-14 also had significant gravels at approximately 3.5 feet, which required repeated drives of the sampler for sample collection. A very slight sheen was observed at 16.5 feet bgs; however, no other sheen or odors were observed.

2.3.3 Minor Work Plan Deviations

Because of Washington State Department of Transportation (WSDOT) right-of-way access restrictions along the northern parcel border fence at the time of monitoring well installation, MW-13 was moved approximately 10 feet south of its proposed location in the RI/FS Work Plan. This well was installed within the parcel boundary, and its revised location is shown in Figure F.3.

Additionally, some soil sampling intervals were altered or omitted because of recovery issues. These include the 4 to 6 feet bgs interval of MW-12, which was collected from 4 to 5.5 feet bgs, and the 4 to 6 feet bgs interval of MW-14, which was not collected.

2.4 DEEP MONITORING WELL INSTALLATION SOIL SAMPLING

2.4.1 Field Procedures

2.4.1.1 Well Installation

The deep monitoring wells (MW-15, MW-16, and MW-17) were installed following the "Minimum Standards for Construction and Maintenance of Wells" from WAC 173-160 and procedures described in the Deep Monitoring Well Installation Technical Memorandum and SAP (WSDOE 2008, Floyd|Snider 2010b).

The three well borings were advanced with a roto-sonic vibratory drill. This technique employs a 6-inch diameter pipe to collect continuous soil cores. The drill bit was lifted from the boring at 5-foot intervals to allow soil cores to be transferred to sonic drilling-specific plastic sample sleeves for field characterization and sampling. PID readings were collected both through slits cut in the bag and again once the bag was opened completely for sampling, and both readings are shown on the Well Installation Logs

(Attachment F.2). Field staff also performed sheen tests and noted any visual or olfactory indications of contamination.

Deep Well MW-15 was co-located with shallow Well MW-5 and PSB-15, in the downgradient area of the Central and Eastern Source Areas, in order to measure the vertical gradient between the shallow and deep aquifers. This boring was advanced to a total depth of 60 feet, with the water table observed at 19.5 to 52 feet bgs. The screened interval was set from 47.5 to 57.5 feet bgs. Deep Well MW-16 was co-located with PSB-9A, within the suspected historical source area, and advanced to a total depth of 49.5 feet bgs. Water was observed at 14 feet bgs to 49.5 feet bgs; the screened interval was set at 37.5 to 47.5 feet bgs. Deep Well MW-17 was co-located with shallow Well MW-4 and PSB-19, in the downgradient area of the Central and Eastern Source Areas. This boring was advanced to a total depth of 60 feet bgs, with water observed at 15.5 feet bgs to 52.5 feet bgs. The screened interval was set at 42 to 52 feet.

All wells were constructed of 2-inch diameter, flush-threaded, Schedule 40 PVC well casing and well screen assemblies consisted of a 10-foot length of 0.020-inch (20-slot), flush-threaded, machine-slotted, Schedule 40 PVC set in a 10/20 sand or equivalent silica sand filter pack. The well design included a 0.5-foot long flush-threaded, Schedule 40 PVC sump with a flush-threaded end cap. The sand filter pack was installed by pouring sand into the space between the well casing and auger as the auger was withdrawn, with the sand extending 3 feet above the top of the screened interval. A minimum 2-foot thick seal of hydrated bentonite chips was installed in the annular space immediately above the sand filter pack and hydrated with potable water if installed above the water table. The remainder of the annular space was sealed with hydrated bentonite chips to within 1 foot of the ground surface.

The monitoring wells were secured with flush-to-ground locking steel protective monuments and labeled with a permanent marker on the well cover. All installed monitoring wells were surveyed by a Port -licensed surveyor. During installation, well construction details were recorded on Well Installation Logs (Attachment F.2).

2.4.1.2 Soil Sampling

Soil samples were collected from the core barrel sample bags at approximate 5-foot-depth intervals as well as at potential contaminated intervals as identified by results of the PID, sheen, and visual/olfactory field screenings. Due to the heat produced by the core barrel during boring installation with this method, samples were collected from soils in the center of the core that were not in contact with the core barrel. During sampling, soil samples were described and classified according to the USCS and photographed. The deepest sample intervals collected from the co-located PSBs, drilled prior to the installation of the deep monitoring wells, were used to determine the shallowest depth at which soil samples were collected from the deep well borings to provide a relatively continuous vertical soil profile. Soil samples were collected from 5 feet below the deepest PSB sample, to a depth where a confining layer was encountered.

Soil samples are documented on the Monitoring Well Logs (Attachment F.2). Soil was removed from the core sample and placed into a decontaminated stainless-steel bowl for homogenization. Prior to sample homogenization, soil samples were collected directly from the sampling tube using USEPA Method 5035A for VOC compounds. Following homogenization, the sample material was placed into laboratory-supplied sample containers, with the lid tightly sealed, labeled, and placed in a cooler on ice. Sample containers were filled, tightly capped, labeled, and immediately placed in a cooler maintained at a temperature of approximately 4º C using crushed ice. Samples were delivered to ARI in Tukwila, Washington, on ice and under standard chain-of-custody procedures.

2.4.1.3 Field Observations and Documentation

As part of sample collection, the field observations were recorded, as described in Section 2.1.2. In the MW-15 boring, a slight odor and slight sheen were observed at 8 to 10 feet bgs, and a maximum PID reading of 50 parts per million (ppm) was measured through a slit in the bag at 4.5 bgs. No other indications of contamination were observed. No sheens or odors were observed in MW-16, and a maximum PID reading of 5.1 ppm occurred at a slit in the bag at 2 feet bgs. No indications of contamination were observed in the MW-17 boring either, and a maximum PID reading of 2.5 ppm occurred in the opened soil core at 30 feet bgs.

2.4.1.4 Deviations from Work Plan

No significant deviations were made from the monitoring well locations or installation methods specified in the Deep Monitoring Well Installation and SAP Technical Memorandum (Floyd|Snider 2010b).

3.0 Soil Analytical Results

3.1 ANALYTICAL METHODS AND DATA QUALITY

The soil samples collected for the LL Apartments Parcel Soil Quality Investigation were analyzed for some or all of the following constituents by the methods indicated below in accordance with the RI/FS Work Plan (Floyd|Snider 2010a):

- Arsenic and lead by USEPA Method 6010
- TPH (diesel range and heavy oil range) by NWTPH Dx
- TPH (gasoline range) by NWTPH-G
- cPAHs by USEPA Method 8270D
- PCP by USEPA Method 8041
- PCE, TCE, cis-1,2-dichloroethene (cis-1,2-DCE), trans-1,2-dichloroethene (trans-1,2-DCE), and 1,2-dichloroethane (1,2-DCA) by USEPA Method 8260C
- Benzene, toluene, ethylbenzene, xylenes (BTEX) by USEPA Method 8021
- Dioxins/furans by USEPA Method 1613

Selected samples were also analyzed for total organic carbon (TOC) by the Plumb 1981 method. The chemical analyses were performed by ARI with Frontier Analytical Laboratory performing the dioxin/furan analyses.

Analytical results for the soil samples are presented in Table F.1 and detected concentrations of the PCOCs are presented in Figures F.4 through F.8. Analytical reports, including Chain-of-Custody Forms, are presented in Attachment F.3.

3.2 DATA QUALITY

A Level III Data Quality Review (Summary Validation) was performed on all the analytical data, except dioxins/furans for which a Level IV, Tier III Data Quality Review (Full Validation) was performed. All data validation was performed by EcoChem, Inc. Refer to Attachment F.4 for the complete EcoChem Data Validation Report.

Data validation was based on the quality control (QC) criteria as recommended in the methods identified in the RI/FS Work Plan (Floyd|Snider 2010a) and in the National Functional Guidelines for Organic and/or Inorganic Data Review (USEPA 2008 and 2004). The dioxin/furan data were also evaluated using the USEPA Region 10 SOP for Validation of Dioxins and Furans (USEPA 1996).

As determined by this evaluation, the laboratory followed the specified analytical method. With the exceptions noted below, accuracy was acceptable, as demonstrated by the surrogate, laboratory control sample (LCS), and matrix spike/matrix spike duplicate (MS/MSD) recoveries. Precision was also acceptable as demonstrated by the

MS/MSD, LCS/laboratory control sample duplicate (LCSD), and field duplicate relative percent difference (RPD) values. The outcomes of the data validation include the following:

- **Arsenic and Lead.** Data were J-qualified based on laboratory duplicate RPD outliers. All data, as qualified, are acceptable for use.
- **cPAHs.** Data were estimated due to exceeded holding times and surrogate recovery outliers. Results were labeled "Do Not Report" (DNR) to indicate which result, from multiple analyses (dilutions, etc.), should not be used. Data labeled as DNR are not usable for any purpose. All other data, as J-qualified, are acceptable for use.
- **PCP.** Data were J-qualified based on surrogate recovery outliers and second column confirmation outliers. Data were rejected due to surrogate recovery values less than 10 percent. Data that have been rejected are not useable for any purpose. All other data, as J-qualified, are acceptable for use.
- **BTEX and Gasoline Range TPH.** Data were estimated because of holding time outliers. Results were flagged DNR to indicate which result, from multiple analyses, should not be used. All other data, as J-qualified, are acceptable for use.
- **VOCs and Diesel Range TPH.** All data, as reported, are acceptable for use.
- **Dioxins/Furans.** Data were estimated based on labeled compound and MS/MSD recovery outliers and laboratory-reported diphenyl ether or other interference. All data, as J-qualified, are acceptable for use.
- **TOC and Total Solids.** Data were J-qualified based on matrix spike recovery and laboratory replicate percent relative standard deviation (%RSD) outliers. All data, as qualified, are acceptable for use.

3.3 RESULTS

3.3.1 Metals

Arsenic and lead were analyzed for in all samples collected from PSB-9 through PSB-24 in the four shallow depth intervals for PSB-25 through PSB-27, and all depth intervals below 4 feet bgs from MW-12 through MW-14, consistent with the LL Apartments RI/FS Work Plan (Floyd|Snider 2010a). Consistent with the Deep Monitoring Well Installation and SAP Technical Memorandum and RI/FS Work Plan, no metals samples were collected from the Deep Monitoring Wells MW-15 through MW-17 or Shallow Soil Borings SSB-1 through SSB-8 (Floyd|Snider 2010b, 2010a). Analytical results for arsenic and lead in all sampling locations are presented in Figure F.4.

Of the 117 samples analyzed, arsenic was detected in 18, with concentrations ranging from 5 mg/kg in the 0 to 0.5 feet bgs interval of PSB-21 and the 0 to 1 feet bgs interval of PSB-19, to 11 mg/kg in the 0 to 0.5 feet bgs interval of PSB-13. Lead was detected in 85 of the 117 samples, with general concentrations ranging from 2 mg/kg in 4 samples

(PSB-9 at 8.5 to 9.5 feet bgs, PSB-10 at 14 to 15 feet bgs, PSB-15 at 17 to 19 feet bgs, and PSB-17 at 2 to 4 feet bgs) to 304 mg/kg in the 1.5 to 2 feet bgs interval of PSB-11. A maximum concentration of 2,880 mg/kg was observed in the 2 to 4 feet bgs interval of PSB-11.

3.3.2 Total Petroleum Hydrocarbons

Total petroleum hydrocarbons (diesel, heavy oil, and gasoline ranges) were analyzed in Primary Soil Borings PSB-9 through PSB-21 at all depth intervals, in Monitoring Wells MW-12 through MW-14 at depth intervals below 4 feet bgs, in PSB 22-24 in depth intervals below 6 feet bgs, and in MW-15 through MW-17 in the interval immediately above the observed second confining layer except as described in Section 2.2.3. Diesel and heavy oil range TPH were only analyzed for shallow intervals in PSB-22 through PSB-24 and intervals below 4 feet bgs in PSB-25 through PSB-27. All TPH analyses were performed in accordance with the RI/FS Work Plan. Analytical results for TPH in all sampling locations are presented in Figure F.5.

Of the 120 samples analyzed for diesel and heavy oil range TPH, diesel was detected in 27 samples and motor oil was detected in 51 samples. Gasoline range TPH was detected in 11 of 94 samples analyzed, primarily in PSB-11, with one detection in PSB-13. Diesel range TPH concentrations ranged from 5.4 mg/kg in the 1.5 to 2 feet bgs interval of PSB-13 to a maximum of 440 mg/kg in the 2 to 4 feet bgs interval of PSB-11. Heavy oil range concentrations ranged from 12 mg/kg in the 1.5 to 2 feet bgs interval of PSB-12 and the 2 to 4 feet bgs interval of PSB-15 to 2,700 mg/kg in the 2 to 4 feet bgs interval of PSB-11. Gasoline range TPH concentrations ranged from 3.3 mg/kg in PSB-16 at 4 to 6 feet bgs and 13 to 15 feet bgs to 150 mg/kg in PSB-11 at 1.5 to 2 feet bgs.

3.3.3 Semivolatile Organic Compounds

PCP and cPAHs were analyzed in all soil depth intervals collected from Primary Soil Borings PSB-9 through PSB-24 and Deep Monitoring Wells MW-15 through MW-17, and at intervals below 4 feet bgs for PSB-24 through PSB-27 and MW-12 through MW-14. All cPAH and PCP analyses were performed in accordance with the RI/FS Work Plan. Analytical results for SVOCs in all sampling locations are presented in Figure F.6.

Of the 112 soil samples analyzed for all SVOCs and an additional sample that was analyzed for PCP only, PCP was detected in a total of 46 samples, with a minimum concentration of 5.9 µg/kg in the 14 to 15 feet bgs interval of PSB-10 and a maximum concentration of 2,400 µg/kg in the 1.5 to 2 feet bgs interval of PSB-11.

Toxicity equivalency quotients (TEQs) for cPAHs were calculated according to MTCA (WAC 173-340-900, Table 708-1) in two ways: with non-detect values set to zero and with non-detects set to one-half of the reporting limit (WSDOE 2007). cPAHs were detected in 25 soil samples out of 112 analyzed, with a minimum TEQ of 0.1 µg/kg (non-detect equal to zero) and 14 µg/kg (non-detect equal to one-half the reporting limit)

in the 1.5 to 2 feet bgs interval of PSB-21. The maximum calculated TEQ was 297 µg/kg (no non-detects) in the 0 to 0.5 feet bgs interval of PSB-10.

3.3.4 Volatile Organic Compounds

VOCs, including cis-1,2-DCE, trans-1,2-DCE, 1,2-DCA, TCE, PCE, and BTEX, were analyzed in all depth intervals for Primary Soil Borings PSB-9 through PSB-21 and depth intervals at the water table for MW-12 through MW-17, except in those samples as described above in Section 2.2.3. Chlorinated VOCs only were analyzed in the depth intervals above 6 feet bgs for Primary Soil Borings PSB-22 through PSB-24, and both chlorinated VOCs and BTEX were analyzed in the deeper intervals below 6 feet bgs, with the exception of the VOC samples that were not collected, as described above in Section 2.2.3. All analyses were performed in accordance with the RI/FS Work Plan. Analytical results for VOCs in all sampling locations are presented in Figure F.7.

VOCs, excluding BTEX, were analyzed in 102 samples, with TCE detected in only one sample at 0.8 µg/kg in the 1.5 to 2 feet bgs interval of PSB-11. PCE was detected in three samples, ranging from 0.6 µg/kg in the 14 to 16 feet bgs interval of PSB-11 to 0.9 µg/kg in the 5.5 to 7.5 feet bgs interval of MW-12. cis-1,2-DCE, trans-1,2-DCE, and 1,2-DCA were not detected in any soil samples.

Benzene was not detected in any of the 91 samples analyzed for BTEX. Ethylbenzene was detected in a total of two soil samples at a concentration of 1 µg/kg in the 13 to 15 feet bgs interval of PSB-16, and at 10 µg/kg in the 4 to 6 feet bgs interval of PSB-21. Toluene was detected in four samples, ranging from 3.9 µg/kg in the 0 to 0.5 feet bgs interval of PSB-16 to 240 µg/kg in the 4 to 6 feet bgs interval of PSB-21. m,p-Xylene was detected in one soil sample collected from PSB-16, at a concentration of 3.7 µg/kg from 13 to 15 feet bgs. o-Xylene was detected in 8 samples, ranging from 1.4 µg/kg in the 13 to 15 feet bgs interval of PSB-16 to 1,400 µg/kg in the 2 to 4 feet bgs interval of PSB-20.

3.3.5 Dioxins/Furans

All shallow soil borings (SSB-1 through SSB-10, HA-1 through HA-3) and eight primary soil borings (PSB-1 through PSB-8) were analyzed for dioxins/furans only in accordance with the RI/FS Work Plan. Soils from Primary Soil Borings PSB-9 through PSB-24, as well as Monitoring Well Borings MW-12 through MW-14, were analyzed for dioxins/furans in the first four depth intervals, as described in Section 8.2.1 of the RI/FS Work Plan, and held for future analysis from deeper intervals (Floyd|Snider 2010a). To define the vertical extent of contamination, 33 of the 94 archived samples were subsequently selected for analysis. The 2 to 4 feet bgs interval of HA-1 through HA-3 was also archived for future analysis, if necessary, to vertically bound dioxin/furan contamination.

TEQs for all chlorinated dibenzo-p-dioxins and dibenzofuran congeners were calculated according to Toxicity Equivalency Factors specified in MTCA (WAC 173-340-900, Table 708-2; WSDOE 2007). For those samples with concentrations flagged as not-

detected, the TEQ was calculated in two ways: with “non-detect” values set to zero, and with “non-detect” values set to one-half of the detection limit. Of the 121 samples analyzed, all had at least one dioxin/furan congener detected, with minimum TEQs of 0.03 pg/g (non-detect equal to zero) and 0.2 pg/g (non-detect equal to one half of the detection limit) in the 1.5 to 2 feet bgs interval of SSB-3. The maximum TEQ was 21,165 pg/g, with no non-detect values, in the 1.5 to 2 feet bgs interval of PSB-11.

Samples from HA-1 through HA-3 were collected and analyzed in April 2011 to further define the lateral extent of dioxin/furan contamination in the southeast corner of the Site, as discussed in the Additional Shallow Dioxin Soil Sampling Technical Memorandum (Floyd|Snider 2011). Dioxin/furan congeners were detected in all six samples analyzed, and TEQs were calculated, as specified above. In surface samples (0 to 0.5 feet bgs), a TEQ of 107 pg/g was reported at HA-2 and a TEQ of 17.7 pg/g was reported at HA-3, both with no non-detect values. Both depth intervals at HA-1 and the subsurface (1.5 to 2 feet bgs) intervals at HA-2 and HA-3 showed dioxin/furan TEQs less than the project soil screening level of 5 pg/g, with detection-only calculated TEQs ranging from 0.016 to 1.99 pg/g and non-detect-weighted TEQs ranging from 0.369 to 3.15 pg/g. Based on these data, no archived “HA-” boring soil samples were analyzed.

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4.0 Groundwater Investigation Procedures

Groundwater investigation activities on the LL Apartments Parcel included well development and the collection and analysis of groundwater samples collected from existing monitoring wells (MW-1 through MW-11). These groundwater monitoring wells were previously installed within the LL Apartments Parcel property boundary and downgradient from the property on the LL Parcel by GeoScience Management in 2007 and AECOM in 2008 (Figure F.3). Three additional shallow wells and three deep wells were installed as part of the LL Apartments Remedial Investigation conducted in 2010. Well Installation Logs for the 2010 remedial investigation are provided in Attachment F.2.

Each well was sampled to assess potential groundwater contamination within the LL Apartments Parcel and downgradient of the property. These groundwater field investigation activities are described in detail below. The collection of soil samples from the newly installed monitoring well borings is described above in Sections 2.3.1.2 and 2.4.1.2. The chemical analyses performed on these groundwater samples and the results of these analyses are discussed in Section 5.0.

4.1 MONITORING WELL DEVELOPMENT

4.1.1 Field Procedures

Well development activities, including purging and surging, were performed on all monitoring wells to remove water and fines from the well casing, filter pack, and surrounding formation. The newly-installed wells (MW-12 through MW-17) were developed, and previously installed wells MW-1 to MW-11 were re-developed because the wells were last sampled in December 2008 (AECOM 2009). Development was conducted to remove water and fines disrupted by well installation or that had collected in the wells over time, and to establish a hydraulic connection between each well and the surrounding water table. The goal of well development was to allow groundwater representative of the formation to flow into the well.

Well development was generally conducted in accordance with the RI/FS Work Plan with some modifications that are further discussed in Section 4.1.3, below. Well development was conducted by continuous pumping at a steady rate using a submersible 12-Volt electric pump (whale pump). The whale pump was agitated in the well during purging by repeatedly raising and lowering the pump along the length of the screened interval to push water through the screen and into the filter pack. Wells were developed at least 48 hours following well installation and prior to groundwater sample collection. Well development equipment was decontaminated by pumping an Alconox solution wash through the pump followed by deionized water.

Low turbidity conditions are desirable during well development and groundwater sampling activities because of the analytical sensitivity and low detection limits associated with analytical testing. Well development was considered complete when the

turbidity readings (nephelometric turbidity units [NTU]) were approximately 50 NTU or less, and a minimum of 10 well volumes had been removed. Slight deviations of well development based on well and field conditions are discussed further in Section 4.1.3.

4.1.2 Field Observations and Documentation

During development, sheen and hydrocarbon odor were observed in two wells. In MW-1, where trace non-aqueous phase liquid (NAPL) has been previously observed (AECOM 2009), NAPL was not observed; however, a moderate sheen and hydrocarbon odor were noted. In Deep Monitoring Well MW-16, small blebs of white sheen were released from sediment in the purged groundwater with a moderate hydrocarbon odor. Additionally, a large mass of roots or grass was noted during the purging of MW-4. No other unusual observations were noted during well development.

Well information, such as depth to static water level before and after development, depth to the bottom of the well or sediment present at the bottom of the well before and after development, visual observations, and turbidity readings were recorded until turbidity levels had stabilized to a level less than 50 NTU. The well development measurements and observations are summarized in Table F.2.

4.1.3 Deviations from the RI/FS Work Plan

4.1.3.1 Surge Method

According to the RI/FS Work Plan, a surge block was meant to be used to agitate/surge the well, not the whale pump itself; however, upon inserting the surge block into the first well to be developed (MW-2), the block became stuck inside the well. Field staff attempted to pull the surge block out, but instead pulled up the casing of the well approximately 2 inches (the well was re-surveyed, as discussed in Section 6.0, to account for this difference). In order to continue well development, it was determined that the whale pump was adequate to complete agitation of the wells.

4.1.3.2 Insufficient Volume/Recovery for Development

One well, MW-6, did not contain any water and, therefore, was unable to be developed or sampled.

In two wells, MW-1 and MW-8, 10 well volumes were not able to be purged due to slow groundwater recharge. MW-1 was purged dry five times, with a final purge volume of 5 gallons (final turbidity measurement was lower than 50 NTU). MW-8 was purged dry four times, with a final purge volume of 12 gallons (final turbidity measurement was greater than 50 NTU; Table F.2).

4.1.3.3 Final Turbidity Measurements

Field staff were unable to obtain final turbidity readings of approximately 50 NTU or less, with the wells purged dry at least twice, from three wells: MW-8, MW-12, and MW-15 (Table F.2). Although these wells did not have a final turbidity reading less than 50 NTU, they were further purged immediately prior to sampling to ensure low turbidity samples. Acceptable sample turbidity less than 5 NTU, as defined in the RI/FS Work Plan, was obtained in each of these wells prior to sample collection.

4.2 GROUNDWATER SAMPLING

4.2.1 Field Procedures

Groundwater samples were collected from all monitoring wells accordance with the RI/FS Work Plan (Floyd|Snider 2010a). Samples were collected during three monitoring events: Summer/Fall 2010, Winter 2011, and Spring 2011. Monitoring wells were purged and sampled using low-flow procedures with a peristaltic pump for shallow wells (MW-1 through MW-14) and a bladder pump required for the deep wells (MW-15, MW-16, and MW-17) because of their depth, and disposable polyethylene tubing.

Prior to sampling, the depth to water was measured and recorded, with date and time, on the Groundwater Sample Collection Form (Attachment F.5) as the static depth to water. An oil-absorbent sock was placed in MW-1 subsequent to the fall 2010 groundwater sample collection and temporarily removed prior to data collection for subsequent sampling events. After water depth measurement, a low-flow peristaltic pump was lowered into the well, centered on the well's submerged screen interval. Purging of the well was then conducted with low-flow rates not exceeding 0.5 liters per minute. During purging, field parameters (temperature, pH, dissolved oxygen, conductivity, salinity, and turbidity) were recorded in the purge water at 3- to 5-minute intervals with a multi-parameter groundwater meter. The time, parameter values, and purge rate were recorded on the Groundwater Sample Collection Form for each set of readings.

When the field measurements for turbidity, dissolved oxygen, and conductivity were stable (within approximately 10 percent) for three consecutive readings and turbidity was less than 5 NTU, the groundwater sample was collected. The last set of field parameters measured during purging represent field parameters for the groundwater sample. All field measurements and observations were recorded on the Groundwater Sample Collection Form (Attachment F.5).

After purging the well and labeling the laboratory-provided bottles, the groundwater sample was collected by directly filling the lab-provided bottles from the pump discharge line. Only dedicated (disposal) tubing was used in sampling and there was no need for equipment decontamination (other than the water level indicator).

Sample bottles were filled, tightly capped, labeled, and immediately placed in a cooler maintained at a temperature of approximately 4º C using crushed ice. Samples were delivered to ARI in Tukwila, Washington, under standard chain-of-custody procedures.

4.2.2 Field Observations and Documentation

The groundwater elevations measured during each sampling event are provided in Table F.3. Groundwater elevation contour maps were generated for the seasonal low (August 2010) and seasonal high (January 2011) water level measurements to determine groundwater flow directions in the vicinity of the LL Apartments Parcel. Figure F.9 provides groundwater elevation contours and flow directions for seasonal low groundwater levels (August 2010) and Figure F.10 provides groundwater elevation contours and flow directions for seasonal high groundwater levels (January 2011). Based on both groundwater elevation contour maps, groundwater flow is primarily to the southeast, with slightly lower horizontal groundwater gradients across the western portion of the parcel compared to the eastern portion of the parcel.

Vertical groundwater gradients were also calculated based on shallow/deep well pairs MW-1/MW16, MW-4/MW-17, and MW-5/MW-15 (refer to Table 2.1 of the RI/FS). These calculations showed a slight downward vertical gradient at the MW-1/MW-16 well pair, a slight upward vertical gradient at the MW-4/MW-17 well pair, and a more significant upward vertical gradient at the MW-5/MW-15 well pair. Based on the groundwater elevation contour maps, it is evident that the vertical gradients change from a slight downward vertical gradient to a more significant upward vertical gradient as groundwater travels horizontally downgradient to the southeast. This change in gradients is likely from groundwater recharge caused by precipitation occurring at the higher, upgradient topographic elevations to the northwest and groundwater discharging to Lora Lake at the lower, downgradient topographic elevations to the southeast.

4.2.2.1 Summer/Fall 2010 Sampling Event

Groundwater samples were collected from MW-1 through MW-14 from August 11 to 13, 2010, and from MW-15 through MW-17 on September 13, 2010. All wells were sampled except MW-6, which was dry at the time of the August event. During sampling, a hydrocarbon-like odor was observed in five wells, but no sheens were observed in any wells. A slight odor was noted in MW-16. A slight to moderate odor observed in MW-7 was identified as a “sulfur-like degraded petroleum odor.” Slight to moderate hydrocarbon odor was noted in MW-1, MW-5, and MW-15. MW-15 was also noted to be very turbid, with a final turbidity measurement of 65.9 NTU.

4.2.2.2 Winter 2011 Sampling Event

Groundwater samples were collected from all wells from January 19 to 21, 2011. Prior to sampling, the oil-absorbent sock was removed from MW-1 and showed evidence of NAPL in the water column. The thickness of the NAPL layer was not detectable at the sensitivity level of an oil-water interface probe and, therefore, estimated to be less than

0.01 inches thick. The groundwater sample collected from MW-1 also displayed a slight sheen and hydrocarbon odor. MW-15 and MW-16 were noted to be very turbid but with no odors, with final turbidity readings of 29.2 NTU and 22.0 NTU, respectively.

4.2.2.3 Spring 2011 Sampling Event

Groundwater samples were collected from all wells from April 26 to 29, 2011. Similar to the Winter 2011 Sampling Event, a very thin film of NAPL (less than 0.01 inches) was observed in MW-1. The groundwater sample from MW-1 had a moderate hydrocarbon odor and slight sheen. No other sheen or odors were observed in other monitoring wells.

As discussed above, all field measurements and observations were recorded on the Groundwater Sample Collection Forms that are included in Attachment F.5.

4.2.3 Deviations from Work Plan

4.2.3.1 Summer/Fall 2010 Sampling Event

A groundwater sample was not collected from Monitoring Well MW-6 because there was insufficient water volume. Groundwater from four monitoring wells did not meet the requirement of final turbidity less than 5 NTU. These wells included MW-15 (as discussed above), MW-8 (8.59 NTU), MW-16 (8.12 NTU), and MW-17 (14.47 NTU). Groundwater in these wells was determined to be of acceptable clarity for sampling and groundwater samples were collected. MW-15 remained slightly turbid, but was purged for approximately 1 hour and determined acceptable for sampling after this period of time.

4.2.3.2 Winter 2011 Sampling Event

Groundwater from five monitoring wells did not meet the final turbidity requirement of less than 5 NTU. These wells included MW-15 and MW-16, as discussed above, as well as MW-6 (11.5 NTU), MW-7 (8.64 NTU), and MW-17 (6.11 NTU). The majority of these wells were purged for a minimum of 35 minutes without demonstrating improvement in turbidity, and groundwater was determined to be of acceptable quality for sampling. MW-6 was purged for 20 minutes, but with consistently increasing turbidity measurements and, therefore, the well was sampled without further purging to minimize turbidity in the sample.

4.2.3.3 Spring 2011 Sampling Event

Groundwater from one monitoring well, MW-16, did not reach the final turbidity requirement of less than 5 NTU. The well was purged for 65 minutes before sampling, with a final turbidity of 9.81 NTU during sample collection. The sample collected from MW-13 was also slightly elevated, with a final turbidity of 5.21 NTU.

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5.0 Groundwater Analytical Results

5.1 ANALYTICAL METHODS AND DATA QUALITY

The groundwater samples collected for the LL Apartments Parcel Groundwater Quality Investigation were analyzed for the following constituents by the methods indicated below in accordance with the RI/FS Work Plan and Deep Monitoring Well Installation and SAP Technical Memorandum (Floyd|Snider 2010a, 2010b):

- Arsenic and lead (total) by USEPA Method 200.8
- TPH (diesel range and heavy oil range) by NWTPH-Dx
- TPH (gasoline range) by NWTPH-G
- cPAHs by USEPA Method 8270D
- PCP by USEPA Method 8041
- PCE, TCE, cis-1,2-DCE, trans-1,2-DCE, and 1,2-DCA by USEPA Method 8260C
- BTEX by USEPA Method 8021
- Dioxins/furans by USEPA Method 1613

These samples were also analyzed for total suspended solids (TSS) by SM 2540D and pH by USEPA Method 150.1. The chemical analyses were performed by ARI with Frontier Analytical Laboratory performing the dioxin/furan analyses.

Analytical results for the groundwater samples are presented in Table F.4 and detected concentrations of the PCOCs are presented in Figures F.11 through F.15. Analytical reports, including Chain-of-Custody Forms, are presented in Attachment F.3.

5.2 DATA QUALITY

A Level III Data Quality Review (Summary Validation) was performed on all the analytical data, except dioxins/furans for which a Level IV, Tier III Data Quality Review (Full Validation) was performed. All data validation was performed by EcoChem, Inc. Refer to Attachment F.4 for complete EcoChem Data Validation Reports.

Data validation was based on the QC criteria as recommended in the methods identified in the RI/FS Work Plan and in the National Functional Guidelines for Organic and/or Inorganic Data Review (USEPA 2008 and 2004). The dioxin/furan data were also evaluated using the USEPA Region 10 SOP for Validation of Dioxins and Furans (USEPA 1996).

As determined by this evaluation, the laboratory followed the specified analytical method. With the exception noted below, accuracy was acceptable, as demonstrated by the surrogate, LCS, and MS/MSD recoveries. Precision was also acceptable as

demonstrated by the MS/MSD, LCS/LCSD, and field duplicate RPD values. The outcomes of the data validation are described below.

5.2.1 Summer/Fall 2010 Sampling Event

- **cPAHs, PCP, Diesel Range and Heavy Oil Range TPH, Gasoline Range TPH, Arsenic, Lead, BTEX, VOCs, TSS, and pH.** All data, as reported, are acceptable for use.
- **Dioxins/Furans.** Data were estimated (J-qualified) based on labeled compound recovery outliers and interference from diphenyl ether. All data, as qualified, are acceptable for use.

5.2.2 Winter 2011 Sampling Event

- **Metals, Gasoline Range TPH, Diesel and Heavy Oil Range TPH, cPAHs, PCP, VOCs, and BETX.** All data, as reported, are acceptable for use.
- **Dioxins/Furans.** Data were estimated (J-qualified) based on labeled compound recovery outliers and laboratory-reported interference from diphenyl ether. Detection limits were also elevated based on diphenyl ether interferences. All data, as qualified, are acceptable for use.

5.2.3 Spring 2011 Sampling Event

- **Metals, Diesel Range and Heavy Oil Range TPH, Gasoline Range TPH, PCP, BETX, and VOCs.** All data, as reported, are acceptable for use.
- **cPAHs.** The LCS percent recovery (%R) value for benzo(a)pyrene was less than the lower control limit of 40 percent. Results for benzo(a)pyrene in MW-1 were estimated (J/UJ-10) to indicate a potential low bias. All data, as qualified, are acceptable for use.
- **Dioxins/Furans.** Data were estimated (J-qualified) based on labeled compound recovery outliers and laboratory-reported interference from diphenyl ether. All data, as qualified, are acceptable for use.

5.3 RESULTS

5.3.1 Metals

5.3.1.1 Summer/Fall 2010 Sampling Event

Arsenic and lead were analyzed in groundwater samples collected from all wells with the exception of the deep monitoring wells, MW-15, MW-16, and MW-17. Arsenic was detected in samples from all wells except two: MW-2 and MW-11. Detected

concentrations of arsenic ranged from 0.3 µg/L (MW-7, MW-9, and MW-13) to 5.6 µg/L (MW-1). Lead was not detected in any groundwater samples.

5.3.1.2 Winter 2011 Sampling Event

Arsenic and lead were analyzed in groundwater samples collected from all wells with the exception of MW-15, MW-16, and MW-17. Arsenic was detected in groundwater samples collected from 11 wells, with a maximum concentration of 11.9 µg/L at MW-1. Concentrations in samples from other wells ranged from 0.3 to 5.4 µg/L. Lead was not detected in any groundwater samples collected from all monitoring wells.

5.3.1.3 Spring 2011 Sampling Event

Lead and arsenic were analyzed in groundwater samples collected from all wells with the exception of deep wells MW-15 through MW-17. Arsenic was detected in samples collected from 12 wells, with a maximum concentration of 14.2 µg/L at MW-1. Detected arsenic concentrations in other samples ranged between 0.2 and 4.6 µg/L. Lead was not detected in any samples.

All analyses were conducted in accordance with the RI/FS Work Plan and analytical results for lead and arsenic in groundwater from all monitoring wells are presented in Figure F.11.

5.3.2 Total Petroleum Hydrocarbons

5.3.2.1 Summer/Fall 2010 Sampling Event

Groundwater samples collected from all wells were analyzed for TPH (diesel, heavy oil, and gasoline ranges). All TPH ranges were not detected in groundwater samples, with the exception of heavy oil range TPH that was detected at a concentration of 0.2 µg/L in the sample from Well MW-15.

5.3.2.2 Winter 2011 Sampling Event

Groundwater samples collected from all wells were analyzed for TPH, which was detected only in the sample collected from MW-1. Diesel range, heavy oil range, and gasoline range TPH were detected at concentrations of 0.18 mg/L, 0.53 mg/L, and 0.46 mg/L, respectively, in this sample.

5.3.2.3 Spring 2011 Sampling Event

Groundwater samples collected from all wells were analyzed for TPH. Diesel range TPH was detected in the sample from MW-6 only at a concentration of 0.8 mg/L. Gasoline range TPH was detected at 0.4 mg/L in the sample from MW-1. Heavy oil range TPH were not detected.

All analyses were conducted in accordance with the RI/FS Work Plan and analytical results for TPH in groundwater from all monitoring wells are presented in Figure F.12.

5.3.3 Semivolatile Organic Compounds

5.3.3.1 Summer/Fall 2010 Sampling Event

Samples collected from all wells were analyzed for cPAHs and PCP. cPAHs were not detected in any samples. PCP was detected in samples from two wells, MW-5 and MW-9, at concentrations of 0.76 µg/L and 0.47 µg/L, respectively.

5.3.3.2 Winter 2011 Sampling Event

Samples collected from all wells were analyzed for cPAHs and PCP. cPAHs were detected in MW-1 only, with TEQs calculated by the same method used for soils as described in Section 3.3, above. The cPAH TEQ with non-detect values set to zero was 0.027 µg/L and the TEQ with non-detect values set to one-half of the reporting limit was 0.028 µg/L. PCP was detected in samples from MW-1 and MW-5, with a maximum concentration of 1.4 µg/L in the sample from MW-5.

5.3.3.3 Spring 2011 Sampling Event

Samples collected from all wells were analyzed for cPAHs and PCP. cPAHs were detected in MW-1 only, TEQs of 0.009 µg/L with non-detect values set to zero and a TEQ of 0.01 µg/L with non-detect values set to one-half of the reporting limit. PCP was detected in samples collected from MW-1, MW-5, and MW-9, with a maximum concentration of 1.4 µg/L in the sample from MW-5.

All analyses were conducted in accordance with the RI/FS Work Plan and analytical results for SVOCs in groundwater from all monitoring wells are presented in Figure F.13.

5.3.4 Volatile Organic Compounds

5.3.4.1 Summer/Fall 2010 Sampling Event

All VOCs, as specified in Section 5.1, and BTEX were analyzed in samples from all wells. Chlorinated VOCs were detected in samples from three wells. In the sample from MW-1, 1,2-DCA, cis-1,2-DCE, trans-1,2-DCE, and TCE were detected in concentrations ranging from 0.038 µg/L to 0.2 µg/L. In the sample from MW-5, 1,2-DCA and cis-1,2-DCE were detected at concentrations of 0.07 µg/L and 0.028 µg/L, respectively. PCE was detected in the sample from MW-13 at a concentration of 0.035 µg/L. BTEX was not detected in samples from any wells.

5.3.4.2 Winter 2011 Sampling Event

All VOCs, as specified in Section 5.1, and BTEX were analyzed in samples from all wells, and detected only in the sample from MW-1. Detected chlorinated VOCs included 1,2-DCA, cis-1,2-DCE, trans-1,2-DCE, TCE, and PCE, with concentrations ranging from 0.025 µg/L for PCE to 0.26 µg/L for cis-1,2-DCE. Ethylbenzene, m,p-xylene, and o-xylene were also detected, with concentrations ranging from 3 µg/L for ethylbenzene to 9.2 µg/L for o-xylene.

5.3.4.3 Spring 2011 Sampling Event

VOCs and BETX were analyzed in samples from all wells. Chlorinated VOCs were detected only in the sample from MW-1, with concentrations ranging from 0.026 µg/L for 1,2-DCA to 0.16 µg/L for cis-1,2-DCE. Ethylbenzene was detected in the samples from MW-1 and MW-6 at 2.5 µg/L and 1.1 µg/L, respectively. m,p-Xylene was detected at 1.8 µg/L in the sample from MW-1.

All analyses were conducted in accordance with the RI/FS Work Plan and analytical results for VOCs in groundwater from all monitoring wells are presented in Figure F.14.

5.3.5 Dioxins/Furans

5.3.5.1 Summer/Fall Sampling Event

Samples were collected for dioxins/furans analysis in all wells, with the exception of the deep aquifer wells, MW-15, MW-16, and MW-17. Dioxin/furan TEQs were calculated by the same method used for soils, as described in Section 3.3. Dioxins/furans were detected in samples from four wells, including MW-1, MW-5, MW-9, and MW-12. For the TEQ concentrations with non-detect values set to zero, detected concentrations were 0.08 µg/L (MW-9 and MW-12), 0.51 µg/L (MW-5) and 16.13 µg/L (MW-1). For the TEQ concentrations with non-detect values set to one half the detection limit, concentrations were 3.02 µg/L (MW-9 and MW-12), 3.72 µg/L (MW-5), and 18.80 µg/L (MW-1).

5.3.5.2 Winter 2011 Sampling Event

Dioxins/furans were analyzed in samples from MW-1 through MW-14 and detected in 11 samples. TEQs were calculated as described above, with TEQ of 37.6 pg/L with non-detect values set to zero, and 38.3 pg/L with non-detect values set to one-half of the detection limit, in the sample from MW-1. Dioxins/furans were also detected in the samples from MW-2 through MW-5 and MW-7 through MW-12. TEQs with non-detect values set to zero in these samples were all less than 0.4 pg/L and TEQs with non-detect values set to one-half of the detection limit were all less than 6 pg/L.

5.3.5.3 Spring 2011 Sampling Event

Dioxins/furans were analyzed in samples from MW-1 through MW-14 and detected in eight samples. A maximum TEQ of 24.09 pg/L with non-detect values set to zero and 24.18 pg/L with non-detect values set to one-half of the detection limit was detected in the sample from MW-1. TEQs with non-detect values set to zero in samples from other wells ranged from 0.002 to 0.32 pg/L, and TEQs with non-detect values set to one-half of the detection limit ranged from 1.60 to 2.58 pg/L.

All analyses were conducted in accordance with the RI/FS Work Plan and analytical results for dioxins in groundwater from all monitoring wells are presented in Figure F.15.

6.0 Survey Methods and Results

Floyd|Snider surveyed all monitoring well, hand auger, and Geoprobe locations on September 10, 2010 using a Trimble GeoExplorer portable differential global positioning system (GPS) capable of providing positions within approximately 1 meter (in real time). To maximize positional accuracy, the instrument was used with a range pole and external antenna.

A licensed Port of Seattle survey crew surveyed all monitoring well, hand auger, and Geoprobe locations, and re-surveyed existing monitoring well locations MW-1 through MW-6. Horizontal data were reported in NAD83, Washington State Plane North Elevation; vertical data were reported in the NGVD 29 datum and were later converted to NAVD88. Monitoring well elevations were measured at ground surface and at the top of the well casing at the north-facing measuring point. All points were surveyed according to the accuracy requirements specified in the RI/FS Work Plan (Floyd|Snider 2010a).

Port of Seattle survey data were used for all locations shown on Figure F.3.

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7.0 Hydrogeologic Testing Procedures

In addition to groundwater analytical sampling, groundwater hydrogeologic data, via slug testing, was collected across the monitoring well network to estimate aquifer hydraulic conductivity in the vicinity of the wells. These data were collected to assist with future evaluation of groundwater contaminant migration and potential transport modeling, if determined to be necessary. Based on a review of the groundwater monitoring results, it was determined that hydraulic conductivity values were not needed at this time. Groundwater PCOC concentrations were detected at low concentrations in a limited area of the site; therefore, contaminant transport modeling was determined not to be necessary. Field procedures used for slug testing are described below. Raw slug test transducer data will be maintained with the project files for potential future use if determined to be necessary.

7.1 FIELD PROCEDURES

Slug tests were conducted in accordance with the RI/FS Work Plan (Floyd|Snider 2010a) and in general accordance with the American Society for Testing and Materials' (ASTM's) Field Procedure for Instantaneous Change in Slug Tests for Determining Hydraulic Properties of Aquifers (ASTM D4044-96(2008); ASTM 2008). For each test, the depth to groundwater was measured before and after a pressure transducer was placed near the bottom of the well, in order to confirm transducer-reported depth measurements or to determine depth correction factors as necessary. Transducers were equipped with data loggers programmed to convert pressure changes to water levels, with measurements taken continuously every half-second for the duration of the test. After the groundwater level stabilized from transducer displacement, the water level probe was removed and a 5-foot PVC slug rod was lowered into the well until submerged in the water column. The recovery of the perturbed groundwater level was monitored until returning to within 95 percent of the initial head, as indicated by the transducer.

Once the water level had re-equilibrated, the slug was quickly removed from the water level column. Water depth was again monitored until it achieved recovery within 95 percent of the final slug-in depth. Depth to water was then measured a third time with an analog water level probe to conclude the test.

Slug tests were not performed in MW-1 or MW-6 because these wells did not have sufficient water column height to accommodate the pressure transducer and slug rod.

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8.0 Investigation-derived Waste Management

All soil and water generated by soil boring installation, well construction, well development, groundwater sampling, and equipment decontamination activities was collected and transferred to new, Department of Transportation-approved 55-gallon steel drums. Drums were lidded, sealed, labeled as non-hazardous waste with indelible marker, and stored on-site while material profiling was conducted. Waste profiling and disposal was coordinated by the Port. On November 15, 2010, 32 drums containing soil and water investigation-derived waste (IDW) generated during the Summer 2010 Sampling Event at the LL Apartments Parcel were transported from the Site as Non-RCRA, Non-Washington State Dangerous Waste. The drums were transported to the Clean Harbors Environmental Services Grassy Mountain Landfill in Grantsville, Utah for disposal. Two additional 55-gallon drums containing purge water generated during the winter and spring groundwater monitoring events were transported to the Clean Harbors Environmental Services Grassy Mountain Landfill for disposal on September 21, 2011.

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9.0 References

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Port of Seattle
Lora Lake Apartments Site

Remedial Investigation/ Feasibility Study

Volume II

Appendix F
Lora Lake Apartments Parcel Remedial Investigation Data Report

Tables

FINAL

Table F.1
Lora Lake Apartments Parcel Soil Analytical Results

Location		HA-1		HA-2		HA-3		SSB-1		SSB-2		SSB-3		SSB-4	SSB-5	
Sample ID		LLA-HA1-0-0.5-041811	LLA-HA1-1.5-2-041811	LLA-HA2-0-0.5-041811	LLA-HA2-1.5-2-041811	LLA-HA3-0-0.5-041811	LLA-HA3-1.5-2-041811	SSB01-0-0.5-080310	SSB01-1.5-2-080310	SSB02-0-0.5-080310	SSB02-1-1.5-080310	SSB03-0-0.5-080610	SSB03-1.5-2-080610	SSB04-0-0.5-090910	SSB05-0-0.5-080610	SSB05-1.5-2-080610
Sample Date		04/18/2011	04/18/2011	04/18/2011	04/18/2011	04/18/2011	04/18/2011	08/03/2010	08/03/2010	08/03/2010	08/03/2010	08/06/2010	08/06/2010	09/09/2010	08/06/2010	08/06/2010
Sample Depth		0–0.5 feet	1.5–2 feet	0–0.5 feet	1.5–2 feet	0–0.5 feet	1.5–2 feet	0–0.5 feet	1.5–2 feet	0–0.5 feet	1.5–2 feet	0–0.5 feet	1.5–2 feet	0–0.5 feet	0–0.5 feet	1.5–2 feet
Analyte	**Unit**															
Conventionals																
Total Organic Carbon	%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Solids	%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals																
Arsenic	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Petroleum Hydrocarbons																
Gasoline Range Hydrocarbons	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diesel Range Hydrocarbons	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heavy Oil Range Hydrocarbons	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds																
Pentachlorophenol	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carcinogenic Polycyclic Aromatic Hydrocarbons																
Benzo(a)pyrene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzofluoranthenes (total)[1]	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Summed cPAH TEQ[2,3]	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Summed cPAH TEQ with One-half of the Reporting Limit[2,4]	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Volatile Organic Compounds																
Tetrachloroethene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis-1,2-Dichloroethene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,2-Dichloroethene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
m,p-Xylene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
o-Xylene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dioxins/Furans																
2,3,7,8-TCDD	pg/g	0.171 U	0.242 U	5.81	0.259 U	0.453 J	0.186 U	1.34	0.891 J	0.531 J	0.63 J	0.53 U	0.11 U	0.243 U	0.434 J	0.144 U
1,2,3,7,8-PeCDD	pg/g	0.267 U	0.683 J	21.5	0.446 U	1.99 J	0.329 U	0.754 J	1.19 J	3.04 J	3.04 J	1.94 J	0.13 U	0.526 J	2.53 J	0.22 U
1,2,3,4,7,8-HxCDD	pg/g	0.285 U	0.706 J	21.2	0.693 J	2.7 J	0.207 U	0.904 J	1.48 J	4.42 J	5.7	2.6 J	0.23 U	1.25 J	3.59 J	0.207 U
1,2,3,6,7,8-HxCDD	pg/g	0.366 U	2.73 J	103	2.13 J	11.6	0.736 J	2.7 J	5.45 J	11.8	15.3	6.61	0.3 U	3.01 J	10.9	0.537 J
1,2,3,7,8,9-HxCDD	pg/g	0.318 U	1.66 J	52.9	1.57 J	7.49	0.232 U	1.79 J	2.78 J	9.08	10.7	5.32	0.26 U	2 J	8.01	0.306 J
1,2,3,4,6,7,8-HpCDD	pg/g	1.38 J	102	3560	69.8	819	13.9	46.5	137 J	245	348	139	2.03 J	59	247	10
Total OCDD	pg/g	6.68 J	958	31200	619	8440	113	370	1110 J	1800	2860	1050 J	15.8	457	1990	76.1
2,3,7,8-TCDF	pg/g	0.121 U	0.425 J	1.4	0.208 U	1.43	0.147 U	0.628 J	1.68 J	0.815 J	0.97 J	0.334 U	0.09 U	0.623 J	0.437 J	0.153 U
1,2,3,7,8-PeCDF	pg/g	0.232 U	0.369 U	2.33 J	0.166 U	0.725 J	0.228 U	0.508 J	1.28 J	0.758 J	0.9 J	0.614 U	0.11 U	0.528 J	0.525 J	0.172 U
2,3,4,7,8-PeCDF	pg/g	0.228 U	0.358 U	4.89	0.544 J	1.75 J	0.238 U	0.633 J	1.91 J	1.2 J	3.03 J	0.832 J	0.12 U	0.724 J	1.07 J	0.202 U
1,2,3,4,7,8-HxCDF	pg/g	0.201 U	0.535 J	18.2	0.727 J	2.11 J	0.236 U	1.13 J	2.9 J	3.16 J	5.72	2.3 J	0.12 U	1.38 J	2.38 J	0.264 U
2,3,4,6,7,8-HxCDF	pg/g	0.204 U	0.744 J	24.3 J	1.15 J	3.72 J	0.258 U	0.993 J	3.57 J	4.23 J	6.2	2.45 J	0.12 U	1.09 J	3.88 J	0.292 U
1,2,3,7,8,9-HxCDF	pg/g	0.185 U	0.2 U	3.38 J	0.249 U	0.503 J	0.228 U	0.202 U	0.634 J	0.554 J	1.1 J	0.766 U	0.11 U	0.343 U	0.385 J	0.255 U
1,2,3,4,6,7,8-HpCDF	pg/g	0.322 U	21.4	833	22	68.3	3.11 J	10.2	32.5 J	69.5	109	37	0.62 J	13.7	74	3.07 J
1,2,3,6,7,8-HxCDF	pg/g	0.191 U	0.39 J	12.3	0.769 J	2.27 J	0.239 U	1.14 J	3.1 J	3.35 J	4.3 J	2.51 J	0.11 U	0.956 J	3.25 J	0.277 U
1,2,3,4,7,8,9-HpCDF	pg/g	0.348 U	1.11 J	30.7	0.601 U	2.61 J	0.192 U	1.07 J	2.67 J	3.69 J	6.36	4.61 J	0.14 U	1.13 J	2.71 J	0.309 U
Total OCDF	pg/g	0.483 U	82.5	2920	54.3	231	7.58 J	25.5	107 J	194	423	70.9 J	1.56 J	34.9	187	8 J
Summed Dioxin/Furan TEQ[5,6]	pg/g	0.0158 J	2.96 J	107 J	1.99 J	17.7 J	0.28 J	3.92 J	6.94 J	11.5 J	15.2 J	6.51 J	0.0317 J	2.68 J	10.5 J	0.24 J
Summed Dioxin/Furan TEQ with One-half of the Detection Limit[5,7]	pg/g	0.369 J	3.15 J	107 J	2.37 J	17.7 J	0.655 J	3.93 J	6.94 J	11.5 J	15.2 J	6.84 J	0.239 J	2.81 J	10.5 J	0.529 J

Notes:

1 Benzofluoranthenes (total) includes both benzo(b)fluoranthene and benzo(k)fluoranthene. Both analytes have a toxic equivalency factor of 0.1; therefore, the total of the two analytes is multiplied by 0.1 when calculating the cPAH TE
2 Calculation of cPAH TEQ concentrations was performed using the California Environmental Protection Agency 2005 Toxic Equivancy Factors as presented in Table 708-2 of WAC 173-340-900 (WSDOE 2007
3 Calculated using detected cPAH concentrations
4 Calculated using detected cPAH concentrations plus one-half the reporting limit for cPAHs that were not detected
5 World Health Organization 2005 Toxic Equivalency Factors used for calculation of dioxin/furan TEQ (Van den Berg et al. 2006
6 Calculated using detected dioxin/furan concentrations
7 Calculated using detected dioxin/furan concentrations plus one-half the detection limit for dioxins/furans that were not detected.

Abbreviations:

cPAH Carcinogenic polycyclic aromatic hydrocarbon
NA Not analyzed
OCDD Octachlorodibenzo-p-dioxin
OCDF Octachlorodibenzofuran
TEQ Toxic equivalency quotient
WAC Washington Administrative Code
WSDOE Washington State Department of Ecology

Qualifiers:

J The analyte was analyzed for and positively identified, but the associated numerical value is an estimated quantity
U Undetected.
UJ Undetected with estimated concentration

Table F.1
Lora Lake Apartments Parcel Soil Analytical Results

Location		SSB-10		PSB-1			PSB-2			PSB-3		PSB-4		PSB-5		
Sample ID		SSB10-0-0.5-080310	SSB10-1.5-2-080310	PSB01-0-0.5-072910	PSB01-1.5-2-072910	PSB01-2-4-072910	PSB02-0-0.5-072910	PSB02-1.5-2-072910	PSB02-4-6-072910	PSB03-0-0.5-072910	PSB03-1.5-2-072910	PSB04-0-0.5-072810	PSB04-1.5-2-072810	PSB05-0-0.5-072810	PSB05-1.5-2-072810	PSB05-4-5-072810
Sample Date		08/03/2010	08/03/2010	07/29/2010	07/29/2010	07/29/2010	07/29/2010	07/29/2010	07/29/2010	07/29/2010	07/29/2010	07/28/2010	07/28/2010	07/28/2010	07/28/2010	07/28/2010
Sample Depth		0–0.5 feet	1.5–2 feet	0–0.5 feet	1.5–2 feet	2–4 feet	0–0.5 feet	1.5–2 feet	4–6 feet	0–0.5 feet	1.5–2 feet	0–0.5 feet	1.5–2 feet	0–0.5 feet	1.5–2 feet	4–5 feet
Analyte	**Unit**															
Conventionals																
Total Organic Carbon	%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Solids	%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals																
Arsenic	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Petroleum Hydrocarbons																
Gasoline Range Hydrocarbons	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diesel Range Hydrocarbons	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heavy Oil Range Hydrocarbons	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds																
Pentachlorophenol	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carcinogenic Polycyclic Aromatic Hydrocarbons																
Benzo(a)pyrene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzofluoranthenes (total)[1]	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Summed cPAH TEQ[2,3]	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Summed cPAH TEQ with One-half of the Reporting Limit[2,4]	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Volatile Organic Compounds																
Tetrachloroethene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis-1,2-Dichloroethene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,2-Dichloroethene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
m,p-Xylene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
o-Xylene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dioxins/Furans																
2,3,7,8-TCDD	pg/g	0.572 U	0.305 J	0.35 U	0.34 UJ	0.407 U	0.37 U	1.12 J	0.113 U	0.63 U	0.33 U	7.18	0.29 U	0.45 J	0.83 J	0.291 U
1,2,3,7,8-PeCDD	pg/g	1.19 U	0.523 J	1.97 J	1.53 J	0.781 J	1.41 J	4.15 J	0.178 U	4.07 J	0.52 U	30	0.42 U	1.17 J	1.15 J	0.314 U
1,2,3,4,7,8-HxCDD	pg/g	1.47 U	0.704 J	2.66 J	2.39 J	0.908 J	2.63 J	8.99 J	0.232 U	8.5 J	0.78 J	37.6	0.53 J	1.56 J	1.91 J	0.378 U
1,2,3,6,7,8-HxCDD	pg/g	1.86 U	3.48 J	10.2 J	8.02 J	3.32 J	7.2 J	20.7	0.292 U	55.6	1.9 J	184	1.33 J	8	12.1	0.486 U
1,2,3,7,8,9-HxCDD	pg/g	1.66 U	1.6 J	6.78 J	5.56 J	2.01 J	5.47 J	17.3	0.254 U	29.9	1.34 J	117	1.01 J	4.23 J	4.24 J	0.431 U
1,2,3,4,6,7,8-HpCDD	pg/g	44.6	85.2	365	246 J	61.4	181	535	2.35 J	2330	50.3	7300	31.8	285	425	5.2
Total OCDD	pg/g	411 J	800	3810	2230 J	451	1550 J	4290 J	20.3	30100 J	468 J	77100	249 J	3370	5160	62.7
2,3,7,8-TCDF	pg/g	0.219 U	0.384 J	0.6 J	0.57 J	1.6	0.84 J	2.24 J	0.0823 U	1.12 J	0.58 J	0.96 J	0.34 J	0.41 J	1.38	0.175 U
1,2,3,7,8-PeCDF	pg/g	0.761 U	0.421 J	0.54 J	0.39 UJ	0.871 J	0.61 J	1.53 J	0.236 U	1.23 J	0.35 U	2.34 J	0.44 U	0.38 J	1.54 J	0.265 U
2,3,4,7,8-PeCDF	pg/g	0.801 U	0.398 J	0.83 J	1.28 J	1.59 J	0.99 J	2.99 J	0.259 U	3.03 J	0.8 J	4.97 J	0.45 U	0.56 J	1.74 J	0.278 U
1,2,3,4,7,8-HxCDF	pg/g	1.06 U	0.89 J	2.18 J	2.08 J	1.6 J	1.76 J	6.62 J	0.137 U	17.8	1.03 J	23.8	0.94 J	1.89 J	6.89	0.228 U
2,3,4,6,7,8-HxCDF	pg/g	1.23 U	0.878 J	2.9 J	2.69 J	2.39 J	2.47 J	8.63 J	0.141 U	10.4 J	1.02 J	24.5	0.88 J	1.79 J	4.12 J	0.257 U
1,2,3,7,8,9-HxCDF	pg/g	1.15 U	0.266 J	0.49 U	0.64 J	0.521 J	0.48 U	1.34 J	0.134 U	1.38 J	0.37 U	3.72 J	0.31 U	0.46 U	2.07 J	0.241 U
1,2,3,4,6,7,8-HpCDF	pg/g	13.9	21.2	75.3	58.4 J	21.1	47.5	139	0.957 J	662	16.4	1630	31.8	82	77.5	1.18 J
1,2,3,6,7,8-HxCDF	pg/g	1.05 U	0.695 J	1.94 J	1.77 J	1.56 J	1.61 J	5.8 J	0.13 U	7.61 J	0.69 J	15.5	0.68 J	1.3 J	2.99 J	0.234 U
1,2,3,4,7,8,9-HpCDF	pg/g	1.3 U	1.07 J	2.52 J	2.35 J	1.8 J	1.84 J	4.04 J	0.179 U	17.1	1.3 J	39.2	1.08 U	2.19 J	4.48 J	0.342 U
Total OCDF	pg/g	37.8 J	75.6	352	214 J	41	137 J	337 J	1.84 J	3550	59.9 J	7290	28.2 J	298	219	2.08 J
Summed Dioxin/Furan TEQ[5,6]	pg/g	0.72 J	3.19 J	10.6 J	8.09 J	3.67 J	6.73 J	21.5 J	0.0397 J	58.4 J	1.81 J	194 J	1.29 J	8.51 J	12.8 J	0.0832 J
Summed Dioxin/Furan TEQ with One-half of the Detection Limit[5,7]	pg/g	2.22 J	3.19 J	10.8 J	8.26 J	3.87 J	6.94 J	21.5 J	0.299 J	58.7 J	2.26 J	194 J	1.74 J	8.53 J	12.8 J	0.555 J

Notes:

1 Benzofluoranthenes (total) includes both benzo(b)fluoranthene and benzo(k)fluoranthene. Both analytes have a toxic equivalency factor of 0.1; therefore, the total of the two analytes is multiplied by 0.1 when calculating the cPAH TE
2 Calculation of cPAH TEQ concentrations was performed using the California Environmental Protection Agency 2005 Toxic Equivancy Factors as presented in Table 708-2 of WAC 173-340-900 (WSDOE 2007
3 Calculated using detected cPAH concentrations
4 Calculated using detected cPAH concentrations plus one-half the reporting limit for cPAHs that were not detected
5 World Health Organization 2005 Toxic Equivalency Factors used for calculation of dioxin/furan TEQ (Van den Berg et al. 2006
6 Calculated using detected dioxin/furan concentrations
7 Calculated using detected dioxin/furan concentrations plus one-half the detection limit for dioxins/furans that were not detected.

Abbreviations:

cPAH Carcinogenic polycyclic aromatic hydrocarbon
NA Not analyzed
OCDD Octachlorodibenzo-p-dioxin
OCDF Octachlorodibenzofuran
TEQ Toxic equivalency quotient
WAC Washington Administrative Code
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Qualifiers:

J The analyte was analyzed for and positively identified, but the associated numerical value is an estimated quantit
U Undetected.
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Table F.1
Lora Lake Apartments Parcel Soil Analytical Results

Location		PSB-6					PSB-7		PSB-8	PSB-8	PSB-9A					
Sample ID		PSB06-0-0.5-072810	PSB06-1.5-2-072810	PSB06-1.5-2-072810-D	PSB06-2-4-072810	PSB06-4-6-072810	PSB07-0-0.5-072810	PSB07-1.5-2-072810	PSB08-0-0.5-072810	PSB08-1.5-2-072810	PSB09-8.5-9.5-073010	PSB09A-0-0.5-073010	PSB09A-1.5-2-073010	PSB09A-2-4-073010	PSB09A-4-6-073010	PSB09A-11-13.5-073010
Sample Date		07/28/2010	07/28/2010	07/28/2010	07/28/2010	07/28/2010	07/28/2010	07/28/2010	07/28/2010	07/28/2010	07/30/2010	07/30/2010	07/30/2010	07/30/2010	07/30/2010	07/30/2010
Sample Depth		0–0.5 feet	1.5–2 feet	1.5–2 feet	2–4 feet	4–6 feet	0–0.5 feet	1.5–2 feet	0–0.5 feet	1.5–2 feet	8.5–9.5 feet	0–0.5 feet	1.5–2 feet	2–4 feet	4–6 feet	11–13.5 feet
Analyte	**Unit**															
Conventionals																
Total Organic Carbon	%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.097	NA	0.08
Total Solids	%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	95.2	NA	84.5
Metals																
Arsenic	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	5 U	8	2 U	5 U	5 U	3 U
Lead	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	2	46	1 U	2 U	2 U	1 U
Total Petroleum Hydrocarbons																
Gasoline Range Hydrocarbons	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8.7	2.9 U	3.1 U	4.9 U	4.4 U
Diesel Range Hydrocarbons	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.4 U	5.2 U	5 U	5.2 U	5.4 U	5.9 U
Heavy Oil Range Hydrocarbons	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	11 U	16	10 U	10 U	11 U	12 U
Semivolatile Organic Compounds																
Pentachlorophenol	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.8 U	38 J	19 J	13 J	6.5 UJ	7.5 U
Carcinogenic Polycyclic Aromatic Hydrocarbons																
Benzo(a)pyrene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	19 U	34 U	19 U	19 UJ	19 U	19 U
Benzo(a)anthracene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	19 U	34 U	19 U	19 UJ	19 U	19 U
Benzofluoranthenes (total)[1]	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	19 U	34 U	19 U	19 UJ	19 U	19 U
Chrysene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	19 U	34 U	19 U	19 UJ	19 U	19 U
Dibenzo(a,h)anthracene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	19 U	34 U	19 U	19 UJ	19 U	19 U
Indeno(1,2,3-cd)pyrene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	19 U	34 U	19 U	19 UJ	19 U	19 U
Summed cPAH TEQ[2,3]	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	0 U	0 U	0 U	0 UJ	0 U	0 U
Summed cPAH TEQ with One-half of the Reporting Limit[2,4]	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	13 U	24 U	13 U	13 UJ	13 U	13 U
Volatile Organic Compounds																
Tetrachloroethene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.8 U	0.6 U	0.6 U	0.9 U	0.9 U
Trichloroethene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.8 U	0.6 U	0.6 U	0.9 U	0.9 U
cis-1,2-Dichloroethene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.8 U	0.6 U	0.6 U	0.9 U	0.9 U
trans-1,2-Dichloroethene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.8 U	0.6 U	0.6 U	0.9 U	0.9 U
1,2-Dichloroethane	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.8 U	0.6 U	0.6 U	0.9 U	0.9 U
Benzene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	9.8 U	7.2 U	7.8 U	12 U	11 U
Ethylbenzene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	9.8 U	7.2 U	7.8 U	12 U	11 U
Toluene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	9.8 U	7.2 U	7.8 U	12 U	11 U
m,p-Xylene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	20 U	14 U	16 U	25 U	22 U
o-Xylene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	9.8 U	7.2 U	7.8 U	12 U	11 U
Dioxins/Furans																
2,3,7,8-TCDD	pg/g	1.71 J	12.3	12.2	0.333 U	0.392 U	0.22 U	0.32 U	0.42 U	0.28 U	NA	0.994 J	0.183 U	0.284 U	NA	NA
1,2,3,7,8-PeCDD	pg/g	10.1 J	67.3	68.2	0.383 U	0.496 U	0.43 J	0.54 U	0.61 U	0.41 U	NA	1.14 J	0.338 U	0.468 U	NA	NA
1,2,3,4,7,8-HxCDD	pg/g	18.5 J	93.6	93.3	0.4 U	0.521 U	0.97 J	0.46 U	0.63 U	0.53 U	NA	1.7 J	0.59 U	0.444 U	NA	NA
1,2,3,6,7,8-HxCDD	pg/g	97.6 J	701	601	0.982 J	0.69 U	5.94	0.55 U	0.76 U	0.63 U	NA	14.7	0.705 U	0.503 U	NA	NA
1,2,3,7,8,9-HxCDD	pg/g	46.7 J	285	284	0.462 U	0.598 U	2.4 J	0.52 U	0.71 U	0.59 U	NA	4.32 J	0.666 U	0.488 U	NA	NA
1,2,3,4,6,7,8-HpCDD	pg/g	4180	30900	23700	19.4	1.99 J	213	1.68 J	12.1	3.79 J	NA	363	35	11.1 J	NA	NA
Total OCDD	pg/g	44200	329000	255000	184 J	13.2 J	2500	10.3 J	117	35.3	NA	3030 J	379 J	119 J	NA	NA
2,3,7,8-TCDF	pg/g	0.69 J	1.31	1.22	0.21 U	0.169 U	0.2 J	0.14 U	0.26 U	0.11 U	NA	1.14 J	0.103 U	0.125 U	NA	NA
1,2,3,7,8-PeCDF	pg/g	1.23 J	4.75 J	4.6 J	0.333 U	0.36 U	0.27 U	0.29 U	0.38 U	0.3 U	NA	0.73 J	0.29 U	0.364 U	NA	NA
2,3,4,7,8-PeCDF	pg/g	1.94 J	8.94	9.84	0.362 U	0.358 U	0.39 J	0.29 U	0.39 U	0.29 U	NA	1.5 J	0.301 U	0.351 U	NA	NA
1,2,3,4,7,8-HxCDF	pg/g	8.68 J	63.1	54.5	0.304 U	0.408 U	1.5 J	0.34 U	0.41 U	0.27 U	NA	2.6 J	0.503 U	0.273 U	NA	NA
2,3,4,6,7,8-HxCDF	pg/g	12.4 J	72.3	65.1	0.354 U	0.445 U	1.39 J	0.38 U	0.45 U	0.3 U	NA	2.87 J	0.568 U	0.295 U	NA	NA
1,2,3,7,8,9-HxCDF	pg/g	1.84 J	8.3	7.55	0.305 U	0.391 U	0.31 U	0.44 U	0.52 U	0.36 U	NA	0.536 U	0.669 U	0.353 U	NA	NA
1,2,3,4,6,7,8-HpCDF	pg/g	799	7290	5970	4.62 J	0.753 U	72.7	0.78 J	3.37 J	0.53 J	NA	121	16.2 J	2.52 J	NA	NA
1,2,3,6,7,8-HxCDF	pg/g	7.12 J	40.5	37.2	0.324 U	0.4 U	0.87 J	0.35 U	0.43 U	0.28 U	NA	2.04 J	0.527 U	0.286 U	NA	NA
1,2,3,4,7,8,9-HpCDF	pg/g	20.3 J	157	131	0.38 U	0.795 U	1.87 J	0.3 U	0.5 U	0.28 U	NA	3.97 J	1.77 J	0.606 U	NA	NA
Total OCDF	pg/g	4060 J	36200	25700	19.3 J	1.21 U	290	0.94 U	12.1	1.4 J	NA	653 J	156 J	23.6 J	NA	NA
Summed Dioxin/Furan TEQ[5,6]	pg/g	96.3 J	702 J	580 J	0.399 J	0.0239 J	5.59 J	0.0277 J	0.193 J	0.0542 J	NA	11.5 J	0.69 J	0.179 J	NA	NA
Summed Dioxin/Furan TEQ with One-half of the Detection Limit[5,7]	pg/g	96.3 J	702 J	580 J	0.937 J	0.716 J	5.72 J	0.666 J	0.984 J	0.602 J	NA	11.6 J	1.22 J	0.754 J	NA	NA

Notes:

1 Benzofluoranthenes (total) includes both benzo(b)fluoranthene and benzo(k)fluoranthene. Both analytes have a toxic equivalency factor of 0.1; therefore, the total of the two analytes is multiplied by 0.1 when calculating the cPAH TE
2 Calculation of cPAH TEQ concentrations was performed using the California Environmental Protection Agency 2005 Toxic Equivancy Factors as presented in Table 708-2 of WAC 173-340-900 (WSDOE 2007
3 Calculated using detected cPAH concentrations
4 Calculated using detected cPAH concentrations plus one-half the reporting limit for cPAHs that were not detected
5 World Health Organization 2005 Toxic Equivalency Factors used for calculation of dioxin/furan TEQ (Van den Berg et al. 2006
6 Calculated using detected dioxin/furan concentrations
7 Calculated using detected dioxin/furan concentrations plus one-half the detection limit for dioxins/furans that were not detected.

Abbreviations:

cPAH Carcinogenic polycyclic aromatic hydrocarbon
NA Not analyzed
OCDD Octachlorodibenzo-p-dioxin
OCDF Octachlorodibenzofuran
TEQ Toxic equivalency quotient
WAC Washington Administrative Code
WSDOE Washington State Department of Ecology

Qualifiers:

J The analyte was analyzed for and positively identified, but the associated numerical value is an estimated quantit
U Undetected.
UJ Undetected with estimated concentration

Table F.1
Lora Lake Apartments Parcel Soil Analytical Results

Location		PSB-10							PSB-11							
Sample ID		PSB10-0-0.5-073010	PSB10-1.5-2-073010	PSB10-2-4-073010	PSB10-4-6-073010	PSB10-8.5-10-073010	PSB10-14-15-073010	PSB10-20-25-073010	PSB11-0-0.5-073010	PSB11-1.5-2-073010	PSB11-2-4-073010	PSB11-2-4-073010-D	PSB11-4-6-073010	PSB11-7.5-9.5-073010	PSB11-11-13-073010	PSB11-14-16-073010
Sample Date		07/30/2010	07/30/2010	07/30/2010	07/30/2010	07/30/2010	07/30/2010	07/30/2010	07/30/2010	07/30/2010	07/30/2010	07/30/2010	07/30/2010	07/30/2010	07/30/2010	07/30/2010
Sample Depth		0–0.5 feet	1.5–2 feet	2–4 feet	4–6 feet	8.5–10 feet	14–15 feet	20–25 feet	0–0.5 feet	1.5–2 feet	2–4 feet	2–4 feet	4–6 feet	7.5–9.5 feet	11–13 feet	14–16 feet
Analyte	**Unit**															
Conventionals																
Total Organic Carbon	%	NA	NA	NA	NA	1.83	0.087	NA	NA	NA	NA	NA	NA	NA	1.75	1.78
Total Solids	%	NA	NA	NA	NA	87.1	95.1	NA	NA	NA	NA	NA	NA	NA	87.1	82.4
Metals																
Arsenic	mg/kg	5 U	5 U	5 U	5 U	7	5 U	6 U	5 U	5 U	7	6	5 U	NA	5 U	6 U
Lead	mg/kg	43	35	36	33	29	2	2 U	12 J	304 J	1680 J	2880 J	131 J	NA	162 J	45 J
Total Petroleum Hydrocarbons																
Gasoline Range Hydrocarbons	mg/kg	3.1 U	3.6 U	3.1 U	3.1 U	3.5 U	2.7 U	4.5 U	3.3 U	150	10	17	8.2	NA	3.5 U	26
Diesel Range Hydrocarbons	mg/kg	24	5.4 U	6.5	12	5.6 U	5 U	6.2 U	32	400	440	430	41	NA	98	130
Heavy Oil Range Hydrocarbons	mg/kg	310	21	42	120	27	10 U	12 U	370	1600	2700	2700	170	NA	510	450
Semivolatile Organic Compounds																
Pentachlorophenol	µg/kg	53 J	210	280	450	28	5.9 UJ	7.8 U	12 J	2400 J	1100 J	1300	210	NA	210	160
Carcinogenic Polycyclic Aromatic Hydrocarbons																
Benzo(a)pyrene	µg/kg	95 U	20 U	10 J	20 U	19 U	20 U	19 U	59 U	100 J	390 U	100 J	16 J	NA	42 J	35
Benzo(a)anthracene	µg/kg	95 U	20 U	16 J	20 U	19 U	20 U	19 U	59 U	130 J	390 U	190 U	12 J	NA	58 U	39
Benzofluoranthenes (total)[1]	µg/kg	50 J	20 U	22	12 J	19 U	20 U	19 U	59 U	200	390 U	190 U	33	NA	75	73
Chrysene	µg/kg	95 U	20 U	17 J	16 J	19 U	20 U	19 U	52 J	170 J	390 U	140 J	21	NA	47 J	65
Dibenzo(a,h)anthracene	µg/kg	95 U	20 U	19 U	20 U	19 U	20 U	19 U	59 U	190 U	390 U	190 U	19 U	NA	58 U	20 U
Indeno(1,2,3-cd)pyrene	µg/kg	95 U	20 U	19 U	20 U	19 U	20 U	19 U	59 U	190 U	390 U	190 U	19 U	NA	58 U	20 U
Summed cPAH TEQ[2,3]	µg/kg	5 J	0 U	14 J	1.4 J	0 U	0 U	0 U	0.52 J	130 J	0 U	100 J	21 J	NA	50 J	47
Summed cPAH TEQ with One-half of the Reporting Limit[2,4]	µg/kg	67 J	14 U	16 J	14 J	13 U	14 U	13 U	42 J	150 J	270 U	140 J	23 J	NA	59 J	49
Volatile Organic Compounds																
Tetrachloroethene	µg/kg	0.5 U	0.6 U	0.6 U	0.5 U	0.6 U	0.5 U	0.6 U	0.5 U	0.8	0.6 U	0.6 U	0.6 U	NA	0.6 U	0.6
Trichloroethene	µg/kg	0.5 U	0.6 U	0.6 U	0.5 U	0.6 U	0.5 U	0.6 U	0.5 U	0.8	0.6 U	0.6 U	0.6 U	NA	0.6 U	0.6 U
cis-1,2-Dichloroethene	µg/kg	0.5 U	0.6 U	0.6 U	0.5 U	0.6 U	0.5 U	0.6 U	0.5 U	0.6 U	0.6 U	0.6 U	0.6 U	NA	0.6 U	0.6 U
trans-1,2-Dichloroethene	µg/kg	0.5 U	0.6 U	0.6 U	0.5 U	0.6 U	0.5 U	0.6 U	0.5 U	0.6 U	0.6 U	0.6 U	0.6 U	NA	0.6 U	0.6 U
1,2-Dichloroethane	µg/kg	0.5 U	0.6 U	0.6 U	0.5 U	0.6 U	0.5 U	0.6 U	0.5 U	0.6 U	0.6 U	0.6 U	0.6 U	NA	0.6 U	0.6 U
Benzene	µg/kg	7.8 U	8.9 U	7.7 U	7.8 U	8.8 U	6.7 U	11 U	8.2 U	8.9 U	9.6 U	9.4 U	8.9 U	NA	8.6 U	9.3 U
Ethylbenzene	µg/kg	7.8 U	8.9 U	7.7 U	7.8 U	8.8 U	6.7 U	11 U	8.2 U	8.9 U	9.6 U	9.4 U	8.9 U	NA	8.6 U	9.3 U
Toluene	µg/kg	7.8 U	8.9 U	7.7 U	7.8 U	8.8 U	6.7 U	11 U	8.2 U	8.9 U	9.6 U	9.4 U	8.9 U	NA	8.6 U	9.3 U
m,p-Xylene	µg/kg	16 U	18 U	15 U	16 U	18 U	14 U	22 U	16 U	18 U	19 U	19 U	18 U	NA	17 U	18 U
o-Xylene	µg/kg	7.8 U	8.9 U	7.7 U	7.8 U	8.8 U	6.7 U	11 U	8.2 U	8.9 U	9.6 U	9.4 U	8.9 U	NA	8.6 U	9.3 U
Dioxins/Furans																
2,3,7,8-TCDD	pg/g	4.83	6	12.8	5.92	2.33	0.31 U	NA	1.09 J	446	164	210	44.2	38.8	32.2	41.7
1,2,3,7,8-PeCDD	pg/g	33.9	29.9	56.6	26.4	9.01	0.36 U	NA	4.23 J	1540	705	868	203	196	134	173
1,2,3,4,7,8-HxCDD	pg/g	57.6	43.3	83.8	36	9.11	0.57 U	NA	6.99 J	2670	1180	1480	301	286	221	237
1,2,3,6,7,8-HxCDD	pg/g	481	414	847	420	102	0.72 U	NA	57.4	24600	11500	13500	3060	2670	2080	2400
1,2,3,7,8,9-HxCDD	pg/g	196	155	306	119	33.9	0.64 U	NA	24.1	8970	4010	5150	943	960	719	780
1,2,3,4,6,7,8-HpCDD	pg/g	19700	16200	32500	16400	4030	4.17 J	NA	2490	922000	448000	490000	98700	84800	73700	93100
Total OCDD	pg/g	234000	204000	411000	177000	40000 J	51.9 J	NA	30900	6050000	4280000 J	5000000 J	994000	919000	812000	760000
2,3,7,8-TCDF	pg/g	1.77 J	1.06 J	3.47	1.34	1.27	0.26 U	NA	0.43 J	36.9	32.9	34.5	6.41	6.55	5.62	4.5
1,2,3,7,8-PeCDF	pg/g	3.96 J	3.1 J	6.93 J	3.19 J	1.67 J	0.3 U	NA	0.61 J	174	74.8	90.3	21.3	21	18.7	18.4
2,3,4,7,8-PeCDF	pg/g	20	15.8	29.4	10.1	3.92 J	0.33 U	NA	2.29 J	849	253	267	125	65.4	102	64
1,2,3,4,7,8-HxCDF	pg/g	124	101	194	97.9	27.3	0.36 U	NA	13.7	5050	2560	2690	714	353	493	377
2,3,4,6,7,8-HxCDF	pg/g	67.5	56.5	107	53.1	16.6	0.41 U	NA	9.01	3680	1610	1760	415	311	336	292
1,2,3,7,8,9-HxCDF	pg/g	9.99 J	10.8 J	18.8	3.86 J	2.72 J	0.44 U	NA	1.26 J	805	178	207	26.9	16.2	35.2	19.8
1,2,3,4,6,7,8-HpCDF	pg/g	5300	4780	9580	5090	1980	1.43 J	NA	636	257000	114000	130000	28700	24200	17400	18100
1,2,3,6,7,8-HxCDF	pg/g	48.3	41.2	85.4	42.2 J	15.6 J	0.37 U	NA	5.98 J	2230	1180	1150	347 J	212 J	234 J	225 J
1,2,3,4,7,8,9-HpCDF	pg/g	140	129	257	141	45.8	0.51 U	NA	14.5	9580	2750	3490	970	678	710	705
Total OCDF	pg/g	25000	22200	44100	20900	5700	4.61 J	NA	3070	1380000	592000	690000	143000	89700	101000	102000
Summed Dioxin/Furan TEQ[5,6]	pg/g	473 J	402 J	803 J	388 J	108 J	0.073 J	NA	59.5 J	21200	10300 J	11700 J	2490 J	2140 J	1800 J	2050 J
Summed Dioxin/Furan TEQ with One-half of the Detection Limit[5,7]	pg/g	473 J	402 J	803 J	388 J	108 J	0.653 J	NA	59.5 J	21200	10300 J	11700 J	2490 J	2140 J	1800 J	2050 J

Notes:

1 Benzofluoranthenes (total) includes both benzo(b)fluoranthene and benzo(k)fluoranthene. Both analytes have a toxic equivalency factor of 0.1; therefore, the total of the two analytes is multiplied by 0.1 when calculating the cPAH TE
2 Calculation of cPAH TEQ concentrations was performed using the California Environmental Protection Agency 2005 Toxic Equivancy Factors as presented in Table 708-2 of WAC 173-340-900 (WSDOE 2007
3 Calculated using detected cPAH concentrations
4 Calculated using detected cPAH concentrations plus one-half the reporting limit for cPAHs that were not detectec
5 World Health Organization 2005 Toxic Equivalency Factors used for calculation of dioxin/furan TEQ (Van den Berg et al. 2006
6 Calculated using detected dioxin/furan concentrations
7 Calculated using detected dioxin/furan concentrations plus one-half the detection limit for dioxins/furans that were not detected.

Abbreviations:

cPAH Carcinogenic polycyclic aromatic hydrocarbor
NA Not analyzed
OCDD Octachlorodibenzo-p-dioxir
OCDF Octachlorodibenzofuran
TEQ Toxic equivalency quotien
WAC Washington Administrative Code
WSDOE Washington State Department of Ecology

Qualifiers:

J The analyte was analyzed for and positively identified, but the associated numerical value is an estimated quantit
U Undetected.
UJ Undetected with estimated concentration

Table F.1
Lora Lake Apartments Parcel Soil Analytical Results

	Location	PSB-11	PSB-12			PSB-12				PSB-13						PSB-14
	Sample ID	PSB11-23-24-073010	PSB12-0-0.5-072810	PSB12-1.5-2-072810	PSB12-2-4-072810	PSB12-4-6-072810	PSB12-8-10-072810	PSB12-8-10-072810-D	PSB12-14-17-072810	PSB13-0-0.5-072910	PSB13-1.5-2-072910	PSB13-2-4-072910	PSB13-4-6-072910	PSB13-11-13-072910	PSB13-14.5-16.5-072910	PSB14-0-0.5-072810
	Sample Date	07/30/2010	07/28/2010	07/28/2010	07/28/2010	07/28/2010	07/28/2010	07/28/2010	07/28/2010	07/29/2010	07/29/2010	07/29/2010	07/29/2010	07/29/2010	07/29/2010	07/28/2010
	Sample Depth	23–24 feet	0–0.5 feet	1.5–2 feet	2–4 feet	4–6 feet	8–10 feet	8–10 feet	14–17 feet	0–0.5 feet	1.5–2 feet	2–4 feet	4–6 feet	11–13 feet	14.5–16.5 feet	0–0.5 feet
Analyte	**Unit**															
Conventionals																
Total Organic Carbon	%	NA	NA	NA	NA	NA	0.413	0.377	0.28	NA	NA	NA	NA	0.408	0.578	NA
Total Solids	%	NA	NA	NA	NA	NA	95.2	95.5	92.5	NA	NA	NA	NA	91.8	91.4	NA
Metals																
Arsenic	mg/kg	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	11	5 U	5 U	10 U	5 U	5 U	5 U
Lead	mg/kg	NA	11	9	30	47	4	3	3	60	29	18	23	3	5	17
Total Petroleum Hydrocarbons																
Gasoline Range Hydrocarbons	mg/kg	NA	3.3 U	3.5 U	2.9 U	3.6 U	4.8 U	3.3 U	2.6 U	3.7 U	3.2 U	6.4 U	3.2 U	3 U	3.8	2.9 U
Diesel Range Hydrocarbons	mg/kg	5.2 U	14	5.1 U	6	10	5.2 U	5.1 U	5.1 U	5.3 U	5.4	54	5.6 U	5.5 U	5.6 U	13
Heavy Oil Range Hydrocarbons	mg/kg	10 U	200	12	50	110	10 U	10 U	42	32	53	930	15	30	61	180
Semivolatile Organic Compounds																
Pentachlorophenol	µg/kg	NA	6.8 U	27	14	16	6.2 U	6.3 U	61	6.6 U	18	6.5 UJ	11	6.7 UJ	6.9 U	8.5 J
Carcinogenic Polycyclic Aromatic Hydrocarbons																
Benzo(a)pyrene	µg/kg	NA	19 U	20 U	20 U	20 U	19 U	19 U	19 U	75 U	20 UJ	19 UJ	20 U	20 U	20 U	19 UJ
Benzo(a)anthracene	µg/kg	NA	19 U	20 U	20 U	20 U	19 U	19 U	19 U	75 U	20 UJ	19 UJ	20 U	20 U	20 U	19 UJ
Benzofluoranthenes (total)[1]	µg/kg	NA	19 U	20 U	20 U	20 U	19 U	19 U	19 U	75 U	20 UJ	19 UJ	20 U	20 U	20 U	19 UJ
Chrysene	µg/kg	NA	17 J	20 U	20 U	9.9 J	19 U	19 U	19 U	75 U	20 UJ	19 UJ	20 U	20 U	20 U	10 J
Dibenzo(a,h)anthracene	µg/kg	NA	19 U	20 U	20 U	20 U	19 U	19 U	19 U	75 U	20 UJ	19 UJ	20 U	20 U	20 U	19 UJ
Indeno(1,2,3-cd)pyrene	µg/kg	NA	19 U	20 U	20 U	20 U	19 U	19 U	19 U	75 U	20 UJ	19 UJ	20 U	20 U	20 U	19 UJ
Summed cPAH TEQ[2,3]	µg/kg	NA	0.17 J	0 U	0 U	0.099 J	0 U	0 U	0 U	0 U	0 UJ	0 UJ	0 U	0 U	0 U	0.1 J
Summed cPAH TEQ with One-half of the Reporting Limit[2,4]	µg/kg	NA	13 J	14 U	14 U	14 J	13 U	13 U	13 U	53 U	14 UJ	13 UJ	14 U	14 U	14 U	13 J
Volatile Organic Compounds																
Tetrachloroethene	µg/kg	NA	0.6 U	0.7 U	0.5 U	0.6 U	0.7 U	0.8 U	0.6 U	0.7 U	0.6 U	0.5 U	0.6 U	0.5 U	0.5 U	0.7 U
Trichloroethene	µg/kg	NA	0.6 U	0.7 U	0.5 U	0.6 U	0.7 U	0.8 U	0.6 U	0.7 U	0.6 U	0.5 U	0.6 U	0.5 U	0.5 U	0.7 U
cis-1,2-Dichloroethene	µg/kg	NA	0.6 U	0.7 U	0.5 U	0.6 U	0.7 U	0.8 U	0.6 U	0.7 U	0.6 U	0.5 U	0.6 U	0.5 U	0.5 U	0.7 U
trans-1,2-Dichloroethene	µg/kg	NA	0.6 U	0.7 U	0.5 U	0.6 U	0.7 U	0.8 U	0.6 U	0.7 U	0.6 U	0.5 U	0.6 U	0.5 U	0.5 U	0.7 U
1,2-Dichloroethane	µg/kg	NA	0.6 U	0.7 U	0.5 U	0.6 U	0.7 U	0.8 U	0.6 U	0.7 U	0.6 U	0.5 U	0.6 U	0.5 U	0.5 U	0.7 U
Benzene	µg/kg	NA	8.4 U	8.8 U	7.3 U	9.1 U	12 U	8.2 U	6.4 U	9.1 U	8.1 U	16 U	8 U	7.6 U	7.8 U	7.2 U
Ethylbenzene	µg/kg	NA	8.4 U	8.8 U	7.3 U	9.1 U	12 U	8.2 U	6.4 U	9.1 U	8.1 U	16 U	8 U	7.6 U	7.8 U	7.2 U
Toluene	µg/kg	NA	8.4 U	8.8 U	7.3 U	9.1 U	12 U	8.2 U	6.4 U	9.1 U	8.1 U	16 U	8 U	7.6 U	7.8 U	7.2 U
m,p-Xylene	µg/kg	NA	17 U	18 U	15 U	18 U	24 U	16 U	13 U	18 U	16 U	32 U	16 U	15 U	16 U	14 U
o-Xylene	µg/kg	NA	8.4 U	8.8 U	7.3 U	9.1 U	12 U	8.2 U	6.4 U	9.1 U	8.1 U	16 U	8 U	7.6 U	7.8 U	7.2 U
Dioxins/Furans																
2,3,7,8-TCDD	pg/g	NA	0.43 U	0.42 U	0.44 U	0.77 J	0.49 U	NA	2.24	2.02 J	2.3 J	0.784 U	0.784 J	0.31 U	NA	2.01 J
1,2,3,7,8-PeCDD	pg/g	NA	0.84 J	1.67 J	2.01 J	2.67 J	1.63 J	NA	8.06	2.45 J	14.4	3.12 J	4.23 J	0.65 U	NA	10.9 J
1,2,3,4,7,8-HxCDD	pg/g	NA	1.1 J	3.69 J	3.68 J	3.63 J	1.95 J	NA	8.99	3.49 J	33.6	7.84 J	6.84	0.51 U	NA	22.1
1,2,3,6,7,8-HxCDD	pg/g	NA	4.41 J	15.2	16.9	24.9	15.1	NA	90.2	14.7	213	53.8	55.9	2.58 J	NA	139
1,2,3,7,8,9-HxCDD	pg/g	NA	2.76 J	6.73 J	9.34 J	10.5	5.78	NA	31	8.68 J	100	20.2	20.2	1.57 J	NA	66.8
1,2,3,4,6,7,8-HpCDD	pg/g	NA	148 J	465	585	869	478	NA	2460	443	8170	2390	2090	55.8	NA	5490
Total OCDD	pg/g	NA	1670 J	4600 J	6740 J	11100 J	6780	NA	35100	4560	81800	28900	25400	548 J	NA	64900
2,3,7,8-TCDF	pg/g	NA	0.17 U	0.16 U	0.47 J	0.464 J	0.32 U	NA	0.284 U	2.23 J	1.03 J	0.614 J	0.52 J	0.23 U	NA	0.63 J
1,2,3,7,8-PeCDF	pg/g	NA	0.37 UJ	0.35 U	0.41 U	0.676 J	0.33 U	NA	1.2 J	1.59 J	1.7 J	0.781 J	0.591 J	0.25 U	NA	1.07 J
2,3,4,7,8-PeCDF	pg/g	NA	0.82 J	0.59 J	1.29 J	1.87 J	1.22 J	NA	3.02 J	2.33 J	3.42 J	1.19 J	1.21 J	0.81 J	NA	4.75 J
1,2,3,4,7,8-HxCDF	pg/g	NA	1.33 J	2.94 J	4.9 J	6.42	2.93 J	NA	19.5	5.42 J	17.3	4.68 J	5.29	0.34 U	NA	24.3
2,3,4,6,7,8-HxCDF	pg/g	NA	1.16 J	3.55 J	3.67 J	4.86 J	3.24 J	NA	19.9	4.4 J	27	6.88 J	7.27	2.58 J	NA	19.4
1,2,3,7,8,9-HxCDF	pg/g	NA	0.45 U	0.48 U	0.78 J	0.475 J	0.42 U	NA	2.55 J	1.16 J	3.66 J	1.34 J	0.845 J	0.34 U	NA	3.14 J
1,2,3,4,6,7,8-HpCDF	pg/g	NA	33.5 J	137	149	261	121	NA	845	111	1870	520	558	13.7	NA	1230
1,2,3,6,7,8-HxCDF	pg/g	NA	0.75 J	2.46 J	2.41 J	3.33 J	1.91 J	NA	11 U	3.09 J	16	4.06 J	5.18	1.43 J	NA	13.3
1,2,3,4,7,8,9-HpCDF	pg/g	NA	0.98 J	4.59 J	5.36 J	7.32	5.68	NA	46.4	3.47 J	38	10.6 J	14.2	0.67 J	NA	27.3
Total OCDF	pg/g	NA	148 J	585 J	681 J	1110	572	NA	3460 J	555	8390	2580	2270	63.1	NA	6040
Summed Dioxin/Furan TEQ[5,6]	pg/g	NA	4.61 J	12.9 J	16.2 J	24.5 J	13.3 J	NA	73.5 J	16.6 J	187 J	52.1 J	50.5 J	1.94 J	NA	132 J
Summed Dioxin/Furan TEQ with One-half of the Detection Limit[5,7]	pg/g	NA	4.86 J	13.2 J	16.5 J	24.5 J	13.6 J	NA	74.1 J	16.6 J	187 J	52.5 J	50.5 J	2.5 J	NA	132 J

Notes:

1 Benzofluoranthenes (total) includes both benzo(b)fluoranthene and benzo(k)fluoranthene. Both analytes have a toxic equivalency factor of 0.1; therefore, the total of the two analytes is multiplied by 0.1 when calculating the cPAH TE
2 Calculation of cPAH TEQ concentrations was performed using the California Environmental Protection Agency 2005 Toxic Equivancy Factors as presented in Table 708-2 of WAC 173-340-900 (WSDOE 2007
3 Calculated using detected cPAH concentrations
4 Calculated using detected cPAH concentrations plus one-half the reporting limit for cPAHs that were not detected
5 World Health Organization 2005 Toxic Equivalency Factors used for calculation of dioxin/furan TEQ (Van den Berg et al. 2006
6 Calculated using detected dioxin/furan concentrations
7 Calculated using detected dioxin/furan concentrations plus one-half the detection limit for dioxins/furans that were not detected.

Abbreviations:

cPAH Carcinogenic polycyclic aromatic hydrocarbon
NA Not analyzed
OCDD Octachlorodibenzo-p-dioxin
OCDF Octachlorodibenzofuran
TEQ Toxic equivalency quotient
WAC Washington Administrative Code
WSDOE Washington State Department of Ecology

Qualifiers:

J The analyte was analyzed for and positively identified, but the associated numerical value is an estimated quantit
U Undetected.
UJ Undetected with estimated concentration

Table F.1
Lora Lake Apartments Parcel Soil Analytical Results

Location		PSB-14					PSB-15							PSB-16		
Sample ID		PSB14-1.5-2-072810	PSB14-2-4-072810	PSB14-4-7-072810	PSB14-7-9-072810	PSB14-12-14-072810	PSB15-0-0.5-073010	PSB15-1.5-2-073010	PSB15-2-4-073010	PSB15-4-6-073010	PSB15-13-15-073010	PSB15-17-19-073010	PSB15-17-19-073010-D	PSB16-0-0.5-082510	PSB16-1-2-082510	PSB16-2-4-082510
Sample Date		07/28/2010	07/28/2010	07/28/2010	07/28/2010	07/28/2010	07/30/2010	07/30/2010	07/30/2010	07/30/2010	07/30/2010	07/30/2010	07/30/2010	08/25/2010	08/25/2010	08/25/2010
Sample Depth		1.5–2 feet	2–4 feet	4–7 feet	7–9 feet	12–14 feet	0–0.5 feet	1.5–2 feet	2–4 feet	4–6 feet	13–15 feet	17–19 feet	17–19 feet	0–0.5 feet	1–2 feet	2–4 feet
Analyte	**Unit**															
Conventionals																
Total Organic Carbon	%	NA	NA	NA	2.01	0.273	NA	NA	NA	NA	1.88	0.581	0.455	NA	NA	NA
Total Solids	%	NA	NA	NA	88.7	89.1	NA	NA	NA	NA	85.5	84.2	83.2	NA	NA	NA
Metals																
Arsenic	mg/kg	5 U	5 U	NA	5 U	6 U	8	5 U	5 U	5 U	6 U	6 U	5 U	10	5 U	5 U
Lead	mg/kg	3	11	NA	16	2 U	245 J	21 J	34 J	43 J	165 J	2 UJ	2 U	79	21	14
Total Petroleum Hydrocarbons																
Gasoline Range Hydrocarbons	mg/kg	3.2 U	3.4 U	NA	4.2 U	3.4 U	4 U	3.5 U	5.5	3.2 U	3.9 U	3.9 U	3.4 U	20 J	2.9 UJ	3 UJ
Diesel Range Hydrocarbons	mg/kg	5.4 U	5.4 U	NA	9	5.4 U	20	5.3 U	5.2 U	5.1 U	24	6.2 U	5.7 U	7.5	110	5.2 U
Heavy Oil Range Hydrocarbons	mg/kg	11 U	11 U	NA	120	11 U	120	10 U	12	17	230	12 U	11 U	65	890	15
Semivolatile Organic Compounds																
Pentachlorophenol	µg/kg	11	9	NA	9.4 J	11	480	6.7 UJ	14 J	63	21	67	11	95	6.5 UJ	11 J
Carcinogenic Polycyclic Aromatic Hydrocarbons																
Benzo(a)pyrene	µg/kg	20 UJ	19 U	NA	19 UJ	19 U	86	20 U	19 U	19 U	60 UJ	20 U	20 U	14 J	140 U	20 U
Benzo(a)anthracene	µg/kg	20 UJ	19 U	NA	19 UJ	19 U	60	20 U	19 U	19 U	60 UJ	20 U	20 U	15 J	140 U	20 U
Benzofluoranthenes (total)[1]	µg/kg	20 UJ	19 U	NA	19 UJ	19 U	180	20 U	19 U	19 U	60 UJ	20 U	20 U	47	110 J	20 U
Chrysene	µg/kg	20 UJ	19 U	NA	19 UJ	19 U	86	20 U	19 U	19 U	60 UJ	20 U	20 U	23	140 U	20 U
Dibenzo(a,h)anthracene	µg/kg	20 UJ	19 U	NA	19 UJ	19 U	14 J	20 U	19 U	19 U	60 UJ	20 U	20 U	19 U	140 U	20 U
Indeno(1,2,3-cd)pyrene	µg/kg	20 UJ	19 U	NA	19 UJ	19 U	31	20 U	19 U	19 U	60 UJ	20 U	20 U	19 U	140 U	20 U
Summed cPAH TEQ[2,3]	µg/kg	0 UJ	0 U	NA	0 UJ	0 U	120 J	0 U	0 U	0 U	0 UJ	0 U	0 U	20 J	11 J	0 U
Summed cPAH TEQ with One-half of the Reporting Limit[2,4]	µg/kg	14 UJ	13 U	NA	13 UJ	13 U	120 J	14 U	13 U	13 U	42 UJ	14 U	14 U	22 J	100 J	14 U
Volatile Organic Compounds																
Tetrachloroethene	µg/kg	0.6 U	0.6 U	NA	0.6 U	0.5 U	0.7 U	0.7 U	0.6 U	0.5 U	0.6 U	0.6 U	0.5 U	0.7 U	0.5 U	0.6 U
Trichloroethene	µg/kg	0.6 U	0.6 U	NA	0.6 U	0.5 U	0.7 U	0.7 U	0.6 U	0.5 U	0.6 U	0.6 U	0.5 U	0.7 U	0.5 U	0.6 U
cis-1,2-Dichloroethene	µg/kg	0.6 U	0.6 U	NA	0.6 U	0.5 U	0.7 U	0.7 U	0.6 U	0.5 U	0.6 U	0.6 U	0.5 U	0.7 U	0.5 U	0.6 U
trans-1,2-Dichloroethene	µg/kg	0.6 U	0.6 U	NA	0.6 U	0.5 U	0.7 U	0.7 U	0.6 U	0.5 U	0.6 U	0.6 U	0.5 U	0.7 U	0.5 U	0.6 U
1,2-Dichloroethane	µg/kg	0.6 U	0.6 U	NA	0.6 U	0.5 U	0.7 U	0.7 U	0.6 U	0.5 U	0.6 U	0.6 U	0.5 U	0.7 U	0.5 U	0.6 U
Benzene	µg/kg	8 U	8.4 U	NA	11 U	8.5 U	9.9 U	8.7 U	7.7 U	8 U	9.7 U	9.7 U	8.6 U	0.7 U	0.5 U	0.6 U
Ethylbenzene	µg/kg	8 U	8.4 U	NA	11 U	8.5 U	9.9 U	8.7 U	7.7 U	8 U	9.7 U	9.7 U	8.6 U	0.7 U	0.5 U	0.6 U
Toluene	µg/kg	8 U	8.4 U	NA	11 U	8.5 U	9.9 U	8.7 U	7.7 U	8 U	9.7 U	9.7 U	8.6 U	3.9	0.5 U	0.6 U
m,p-Xylene	µg/kg	16 U	17 U	NA	21 U	17 U	20 U	18 U	15 U	16 U	19 U	19 U	17 U	0.7 U	0.5 U	0.6 U
o-Xylene	µg/kg	8 U	8.4 U	NA	11 U	8.5 U	9.9 U	8.7 U	7.7 U	8 U	9.7 U	9.7 U	8.6 U	0.7 U	0.5 U	0.6 U
Dioxins/Furans																
2,3,7,8-TCDD	pg/g	1.15 J	1.11 J	1.62	1.56	1.23	76.1	0.37 U	0.84 U	5.38	2.1	0.38 U	0.33 U	9.63	0.342 J	0.341 U
1,2,3,7,8-PeCDD	pg/g	3.43 J	4.42 J	10.1	9.97	5.76	359	1.74 J	5.78 J	33	8.59	0.47 U	0.43 U	38.1	2.21 J	2.41 J
1,2,3,4,7,8-HxCDD	pg/g	6.72 J	7.31 J	14.7	14.7	7.17	391	2.45 J	10.9	74.4	22.1	0.85 U	0.9 U	45.5	4.14 J	4.62 J
1,2,3,6,7,8-HxCDD	pg/g	40.9	40.7	99.3	92.6	38.6	2190	12.5	58.6	396	137	1.03 U	1.04 U	185	15.2	18.1
1,2,3,7,8,9-HxCDD	pg/g	18.6	21.9	43.5	46.9	19.4	1360	6.37 J	30.4	212	54	0.97 U	1 U	122	10	11.1
1,2,3,4,6,7,8-HpCDD	pg/g	1530	1560	3120	2790	785	83200	408	2020	12700	5700	28.8	33.5	5820	355	491
Total OCDD	pg/g	18700	17900	38100	32500	7610	903000	4360	21200 J	127000	73500	1270 J	1560 J	65300	3480 J	4910
2,3,7,8-TCDF	pg/g	0.23 U	0.44 J	0.702 J	1.39	0.23 U	9.8	0.52 J	0.41 U	1.08 J	1.34 J	0.21 U	0.13 U	6.47	0.384 J	0.346 J
1,2,3,7,8-PeCDF	pg/g	0.48 U	0.49 U	1.23 J	1.6 J	0.44 U	29.3	0.57 J	0.85 U	3.68 J	1.73 J	0.43 U	0.34 U	14.1	0.641 J	0.634 J
2,3,4,7,8-PeCDF	pg/g	1.76 J	2.64 J	5.55	6.4	4.88	58.9	1.37 J	2.73 J	6.69	2.83 J	0.44 U	0.32 U	20.6	1.3 J	1.43 J
1,2,3,4,7,8-HxCDF	pg/g	6.96 J	12.5	25.3	25.7	19.7	310	3.1 J	10.5	49.2	28	0.46 U	0.29 U	65.4 J	3.52 J	4.63 J
2,3,4,6,7,8-HxCDF	pg/g	5.63 J	8.18 J	16.4	16.9	7.73	296	2.75 J	9.59	60.3	28.1	0.55 U	0.33 U	50 J	5 J	7.06
1,2,3,7,8,9-HxCDF	pg/g	1.17 J	1.27 J	2.34 J	1.83 J	1.13 J	40.4	0.74 J	1.4 J	7.07	6.3 J	0.64 U	0.38 U	7.95 J	0.44 J	0.505 J
1,2,3,4,6,7,8-HpCDF	pg/g	340	401	864	786	212	19800	108	520 J	3350	1180	3.17 J	2.46 J	1780 J	134	192
1,2,3,6,7,8-HxCDF	pg/g	3.88 J	5.93 J	12.5	12.7	5.86	199	1.85 J	5.72 J	37.4	16.3	0.49 U	0.31 U	43.6 J	3.26 J	4.52 J
1,2,3,4,7,8,9-HpCDF	pg/g	7.54 J	8.96 J	24.4 J	22.9	11.6	469	4.04 J	15	97.8	37.9	0.7 U	0.49 U	58.9	4.81 J	5.92
Total OCDF	pg/g	1670	1740	3430	2750	991	82700	579	2420 J	12800	5750	12 J	11.3 J	6940	329 J	510
Summed Dioxin/Furan TEQ[5,6]	pg/g	38.4 J	41.7 J	87.4 J	81.3 J	31.1 J	2260	11.9 J	51.9 J	328 J	134 J	0.704 J	0.831 J	205 J	13.2 J	16.5 J
Summed Dioxin/Furan TEQ with One-half of the Detection Limit[5,7]	pg/g	38.4 J	41.7 J	87.4 J	81.3 J	31.1 J	2260	12.1 J	52.4 J	328 J	134 J	1.47 J	1.49 J	205 J	13.2 J	16.6 J

Notes:

1 Benzofluoranthenes (total) includes both benzo(b)fluoranthene and benzo(k)fluoranthene. Both analytes have a toxic equivalency factor of 0.1; therefore, the total of the two analytes is multiplied by 0.1 when calculating the cPAH TE
2 Calculation of cPAH TEQ concentrations was performed using the California Environmental Protection Agency 2005 Toxic Equivancy Factors as presented in Table 708-2 of WAC 173-340-900 (WSDOE 2007
3 Calculated using detected cPAH concentrations
4 Calculated using detected cPAH concentrations plus one-half the reporting limit for cPAHs that were not detected
5 World Health Organization 2005 Toxic Equivalency Factors used for calculation of dioxin/furan TEQ (Van den Berg et al. 2006
6 Calculated using detected dioxin/furan concentrations
7 Calculated using detected dioxin/furan concentrations plus one-half the detection limit for dioxins/furans that were not detected.

Abbreviations:

cPAH Carcinogenic polycyclic aromatic hydrocarbon
NA Not analyzed
OCDD Octachlorodibenzo-p-dioxin
OCDF Octachlorodibenzofuran
TEQ Toxic equivalency quotient
WAC Washington Administrative Code
WSDOE Washington State Department of Ecology

Qualifiers:

J The analyte was analyzed for and positively identified, but the associated numerical value is an estimated quantit
U Undetected.
UJ Undetected with estimated concentration

Table F.1
Lora Lake Apartments Parcel Soil Analytical Results

Location		PSB-16			PSB-17					PSB-18						
Sample ID		PSB16-4-6-082510	PSB16-9.5-10-082510	PSB16-13-15-082510	PSB17-0-0.5-072810	PSB17-1.5-2-072810	PSB17-2-4-072810	PSB17-4-6-072810	PSB17-10-13-072810	PSB18-0-0.5-082610	PSB18-1.5-2-082610	PSB18-2-4-082610	PSB18-4-6-082610	PSB18-7-9-082610	PSB18-12.5-15-082610	PSB18-12.5-15-082610-D
Sample Date		08/25/2010	08/25/2010	08/25/2010	07/28/2010	07/28/2010	07/28/2010	07/28/2010	07/28/2010	08/26/2010	08/26/2010	08/26/2010	08/26/2010	08/26/2010	08/26/2010	08/26/2010
Sample Depth		4–6 feet	9.5–10 feet	13–15 feet	0–0.5 feet	1.5–2 feet	2–4 feet	4–6 feet	10–13 feet	0–0.5 feet	1.5–2 feet	2–4 feet	4–6 feet	7–9 feet	12.5–15 feet	12.5–15 feet
Analyte	**Unit**															
Conventionals																
Total Organic Carbon	%	NA	NA	0.15 J	NA	NA	NA	0.147	NA	NA	NA	NA	NA	0.157	0.029	0.039
Total Solids	%	NA	NA	84.4	NA	NA	NA	79.4	NA	NA	NA	NA	NA	94.9	91	90
Metals																
Arsenic	mg/kg	5 U	6 U	5 U	5 U	5 U	5 U	5 U	5 U	7	5 U	5 U	5 U	5 U	5 U	5 U
Lead	mg/kg	13	2 U	2 U	7	7	2	2 U	2 U	78	3	2 U	2 U	2 U	2 U	2 U
Total Petroleum Hydrocarbons																
Gasoline Range Hydrocarbons	mg/kg	3.3 J		3.3 J	3 U	3.3 U	3.4 U	3.6 U	3.1 U	3.7 U	3.3 U	3.4 U	3.3 U	3.4 U	3.1 U	3.2 U
Diesel Range Hydrocarbons	mg/kg	6.3	6.1 U	5.5 U	22	5.2 U	5.2 U	5.3 U	5.4 U	9.3	5.3 U	5.3 U	6.2 U	5.2 U	5.4 U	5.5 U
Heavy Oil Range Hydrocarbons	mg/kg	30	12 U	11 U	260	10 U	10 U	38	11 U	72	10 U	11 U	12 U	10 U	11 U	11 U
Semivolatile Organic Compounds																
Pentachlorophenol	µg/kg	19			6.4 UJ	6.4 U	6.7 U	6.7 UJ	6.7 UJ	100	6.4 U	6.4 U	7.7 U	6.5 U	6.9 UJ	6.9 UJ
Carcinogenic Polycyclic Aromatic Hydrocarbons																
Benzo(a)pyrene	µg/kg	20 U	20 U	20 U	20 U	19 U	20 U	19 U	20 U	49	19 U	20 U	20 U	19 U	20 U	20 U
Benzo(a)anthracene	µg/kg	20 U	20 U	20 U	20 U	19 U	20 U	19 U	20 U	49	19 U	20 U	20 U	19 U	20 U	20 U
Benzofluoranthenes (total)[1]	µg/kg	20 U	20 U	20 U	20 U	19 U	20 U	19 U	20 U	110	19 U	20 U	20 U	19 U	20 U	20 U
Chrysene	µg/kg	20 U	20 U	20 U	40	19 U	20 U	19 U	20 U	65	19 U	20 U	20 U	19 U	20 U	20 U
Dibenzo(a,h)anthracene	µg/kg	20 U	20 U	20 U	20 U	19 U	20 U	19 U	20 U	17 J	19 U	20 U	20 U	19 U	20 U	20 U
Indeno(1,2,3-cd)pyrene	µg/kg	20 U	20 U	20 U	20 U	19 U	20 U	19 U	20 U	36	19 U	20 U	20 U	19 U	20 U	20 U
Summed cPAH TEQ[2,3]	µg/kg	0 U	0 U	0 U	0.4	0 U	0 U	0 U	0 U	71 J	0 U	0 U	0 U	0 U	0 U	0 U
Summed cPAH TEQ with One-half of the Reporting Limit[2,4]	µg/kg	14 U	14 U	14 U	14	13 U	14 U	13 U	14 U	71 J	13 U	14 U	14 U	13 U	14 U	14 U
Volatile Organic Compounds																
Tetrachloroethene	µg/kg	0.6 U	NA	0.5 U	0.6 U	0.6 U	0.6 U	0.7 U	0.5 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.5 U	0.5 U
Trichloroethene	µg/kg	0.6 U	NA	0.5 U	0.6 U	0.6 U	0.6 U	0.7 U	0.5 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	µg/kg	0.6 U	NA	0.5 U	0.6 U	0.6 U	0.6 U	0.7 U	0.5 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.5 U	0.5 U
trans-1,2-Dichloroethene	µg/kg	0.6 U	NA	0.5 U	0.6 U	0.6 U	0.6 U	0.7 U	0.5 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.5 U	0.5 U
1,2-Dichloroethane	µg/kg	0.6 U	NA	0.5 U	0.6 U	0.6 U	0.6 U	0.7 U	0.5 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.5 U	0.5 U
Benzene	µg/kg	0.6 U	NA	0.5 U	7.4 U	8.2 U	8.6 U	8.9 U	7.8 U	9.4 U	8.2 U	8.4 U	8.4 U	8.4 U	7.8 U	8 U
Ethylbenzene	µg/kg	0.6 U	NA	1	7.4 U	8.2 U	8.6 U	8.9 U	7.8 U	9.4 U	8.2 U	8.4 U	8.4 U	8.4 U	7.8 U	8 U
Toluene	µg/kg	0.6 U	NA	15	7.4 U	8.2 U	8.6 U	8.9 U	7.8 U	9.4 U	8.2 U	8.4 U	8.4 U	8.4 U	7.8 U	8 U
m,p-Xylene	µg/kg	0.6 U	NA	3.7	15 U	16 U	17 U	18 U	16 U	19 U	16 U	17 U	17 U	17 U	16 U	16 U
o-Xylene	µg/kg	0.6 U	NA	1.4	7.4 U	8.2 U	8.6 U	8.9 U	7.8 U	57	8.2 U	160	8.4 U	21	7.8 U	8 U
Dioxins/Furans			NA													
2,3,7,8-TCDD	pg/g	0.834 J	NA	0.178 U	0.49 U	0.28 U	0.37 U	0.38 U	0.33 U	11.3	0.32 UJ	0.224 U	NA	NA	NA	NA
1,2,3,7,8-PeCDD	pg/g	5.49	NA	0.332 U	1.09 J	0.5 U	0.55 U	0.47 U	0.52 U	53.5	0.328 U	0.319 U	NA	NA	NA	NA
1,2,3,4,7,8-HxCDD	pg/g	9.67	NA	0.29 U	1.81 J	0.74 U	0.68 U	0.63 U	0.68 U	47.1	0.4 UJ	0.358 U	NA	NA	NA	NA
1,2,3,6,7,8-HxCDD	pg/g	34.3	NA	0.378 U	8.32 J	1.79 J	0.78 U	0.72 U	0.79 U	212	0.507 UJ	0.453 U	NA	NA	NA	NA
1,2,3,7,8,9-HxCDD	pg/g	24.2	NA	0.333 U	4.01 J	0.8 U	0.75 U	0.7 U	0.76 U	152	0.454 U	0.406 U	NA	NA	NA	NA
1,2,3,4,6,7,8-HpCDD	pg/g	842	NA	4.15 J	272	34.2	13.2	3.62 J	2.42 J	5800	5.09 J	2.18 J	NA	NA	NA	NA
Total OCDD	pg/g	8430	NA	39.1	3010	161	180	27.2	25.5 J	56200 J	41 J	19.9	NA	NA	NA	NA
2,3,7,8-TCDF	pg/g	0.711 J	NA	0.165 U	0.26 U	0.27 U	0.21 U	0.2 U	0.19 U	2.18	0.216 UJ	0.156 U	NA	NA	NA	NA
1,2,3,7,8-PeCDF	pg/g	1.25 J	NA	0.189 U	0.36 U	0.38 U	0.27 U	0.27 U	0.45 U	3.66 J	0.306 UJ	0.218 U	NA	NA	NA	NA
2,3,4,7,8-PeCDF	pg/g	3.13 J	NA	0.197 U	0.87 J	0.38 U	0.28 U	0.27 U	0.45 U	8.36	0.307 UJ	0.233 U	NA	NA	NA	NA
1,2,3,4,7,8-HxCDF	pg/g	11.2	NA	0.254 U	1.86 J	0.29 U	0.37 U	0.31 U	0.34 U	27.1	0.259 UJ	0.365 U	NA	NA	NA	NA
2,3,4,6,7,8-HxCDF	pg/g	15.9	NA	0.282 UJ	1.63 J	0.33 U	0.41 U	0.35 U	0.38 U	30.2	0.295 UJ	0.387 U	NA	NA	NA	NA
1,2,3,7,8,9-HxCDF	pg/g	1.28 J	NA	0.273 U	0.37 U	0.38 U	0.47 U	0.41 U	0.44 U	4.39 J	0.287 UJ	0.347 U	NA	NA	NA	NA
1,2,3,4,6,7,8-HpCDF	pg/g	390	NA	1.2 J	66.9	4.74 J	1.93 J	0.85 J	0.42 U	1470	1.37 J	0.67 J	NA	NA	NA	NA
1,2,3,6,7,8-HxCDF	pg/g	10.5	NA	0.254 U	1.26 J	0.3 U	0.39 U	0.33 U	0.35 U	22.4	0.261 UJ	0.361 U	NA	NA	NA	NA
1,2,3,4,7,8,9-HpCDF	pg/g	11.3	NA	0.35 U	2.03 J	0.41 U	0.65 U	0.47 U	0.48 U	44.8	0.473 UJ	0.368 U	NA	NA	NA	NA
Total OCDF	pg/g	815	NA	3.83 J	309	14.9 J	5.14 J	2.41 J	1.17 U	5890	4.24 J	1.57 J	NA	NA	NA	NA
Summed Dioxin/Furan TEQ[5,6]	pg/g	33.3 J	NA	0.0664 J	7.65 J	0.621 J	0.207 J	0.0536 J	0.0319 J	209 J	0.0782 J	0.0349 J	NA	NA	NA	NA
Summed Dioxin/Furan TEQ with One-half of the Detection Limit[5,7]	pg/g	33.3 J	NA	0.467 J	7.93 J	1.23 J	0.919 J	0.708 J	0.732 J	209 J	0.589 J	0.488 J	NA	NA	NA	NA

Notes:

1 Benzofluoranthenes (total) includes both benzo(b)fluoranthene and benzo(k)fluoranthene. Both analytes have a toxic equivalency factor of 0.1; therefore, the total of the two analytes is multiplied by 0.1 when calculating the cPAH TE
2 Calculation of cPAH TEQ concentrations was performed using the California Environmental Protection Agency 2005 Toxic Equivancy Factors as presented in Table 708-2 of WAC 173-340-900 (WSDOE 2007
3 Calculated using detected cPAH concentrations
4 Calculated using detected cPAH concentrations plus one-half the reporting limit for cPAHs that were not detected
5 World Health Organization 2005 Toxic Equivalency Factors used for calculation of dioxin/furan TEQ (Van den Berg et al. 2006
6 Calculated using detected dioxin/furan concentrations
7 Calculated using detected dioxin/furan concentrations plus one-half the detection limit for dioxins/furans that were not detected.

Abbreviations:

cPAH Carcinogenic polycyclic aromatic hydrocarbon
NA Not analyzed
OCDD Octachlorodibenzo-p-dioxin
OCDF Octachlorodibenzofuran
TEQ Toxic equivalency quotient
WAC Washington Administrative Code
WSDOE Washington State Department of Ecology

Qualifiers:

J The analyte was analyzed for and positively identified, but the associated numerical value is an estimated quantit
U Undetected.
UJ Undetected with estimated concentration

Table F.1
Lora Lake Apartments Parcel Soil Analytical Results

Location		PSB-18	PSB-19				PSB-20						PSB-21			
Sample ID		PSB18-19-20-082610	PSB19-0-1-082510	PSB19-1-2-082510	PSB19-2-4-082510	PSB19-13-15-082510	PSB20-0-0.5-082510	PSB20-1.5-2-082510	PSB20-2-4-082510	PSB20-2-4-082510-D	PSB20-4-6-082510	PSB20-11.5-13.5-082510	PSB21-0-0.5-082510	PSB21-1.5-2-082510	PSB21-2-4-082510	PSB21-4-6-082510
Sample Date		08/26/2010	08/25/2010	08/25/2010	08/25/2010	08/25/2010	08/25/2010	08/25/2010	08/25/2010	08/25/2010	08/25/2010	08/25/2010	08/25/2010	08/25/2010	08/25/2010	08/25/2010
Sample Depth		19–20 feet	0–1 feet	1–2 feet	2–4 feet	13–15 feet	0–0.5 feet	1.5–2 feet	2–4 feet	2–4 feet	4–6 feet	11.5–13 feet	0–0.5 feet	1.5–2 feet	2–4 feet	4–6 feet
Analyte	**Unit**															
Conventionals																
Total Organic Carbon	%	1.18	NA	NA	NA	0.345	NA	NA	NA	NA	NA	0.098 J	NA	NA	NA	NA
Total Solids	%	81.6	NA	NA	NA	79.4	NA	NA	NA	NA	NA	81	NA	NA	NA	NA
Metals																
Arsenic	mg/kg	7	5	5 U	5 U	6 U	9	5 U	5 U	5 U	5 U	6 U	8	5	6	5 U
Lead	mg/kg	2 U	62	27	5	5	32	8	3	3	9	2 U	45	29	26	13
Total Petroleum Hydrocarbons																
Gasoline Range Hydrocarbons	mg/kg	4.9 U	3.4 U	2.9 U	3.6 U	4.9 U	3.6 U	3.1 U	440 U	3.1 U	3 U	4.2 U	4.3 U	3.3 U	3.1 U	3.4 U
Diesel Range Hydrocarbons	mg/kg	6.2 U	5 U	5.2 U	5.4 U	6.1 U	22	8	5.2 U	5.2 U	5.3 U	6.1 U	5.2 U	5.2 U	5.4 U	5.6 U
Heavy Oil Range Hydrocarbons	mg/kg	20	44	17	11 U	50	210	150	10 U	10 U	13	12 U	19	20	34	11 U
Semivolatile Organic Compounds																
Pentachlorophenol	µg/kg	7.7 U	220	21	12	7.6 U	12	6.6 UJ	6.5 U	15	6.5 UJ	16	13	9.1	14	6.9 U
Carcinogenic Polycyclic Aromatic Hydrocarbons																
Benzo(a)pyrene	µg/kg	19 U	59 U	16 J	20 U	20 U	260	20 U	20 U	19 U	19 U	20 U	20 U	19 U	58 U	19 U
Benzo(a)anthracene	µg/kg	19 U	32 J	20	20 U	20 U	260	20 U	20 U	19 U	19 U	20 U	20 U	19 U	58 U	19 U
Benzofluoranthenes (total)[1]	µg/kg	19 U	59	36	20 U	20 U	550	20 U	20 U	19 U	19 U	20 U	20 U	19 U	58 U	19 U
Chrysene	µg/kg	19 U	39 J	21	20 U	20 U	270	19 J	20 U	19 U	19 U	20 U	11 J	11 J	58 U	19 U
Dibenzo(a,h)anthracene	µg/kg	19 U	59 U	20 U	20 U	20 U	29	20 U	20 U	19 U	19 U	20 U	20 U	19 U	58 U	19 U
Indeno(1,2,3-cd)pyrene	µg/kg	19 U	59 U	20 U	20 U	20 U	52	20 U	20 U	19 U	19 U	20 U	20 U	19 U	58 U	19 U
Summed cPAH TEQ[2,3]	µg/kg	0 U	9.5 J	22 J	0 U	0 U	350	0.19 J	0 U	0 U	0 U	0 U	0.11 J	0.11 J	0 U	0 U
Summed cPAH TEQ with One-half of the Reporting Limit[2,4]	µg/kg	13 U	45 J	24 J	14 U	14 U	350	14 J	14 U	13 U	13 U	14 U	14 J	13 J	41 U	13 U
Volatile Organic Compounds																
Tetrachloroethene	µg/kg	0.7 U	0.6 U	0.6 U	0.6 U	0.6 U	0.7 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.8 U	0.6 U	0.6 U	0.6 U
Trichloroethene	µg/kg	0.7 U	0.6 U	0.6 U	0.6 U	0.6 U	0.7 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.8 U	0.6 U	0.6 U	0.6 U
cis-1,2-Dichloroethene	µg/kg	0.7 U	0.6 U	0.6 U	0.6 U	0.6 U	0.7 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.8 U	0.6 U	0.6 U	0.6 U
trans-1,2-Dichloroethene	µg/kg	0.7 U	0.6 U	0.6 U	0.6 U	0.6 U	0.7 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.8 U	0.6 U	0.6 U	0.6 U
1,2-Dichloroethane	µg/kg	0.7 U	0.6 U	0.6 U	0.6 U	0.6 U	0.7 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.8 U	0.6 U	0.6 U	0.6 U
Benzene	µg/kg	12 U	8.5 U	7.2 U	9.1 U	12 U	9.1 U	7.8 U	1100 U	7.8 U	7.5 U	10 U	11 U	8.2 U	7.7 U	8.4 U
Ethylbenzene	µg/kg	12 U	8.5 U	7.2 U	9.1 U	12 U	9.1 U	7.8 U	1100 U	7.8 U	7.5 U	10 U	11 U	8.2 U	7.7 U	10
Toluene	µg/kg	12 U	8.5 U	7.2 U	9.1 U	12 U	9.1 U	7.8 U	1100 U	7.8 U	7.5 U	10 U	74	8.2 U	7.7 U	240
m,p-Xylene	µg/kg	25 U	17 U	14 U	18 U	25 U	18 U	16 U	2200 U	16 U	15 U	21 U	21 U	16 U	15 U	17 U
o-Xylene	µg/kg	210	8.5 U	7.2 U	9.1 U	12 U	130	7.8 U	1400	7.8 U	7.5 U	10 U	19	8.2 U	7.7 U	8.4 U
Dioxins/Furans																
2,3,7,8-TCDD	pg/g	NA	4.74	0.427 J	0.205 U	NA	1.28	0.262 U	0.182 U	0.152 U	NA	NA	1.46	0.415 J	0.623 J	0.33 U
1,2,3,7,8-PeCDD	pg/g	NA	22	2.62 J	0.395 J	NA	5.19	0.82 J	0.467 J	0.452 J	NA	NA	3.26 J	1.08 J	1.66 J	0.49 U
1,2,3,4,7,8-HxCDD	pg/g	NA	27.6	4.72 J	0.579 J	NA	6.78	1.29 J	0.663 J	0.827 J	NA	NA	6.25	2.2 J	3.13 J	0.99 J
1,2,3,6,7,8-HxCDD	pg/g	NA	135	17.3	2.08 J	NA	32.4	5.72	2.59 J	3.2 J	NA	NA	19.3	8.44	11	3.46 J
1,2,3,7,8,9-HxCDD	pg/g	NA	81	12.6	1.63 J	NA	20.2	3.06 J	1.28 J	1.84 J	NA	NA	12.9	4.59 J	7.3	2.07 J
1,2,3,4,6,7,8-HpCDD	pg/g	NA	4720	469	59.5	NA	964	165	72.2	97.2	NA	NA	573	226	311	64.4
Total OCDD	pg/g	NA	48300 J	3960	506	NA	10300	1700	741	1050	NA	NA	4550	2040	2940	613 J
2,3,7,8-TCDF	pg/g	NA	1.08	0.469 J	0.131 U	NA	0.497 J	0.2 U	0.115 U	0.0956 U	NA	NA	1.26	0.66 J	0.874 J	0.8 J
1,2,3,7,8-PeCDF	pg/g	NA	2.25 J	0.502 U	0.171 U	NA	0.829 J	0.283 U	0.151 U	0.161 U	NA	NA	1.03 J	0.651 J	0.63 J	0.33 U
2,3,4,7,8-PeCDF	pg/g	NA	3.81 J	1.27 J	0.253 J	NA	1.93 J	0.345 J	0.471 J	0.54 J	NA	NA	1.47 J	1.32 J	1.64 J	0.89 J
1,2,3,4,7,8-HxCDF	pg/g	NA	22.2	4.01 J	0.759 J	NA	6.49	1.38 J	0.965 J	0.908 J	NA	NA	4.29 J	2.6 J	3.45 J	1.32 J
2,3,4,6,7,8-HxCDF	pg/g	NA	23.5	6.06	0.702 J	NA	7.53	1.69 J	0.887 J	0.974 J	NA	NA	3.91 J	2.72 J	4.17 J	1.4 J
1,2,3,7,8,9-HxCDF	pg/g	NA	2.78 J	0.557 J	0.298 U	NA	0.837 J	0.342 U	0.213 U	0.229 U	NA	NA	0.762 J	0.313 J	0.476 J	0.25 U
1,2,3,4,6,7,8-HpCDF	pg/g	NA	1240	161	19.1 J	NA	282	47.7	23.5	29.2	NA	NA	94.9	58.3	92.5 J	16.4
1,2,3,6,7,8-HxCDF	pg/g	NA	16.6	4.28 J	0.591 J	NA	4.99 J	1.18 J	0.623 J	0.682 J	NA	NA	3.02 J	1.95 J	2.96 J	0.93 J
1,2,3,4,7,8,9-HpCDF	pg/g	NA	39.4	4.9 J	0.885 J	NA	9.17	1.72 J	1.11 J	1.41 J	NA	NA	4.12 J	2.67 J	3.96 J	1.09 J
Total OCDF	pg/g	NA	4550	345	48.3	NA	1060	143	69.9 J	91.2	NA	NA	325	150	225	50.3
Summed Dioxin/Furan TEQ[5,6]	pg/g	NA	135 J	16.1 J	2.07 J	NA	31 J	5.05 J	2.52 J	3.08 J	NA	NA	18.5 J	7.78 J	11.2 J	2.38 J
Summed Dioxin/Furan TEQ with One-half of the Detection Limit[5,7]	pg/g	NA	135 J	16.1 J	2.19 J	NA	31 J	5.21 J	2.63 J	3.17 J	NA	NA	18.5 J	7.78 J	11.2 J	2.81 J

Notes:

1 Benzofluoranthenes (total) includes both benzo(b)fluoranthene and benzo(k)fluoranthene. Both analytes have a toxic equivalency factor of 0.1; therefore, the total of the two analytes is multiplied by 0.1 when calculating the cPAH TE
2 Calculation of cPAH TEQ concentrations was performed using the California Environmental Protection Agency 2005 Toxic Equivancy Factors as presented in Table 708-2 of WAC 173-340-900 (WSDOE 2007
3 Calculated using detected cPAH concentrations
4 Calculated using detected cPAH concentrations plus one-half the reporting limit for cPAHs that were not detected
5 World Health Organization 2005 Toxic Equivalency Factors used for calculation of dioxin/furan TEQ (Van den Berg et al. 2006
6 Calculated using detected dioxin/furan concentrations
7 Calculated using detected dioxin/furan concentrations plus one-half the detection limit for dioxins/furans that were not detected.

Abbreviations:

cPAH Carcinogenic polycyclic aromatic hydrocarbon
NA Not analyzed
OCDD Octachlorodibenzo-p-dioxin
OCDF Octachlorodibenzofuran
TEQ Toxic equivalency quotient
WAC Washington Administrative Code
WSDOE Washington State Department of Ecology

Qualifiers:

J The analyte was analyzed for and positively identified, but the associated numerical value is an estimated quantit
U Undetected.
UJ Undetected with estimated concentration

Table F.1
Lora Lake Apartments Parcel Soil Analytical Results

Location		PSB-21		PSB-22						PSB-23						PSB-24
Sample ID		PSB21-6-7-082510	PSB21-9-11-082510	PSB22-0-0.5-072910	PSB22-1.5-2-072910	PSB22-2-4-072910	PSB22-4-6-072910	PSB22-17-19-072910	PSB22-19-20-072910	PSB23-0-0.5-072910	PSB23-1.5-2-072910	PSB23-2-4-072910	PSB23-4-6-072910	PSB23-14-16.5-072910	PSB23-16.5-19-072910	PSB24-0-0.5-072910
Sample Date		08/25/2010	08/25/2010	07/29/2010	07/29/2010	07/29/2010	07/29/2010	07/29/2010	07/29/2010	07/29/2010	07/29/2010	07/29/2010	07/29/2010	07/29/2010	07/29/2010	07/29/2010
Sample Depth		6–7 feet	9–11 feet	0–0.5 feet	1.5–2 feet	2–4 feet	4–6 feet	17–19 feet	19–20 feet	0–0.5 feet	1.5–2 feet	2–4 feet	4–6 feet	14–16.5 feet	16.5–19 feet	0–0.5 feet
Analyte	**Unit**															
Conventionals																
Total Organic Carbon	%	14.5	1.31	NA	NA	NA	NA	0.08	0.078	NA	NA	NA	NA	0.29	0.06	NA
Total Solids	%	24.5	74.1	NA	NA	NA	NA	86	83.2	NA	NA	NA	NA	89.7	86.9	NA
Metals																
Arsenic	mg/kg	20 U	7 U	5 U	5 U	5 U	5 U	6 U	6 U	7	8	6	5 U	6 U	6 U	9
Lead	mg/kg	50	4	7	7	7	5	2 U	2 U	49	25	17	13	3	2 U	32
Total Petroleum Hydrocarbons																
Gasoline Range Hydrocarbons	mg/kg	28 U	5.4 U					4.4 U	3.9 U					3 U	3.9 U	
Diesel Range Hydrocarbons	mg/kg	17 U	6.8 U	5.2 U	5.3 U	5.5 U	5.4 U	5.7 U	5.9 U	5.3 U	5.4 U	5.3 U	5.2 U	5.4 U	5.8 U	5.2 U
Heavy Oil Range Hydrocarbons	mg/kg	50	14 U	10 U	11 U	11 U	11 U	11 U	12 U	18	11 U	10 U	10 U	11 U	12 U	18
Semivolatile Organic Compounds																
Pentachlorophenol	µg/kg	21 U	8.5 U	6.5 U	6.6 UJ	6.8 U	6.8 U	7.1 UJ	7.4 UJ	14	6.7 U	6.6 U	6.4 U	6.7 U	7.2 U	14
Carcinogenic Polycyclic Aromatic Hydrocarbons																
Benzo(a)pyrene	µg/kg	26 U	20 U	19 U	20 U	20 U	20 U	20 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U	19 U
Benzo(a)anthracene	µg/kg	26 U	20 U	19 U	20 U	20 U	20 U	20 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U	19 U
Benzofluoranthenes (total)[1]	µg/kg	26 U	20 U	19 U	20 U	20 U	20 U	20 U	19 U	18 J	20 U	20 U	20 U	20 U	19 U	12 J
Chrysene	µg/kg	26 U	20 U	19 U	20 U	20 U	20 U	20 U	19 U	12 J	20 U	20 U	20 U	20 U	19 U	19 U
Dibenzo(a,h)anthracene	µg/kg	26 U	20 U	19 U	20 U	20 U	20 U	20 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U	19 U
Indeno(1,2,3-cd)pyrene	µg/kg	26 U	20 U	19 U	20 U	20 U	20 U	20 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U	19 U
Summed cPAH TEQ[2,3]	µg/kg	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	1.9 J	0 U	0 U	0 U	0 U	0 U	1.2 J
Summed cPAH TEQ with One-half of the Reporting Limit[2,4]	µg/kg	18 U	14 U	13 U	14 U	14 U	14 U	14 U	13 U	14 J	14 U	14 U	14 U	14 U	13 U	14 J
Volatile Organic Compounds																
Tetrachloroethene	µg/kg	3.1 U	0.7 U	0.6 U	0.7 U	0.6 U	0.6 U	0.6 U	0.6 U	NA	NA	NA	NA	0.4 U	0.6 U	NA
Trichloroethene	µg/kg	3.1 U	0.7 U	0.6 U	0.7 U	0.6 U	0.6 U	0.6 U	0.6 U	NA	NA	NA	NA	0.4 U	0.6 U	NA
cis-1,2-Dichloroethene	µg/kg	3.1 U	0.7 U	0.6 U	0.7 U	0.6 U	0.6 U	0.6 U	0.6 U	NA	NA	NA	NA	0.4 U	0.6 U	NA
trans-1,2-Dichloroethene	µg/kg	3.1 U	0.7 U	0.6 U	0.7 U	0.6 U	0.6 U	0.6 U	0.6 U	NA	NA	NA	NA	0.4 U	0.6 U	NA
1,2-Dichloroethane	µg/kg	3.1 U	0.7 U	0.6 U	0.7 U	0.6 U	0.6 U	0.6 U	0.6 U	NA	NA	NA	NA	0.4 U	0.6 U	NA
Benzene	µg/kg	69 U	14 U	NA	NA	NA	NA	11 U	9.8 U	NA	NA	NA	NA	7.6 U	9.7 U	NA
Ethylbenzene	µg/kg	69 U	14 U	NA	NA	NA	NA	11 U	9.8 U	NA	NA	NA	NA	7.6 U	9.7 U	NA
Toluene	µg/kg	69 U	14 U	NA	NA	NA	NA	11 U	9.8 U	NA	NA	NA	NA	7.6 U	9.7 U	NA
m,p-Xylene	µg/kg	140 U	27 U	NA	NA	NA	NA	22 U	20 U	NA	NA	NA	NA	15 U	19 U	NA
o-Xylene	µg/kg	69 U	14 U	NA	NA	NA	NA	11 U	9.8 U	NA	NA	NA	NA	7.6 U	9.7 U	NA
Dioxins/Furans																
2,3,7,8-TCDD	pg/g	NA	NA	0.63 U	0.49 U	NA	NA	NA	NA	1.73 J	1.77 J	NA	NA	NA	NA	2.61
1,2,3,7,8-PeCDD	pg/g	NA	NA	0.92 U	0.55 U	NA	NA	NA	NA	1.27 U	0.99 U	NA	NA	NA	NA	2.28 J
1,2,3,4,7,8-HxCDD	pg/g	NA	NA	0.94 U	0.76 U	NA	NA	NA	NA	1.91 J	0.89 U	NA	NA	NA	NA	3.15 J
1,2,3,6,7,8-HxCDD	pg/g	NA	NA	0.96 U	0.9 U	NA	NA	NA	NA	7.43 J	4.2 J	NA	NA	NA	NA	15.3
1,2,3,7,8,9-HxCDD	pg/g	NA	NA	0.98 U	0.86 U	NA	NA	NA	NA	4.87 J	2.18 J	NA	NA	NA	NA	8.04 J
1,2,3,4,6,7,8-HpCDD	pg/g	NA	NA	19.3	19.2	NA	NA	NA	NA	170	90.6	NA	NA	NA	NA	486
Total OCDD	pg/g	NA	NA	167	151	NA	NA	NA	NA	1400	730	NA	NA	NA	NA	4530
2,3,7,8-TCDF	pg/g	NA	NA	0.31 U	0.35 U	NA	NA	NA	NA	1.54 J	0.97 J	NA	NA	NA	NA	1.25 J
1,2,3,7,8-PeCDF	pg/g	NA	NA	0.66 U	0.54 U	NA	NA	NA	NA	1.04 U	0.96 U	NA	NA	NA	NA	0.53 U
2,3,4,7,8-PeCDF	pg/g	NA	NA	0.65 U	0.54 U	NA	NA	NA	NA	1.07 U	0.94 U	NA	NA	NA	NA	1.51 J
1,2,3,4,7,8-HxCDF	pg/g	NA	NA	0.61 U	0.57 U	NA	NA	NA	NA	2.4 J	1.46 J	NA	NA	NA	NA	4 J
2,3,4,6,7,8-HxCDF	pg/g	NA	NA	0.66 U	0.61 U	NA	NA	NA	NA	2.16 J	1.65 J	NA	NA	NA	NA	2.84 J
1,2,3,7,8,9-HxCDF	pg/g	NA	NA	0.74 U	0.66 U	NA	NA	NA	NA	0.71 U	0.49 U	NA	NA	NA	NA	0.71 U
1,2,3,4,6,7,8-HpCDF	pg/g	NA	NA	5.52 J	5.02 J	NA	NA	NA	NA	29	20.6	NA	NA	NA	NA	111
1,2,3,6,7,8-HxCDF	pg/g	NA	NA	0.65 U	0.55 U	NA	NA	NA	NA	1.5 J	1.1 J	NA	NA	NA	NA	2.14 J
1,2,3,4,7,8,9-HpCDF	pg/g	NA	NA	0.75 U	0.52 U	NA	NA	NA	NA	1.88 J	1.05 J	NA	NA	NA	NA	4.44 J
Total OCDF	pg/g	NA	NA	13.3 J	12.1 J	NA	NA	NA	NA	86.5	64.5	NA	NA	NA	NA	452
Summed Dioxin/Furan TEQ[5,6]	pg/g	NA	NA	0.302 J	0.291 J	NA	NA	NA	NA	6.37 J	4.29 J	NA	NA	NA	NA	16.5 J
Summed Dioxin/Furan TEQ with One-half of the Detection Limit[5,7]	pg/g	NA	NA	1.48 J	1.17 J	NA	NA	NA	NA	7.21 J	5.01 J	NA	NA	NA	NA	16.6 J

Notes:

1 Benzofluoranthenes (total) includes both benzo(b)fluoranthene and benzo(k)fluoranthene. Both analytes have a toxic equivalency factor of 0.1; therefore, the total of the two analytes is multiplied by 0.1 when calculating the cPAH TE
2 Calculation of cPAH TEQ concentrations was performed using the California Environmental Protection Agency 2005 Toxic Equivancy Factors as presented in Table 708-2 of WAC 173-340-900 (WSDOE 2007
3 Calculated using detected cPAH concentrations
4 Calculated using detected cPAH concentrations plus one-half the reporting limit for cPAHs that were not detectec
5 World Health Organization 2005 Toxic Equivalency Factors used for calculation of dioxin/furan TEQ (Van den Berg et al. 2006
6 Calculated using detected dioxin/furan concentrations
7 Calculated using detected dioxin/furan concentrations plus one-half the detection limit for dioxins/furans that were not detected.

Abbreviations:

cPAH Carcinogenic polycyclic aromatic hydrocarbor
NA Not analyzed
OCDD Octachlorodibenzo-p-dioxir
OCDF Octachlorodibenzofuran
TEQ Toxic equivalency quotien
WAC Washington Administrative Code
WSDOE Washington State Department of Ecology

Qualifiers:

J The analyte was analyzed for and positively identified, but the associated numerical value is an estimated quantit
U Undetected.
UJ Undetected with estimated concentration

Table F.1
Lora Lake Apartments Parcel Soil Analytical Results

Location		PSB-24						PSB-25						PSB-26		
Sample ID		PSB24-1.5-2-072910	PSB24-2-4-072910	PSB24-2-4-072910-D	PSB24-4-6-072910	PSB24-14-16-072910	PSB24-16-17-072910	PSB25-0-1-082510	PSB25-1-2-082510	PSB25-2-4-082510	PSB25-14-15-082510	PSB25-18-20-082510	PSB25-18-20-082510-D	PSB26-0-2-082510	PSB26-2-4-082510	PSB26-14-15-082510
Sample Date		07/29/2010	07/29/2010	07/29/2010	07/29/2010	07/29/2010	07/29/2010	08/25/2010	08/25/2010	08/25/2010	08/25/2010	08/25/2010	08/25/2010	08/25/2010	08/25/2010	08/25/2010
Sample Depth		1.5–2 feet	2–4 feet	2–4 feet	4–6 feet	14–16 feet	16–17 feet	0–1 feet	1–2 feet	2–4 feet	14–15 feet	18–20 feet	18–20 feet	0–2 feet	2–4 feet	14–15 feet
Analyte	**Unit**															
Conventionals																
Total Organic Carbon	%	NA	NA	NA	NA	0.185	0.065	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Solids	%	NA	NA	NA	NA	90.8	90.2	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals																
Arsenic	mg/kg	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	NA	NA	NA	5 U	5 U	NA
Lead	mg/kg	7	4	4	2 U	3	2 U	37 J	36 J	48 J	NA	NA	NA	123 J	2 UJ	NA
Total Petroleum Hydrocarbons																
Gasoline Range Hydrocarbons	mg/kg					3.4 U	3.2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diesel Range Hydrocarbons	mg/kg	5.2 U	5.4 U	5.4 U	5.4 U	5.4 U	5.5 U	NA	NA	NA	5.4 U	5.7 U	5.7 U	NA	NA	5.3 U
Heavy Oil Range Hydrocarbons	mg/kg	10 U	11 U	11 U	11 U	11 U	11 U	NA	NA	NA	11 U	12 U	11 U	NA	NA	11 U
Semivolatile Organic Compounds																
Pentachlorophenol	µg/kg	6.6 U	6.7 U	6.5 U	6.7 U	6.9 U	7 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carcinogenic Polycyclic Aromatic Hydrocarbons																
Benzo(a)pyrene	µg/kg	20 U	20 U	19 U	19 U	19 U	19 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	µg/kg	20 U	20 U	19 U	19 U	19 U	19 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzofluoranthenes (total)[1]	µg/kg	20 U	20 U	19 U	19 U	19 U	19 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	µg/kg	20 U	20 U	19 U	19 U	19 U	19 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	µg/kg	20 U	20 U	19 U	19 U	19 U	19 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	µg/kg	20 U	20 U	19 U	19 U	19 U	19 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Summed cPAH TEQ[2,3]	µg/kg	0 U	0 U	0 U	0 U	0 U	0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Summed cPAH TEQ with One-half of the Reporting Limit[2,4]	µg/kg	14 U	14 U	13 U	13 U	13 U	13 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Volatile Organic Compounds																
Tetrachloroethene	µg/kg	NA	NA	NA	NA	0.5 U	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	µg/kg	NA	NA	NA	NA	0.5 U	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis-1,2-Dichloroethene	µg/kg	NA	NA	NA	NA	0.5 U	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,2-Dichloroethene	µg/kg	NA	NA	NA	NA	0.5 U	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	µg/kg	NA	NA	NA	NA	0.5 U	0.5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	µg/kg	NA	NA	NA	NA	8.6 U	7.9 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	µg/kg	NA	NA	NA	NA	8.6 U	7.9 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	µg/kg	NA	NA	NA	NA	8.6 U	7.9 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
m,p-Xylene	µg/kg	NA	NA	NA	NA	17 U	16 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
o-Xylene	µg/kg	NA	NA	NA	NA	8.6 U	7.9 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dioxins/Furans																
2,3,7,8-TCDD	pg/g	0.53 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8-PeCDD	pg/g	0.8 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,7,8-HxCDD	pg/g	1.02 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,6,7,8-HxCDD	pg/g	1.12 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8,9-HxCDD	pg/g	1.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,6,7,8-HpCDD	pg/g	8.22 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total OCDD	pg/g	31.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,3,7,8-TCDF	pg/g	0.42 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8-PeCDF	pg/g	0.43 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,3,4,7,8-PeCDF	pg/g	0.42 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,7,8-HxCDF	pg/g	0.59 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,3,4,6,7,8-HxCDF	pg/g	0.6 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8,9-HxCDF	pg/g	0.73 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,6,7,8-HpCDF	pg/g	0.77 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,6,7,8-HxCDF	pg/g	0.57 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,7,8,9-HpCDF	pg/g	0.82 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total OCDF	pg/g	1.64 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Summed Dioxin/Furan TEQ[5,6]	pg/g	0.0917 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Summed Dioxin/Furan TEQ with One-half of the Detection Limit[5,7]	pg/g	1.14 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

1 Benzofluoranthenes (total) includes both benzo(b)fluoranthene and benzo(k)fluoranthene. Both analytes have a toxic equivalency factor of 0.1; therefore, the total of the two analytes is multiplied by 0.1 when calculating the cPAH TE
2 Calculation of cPAH TEQ concentrations was performed using the California Environmental Protection Agency 2005 Toxic Equivancy Factors as presented in Table 708-2 of WAC 173-340-900 (WSDOE 2007
3 Calculated using detected cPAH concentrations
4 Calculated using detected cPAH concentrations plus one-half the reporting limit for cPAHs that were not detectec
5 World Health Organization 2005 Toxic Equivalency Factors used for calculation of dioxin/furan TEQ (Van den Berg et al. 2006
6 Calculated using detected dioxin/furan concentrations
7 Calculated using detected dioxin/furan concentrations plus one-half the detection limit for dioxins/furans that were not detected.

Abbreviations:

cPAH Carcinogenic polycyclic aromatic hydrocarbor
NA Not analyzed
OCDD Octachlorodibenzo-p-dioxir
OCDF Octachlorodibenzofuran
TEQ Toxic equivalency quotien
WAC Washington Administrative Code
WSDOE Washington State Department of Ecology

Qualifiers:

J The analyte was analyzed for and positively identified, but the associated numerical value is an estimated quantit
U Undetected.
UJ Undetected with estimated concentration

Table F.1
Lora Lake Apartments Parcel Soil Analytical Results

Location		PSB-26	PSB-27					MW-12								MW-13
Sample ID		PSB26-16-18-082510	PSB27-0-0.5-082610	PSB27-1.5-2-082610	PSB27-2-4-082610	PSB27-8-10-082610	PSB27-10-12-082610	MW12-0-0.5-080210	MW12-1.5-2-080210	MW12-2-4-080210	MW12-4-5.5-080210	MW12-5.5-7.5-080210	MW12-8-9.5-080210	MW12-10-11.5-080210	MW12-17.5-19-080210	MW13-0-0.5-080210
Sample Date		08/25/2010	08/26/2010	08/26/2010	08/26/2010	08/26/2010	08/26/2010	08/02/2010	08/02/2010	08/02/2010	08/02/2010	08/02/2010	08/02/2010	08/02/2010	08/02/2010	08/02/2010
Sample Depth		16–18 feet	0–0.5 feet	1.5–2 feet	2–4 feet	8–10 feet	10–12 feet	0–0.5 feet	1.5–2 feet	2–4 feet	4–5.5 feet	5.5–7.5 feet	8–9.5 feet	10–11.5 feet	17.5–19 feet	0–0.5 feet
Analyte	**Unit**															
Conventionals																
Total Organic Carbon	%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.151 J	0.115 J	0.062 J	NA
Total Solids	%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	83.2	81.5	76.1	NA
Metals																
Arsenic	mg/kg	NA	5 U	5 U	10 U	NA	NA	NA	NA	NA	NA	5 U	6 U	6 U	6 U	NA
Lead	mg/kg	NA	39 J	152 J	131 J	NA	NA	NA	NA	NA	NA	13	2 U	3	2 U	NA
Total Petroleum Hydrocarbons																
Gasoline Range Hydrocarbons	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4 U	4.3 U	4.3 U	4.5 U	NA
Diesel Range Hydrocarbons	mg/kg	5.9 U	NA	NA	NA	19	5.9 U	NA	NA	NA	NA	5.2 U	5.8 U	6.5 U	6 U	NA
Heavy Oil Range Hydrocarbons	mg/kg	12 U	NA	NA	NA	38	12 U	NA	NA	NA	NA	10 U	12 U	13 U	12 U	NA
Semivolatile Organic Compounds																
Pentachlorophenol	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.8 U	7.5 U	7.7 U	7.4 UJ	NA
Carcinogenic Polycyclic Aromatic Hydrocarbons																
Benzo(a)pyrene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	20 U	19 U	20 U	19 U	NA
Benzo(a)anthracene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	20 U	19 U	20 U	19 U	NA
Benzofluoranthenes (total)[1]	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	20 U	19 U	20 U	19 U	NA
Chrysene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	20 U	19 U	20 U	19 U	NA
Dibenzo(a,h)anthracene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	20 U	19 U	20 U	19 U	NA
Indeno(1,2,3-cd)pyrene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	20 U	19 U	20 U	19 U	NA
Summed cPAH TEQ[2,3]	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0 U	0 U	0 U	0 U	NA
Summed cPAH TEQ with One-half of the Reporting Limit[2,4]	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	14 U	13 U	14 U	13 U	NA
Volatile Organic Compounds																
Tetrachloroethene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.9	0.5 U	0.6 U	0.7 U	NA
Trichloroethene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.6 U	0.5 U	0.6 U	0.7 U	NA
cis-1,2-Dichloroethene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.6 U	0.5 U	0.6 U	0.7 U	NA
trans-1,2-Dichloroethene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.6 U	0.5 U	0.6 U	0.7 U	NA
1,2-Dichloroethane	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.6 U	0.5 U	0.6 U	0.7 U	NA
Benzene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	10 U	11 U	11 U	11 U	NA
Ethylbenzene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	10 U	11 U	11 U	11 U	NA
Toluene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	10 U	11 U	11 U	11 U	NA
m,p-Xylene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	20 U	22 U	21 U	23 U	NA
o-Xylene	µg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	10 U	11 U	11 U	11 U	NA
Dioxins/Furans																
2,3,7,8-TCDD	pg/g	NA	4.21	21.4	NA	NA	NA	0.552 U	0.49 U	0.844 J	0.24 U	NA	NA	NA	NA	2.62
1,2,3,7,8-PeCDD	pg/g	NA	21.7	121	NA	NA	NA	2.52 J	1.5 J	1.5 J	0.13 U	NA	NA	NA	NA	2.99 J
1,2,3,4,7,8-HxCDD	pg/g	NA	34	185	NA	NA	NA	5.03 J	3.41 J	2.05 J	0.26 U	NA	NA	NA	NA	4.62 J
1,2,3,6,7,8-HxCDD	pg/g	NA	287	1720	NA	NA	NA	25.2	17.1	15.9	0.73 J	NA	NA	NA	NA	25.9
1,2,3,7,8,9-HxCDD	pg/g	NA	109	661	NA	NA	NA	10.9 J	9.13 J	5.84	0.29 U	NA	NA	NA	NA	12 J
1,2,3,4,6,7,8-HpCDD	pg/g	NA	11300	67500	NA	NA	NA	892	574	496	18.2	NA	NA	NA	NA	885
Total OCDD	pg/g	NA	130000	726000 J	NA	NA	NA	10200	7390	5510	217	NA	NA	NA	NA	8440
2,3,7,8-TCDF	pg/g	NA	1.34	4.06	NA	NA	NA	0.989 J	0.701 J	0.682 J	0.52 J	NA	NA	NA	NA	1.27 J
1,2,3,7,8-PeCDF	pg/g	NA	3.04 J	14.2	NA	NA	NA	0.963 U	0.976 U	0.537 J	0.27 J	NA	NA	NA	NA	0.522 U
2,3,4,7,8-PeCDF	pg/g	NA	14.4	99.1	NA	NA	NA	1.69 J	0.963 U	1.6 J	0.43 J	NA	NA	NA	NA	2.11 J
1,2,3,4,7,8-HxCDF	pg/g	NA	87.9	597	NA	NA	NA	6 J	4.7 J	4.41 J	0.31 J	NA	NA	NA	NA	7.5 J
2,3,4,6,7,8-HxCDF	pg/g	NA	50.9	278	NA	NA	NA	4.62 J	3.24 J	3.2 J	0.35 J	NA	NA	NA	NA	4.76 J
1,2,3,7,8,9-HxCDF	pg/g	NA	5.73	26	NA	NA	NA	0.935 U	0.761 U	0.466 J	0.1 U	NA	NA	NA	NA	0.967 U
1,2,3,4,6,7,8-HpCDF	pg/g	NA	3220	17500	NA	NA	NA	229	150	152	5.89	NA	NA	NA	NA	218
1,2,3,6,7,8-HxCDF	pg/g	NA	34.3	210 J	NA	NA	NA	3.23 J	2.06 J	2.54 J	0.29 J	NA	NA	NA	NA	3.78 J
1,2,3,4,7,8,9-HpCDF	pg/g	NA	113 J	690 J	NA	NA	NA	7.09 J	4.27 J	4.97	0.3 J	NA	NA	NA	NA	8.48 J
Total OCDF	pg/g	NA	18700	111000	NA	NA	NA	969	624	691	29.9	NA	NA	NA	NA	899
Summed Dioxin/Furan TEQ[5,6]	pg/g	NA	282 J	1650 J	NA	NA	NA	23.3 J	15.2 J	14.7 J	0.675 J	NA	NA	NA	NA	26.1 J
Summed Dioxin/Furan TEQ with One-half of the Detection Limit[5,7]	pg/g	NA	282 J	1650 J	NA	NA	NA	23.6 J	15.7 J	14.7 J	0.893 J	NA	NA	NA	NA	26.2 J

Notes:

1 Benzofluoranthenes (total) includes both benzo(b)fluoranthene and benzo(k)fluoranthene. Both analytes have a toxic equivalency factor of 0.1; therefore, the total of the two analytes is multiplied by 0.1 when calculating the cPAH TE
2 Calculation of cPAH TEQ concentrations was performed using the California Environmental Protection Agency 2005 Toxic Equivancy Factors as presented in Table 708-2 of WAC 173-340-900 (WSDOE 2007
3 Calculated using detected cPAH concentrations
4 Calculated using detected cPAH concentrations plus one-half the reporting limit for cPAHs that were not detectec
5 World Health Organization 2005 Toxic Equivalency Factors used for calculation of dioxin/furan TEQ (Van den Berg et al. 2006
6 Calculated using detected dioxin/furan concentrations
7 Calculated using detected dioxin/furan concentrations plus one-half the detection limit for dioxins/furans that were not detected.

Abbreviations:

cPAH Carcinogenic polycyclic aromatic hydrocarbor
NA Not analyzed
OCDD Octachlorodibenzo-p-dioxir
OCDF Octachlorodibenzofuran
TEQ Toxic equivalency quotien
WAC Washington Administrative Code
WSDOE Washington State Department of Ecology

Qualifiers:

J The analyte was analyzed for and positively identified, but the associated numerical value is an estimated quantit
U Undetected.
UJ Undetected with estimated concentration

Table F.1
Lora Lake Apartments Parcel Soil Analytical Results

Location		MW-13						MW-14				MW-15	MW-16		MW-17
Sample ID		MW13-1.5-2-080210	MW13-2-4-080210	MW13-10-11.5-080210	MW13-14-14.5-080210	MW13-18.5-19.5-080210	MW13-18.5-19.5-080210-D	MW14-0-0.5-080210	MW14-1.5-2-080210	MW14-15-16.5-080210	MW14-22.5-24-080210	MW15-50-55-082310	MW16-39-40-082410	MW16-39-40-082410-D	MW17-50-51-082610
Sample Date		*08/02/2010*	08/02/2010	08/02/2010	08/02/2010	08/02/2010	08/02/2010	08/02/2010	08/02/2010	08/02/2010	08/02/2010	08/23/2010	08/24/2010	08/24/2010	08/26/2010
Sample Depth		1.5–2 feet	2–4 feet	10–11.5 feet	14–14.5 feet	18.5–19.5 feet	18.5–19.5 feet	0–0.5 feet	1.5–2 feet	15–16.5 feet	22.5–24 feet	50–55 feet	39–40 feet	39–40 feet	50–51 feet
Analyte	**Unit**														
Conventionals															
Total Organic Carbon	%	NA	NA	0.09 J	0.132 J	0.037 J	NA	NA	NA	0.107 J	0.043 J	0.228	0.102	NA	0.412 J
Total Solids	%	NA	NA	85.5	85.8	86.9	NA	NA	NA	84.6	82.4	81	82.1	NA	77.7
Metals															
Arsenic	mg/kg	NA	NA	6 U	5 U	6 U	6 U	NA	NA	6 U	6 U	NA	NA	NA	NA
Lead	mg/kg	NA	NA	3	2 U	2 U	2 U	NA	NA	2 U	2 U	NA	NA	NA	NA
Total Petroleum Hydrocarbons															
Gasoline Range Hydrocarbons	mg/kg	NA	NA	3.4 U	3.4 U	3.4 U	3.4 U	NA	NA	3.6 U	4.4 U		NA	NA	NA
Diesel Range Hydrocarbons	mg/kg	NA	NA	5.7 U	5.5 U	5.6 U	5.6 U	NA	NA	5.9 U	5.8 U	6.1 U	NA U	NA	NA U
Heavy Oil Range Hydrocarbons	mg/kg	NA	NA	11 U	11 U	11 U	11 U	NA	NA	12 U	12 U	12 U	12 U		13 U
Semivolatile Organic Compounds															
Pentachlorophenol	µg/kg	NA	NA	6.9 U	6.6 U	7.2 U	7.3 U	NA	NA	7.4 U	7.3 UJ	7.5 U	7.7 U	7.3 U	7.9 U
Carcinogenic Polycyclic Aromatic Hydrocarbons															
Benzo(a)pyrene	µg/kg	NA	NA	20 U	20 U	20 U	19 U	NA	NA	20 U	20 U	20 U	20 U	NA	19 U
Benzo(a)anthracene	µg/kg	NA	NA	20 U	20 U	20 U	19 U	NA	NA	20 U	20 U	20 U	20 U	NA	19 U
Benzofluoranthenes (total)[1]	µg/kg	NA	NA	20 U	20 U	20 U	19 U	NA	NA	20 U	20 U	20 U	20 U	NA	19 U
Chrysene	µg/kg	NA	NA	20 U	20 U	20 U	19 U	NA	NA	20 U	20 U	20 U	20 U	NA	19 U
Dibenzo(a,h)anthracene	µg/kg	NA	NA	20 U	20 U	20 U	19 U	NA	NA	20 U	20 U	20 U	20 U	NA	19 U
Indeno(1,2,3-cd)pyrene	µg/kg	NA	NA	20 U	20 U	20 U	19 U	NA	NA	20 U	20 U	20 U	20 U	NA	19 U
Summed cPAH TEQ[2,3]	µg/kg	NA	NA	0 U	0 U	0 U	0 U	NA	NA	0 U	0 U	0 U	0 U	NA	0 U
Summed cPAH TEQ with One-half of the Reporting Limit[2,4]	µg/kg	NA	NA	14 U	14 U	14 U	13 U	NA	NA	14 U	14 U	14 U	14 U	NA	13 U
Volatile Organic Compounds															
Tetrachloroethene	µg/kg	NA	NA	0.6 U	0.5 U	0.5 U	0.6 U	NA	NA	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
Trichloroethene	µg/kg	NA	NA	0.6 U	0.5 U	0.5 U	0.6 U	NA	NA	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
cis-1,2-Dichloroethene	µg/kg	NA	NA	0.6 U	0.5 U	0.5 U	0.6 U	NA	NA	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
trans-1,2-Dichloroethene	µg/kg	NA	NA	0.6 U	0.5 U	0.5 U	0.6 U	NA	NA	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
1,2-Dichloroethane	µg/kg	NA	NA	0.6 U	0.5 U	0.5 U	0.6 U	NA	NA	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
Benzene	µg/kg	NA	NA	8.4 U	8.4 U	8.6 U	8.5 U	NA	NA	9.1 U	11 U	0.6 U	0.6 U	NA	0.6 U
Ethylbenzene	µg/kg	NA	NA	8.4 U	8.4 U	8.6 U	8.5 U	NA	NA	9.1 U	11 U	0.6 U	0.6 U	NA	0.6 U
Toluene	µg/kg	NA	NA	8.4 U	8.4 U	8.6 U	8.5 U	NA	NA	9.1 U	11 U	0.6 U	0.6 U	NA	0.6 U
m,p-Xylene	µg/kg	NA	NA	17 U	17 U	17 U	17 U	NA	NA	18 U	22 U	0.6 U	0.6 U	NA	0.6 U
o-Xylene	µg/kg	NA	NA	8.4 U	8.4 U	8.6 U	8.5 U	NA	NA	9.1 U	11 U	0.6 U	0.6 U	NA	0.6 U
Dioxins/Furans															
2,3,7,8-TCDD	pg/g	2.2 J	0.285 U	NA	NA	NA	NA	0.64 U	0.437 U	NA	NA	NA	NA	NA	NA
1,2,3,7,8-PeCDD	pg/g	2.79 J	0.32 U	NA	NA	NA	NA	0.71 U	0.644 U	NA	NA	NA	NA	NA	NA
1,2,3,4,7,8-HxCDD	pg/g	5.03 J	0.254 U	NA	NA	NA	NA	1.08 U	0.848 U	NA	NA	NA	NA	NA	NA
1,2,3,6,7,8-HxCDD	pg/g	26.3	1.03 J	NA	NA	NA	NA	1.23 U	0.993 U	NA	NA	NA	NA	NA	NA
1,2,3,7,8,9-HxCDD	pg/g	12.5	0.564 J	NA	NA	NA	NA	1.19 U	0.947 U	NA	NA	NA	NA	NA	NA
1,2,3,4,6,7,8-HpCDD	pg/g	821	24.4	NA	NA	NA	NA	37.4	10.2 J	NA	NA	NA	NA	NA	NA
Total OCDD	pg/g	8090	215	NA	NA	NA	NA	482	64.7	NA	NA	NA	NA	NA	NA
2,3,7,8-TCDF	pg/g	1.19 J	0.134 U	NA	NA	NA	NA	0.383 U	0.217 U	NA	NA	NA	NA	NA	NA
1,2,3,7,8-PeCDF	pg/g	0.486 U	0.278 U	NA	NA	NA	NA	0.619 U	0.494 U	NA	NA	NA	NA	NA	NA
2,3,4,7,8-PeCDF	pg/g	1.4 J	0.287 U	NA	NA	NA	NA	0.599 U	0.476 U	NA	NA	NA	NA	NA	NA
1,2,3,4,7,8-HxCDF	pg/g	7.22 J	0.33 J	NA	NA	NA	NA	0.627 U	0.481 U	NA	NA	NA	NA	NA	NA
2,3,4,6,7,8-HxCDF	pg/g	5.16 J	0.353 J	NA	NA	NA	NA	0.665 U	0.538 U	NA	NA	NA	NA	NA	NA
1,2,3,7,8,9-HxCDF	pg/g	1.13 J	0.128 U	NA	NA	NA	NA	0.746 U	0.625 U	NA	NA	NA	NA	NA	NA
1,2,3,4,6,7,8-HpCDF	pg/g	216	7.38	NA	NA	NA	NA	8.57 J	2.59 J	NA	NA	NA	NA	NA	NA
1,2,3,6,7,8-HxCDF	pg/g	3.57 J	0.206 J	NA	NA	NA	NA	0.671 U	0.514 U	NA	NA	NA	NA	NA	NA
1,2,3,4,7,8,9-HpCDF	pg/g	8.28 J	0.498 J	NA	NA	NA	NA	0.565 U	0.833 U	NA	NA	NA	NA	NA	NA
Total OCDF	pg/g	925	30.3	NA	NA	NA	NA	22.4 J	6.11 J	NA	NA	NA	NA	NA	NA
Summed Dioxin/Furan TEQ[5,6]	pg/g	24.8 J	0.645 J	NA	NA	NA	NA	0.611 J	0.149 J	NA	NA	NA	NA	NA	NA
Summed Dioxin/Furan TEQ with One-half of the Detection Limit[5,7]	pg/g	24.8 J	1.02 J	NA	NA	NA	NA	1.72 J	1.03 J	NA	NA	NA	NA	NA	NA

Notes:

1 Benzofluoranthenes (total) includes both benzo(b)fluoranthene and benzo(k)fluoranthene. Both analytes have a toxic equivalency factor of 0.1; therefore, the total of the two analytes is multiplied by 0.1 when calculating the cPAH TE
2 Calculation of cPAH TEQ concentrations was performed using the California Environmental Protection Agency 2005 Toxic Equivancy Factors as presented in Table 708-2 of WAC 173-340-900 (WSDOE 2007
3 Calculated using detected cPAH concentrations
4 Calculated using detected cPAH concentrations plus one-half the reporting limit for cPAHs that were not detecte
5 World Health Organization 2005 Toxic Equivalency Factors used for calculation of dioxin/furan TEQ (Van den Berg et al. 2006
6 Calculated using detected dioxin/furan concentrations
7 Calculated using detected dioxin/furan concentrations plus one-half the detection limit for dioxins/furans that were not detected.

Abbreviations:

cPAH Carcinogenic polycyclic aromatic hydrocarbor
NA Not analyzed
OCDD Octachlorodibenzo-p-dioxir
OCDF Octachlorodibenzofuran
TEQ Toxic equivalency quotien
WAC Washington Administrative Code
WSDOE Washington State Department of Ecology

Qualifiers:

J The analyte was analyzed for and positively identified, but the associated numerical value is an estimated quantit
U Undetected.
UJ Undetected with estimated concentration

Table F.2
Summary of Monitoring Well Development Measurements and Observations

Monitoring Well ID	Monitoring Well Measurements			Purge Volumes and Rates		Groundwater Characteristics During Development			
	Pre-development Measurements					Turbidity			
	Depth to Water (ft TOC)	Depth to Bottom of Well (ft TOC)	Time	Volume of Well Casing (gal)	Total Purge Volume (gal)	Initial Turbidity (NTU)	Final Turbidity (NTU)	Apparent Odor	Visible Sheen
MW-1	17.14		9:10	0.47	5	150	34.7	Moderate to Strong HC Odor	Moderate
MW-2	7.30	12.76	13:50	1.26	12.0		30	None	None
MW-3	18.16		9:25	1.11	15.0	146	22	None	None
MW-4	16.71	24.95	14:30	1.51	25.0		50	None	None
MW-5	20.96	27.85	15:30	1.15	28.0	>5000	NA	None	None
MW-5 Day 2			8:45		6.0	73	48	None	None
MW-6	14.22	14.85	10:50	0.94	NA	NA	NA	None	None
MW-7	14.88		11:10	1.65	19.0	> 4946	84	None	None
MW-8	10.51	18.90	12:45	1.55	12.0	169	NA	None	None
MW-9	13.03		14:35	1.14	29.0	104	17	None	None
MW-10	13.75		13:45	1.02	38.0	53	43	None	None
MW-11	11.37		12:50	1.41	32.0	> 5000	15	None	None
MW-12	8.07	16.05	11:05	1.46	30.0	261	NA	None	None
MW-13	12.01	20.10	10:20	0.81	54.0	182	183	None	None
MW-13 Day 2	12.12		10:25		15.0	164	47	None	None
MW-14	15.57	23.40	15:35	1.46	29.0	1524	53	None	None
MW-15			13:00	9.37	30	>5000	282	Moderate to Strong HC Odor	Slight
MW-16	11.52	42.60	12:30	5.86	80.0	93	69	Moderate HC odor	Moderate
MW-17	16.63	52.00	14:45	5.77	55.0	117	36	None	None

Abbreviations:

ft	Feet
ft TOC	Feet from top of casing
gal	Gallon
HC	Hydrocarbon or hydrocarbon-like
NA	Not applicable.
NTU	Nephlometric turbidity units

Table F.3
Summary of Groundwater Elevations

Monitoring Well ID	Date and Time	Top of Casing Elevation[1,2] (feet)	Depth to Water[3] (feet)	Groundwater Elevation[1] (feet)
MW-1	8/13/210 12:40	304.67	17.38	287.29
	1/21/2011 15:45	304.67	14.11	290.56
	4/2/9/2011 9:08	304.67	14.51	290.16
MW-2	8/11/2010 10:25	303.52	7.36	296.16
	1/21/2011 12:30	303.52	8.74	294.78
	4/26/2011 9:55	303.52	5.14	298.38
MW-3	8/11/2010 12:20	303.70	18.22	285.48
	1/19/2011 8:30	303.70	15.65	288.05
	4/26/2011 13:00	303.70	16.09	287.61
MW-4	8/11/2010 14:15	297.97	16.88	281.09
	1/19/2011 8:37	297.97	14.71	283.26
	4/28/2011 12:40	297.97	14.91	283.06
MW-5	8/13/2010 14:15	298.55	21.00	277.55
	1/19/2011 8:45	298.55	19.19	279.36
	4/28/2011 8:42	298.55	19.40	279.15
MW-6	8/12/2010 10:50	294.47	14.35	280.12
	1/19/2011 8:00	294.47	8.66	285.81
	4/26/2011 15:23	294.47	10.86	283.61
MW-7	8/13/2010 11:05	291.46	14.80	276.66
	1/19/2011 10:15	291.46	11.15	280.31
	4/27/2011 8:43	291.46	12.21	279.25
MW-8	8/12/2010 9:29	285.84	13.05	272.79
	1/19/2011 10:05	285.84	8.56	277.28
	4/27/2011 13:51	285.84	8.69	277.15
MW-9	8/13/2010 8:20	286.89	13.10	273.79
	1/19/2011 10:00	286.89	12.13	274.76
	4/27/2011 12:48	286.89	12.26	274.63
MW-10	8/12/2010 14:55	287.70	13.78	273.92
	1/19/2011 9:55	287.70	12.79	274.91
	4/27/2011 11:17	287.70	12.98	274.72
MW-11	8/12/2010 13:40	287.91	11.42	276.49
	1/19/2011 9:45	287.91	10.01	277.90
	4/27/2011 10:14	287.91	10.20	277.71
MW-12	8/12/2010 9:12	290.08	8.15	281.93
	1/19/2011 8:15	290.08	4.90	285.18
	4/27/2011 15:09	290.08	5.43	284.65
MW-13	8/12/2010 11:35	292.98	12.17	280.81
	1/19/2011 7:40	292.98	8.53	284.45
	4/26/2011 14:15	292.98	9.59	283.39

Table F.3
Summary of Groundwater Elevations

Monitoring Well ID	Date and Time	Top of Casing Elevation[1,2] (feet)	Depth to Water[3] (feet)	Groundwater Elevation[1] (feet)
MW-14	8/11/2010 15:35	300.49	15.70	284.79
	1/19/2011 8:25	300.49	12.90	287.59
	4/28/2011 14:40	300.49	13.15	287.34
MW-15	9/13/2010 11:45	299.63	17.93	281.70
	1/19/2011 8:30	299.63	15.50	284.13
	4/28/2011 10:25	299.63	15.44	284.19
MW-16	9/13/2010 16:10	298.15	11.54	286.61
	1/19/2011 8:55	298.15	9.24	288.91
	4/28/2011 15:30	298.15	8.95	289.20
MW-17	9/13/2010 15:02	297.98	15.82	282.16
	1/19/2011 8:41	297.98	14.27	283.71
	4/28/2011 13:35	297.98	14.50	283.48

Notes:

1 Top of casing elevation measurement is in North American Vertical Datum of 1988.

2 Top of casing elevation accounts for the length of PVC casing cut off to allow for well completion at ground surface.

3 Measured depth to water from top of the casing.

Table F.4
Lora Lake Apartments Parcel Groundwater Analytical Results

Location		MW-1					MW-2			MW-3				MW-4		
Sample ID		MW01-081310	MW01-012111	MW01-012111-D	MW01-042911[1]	MW01-042911-D[1]	MW02-081110	MW02-012111	MW02-042611	MW03-081110	MW03-081110-D	MW03-012011	MW03-042611	MW04-081110	MW04-012011	MW04-042811
Sample Date		08/13/2010	01/21/2011	01/21/2011	04/29/2011	04/29/2011	08/11/2010	01/21/2011	04/26/2011	08/11/2010	08/11/2010	01/20/2011	04/26/2011	08/11/2010	01/20/2011	04/28/2011
Analyte	**Unit**															
Metals																
Arsenic	µg/L	5.6	11.7	11.9	14.2	13.4	0.2 U	0.2 U	0.2 U	0.4	0.4	0.5	0.4	0.4	0.9	0.4
Lead	µg/L	1 U	1 U	1 U	0.1 U	0.1 U	1 U	1 U	0.1 U	1 U	1 U	1 U	0.1 U	1 U	1 U	0.1 U
Total Petroleum Hydrocarbons																
Gasoline Range Hydrocarbons	mg/L	0.25 U	0.46	0.46	0.38	0.4	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Diesel Range Hydrocarbons	mg/L	0.1 U	0.1 U	0.18	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Heavy Oil Range Hydrocarbons	mg/L	0.2 U	0.25	0.53	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Semivolatile Organic Compounds																
Pentachlorophenol	µg/L	0.25 U	0.76	0.68	0.41	0.42	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Carcinogenic Polycyclic Aromatic Hydrocarbons																
Benzo(a)pyrene	µg/L	0.01 U	0.021	0.01 U	0.0057 J	0.0086 J	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(a)anthracene	µg/L	0.01 U	0.017	0.01 U	0.01 U	0.0058 J	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzofluoranthenes (total)[2]	µg/L	0.01 U	0.031	0.012	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chrysene	µg/L	0.01 U	0.026	0.01	0.008 J	0.011	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibenzo(a,h)anthracene	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	µg/L	0.01 U	0.012	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Summed cPAH TEQ[3,4]	µg/L	0 U	0.027	0.0013	0.0058 J	0.0093 J	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U
Summed cPAH TEQ with One-half of the Reporting Limit[3,5]	µg/L	0.0071 U	0.028	0.0078	0.0078 J	0.011 J	0.0071 U	0.0071 U	0.0071 U	0.0071 U	0.0071 U	0.0071 U	0.0071 U	0.0071 U	0.0071 U	0.0071 U
Volatile Organic Compounds																
Tetrachloroethene	µg/L	0.02 U	0.025	0.024	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Trichloroethene	µg/L	0.17	0.12	0.12	0.12	0.12	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
cis-1,2-Dichloroethene	µg/L	0.2	0.26	0.24	0.16	0.16	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
trans-1,2-Dichloroethene	µg/L	0.11	0.059	0.052	0.041	0.042	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
1,2-Dichloroethane	µg/L	0.038	0.037	0.032	0.028	0.026	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Benzene	µg/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	µg/L	1 U	3.1	3	2.5	2.5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	µg/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
m,p-Xylene	µg/L	1 U	5.3	5.6	1.8	1.8	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
o-Xylene	µg/L	1 U	9.2	8.6	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dioxins/Furans																
2,3,7,8-TCDD	pg/L	1.53 U	3.34 J	4.54 UJ	2.27	1.17 U	1.64 U	2.62 U	0.98 U	1.89 U	1.44 U	1.43 U	0.9 U	1.81 U	1.11 U	0.76 U
1,2,3,7,8-PeCDD	pg/L	2.41 U	9.29 J	7.94 J	4.97 J	1.5 J	2.45 U	4.11 U	1.19 U	3.3 U	1.79 U	2 U	1.35 U	2.44 U	1.64 U	1.18 U
1,2,3,4,7,8-HxCDD	pg/L	4.5 J	5.19 J	5.61 UJ	4.05 J	2.91 J	3.2 U	4.87 U	1.76 U	3.78 U	2.24 U	2.11 U	1.51 U	2.58 UJ	1.78 U	1.25 U
1,2,3,6,7,8-HxCDD	pg/L	15.9 J	37.9	46.6 J	27.1	16 J	3.74 U	6.15 U	2.24 U	4.63 U	2.72 U	2.65 U	1.92 U	3.04 U	2.23 U	1.63 U
1,2,3,7,8,9-HxCDD	pg/L	7.59 J	20.6 J	17.6 J	11.8	6.43 J	3.5 U	5.54 U	1.93 U	4.25 U	2.5 U	2.38 U	1.66 U	2.84 U	2.01 U	1.4 U
1,2,3,4,6,7,8-HpCDD	pg/L	708	843	920 J	599	305	5.24 U	9.05 J	2.49 U	6.14 U	3.69 U	5.99 J	2.05 U	3.91 U	19.5 J	7.91 J
Total OCDD	pg/L	11700	16200	13300	8430	3520	9.64 UJ	43.2 J	9.17 J	9.78 U	8.62 U	51.2 J	2.34 U	9.23 U	186	66.9 J
2,3,7,8-TCDF	pg/L	0.924 U	1.38 U	3.1 UJ	1.56 U	1.25 U	0.905 U	1.92 U	0.74 U	1.06 U	0.797 U	0.785 U	0.91 U	0.832 U	0.61 U	0.67 U
1,2,3,7,8-PeCDF	pg/L	2.99 U	11.8 J	13 J	14.6 J	13.1 J	1.55 UJ	2.68 U	1.31 U	1.93 U	1.22 U	1.29 U	1.4 U	1.33 U	1.14 U	0.96 U
2,3,4,7,8-PeCDF	pg/L	3.15 U	4.51 J	4.02 UJ	3.23 J	2.5 J	1.59 UJ	2.93 U	1.32 U	2.07 U	1.33 U	1.39 U	1.48 U	1.34 U	1.23 U	1.09 U
1,2,3,4,7,8-HxCDF	pg/L	2.98 J	5.06 J	3.89 UJ	4.2 J	2.58 J	2.11 U	4.23 U	1.2 U	2.57 U	1.44 U	2.3 UJ	1.04 U	1.91 U	1.45 U	1.05 U
2,3,4,6,7,8-HxCDF	pg/L	11.1 J	16.2 J	17.4 J	7.38 J	6.34 J	2.33 U	4.74 U	1.17 U	2.88 U	1.58 U	2.52 UJ	1.04 U	1.92 U	1.53 U	1.11 U
1,2,3,7,8,9-HxCDF	pg/L	2.57 U	1.85 UJ	4.25 UJ	2.04 J	2.11 J	2.71 U	5.13 U	1.05 U	3.09 U	1.78 U	2.59 UJ	0.95 U	2.27 U	1.53 U	1.14 U
1,2,3,4,6,7,8-HpCDF	pg/L	71.6	126	94.9 J	54.3	31.8	2.86 U	5.92 U	1.21 U	3.3 U	2.28 U	2.61 UJ	1.15 U	2.49 U	6.37 J	2.05 U
1,2,3,6,7,8-HxCDF	pg/L	4.72 J	9.83 UJ	6.56 UJ	6.06 J	4.42 J	2.02 U	4.14 U	1.14 U	2.49 U	1.39 U	2.28 UJ	1.03 U	1.83 U	1.4 U	1 U
1,2,3,4,7,8,9-HpCDF	pg/L	6.5 J	11.7 J	8.75 J	6.3 J	4.16 J	5.04 UJ	8.21 U	1.53 U	5.91 U	4.03 U	4.96 UJ	1.52 U	4.19 UJ	2.68 U	1.94 UJ
Total OCDF	pg/L	281	384	294 J	207	113	7.78 U	11.5 U	2.37 U	8.63 U	5.87 U	8.4 UJ	2.51 U	6.5 U	22.1 J	6.5 UJ
Summed Dioxin/Furan TEQ[6,7]	pg/L	16.1 J	37.6 J	30.8 J	24.1 J	11.2 J	0 UJ	0.103 J	0.00275 J	0 U	0 U	0.0753 J	0 U	0 UJ	0.321 J	0.0992 J
Summed Dioxin/Furan TEQ with One-half of the Detection Limit[6,8]	pg/L	18.8 J	38.3 J	34.8 J	24.2 J	11.9 J	3.4 UJ	5.86 J	1.89 J	4.25 U	2.61 U	2.94 J	1.90 U	3.26 UJ	2.54 J	1.73 J

Notes:

1 Results represent total, rather than dissolved, metals. Refer to Section 4.2.3 for additional information.
2 Benzofluoranthenes (total) includes both benzo(b)fluoranthene and benzo(k)fluoranthene. Both analytes have a toxic equivalency factor of 0.1; therefore, the total of the two analytes is multiplied by 0.1 when calculating the cPAH TEQ
3 Calculation of cPAH TEQ concentrations was performed using the California Environmental Protection Agency 2005 Toxic Equivancy Factors as presented in Table 708-2 of WAC 173-340-900 (WSDOE 2007)
4 Calculated using detected cPAH concentrations.
5 Calculated using detected cPAH concentrations plus one-half the reporting limit for cPAHs that were not detected.
6 World Health Organization 2005 Toxic Equivalency Factors used for calculation of dioxin/furan TEQ (Van den Berg et al. 2006)
7 Calculated using detected dioxin/furan concentrations.
8 Calculated using detected dioxin/furan concentrations plus one-half the detection limit for dioxins/furans that were not detected.

Abbreviations:

cPAH Carcinogenic polycyclic aromatic hydrocarbor
NA Not analyzed
OCDD Octachlorodibenzo-p-dioxin
OCDF Octachlorodibenzofuran
TEQ Toxic equivalency quotient
WAC Washington Administrative Code
WSDOE Washington State Department of Ecology

Qualifiers:

J The analyte was analyzed for and positively identified, but the associated numerical value is an estimated quantity
U Undetected.
UJ Undetected with estimated concentration.

Table F.4
Lora Lake Apartments Parcel Groundwater Analytical Results

Location		MW-05			MW-06		MW-07			MW-08			MW-09			MW-10
Sample ID		MW05-081310	MW05-012111	MW05-042811	MW06-012011	MW06-042611	MW07-081310	MW07-011911	MW07-042711	MW08-081310	MW08-012111	MW08-042711	MW09-081310	MW09-012111	MW09-042711	MW10-081210
Sample Date		08/13/2010	01/21/2011	04/28/2011	01/20/2011	04/26/2011	08/13/2010	01/19/2011	04/27/2011	08/13/2010	01/21/2011	04/27/2011	08/13/2010	01/21/2011	04/27/2011	08/12/2010
Analyte	**Unit**															
Metals																
Arsenic	µg/L	3	5.4	4.6	0.6	0.4	0.3	0.9	0.5	0.6	0.6	0.5	0.3	0.3	0.2	0.6
Lead	µg/L	1 U	1 U	0.1 U	1 U	0.1 U	1 U	1 U	0.1 U	1 U	1 U	0.1 U	1 U	1 U	0.1 U	1 U
Total Petroleum Hydrocarbons																
Gasoline Range Hydrocarbons	mg/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Diesel Range Hydrocarbons	mg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.18	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Heavy Oil Range Hydrocarbons	mg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Semivolatile Organic Compounds																
Pentachlorophenol	µg/L	0.76	1.4	1.4	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.47	0.29	0.31	0.25 U
Carcinogenic Polycyclic Aromatic Hydrocarbons																
Benzo(a)pyrene	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(a)anthracene	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzofluoranthenes (total)[2]	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chrysene	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibenzo(a,h)anthracene	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Summed cPAH TEQ[3,4]	µg/L	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U
Summed cPAH TEQ with One-half of the Reporting Limit[3,5]	µg/L	0.0071 U	0.0071 U	0.0071 U	0.0071 U	0.0071 U	0.0071 U	0.0071 U	0.0071 U	0.0071 U	0.0071 U	0.0071 U	0.0071 U	0.0071 U	0.0071 U	0.0071 U
Volatile Organic Compounds																
Tetrachloroethene	µg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Trichloroethene	µg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
cis-1,2-Dichloroethene	µg/L	0.028	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
trans-1,2-Dichloroethene	µg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
1,2-Dichloroethane	µg/L	0.07	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Benzene	µg/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	µg/L	1 U	1 U	1 U	1 U	1.1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	µg/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
m,p-Xylene	µg/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
o-Xylene	µg/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dioxins/Furans																
2,3,7,8-TCDD	pg/L	1.82 U	1.26 U	0.98 U	1.02 U	0.97 U	1.63 U	1.58 U	1.01 U	1.91 U	1.2 U	1.22 U	1.4 U	1.57 U	0.96 U	1.73 U
1,2,3,7,8-PeCDD	pg/L	2.71 U	1.88 U	1.36 U	1.55 U	1.07 U	2.3 U	1.78 U	1.29 U	2.59 U	1.75 U	1.26 U	2.14 U	2.54 U	1.5 U	1.93 U
1,2,3,4,7,8-HxCDD	pg/L	2.22 U	2.23 U	2.44 U	1.6 U	1.18 U	1.71 U	2.01 U	1.24 U	3.39 U	1.84 U	1.48 U	2.4 U	2.51 U	1.95 U	2.6 U
1,2,3,6,7,8-HxCDD	pg/L	2.79 U	2.83 U	3.11 U	2.03 U	1.48 U	2.21 U	2.55 U	1.6 U	4.4 U	2.3 U	1.92 U	3.1 U	3.17 U	2.48 U	3.25 U
1,2,3,7,8,9-HxCDD	pg/L	2.5 U	2.54 U	2.72 U	1.82 U	1.28 U	1.96 U	2.29 U	1.37 U	3.89 U	2.08 U	1.63 U	2.76 U	2.86 U	2.13 U	2.94 U
1,2,3,4,6,7,8-HpCDD	pg/L	42	26.5	24.5 J	1.8 U	1.62 U	2.77 U	2.52 U	2.14 U	3.53 U	2.62 J	2.27 U	7.65 J	3.05 U	7.05 J	4.08 U
Total OCDD	pg/L	289	166	139	3.15 U	6.65 J	4.68 U	16.2 J	2.67 U	8.44 U	26.1	8.84 J	17.6 J	9.14 J	31.5 J	10.2 UJ
2,3,7,8-TCDF	pg/L	0.79 U	0.991 U	0.48 U	0.613 U	0.82 U	0.839 U	0.941 U	0.8 U	0.869 U	0.718 U	0.82 U	1 U	1.06 U	0.93 U	0.836 U
1,2,3,7,8-PeCDF	pg/L	1.25 U	1.47 U	1.02 U	1.14 U	1.03 U	1.5 U	1.39 U	1.42 U	1.74 U	1.31 U	1.32 U	2.04 U	1.54 U	1.3 U	1.41 U
2,3,4,7,8-PeCDF	pg/L	1.26 U	1.52 U	1.17 U	1.2 U	1.09 U	1.55 U	1.44 U	1.4 U	1.74 U	1.31 U	1.31 U	2.08 U	1.62 U	1.29 U	1.46 U
1,2,3,4,7,8-HxCDF	pg/L	1.44 U	1.73 U	1.18 U	1.38 U	0.77 U	1.46 U	1.57 U	1.17 U	2.18 U	1.64 U	1.19 U	1.64 U	2.03 U	1.17 U	1.71 U
2,3,4,6,7,8-HxCDF	pg/L	1.55 U	1.88 UJ	1.26 U	1.39 U	0.76 U	1.45 U	1.75 U	1.21 U	2.24 U	1.77 U	1.14 U	1.7 U	2.18 U	1.17 U	1.79 U
1,2,3,7,8,9-HxCDF	pg/L	1.5 U	2.04 U	1.29 U	1.5 U	0.65 U	1.46 U	1.76 U	1.08 U	2.2 U	1.8 U	1.01 U	1.68 U	2.47 U	1.02 U	2.01 U
1,2,3,4,6,7,8-HpCDF	pg/L	3.63 U	5.71 J	3.5 J	1.57 U	0.74 U	2.3 U	2.41 U	1.41 U	2.37 U	2.18 U	1.24 U	2.09 U	2.52 U	1.71 U	2.49 U
1,2,3,6,7,8-HxCDF	pg/L	1.45 U	1.76 U	1.11 U	1.37 U	0.75 U	1.44 U	1.55 U	1.19 U	2.12 U	1.6 U	1.15 U	1.62 U	1.93 U	1.17 U	1.62 U
1,2,3,4,7,8,9-HpCDF	pg/L	2.27 U	2.97 U	2.14 U	2.44 U	0.94 U	3.54 U	3.62 U	1.76 U	3.71 U	3.19 U	1.58 U	3 U	3.49 U	2.11 U	4.68 UJ
Total OCDF	pg/L	6.64 U	17.8 J	10.6 J	3.32 U	2.06 U	5.48 U	5.4 U	2.73 U	5.64 U	4.47 U	2.91 U	5.35 U	7.91 U	2.99 U	8.56 UJ
Summed Dioxin/Furan TEQ[6,7]	pg/L	0.507	0.377 J	0.325 J	0 U	0.00200 J	0 U	0.00486 J	0 U	0 U	0.034 J	0.00265 J	0.0818 J	0.00274 J	0.0800 J	0 UJ
Summed Dioxin/Furan TEQ with One-half of the Detection Limit[6,8]	pg/L	3.72	3.01 J	2.38 J	2.1 U	1.6 J	2.89 U	2.69 J	1.89 U	3.65 U	2.44 J	2.00 J	3.02 J	3.28 J	2.14 J	2.97 UJ

Notes:

1 Results represent total, rather than dissolved, metals. Refer to Section 4.2.3 for additional information.
2 Benzofluoranthenes (total) includes both benzo(b)fluoranthene and benzo(k)fluoranthene. Both analytes have a toxic equivalency factor of 0.1; therefore, the total of the two analytes is multiplied by 0.1 when calculating the cPAH TEQ
3 Calculation of cPAH TEQ concentrations was performed using the California Environmental Protection Agency 2005 Toxic Equivancy Factors as presented in Table 708-2 of WAC 173-340-900 (WSDOE 2007)
4 Calculated using detected cPAH concentrations.
5 Calculated using detected cPAH concentrations plus one-half the reporting limit for cPAHs that were not detected.
6 World Health Organization 2005 Toxic Equivalency Factors used for calculation of dioxin/furan TEQ (Van den Berg et al. 2006)
7 Calculated using detected dioxin/furan concentrations.
8 Calculated using detected dioxin/furan concentrations plus one-half the detection limit for dioxins/furans that were not detected.

Abbreviations:

cPAH Carcinogenic polycyclic aromatic hydrocarbor
NA Not analyzed
OCDD Octachlorodibenzo-p-dioxin
OCDF Octachlorodibenzofuran
TEQ Toxic equivalency quotient
WAC Washington Administrative Code
WSDOE Washington State Department of Ecology

Qualifiers:

J The analyte was analyzed for and positively identified, but the associated numerical value is an estimated quantity
U Undetected.
UJ Undetected with estimated concentration.

Table F.4
Lora Lake Apartments Parcel Groundwater Analytical Results

Location		MW-10		MW-11			MW-12			MW-13			MW-14			MW-15
Sample ID		MW10-011911	MW10-042711	MW11-081210	MW11-011911	MW11-042711	MW12-081210	MW12-012011	MW12-042711	MW13-081210	MW13-012011	MW13-042611	MW14-081110	MW14-011911	MW14-042811	MW15-091310
Sample Date		01/19/2011	04/27/2011	08/12/2010	01/19/2011	04/27/2011	08/12/2010	01/20/2011	04/27/2011	08/12/2010	01/20/2011	04/26/2011	08/11/2010	01/19/2011	04/28/2011	9/13/2010
Analyte	**Unit**															
Metals																
Arsenic	µg/L	0.6	0.6	0.2 U	0.2 U	0.2 U	0.5	0.4	0.4	0.3	0.3	0.2	0.4	0.4	0.4	NA
Lead	µg/L	1 U	0.1 U	1 U	1 U	0.1 U	1 U	1 U	0.1 U	1 U	1 U	0.1 U	1 U	1 U	0.1 U	NA
Total Petroleum Hydrocarbons																
Gasoline Range Hydrocarbons	mg/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	NA
Diesel Range Hydrocarbons	mg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Heavy Oil Range Hydrocarbons	mg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2
Semivolatile Organic Compounds																
Pentachlorophenol	µg/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Carcinogenic Polycyclic Aromatic Hydrocarbons																
Benzo(a)pyrene	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(a)anthracene	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzofluoranthenes (total)[2]	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chrysene	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibenzo(a,h)anthracene	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Summed cPAH TEQ[3,4]	µg/L	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U
Summed cPAH TEQ with One-half of the Reporting Limit[3,5]	µg/L	0.0071 U	0.0071 U	0.0071 U	0.0071 U	0.0071 U	0.0071 U	0.0071 U	0.0071 U	0.0071 U	0.0071 U	0.0071 U	0.0071 U	0.0071 U	0.0071 U	0.0071 U
Volatile Organic Compounds																
Tetrachloroethene	µg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.035	0.02 U	0.025	0.02 U	0.02 U	0.02 U	0.02 U
Trichloroethene	µg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
cis-1,2-Dichloroethene	µg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
trans-1,2-Dichloroethene	µg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
1,2-Dichloroethane	µg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Benzene	µg/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.2 U
Ethylbenzene	µg/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.2 U
Toluene	µg/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.2 U
m,p-Xylene	µg/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.4 U
o-Xylene	µg/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.2 U
Dioxins/Furans																
2,3,7,8-TCDD	pg/L	1.6 U	1.19 U	1.62 U	1.81 UJ	0.83 U	1.49 U	1.12 U	1.01 U	3.05 UJ	1.32 U	1.31 U	1.51 U	1.45 U	0.55 U	NA
1,2,3,7,8-PeCDD	pg/L	1.93 U	1.34 U	2 U	2.77 U	1.14 U	2.2 U	1.4 U	1.44 U	4.96 UJ	1.97 U	1.78 UJ	1.65 U	2.15 U	1.17 U	NA
1,2,3,4,7,8-HxCDD	pg/L	2.37 U	1.52 U	2.52 U	2.82 U	1.4 U	2.52 U	1.6 U	1.79 U	5.03 UJ	2.12 U	2.29 U	2.58 U	2.3 U	0.92 U	NA
1,2,3,6,7,8-HxCDD	pg/L	2.93 U	1.97 U	3.11 U	3.6 U	1.83 U	3.09 U	2.04 U	2.27 U	6.01 UJ	2.61 U	2.96 UJ	3.22 U	2.9 U	1.16 U	NA
1,2,3,7,8,9-HxCDD	pg/L	2.66 U	1.68 U	2.84 U	3.22 U	1.55 U	2.82 U	1.82 U	1.95 U	5.6 UJ	2.37 U	2.53 U	2.92 U	2.61 U	1.02 U	NA
1,2,3,4,6,7,8-HpCDD	pg/L	3.08 U	2.06 U	4.19 U	4.89 U	1.71 U	7.05 J	3.94 J	2.15 U	8.01 UJ	2.78 U	3.12 U	3.54 U	3.27 U	1.49 U	NA
Total OCDD	pg/L	14 J	3.13 U	8.66 UJ	26.3 J	2.42 U	24.3 J	27 J	4.95 U	14.4 UJ	4.87 U	8.94 J	5.72 U	6.97 U	4.98 U	NA
2,3,7,8-TCDF	pg/L	0.982 U	0.81 U	0.841 U	1.15 UJ	0.67 U	0.823 U	0.577 U	0.87 U	1.72 UJ	0.848 U	1.01 U	0.825 U	0.877 U	0.49 U	NA
1,2,3,7,8-PeCDF	pg/L	1.29 U	1.19 U	1.71 U	1.95 U	1.02 U	1.36 U	0.949 U	1.32 U	3.39 UJ	1.34 U	1.5 UJ	1.37 U	1.84 U	0.77 U	NA
2,3,4,7,8-PeCDF	pg/L	1.34 U	1.23 U	1.81 U	1.99 U	1.03 U	1.39 U	0.974 U	1.29 U	3.55 UJ	1.37 U	1.56 UJ	1.35 U	1.9 U	0.83 U	NA
1,2,3,4,7,8-HxCDF	pg/L	2.02 U	1.08 U	1.92 U	2.29 UJ	0.95 U	1.75 U	1.28 U	1.17 U	3.56 UJ	1.5 U	1.56 U	1.56 U	1.72 U	1.12 U	NA
2,3,4,6,7,8-HxCDF	pg/L	2.19 U	1.07 U	2.05 U	2.4 UJ	0.91 U	1.83 U	1.27 U	1.21 U	3.8 UJ	1.58 U	1.54 U	1.62 U	1.76 U	1.19 U	NA
1,2,3,7,8,9-HxCDF	pg/L	2.3 U	0.97 U	2.27 U	2.58 UJ	0.8 U	2.15 U	1.37 U	1.05 U	4.48 UJ	1.69 UJ	1.39 U	1.86 U	1.88 U	1.19 U	NA
1,2,3,4,6,7,8-HpCDF	pg/L	2.84 U	1.25 U	2.76 U	2.52 UJ	0.97 U	2.41 UJ	1.87 UJ	1.37 U	4.24 UJ	2.27 U	1.72 U	2.01 U	2.36 U	0.99 U	NA
1,2,3,6,7,8-HxCDF	pg/L	2.01 U	0.99 U	1.84 U	2.27 UJ	0.93 U	1.71 U	1.25 UJ	1.18 U	3.43 UJ	1.46 UJ	1.55 UJ	1.49 U	1.61 U	1.09 U	NA
1,2,3,4,7,8,9-HpCDF	pg/L	4.23 U	1.6 U	5.74 UJ	3.76 UJ	1.19 U	4.76 UJ	2.79 U	1.68 U	9.24 UJ	3.61 UJ	2.23 U	3.5 U	3.71 U	1.57 U	NA
Total OCDF	pg/L	5.68 U	2.32 U	8.26 UJ	4.68 UJ	2.24 U	8.36 UJ	3.58 U	2.83 U	14.3 UJ	5.77 U	3.04 UJ	5.24 U	5.42 U	2.59 UJ	NA
Summed Dioxin/Furan TEQ[6,7]	pg/L	0.0042 J	0 U	0 UJ	0.00789 J	0 U	0.0778 J	0.0475 J	0 U	0 UJ	0 UJ	0.00268 J	0 U	0 U	0 UJ	NA
Summed Dioxin/Furan TEQ with One-half of the Detection Limit[6,8]	pg/L	2.91 J	2.00 U	3.04 UJ	3.70 J	1.63 U	3.02 J	2.05 J	2.04 U	6.38 UJ	2.62 UJ	2.58 J	2.65 U	2.94 U	1.43 UJ	NA

Notes:

1 Results represent total, rather than dissolved, metals. Refer to Section 4.2.3 for additional information.
2 Benzofluoranthenes (total) includes both benzo(b)fluoranthene and benzo(k)fluoranthene. Both analytes have a toxic equivalency factor of 0.1; therefore, the total of the two analytes is multiplied by 0.1 when calculating the cPAH TEQ
3 Calculation of cPAH TEQ concentrations was performed using the California Environmental Protection Agency 2005 Toxic Equivancy Factors as presented in Table 708-2 of WAC 173-340-900 (WSDOE 2007)
4 Calculated using detected cPAH concentrations.
5 Calculated using detected cPAH concentrations plus one-half the reporting limit for cPAHs that were not detected.
6 World Health Organization 2005 Toxic Equivalency Factors used for calculation of dioxin/furan TEQ (Van den Berg et al. 2006)
7 Calculated using detected dioxin/furan concentrations.
8 Calculated using detected dioxin/furan concentrations plus one-half the detection limit for dioxins/furans that were not detected.

Abbreviations:

cPAH Carcinogenic polycyclic aromatic hydrocarbor
NA Not analyzed
OCDD Octachlorodibenzo-p-dioxin
OCDF Octachlorodibenzofuran
TEQ Toxic equivalency quotient
WAC Washington Administrative Code
WSDOE Washington State Department of Ecology

Qualifiers:

J The analyte was analyzed for and positively identified, but the associated numerical value is an estimated quantity
U Undetected.
UJ Undetected with estimated concentration.

Table F.4
Lora Lake Apartments Parcel Groundwater Analytical Results

Location			MW-15	MW-16				MW-17		
Sample ID		MW15-012111	MW15-042811	MW16-091310	MW16-091310-D	MW16-012111	MW16-042811	MW17-091310	MW17-012011	MW17-042811
Sample Date		01/21/2011	04/28/2011			01/21/2011	04/28/2011		01/20/2011	04/28/2011
Analyte	**Unit**									
Metals										
Arsenic	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Petroleum Hydrocarbons										
Gasoline Range Hydrocarbons	mg/L	0.25 U	0.25 U	NA	NA	0.25 U	0.25 U	NA	0.25 U	0.25 U
Diesel Range Hydrocarbons	mg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Heavy Oil Range Hydrocarbons	mg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Semivolatile Organic Compounds										
Pentachlorophenol	µg/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Carcinogenic Polycyclic Aromatic Hydrocarbons										
Benzo(a)pyrene	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(a)anthracene	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzofluoranthenes (total)[2]	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chrysene	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibenzo(a,h)anthracene	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Summed cPAH TEQ[3,4]	µg/L	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U
Summed cPAH TEQ with One-half of the Reporting Limit[3,5]	µg/L	0.0071 U	0.0071 U	0.0071 U	0.0071 U	0.0071 U	0.0071 U	0.0071 U	0.0071 U	0.0071 U
Volatile Organic Compounds										
Tetrachloroethene	µg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Trichloroethene	µg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
cis-1,2-Dichloroethene	µg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
trans-1,2-Dichloroethene	µg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
1,2-Dichloroethane	µg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Benzene	µg/L	1 U	1 U	0.2 U	0.2 U	1 U	1 U	0.2 U	1 U	1 U
Ethylbenzene	µg/L	1 U	1 U	0.2 U	0.2 U	1 U	1 U	0.2 U	1 U	1 U
Toluene	µg/L	1 U	1 U	0.2 U	0.2 U	1 U	1 U	0.2 U	1 U	1 U
m,p-Xylene	µg/L	1 U	1 U	0.4 U	0.4 U	1 U	1 U	0.4 U	1 U	1 U
o-Xylene	µg/L	1 U	1 U	0.2 U	0.2 U	1 U	1 U	0.2 U	1 U	1 U
Dioxins/Furans										
2,3,7,8-TCDD	pg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8-PeCDD	pg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,7,8-HxCDD	pg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,6,7,8-HxCDD	pg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8,9-HxCDD	pg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,6,7,8-HpCDD	pg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total OCDD	pg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,3,7,8-TCDF	pg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8-PeCDF	pg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,3,4,7,8-PeCDF	pg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,7,8-HxCDF	pg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,3,4,6,7,8-HxCDF	pg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,7,8,9-HxCDF	pg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,6,7,8-HpCDF	pg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,6,7,8-HxCDF	pg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,7,8,9-HpCDF	pg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total OCDF	pg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Summed Dioxin/Furan TEQ[6,7]	pg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA
Summed Dioxin/Furan TEQ with One-half of the Detection Limit[6,8]	pg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

1 Results represent total, rather than dissolved, metals. Refer to Section 4.2.3 for additional information.
2 Benzofluoranthenes (total) includes both benzo(b)fluoranthene and benzo(k)fluoranthene. Both analytes have a toxic equivalency factor of 0.1; therefore, the total of the two analytes is multiplied by 0.1 when calculating the cPAH TEQ
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U Undetected.
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Port of Seattle
Lora Lake Apartments Site

Remedial Investigation/ Feasibility Study

Volume II

Appendix F
Lora Lake Apartments Parcel Remedial Investigation Data Report

Figures

FINAL

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Remedial Investigation/Feasibility Study
Port of Seattle
Lora Lake Apartments Site
Burien, Washington

Figure F.1
Vicinity Map

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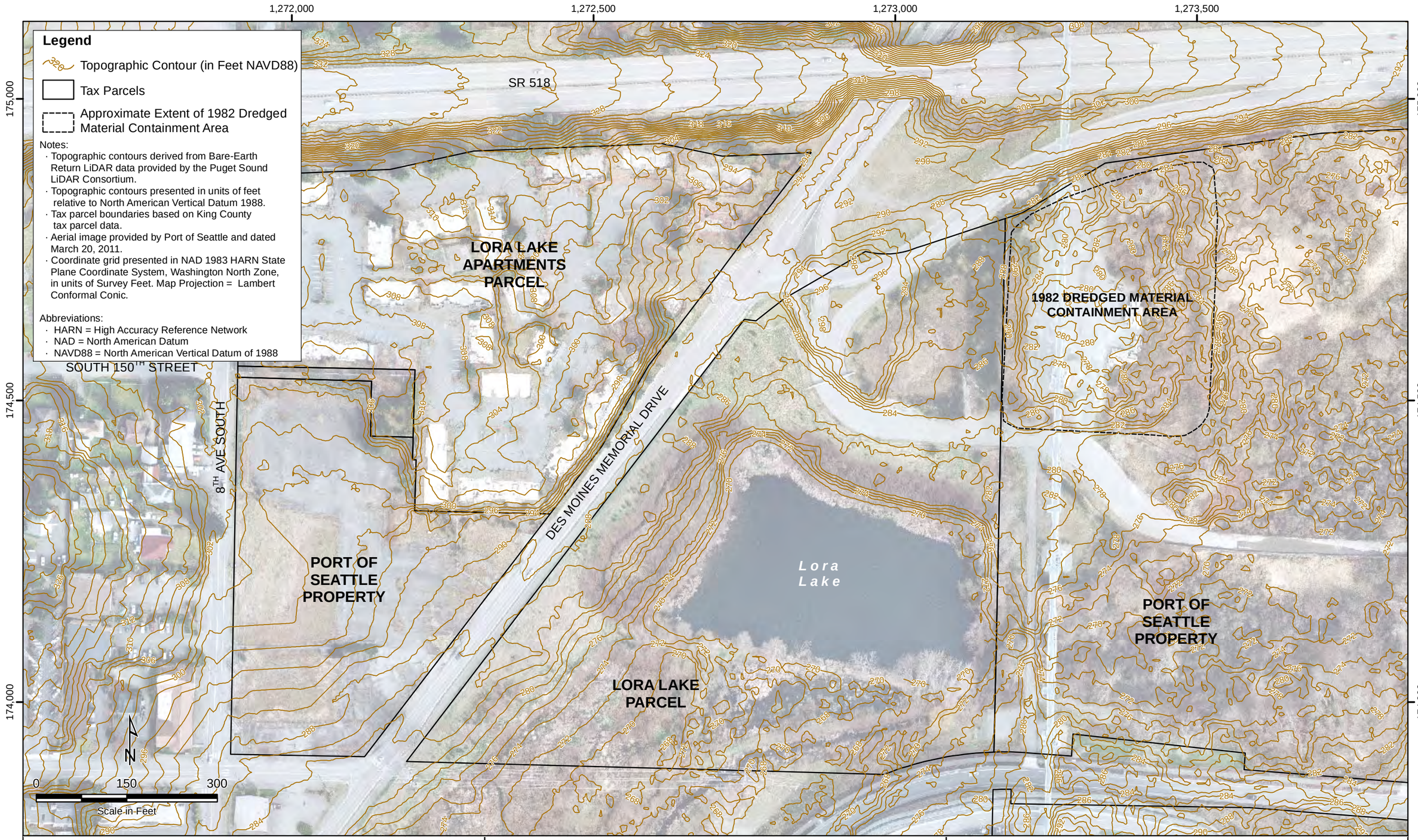
9/9/2014



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Lora Lake Apartments Site
Burien, Washington

Figure F.2
Site Topography

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Port of Seattle
Lora Lake Apartments Site
Burien, Washington

Figure F.3
2010–2011 RI Lora Lake Apartments Parcel
Soil Sampling Locations

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9/9/2014

1,272,000 1,272,500 1,273,000

175,000 174,500

Legend

- Previous Geoprobe Location (2007)
- Previous Geoprobe Location (2008)

Floyd|Snider Investigation:

- Hand Auger Location
- Primary Soil Boring Location
- Secondary Soil Boring Location
- Monitoring Well Location
- Tax Parcels

Notes:
- Tax parcel boundaries based on King County tax parcel data.
- Aerial image provided by Port of Seattle and dated March 20, 2011.
- Coordinate grid presented in NAD 1983 HARN State Plane Coordinate System, Washington North Zone, in units of Survey Feet. Map Projection = Lambert Conformal Conic.

Abbreviations:
- ft = Foot
- HARN = High Accuracy Reference Network
- mg/kg = Milligrams per kilogram
- NAD = North American Datum

Qualifier:
- J = Contaminant of concern was detected but the result is qualified.

SR 518

SOUTH 150TH STREET

8TH AVE SOUTH

DES MOINES MEMORIAL DRIVE

Lora Lake

N

0 100 200

Scale in Feet

PSB-12

Analyte	Result	Unit	Depth (ft)
Lead	11	mg/kg	0–0.5
	9	mg/kg	1.5–2
	30	mg/kg	2–4
	47	mg/kg	4–6
	4	mg/kg	8–10
	3	mg/kg	14–17

PSB-10

Analytes	Result	Unit	Depth (ft)
Arsenic	7	mg/kg	8.5–10
Lead	43	mg/kg	0–0.5
	35	mg/kg	1.5–2
	36	mg/kg	2–4
	33	mg/kg	4–6
	29	mg/kg	8.5–10
	2	mg/kg	14–15

PSB-11

Analytes	Result	Unit	Depth (ft)
Arsenic	7	mg/kg	2–4
Lead	12 J	mg/kg	0–0.5
	304 J	mg/kg	1.5–2
	2,880 J	mg/kg	2–4
	131 J	mg/kg	4–6
	162 J	mg/kg	11–13
	45 J	mg/kg	14–16

PSB-27

Analyte	Result	Unit	Depth (ft)
Lead	39 J	mg/kg	0–0.5
	152 J	mg/kg	1.5–2
	131 J	mg/kg	2–4

PSB-09A

Analytes	Result	Unit	Depth (ft)
Arsenic	8	mg/kg	0–0.5
Lead	46	mg/kg	0–0.5

PSB-09

Analyte	Result	Unit	Depth (ft)
Lead	2	mg/kg	8.5–9.5

PSB-26

Analyte	Result	Unit	Depth (ft)
Lead	123 J	mg/kg	0–2

PSB-14

Analyte	Result	Unit	Depth (ft)
Lead	17	mg/kg	0–0.5
	3	mg/kg	1.5–2
	11	mg/kg	2–4
	16	mg/kg	7–9

PSB-17

Analyte	Result	Unit	Depth (ft)
Lead	7	mg/kg	0–0.5
	7	mg/kg	1.5–2
	2	mg/kg	2–4

PSB-22

Analyte	Result	Unit	Depth (ft)
Lead	7	mg/kg	0–0.5
	7	mg/kg	1.5–2
	7	mg/kg	2–4
	5	mg/kg	4–6

MW-14

No Metals Detected

PSB-23

Analytes	Result	Unit	Depth (ft)
Arsenic	7	mg/kg	0–0.5
	8	mg/kg	1.5–2
	6	mg/kg	2–4
Lead	49	mg/kg	0–0.5
	25	mg/kg	1.5–2
	17	mg/kg	2–4
	13	mg/kg	4–6
	3	mg/kg	14–16.5

MW-13

Analyte	Result	Unit	Depth (ft)
Lead	3	mg/kg	10–11.5

PSB-24

Analytes	Result	Unit	Depth (ft)
Arsenic	9	mg/kg	0–0.5
Lead	32	mg/kg	0–0.5
	7	mg/kg	1.5–2
	4	mg/kg	2–4
	3	mg/kg	14–16

MW-12

Analyte	Result	Unit	Depth (ft)
Lead	13	mg/kg	5.5–7.5
	3	mg/kg	10–11.5

PSB-13

Analytes	Result	Unit	Depth (ft)
Arsenic	11	mg/kg	0–0.5
Lead	60	mg/kg	0–0.5
	29	mg/kg	1.5–2
	18	mg/kg	2–4
	23	mg/kg	4–6
	3	mg/kg	11–13
	5	mg/kg	14.5–16.5

PSB-21

Analytes	Result	Unit	Depth (ft)
Arsenic	8	mg/kg	0–0.5
	5	mg/kg	1.5–2
	6	mg/kg	2–4
Lead	45	mg/kg	0–0.5
	29	mg/kg	1.5–2
	26	mg/kg	2–4
	13	mg/kg	4–6
	50	mg/kg	6–7
	4	mg/kg	9–11

PSB-25

Analyte	Result	Unit	Depth (ft)
Lead	37 J	mg/kg	0–0.5
	36 J	mg/kg	1.5–2
	48 J	mg/kg	2–4

PSB-15

Analytes	Result	Unit	Depth (ft)
Arsenic	8	mg/kg	0–0.5
Lead	245 J	mg/kg	0–0.5
	21 J	mg/kg	1.5–2
	34 J	mg/kg	2–4
	43 J	mg/kg	4–6
	165 J	mg/kg	13–15

PSB-20

Analytes	Result	Unit	Depth (ft)
Arsenic	9	mg/kg	0–0.5
Lead	32	mg/kg	0–0.5
	8	mg/kg	1.5–2
	3	mg/kg	2–4
	9	mg/kg	4–6

PSB-18

Analytes	Result	Unit	Depth (ft)
Arsenic	7	mg/kg	0–0.5
	7	mg/kg	19–20
Lead	78	mg/kg	0–0.5
	3	mg/kg	1.5–2

PSB-19

Analytes	Result	Unit	Depth (ft)
Arsenic	5	mg/kg	0–1
Lead	62	mg/kg	0–1
	27	mg/kg	1–2
	5	mg/kg	2–4
	5	mg/kg	13–15

PSB-16

Analytes	Result	Unit	Depth (ft)
Arsenic	10	mg/kg	0–0.5
Lead	79	mg/kg	0–0.5
	21	mg/kg	1–2
	14	mg/kg	2–4
	13	mg/kg	4–6

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Figure F.4
Detected Concentrations of Arsenic and Lead in Lora Lake Apartments Parcel Soils

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9/9/2014

1,272,000 1,272,500 1,273,000

175,000 174,500

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- Previous Geoprobe Location (2008)

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Abbreviations:
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- HARN = High Accuracy Reference Network
- mg/kg = Milligrams per kilogram
- NAD = North American Datum
- TPH = Total petroleum hydrocarbons

Qualifier:
- J = Contaminant of concern was detected but the result is qualified.

N

0 100 200

Scale in Feet

SR 518

8TH AVE SOUTH

DES MOINES MEMORIAL DRIVE

Lora Lake

PSB-10

Analytes	Result	Unit	Depth (ft)
TPH-Diesel Range	24	mg/kg	0–0.5
	6.5	mg/kg	2–4
	12	mg/kg	4–6
TPH-Heavy Oil Range	310	mg/kg	0–0.5
	21	mg/kg	1.5–2
	42	mg/kg	2–4
	120	mg/kg	4–6
	27	mg/kg	8.5–10

PSB-12

Analytes	Result	Unit	Depth (ft)
TPH-Diesel Range	14	mg/kg	0–0.5
	6	mg/kg	2–4
	10	mg/kg	4–6
TPH-Heavy Oil Range	200	mg/kg	0–0.5
	12	mg/kg	1.5–2
	50	mg/kg	2–4
	110	mg/kg	4–6
	42	mg/kg	14–17

MW-14

No TPH Detected

PSB-22

No TPH Detected

MW-13

No TPH Detected

PSB-24

Analyte	Result	Unit	Depth (ft)
TPH-Heavy Oil Range	18	mg/kg	0–0.5

PSB-23

Analyte	Result	Unit	Depth (ft)
TPH-Heavy Oil Range	18	mg/kg	0–0.5

PSB-25

No TPH Detected

MW-12

No TPH Detected

PSB-13

Analytes	Result	Unit	Depth (ft)
TPH-Gasoline Range	3.8	mg/kg	14.5–16.5
TPH-Diesel Range	5.4	mg/kg	1.5–2
	54	mg/kg	2–4
TPH-Heavy Oil Range	32	mg/kg	0–0.5
	53	mg/kg	1.5–2
	930	mg/kg	2–4
	15	mg/kg	4–6
	30	mg/kg	11–13
	61	mg/kg	14.5–16.5

PSB-21

Analyte	Result	Unit	Depth (ft)
TPH-Heavy Oil Range	19	mg/kg	0–0.5
	20	mg/kg	1.5–2
	34	mg/kg	2–4
	50	mg/kg	6–7

PSB-15

Analytes	Result	Unit	Depth (ft)
TPH-Gasoline Range	5.5	mg/kg	2–4
TPH-Diesel Range	20	mg/kg	0–0.5
	24	mg/kg	13–15
TPH-Heavy Oil Range	120	mg/kg	0–0.5
	12	mg/kg	2–4
	17	mg/kg	4–6
	230	mg/kg	13–15

MW-15

No TPH Detected

PSB-20

Analytes	Result	Unit	Depth (ft)
TPH-Diesel Range	22	mg/kg	0–0.5
	8	mg/kg	1.5–2
TPH-Heavy Oil Range	210	mg/kg	0–0.5
	150	mg/kg	1.5–2
	13	mg/kg	4–6

PSB-16

Analytes	Result	Unit	Depth (ft)
TPH-Gasoline Range	20 J	mg/kg	0–0.5
	3.3 J	mg/kg	4–6
	3.3 J	mg/kg	13–15
TPH-Diesel Range	7.5	mg/kg	0–0.5
	110	mg/kg	1–2
	6.3	mg/kg	4–6
TPH-Heavy Oil Range	65	mg/kg	0–0.5
	890	mg/kg	1–2
	15	mg/kg	2–4
	30	mg/kg	4–6

PSB-11

Analytes	Result	Unit	Depth (ft)
TPH-Gasoline Range	150	mg/kg	1.5–2
	17	mg/kg	2–4
	8.2	mg/kg	4–6
	26	mg/kg	14–16
TPH-Diesel Range	32	mg/kg	0–0.5
	400	mg/kg	1.5–2
	440	mg/kg	2–4
	41	mg/kg	4–6
	98	mg/kg	11–13
	130	mg/kg	14–16
TPH-Heavy Oil Range	370	mg/kg	0–0.5
	1,600	mg/kg	1.5–2
	2,700	mg/kg	2–4
	170	mg/kg	4–6
	510	mg/kg	11–13
	450	mg/kg	14–16

PSB-27

Analytes	Result	Unit	Depth (ft)
TPH-Diesel Range	19	mg/kg	8–10
TPH-Heavy Oil Range	38	mg/kg	8–10

PSB-09A

Analytes	Result	Unit	Depth (ft)
TPH-Gasoline Range	8.7	mg/kg	0–0.5
TPH-Heavy Oil Range	16	mg/kg	0–0.5

PSB-09

No TPH Detected

MW-16

No TPH Detected

PSB-26

No TPH Detected

PSB-14

Analytes	Result	Unit	Depth (ft)
TPH-Diesel Range	13	mg/kg	0–0.5
	9	mg/kg	7–9
TPH-Heavy Oil Range	180	mg/kg	0–0.5
	120	mg/kg	7–9

PSB-17

Analytes	Result	Unit	Depth (ft)
TPH-Diesel Range	22	mg/kg	0–0.5
TPH-Heavy Oil Range	260	mg/kg	0–0.5
	38	mg/kg	4–6

PSB-18

Analytes	Result	Unit	Depth (ft)
TPH-Diesel Range	9.3	mg/kg	0–0.5
TPH-Heavy Oil Range	72	mg/kg	0–0.5
	20	mg/kg	19–20

MW-17

No TPH Detected

PSB-19

Analyte	Result	Unit	Depth (ft)
TPH-Heavy Oil Range	44	mg/kg	0–1
	17	mg/kg	1–2
	50	mg/kg	13–15

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Figure F.5
Detected Concentrations of TPH in Lora Lake Apartments Parcel Soils

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9/9/2014

1,272,000 1,272,500 1,273,000

175,000 174,500

Legend

- Previous Geoprobe Location (2007)
- Previous Geoprobe Location (2008)

Floyd|Snider Investigation:

- Hand Auger Location
- Primary Soil Boring Location
- Secondary Soil Boring Location
- Monitoring Well Location
- Tax Parcels

Notes:

· The TEQs for cPAHs presented on this figure were calculated using detected concentrations plus one-half the reporting limit for analytes that were not detected.
· Tax parcel boundaries based on King County tax parcel data.
· Aerial image provided by Port of Seattle and dated March 20, 2011.
· Coordinate grid presented in NAD 1983 HARN State Plane Coordinate System, Washington North Zone, in units of Survey Feet. Map Projection = Lambert Conformal Conic.

Abbreviations:

· cPAH = Carcinogenic polycyclic aromatic hydrocarbon
· ft = Foot
· HARN = High Accuracy Reference Network
· µg/kg = Micrograms per kilogram
· NAD = North American Datum
· SVOC = Semivolatile organic compound
· TEQ = Toxic equivalency quotient

Qualifier:

· J = Contaminant of concern was detected but the result is qualified.

PSB-10

Analytes	Result	Unit	Depth (ft)
cPAH TEQ	67 J	µg/kg	0–0.5
	16 J	µg/kg	2–4
	14 J	µg/kg	4–6
Pentachlorophenol	53 J	µg/kg	0–0.5
	210	µg/kg	1.5–2
	280	µg/kg	2–4
	450	µg/kg	4–6
	28	µg/kg	8.5–10

PSB-11

Analytes	Result	Unit	Depth (ft)
cPAH TEQ	42 J	µg/kg	0–0.5
	150 J	µg/kg	1.5–2
	140 J	µg/kg	2–4
	23 J	µg/kg	4–6
	59 J	µg/kg	11–13
	49	µg/kg	14–16
Pentachlorophenol	12 J	µg/kg	0–0.5
	2,400 J	µg/kg	1.5–2
	1,300	µg/kg	2–4
	210	µg/kg	4–6
	210	µg/kg	11–13
	160	µg/kg	14–16

PSB-12

Analytes	Result	Unit	Depth (ft)
cPAH TEQ	13 J	µg/kg	0–0.5
	14 J	µg/kg	4–6
Pentachlorophenol	27	µg/kg	1.5–2
	14	µg/kg	2–4
	16	µg/kg	4–6
	61	µg/kg	14–17

PSB-22
No SVOCs Detected

MW-14
No SVOCs Detected

MW-13
No SVOCs Detected

PSB-24

Analytes	Result	Unit	Depth (ft)
cPAH TEQ	14	µg/kg	0–0.5
Pentachlorophenol	14 J	µg/kg	0–0.5

PSB-23

Analytes	Result	Unit	Depth (ft)
cPAH TEQ	14 J	µg/kg	0–0.5
Pentachlorophenol	14	µg/kg	0–0.5

MW-12
No SVOCs Detected

PSB-13

Analyte	Result	Unit	Depth (ft)
Pentachlorophenol	18	µg/kg	1.5–2
	11	µg/kg	4–6

PSB-21

Analytes	Result	Unit	Depth (ft)
cPAH TEQ	14 J	µg/kg	0–0.5
	13 J	µg/kg	1.5–2
Pentachlorophenol	13	µg/kg	0–0.5
	9.1	µg/kg	1.5–2
	14	µg/kg	2–4

PSB-15

Analytes	Result	Unit	Depth (ft)
cPAH TEQ	120 J	µg/kg	0–0.5
Pentachlorophenol	480	µg/kg	0–0.5
	14 J	µg/kg	2–4
	63	µg/kg	4–6
	21	µg/kg	13–15
	67	µg/kg	17–19

MW-15
No SVOCs Detected

PSB-20

Analytes	Result	Unit	Depth (ft)
cPAH TEQ	350	µg/kg	0–0.5
	14 J	µg/kg	1.5–2
Pentachlorophenol	12	µg/kg	0–0.5
	15	µg/kg	2–4
	16	µg/kg	11.5–13.5

PSB-16

Analytes	Result	Unit	Depth (ft)
cPAH TEQ	22 J	µg/kg	0–0.5
	100 J	µg/kg	1–2
Pentachlorophenol	95	µg/kg	0–0.5
	11 J	µg/kg	2–4
	19	µg/kg	4–6

PSB-19

Analyte	Result	Unit	Depth (ft)
cPAH TEQ	45 J	µg/kg	0–1
	24 J	µg/kg	1–2
Pentachlorophenol	220	µg/kg	0–1
	21	µg/kg	1–2
	12	µg/kg	2–4

MW-17
No SVOCs Detected

PSB-09A

Analyte	Result	Unit	Depth (ft)
Pentachlorophenol	38 J	µg/kg	0–0.5
	19 J	µg/kg	1.5–2
	13 J	µg/kg	2–4

PSB-09
No SVOCs Detected

MW-16
No SVOCs Detected

PSB-14

Analytes	Result	Unit	Depth (ft)
cPAH TEQ	13 J	µg/kg	0–0.5
Pentachlorophenol	8.5 J	µg/kg	0–0.5
	11	µg/kg	1.5–2
	9	µg/kg	2–4
	9.4 J	µg/kg	7–9
	11	µg/kg	12–14

PSB-17

Analyte	Result	Unit	Depth (ft)
cPAH TEQ	14	µg/kg	0–0.5

PSB-18

Analytes	Result	Unit	Depth (ft)
cPAH TEQ	71 J	µg/kg	0–0.5
Pentachlorophenol	100	µg/kg	0–0.5

SSB-4, MW-2, PSB-3, SSB-1, PSB-5, PSB-7, LL-09, PSB-22, MW-13, PSB-24, MW-6, PSB-23, MW-14, SSB-7, SSB-10, MW-12, PSB-1, PSB-4, LL-12, PSB-10, LLP-1, LLP-7, PSB-12, SSB-9, LL-10, LLP-2, LLP-3, LLP-6, PSB-13, PSB-21, LLP-4, PSB-11, LL-01, SSB-2, PSB-27, MW-1, LLP-5, PSB-25, SSB-8, LLP-8, LLP-9, PSB-9A, PSB-9, MW-16, PSB-26, LL-11, LL-08, PSB-6, PSB-14, PSB-15, MW-15, MW-5, PSB-2, LL-07, SSB-3, SSB-5, PSB-20, MW-9, PSB-8, PSB-17, MW-17, PSB-16, MW-4, PSB-19, MW-10, PSB-18, HA-1, MW-3, HA-2, HA-3, MW-11, 8TH AVE SOUTH, DES MOINES MEMORIAL DRIVE, Lora Lake

N

0 100 200

Scale in Feet

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Figure F.6
Detected Concentrations of SVOCs in Lora Lake Apartments Parcel Soils

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9/9/2014

1,272,000 1,272,500 1,273,000

175,000 174,500

Legend

- Previous Geoprobe Location (2007)
- Previous Geoprobe Location (2008)

Floyd|Snider Investigation:

- Hand Auger Location
- Primary Soil Boring Location
- Secondary Soil Boring Location
- Monitoring Well Location
- Tax Parcels

Notes:
- Tax parcel boundaries based on King County tax parcel data.
- Aerial image provided by Port of Seattle and dated March 20, 2011.
- Coordinate grid presented in NAD 1983 HARN State Plane Coordinate System, Washington North Zone, in units of Survey Feet. Map Projection = Lambert Conformal Conic.

Abbreviations:
- ft = Foot
- HARN = High Accuracy Reference Network
- µg/kg = Micrograms per kilogram
- NAD = North American Datum
- VOC = Volatile organic compound

SR 518

SOUTH 150TH STREET

8TH AVE SOUTH

DES MOINES MEMORIAL DRIVE

Lora Lake

SSB-1 SSB-2 SSB-3 SSB-4 SSB-5 SSB-6 SSB-7 SSB-8 SSB-9 SSB-10

MW-1 MW-2 MW-3 MW-4 MW-5 MW-6 MW-7 MW-8 MW-9 MW-10 MW-11 MW-12 MW-13 MW-14 MW-15 MW-16 MW-17

PSB-1 PSB-2 PSB-3 PSB-4 PSB-5 PSB-6 PSB-7 PSB-8 PSB-9 PSB-9A PSB-10 PSB-11 PSB-12 PSB-13 PSB-14 PSB-15 PSB-16 PSB-17 PSB-18 PSB-19 PSB-20 PSB-21 PSB-22 PSB-23 PSB-24 PSB-25 PSB-26 PSB-27

LL-01 LL-07 LL-08 LL-09 LL-10 LL-11 LL-12

LLP-1 LLP-2 LLP-3 LLP-4 LLP-5 LLP-6 LLP-7 LLP-8 LLP-9

HA-1 HA-2 HA-3

PSB-10 — No VOCs Detected

PSB-12 — No VOCs Detected

PSB-22 — No VOCs Detected

MW-14 — No VOCs Detected

PSB-11

Analytes	Result	Unit	Depth (ft)
PCE	0.8	µg/kg	1.5–2
	0.6	µg/kg	14–16
TCE	0.8	µg/kg	1.5–2

MW-13 — No VOCs Detected

PSB-24 — No VOCs Detected

PSB-23 — No VOCs Detected

MW-12

Analyte	Result	Unit	Depth (ft)
PCE	0.9	µg/kg	5.5–7.5

PSB-13 — No VOCs Detected

PSB-21

Analyte	Result	Unit	Depth (ft)
Ethylbenzene	10	µg/kg	4–6
Toluene	74	µg/kg	0–0.5
	240	µg/kg	4–6
o-Xylene	19	µg/kg	0–0.5

PSB-15 — No VOCs Detected

MW-15 — No VOCs Detected

PSB-20

Analyte	Result	Unit	Depth (ft)
o-Xylene	130	µg/kg	0–0.5
	1,400	µg/kg	2–4

PSB-09A — No VOCs Detected

MW-16 — No VOCs Detected

PSB-14 — No VOCs Detected

PSB-17 — No VOCs Detected

PSB-16

Analyte	Result	Unit	Depth (ft)
Ethylbenzene	1	µg/kg	13–15
Toluene	15	µg/kg	13–15
m,p-Xylene	3.7	µg/kg	13–15
o-Xylene	1.4	µg/kg	13–15

PSB-19 — No VOCs Detected

MW-17 — No VOCs Detected

PSB-18

Analyte	Result	Unit	Depth (ft)
o-Xylene	57	µg/kg	0–0.5
	160	µg/kg	2–4
	21	µg/kg	7–9
	210	µg/kg	19–20

N

0 100 200

Scale in Feet

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Figure F.7
Detected Concentrations of VOCs in Lora Lake Apartments Parcel Soils

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9/9/2014

1,272,000 1,272,500 1,273,000

175,000 174,500

SR 518

DES MOINES MEMORIAL DRIVE

8TH AVE SOUTH

Lora Lake

PSB-10

Analyte	Result	Unit	Depth (ft)
Dioxin/Furan TEQ	473 J	pg/g	0–0.5
	402 J	pg/g	1.5–2
	803 J	pg/g	2–4
	388 J	pg/g	4–6
	108 J	pg/g	8.5–10
	0.653 J	pg/g	14–15

PSB-07

Analyte	Result	Unit	Depth (ft)
Dioxin/Furan TEQ	5.72 J	pg/g	0–0.5
	0.666 J	pg/g	1.5–2

PSB-12

Analyte	Result	Unit	Depth (ft)
Dioxin/Furan TEQ	4.86 J	pg/g	0–0.5
	13.2 J	pg/g	1.5–2
	16.5 J	pg/g	2–4
	24.5 J	pg/g	4–6
	13.6 J	pg/g	8–10
	74.1 J	pg/g	14–17

MW-13

Analyte	Result	Unit	Depth (ft)
Dioxin/Furan TEQ	26.2 J	pg/g	0–0.5
	24.8 J	pg/g	1.5–2
	1.02 J	pg/g	2–4

PSB-03

Analyte	Result	Unit	Depth (ft)
Dioxin/Furan TEQ	58.7 J	pg/g	0–0.5
	2.26 J	pg/g	1.5–2

PSB-11

Analyte	Result	Unit	Depth (ft)
Dioxin/Furan TEQ	59.5 J	pg/g	0–0.5
	21,200 J	pg/g	1.5–2
	11,700 J	pg/g	2–4
	2,490 J	pg/g	4–6
	2,140 J	pg/g	7.5–9.5
	1,800 J	pg/g	11–13
	2,050 J	pg/g	14–16

PSB-22

Analyte	Result	Unit	Depth (ft)
Dioxin/Furan TEQ	1.48 J	pg/g	0–0.5
	1.17 J	pg/g	1.5–2

PSB-24

Analyte	Result	Unit	Depth (ft)
Dioxin/Furan TEQ	16.6 J	pg/g	0–0.5
	1.14 J	pg/g	1.5–2

SSB-04

Analyte	Result	Unit	Depth (ft)
Dioxin/Furan TEQ	2.81 J	pg/g	0–0.5

PSB-05

Analyte	Result	Unit	Depth (ft)
Dioxin/Furan TEQ	8.53 J	pg/g	0–0.5
	12.8 J	pg/g	1.5–2
	0.555 J	pg/g	4–5

PSB-04

Analyte	Result	Unit	Depth (ft)
Dioxin/Furan TEQ	194 J	pg/g	0–0.5
	1.74 J	pg/g	1.5–2

MW-14

Analyte	Result	Unit	Depth (ft)
Dioxin/Furan TEQ	1.72 J	pg/g	0–0.5
	1.03 J	pg/g	1.5–2

SSB-01

Analyte	Result	Unit	Depth (ft)
Dioxin/Furan TEQ	3.93 J	pg/g	0–0.5
	6.94 J	pg/g	1.5–2

PSB-01

Analyte	Result	Unit	Depth (ft)
Dioxin/Furan TEQ	10.8 J	pg/g	0–0.5
	8.26 J	pg/g	1.5–2
	3.87 J	pg/g	2–4

PSB-23

Analyte	Result	Unit	Depth (ft)
Dioxin/Furan TEQ	7.21 J	pg/g	0–0.5
	5.01 J	pg/g	1.5–2

SSB-10

Analyte	Result	Unit	Depth (ft)
Dioxin/Furan TEQ	2.22 J	pg/g	0–0.5
	3.19 J	pg/g	1.5–2

MW-12

Analyte	Result	Unit	Depth (ft)
Dioxin/Furan TEQ	23.6 J	pg/g	0–0.5
	15.7 J	pg/g	1.5–2
	14.7 J	pg/g	2–4
	0.893 J	pg/g	4–5.5

SSB-05

Analyte	Result	Unit	Depth (ft)
Dioxin/Furan TEQ	10.5 J	pg/g	0–0.5
	0.529 J	pg/g	1.5–2

PSB-27

Analyte	Result	Unit	Depth (ft)
Dioxin/Furan TEQ	282 J	pg/g	0–0.5
	1,650 J	pg/g	1.5–2

PSB-13

Analyte	Result	Unit	Depth (ft)
Dioxin/Furan TEQ	16.6 J	pg/g	0–0.5
	187 J	pg/g	1.5–2
	52.5 J	pg/g	2–4
	50.5 J	pg/g	4–6
	2.5 J	pg/g	11–13

SSB-02

Analyte	Result	Unit	Depth (ft)
Dioxin/Furan TEQ	11.5 J	pg/g	0–0.5
	15.2 J	pg/g	1.5–2

PSB-02

Analyte	Result	Unit	Depth (ft)
Dioxin/Furan TEQ	6.94 J	pg/g	0–0.5
	21.5 J	pg/g	1.5–2
	0.299 J	pg/g	4–6

PSB-21

Analyte	Result	Unit	Depth (ft)
Dioxin/Furan TEQ	18.5 J	pg/g	0–0.5
	7.78 J	pg/g	1.5–2
	11.2 J	pg/g	2–4
	2.81 J	pg/g	4–6

SSB-03

Analyte	Result	Unit	Depth (ft)
Dioxin/Furan TEQ	6.84 J	pg/g	0–0.5
	0.239 J	pg/g	1.5–2

PSB-09A

Analyte	Result	Unit	Depth (ft)
Dioxin/Furan TEQ	11.6 J	pg/g	0–0.5
	1.22 J	pg/g	1.5–2
	0.754 J	pg/g	2–4

PSB-15

Analyte	Result	Unit	Depth (ft)
Dioxin/Furan TEQ	2,260 J	pg/g	0–0.5
	12.1 J	pg/g	1.5–2
	52.4 J	pg/g	2–4
	328 J	pg/g	4–6
	134 J	pg/g	13–15
	1.49 J	pg/g	17–19

PSB-06

Analyte	Result	Unit	Depth (ft)
Dioxin/Furan TEQ	96.3 J	pg/g	0–0.5
	702 J	pg/g	1.5–2
	0.937 J	pg/g	2–4
	0.716 J	pg/g	4–6

PSB-08

Analyte	Result	Unit	Depth (ft)
Dioxin/Furan TEQ	0.984 J	pg/g	0–0.5
	0.602 J	pg/g	1.5–2

PSB-20

Analyte	Result	Unit	Depth (ft)
Dioxin/Furan TEQ	31 J	pg/g	0–0.5
	5.21 J	pg/g	1.5–2
	3.17 J	pg/g	2–4

PSB-17

Analyte	Result	Unit	Depth (ft)
Dioxin/Furan TEQ	7.93 J	pg/g	0–0.5
	1.23 J	pg/g	1.5–2
	0.919 J	pg/g	2–4
	0.708 J	pg/g	4–6
	0.732 J	pg/g	10–13

PSB-16

Analyte	Result	Unit	Depth (ft)
Dioxin/Furan TEQ	205 J	pg/g	0–0.5
	13.2 J	pg/g	1–2
	16.6 J	pg/g	2–4
	33.3 J	pg/g	4–6
	0.467 J	pg/g	13–15

PSB-14

Analyte	Result	Unit	Depth (ft)
Dioxin/Furan TEQ	132 J	pg/g	0–0.5
	38.4 J	pg/g	1.5–2
	41.7 J	pg/g	2–4
	87.4 J	pg/g	4–7
	81.3 J	pg/g	7–9
	31.1 J	pg/g	12–14

LLA-HA1

Analyte	Result	Unit	Depth (ft)
Dioxin/Furan TEQ	0.369 J	pg/g	0–0.5
	3.15 J	pg/g	1.5–2

PSB-19

Analyte	Result	Unit	Depth (ft)
Dioxin/Furan TEQ	135 J	pg/g	0–1
	16.1 J	pg/g	1–2
	2.19 J	pg/g	2–4

LLA-HA3

Analyte	Result	Unit	Depth (ft)
Dioxin/Furan TEQ	17.7 J	pg/g	0–0.5
	0.655 J	pg/g	1.5–2

LLA-HA2

Analyte	Result	Unit	Depth (ft)
Dioxin/Furan TEQ	107 J	pg/g	0–0.5
	2.37 J	pg/g	1.5–2

PSB-18

Analyte	Result	Unit	Depth (ft)
Dioxin/Furan TEQ	209 J	pg/g	0–0.5
	0.589 J	pg/g	1.5–2
	0.488 J	pg/g	2–4

Legend

- Previous Geoprobe Location (2007)
- Previous Geoprobe Location (2008)

Floyd|Snider Investigation:

- Hand Auger Location
- Primary Soil Boring Location
- Secondary Soil Boring Location
- Monitoring Well Location
- Tax Parcels

Qualifier:
- J = Contaminant of concern was detected but the result is qualified.

Notes:
- The TEQs for dioxins/furans presented on this figure were calculated using detected concentrations plus one-half the detection limit for analytes that were not detected.
- Tax parcel boundaries based on King County tax parcel data.
- Aerial image provided by Port of Seattle and dated March 20, 2011.
- Coordinate grid presented in NAD 1983 HARN State Plane Coordinate System, Washington North Zone, in units of Survey Feet. Map Projection = Lambert Conformal Conic.

Abbreviations:
- ft = Foot
- HARN = High Accuracy Reference Network
- NAD = North American Datum
- pg/g = Picograms per gram
- TEQ = Toxic equivalency quotient

N

0 100 200

Scale in Feet

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Figure F.8
Detected Concentrations of Dioxins/Furans in Lora Lake Apartments Parcel Soils

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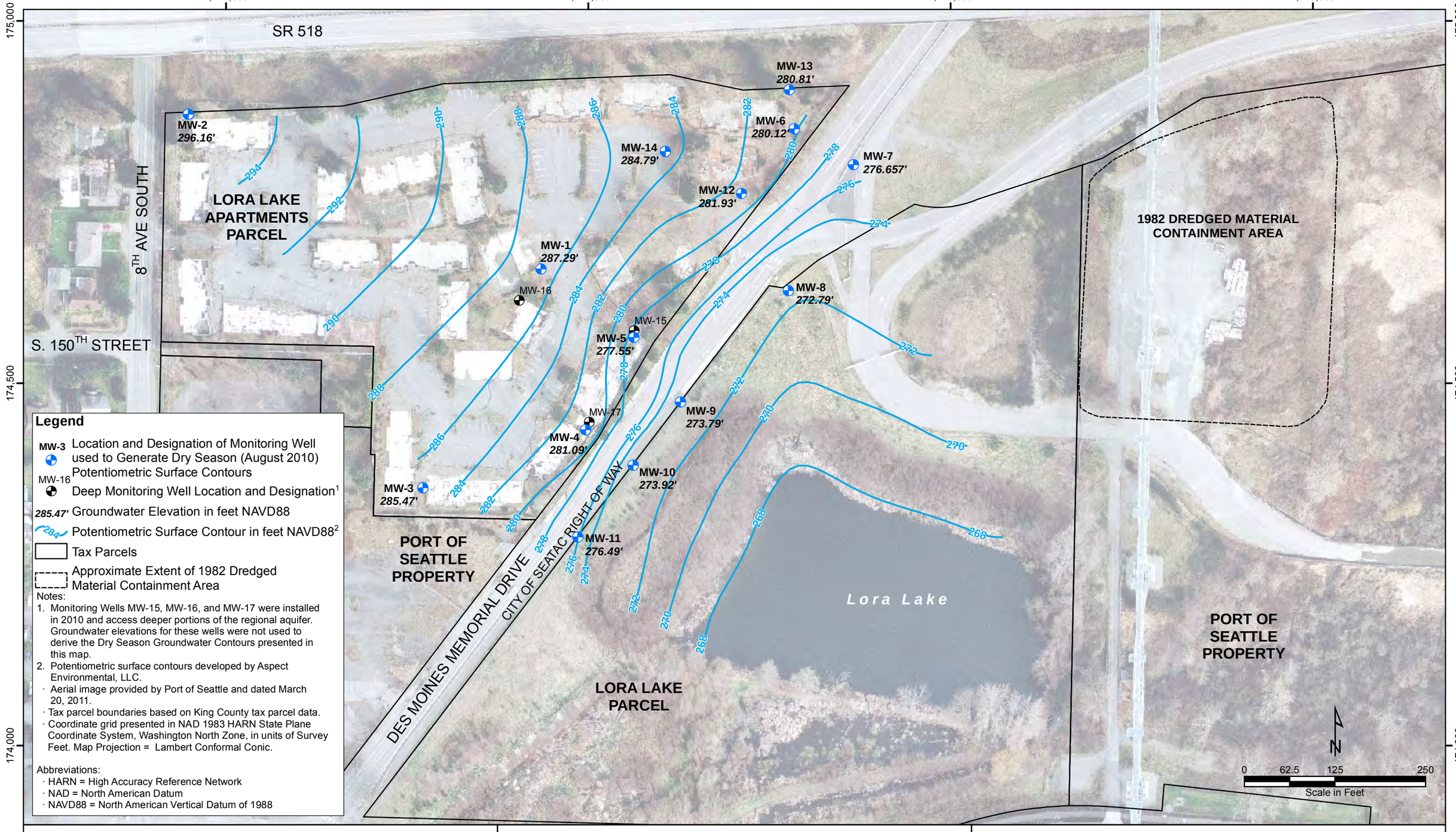
9/9/2014



Legend

- MW-3 — Location and Designation of Monitoring Well used to Generate Dry Season (August 2010) Potentiometric Surface Contours
- MW-16 — Deep Monitoring Well Location and Designation[1]
- 285.47' — Groundwater Elevation in feet NAVD88
- 284 — Potentiometric Surface Contour in feet NAVD88[2]
- Tax Parcels
- Approximate Extent of 1982 Dredged Material Containment Area

Notes:

1. Monitoring Wells MW-15, MW-16, and MW-17 were installed in 2010 and access deeper portions of the regional aquifer. Groundwater elevations for these wells were not used to derive the Dry Season Groundwater Contours presented in this map.
2. Potentiometric surface contours developed by Aspect Environmental, LLC.

· Aerial image provided by Port of Seattle and dated March 20, 2011.
· Tax parcel boundaries based on King County tax parcel data.
· Coordinate grid presented in NAD 1983 HARN State Plane Coordinate System, Washington North Zone, in units of Survey Feet. Map Projection = Lambert Conformal Conic.

Abbreviations:

· HARN = High Accuracy Reference Network
· NAD = North American Datum
· NAVD88 = North American Vertical Datum of 1988

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Figure F.9
Groundwater Potentiometric Surface Map—Dry Season

I:\GIS\Projects\POS_LLA\MXD\T6030\Figure F.9 Groundwater Elevation Map - Dry Season.mxd
9/9/2014

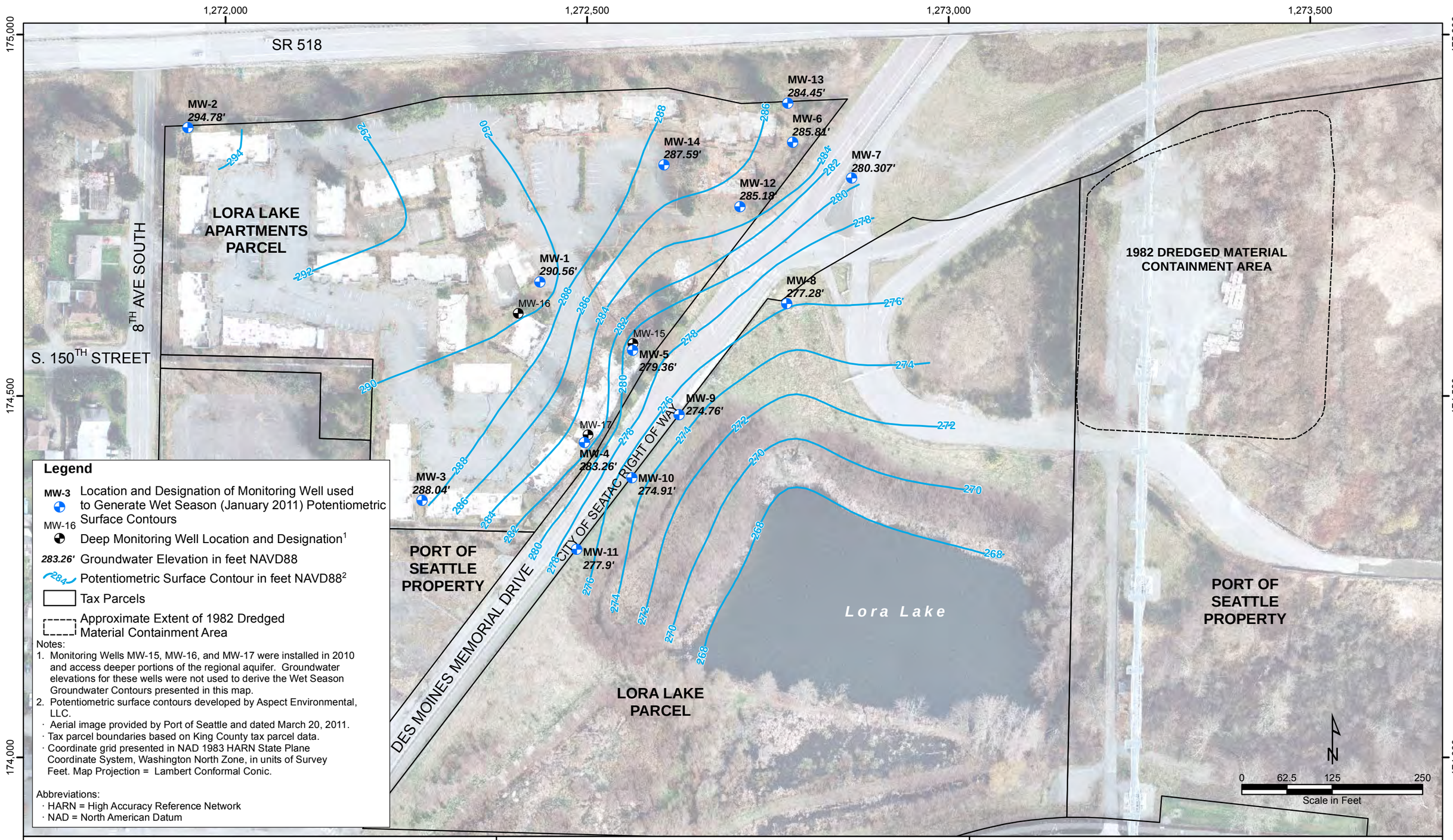

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Figure F.10
Groundwater Potentiometric Surface Map—Wet Season

I:\GIS\Projects\POS_LLA\MXD\T6030\Appendix F\Figure F.10 Groundwater Elevation Map - Wet Season.mxd
9/9/2014

1,272,000 1,272,500 1,273,000

175,000 174,500

Legend

- Previous Geoprobe Location (2007)
- Previous Geoprobe Location (2008)

Floyd|Snider Investigation:

- Hand Auger Location
- Primary Soil Boring Location
- Secondary Soil Boring Location
- Monitoring Well Location
- Tax Parcels

Notes:

1. Results for location MW-1 represent total, rather than dissolved, arsenic. Refer to Section 4.2.3 for additional information.
· Tax parcel boundaries based on King County tax parcel data.
· Aerial image provided by Port of Seattle and dated March 20, 2011.
· Coordinate grid presented in NAD 1983 HARN State Plane Coordinate System, Washington North Zone, in units of Survey Feet. Map Projection = Lambert Conformal Conic.

Abbreviations:
· HARN = High Accuracy Reference Network
· µg/L = Micrograms per liter
· NAD = North American Datum

SR 518

SOUTH 150TH STREET

8TH AVE SOUTH

DES MOINES MEMORIAL DRIVE

Lora Lake

SSB-1 SSB-2 SSB-3 SSB-4 SSB-5 SSB-6 SSB-7 SSB-8 SSB-9 SSB-10

MW-1 MW-2 MW-3 MW-4 MW-5 MW-6 MW-7 MW-8 MW-9 MW-10 MW-11 MW-12 MW-13 MW-14 MW-16 MW-17

PSB-1 PSB-2 PSB-3 PSB-4 PSB-5 PSB-6 PSB-7 PSB-8 PSB-9 PSB-9A PSB-10 PSB-11 PSB-12 PSB-13 PSB-14 PSB-15 PSB-16 PSB-17 PSB-18 PSB-19 PSB-20 PSB-21 PSB-22 PSB-23 PSB-24 PSB-25 PSB-26 PSB-27

LL-01 LL-07 LL-08 LL-09 LL-10 LL-11 LL-12

LLP-1 LLP-2 LLP-3 LLP-4 LLP-5 LLP-6 LLP-7 LLP-8 LLP-9

HA-1 HA-2 HA-3

MW-2

No Metals Detected

MW-14

Analyte	Sample Event	Result	Unit
Arsenic	Summer 2010	0.4	µg/L
	Winter 2011	0.4	µg/L
	Spring 2011	0.4	µg/L

MW-13

Analyte	Sample Event	Result	Unit
Arsenic	Summer 2010	0.3	µg/L
	Winter 2011	0.3	µg/L
	Spring 2011	0.2	µg/L

MW-6

Analyte	Sample Event	Result	Unit
Arsenic	Winter 2011	0.6	µg/L
	Spring 2011	0.4	µg/L

MW-7

Analyte	Sample Event	Result	Unit
Arsenic	Summer 2010	0.3	µg/L
	Winter 2011	0.9	µg/L
	Spring 2011	0.5	µg/L

MW-12

Analyte	Sample Event	Result	Unit
Arsenic	Summer 2010	0.5	µg/L
	Winter 2011	0.4	µg/L
	Spring 2011	0.4	µg/L

MW-8

Analyte	Sample Event	Result	Unit
Arsenic	Summer 2010	0.6	µg/L
	Winter 2011	0.6	µg/L
	Spring 2011	0.5	µg/L

MW-5

Analyte	Sample Event	Result	Unit
Arsenic	Summer 2010	3	µg/L
	Winter 2011	5.4	µg/L
	Spring 2011	4.6	µg/L

MW-9

Analyte	Sample Event	Result	Unit
Arsenic	Summer 2010	0.3	µg/L
	Winter 2011	0.3	µg/L
	Spring 2011	0.2	µg/L

MW-10

Analyte	Sample Event	Result	Unit
Arsenic	Summer 2010	0.6	µg/L
	Winter 2011	0.6	µg/L
	Spring 2011	0.6	µg/L

MW-4

Analyte	Sample Event	Result	Unit
Arsenic	Summer 2010	0.4	µg/L
	Winter 2011	0.9	µg/L
	Spring 2011	0.4	µg/L

MW-11

No Metals Detected

MW-1[1]

Analyte	Sample Event	Result	Unit
Arsenic	Summer 2010	5.6	µg/L
	Winter 2011	11.9	µg/L
	Spring 2011	14.2	µg/L

MW-3

Analyte	Sample Event	Result	Unit
Arsenic	Summer 2010	0.4	µg/L
	Winter 2011	0.5	µg/L
	Spring 2011	0.4	µg/L

N

0 100 200

Scale in Feet

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Figure F.11
Detected Concentrations of Arsenic in
Lora Lake Apartments Parcel Groundwater

I:\GIS\Projects\POS_LLA\MXD\T6030\Appendix F\Figure F.11 Detected Conc of Arsenic in LLA GW.mxd
9/9/2014

1,272,000 1,272,500 1,273,000

175,000 174,500

Legend

- Previous Geoprobe Location (2007)
- Previous Geoprobe Location (2008)

Floyd|Snider Investigation:

- Hand Auger Location
- Primary Soil Boring Location
- Secondary Soil Boring Location
- Monitoring Well Location
- Tax Parcels

Notes:
- Tax parcel boundaries based on King County tax parcel data.
- Aerial image provided by Port of Seattle and dated March 20, 2011.
- Coordinate grid presented in NAD 1983 HARN State Plane Coordinate System, Washington North Zone, in units of Survey Feet.
  Map Projection = Lambert Conformal Conic.

Abbreviations:
- HARN = High Accuracy Reference Network
- mg/L = Milligrams per liter
- NAD = North American Datum
- TPH = Total petroleum hydrocarbons

SR 518

SOUTH 150TH STREET

8TH AVE SOUTH

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Lora Lake

MW-1

Analyte	Sample Event	Result	Unit
TPH-Gasoline range	Winter 2011	0.46	mg/L
	Spring 2011	0.4	mg/L
TPH-Diesel range	Winter 2011	0.18	mg/L
TPH-Heavy oil range	Winter 2011	0.53	mg/L

MW-6

Analyte	Sample Event	Result	Unit
TPH-Diesel range	Spring 2011	0.18	mg/L

MW-2: No TPH Detected
MW-3: No TPH Detected
MW-4: No TPH Detected
MW-5: No TPH Detected
MW-7: No TPH Detected
MW-8: No TPH Detected
MW-9: No TPH Detected
MW-10: No TPH Detected
MW-11: No TPH Detected
MW-12: No TPH Detected
MW-13: No TPH Detected
MW-14: No TPH Detected
MW-15: No TPH Detected
MW-16: No TPH Detected

N

0 100 200

Scale in Feet

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Burien, Washington

Figure F.12
Detected Concentrations of TPH in
Lora Lake Apartments Parcel Groundwater

I:\GIS\Projects\POS_LLA\MXD\T6030\Appendix F\Figure F.12 Detected Conc of TPH in LLA Gw.mxd
9/9/2014

1,272,000 1,272,500 1,273,000

175,000 174,500

SR 518

8TH AVE SOUTH

DES MOINES MEMORIAL DRIVE

Lora Lake

Legend

- Previous Geoprobe Location (2007)
- Previous Geoprobe Location (2008)

Floyd|Snider Investigation:

- Hand Auger Location
- Primary Soil Boring Location
- Secondary Soil Boring Location
- Monitoring Well Location
- Tax Parcels

Notes:

- The TEQs for cPAHs presented on this figure were calculated using detected concentrations plus one-half the reporting limit for analytes that were not detected.
- Tax parcel boundaries based on King County tax parcel data.
- Aerial image provided by Port of Seattle and dated March 20, 2011.
- Coordinate grid presented in NAD 1983 HARN State Plane Coordinate System, Washington North Zone, in units of Survey Feet. Map Projection = Lambert Conformal Conic.

Abbreviations:

- cPAH = Carcinogenic polycyclic aromatic hydrocarbon
- HARN = High Accuracy Reference Network
- µg/L = Micrograms per liter
- NAD = North American Datum
- SVOC = Semivolatile organic compound
- TEQ = Toxic equivalency quotient

Qualifier:

- J = Contaminant of concern was detected but the result is qualified.

MW-1

Analyte	Sample Event	Result	Unit
cPAH TEQ	Winter 2011	0.028	µg/L
	Spring 2011	0.011 J	µg/L
Pentachlorophenol	Winter 2011	0.76	µg/L
	Spring 2011	0.42	µg/L

MW-2: No SVOCs Detected

MW-3: No SVOCs Detected

MW-4: No SVOCs Detected

MW-5

Analyte	Sample Event	Result	Unit
Pentachlorophenol	Summer 2010	0.76	µg/L
	Winter 2011	1.4	µg/L
	Spring 2011	1.4	µg/L

MW-6: No SVOCs Detected

MW-7: No SVOCs Detected

MW-8: No SVOCs Detected

MW-9

Analyte	Sample Event	Result	Unit
Pentachlorophenol	Summer 2010	0.47	µg/L
	Winter 2011	0.29	µg/L
	Spring 2011	0.31	µg/L

MW-10: No SVOCs Detected

MW-11: No SVOCs Detected

MW-12: No SVOCs Detected

MW-13: No SVOCs Detected

MW-14: No SVOCs Detected

MW-15: No SVOCs Detected

MW-16: No SVOCs Detected

MW-17: No SVOCs Detected

0 100 200

Scale in Feet

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Burien, Washington

Figure F.13
Detected Concentrations of SVOCs in
Lora Lake Apartments Parcel Groundwater

I:\GIS\Projects\POS_LLA\MXD\T6030\Appendix F\Figure F.13 Detected Conc of SVOCs in LLA Gw.mxd
9/9/2014

1,272,000 1,272,500 1,273,000

175,000 174,500

Legend

- Previous Geoprobe Location (2007)
- Previous Geoprobe Location (2008)

Floyd|Snider Investigation:

- Hand Auger Location
- Primary Soil Boring Location
- Secondary Soil Boring Location
- Monitoring Well Location
- Tax Parcels

Notes:

· Tax parcel boundaries based on King County tax parcel data.
· Aerial image provided by Port of Seattle and dated March 20, 2011.
· Coordinate grid presented in NAD 1983 HARN State Plane Coordinate System, Washington North Zone, in units of Survey Feet. Map Projection = Lambert Conformal Conic.

Abbreviations:

· DCA = Dichloroethane
· DCE = Dichloroethene
· HARN = High Accuracy Reference Network
· µg/L = Micrograms per liter
· NAD = North American Datum
· PCE = Tetrachloroethene
· TCE = Trichloroethene
· VOC = Volatile organic compound

SR 518

SOUTH 150TH STREET

8TH AVE SOUTH

DES MOINES MEMORIAL DRIVE

Lora Lake

N

0 100 200

Scale in Feet

MW-2, MW-3, MW-4, MW-5, MW-6, MW-7, MW-8, MW-9, MW-10, MW-11, MW-12, MW-13, MW-14, MW-15, MW-16, MW-17, HA-1, HA-2, HA-3, SSB-1, SSB-2, SSB-3, SSB-4, SSB-5, SSB-6, SSB-7, SSB-8, SSB-9, SSB-10, PSB-1, PSB-2, PSB-3, PSB-4, PSB-5, PSB-6, PSB-7, PSB-8, PSB-9, PSB-9A, PSB-10, PSB-11, PSB-12, PSB-13, PSB-14, PSB-15, PSB-16, PSB-17, PSB-18, PSB-19, PSB-20, PSB-21, PSB-22, PSB-23, PSB-24, PSB-25, PSB-26, PSB-27, LL-01, LL-07, LL-08, LL-09, LL-10, LL-11, LL-12, LLP-1, LLP-2, LLP-3, LLP-4, LLP-5, LLP-6, LLP-7, LLP-8, LLP-9

MW-1

Analyte	Sample Event	Result	Unit
PCE	Winter 2011	0.025	µg/L
TCE	Summer 2010	0.17	µg/L
	Winter 2011	0.12	µg/L
	Spring 2011	0.12	µg/L
cis-1,2-DCE	Summer 2010	0.2	µg/L
	Winter 2011	0.26	µg/L
	Spring 2011	0.16	µg/L
trans-1,2-DCE	Summer 2010	0.11	µg/L
	Winter 2011	0.059	µg/L
	Spring 2011	0.042	µg/L
1,2-DCA	Summer 2010	0.038	µg/L
	Winter 2011	0.037	µg/L
	Spring 2011	0.028	µg/L
Ethylbenzene	Winter 2011	3.1	µg/L
	Spring 2011	2.5	µg/L
m,p-Xylene	Winter 2011	5.6	µg/L
	Spring 2011	1.8	µg/L
o-Xylene	Winter 2011	9.2	µg/L

MW-5

Analyte	Sample Event	Result	Unit
cis-1,2-DCE	Summer 2010	0.028	µg/L
1,2-DCA	Summer 2010	0.07	µg/L

MW-6

Analyte	Sample Event	Result	Unit
Ethylbenzene	Spring 2011	1.1	µg/L

MW-13

Analyte	Sample Event	Result	Unit
PCE	Summer 2010	0.035	µg/L
	Spring 2011	0.025	µg/L

MW-16: No VOCs Detected
MW-2: No VOCs Detected
MW-14: No VOCs Detected
MW-7: No VOCs Detected
MW-12: No VOCs Detected
MW-8: No VOCs Detected
MW-15: No VOCs Detected
MW-9: No VOCs Detected
MW-10: No VOCs Detected
MW-17: No VOCs Detected
MW-4: No VOCs Detected
MW-3: No VOCs Detected
MW-11: No VOCs Detected

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Figure F.14
Detected Concentrations of VOCs in
Lora Lake Apartments Parcel Groundwater

I:\GIS\Projects\POS_LLA\MXD\T6030\Appendix F\Figure F.14 Detected Conc of VOCs in LLA Gw.mxd
9/9/2014

1,272,000 1,272,500 1,273,000

175,000 174,500

Legend

- Previous Geoprobe Location (2007)
- Previous Geoprobe Location (2008)

Floyd|Snider Investigation:

- Hand Auger Location
- Primary Soil Boring Location
- Secondary Soil Boring Location
- Monitoring Well Location
- Tax Parcels

Notes:

· The TEQ for dioxins/furans presented on this figure were calculated using detected concentrations plus one-half the detection limit for analytes that were not detected.
· Tax parcel boundaries based on King County tax parcel data.
· Aerial image provided by Port of Seattle and dated March 20, 2011.
· Coordinate grid presented in NAD 1983 HARN State Plane Coordinate System, Washington North Zone, in units of Survey Feet.
Map Projection = Lambert Conformal Conic.

Abbreviations:

· HARN = High Accuracy Reference Network
· NAD = North American Datum
· pg/L = Picograms per liter
· TEQ = Toxic equivalency quotient

Qualifier:

· J = Contaminant of concern was detected but the result is qualified.

SR 518

8TH AVE SOUTH

DES MOINES MEMORIAL DRIVE

Lora Lake

N

0 100 200

Scale in Feet

MW-2

Analyte	Sample Event	Result	Unit
Dioxin/Furan TEQ	Winter 2011	5.86 J	pg/L
	Spring 2011	1.89 J	pg/L

MW-14

No Dioxins/Furans Detected

MW-13

Analyte	Sample Event	Result	Unit
Dioxin/Furan TEQ	Spring 2011	2.58 J	pg/L

MW-6

Analyte	Sample Event	Result	Unit
Dioxin/Furan TEQ	Spring 2011	1.6 J	pg/L

MW-7

Analyte	Sample Event	Result	Unit
Dioxin/Furan TEQ	Winter 2011	2.69 J	pg/L

MW-12

Analyte	Sample Event	Result	Unit
Dioxin/Furan TEQ	Summer 2010	3.02 J	pg/L
	Winter 2011	2.05 J	pg/L

MW-8

Analyte	Sample Event	Result	Unit
Dioxin/Furan TEQ	Winter 2011	2.44 J	pg/L
	Spring 2011	2.00 J	pg/L

MW-5

Analyte	Sample Event	Result	Unit
Dioxin/Furan TEQ	Summer 2010	3.72	pg/L
	Winter 2011	3.01 J	pg/L
	Spring 2011	2.38 J	pg/L

MW-1

Analyte	Sample Event	Result	Unit
Dioxin/Furan TEQ	Summer 2010	18.8 J	pg/L
	Winter 2011	38.3 J	pg/L
	Spring 2011	24.2 J	pg/L

MW-9

Analyte	Sample Event	Result	Unit
Dioxin/Furan TEQ	Summer 2010	3.02 J	pg/L
	Winter 2011	3.28 J	pg/L
	Spring 2011	2.14 J	pg/L

MW-10

Analyte	Sample Event	Result	Unit
Dioxin/Furan TEQ	Winter 2011	2.91 J	pg/L

MW-3

Analyte	Sample Event	Result	Unit
Dioxin/Furan TEQ	Winter 2011	2.94 J	pg/L

MW-4

Analyte	Sample Event	Result	Unit
Dioxin/Furan TEQ	Winter 2011	2.54 J	pg/L
	Spring 2011	1.73 J	pg/L

MW-11

Analyte	Sample Event	Result	Unit
Dioxin/Furan TEQ	Winter 2011	3.7 J	pg/L

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Figure F.15
Detected Concentrations of Dioxins/Furans in Lora Lake Apartments Parcel Groundwater

I:\GIS\Projects\POS_LLA\MXD\T6030\Appendix F\Figure F.15 Detected Conc of Dioxin-Furans in LLA Gw.mxd
9/15/2014

Port of Seattle
Lora Lake Apartments Site

Remedial Investigation/ Feasibility Study

Volume II

Appendix F
Lora Lake Apartments Parcel Remedial Investigation Data Report

Attachment F.1
Boring Logs

FINAL

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Boring ID: PSB-1

Drill Date: July 29, 2010
Logged By: Megan McCullough
Drilled By: Cascade Drilling
Drill Type: L.A. Direct Push Geoprobe
Sample Method: direct push 2"x5' core
Boring Diameter: 2 inches
Boring Depth (ft bgs): 6 ft
Groundwater ATD (ft bgs): NA

Coordinate System: NGVD29/NAD83
Ground Surface Elevation: 298.91 ft
Latitude/Northing: 174735.4544 ft
Longitude/Easting: 1271918.92 ft
Boring Location: Western property line

Client: Port of Seattle
Project: POS-LLA
Task: T 4010
Address: Lora Lake Apts Parcel
15001 Des Moines Memorial Dr.

Remarks: Multiple penetrations at this location to obtain soil volume required for analysis

PID (ppm)	SHEEN	SAMPLE ID	DRIVEN / RECOVERED	DEPTH FT BGS	USCS SYMBOL	SOIL DESCRIPTION AND OBSERVATIONS (color, texture, moisture, MAJOR CONSITIUENT, odor, staining, sheen, debris, etc.)
0.7	no sheen	PSB01-0-0.5-072910		0	SM	light brown, dry, fine SILTY SAND with small gravel (rounded), loose, no odor
		PSB01-1.5-2-072910		1		
				2		
		PSB01-2-4-072910		3		color darkens, moist
				4		silt content lessens with depth
0.4	no sheen	PSB01-4-6-072910		5		
				6		

Notes:
FT BGS = feet below ground surface
ppm = parts per million
--- Dashed contact line in soil description indicates a gradational contact
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Boring ID: PSB-2

Drill Date: July 29, 2010
Logged By: Megan McCullough
Drilled By: Cascade Drilling
Drill Type: L.A. Direct Push Geoprobe
Sample Method: direct push 2"x5' core
Boring Diameter: 2 inches
Boring Depth (ft bgs): 6 ft
Groundwater ATD (ft bgs): NA

Client: Port of Seattle
Project: POS-LLA
Task: T 4010
Address: Lora Lake Apts Parcel
15001 Des Moines Memorial Dr.

Coordinate System:
Ground Surface Elevation: 299.88 ft
Latitude/Northing: 174568.992 ft
Longitude/Easting: 1271929.648 ft
Boring Location: Southwestern property line

Remarks: Multiple penetrations at this location to obtain soil volume required for analysis

PID (ppm)	SHEEN	SAMPLE ID	DRIVEN / RECOVERED	DEPTH FT BGS	USCS SYMBOL	SOIL DESCRIPTION AND OBSERVATIONS (color, texture, moisture, MAJOR CONSITIUENT, odor, staining, sheen, debris, etc.)
0.2	no sheen	PSB02-0-0.5-072910		0	SM	light brown, dry, fine SILTY SAND with small gravel (<10%), loose, no odor, small rootlets
		PSB02-1.5-2-029010		1		
				2		
		PSB02-2-4-072910		3		color grades to dark brown
				4		color grades to medium brown silt content lessens with depth
0.3	no sheen					
		PSB02-4-6-072910		5	SP	fine to medium SAND
				6		

Notes:
FT BGS = feet below ground surface
ppm = parts per million
--- Dashed contact line in soil description indicates a gradational contact
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Boring ID: PSB-3

Drill Date: July 29, 2010
Logged By: Megan McCullough
Drilled By: Cascade Drilling
Drill Type: L.A. Direct Push Geoprobe
Sample Method: direct push 2"x5' core
Boring Diameter: 2 inches
Boring Depth (ft bgs): 6 ft
Groundwater ATD (ft bgs): NA

Coordinate System: NGVD29/NAD83
Ground Surface Elevation: 301.77 ft
Latitude/Northing: 174875.0605 ft
Longitude/Easting: 1272061.492 ft
Boring Location: Northwestern property line

Client: Port of Seattle
Project: POS-LLA
Task: T 4010
Address: Lora Lake Apts Parcel
15001 Des Moines Memorial Dr.

Remarks: Multiple penetrations at this location to obtain soil volume required for analysis

PID (ppm)	SHEEN	SAMPLE ID	DRIVEN / RECOVERED	DEPTH FT BGS	USCS SYMBOL	SOIL DESCRIPTION AND OBSERVATIONS (color, texture, moisture, MAJOR CONSITIUENT, odor, staining, sheen, debris, etc.)
		PSB03--0-0.5-072910		0	SM	light brown, dry fine SILTY SAND, trace gravel, no odor
0.3	no sheen			1	SP	grades to light brown medium SAND with trace silt
		PSB03--1.5-2-072910		2	SM	dark brown, moist, fine SILTY SAND, no odor color grades to medium brown
		PSB03--2-4-072910		3	SW	light brown/gray, moist, fine to medium SAND with trace gravel, no odor
0.4	no sheen			4		
		PSB03--4-6-072910		5		
				6		

Notes:
FT BGS = feet below ground surface
ppm = parts per million
--- Dashed contact line in soil description indicates a gradational contact
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Boring ID: PSB-4

Drill Date: July 28, 2010
Logged By: Megan McCullough
Drilled By: Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: direct push 2"x5' core
Boring Diameter: 2 inches
Boring Depth (ft bgs): 6 ft
Groundwater ATD (ft bgs): NA

Coordinate System: NGVD29/NAD83
Ground Surface Elevation: 301.68 ft
Latitude/Northing: 174735.2208 ft
Longitude/Easting: 1272077.26 dt
Boring Location: Near western former carport

Client: Port of Seattle
Project: POS-LLA
Task: T 4010
Address: Lora Lake Apts Parcel 15001 Des Moines Memorial Dr.

Remarks: Multiple penetrations at this location to obtain soil volume required for analysis.

PID (ppm)	SHEEN	SAMPLE ID	DRIVEN / RECOVERED	DEPTH FT BGS	USCS SYMBOL	SOIL DESCRIPTION AND OBSERVATIONS (color, texture, moisture, MAJOR CONSITIUENT, odor, staining, sheen, debris, etc.)
4.5	no sheen	PSB04-0-0.5-072810		0	SM	medium brown, dry to moist SILTY SAND with gravel (rounded and angular), no odor
5.3	no sheen			1	GP	2 inch band of GRAVEL
					SM	
		PSB04-1.5-2-072810		2	CL	2 inch band of light brown CLAY
3.4	no sheen				SM	
		PSB04-2-4-072810		3	SW-SM	dark brown to reddish, moist, fine to medium SAND with SILT, trace small gravel (rounded), no odor
2.3	no sheen					silt content lessens with depth
4.4	no sheen	PSB04-4-6-072810		4		
3.3	no sheen			5		color grades to dark brown
				6		

Notes:
FT BGS = feet below ground surface
ppm = parts per million
--- Dashed contact line in soil description indicates a gradational contact
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Boring ID: PSB-5

Drill Date: July 28, 2010
Logged By: Megan McCullough
Drilled By: Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: direct push 2"x5' core
Boring Diameter: 2 inches
Boring Depth (ft bgs): 6 ft
Groundwater ATD (ft bgs): NA

Coordinate System: NGVD29/NAD83
Ground Surface Elevation: 305.21 ft
Latitude/Northing: 174833.7833 ft
Longitude/Easting: 1272189.871 f
Boring Location: North of former Bldg S

Client: Port of Seattle
Project: POS-LLA
Task: T 4010
Address: Lora Lake Apts Parcel
15001 Des Moines Memorial Dr.

Remarks: Multiple penetrations at this location to obtain soil volume required for analysis

PID (ppm)	SHEEN	SAMPLE ID	DRIVEN / RECOVERED	DEPTH FT BGS	USCS SYMBOL	SOIL DESCRIPTION AND OBSERVATIONS (color, texture, moisture, MAJOR CONSITIUENT, odor, staining, sheen, debris, etc.)
0.9	no sheen	PSB05-0-0.5-072810		0	SW-SM	medium brown fine to medium SAND with SILT and GRAVEL (rounded, small to medium), no odor
1.4	no sheen			1		light gray concrete chunk
		PSB05-1.5-2-072810		2	SW	2 inch band of dark brown staining light brown fine to medium SAND, no silt, slight rounded gravel increasing with depth
1.4	no sheen					
		PSB05-2-4-072810		3	GP SW	2 inch band of dark gray, dry, coarse SAND with GRAVEL (angular)
1.3	no sheen			4	SP	grades to coarse SAND increasing gravel with depth
2.0	no sheen	PSB05-4-5-072810			GP	3 inch band of GRAVEL (rounded)
				5	SW	light brown, fine to medium SAND, slight rounded gravel increasing with depth
1.5	no sheen			6		

Notes:
FT BGS = feet below ground surface
ppm = parts per million
--- Dashed contact line in soil description indicates a gradational contact
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Boring ID: PSB-6

Drill Date: July 28, 2010
Logged By: Megan McCullough
Drilled By: Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: direct push 2"x5' core
Boring Diameter: 2 inches
Boring Depth (ft bgs): 6 ft
Groundwater ATD (ft bgs): NA

Coordinate System: NGVD29/NAD83
Ground Surface Elevation: 305.92 ft
Latitude/Northing: 174579.2516 ft
Longitude/Easting: 1272226.664 ft
Boring Location: East of location LL-08

Client: Port of Seattle
Project: POS-LLA
Task: T 4010
Address: Lora Lake Apts Parcel
15001 Des Moines Memorial Dr.

Remarks: Multiple penetrations at this location to obtain soil volume required for analysis

PID (ppm)	SHEEN	SAMPLE ID	DRIVEN / RECOVERED	DEPTH FT BGS	USCS SYMBOL	SOIL DESCRIPTION AND OBSERVATIONS (color, texture, moisture, MAJOR CONSITIUENT, odor, staining, sheen, debris, etc.)
3.8	no sheen	PSB06-0-0.5-072810			SW	medium brown, dry, fine to medium SAND with trace silt and gravel (rounded and angular), no odor
2.1	no sheen	PSB06-1.5-2-072810				trace black cinders
2.1	no sheen	PSB06-2-4-072810				color grades to light brown/gray, trace small rounded gravel throughout
2.1	no sheen					clump of bright orange chalky material
2.0	no sheen	PSB06-4-6-072810				

Notes:
FT BGS = feet below ground surface
ppm = parts per million
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▼ = denotes groundwater table

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Boring ID: PSB-7

Drill Date: July 28, 2010
Logged By: Megan McCullough
Drilled By: Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: direct push 2"x5' core
Boring Diameter: 2 inches
Boring Depth (ft bgs): 6 ft
Groundwater ATD (ft bgs): NA

Coordinate System: NGVD29/NAD83
Ground Surface Elevation: 308.82 ft
Latitude/Northing: 174842.6285 ft
Longitude/Easting: 1272359.706 ft
Boring Location: Near former Bldg T

Client: Port of Seattle
Project: POS-LLA
Task: T 4010
Address: Lora Lake Apts Parcel 15001 Des Moines Memorial Dr.

Remarks: Multiple penetrations at this location to obtain soil volume required for analysis

PID (ppm)	SHEEN	SAMPLE ID	DRIVEN / RECOVERED	DEPTH FT BGS	USCS SYMBOL	SOIL DESCRIPTION AND OBSERVATIONS (color, texture, moisture, MAJOR CONSITIUENT, odor, staining, sheen, debris, etc.)
1.7	no sheen	PSB07-0-0.5-072810		0	SW-SM	medium brown, dry, fine to medium SAND with SILT and GRAVEL (rounded and angular), no odor or staining
2.1	no sheen			1		
		PSB07-1.5-2-072810		2	SW	light brown, dry, fine to medium SAND with small rounded GRAVEL, gravel blocking sampler on first drive
1.6	no sheen					
		PSB07-2-4-072810		3	GP-GM	1 inch band of dark gray GRAVEL with SILT and SAND, no odor
3.5	no sheen				SW	
2.2	no sheen			4		
		PSB07-4-6-072810		5	GP	5 inch lense of GRAVEL with SAND
2.3	no sheen				SW	
				6		

Notes:
FT BGS = feet below ground surface
ppm = parts per million
--- Dashed contact line in soil description indicates a gradational contact
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▼ = denotes groundwater table

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Boring ID: PSB-8

Drill Date: July 28, 2010
Logged By: Megan McCullough
Drilled By: Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: direct push 2"x5' core
Boring Diameter: 2 inches
Boring Depth (ft bgs): 6 ft
Groundwater ATD (ft bgs): NA

Coordinate System: NGVD29/NAD83
Ground Surface Elevation: 299.68 ft
Latitude/Northing: 174466.9365 ft
Longitude/Easting: 1272337.843 ft
Boring Location: South of former Bldg G

Client: Port of Seattle
Project: POS-LLA
Task: T 4010
Address: Lora Lake Apts Parcel
15001 Des Moines Memorial Dr.

Remarks: Multiple penetrations at this location to obtain soil volume required for analysis

PID (ppm)	SHEEN	SAMPLE ID	DRIVEN / RECOVERED	DEPTH FT BGS	USCS SYMBOL	SOIL DESCRIPTION AND OBSERVATIONS (color, texture, moisture, MAJOR CONSITIUENT, odor, staining, sheen, debris, etc.)
0.3	no sheen	PSB08-0-0.5-072810		0	SM	light brown, dry, SILTY SAND with GRAVEL, no odor, iron oxide staining, zones of silt
				1	SP	3 inch lense of light brown to gray, dry, coarse SAND, no odor
0.3	no sheen				SP	light brown to gray, moist, fine SAND with trace gravel, no odor
		PSB08-1.5-2-072810		2		
0.4	no sheen					
		PSB08-2-4-072810		3	SM	light brown to gray, moist SILTY SAND with GRAVEL (rounded), very dense, no odor
0.2	no sheen					
				4		
0.1	no sheen					
		PSB08-4-6-072810		5		
0.2	no sheen				SP	1 inch lense of medium SAND
					SM	
				6		

Notes:
FT BGS = feet below ground surface
ppm = parts per million
--- Dashed contact line in soil description indicates a gradational contact
USCS = Unified Soil Classification System
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Boring ID: PSB-9

Drill Date: July 30, 2010
Logged By: Megan McCullough
Drilled By: Cascade Drilling
Drill Type: L.A. Direct Push Geoprobe
Sample Method: direct push 2"x5' core
Boring Diameter: 2 inches
Boring Depth (ft bgs): 10 ft
Groundwater ATD (ft bgs): NA

Coordinate System: NGVD29/NAD83
Ground Surface Elevation: 294.52 ft
Latitude/Northing: 174615.6999 ft
Longitude/Easting: 1272401.021 ft
Boring Location: South of former Rec Bldg

Client: Port of Seattle
Project: POS-LLA
Task: T 4010
Address: Lora Lake Apts Parcel
15001 Des Moines Memorial Dr.

Remarks: Top four intervals sampled for dioxin only. Two drives conducted for sample volume. Repeated refusal at 10 feet due to gravel blockage, abandoned location.

PID (ppm)	SHEEN	SAMPLE ID	DRIVEN / RECOVERED	DEPTH FT BGS	USCS SYMBOL	SOIL DESCRIPTION AND OBSERVATIONS (color, texture, moisture, MAJOR CONSITIUENT, odor, staining, sheen, debris, etc.)
0.5	no sheen	PSB09-0-0.5-073010			SM	light brown to gray, dry fine SILTY SAND with GRAVEL, no odor
		PSB09-1.5-2-073010				
0.7	no sheen	PSB09-2-4-073010			ML	1 inch SILT lense at 3.3 ft bgs
					SM	tree root at 3.4 ft bgs
0.3	no sheen					silt content lessens with depth
						gravel increasing with depth
		PSB09-4-6-073010				
0.4	no sheen					zone of high organic matter (bark)
0.9	no sheen				SW	light brown to gray, moist, fine to medium SAND, trace to no gravel, no odor.
0.8	no sheen				SP	black, moist, fine SAND. interbedded lenses of iron staining black, red and reddish brown. no odor
1.1	slight sheen					thin 1/4 inch black stained band at 9.75 ft, reddish brown beneath

Notes:
FT BGS = feet below ground surface
ppm = parts per million
--- Dashed contact line in soil description indicates a gradational contact
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Boring ID: PSB-9A

Drill Date: July 30, 2010
Logged By: Megan McCullough
Drilled By: Cascade Drilling
Drill Type: L.A. Direch Push Geoprobe
Sample Method: direct push 2"x5' core
Boring Diameter: 2 inches
Boring Depth (ft bgs): 20 ft
Groundwater ATD (ft bgs): 12.5 ft

Coordinate System: NGVD29/NAD83
Ground Surface Elevation: 298.75 ft
Latitude/Northing: 174615.3802 ft
Longitude/Easting: 1272365.493 ft
Boring Location: South of former Rec Bldg

Client: Port of Seattle
Project: POS-LLA
Task: T 4010
Address: Lora Lake Apt Parcel
15001 Des Moines Memorial Dr.

Remarks: Moved to opposide side of rock wall, west of PSB-9 (ground surface ~4ft below PSB-9)
Multiple penetrations at this location to obtain soil volume required for analysis.

PID (ppm)	SHEEN	SAMPLE ID	DRIVEN / RECOVERED	DEPTH FT BGS	USCS SYMBOL	SOIL DESCRIPTION AND OBSERVATIONS (color, texture, moisture, MAJOR CONSITIUENT, odor, staining, sheen, debris, etc.)
1.4	no sheen	PSB09-0-0.5-073010		0–2	SM	light brown, dry SILTY SAND with gravel, no odor
0.8	no sheen	PSB09-1.5-2-073010 PSB09-2-4-073010		2–7	SW	light brown, fine to medium SAND, no gravel, coarsens with depth
0.4	no sheen	PSB09-4-6-073010		7–12	SP	light brown medium SAND
0.7	slight sheen					3 bands of black staining- 1/2 inch, 1/2 inch, and 1/4 inch thick
0.8	very slight sheen	PSB09-11.5-13.5-073010		12–13		fine and wet at 12.5 ft
0.6	very slight sheen			13–15	SW	light brown, wet, fine to coarse SAND, coarse grains in top 6 inches only, no odor
				15–19		no recovery
0.8	very slight sheen			19–20	SW	medium gray, wet, medium to coarse SAND, no odor

Notes:
FT BGS = feet below ground surface
ppm = parts per million
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▼ = denotes groundwater table

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Boring ID: PSB-10

Drill Date: July 30, 2010
Logged By: Megan McCullough
Drilled By: Cascade Drilling
Drill Type: L.A. Direct Push Geoprobe
Sample Method: direct push 2"x5' core
Boring Diameter: 2 inches
Boring Depth (ft bgs): 25 ft
Groundwater ATD (ft bgs): 19.5 ft

Coordinate System: NGVD29/NAD83
Ground Surface Elevation: 304.22 ft
Latitude/Northing: 174740.4401 ft
Longitude/Easting: 1272404.887 ft
Boring Location: North of former Rec Bldg

Client: Port of Seattle
Project: POS-LLA
Task: T 4010
Address: Lora Lake Apts Parcel
15001 Des Moines Memorial Dr.

Remarks: Multiple penetrations at this location to obtain soil volume required for analysis.

PID (ppm)	SHEEN	SAMPLE ID	DRIVEN / RECOVERED	DEPTH FT BGS	USCS SYMBOL	SOIL DESCRIPTION AND OBSERVATIONS (color, texture, moisture, MAJOR CONSITIUENT, odor, staining, sheen, debris, etc.)
2.6	no sheen	PSB10-0-0.5-073010		0	SP	medium to dark brown, moist, fine SAND with GRAVEL and trace silt, no odor
4.4	no sheen	PSB10-1.5-2-073010		1		
		PSB10-2-4-073010		2		
				3		
		PSB10-4-6-073010		4		
3.5	no sheen			5		
				6		
				7		
				8		dark brown, cohesive lense with slight odor from 8.5 to 9.5 ft
		PSB10-8.5-10-073010		9		
1.4	no sheen			10	SW	medium brownish red, fine to medium SAND with GRAVEL (some larger than core diameter)
				11		
0.8	no sheen			12		gravel increases
				13		
		PSB10-14-15-073010		14		
1.2	no sheen			15		
				16		
				17		
3.8	no sheen			18	CL	light brown, moist CLAY, no odor
				19	SP-SM	SAND with SILT and GRAVEL
				20	SW	light to medium brown, wet, fine to coarse SAND with GRAVEL
				21		
		PSB10-20-25-073010		22	SP	medium brown to gray, wet, fine SAND with trace silt and gravel, no odor
				23		
				24		
				25		

Notes:
FT BGS = feet below ground surface
ppm = parts per million
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Boring ID: PSB-11

Drill Date: July 30, 2010
Logged By: Megan McCullough
Drilled By: Cascade Drilling
Drill Type: L. A. Direct Push Geoprobe
Sample Method: direct push 2"x5' core
Boring Diameter: 2 inches
Boring Depth (ft bgs): 25 ft
Groundwater ATD (ft bgs): 13.5

Client: Port of Seattle
Project: POS-LLA
Task: T 4010
Address: Lora Lake Apts Parcel 15001 Des Moines Memorial Dr.

Coordinate System: NDGV29/NAD83
Ground Surface Elevation: 299.77 ft
Latitude/Northing: 174658.9807 ft
Longitude/Easting: 1272456.255 ft
Boring Location: East of former Rec Bldg

Remarks: Multiple penetrations at this location to obtain soil volume required for analysis

PID (ppm)	SHEEN	SAMPLE ID	DRIVEN / RECOVERED	DEPTH FT BGS	USCS SYMBOL	SOIL DESCRIPTION AND OBSERVATIONS (color, texture, moisture, MAJOR CONSITIUENT, odor, staining, sheen, debris, etc.)
0.2	slight sheen	PSB11-0-0.5-073010			SM	medium brown, moist, SILTY SAND with GRAVEL
4.7	slight sheen	PSB11-1.5-2-073010				gravel lenses and larger gravel
0.9	no sheen	PSB11-2-4-073010				hard lense of black staining, moderate hydrocarbon odor, shard of glass at 3.5 ft bgs
2.1	very slight sheen (organic?)	PSB11-4-6-073010				bright green SILT at 4.5 ft bgs above dark gray stained interval, no odor
0.3	no sheen	PSB11-7.5-9.5-073010			SP	medium reddish brown, moist, fine to medium SAND with GRAVEL, no odor. gray from 11-12 feet
0.7	no sheen					
0.5	no sheen	PSB11-11-13-073010				large non-native pink rock
1.5	no sheen				SW	medium gray fine to coarse SAND with trace silt and gravel, moist to wet from 13.5 ft-15 ft. bright green 1 inch silt lense at 14 ft. green material soluble, turned water green on sheen test. no odor.
10.3	no sheen					
10.9	no sheen	PSB11-14-16-073010			SW-SM	medium gray, wet SAND with GRAVEL and SILT, moderate to strong hydrocarbon odor, gravelly lense at 15 ft.
16.2	no sheen					
5.7	no sheen				SW	medium gray, wet, fine to coarse SAND, slight hydrocarbon odor
8.9	no sheen					
17	no sheen					
42.9	no sheen				GP	GRAVEL with SAND, slight hydrocarbon odor

Notes:
FT BGS = feet below ground surface
ppm = parts per million
--- Dashed contact line in soil description indicates a gradational contact
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Boring ID: PSB-12

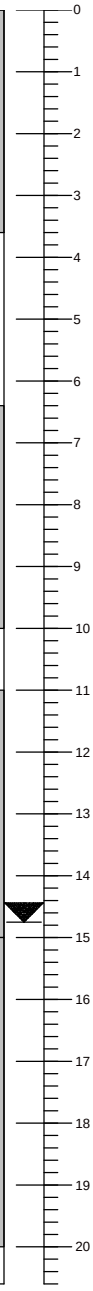
Drill Date: July 28, 2010
Logged By: Megan McCullough
Drilled By: Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: direct push 2"x5' core
Boring Diameter: 2 inches
Boring Depth (ft bgs): 20 ft
Groundwater ATD (ft bgs): 14.75 ft

Coordinate System: NGVD29/NAD83
Ground Surface Elevation: 301.5 ft
Latitude/Northing: 174713.1632 ft
Longitude/Easting: 1272486.862 ft
Boring Location: NE of former Rec Bldg

Client: Port of Seattle
Project: POS-LLA
Task: T 4010
Address: Lora Lake Apts Parcel
15001 Des Moines Memorial Dr.

Remarks: Multiple penetrations at this lcoation to obtain soil volume required for analysis.

PID (ppm)	SHEEN	SAMPLE ID	DRIVEN / RECOVERED	DEPTH FT BGS	USCS SYMBOL	SOIL DESCRIPTION AND OBSERVATIONS (color, texture, moisture, MAJOR CONSITIUENT, odor, staining, sheen, debris, etc.)
0.2	no sheen	PSB12-0-0.5-072810			SW	light to medium brown, fine to medium SAND with trace silt and gravel (10% gravel)
0.1	no sheen					
0.1	no sheen	PSB12-1.5-2-072810				
0.3	no sheen	PSB12-2-4-072810				dark brown lense
0.0	no sheen	PSB12-4-6-072810				rock in shoe, no recovery 4-5 feet
0.3	no sheen					dark brown lense
0.1	no sheen					small brick and cinder pieces, dark brown lense
0.2	no sheen	PSB12-8-10-072810			SW	fine to coarse SAND with GRAVEL, no silt
0.7	no sheen					
0.1	no sheen				GW	light brown and gray well graded GRAVEL with sand (2" max diam.)
0.3	no sheen					
0.5	no sheen					
0.6	no sheen	PSB12-14-17-072810				
0.3	no sheen				CL	olive brown, moist, dense CLAY
0.1	no sheen				SP	medium gray, wet, medium SAND with trace gravel, no odor
0.2	no sheen					
0.1	no sheen				CL	1.5 inch CLAY lense at 19 ft
					SP	



Notes:
FT BGS = feet below ground surface
ppm = parts per million
--- Dashed contact line in soil description indicates a gradational contact
USCS = Unified Soil Classification System
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Boring ID: PSB-13

Drill Date: July 29, 2010
Logged By: Megan McCullough
Drilled By: Cascade Drilling
Drill Type: L.A. Direct Push Geoprobe
Sample Method: direct push 2"x5' core
Boring Diameter: 2 inches
Boring Depth (ft bgs): 20 ft
Groundwater ATD (ft bgs): 15.8 ft

Coordinate System: NGVD29/NAD83
Ground Surface Elevation: 293.52 ft
Latitude/Northing: 174670.3376 ft
Longitude/Easting: 1272582.267 ft
Boring Location: Eastern property line

Client: Port of Seattle
Project: POS-LLA
Task: T 4010
Address: Lora Lake Apts Parcel 15001 Des Moines Memorial Dr.

Remarks: Multiple penetrations at this location to obtain soil volume required for analysis

PID (ppm)	SHEEN	SAMPLE ID	DRIVEN / RECOVERED	DEPTH FT BGS	USCS SYMBOL	SOIL DESCRIPTION AND OBSERVATIONS (color, texture, moisture, MAJOR CONSITIUENT, odor, staining, sheen, debris, etc.)
0.3	no sheen	PSB13 -0-0.5 -072910			SM	medium brown, dry, fine SILTY SAND with GRAVEL (rounded), small rootlets, no odor
		PSB13 -1.5-2 -072910				
		PSB13 -2-4 -072910				4 inch band of dark brown-black staining at 3.8 feet, no odor
0.3	no sheen	PSB13 -4-6 -072910				reddish brown, grades to medium at 4.2 ft, no odor. sand grades to coarse with depth.
0.3	no sheen					
0.2	no sheen				SP, SM, GP	interbedded lenses of gray, and reddish brown, dry SILTY SAND, fine SAND, and GRAVEL with varying silt and gravel content, no odor.
0.2	no sheen					
0.1	no sheen					
0.1	no sheen	PSB13 -11-13 -072910				
0.2	no sheen				SM	light brown grading to light gray, fine to medium, moist SILTY SAND with GRAVEL
0.1	no sheen					
0.3	no sheen				SP	1 inch lense of moist, coarse SAND with GRAVEL at 14.9 ft
0.3	no sheen	PSB13 -14.5-16.5 -072910			SM	
					SW	light gray, wet, fine to medium SAND with trace silt and gravel
0.2	no sheen					coarse SAND lense, no odor

Notes:
FT BGS = feet below ground surface
ppm = parts per million
--- Dashed contact line in soil description indicates a gradational contact
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Boring ID: PSB-14

Drill Date: July 28, 2010
Logged By: Megan McCullough
Drilled By: Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: direct push 2"x5' core
Boring Diameter: 2 inches
Boring Depth (ft bgs): 15 ft
Groundwater ATD (ft bgs): 12.75 ft

Coordinate System: NGVD29/NAD83
Ground Surface Elevation: 295.66 ft
Latitude/Northing: 174573.0667 ft
Longitude/Easting: 1272493.391
Boring Location: East of former Bldg C

Client: Port of Seattle
Project: POS-LLA
Task: T 4010
Address: Lora Lake Apts Parcel 15001 Des Moines Memorial Dr.

Remarks: Multiple penetrations at this location to obtain sample volume required for analysis

PID (ppm)	SHEEN	SAMPLE ID	DRIVEN / RECOVERED	DEPTH FT BGS	USCS SYMBOL	SOIL DESCRIPTION AND OBSERVATIONS (color, texture, moisture, MAJOR CONSITIUENT, odor, staining, sheen, debris, etc.)
2.3	no sheen	PSB14-0-0.5-072810		0–1	SM	medium to dark brown, moist, SILTY SAND with GRAVEL, no odor.
0.3	no sheen	PSB14-1.5-2-072810		1–3	SP	light to medium brown, moist, fine SAND with trace gravel and some iron oxide staining, no odor
0.3	no sheen	PSB14-2-4-072910				
		PSB14-4-6-07810		5–7	SM	dark brown, moist SILTY SAND with small organic particles, white flecks, no odor
0.3	no sheen	PSB14-7-9-072810		7–12	SW	medium gray, moist, fine to medium SAND with GRAVEL (rounded) and trace silt, no odor gravel content increasing with depth
		PSB14-12-14-072810		12–13	ML	light gray (orange mottled), moist to wet SILT with fine SAND and GRAVEL
				13–15	SP	medium gray and brown, wet, coarse SAND with GRAVEL and trace silt, no odor

Notes:
FT BGS = feet below ground surface
ppm = parts per million
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Boring ID: PSB-15

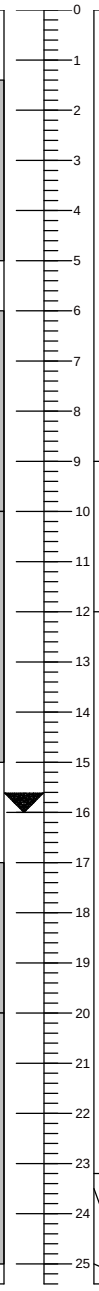
Drill Date: July 30, 2010
Logged By: Megan McCullough
Drilled By: Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: direct push 2"x5' core
Boring Diameter: 2 inches
Boring Depth (ft bgs): 25 ft
Groundwater ATD (ft bgs): ~ 16 ft

Coordinate System: NGVD29/NAD83
Ground Surface Elevation: 296.28 ft
Latitude/Northing: 174576.9965 ft
Longitude/Easting: 1272566.224 ft
Boring Location: Eastern property line

Client: Port of Seattle
Project: POS-LLA
Task: T 4010
Address: Lora Lake Apts Parcel
15001 Des Moines Memorial Dr.

Remarks: Multiple penetrations at this location to obtain soil volume required for analysis.

PID (ppm)	SHEEN	SAMPLE ID	DRIVEN / RECOVERED	DEPTH FT BGS	USCS SYMBOL	SOIL DESCRIPTION AND OBSERVATIONS (color, texture, moisture, MAJOR CONSITIUENT, odor, staining, sheen, debris, etc.)
0.5	no sheen	PSB15-0-0.5-073010			SM	light brown, dry, fine SILTY SAND with slight small gravel, no odor, woody debris/rootlets
		PSB15-1.5-2-073010				
1.0	no sheen	PSB15-2-4-073010				brick fragment
2.0	no sheen	PSB15-4-6-073010				
2.8					SW	light brown, dry, fine to medium SAND with GRAVEL and trace silt, no odor
5.0	no sheen					
4.1	no sheen				SM	medium gray, moist (oily?), fine to medium SILTY SAND, cohesive, slight chemical odor
		PSB15-13-15-073010				color darkens to black at 14.5-15 ft bgs
3.1	no sheen					
		PSB15-17-19-073010				wet, gravel and silt clasts, slight chemical odor and oxide staining
3.4	no sheen					
4.6	no sheen					
5.4	no sheen	PSB15-24-25-073010			SP	lense of coarse SAND at 23.2-23.5 ft bgs
					SW	medium brown, wet, fine to coarse SAND with GRAVEL, no odor



Notes:
FT BGS = feet below ground surface
ppm = parts per million
--- Dashed contact line in soil description indicates a gradational contact
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Boring ID: PSB-16

Drill Date: August 25, 2010
Logged By: Kristin Anderson
Drilled By: Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: direct push 2"x5' core
Boring Diameter: 2 inches
Boring Depth (ft bgs): 15 ft
Groundwater ATD (ft bgs): 13 ft

Coordinate System: NGVD29/NAD83
Ground Surface Elevation: 285.28 ft
Latitude/Northing: 174475.7878 ft
Longitude/Easting: 1272550.185 ft
Boring Location: D.M.D. Right-of-Way

Client: Port of Seattle
Project: POS-LLA
Task: T 4010
Address: Lora Lake Apts Parcel 15001 Des Moines Memorial Dr.

Remarks: Multiple penetrations at this location to obtain sample volume required for analysis. Penetrations ~3 ft apart, black staining at 1 ft observed in one penetration.

PID (ppm)	SHEEN	SAMPLE ID	DRIVEN / RECOVERED	DEPTH FT BGS	USCS SYMBOL	SOIL DESCRIPTION AND OBSERVATIONS (color, texture, moisture, MAJOR CONSITIUENT, odor, staining, sheen, debris, etc.)
	slight organic sheen	PSB16-0-0.5-082510			SM	brown fine, dry, SILTY SAND with sub-rounded gravel (1/4"). no odor.
1.2	no sheen	PSB16-1.5-2-082510			SP	brown, dry, medium SAND with GRAVEL (sub-rounded, 1/2") and trace silt. lense of black, siltier sand at 1 ft with slight asphalt-like odor
					SP	brown, slightly moist, medium SAND with GRAVEL (rounded, 1/2"), no odor.
1.3	no sheen	PSB16-2-4-082510				
		PSB16-4-6-082510				gravelly pockets at 5.5 ft bgs
2.1	no sheen					
						decreased gravel content and trace silt at 7.5 ft
1.1	no sheen					
	slight sheen	PSB16-9.5-10-082510				abundant sub-rounded gravel, black staining, slightly reflective material, silt clasts, and slight sheen at 10 ft
2.0	no sheen					dark brown and moist with highly rounded gravel (pea gravel?) at 12 ft
		PSB13-13-15-082510			ML	brown, wet, SILT with GRAVEL. no odor
					CL	reddish-brown CLAY, no odor.

Notes:
FT BGS = feet below ground surface
ppm = parts per million
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USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Boring ID: PSB-17

Drill Date: July 28, 2010
Logged By: Megan McCullough
Drilled By: Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: direct-push 2"x5' core
Boring Diameter: 2 inches
Boring Depth (ft bgs): 13 ft
Groundwater ATD (ft bgs): NA

Coordinate System: NGVD29/NAD83
Ground Surface Elevation: 296.78 ft
Latitude/Northing: 174469.0049 ft
Longitude/Easting: 1272436.52 ft
Boring Location: North of former Bldg D

Client: Port of Seattle
Project: POS-LLA
Task: T 4010
Address: Lora Lake Apts Parcel
15001 Des Moines Memorial Dr.

Remarks: Multiple penetrations at this location to obtain soil volume required for analysis.
Refusal at 13 ft

PID (ppm)	SHEEN	SAMPLE ID	DRIVEN / RECOVERED	DEPTH FT BGS	USCS SYMBOL	SOIL DESCRIPTION AND OBSERVATIONS (color, texture, moisture, MAJOR CONSITIUENT, odor, staining, sheen, debris, etc.)
0.4	no sheen	PSB17-0-0.5-072810			SM	light brown/gray, dry, fine SILTY SAND with abundant GRAVEL, dense, no odor or staining
0.3	no sheen	PSB17-1.5-2-072810				
0.1	no sheen				SW	light brown/gray, dry, fine to coarse SAND, no odor
0.0	no sheen	PSB17-2-4-072810			GP,ML,SP	interbeddded lenses of light brown, dry SANDY GRAVEL, SILT, and fine SAND, no odor
0.1	no sheen	PSB17-4-6-072810			SP-SM	lenses of light gray/brown, dry, fine SILTY SAND and fine SAND with GRAVEL, no odor.
0.2	no sheen					silt content increasing with depth
0.0	no sheen		?			
0.1	no sheen				ML	grades to very dense, SANDY SILT
0.3	no sheen	PSB17-10-13-072810				refusal at 13 ft bgs

Notes:
FT BGS = feet below ground surface
ppm = parts per million
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Boring ID: PSB-18

Drill Date: August 26, 2010
Logged By: Kristin Anderson
Drilled By: Cascade Drilling
Drill Type: L.A. Direct Push Geoprobe
Sample Method: direct push 2"x5' core
Boring Diameter: 2 inches
Boring Depth (ft bgs): 20 ft
Groundwater ATD (ft bgs): 12.5 ft

Coordinate System: NGVD29/NAD83
Ground Surface Elevation: 294.82 ft
Latitude/Northing: 174382.5489 ft
Longitude/Easting: 1272457.185 ft
Boring Location: D.M.D. Right-of-Way

Client: Port of Seattle
Project: POS-LLA
Task: T 4010
Address: Lora Lake Apts Parcel 15001 Des Moines Memorial Dr

Remarks: Multiple penetrations at this location to obtain soil volume required for analysis.

PID (ppm)	SHEEN	SAMPLE ID	DRIVEN / RECOVERED	DEPTH FT BGS	USCS SYMBOL	SOIL DESCRIPTION AND OBSERVATIONS (color, texture, moisture, MAJOR CONSITIUENT, odor, staining, sheen, debris, etc.)
5.9	no sheen	PSB18-0-0.50 082610		0	SP	light brown, dry, fine SAND with slight rounded gravel. one large (1" diam) gravel clast. no odor.
		PSB18-1.5-2-082610		1		trace silt beginning at 1ft
2.3	slight organic sheen	PSB18-2-4-082610		2		slightly moist at 3ft
		PSB18-4-6-082610		3	GW	well-graded, slightly moist GRAVEL (sub-angular, up to 1 1/4") with SAND. no odor.
3.9	no sheen			4		
		PSB18-7-9-082610		5	SW	brown, moist SAND with slight gravel. no odor.
3.4	no sheen			6		
				7	CL	2" lense of gray SANDY CLAY at 10 ft
5.4	no sheen			8	SM	brown, moist, medium SILTY SAND with GRAVEL (sub-rounded, 2"). no odor.
		PSB18-12.5-15-082610		9	SP	brown, wet SAND with moderate sub-angular GRAVEL and trace silt. no odor
5.6	slight silty sheen			10		grades to fine with slight red-brown clay pockets, no odor
				11	SM	brown, dense, wet SILTY SAND with GRAVEL. no odor.
4.7	trace silty sheen			12		no gravel at 16 ft
				13		color grades to blue-gray at 17.5 ft with pockets of bark from 17.5-20 ft
4.1	no sheen	PSB18-18-20-082610		14	ML	2" lense of red-brown SILT at 20 ft
				15		
				16		
				17		
				18		
				19		
				20		

Notes:
FT BGS = feet below ground surface
ppm = parts per million
--- Dashed contact line in soil description indicates a gradational contact
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Boring ID: PSB-19

Drill Date: Aug. 25, 2010
Logged By: Amanda McKay
Drilled By: Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: direct push 2"x5' core
Boring Diameter: 2 inches
Boring Depth (ft bgs): 15 ft
Groundwater ATD (ft bgs): 13 ft

Coordinate System: NGVD29/NAD83
Ground Surface Elevation: 285.05 ft
Latitude/Northing: 174431.3369 ft
Longitude/Easting: 1272523.852 ft
Boring Location: D.M.D. Right-of-Way

Client: Port of Seattle
Project: POS-LLA
Task: 4010
Address: Lora Lake Apts Parcel
15001 Des Moines Memorial Dr

Remarks: Multiple penetrations at this location to obtain sample volume required for analysis
no sample collected at 4-6 ft bgs

PID (ppm)	SHEEN	SAMPLE ID	DRIVEN / RECOVERED	DEPTH FT BGS	USCS SYMBOL	SOIL DESCRIPTION AND OBSERVATIONS (color, texture, moisture, MAJOR CONSITIUENT, odor, staining, sheen, debris, etc.)
0.7	no sheen	PSB19-0-1 082510		0	SP	light brown, dry, fine, SAND with trace silt. some oxide staining, rootlets, slight rounded gravel (1/4"). .
		PSB19-1-2-082510		1		
				2		
2.5	no sheen	PSB19-2-4-082510		3		
				4		coarsens with depth, color grades to dark brown at 4 ft. no odor
				5		red-brown, medium and slightly moist with decreased silt at 4.5 ft. some gray coloration. no odor.
3.4	no sheen			6		
				7		
				8	GW	two-inch GRAVEL lense up to 1/2" diameter. loose, mostly rounded with some angular clasts
1.8	no sheen			9	ML	black lense of clayey SILT with some fine sand at 8.5 ft. no odor, some organic material
				10		
				11		
				12		
				13	SW	dark brown, wet, fine to medium SAND with GRAVEL (rounded) and red coloration, very trace to no silt. no odor.
2.3	no sheen	PSB19-13-15-082510		14		
				15		

Notes:
FT BGS = feet below ground surface
ppm = parts per million
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▼ = denotes groundwater table

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Boring ID: PSB-20

Drill Date: August 25, 2010
Logged By: Kristin Anderson
Drilled By: Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: direct push 2"x5' core
Boring Diameter: 2 inches
Boring Depth (ft bgs): 15 ft
Groundwater ATD (ft bgs): 12.5 ft

Coordinate System: NGVD29/NAD83
Ground Surface Elevation: 283.76 ft
Latitude/Northing: 174528.8178 ft
Longitude/Easting: 1272589.51 ft
Boring Location: D.M.D. Right-of-Way

Client: Port of Seattle
Project: POS-LLA
Task: 4010
Address: Lora Lake Apts Parcel
15001 Des Moines Memorial Dr.

Remarks: Multiple penetrations at this location to obtain soil volume required for analysis

PID (ppm)	SHEEN	SAMPLE ID	DRIVEN / RECOVERED	DEPTH FT BGS	USCS SYMBOL	SOIL DESCRIPTION AND OBSERVATIONS (color, texture, moisture, MAJOR CONSITIUENT, odor, staining, sheen, debris, etc.)
3.3	no sheen	PSB20-0-0.5-082510		0–1	SP	brown, dry medium SAND with sub-angular GRAVEL (1/2"). no odor.
		PSB20-1.5-2-082510		1–2		slightly moist with trace silt and gravel (sub-rounded, 1/2") at 1.5 ft
				2	ML	2 inch lense of black, moist SANDY SILT
5.9	no sheen	PSB20-2-4-082510		2–3	SP	
		PSB20-4-6-082510		3–5		dark brown with sub-rounded gravel (1"). no odor.
6.8	no sheen			5–6		
5.7	no sheen			6–10		
				10	OL/OH	black, moist, peaty ORGANIC SOIL with moderate sand. plant matter visible, organic odor.
				10–11	SM	
1.6	no sheen			11	ML	gray, moist SILTY SAND with moderate sub-rounded gravel (1"). no odor.
				11–12		brown, dense, moist SILT. no odor.
		PSB20-11.5-13.5-082510		12–13	SM	brown, grading to dark brown, wet SILTY SAND. no odor.
2.3	no sheen			13–15		

Notes:
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ppm = parts per million
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Boring ID: PSB-21

Drill Date: August 25, 2010
Logged By: Kristin Anderson
Drilled By: Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: direct push 2"x5' core
Boring Diameter: 2 inches
Boring Depth (ft bgs): 15 ft
Groundwater ATD (ft bgs): 10 ft

Coordinate System: NGVD29/NAD83
Ground Surface Elevation: 284.08 ft
Latitude/Northing: 174650.6964 ft
Longitude/Easting: 1272661.287 ft
Boring Location: D.M.D. Right-of-Way

Client: Port of Seattle
Project: POS-LLA
Task: 4010
Address: Lora Lake Apts Parcel
15001 Des Moines Memorial Dr.

Remarks:

PID (ppm)	SHEEN	SAMPLE ID	DRIVEN / RECOVERED	DEPTH FT BGS	USCS SYMBOL	SOIL DESCRIPTION AND OBSERVATIONS (color, texture, moisture, MAJOR CONSITIUENT, odor, staining, sheen, debris, etc.)
2.1	no sheen	PSB21-0-0.5-082510		0	SP	brown, dry fine SAND with slight sub-rounded GRAVEL (1/2"). no odor.
		PSB21-1.5-2-082510		1		moist, grades to medium at 1.5 ft
2.4	no sheen	PSB21-2-4-082510		2		
				3		
				4		trace black and blue-gray silty pockets at 5 ft
		PSB21-4-6-082510		5		
2.6	no sheen			6	OL/OH	black, moist peaty ORGANIC SOIL, plant matter visible. organic odor.
		PSB21-6-7-082510		7		
				8	ML	tan, moist SILT with trace sand. no odor.
2.3	no sheen			9		
				10		color grades to gray, wet at 9.5 ft
		PSB21-9-11-082510		11		
2.8	no sheen			12	CL	gray, wet CLAY interbedded with tan CLAY. no odor.
				13		
2.3	no sheen			14		
				15	SW	brown, wet, fine SAND with slight rounded and sub-rounded GRAVEL (1/2"). sand coarsens with depth. no odor.

Notes:
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Boring ID: PSB-22

Drill Date: July 29, 2010
Logged By: Megan McCullough
Drilled By: Cascade Drilling
Drill Type: L.A. Direct Push Geoprobe
Sample Method: direct push 2"x5' core
Boring Diameter: 2 inches
Boring Depth (ft bgs): 20 ft
Groundwater ATD (ft bgs): 19 ft

Coordinate System: NGVD29/NAD83
Ground Surface Elevation: 300.14 ft
Latitude/Northing: 174874.8123 ft
Longitude/Easting: 1272618.693 ft
Boring Location: West of former Building D

Client: Port of Seattle
Project: POS-LLA
Task: T 4010
Address: Lora Lake Apts Parcel 15001 Des Moines Memorial Dr.

Remarks: Multiple penetrations at this location to obtain soil volume required for analysis

PID (ppm)	SHEEN	SAMPLE ID	DRIVEN / RECOVERED	DEPTH FT BGS	USCS SYMBOL	SOIL DESCRIPTION AND OBSERVATIONS (color, texture, moisture, MAJOR CONSITIUENT, odor, staining, sheen, debris, etc.)
2	no sheen	PSB22-0-0.5-072910		0	SP-SM	light brown, dry, fine SILTY SAND with rounded GRAVEL
3.5	no sheen			1		
3.1	no sheen	PSB22-1.5-2-072910		2		
		PSB22-2-4-072910		3		
				4		
3.2	no sheen	PSB22-4-6-072910		5	SP	3 inch lense of medium brown/red SAND
				6	SP-SM	
3.4	no sheen			7		
				8	SW, ML	light brown/gray fine to coarse SAND with GRAVEL (~10%), interbedded with brown/gray, dry SILT, no odor
3.7	no sheen			9	ML	light brown/gray SILT
2.3	no sheen			10	SM	light brown/gray fine SILTY SAND, trace gravel (5%)
3.2	no sheen			11		
3.7	no sheen			12		
2.4	no sheen			13	SP-SM	black, dense rock- possible petrified wood (clast had no odor). light brown/gray fine SAND with SILT and GRAVEL below
4.5	no sheen			14		
				15	SW	grades to light brown, moist, well-graded fine SAND, no silt or gravel, no odor
3.7	no sheen			16		
				17		
4.4	no sheen	PSB22-17-19-072910		18		
4.5	no sheen	PSB22-19-20-072910		19	SP	light brown/gray, moist, fine SAND
				20		grades to medium, wet at 20 ft. no odor.

Notes:
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ppm = parts per million
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Boring ID: PSB-23

Drill Date: July 29, 2010
Logged By: Megan McCullough
Drilled By: Cascade Drilling
Drill Type: L.A. Direct Push Geoprobe
Sample Method: direct push 2"x5' core
Boring Diameter: 2 inches
Boring Depth (ft bgs): 20 ft
Groundwater ATD (ft bgs): 16.5 ft

Coordinate System: NGVD29/NAD83
Ground Surface Elevation: 290.23 ft
Latitude/Northing: 174822.1545 ft
Longitude/Easting: 1272763.379 ft
Boring Location: Southeast of former Bldg D

Client: Port of Seattle
Project: POS-LLA
Task: T 4010
Address: Lora Lake Apt Parcel
15001 Des Moines Memorial Dr.

Remarks: Multiple penetrations at this location to obtain soil volume required for analysis

PID (ppm)	SHEEN	SAMPLE ID	DRIVEN / RECOVERED	DEPTH FT BGS	USCS SYMBOL	SOIL DESCRIPTION AND OBSERVATIONS (color, texture, moisture, MAJOR CONSITIUENT, odor, staining, sheen, debris, etc.)
2.7	no sheen	PSB23-0-0.5-072910 PSB23-1.5-2-072910		0–2	SP-SM	medium brown, dry, fine SAND with SILT and GRAVEL (small, rounded), no odor
2.9	no sheen	PSB23-2-4-072910		2–4		black staining, root fragments
3.6	no sheen	PSB23-4-6-072910		4–6		
4.0	no sheen			6–8		
2.6	no sheen			8–10		
3.3	no sheen			10–12		
5.2	no sheen	PSB23-14-16.5-072910		12–14	SP	light brown/gray, dry, fine SAND, orange oxide mottling, no odor. moist at 13.3 ft
4.9	no sheen	PSB23-16.5-19-072910		14–16	SW	light brown/gray, very moist, fine to coarse SAND with GRAVEL
4.3	no sheen			16–17	ML	light gray, wet SILT with SAND, sand lenses (medium to coarse) ~ 1 inch thick and GRAVEL (rounded), no odor
				17–20	SW	light gray, wet, fine to medium SAND, trace silt and gravel, no odor

Notes:
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ppm = parts per million
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Boring ID: PSB-24

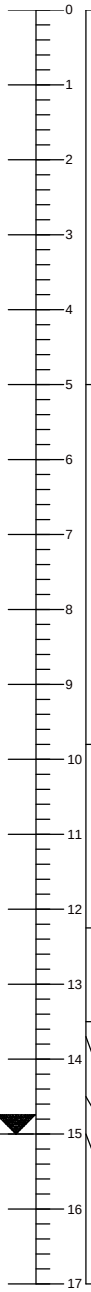
Drill Date: July 29, 2010
Logged By: Megan McCullough
Drilled By: Cascade Drilling
Drill Type: L.A. Direct Push Geoprobe
Sample Method: direct push 2"x5' core
Boring Diameter: 2 inches
Boring Depth (ft bgs): 17 ft
Groundwater ATD (ft bgs): 15 ft

Coordinate System: NAV83
Ground Surface Elevation: NA
Latitude/Northing: NA
Longitude/Easting: NA
Boring Location: northeast corner of site

Client: Port of Seattle
Project: POS-LLA
Task: T 4010
Address: Lora Lake Apts Parcel 15001 Des Moines Memorial Dr.

Remarks: Multiple penetrations at this location to obtain soil volume required for analysis
Refusal on large rock at 17 ft.

PID (ppm)	SHEEN	SAMPLE ID	DRIVEN / RECOVERED	DEPTH FT BGS	USCS SYMBOL	SOIL DESCRIPTION AND OBSERVATIONS (color, texture, moisture, MAJOR CONSITIUENT, odor, staining, sheen, debris, etc.)
3.4	no sheen	PSB24-0-0.5-072910			SP-SM	light to medium brown, dry, fine SILTY SAND. no odor, small rootlets.
		PSB24-1.5-2-072910				
3.1	no sheen	PSB24-2-4-072910				
4.6	no sheen	PSB24-4-6-072910			SP	grades to light brown, fine SAND with trace gravel, oxide staining, no odor. no rootlets below 5.5 ft
5.0	no sheen					
6.1	no sheen				GP	light gray, dry GRAVEL with SAND. large gravels, some silt, no odor
5.4	no sheen				SW	light brown/gray, moist, fine to medium SAND with trace silt and rounded gravel, no odor. 3 inch gray, coarse band at 14.25 ft
3.4	no sheen				GP	1 inch lense of GRAVEL
4.1	no sheen				SW	
		PSB24-14-16-072910			CL	gray, moist silty CLAY with large gravel, no odor
4.2	no sheen				SM	light to medium gray, wet, fine to coarse SILTY SAND, no odor



Notes:
FT BGS = feet below ground surface
ppm = parts per million
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Boring ID: PSB-25

Drill Date: August 25, 2010
Logged By: Amanda McKay
Drilled By: Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: direct push 2"x5' core
Boring Diameter: 2 inches
Boring Depth (ft bgs): 20 ft
Groundwater ATD (ft bgs): 18 ft

Coordinate System: NGVD29/NAD83
Ground Surface Elevation: 299.41 ft
Latitude/Northing: 174643.1781 ft
Longitude/Easting: 1272505.591 ft
Boring Location: Parking lot near Rec Bldg

Client: Port of Seattle
Project: POS-LLA
Task: 4010
Address: Lora Lake Apts Parcel
15001 Des Moines Memorial Dr

Remarks: Multiple penetrations at this location to obtain soil volume required for analysis
Extra boring near DNAPL-forming source area

PID (ppm)	SHEEN	SAMPLE ID	DRIVEN / RECOVERED	DEPTH FT BGS	USCS SYMBOL	SOIL DESCRIPTION AND OBSERVATIONS (color, texture, moisture, MAJOR CONSITIUENT, odor, staining, sheen, debris, etc.)
1.1	no sheen	PSB26-0-1-082510		0–1	SM	light brown, dry, fine to medium SILTY SAND with angular and rounded GRAVEL (up to 1"). no odor.
		PSB26-1-2-082510		1–2		color grades to darker brown with oxide staining. slightly less slity. no odor.
		PSB26-2-4-082510		2–4		shattered rocks at 3.8 and 5.1 ft
6.8	no sheen	PSB26-4-6-082510		4–5	OL/OH	1-inch lense of black, fine, ash-like material. no odor.
				5–6	SW	dark brown medium to coarse SAND with slightly reddish, rounded GRAVEL , no odor. color becomes reddish-brown at 4.5 ft
				6–8		gray-brown, moist , with oxide staining and occasional large rounded gravel at 5 ft. slightly sweet odor.
1.1	no sheen			8–9		grades to dark reddish gray, fine SAND with GRAVEL and slight organic matter at 8.5 ft
				10–12		no recovery 10-12 ft
2.8	no sheen	PSB26-14-15-082510		12–18	SW	red-brown, moist, medium to coarse SAND with angular GRAVEL. several large cobbles up to 1 1/2". no odor.
1.8	no sheen	PSB26-18-20-082510		18–20	SP	dark brown, wet, coarse SAND with GRAVEL. no odor.

Notes:
FT BGS = feet below ground surface
ppm = parts per million
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USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Boring ID: PSB-26

Drill Date: August 25, 2010
Logged By: Amanda McKay
Drilled By: Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: direct push 2"x5' core
Boring Diameter: 2 inches
Boring Depth (ft bgs): 20 ft
Groundwater ATD (ft bgs): 16 ft

Coordinate System: NGVD29/NAD83
Ground Surface Elevation: 297.69 ft
Latitude/Northing: 174604.4908 ft
Longitude/Easting: 1272447.771 ft
Boring Location: Parking lot near Rec Bldg

Client: Port of Seattle
Project: POS-LLA
Task: 4010
Address: Lora Lake Apts Parcel
15001 Des Moines Memorial Dr

Remarks: Multiple penetrations at this location to obtain soil volume required for analysis
Extra boring near DNAPL-forming source area

PID (ppm)	SHEEN	SAMPLE ID	DRIVEN / RECOVERED	DEPTH FT BGS	USCS SYMBOL	SOIL DESCRIPTION AND OBSERVATIONS (color, texture, moisture, MAJOR CONSITIUENT, odor, staining, sheen, debris, etc.)
				0		asphalt pavement
	no sheen	PSB26-0-2-082510		1	SM	brown and gray, dry SILTY SAND with lenses of abundant GRAVEL (some large, angular). well-graded sand and gravel, some reddish color. no odor.
1.6		PSB26-2-4-082510		2	SW	gray, dry, fine to medium SAND with GRAVEL. no odor.
				3		
				4		
				5		no recovery 5-7 ft
				6		
2.3	no sheen	PSB26-5-10-082510		7	SM	red-brown, moist, fine SILTY SAND with slight gravel. no odor.
				8	SW	gray, fine to medium SAND with angular and rounded GRAVEL (up to 1"). no odor.
				9	SM	dark brown, fine, SILTY SAND. no odor.
				10		

Notes:
FT BGS = feet below ground surface
ppm = parts per million
--- Dashed contact line in soil description indicates a gradational contact
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Boring ID: PSB-26

Drill Date: August 25, 2010
Logged By: Amanda McKay
Drilled By: Cascade Drilling
Drill Type: Direct Push Geoprobe
Sample Method: direct push 2"x5' core
Boring Diameter: 2 inches
Boring Depth (ft bgs): 20 ft
Groundwater ATD (ft bgs): 16 ft

Coordinate System: NGVD29/NAD83
Ground Surface Elevation: 297.69 ft
Latitude/Northing: 174604.4908 ft
Longitude/Easting: 1272447.771 ft
Boring Location: Parking lot near Rec Bldg

Client: Port of Seattle
Project: POS-LLA
Task: 4010
Address: Lora Lake Apts Parcel
15001 Des Moines Memorial Dr

Remarks: Multiple penetrations at this location to obtain soil volume required for analysis
Extra boring near DNAPL-forming source area

PID (ppm)	SHEEN	SAMPLE ID	DRIVEN / RECOVERED	DEPTH FT BGS	USCS SYMBOL	SOIL DESCRIPTION AND OBSERVATIONS (color, texture, moisture, MAJOR CONSITIUENT, odor, staining, sheen, debris, etc.)
3.9	no sheen			11	SW	medium brown, medium to coarse SAND with rounded and angular GRAVEL.
				12	SM	lense of light gray, dry SILTY SAND. well-graded sand, occasional larger (~2") and rounded gravel. no odor.
					SP	reddish brown medium SAND with slight gravel. gradational change to fine SAND. no odor.
				13	ML	lense of SILT and cobbles.
2.8	no sheen	PSB26-14-15-082510			SP	reddish brown, fine SAND. band of oxidized staining at 14 ft, wet at 16 ft
				14		
				15		
5.0	no sheen	PSB26-16-18-082510		16		
					GW	lense of gray-brown GRAVEL
				17	SP	dark brown, moist SAND. grades to reddish brown color. no odor.
				18		
3.4	no sheen	PSB26-19-20-082510		19		red, oxidized SAND at 18.5 ft
				20		

Notes:
FT BGS = feet below ground surface
ppm = parts per million
--- Dashed contact line in soil description indicates a gradational contact
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Boring ID: PSB-27

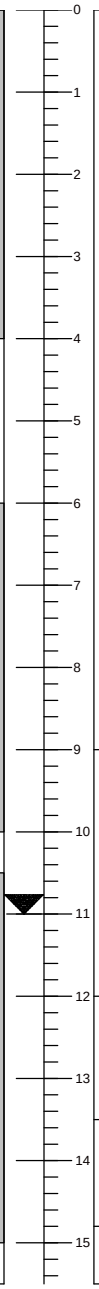
Drill Date: August 26, 2010
Logged By: Kristin Anderson
Drilled By: Cascade Drilling
Drill Type: L.A. Direct Push Geoprobe
Sample Method: direct push 2"x5' core
Boring Diameter: 2 inches
Boring Depth (ft bgs): 15 ft bgs
Groundwater ATD (ft bgs): 11 ft

Client: Port of Seattle
Project: POS-LLA
Task: 4010
Address: Lora Lake Apts Parcel
15001 Des Moines Memorial Dr

Coordinate System: NGVD29/NAD83
Ground Surface Elevation: 299.44 ft
Latitude/Northing: 174645.4814 ft
Longitude/Easting: 1272402.49 ft
Boring Location: Former indoor pool

Remarks: Multiple penetrations at this location to obtain soil volume required for analysis
Extra boring near DNAPL-forming source area

PID (ppm)	SHEEN	SAMPLE ID	DRIVEN / RECOVERED	DEPTH FT BGS	USCS SYMBOL	SOIL DESCRIPTION AND OBSERVATIONS (color, texture, moisture, MAJOR CONSITIUENT, odor, staining, sheen, debris, etc.)
2.8	no sheen	PSB27-0-0.5-082610			SP	brown, dry, medium SAND with moderate sub-rounded GRAVEL (1/2") and trace silt. no odor.
		PSB27-1.5-2-082610				grades to medium with abundant gravel at 1 ft.
2.7	no sheen	PSB27-2-4-082610				color grades to dark brown at 3.5 ft
		PSB27-4-6-082610				slightly moist with trace silt at 5 ft
3.2	no sheen					
3.0	no sheen	PSB27-8-10-082610			SM	interbedded gray and brown, moist, medium SILTY SAND with slight gravel (1/4"). no odor.
		PSB27-10-12-082610				wet at 11 ft
9.9	no sheen					slight hydrocarbon odor at 12ft
					CL	gray, dense, wet, fine SANDY CLAY. no odor.
3.2	no sheen	PSB27-13-15-082610			SP	gray-brown, wet, medium SAND with slight silt, no odor.
					ML	lense of red-brown SILT



Notes:
FT BGS = feet below ground surface
ppm = parts per million
--- Dashed contact line in soil description indicates a gradational contact
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Boring ID: SSB-1

Drill Date: August 3, 2010
Logged By: Amanda McKay
Drilled By: Floyd|Snider
Drill Type: 3" x 18" Hand Auger
Sample Method: Composite Grab
Boring Diameter: 3 inches
Boring Depth (ft bgs): 2 ft
Groundwater ATD (ft bgs): NA

Coordinate System: NGVD29/NAD83
Ground Surface Elevation: 300.27 ft
Latitude/Northing: 174848.16 ft
Longitude/Easting: 1271910.11 ft
Boring Location: NW corner along 8th Ave S.

Client: Port of Seattle
Project: POS-LLA
Task: 4010
Address: Lora Lake Apts Parcel 15001 Des Moines Memorial Dr

Remarks:

PID (ppm)	SHEEN	SAMPLE ID	DRIVEN / RECOVERED	DEPTH FT BGS	USCS SYMBOL	SOIL DESCRIPTION AND OBSERVATIONS (color, texture, moisture, MAJOR CONSITIUENT, odor, staining, sheen, debris, etc.)
5.4	No sheen	SSB01-0-0.5-080310		0	SM	light to medium brown, dry,medium SILTY SAND with rounded GRAVEL and organic material. no odor
						slightly darker brown with red flecks and organic particles at 0.5 ft
5.2	No sheen			1		
						decreased gravel content and some bark fragments at 1 ft.
6.0	No sheen					
						plastic fragments at 1.5 ft
5.3	No sheen	SSB01-1.5-2-080310		2		

Notes:
FT BGS = feet below ground surface
ppm = parts per million
--- Dashed contact line in soil description indicates a gradational contact
USCS = Unified Soil Classification System
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Boring ID: SSB-2

Drill Date: August 3, 2010
Logged By: Megan McCullough
Drilled By: Floyd|Snider
Drill Type: 3" x 18" Hand Auger
Sample Method: Composite Grab
Boring Diameter: 3 inches
Boring Depth (ft bgs): 1.5 ft
Groundwater ATD (ft bgs): NA

Coordinate System: NGVD29/NAD83
Ground Surface Elevation: 298.04 ft
Latitude/Northing: 174653.03 ft
Longitude/Easting: 1271903.67 ft
Boring Location: South of west entrance drive

Client: Port of Seattle
Project: POS-LLA
Task: 4010
Address: Lora Lake Apts Parcel
15001 Des Moines Memorial Dr

Remarks: Repeated refusal encountered at 0.5 ft bgs in original SSB-2 location. Relocated boring ~8 ft south.

PID (ppm)	SHEEN	SAMPLE ID	DRIVEN / RECOVERED	DEPTH FT BGS	USCS SYMBOL	SOIL DESCRIPTION AND OBSERVATIONS (color, texture, moisture, MAJOR CONSITIUENT, odor, staining, sheen, debris, etc.)
1.8 (7.8)	No sheen	SSB02-0-0.5-080310		0	SM	brown, dry SILTY SAND with abundant rounded and angular GRAVEL (up to 1" diameter). well graded sand, with organic roots and bark. no odor.
						fiber paper-like debris at 0.5 ft
2.9	No sheen					
				1		moist with glass debris at 1 ft
2.4	No sheen	SSB02-1-1.5-080310				refusal on rock at 1.5 ft

Notes:
FT BGS = feet below ground surface
ppm = parts per million
--- Dashed contact line in soil description indicates a gradational contact
USCS = Unified Soil Classification System
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Boring ID: SSB-3

Drill Date: August 7, 2010
Logged By: Tucker Stevens
Drilled By: Floyd|Snider
Drill Type: 3" x 18" Hand Auger
Sample Method: Composite Grab
Boring Diameter: 3 inches
Boring Depth (ft bgs): 2 ft
Groundwater ATD (ft bgs): NA

Coordinate System: NGVD29/NAD83
Ground Surface Elevation: 298.84 ft
Latitude/Northing: 174543.40 ft
Longitude/Easting: 1271952.83 ft
Boring Location: S. of Bldg N- outside fence

Client: Port of Seattle
Project: POS-LLA
Task: 4010
Address: Lora Lake Apts Parcel
15001 Des Moines Memorial Dr

Remarks:

PID (ppm)	SHEEN	SAMPLE ID	DRIVEN / RECOVERED	DEPTH FT BGS	USCS SYMBOL	SOIL DESCRIPTION AND OBSERVATIONS (color, texture, moisture, MAJOR CONSITIUENT, odor, staining, sheen, debris, etc.)
	No sheen	SSB03-0-0.5-080710		0	ML	medium brown, dry SILT with GRAVEL (angular, well-graded) and SAND. roots, wood particles, twigs, leaf matter and glass fragments.
	No sheen			1	SM	medium brown, dry SILTY SAND with GRAVEL (angular and round). well-graded, with fine and coarse sand. some red pockets, roots and small twigs.
	No sheen				SP-SM	reddish brown,dry, fine SAND with SILT and GRAVEL. small gravel (<1" diameter), roots.
	No sheen	SSB03-1.5-2-080710		2	SW	reddish brown, dry, fine to medium SAND with GRAVEL (round, <1") and trace silt

Notes:
FT BGS = feet below ground surface
ppm = parts per million
--- Dashed contact line in soil description indicates a gradational contact
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Boring ID: SSB-4

Drill Date: September 9, 2010
Logged By: Tucker Stevens
Drilled By: Floyd|Snider
Drill Type: 3" x 18" Hand Auger
Sample Method: Composite Grab
Boring Diameter: 3 inches
Boring Depth (ft bgs): 2 ft
Groundwater ATD (ft bgs): NA

Coordinate System: NGVD29/NAD83
Ground Surface Elevation: 306.860ft
Latitude/Northing: 174908.88 ft
Longitude/Easting: 1271994.13 ft
Boring Location: NW corner- outside fence

Client: Port of Seattle
Project: POS-LLA
Task: 4010
Address: Lora Lake Apts Parcel 15001 Des Moines Memorial Dr

Remarks:

PID (ppm)	SHEEN	SAMPLE ID	DRIVEN / RECOVERED	DEPTH FT BGS	USCS SYMBOL	SOIL DESCRIPTION AND OBSERVATIONS (color, texture, moisture, MAJOR CONSITIUENT, odor, staining, sheen, debris, etc.)
3.0	No sheen	SSB04-0-0.5-090910		0	ML	light brown fine SANDY SILT with round and angular gravel (<2" diameter) and rootlets. fine-grained sand. no odor.
0.5	No sheen					gravel content decreased, rounded at 0.5 ft.
0.4	No sheen			1		small, round gravel (<1/2" diameter) and fine rootlets at 1.5 ft. no odor.
0.7	No sheen	SSB04-1.5-2-090910		2		

Notes:
FT BGS = feet below ground surface
ppm = parts per million
--- Dashed contact line in soil description indicates a gradational contact
USCS = Unified Soil Classification System
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Boring ID: SSB-5

Drill Date: August 7, 2010
Logged By: Tucker Stevens
Drilled By: Floyd|Snider
Drill Type: 3" x 18" Hand Auger
Sample Method: Composite Grab
Boring Diameter: 3 inches
Boring Depth (ft bgs): 2 feet
Groundwater ATD (ft bgs): NA

Coordinate System: NGVD29/NAD83
Ground Surface Elevation: 301.64 ft
Latitude/Northing: 174541.28 ft
Longitude/Easting: 1272096.57 ft
Boring Location: S. of Bldg M- outside fence

Client: Port of Seattle
Project: POS-LLA
Task: 4010
Address: Lora Lake Apts Parcel
15001 Des Moines Memorial Dr

Remarks:

PID (ppm)	SHEEN	SAMPLE ID	DRIVEN / RECOVERED	DEPTH FT BGS	USCS SYMBOL	SOIL DESCRIPTION AND OBSERVATIONS (color, texture, moisture, MAJOR CONSITIUENT, odor, staining, sheen, debris, etc.)
	No sheen	SSB05-0-0.5-080710		0	GW-GM	medium brown, dry, well-graded GRAVEL (angular) with SILT and SAND. some large gravel clasts (up to 2"). small roots and twigs.
	No sheen			1	SW-SM	light brown, dry, very fine to medium SAND with SILT and small, rounded GRAVEL.
	No sheen					some larger gravel (>3" diameter) at 1 ft.
	No sheen	SSB05-1.5-2-080710		2		increased gravel (round, up to 1 1/2") at 1.5 ft.

Notes:
FT BGS = feet below ground surface
ppm = parts per million
--- Dashed contact line in soil description indicates a gradational contact
USCS = Unified Soil Classification System
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Boring ID: SSB-6

Drill Date: September 9, 2010
Logged By: Tucker Stevens
Drilled By: Floyd|Snider
Drill Type: 3" x 18" Hand Auger
Sample Method: Composite Grab
Boring Diameter: 3 inches
Boring Depth (ft bgs): 2 ft
Groundwater ATD (ft bgs): NA

Coordinate System: NGVD29/NAD83
Ground Surface Elevation: 301.70 ft
Latitude/Northing: 174918.87 ft
Longitude/Easting: 1272291.60 ft
Boring Location: North side- outside fence

Client: Port of Seattle
Project: POS-LLA
Task: 4010
Address: Lora Lake Apts Parcel
15001 Des Moines Memorial Dr

Remarks:

PID (ppm)	SHEEN	SAMPLE ID	DRIVEN / RECOVERED	DEPTH FT BGS	USCS SYMBOL	SOIL DESCRIPTION AND OBSERVATIONS (color, texture, moisture, MAJOR CONSITIUENT, odor, staining, sheen, debris, etc.)
0.2	No sheen	PSB06-0-0.5-090910		0	ML	light brown, dry, fine SANDY SILT with rounded and angular gravel (<2" diameter). abundant rootlets. no odor or staining.
0.1	No sheen					larger, rounded gravel up to 3 1/2" at 0.5 ft. fewer roots. no odor.
0.2	No sheen			1		increased gravel content at 1 ft, 1-4" diameter.
0.2	No sheen	PSB06-1.5-2-090910		2		decreased gravel content at 1.5 ft, smaller (1/2-2") and rounded

Notes:
FT BGS = feet below ground surface
ppm = parts per million
--- Dashed contact line in soil description indicates a gradational contact
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Boring ID: SSB-7

Drill Date: August 13, 2010
Logged By: Kristin Anderson
Drilled By: Floyd|Snider
Drill Type: 3" x 18" Hand Auger
Sample Method: Composite Grab
Boring Diameter: 3 inches
Boring Depth (ft bgs): 2 feet
Groundwater ATD (ft bgs): NA

Coordinate System: NGVD29/NAD83
Ground Surface Elevation: 301.84 ft
Latitude/Northing: 174784.39 ft
Longitude/Easting: 1272002.84 ft
Boring Location: Pavement btw bldgs P and Q

Client: Port of Seattle
Project: POS-LLA
Task: 4010
Address: Lora Lake Apts Parcel 15001 Des Moines Memorial Dr

Remarks:

PID (ppm)	SHEEN	SAMPLE ID	DRIVEN / RECOVERED	DEPTH FT BGS	USCS SYMBOL	SOIL DESCRIPTION AND OBSERVATIONS (color, texture, moisture, MAJOR CONSITIUENT, odor, staining, sheen, debris, etc.)
1.8	No sheen	SSB07-0-0.5-081310		0	SM	medium brown, moist, medium SILTY SAND with angular GRAVEL. no odor.
2.4	No sheen					becomes slightly less moist at 0.5 ft.
2.7	No sheen			1		
2.2	No sheen	SSB07-1.5-2-081310		2		

Notes:
FT BGS = feet below ground surface
ppm = parts per million
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Boring ID: SSB-8

Drill Date: August 3, 2010
Logged By: Kristin Anderson
Drilled By: Floyd Snider
Drill Type: 3" x 18" Hand Auger
Sample Method: Composite Grab
Boring Diameter: 3 inches
Boring Depth (ft bgs): 2 feet
Groundwater ATD (ft bgs): NA

Coordinate System: NGVD29/NAD83
Ground Surface Elevation: 302.39 ft
Latitude/Northing: 174628.19 ft
Longitude/Easting: 1272068.91
Boring Location: Parking lot near bldg M

Client: Port of Seattle
Project: POS-LLA
Task: 4010
Address: Lora Lake Apts Parcel 15001 Des Moines Memorial Dr

Remarks:

PID (ppm)	SHEEN	SAMPLE ID	DRIVEN / RECOVERED	DEPTH FT BGS	USCS SYMBOL	SOIL DESCRIPTION AND OBSERVATIONS (color, texture, moisture, MAJOR CONSITIUENT, odor, staining, sheen, debris, etc.)
3.8	No sheen	SSB08-0-0.5-080310		0	SM	medium brown, moist, medium SILTY SAND with large, angular GRAVEL. no odor.
5.0	No sheen					slighly less moist than above with small areas of reddish staining at 0.5 ft. no odor.
2.9	No sheen			1		more moist than above, with small black clumps of decaying wood chips (~1/4" wide) at 1 ft. no odor.
3.4	No sheen	SSB08-1.5-2-080310		2	SW-SM	medium reddish brown, moist, medium to fine SAND with SILT and angular GRAVEL. small clumps of gray, plastic silt and trace black flecks. no odor.

Notes:
FT BGS = feet below ground surface
ppm = parts per million
--- Dashed contact line in soil description indicates a gradational contact
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Boring ID: SSB-9

Drill Date: August 3, 2010
Logged By: Amanda McKay
Drilled By: Floyd|Snider
Drill Type: 3" x 18" Hand Auger
Sample Method: Composite Grab
Boring Diameter: 3 inches
Boring Depth (ft bgs): 2 feet
Groundwater ATD (ft bgs): NA

Coordinate System: NGVD29/NAD83
Ground Surface Elevation: 305.44 ft
Latitude/Northing: 174704.77 ft
Longitude/Easting: 1272292.88 ft
Boring Location: near former bldg J

Client: Port of Seattle
Project: POS-LLA
Task: 4010
Address: Lora Lake Apts Parcel
15001 Des Moines Memorial Dr

Remarks:

PID (ppm)	SHEEN	SAMPLE ID	DRIVEN / RECOVERED	DEPTH FT BGS	USCS SYMBOL	SOIL DESCRIPTION AND OBSERVATIONS (color, texture, moisture, MAJOR CONSITIUENT, odor, staining, sheen, debris, etc.)
4.9	No sheen	SSB09-0-0.5-080310		0	SM	light brown, dry, fine and coarse SILTY SAND with small rounded GRAVEL. some roots, no odor.
2.9	No sheen			1	SW-SM	light brown, dry, medium and coarse SAND with SILT and rounded GRAVEL. slighly darker than above, with some debris (marble). no odor.
4.8	No sheen					medium brown, moist, and fine to medium at 1.5 ft, with trace small roots and wood fragments.
2.0	No sheen	SSB09-1.5-2-080310		2		

Notes:
FT BGS = feet below ground surface
ppm = parts per million
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USCS = Unified Soil Classification System
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Boring ID: SSB-10

Drill Date: August 3, 2010
Logged By: Amanda McKay
Drilled By: Floyd|Snider
Drill Type: 3" x 18" Hand Auger
Sample Method: Composite Grab
Boring Diameter: 3 inches
Boring Depth (ft bgs): 2 feet
Groundwater ATD (ft bgs): NA

Coordinate System: NGVD29/NAD83
Ground Surface Elevation: 174780.56 ft
Latitude/Northing: 174780.56 f
Longitude/Easting: 1272553.59 ft
Boring Location: East entrance driveway

Client: Port of Seattle
Project: POS-LLA
Task: 4010
Address: Lora Lake Apts Parcel
15001 Des Moines Memorial Dr

Remarks:

PID (ppm)	SHEEN	SAMPLE ID	DRIVEN / RECOVERED	DEPTH FT BGS	USCS SYMBOL	SOIL DESCRIPTION AND OBSERVATIONS (color, texture, moisture, MAJOR CONSITIUENT, odor, staining, sheen, debris, etc.)
1.1	No sheen	SSB10-0-0.5-080310		0	SM	medium brown, moist, fine SILTY SAND with rounded GRAVEL. trace roots, no odor
2.5	No sheen					no roots below 0.5 ft
3.3	No sheen			1		
2.8	No sheen	SSB10-1.5-2-080310		2		

Notes:
FT BGS = feet below ground surface
ppm = parts per million
--- Dashed contact line in soil description indicates a gradational contact
USCS = Unified Soil Classification System
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Boring ID: HA-1

Drill Date: April 18, 2011
Logged By: Tucker Stevens
Drilled By: Floyd|Snider
Drill Type: 3" x 18" Hand Auger
Sample Method: Composite grab
Boring Diameter: 3 inches
Boring Depth (ft bgs): 4 ft
Groundwater ATD (ft bgs): NA

Coordinate System: NAD83/NGVD29
Ground Surface Elevation: 300.06 ft
Latitude/Northing: 1272378.72 ft
Longitude/Easting: 1272378.7 ft
Boring Location: SE corner parking lot

Client: Port of Seattle
Project: POS-LLA
Task: 4010
Address: Lora Lake Apts Parcel
15001 Des Moines Memorial Dr

Remarks: Additional dioxin hand auger

PID (ppm)	SHEEN	SAMPLE ID	DRIVEN / RECOVERED	DEPTH FT BGS	USCS SYMBOL	SOIL DESCRIPTION AND OBSERVATIONS (color, texture, moisture, MAJOR CONSITIUENT, odor, staining, sheen, debris, etc.)
0.2	no sheen	LL-HA1-0-0.5-041811		0	GM	light/medium brown SILTY GRAVEL with SAND. small, angular gravel < 1" diameter. some organic material and rootlets. no odor.
0.2	no sheen			1		medium brown with little organic material at 1 ft. small piece of plastic landscape geotextile
0.2	no sheen	LL-HA1-1.5-2-041811		2	SM	medium brown fine SILTY SAND with small round GRAVEL. non-plastic silt. some larger gravel, roots and light brown lenses at 2.5 ft
0.1	no sheen	LL-HA1-2-4-041811		3	SP	6" lense of orange oxidized and black SAND. no odor.
				4	SM	medium brown fine SILTY SAND with GRAVEL.

Notes:
FT BGS = feet below ground surface
ppm = parts per million
--- Dashed contact line in soil description indicates a gradational contact
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Boring ID: HA-2

Drill Date: April 18, 2011
Logged By: Tucker Stevens
Drilled By: Floyd|Snider
Drill Type: 3" x 18" Hand Auger
Sample Method: Composite Grab
Boring Diameter: 3 inches
Boring Depth (ft bgs): 4 ft
Groundwater ATD (ft bgs): NA

Coordinate System: NAD83/NGVD29
Ground Surface Elevation: 285.61 ft
Latitude/Northing: 174347.41 ft
Longitude/Easting: 1272455.26 ft
Boring Location: SE Corner along D.M.D.

Client: Port of Seattle
Project: POS-LLA
Task: 4010
Address: Lora Lake Apts Parcel 15001 Des Moines Memoral Dr

Remarks: Additional dioxin hand auger

PID (ppm)	SHEEN	SAMPLE ID	DRIVEN / RECOVERED	DEPTH FT BGS	USCS SYMBOL	SOIL DESCRIPTION AND OBSERVATIONS (color, texture, moisture, MAJOR CONSITIUENT, odor, staining, sheen, debris, etc.)
0.1	No sheen	LL-HA2 0-0.5-041811		0	SM	medium brown fine SILTY SAND with slight small gravel (<1"). sticks and roots. no odor.
					CL	1-inch thick lense of CLAY at 0.5 ft
0.0	No sheen			1	SM	medium brown fine SILTY SAND. worms and rootlets
0.0	No sheen	LL-HA2 1.5-2-041811		2		color grades to light brown, with small rounded gravels and very little organic material. no odor.
0.0	No sheen	LL-HA2 2-4-041811		3	SM/CL	light/medium brown, medium SILTY SAND with thin lenses of hardened CLAY. round and angular gravel <1.5" diameter. little organic material, no odor.
				4		

Notes:
FT BGS = feet below ground surface
ppm = parts per million
--- Dashed contact line in soil description indicates a gradational contact
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Boring ID: HA-3

Drill Date: April 18, 2011
Logged By: Dean Brame
Drilled By: Floyd|Snider
Drill Type: 3" x 18" Hand Auger
Sample Method: Composite Grab
Boring Diameter: 3 inches
Boring Depth (ft bgs): 4 ft
Groundwater ATD (ft bgs): NA

Coordinate System: NAD83/NGVD29
Ground Surface Elevation: 291.46 ft
Latitude/Northing: 174314.99 ft
Longitude/Easting: 1272378.34 ft
Boring Location: SE corner- Sunnydale prop.

Client: Port of Seattle
Project: POS-LLA
Task: 4010
Address: 15001 Des Moines Memorial Dr.S., Burien

Remarks: Additional dioxin hand auger

PID (ppm)	SHEEN	SAMPLE ID	DRIVEN / RECOVERED	DEPTH FT BGS	USCS SYMBOL	SOIL DESCRIPTION AND OBSERVATIONS (color, texture, moisture, MAJOR CONSITIUENT, odor, staining, sheen, debris, etc.)
0.0	No sheen	LL-HA3-0-0.5-041811		0	SM	medium brown, moist, fine SILTY SAND and trace (~1%) rounded gravel. few roots, no odor.
0.1	No sheen			1	SW	orange-brown, moist medium SAND with slight rounded gravel (~1/2"). oxidized throughout, with minor roots. no odor.
0.0	No sheen	LL-HA3-1.5-2-041811		2		dry with ~ 10% coarse sand at 1.5 ft. ~1% rounded gravel, 1/2" diameter. no odor.
0.0	No sheen	LL-HA3-2-4-041811		3		~5% small gravel and 1% large gravel at 2.5 ft. dry, no odor.
				4		

Notes:
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ppm = parts per million
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Port of Seattle
Lora Lake Apartments Site

Remedial Investigation/ Feasibility Study

Volume II

Appendix F
Lora Lake Apartments Parcel Remedial Investigation Data Report

Attachment F.2
Well Installation Logs

FINAL

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Monitoring Well ID: MW-12

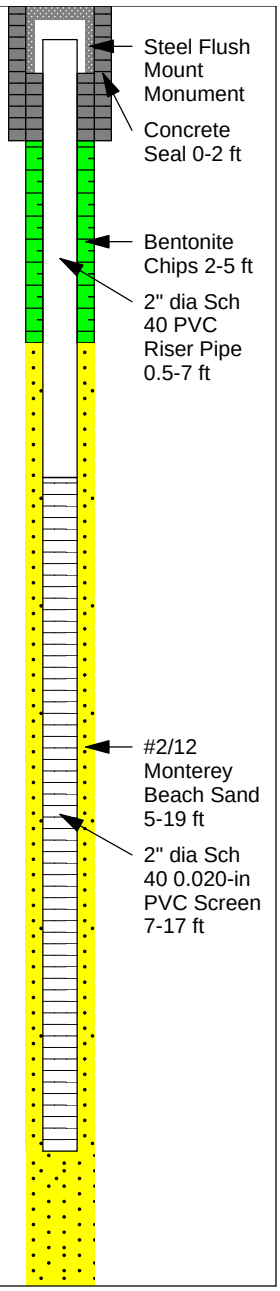
Drill Date: August 2, 2010
Logged By: Megan McCullough
Drilled By: Cascade Drilling
Drill Type: Hollow Stem Auger
Sample Method: 18" split spoon
Boring Diameter: 8 inches
Boring Depth (ft bgs): 19 ft
Groundwater ATD (ft bgs): 10 ft

Ground Surf Elev. & Datum: 287.13 ft
Coordinate System: NGVD29/NAD83
Latitude/Northing: 174762.0372 ft
Longitude/Easting: 1272711.531 ft
Casing Elevation: 286.53 ft

Client: Port of Seattle
Project: POS-LLA
Task Number: T 4010
Site Location: LL Apts Parcel
15001 Des Moines Memorial Dr.

Remarks:

SAMPLE INTERVAL	PID (ppm)	DRIVE / RECOVERY	BLOW COUNT	DEPTH FT BGS	USCS SYMBOL	SOIL DESCRIPTION AND OBSERVATIONS: (color, texture, moisture, MAJOR CONSTITUENT, odor, staining, sheen, debris, etc.)
MW12-0-0.5-080210	4.4		23 50/6"	0	SM	medium brown, dry, fine SILTY SAND with GRAVEL. bark and organics in top 4". no sheen, no odor.
MW12-1.5-2-080210	4.5		29 50/6"	1		
MW12-2-4-080210	3.7		22 50/4"	2		less silt with depth
MW12-4-5.5-080210	4.6		18 25 50/6"	3		1" layer of bark color grades to black
MW12-5.5-7.5-080210	3.5		16 23 34	4	SP-SM	gray, fine SAND with SILT and streaks of black staining. no odor.
MW12-8-9.5-080210	4.3		14 23 39	5	SP	light brown, moist, fine SAND with streaks of gray to orange (oxide). trace organics, no odor
MW12-10-11.5-080210	3.7		17 26 38	6	SW ML SW	medium gray to brown, fine to coarse SAND with small GRAVEL. 3" lense of light gray, wet SILT with iron oxide staining at 10.9 ft, no odor.
	3.1		17 34 50/3"	7	SM	light brown, wet, fine SILTY SAND. no odor
			50/3" 50/6"	8		no recovery at 15 ft- loose, wet material
MW12-17.5-19-0080210			14 28 35	9	SP	light brown, wet, fine SAND with trace silt. no odor.



Notes:
FT BGS = feet below ground surface
ppm = parts per million

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Monitoring Well ID: MW-13

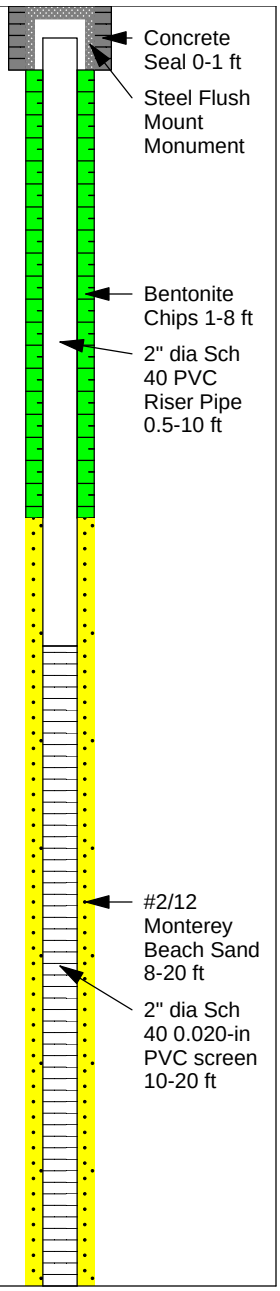
Drill Date: August 2, 2010
Logged By: Megan McCullough
Drilled By: Cascade Drilling
Drill Type: Hollow Stem Auger
Sample Method: 18" split spoon
Boring Diameter: 8 inches
Boring Depth (ft bgs): 20 ft
Groundwater ATD (ft bgs): 13.75 ft

Ground Surf Elev. & Datum: 289.89 ft
Coordinate System: NGVD29/NAD83
Latitude/Northing: 174904.8622 ft
Longitude/Easting: 1272777.633 ft
Casing Elevation: 289.43 ft

Client: Port of Seattle
Project: POS-LLA
Task Number: T 4010
Site Location: LL Apts Parcel
15001 Des Moines Memorial Dr.

Remarks:

SAMPLE INTERVAL	PID (ppm)	DRIVE / RECOVERY	BLOW COUNT	DEPTH FT BGS	USCS SYMBOL	SOIL DESCRIPTION AND OBSERVATIONS: (color, texture, moisture, MAJOR CONSTITUENT, odor, staining, sheen, debris, etc.)
MW13-0-0.5-080210	3.8		7 10 10	0–1	SM	medium brown to reddish brown, dry, fine SILTY SAND. no odor
MW13-1.5-2-080210	4.0		9 11 13	1–2	SP	grades to light brown/gray, dry, fine SAND with few small areas of oxide staining. no odor, no sheen.
MW13-2-4-080210	.5		10 14 17	2–4	ML	grades to light gray, dry, SILT with fine SAND. abundant oxide staining and woody debris (small rootlets and bark). no odor, no sheen.
MW13-4-6-080210	3.6		12 14 22	4–6		
	4.3		60/6"	6–8	SP-SM	light brown/reddish brown, moist, fine SAND with SILT and increasing GRAVEL (2-4.5" diameter). no odor, no sheen
MW13-10-11.5-080210	3.7		12 50/6"	8–10	ML	light brown/gray, moist SILT. trace organics, oxide stains, no sheen, no odor.
				10–11	SP	light brown/gray, fine SAND with GRAVEL. no odor, no sheen.
				11–13		no recovery at 12.5 ft- rock blocking sampler
MW13-14-14.5-080210	3.8		60/5"	13–15	SW	medium blue/gray, fine and coarse SAND in interbedded lenses. trace silt and gravel in coarse lenses. no odor, no sheen.
	3.5		60/6"			medium gray and wet with trace silt and gravel at 15 ft.. large 4" diameter rock in core. no odor, no sheen.
MW13-18.5-19.5-080210	2.8		21 50/6"	18–20		dark gray with abundant gravel and trace silt at 18.5 ft. no odor, no sheen



Notes:
FT BGS = feet below ground surface
ppm = parts per million

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▼ = denotes groundwater table

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Monitoring Well ID: MW-14

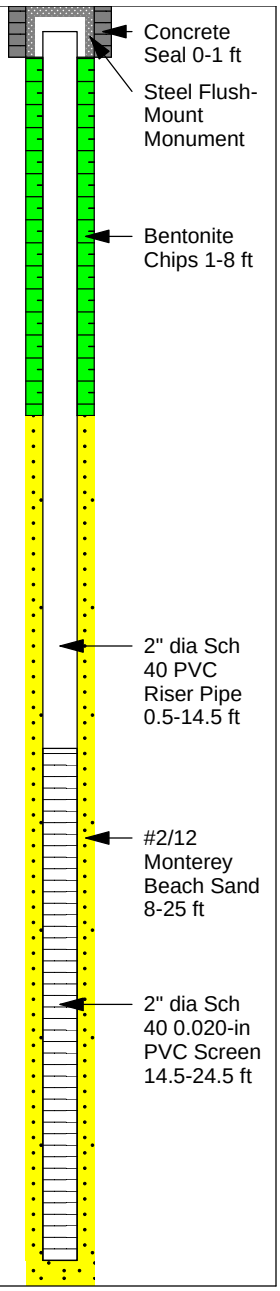
Drill Date: August 2, 2010
Logged By: Megan McCullough
Drilled By: Cascade Drilling
Drill Type: Hollow Stem Auger
Sample Method: 18" split spoon
Boring Diameter: 8 inches
Boring Depth (ft bgs): 25 ft
Groundwater ATD (ft bgs): 15.25 ft

Ground Surf Elev. & Datum: 297.19 ft
Coordinate System: NGVD29/NAD83
Latitude/Northing: 174819.3889 ft
Longitude/Easting: 1272606.284 ft
Casing Elevation: 296.94 ft

Client: Port of Seattle
Project: POS-LLA
Task Number: T 4010
Site Location: LL Apts Parcel
15001 Des Moines Memorial Dr.

Remarks:

SAMPLE INTERVAL	PID (ppm)	DRIVE / RECOVERY	BLOW COUNT	DEPTH FT BGS	USCS SYMBOL	SOIL DESCRIPTION AND OBSERVATIONS: (color, texture, moisture, MAJOR CONSTITUENT, odor, staining, sheen, debris, etc.)
MW14-0-0.5-080210	2.1		15 22 34	0	SM	2" of asphalt above medium brown, moist SILTY SAND with GRAVEL. no odor, slight sheen
	1.4		33 50/6"	1	SP	grades to reddish brown, fine SAND with GRAVEL and trace silt. no odor, no sheen.
MW14-1.5-2-080210	2.5		23	2		
	2.7		18	3		grades to coarse at 3 ft.. refusal on first 1.5-3 ft drive, poor recovery on second attempt. abundant gravel.
MW14-2-4-080210			40 24 28 30	4		no recovery 4-6 ft, multiple drives attempted. large cobbles and 2-4" diameter gravel in cuttings
	2.7		60/5"	8	SM	medium brown, moist, fine to medium SILTY SAND with GRAVEL. no odor, no sheen.
	2.1		100/6"	10	SP	brown/gray, moist, medium SAND with GRAVEL and few small silt clasts, small gravel ~30%. no sheen, no odor.
	2.5		28 36 36	12		light brown/gray and medium with trace silt at 12.5 ft. no odor, no sheen.
MW14-15-16.5-080210	2.8		15 38 50/5"	15		same as above at 15 ft. wet at 15.25 ft, grades to coarse at 16 ft with very slight sheen (1-2 small strands). no odor.
	3.4		12 22 38	18	SW	light brown/gray, wet, fine to medium SAND with trace silt. no odor, no sheen.
	2.7		17 28 25	20	SP	light brown, wet, fine SAND with grace silt and no gravel. no odor.
MW14-22.5-24-080210	3.6		15 21 30	23		same as above at 22.5 ft. no odor, no sheen.
				24		



Notes:
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ppm = parts per million

--- Dashed contact line in soil description indicates a gradational contact
USCS = Unified Soil Classification System
▼ = denotes groundwater table

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Monitoring Well Construction Log

Project Number	Well Number	Sheet
090134-001-04	MW-15	1 of 3

Project Name: Lora Lake Apartment Parcel RI/FS
Location: Burien, WA
Driller/Method: Cascade / Rotosonic
Sampling Method: Continuous core

Ground Surface Elev: --
Top of Casing Elev.: --
Depth to Water (ft BGS): 17.93
Start/Finish Date: 8/23/2010-8/24/2010

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Field Screening Observations	PID (ppm)	Density (psf)	Material Type	Description	Depth (ft)
1	Flush mount monument		No odor, sheen, or staining				**FILL** Dry, dark brown, slightly silty, slightly gravelly SAND (SP-SM); fine to medium sand, fine subrounded gravel, scattered organics (roots)	1
2	Neat cement (0-2')			2.0			Yellow-red/brown, fine to coarse gravel (1.5")	2
3	Centralizer (2.5')							3
4							Decrease in gravel	4
5			No odor, sheen, or staining	7.0 (50)			Dry, yellow-red/brown, slightly silty, very gravelly SAND (SP-SM); predominantly fine to medium sand, fine to coarse subrounded gravel (2.5")	5
6								6
7	Bentonite chips (2-44.5')							7
8								8
9		Soil: MW15-8-10-082310	Slight sheen, slight sweet odor, no staining	3.0 (37)			Slightly moist, gray, gravelly SAND (SP); predominantly medium sand, fine to coarse rounded to subrounded gravel (2.5")	9
10								10
11			No odor, sheen, or staining	5.0			Slightly moist, dark gray, silty, gravelly SAND (SM); fine to coarse sand, fine to coarse rounded to subrounded gravel (2.5")	11
12								12
13							Red brick	13
14			No odor, sheen, or staining	2.0 (4.0)			Slightly moist, dark gray, slightly silty SAND (SP-SM); trace fine to coarse rounded gravel (1"); predominantly fine to medium sand	14
15	2" Sch40 PVC riser, flush-thread, O-rings (0.3-47.25')						**GLACIAL OUTWASH (Qvr/Qva)** Moist, light gray, silty SAND (SM); trace fine gravel, predominantly fine to medium sand	15
16								16
17			No odor, sheen, or staining	2.5 (2)			Moist, light gray SAND (SP); trace fine gravel, predominantly medium sand	17
18	▼ 9/13/2010							18
19	▽ 8/26/2010		No odor, sheen, or staining	2.7 (7)				19
20								20
21								21
22		Soil: MW15-20-25-082310	No odor, sheen, or staining	2.8 (7.7)			Wet, light gray, slightly gravelly SAND (SP); predominantly coarse sand, fine gravel	22
23							SAND (SP); trace gravel, predominantly medium sand	23
24			No odor, sheen, or staining	(2.8)			Wet, light gray/brown, very gravelly SAND (SP); medium to coarse sand, fine to coarse gravel (3.5") Gravelly SAND (SP); predominantly medium sand; fine gravel	24

Sampler Type:
○ No Recovery
▮ Continuous Core

PID - Photoionization Detector
▼ Static Water Level
▽ Water Level (ATD)

Logged by: JMS
Approved by: JJS

PID concentration in parenthesis measured directly from sonic sample bag.

Figure No.

_MONITORING WELL_SONIC LORA LAKE.GPJ July 20, 2011

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Aspect CONSULTING

Monitoring Well Construction Log

Project Number	Well Number	Sheet
090134-001-04	MW-15	2 of 3

Project Name: Lora Lake Apartment Parcel RI/FS
Location: Burien, WA
Driller/Method: Cascade / Rotosonic
Sampling Method: Continuous core

Ground Surface Elev: --
Top of Casing Elev.: --
Depth to Water (ft BGS): 17.93
Start/Finish Date: 8/23/2010-8/24/2010

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Field Screening Observations	PID (ppm)	Density (psf)	Material Type	Description	Depth (ft)
26			No odor, sheen, or staining	(5.6)			Wet, brown SAND (SP); trace fine gravel, predominantly medium sand	26
27		Soil: MW15-25-30-082310						27
28							Wet, dark brown, very gravelly SAND (SP); fine to coarse gravel (4"), predominantly medium sand	28
29								29
30			No odor, sheen, or staining	(3.2)			Gravelly SAND (SP); fine to coarse gravel (1.5")	30
31								31
32		Soil: MW15-30-35-082310						32
33							Wet, dark brown SAND (SP); medium sand	33
34								34
35			No odor, sheen, or staining	2.0 (10)				35
36								36
37		Soil: MW15-35-40-082310						37
38							Dark brown/gray	38
39								39
40			No odor, sheen, or staining	(2.5)			Gray, medium sand, coarsens downward to 42.5'	40
41								41
42		Soil: MW15-40-45-082310					Fine sand	42
43			No odor, sheen, or staining	(1.6)			Medium sand, coarsens downward to 49'	43
44								44
45	2-12 sand (44.5-57.75')							45
46			No odor, sheen, or staining	(3.4)				46
47	Centralizer (46.75')							47
48			No odor, sheen, or staining	(5.9)				48
49		Soil: 49-50					Fine sand	49

Sampler Type:
- No Recovery
- Continuous Core

PID - Photoionization Detector
- Static Water Level
- Water Level (ATD)

Logged by: JMS
Approved by: JJS

PID concentration in parenthesis measured directly from sonic sample bag.

Figure No.

_MONITORING WELL_SONIC LORA LAKE.GPJ July 20, 2011

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Aspect CONSULTING

Monitoring Well Construction Log

Project Number	Well Number	Sheet
090134-001-04	MW-15	3 of 3

Project Name: Lora Lake Apartment Parcel RI/FS
Location: Burien, WA
Driller/Method: Cascade / Rotosonic
Sampling Method: Continuous core

Ground Surface Elev: --
Top of Casing Elev.: --
Depth to Water (ft BGS): 17.93
Start/Finish Date: 8/23/2010-8/24/2010

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Field Screening Observations	PID (ppm)	Density (psf)	Material Type	Description	Depth (ft)
51	2" Sch40 PVC screen, flush-thread, O-rings, 0.010" slot (47.25-57.25')		No odor, sheen, or staining	(<1)			Slighlty moist to wet, gray SILT (ML)	51
52		Soil: MW15-50-55-082310					Wet, gray SAND (SP); predominantly fine sand	52
53			No odor, sheen, or staining	2.1 (5.5)				53
54								54
55							Slightly moist to wet, gray, clayey SILT (CL-ML)	55
56								56
57	Centralizer (57.25')	Soil: MW15-55-60-082310	No odor, sheen, or staining	(2.0)				57
58	2" Sch40 PVC sump (57.25-57.75')							58
59	Bentonite chips (57.75-60')							59
60							Bottom of boring at 60'.	60
61								61
62								62
63								63
64								64
65								65
66								66
67								67
68								68
69								69
70								70
71								71
72								72
73								73
74								74

Sampler Type:
- No Recovery
- Continuous Core

PID - Photoionization Detector
- Static Water Level
- Water Level (ATD)

Logged by: JMS
Approved by: JJS

PID concentration in parenthesis measured directly from sonic sample bag.

Figure No.

_MONITORING WELL_SONIC LORA LAKE.GPJ July 20, 2011

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Monitoring Well Construction Log

Project Number	Well Number	Sheet
090134-001-04	MW-16	1 of 2

Project Name: Lora Lake Apartment Parcel RI/FS
Location: Burien, WA
Driller/Method: Cascade / Rotosonic
Sampling Method: Continuous core

Ground Surface Elev: --
Top of Casing Elev.: --
Depth to Water (ft BGS): 11.54
Start/Finish Date: 8/24/2010-8/25/2010

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Field Screening Observations	PID (ppm)	Density (psf)	Material Type	Description	Depth (ft)
1	Flush mount monument; Neat cement (0-2')		No odor, sheen, or staining	3.3 (5.1)			**FILL** Dry, brown, very sandy GRAVEL (GW); fine to coarse sand, fine to coarse subrounded gravel (3"), scattered organics	1
2							Dry, brown/yellow-red, silty SAND (SM); trace fine gravel, predominantly medium sand; silt lense w/ trace gravel at 3'	2
3			No odor, sheen, or staining	1.4 (4.7)			Dry, brown, slightly silty, very gravelly SAND (SP-SM); fine to coarse subrounded gravel (3"), fine to coarse sand	3
4								4
5							Slightly moist, brown/dark brown	5
6							**GLACIAL OUTWASH (Qvr/Qva)**	6
7	Bentonite chips (2-34.75')		No odor, sheen, or staining	2.2 (4.7)			Slightly moist, red-brown/dark brown SAND (SP); trace silt; trace fine rounded gravel; medium sand Slightly moist, red-brown SAND (SP); medium sand	7
8								8
9							Moist, dark brown, SAND (SP); trace silt, medium sand	9
10			No odor, sheen, or staining	2.7 (1.7)				10
11	▽ 8/26/2010 ▼ 9/13/2010						Moist, red-brown, slightly silty SAND (SP-SM); medium sand	11
12								12
13		○	No odor, sheen, or staining	1.8 (1.8)				13
14							Wet	14
15	2" Sch40 PVC riser, flush-thread, O-rings (0.3-37.25')						Wet, dark brown SAND (SP); medium sand; gradational color change to gray at 18' Gray-purple sand pocket	15
16			No odor, sheen, or staining	1.9 (0.4)				16
17		Soil: MW16-15-20-082410						17
18							Gray, trace silt	18
19			No odor, sheen, or staining	2.3 (1.4)				19
20							Wet, gray-purple SAND (SP); medium sand	20
21								21
22		Soil: MW16-20-25-082410						22
23			No odor, sheen, or staining	1.7 (2.6)				23
24		○						24

Sampler Type:
○ No Recovery
▯ Continuous Core

PID - Photoionization Detector
▼ Static Water Level
▽ Water Level (ATD)

PID concentration in parenthesis measured directly from sonic sample bag.

Logged by: JMS
Approved by: JJS
Figure No.

_MONITORING WELL_SONIC LORA LAKE.GPJ September 27, 2010

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Monitoring Well Construction Log

Project Number	Well Number	Sheet
090134-001-04	MW-16	2 of 2

Project Name:	Lora Lake Apartment Parcel RI/FS	Ground Surface Elev	--
Location:	Burien, WA	Top of Casing Elev.	--
Driller/Method:	Cascade / Rotosonic	Depth to Water (ft BGS)	11.54
Sampling Method:	Continuous core	Start/Finish Date	8/24/2010-8/25/2010

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Field Screening Observations	PID (ppm)	Density (psf)	Material Type	Description	Depth (ft)
26							Wet, dark brown SAND (SP); trace silt, medium-fine sand	26
27		Soil: MW16-25-30-082410	No odor, sheen, or staining	0.6 (2.5)				27
28								28
29							Medium sand	29
30								30
31								31
32		Soil: MW16-30-35-082410						32
33								33
34			No odor, sheen, or staining	0.8 (3.2)				34
35	2-12 sand (34.75-48.5')							35
36							Wet, dark brown SAND (SP); medium-fine sand; fining downward to silt at 39'	36
37	Centralizer (36.75')							37
38								38
39		Soil (Dup): 39-40	No odor, sheen, or staining	1.5 (5.8)			Wet, light gray SILT (ML)	39
40	2" Sch40 PVC screen, flush-thread, O-rings, 0.010" slot (37.25-47.25')						Wet, gray, sandy SILT (ML); scattered organics	40
41		Soil: MW16-40-42-082410		0.9 (1.2)				41
42							Wet, gray, very silty SAND (SM); fine sand	42
43			No odor, sheen, or staining	0.5 (1.5)				43
44		Soil: MW16-42-47.5-082410						44
45								45
46								46
47	Centralizer (47.25')		No odor, sheen, or staining	0.5 (1.1)			Wet, gray, clayey SILT (CL-SM)	47
48	2" Sch40 PVC sump (47.25-47.75')							48
49							Bottom of boring at 49.5'	49

Sampler Type:
- ○ No Recovery
- ▮▮ Continuous Core

PID - Photoionization Detector
- ▼ Static Water Level
- ▽ Water Level (ATD)

Logged by: JMS

Approved by: JJS

PID concentration in parenthesis measured directly from sonic sample bag.

Figure No.

_MONITORING WELL_SONIC LORA LAKE.GPJ September 27, 2010

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Monitoring Well Construction Log

Project Number	Well Number	Sheet
090134-001-04	MW-17	1 of 3

Project Name: Lora Lake Apartment Parcel RI/FS
Location: Burien, WA
Driller/Method: Cascade / Rotosonic
Sampling Method: Continuous core

Ground Surface Elev: --
Top of Casing Elev.: --
Depth to Water (ft BGS): 15.82
Start/Finish Date: 8/25/2010-8/26/2010

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Field Screening Observations	PID (ppm)	Density (psf)	Material Type	Description	Depth (ft)
1	Flush mount monument; Neat cement (0-2')		No odor, sheen, or staining	0.0			**FILL** Dry, brown, slightly silty, gravelly SAND (SW-SM): fine to coarse sand, fine to coarse rounded to subrounded gravel (2.5"), scattered organics (roots)	1
2								2
3			No odor, sheen, or staining	0.6			Dry, brown, gravelly SAND (SP); trace silt, predominantly medium sand, fine to coarse subrounded gravel (1.5"), occasional organics (wood)	3
4	2" Sch40 PVC riser, flush-thread, O-rings (0.3-42')							4
5		○					Yellow-red (oxidized), silty, gravelly SAND (SM) lense (6")	5
6			No odor, sheen, or staining	0.8			Yellow-red (oxidized), silty, gravelly SAND (SM) lense (6")	6
7	Bentonite chips (2-39.5')						Dry, brown, slightly silty, very gavelly SAND (SW-SM); fine to coarse sand, fine to coarse subrounded gravel (1.5")	7
8								8
9			No odor, sheen, or staining	0.4			Dry, yellow-red, slightly gravelly SAND (SP); trace silt, predominantly medium sand, fine rounded to subrounded gravel	9
10								10
11							Dry, dark brown, gravelly, silty SAND (SM); fine to coarse sand, fine rounded to subrounded gravel	11
12			No odor, sheen, or staining	1.3				12
13							**GLACIAL OUTWASH (Qvr/Qva)**	13
14			No odor, sheen, or staining	0.9			Slightly moist, dark brown SAND (SP); trace silt, medium-fine sand	14
15							Moist, dark brown SAND (SP); with red-brown, silty SAND (SM) lense	15
16	▼9/13/2010		No odor, sheen, or staining	0.9			Wet	16
17		Soil: MW17-15-20-082610					Wet, dark brown SAND (SP); trace silt; with silty SAND (SM) lense	17
18							Wet, dark brown SAND (SP); medium-fine sand; with scattered red-brown (oxidized) slightly silty SAND (SP-SM) pockets	18
19			No odor, sheen, or staining	0.8				19
20								20
21			No odor, sheen, or staining	1.3				21
22		○ Soil: MW17-20-25-082610						22
23								23
24			No odor, sheen, or staining	1.5			Brown, clayey silt laminae (0.25")	24

Sampler Type:
○ No Recovery
▮ Continuous Core

PID - Photoionization Detector
▼ Static Water Level
▽ Water Level (ATD)

PID concentration in parenthesis measured directly from sonic sample bag.

Logged by: JMS
Approved by: JJS
Figure No.

_MONITORING WELL_SONIC LORA LAKE.GPJ September 27, 2010

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Monitoring Well Construction Log

Project Number	Well Number	Sheet
090134-001-04	MW-17	2 of 3

Project Name:	Lora Lake Apartment Parcel RI/FS	Ground Surface Elev	--
Location:	Burien, WA	Top of Casing Elev.	--
Driller/Method:	Cascade / Rotosonic	Depth to Water (ft BGS)	15.82
Sampling Method:	Continuous core	Start/Finish Date	8/25/2010-8/26/2010

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Field Screening Observations	PID (ppm)	Density (psf)	Material Type	Description	Depth (ft)
26							Wet, dark brown/gray SAND (SP); medium sand	26
27		Soil: MW17-25-30-082610	No odor, sheen, or staining	1.4				27
28								28
29			No odor, sheen, or staining	1.2				29
30							Medium-fine sand	30
31			No odor, sheen, or staining	2.2				31
32		Soil: MW17-30-35-082610						32
33			No odor, sheen, or staining	1.1				33
34								34
35								35
36			No odor, sheen, or staining	0.6				36
37		Soil: MW17-35-40-082610						37
38								38
39			No odor, sheen, or staining	0.7				39
40	2-12 sand (39.5-52.5')						Wet, gray SAND (SP); medium sand	40
41	Centralizer (41.5')	Soil: MW17-40-42.5-082610	No odor, sheen, or staining	1.0				41
42								42
43					3500		Stiff, moist, gray, very clayey SILT (CL-ML)	43
44			No odor, sheen, or staining	0.5			Wet, gray SAND (SP); medium sand	44
45	2" Sch40 PVC screen, flush-thread, O-rings, 0.010" slot (42-52')				2500		Stiff, moist, gray, clayey SILT (CL-ML)	45
46			No odor, sheen, or staining	0.0				46
47		Soil: MW17-45-50-082610					Wet, gray, silty SAND (SM); fine sand	47
48							Wet, gray SAND (SP); trace silt, medium sand	48
49			No odor, sheen, or staining	0.0				49

Sampler Type:
- ○ No Recovery
- ▯ Continuous Core

PID - Photoionization Detector
- ▼ Static Water Level
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Monitoring Well Construction Log

Project Number	Well Number	Sheet
090134-001-04	MW-17	3 of 3

Project Name:	Lora Lake Apartment Parcel RI/FS	Ground Surface Elev	--
Location:	Burien, WA	Top of Casing Elev.	--
Driller/Method:	Cascade / Rotosonic	Depth to Water (ft BGS)	15.82
Sampling Method:	Continuous core	Start/Finish Date	8/25/2010-8/26/2010

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Field Screening Observations	PID (ppm)	Density (psf)	Material Type	Description	Depth (ft)
51		Soil: 50-51	No odor, sheen, or staining	1.6	>5000		Very stiff, slightly moist, gray, very clayey SILT (CL-ML)	51
52	Centralizer (52') 2" Sch40 PVC sump (52-52.5')							52
53			No odor, sheen, or staining	1.5			Moist/very moist, gray, silty SAND (SM) lense (6"); very fine sand	53
54								54
55		◯			4000		Moist	55
56			No odor, sheen, or staining	2.0				56
57								57
58	Bentonite chips (52.5-60')				3000		Stiff, slightly moist/moist, gray, very clayey SILT (CL-ML); with silty SAND (SM) pockets at 58'	58
59		Soil: MW17-57.5-60-082610	No odor, sheen, or staining	2.1				59
60							Bottom of boring at 60'	60
61								61
62								62
63								63
64								64
65								65
66								66
67								67
68								68
69								69
70								70
71								71
72								72
73								73
74								74

Sampler Type:
◯ No Recovery
‖ Continuous Core

PID - Photoionization Detector
▼ Static Water Level
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