Bothell Landing
Remedial Investigation/Feasibility Study
Revision No. 1

Prepared for

City of Bothell
9654 NE 182nd Street
Bothell, WA 98011

Prepared by

Parametrix
411 108th Avenue NE, Suite 1800
Bellevue, WA 98004-5571
T. 425.458.6200 F. 425.458.6363
www.parametrix.com

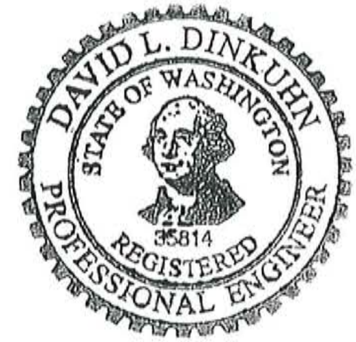
December 2009 | 555-1647-019 (02/0210)

CITATION

Parametrix. 2009. Bothell Landing Remedial
Investigation/Feasibility Study
Revision No. 1. Prepared by Parametrix, Bellevue, Washington.
December 2009.

CERTIFICATION

The technical material and data contained in this document were prepared under the supervision and direction of the undersigned, whose seal, as a professional engineer licensed to practice as such, is affixed below.



Prepared by David Dinkuhn, PE 12/8/09

Checked by Brandon Ball, PE

Approved by Steve Fuller, LEG, PG

TABLE OF CONTENTS

TABLE OF CONTENTS (CONTINUED)

LIST OF FIGURES

TABLE OF CONTENTS (CONTINUED)

LIST OF TABLES

APPENDICES

ACRONYMS AND ABBREVIATIONS

ARAR	applicable relevant and appropriate requirement
ASIL	acceptable source impact limit
bgs	below the existing ground surface
Bothell Landing property	Site
BTEX	benzene, toluene, ethylbenzene, and total xylenes
CAP	Cleanup Action Plan
CFR	Code of Federal Regulations
City	City of Bothell
COC	contaminant of concern
COPC	contaminant of potential concern
CSCL	Confirmed and Suspected Contaminated Sites Lists
CSM	conceptual site model
cy	cubic yards
DCA	dichloroethane
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
ESA	Environmental Site Assessment
ft/min	per minute
HVOC	halogenated volatile organic compound
LUST	Leaking Underground Storage Tank
µg/l	microgram per liter
MCL	maximum concentration limit
mg/kg	milligram per kilogram
MNA	monitored natural attenuation
MTCA	Model Toxics Control Act
NESHAPs	National Emission Standards for Hazardous Air Pollutants
NFA	No Further Action
NHPA	National Historic Preservation Act
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NTR	National Toxics Rule
ORC™	oxygen release compound

ACRONYMS AND ABBREVIATIONS (CONTINUED)

PCE	tetrachloroethylene
PID	photoionization detector
POTW	publicly owned treatment work
PVC	polyvinyl chloride
RAO	remedial action objective
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study
Riley	Riley Group, Inc.
ROW	right of way
SR	State Route
SVOC	semi-volatile organic compound
TCE	trichloroethylene
USCS	Unified Soil Classification System
USFS	U.S. Fish and Wildlife Service
UST	underground storage tank
VC	vinyl chloride
VCP	Voluntary Cleanup Program
VOC	volatile organic compound
WAC	Washington Administrative Code

1. INTRODUCTION

This Remedial Investigation/Feasibility Study (RI/FS) report has been prepared for the Bothell Landing property (Site) located in Bothell, Washington (Figure 1-1). The RI/FS is being conducted under Agreed Order DE 6294, dated February 3, 2009, between the City of Bothell (City) and the Washington State Department of Ecology (Ecology). Requirements under the Agreed Order include performance of an RI/FS and development of a Cleanup Action Plan (CAP) to address soil and groundwater contamination related to historical releases of hazardous substances at the Site. RI activities were performed according to the Ecology-approved project work plans (HWA 2009 a;b). The CAP will be prepared under a separate cover.

The City currently owns the Site, a portion of which will accommodate the realignment of State Route (SR) 522 (scheduled for construction in summer 2010). Cleanup actions will be implemented as part of the new road construction. Remnant portions of the property will be redeveloped as part of the City's overall Downtown Revitalization Plan. In general, cleanup approaches discussed in this document will address anticipated future property uses as envisioned in the Downtown Revitalization Plan. Figure 1.1 from the Bothell Downtown Subarea Plan is provided in Appendix A for reference. The figure shows proposed future land uses in the vicinity of the Site. Figure 1-2 shows adjacent properties to the Site.

1.1 PURPOSE/REGULATORY FRAMEWORK

This RI/FS was completed per the Agreed Order and Washington Administrative Code (WAC) 173-340, Model Toxics Control Act (MTCA) [Ecology 2007]. The purpose of the RI/FS was to evaluate the nature and extent of contamination and to develop and evaluate cleanup action alternatives. MTCA requires an RI/FS to include cleanup action alternatives that protect human health and the environment by eliminating, reducing, or otherwise controlling risks posed through each exposure pathway and migration route. Each alternative may consist of one or more cleanup action components. Each alternative shall be evaluated in the FS on the basis of the requirements stated in WAC 173-340-360:

- Protection of human health and the environment
- Compliance with cleanup standards
- Compliance with applicable state and federal laws
- Provision for compliance monitoring

The selected cleanup action will also use permanent solutions to the maximum extent practicable, provide for a reasonable restoration time frame, and consider public concerns.

Cleanup standards under MTCA provided in WAC 173-340-700(3) include:

- Cleanup levels for hazardous substances present at the Site
- The location where the cleanup levels must be met (point of compliance)
- Other regulatory requirements applicable to the Site

The Site is listed on Ecology's toxics cleanup sites database as Facility Site ID #73975762.

1.2 OVERVIEW OF RI/FS REPORT

This report is divided into five chapters and includes:

- **Chapter 1: Introduction**—includes the purpose/regulatory framework for completing this report and an overview of the RI/FS report.
- **Chapter 2: Site Background—**describes Site information, including description and history, summary of Previous studies/remedial actions, and physical characteristics (topography, geology/hydrogeology, surface water hydrology, and current ecological conditions).
- **Chapter 3: Remedial Investigation**—describes the nature and extent of contamination, the developed conceptual site model (CSM), applicable relevant and appropriate requirements (ARARs) analysis results, an assessment of risk, selection of cleanup standards, and chapter summary.
- **Chapter 4: Feasibility Study—**discusses remedial action objectives (RAOs), the screening of remedial technologies, development of remedial alternatives, threshold requirements, a detailed analysis of remedial alternatives, and selection of a preferred remedial alternative.
- **Chapter 5: References**—provides complete citations for documents cited in this report.

2. SITE BACKGROUND

This chapter presents background information including a description of the Site and its history, a summary of previous investigations, and physical characteristics such as topography, hydrogeology, and ecological conditions.

2.1 SITE DESCRIPTION AND HISTORY

The approximately 2.8-acre Site is located at 18120, 18126, and 18132 Bothell Way, and 10001 Woodinville Drive, Bothell, Washington (Tax Parcels Nos. 9457200015 and 9457200020). The property currently contains two single-story restaurants in the northeast and northwest corners of the property and two multi-tenant retail and office buildings in the southern portion of the site. The remainder of the site is covered with asphalt-paved parking and landscaping (Figure 2-1).

An 1897 topographic map shows a railroad spur line that may have crossed on or near the eastern edge of the property (HWA 2007). The spur line is not shown on a 1944 topographic map.

Two service stations were reportedly located on the northeastern quadrant of the Site from the 1930s to the 1970s along with mixed commercial activity (ECOSS 2008; HWA 2007). The stations were demolished during site reconstruction in the 1970s and underground storage tanks (USTs) associated with the stations were reportedly removed at that time (HWA 2007). Historical information did not include as-builts or detailed site plans; therefore, it is possible that additional USTs or piping may be encountered during future earthwork in the vicinity of the former service stations.

2.2 SUMMARY OF PREVIOUS SITE INVESTIGATIONS/REMEDIAL ACTION

The Riley Group, Inc. (Riley) completed a Phase I Environmental Site Assessment (ESA) at the subject property in May 2007 (Riley Group 2007). Based on Riley's research and review of previous Site reports, two service stations had been located at the northeastern corner of the property from the 1930s to the 1970s. The stations were demolished during site reconstruction in the 1970s and USTs associated with the stations were reported to have been removed.

In 1998, the City purchased the north-central portion of the Site at 10001 Woodinville Way as part of a roadway widening and Rotunda Park project. In the course of Site excavation, five USTs and associated petroleum-affected soils were discovered. The USTs were assumed to have been associated with one of the former service stations. At the time of the discovery, excavation was limited to the City property boundary. The City removed approximately 385 tons of petroleum-affected soils. Petroleum hydrocarbon and aromatic hydrocarbon concentrations remaining in all four excavation sidewalls exceeded MTCA cleanup levels (PSI 1998). Test results showed that the excavation bottom was clean. The excavation was backfilled with clean imported soils. A visqueen barrier was placed around the excavation limits to minimize recontamination of soil from adjacent impacted soils.

Kleinfelder, Inc. performed a Phase II ESA for the Bothell Landing Shopping Plaza in 1999 to delineate soil and groundwater impacts from the historical gas station at the northeastern corner of the property (Kleinfelder 1999a,b). Kleinfelder completed GeoProbe borings, and identified gasoline, diesel, oil, and benzene in soil and groundwater. Kleinfelder supplemented the Phase II in 1999 with the installation of four monitoring wells to monitor groundwater impacts and flow direction. Kleinfelder's initial groundwater sampling found petroleum hydrocarbons in groundwater above cleanup levels. Subsequent groundwater sampling events from the four monitoring wells indicated that petroleum concentrations in groundwater were decreasing, and results from Kleinfelder's most recent sampling event (April 2006) were below MTCA cleanup levels.

The property owner filed a restrictive covenant on the Site in January 2002 (Riley Group 2007) acknowledging that affected soils and groundwater remained at the property. Ecology issued an interim No Further Action (NFA) determination for the Site in 2002 for soils only. The site was later removed from the Voluntary Cleanup Program (VCP) in 2006 due to the lack of further activity, such as monitoring or remediation. The 2002 NFA was also rescinded at this time due to cleanup exceedances.

A Phase II ESA was performed by HWA Geosciences Inc. in the fall of 2007 (HWA 2007). The purpose of the investigation was to delineate the nature and extent of contamination following the previous studies/cleanup activities. Initial activities included an extensive ground penetrating radar survey to assess the presence of unknown USTs. No USTs were identified during the survey. Site explorations consisted of the installation of 22 soil borings using a push-probe rig and the collection of soil and groundwater samples from each boring. Selected samples were analyzed for contaminants of concern (COCs). Petroleum hydrocarbons were detected in soil at concentrations exceeding cleanup levels in borings located near the former USTs. Petroleum was also found in groundwater samples near the USTs, indicating that the extent of the contaminated groundwater plume was similar to the historical extents. Several halogenated volatile organic compounds (HVOCs) were detected in groundwater, apparently originating from an upgradient source.

A Phase II ESA was performed in the SR 522 right of way (ROW) by CDM during the summer of 2009 to identify contaminants within the ROW (CDM 2009). A total of 18 push-probe borings were drilled in the ROW, four of which were located near the Site. Concentrations of gasoline, lube oil, and benzene, toluene, ethylbenzene, and total xylenes (BTEX) in soil were detected above MTCA A cleanup levels in one of the four probes. Several HVOCs were detected in groundwater, also apparently originating from an upgradient source. The CDM report concluded that, although the exact source of the petroleum contamination in the ROW could not be ascertained, the most likely source was the former gas station located at the northeastern corner of the Site (known as the Signal gas station).

2.3 PHYSICAL CHARACTERISTICS OF THE SITE

This section includes descriptions of Site topography, geology, hydrogeology, surface water hydrology, and current ecological conditions.

2.3.1 Topography

The subject property is predominantly flat and fully developed with occupied commercial buildings, paved parking, and landscaped strips along the north and south property boundaries. The west property boundary adjoins a commercial rental business with documented and suspected hazardous material releases to soil and groundwater (HWA 2008). The east boundary consists of vegetated/landscaped ground sloping down to Horse Creek. Horse Creek is an urban stream discharging to the Sammamish River just beyond the southern boundary of the property. The creek is conveyed through storm drain pipes upgradient of the Site. A 48-inch concrete storm drain that conveys Horse Creek extends through the northern and eastern portion of the property, daylighting just beyond the east property boundary (Figure 1-2). The Sammamish River is between 120 and 150 feet south of the property line and separated from the property by NE 180th Street and the Park at Bothell Landing, a City park.

2.3.2 Geologic and Hydrogeologic Conditions

The Site is located in an area where soil stratigraphy typically consists of up to 9 feet of loose to medium dense, silty sand to sandy silt fill over alluvial soil consisting of soft interbedded silts, sandy silt, peat, silty sand, and sand to depths around 20 to 25 feet below the existing ground surface (bgs). The alluvial deposits are underlain locally by a predominantly dense sand layer containing variable amounts of gravel to depths of approximately 40 to 50 feet bgs. This sand may be a glacial outwash deposit. Beneath the dense sand is a stiff to hard clay or silt with a maximum thickness locally in excess of 14 feet. This unit is inferred to be a drift deposit of glacial-lacustrine origin.

Based on observations made during the several Site investigations, Site-specific soil stratigraphy typically consists of approximately 5 to 8 feet of silty sand fill over alluvial soil consisting of interbedded silt and peat. Interbedded alluvial sand and silt was encountered between 8 and 20 feet bgs.

Most fill material on the property appears to be derived from 20th century commercial development along Bothell Way and Woodinville Drive, and dredge and soil spoils placed on the southern portion of the project area by the U.S. Army Corps of Engineers between 1961 and 1966. Some of the commercial development fill may have been imported into the project area. Sampling of fill soils and groundwater on this and other adjacent sites indicates the river dredge fill is not contaminated (HWA 2007).

Peat or silt beds with high organic content up to 2 feet thick are present within the alluvial soil, generally at depths greater than 10 feet bgs. These organic-rich beds appear to underlie much of the Site but may not represent a contiguous layer.

The shallowest glacial deposits in the area are Vashon recessional outwash. Advance outwash and Vashon Till deposits are mapped on adjoining hills. Geologic maps identify till within a portion of the Site; however, characteristic till deposits have not been identified in subsurface explorations within the property to date. However, some deposits within the property may have the same age as the Vashon Till.

Groundwater was encountered in the soil borings at depths of approximately 6 to 8 feet bgs. Groundwater in existing and new monitoring wells was encountered between approximately 3 and 9 feet bgs. Based on the water level survey conducted for the RI, groundwater flow is to the east-southeast, toward the Sammamish River. A site plan and groundwater potentiometric surface map for September 2009 groundwater levels is provided as Figure 2-2. A potentiometric surface map for November 2009 groundwater levels is provided as Figure 2-3. Note that the potentiometric surface maps are for groundwater only and do not consider how groundwater interacts with Horse Creek. Insufficient data was collected during the RI to make this evaluation. During upcoming RI groundwater sampling in December 2009, surface water elevation measurements will be made at several locations in Horse creek and the data will be incorporated into the hydrogeologic evaluation of the site. Future potentiometric surface maps will reflect this evaluation.

The horizontal hydraulic conductivity for the Site was estimated using slug testing data collected during the RI field activities. Based on the results of the slug test data analysis, the estimated hydraulic conductivity for the water-bearing zone ranged from 4.8×10^{-3} to 1.8×10^{-2} feet per minute (ft/min).

2.3.3 Surface Water Hydrology

Horse Creek daylights from beneath the Site at the midway point of the eastern Site boundary and runs south along the boundary to another culvert beneath NE 180th Street. Horse Creek daylights again south of NE 180th Street and discharges directly into the Sammamish River.

2.3.4 Current Ecological Conditions

Potential ecological receptors are defined as terrestrial biota (e.g., birds, mammals, and plants) that inhabit or use, or have the potential to inhabit or use, the terrestrial habitats of the Site. Site use by ecological receptors is limited due to current Site conditions (the Site is fully developed) and lack of green space. Birds such as the bald eagle and the American robin, and various local bird species may visit the Site. A wide range of mammals, including the short-tailed shrew, the raccoon, and the white-tailed deer, could also frequent the Site.

3. REMEDIAL INVESTIGATION

The purpose of the RI was to collect and evaluate data (both historical and new supplemental data) necessary to adequately characterize the Site for the ultimate purpose of developing a preferred cleanup action alternative. This chapter presents the results of the RI including assessment of the nature and extent of contamination, determination of contaminants of potential concern, development of the CSM, identification of ARARs, and assessment of risk and associated cleanup standards.

3.1 REMEDIAL INVESTIGATION ACTIVITIES

Activities performed during the RI included both surface and subsurface investigation and sampling to address data gaps identified in the RI/FS work plans (HWA 2009a,b) and included the following:

- Installation of six new groundwater monitoring wells
- Advancing two soil push probes
- Collection of soil and groundwater samples from the wells and push probes
- Collection of groundwater samples from seven existing monitoring wells
- Collection of two surface soil samples along Horse Creek
- Aquifer (slug) testing to determine aquifer hydraulic conductivity values
- Analytical and physical laboratory testing of selected soil and groundwater samples

3.1.1 Monitoring Well Installation and Sampling

A total of six groundwater monitoring wells were installed during the RI. Four wells were installed on the Bothell Landing property (BLMW-5 through BLMW-8) while the other two were completed upgradient on the Hertz Equipment Rental site immediately to the west (HZMW-12 and HZMW-13). Locations of the wells are shown on Figure 3-1.

All borings for the well installations were advanced using a hollow-stem auger drill rig. Soil samples were collected from each of the borings at 5-foot intervals using a split-spoon sampler. Soil samples were visually examined and logged using the Unified Soil Classification System (USCS) and field screened using a photoionization detector (PID) for the presence of volatile organic compounds (VOCs). Soil samples were collected from pre-determined depths described in the work plans (HWA 2009a,b) or based on field screening. In general, samples included a shallow subsurface soil sample and a deeper sample collected at the groundwater table depth. All collected samples were placed into the appropriate containers and submitted for laboratory analysis.

At the desired depth, each well was constructed of 2-inch-diameter polyvinyl chloride (PVC) with a 0.010-inch slot screen spanning the bottom 5 to 10 feet. Wells were constructed using a filter sand pack to within 4 feet of the surface. Hydrated bentonite chips were used to create a seal to within 3 feet of the ground surface. The top 3 feet was filled with concrete to the ground surface and the well was secured with a locking cap and flush-mounted monument. Logs of each boring and well construction are provided in Appendix B. Appendix B also contains logs of historical borings and monitoring wells for reference. Following installation and construction, wells were allowed to sit for a minimum of 24 hours prior to development. All wells were fully developed using a surge-and-bail technique with a truck-mounted surge block and portable submersible pump until water quality parameters stabilized.

Following development, all newly installed wells were sampled using low-flow techniques and a down-hole, positive-displacement pump. The seven existing wells were also sampled using the same method.

3.1.2 Push Probe Installation and Sampling

Two soil probes (BLBH-23 and BLBH-24) were advanced using a hydraulically operated probe rig to 15 and 20 feet bgs, respectively. Continuous samples were captured in acetate sleeves at 4-foot intervals and split at the surface to reveal the sample. Samples were logged and field screened in a similar fashion to borings for the monitoring well installation. Soil samples were collected from predetermined depths submitted for laboratory analysis. Soil samples were not planned for BLBH-24 and were not collected. A single groundwater sample was collected from each of the probes at the time of installation.

At well BLMW-8, prior to the well installation, a push-probe boring was advanced to a depth of 25 feet bgs for the purposes of collecting a deep groundwater sample. The soil collected in the probe was logged the entire depth and soil descriptions from the probe were included in the log for BLMW-8.

3.1.3 Surface Soil Sampling

Two surface soil samples were collected along Horse Creek as shown in Figure 3-1 (BLSS-1 and BLSS-2). Soil samples were collected from within the top 6 inches of the surface along the western bank of the creek.

3.1.4 Aquifer Testing

In conjunction with the well installation and groundwater sampling, aquifer testing was conducted using a known volume (slug) to displace groundwater within each well. Recovery time and water levels were measured using pressure transducers. The results of the testing were used to determine an estimated hydraulic conductivity value for the aquifer at the well location. As reported in Section 2.3.2, the estimated hydraulic conductivity for the Site’s shallow aquifer ranged from 4.8×10^{-3} to 1.8×10^{-2} ft/min. These values are typical of moderately permeable soils such as sand-silt mixtures.

3.1.5 Analytical/Physical Laboratory Testing

Soil and groundwater samples collected during the RI were submitted to OnSite Environmental Inc. of Redmond, Washington for analytical testing. The samples were analyzed for COCs including gasoline, diesel, lube oil, BTEX, MTCA metals, HVOCs, and naphthalenes. A summary of analytical results for soil is provided in Table 3-1. A groundwater results summary is provided in Table 3-2. An analytical data validation memorandum, comprehensive data tables, and analytical laboratory reports are provided in Appendix C.

Two soil samples from the soil boring advanced for well BLMW-8 were submitted for physical testing including moisture content, particle size analysis, plasticity index, and hydraulic conductivity. The laboratory report for the physical tests is provided in Appendix C.

3.1.6 Nature and Extent of Contamination

The following sections describe the nature and extent of contamination and are organized by medium and contaminant. Both current and historical analytical data were considered in evaluating the nature and extent of contamination. For clarity, summaries of pertinent RI/historical soil and groundwater analytical data are provided in Figures 3-1 and 3-2. Summaries of soil and groundwater analytical data from the 2007 HWA Phase II ESA and the 2009 CDM Phase II ESA are presented in tabular form in Tables 3-3 and 3-4.

3.1.7 Soil

Historical Site investigations have typically focused on known sources of petroleum contamination near the Rotunda Park and the former gas stations located in the northeastern corner of the Site. The 2007 Phase II ESA by HWA considered the Site as a whole while the 2009 CDM Phase II ESA investigated the adjacent SR 522 ROW. For evaluation of nature and extent of contamination, the historical and current soil and groundwater analytical data were compared to the following screening criteria:

- MTCA Method A Soil Cleanup Levels for Unrestricted Land Use (Table 740-1).
- MTCA Ecological Indicator Soil Concentrations for Protection of Terrestrial Plants and Animals (Table 749-3). The lowest of three values (for plants, soil biota, and wildlife) was selected for the evaluation.
- Background metals concentrations per Natural Background Soil Metals Concentrations in Washington State (Ecology 1994) for the Puget Sound area.

Screening criteria values for each individual constituent are included in Table 3-1.

3.1.7.1 Petroleum Hydrocarbons (including BTEX)

Petroleum releases in the vicinity of the historical gas stations and USTs have been well documented. The estimated horizontal extent of petroleum-impacted soil is shown on Figure 3-1. Also shown are the locations of the former gas stations (Riley Group 2007; ECOSS 2008).

RI boring BLBH-23 was installed to investigate the eastern extent of petroleum-impacted soil. Motor oil was detected in the two soil samples analyzed from the boring but at concentrations less than the screening criteria. Monitoring well BLMW-7 was installed to investigate groundwater in the backfill around the Horse Creek culvert. No soil samples were collected from the boring; however, visual soil screening results indicated that soils in the boring were clean.

Concentrations of gasoline, lube oil, and BTEX were detected above MTCA Method A cleanup levels in CDM boring B3 (Figure 3-1). The CDM Phase II ESA report concluded that "current data is not sufficient to ascertain whether the source is the former Signal station or the former Associated station to the north across the street…the most likely source of the hydrocarbons appears to be the former Signal gas station" (CDM 2009). CDM based this opinion on the presence of less mobile motor oil in the soils and the potential that the Signal gas station once occupied part of the current ROW. No environmental studies have been conducted on the Associated station site and the site is not on Ecology's Confirmed and Suspected Contaminated Sites Lists (CSCL) or Leaking Underground Storage Tank (LUST) lists (ECOSS 2008). The contaminated soil footprint shown in Figure 3-1 assumes that the source of the contamination in B3 is the Site.

The historical sampling results indicate that soils within the contaminated soil footprint contain gasoline, diesel, motor oil, BTEX, and semi-volatile organic compounds (SVOCs), including high concentrations of naphthalenes in BLMW-3 at concentrations above the screening criteria. Petroleum odors were observed in the soil borings ranging from 3 to 9 feet bgs. Soil samples containing contaminants above the screening criteria were collected from depths ranging from 6 to 12 feet bgs. These depths of both observed and measured soil contamination are consistent with a "smear zone" in which soils within the range of annual water table fluctuations are contaminated by floating petroleum.

Two surface soil samples were collected along the banks of Horse Creek above the high water mark (BLSS-1 and BLSS-2) to investigate potential impacts from Horse Creek surface water. Lube oil was detected in both samples at concentrations below the screening criteria.

Monitoring wells BLMW-6, HZMW-12, and HZMW-13 were installed to investigate potential impacts from petroleum migrating from the Hertz Rental Property. Specifically, gasoline- and oil-range petroleum hydrocarbons were detected in groundwater above screening criteria in soil probe HZ-B7 (non-aqueous phase liquid was observed during groundwater sampling in this boring; HWA 2008). Gasoline-, diesel-, and oil- range petroleum hydrocarbons were detected in the soil samples from the monitoring well borings but at concentrations below the screening criteria. The extent of potential petroleum contamination in soil has not been delineated by this study but it appears to be limited.

3.1.7.2 Naphthalenes

High concentrations of naphthalenes were detected in the soil sample from HWA soil boring BH-3. To further assess the Site for the presence of naphthalenes, all subsurface soil samples collected during the RI were analyzed for naphthalenes. Naphthalenes were detected in a single soil sample (BLMW-6) at a concentration well below the screening criteria.

3.1.7.3 HVOCs

No HVOCs were detected in Site soils during any of the investigations. However, during the 2009 CDM ROW investigation, tetrachloroethylene (PCE) was detected in the soil sample from boring B7 at a concentration below the screening criteria.

3.1.7.4 Metals

Limited sampling for metals was conducted during the 2007 HWA investigation and RI. In 2007, five locations were sampled and analyzed for Resource Conservation and Recovery Act (RCRA) metals including arsenic, barium, cadmium, chromium, lead, selenium, silver, and mercury. Samples were collected from RI monitoring wells BLMW-6, HZMW-12, and HZMW-13 and analyzed for MTCA metals, which include arsenic, cadmium, chromium, lead, and mercury.

Chromium was detected in all of the samples from 2007 and 2009 at concentrations ranging from 31 milligrams per kilogram (mg/kg) to 45 mg/kg, which are below the Puget Sound background chromium concentration of 48 mg/kg. A single outlier of 60 mg/kg was detected in the sample from MWHZ-12. Note that this monitoring well is located on the Hertz property and any potential cleanup of metals will be addressed separately under a cleanup plan for the Hertz property.

Barium and/or lead were detected above screening criteria (ecological indicator concentrations) in the soil samples from HWA borings BH-13 and BH-14 at depths of 6 feet bgs each. These borings are located within the footprint of the future SR 522 alignment; therefore, paving to be completed following the cleanup action during the summer of 2010 will eliminate the ecological receptor pathway. An apparent source for the barium and lead has not been identified. No other metals were detected at concentrations above screening criteria.

3.1.8 Groundwater

Groundwater at the Site has been investigated for petroleum since 1999; at which time the former gas station area was targeted for environmental assessment. In the last 2 years, area-wide solvent-related groundwater contamination has become an increasing concern, primarily due to contaminant migration from the north. For evaluation purposes, both historical and current groundwater data were compared to the following screening criteria:

- MTCA Method A Cleanup Levels for Groundwater (Table 720-1).

Screening criteria values for each individual constituent are included in Table 3-2.

3.1.8.1 Petroleum Hydrocarbons (including BTEX)

All groundwater samples collected during the RI were analyzed for petroleum hydrocarbons. One constituent (benzene) was detected above the screening criterion in a single well (MW-3). This is consistent with the historical data because MW-3 is located within the petroleum-contaminated soil footprint. The only other analyte detected was gasoline in monitoring well HZMW-13 at a concentration below the screening criteria. The approximate area of petroleum-impacted groundwater as estimated by HWA in 2007 is shown in Figure 3-2.

3.1.8.2 HVOCs

All groundwater samples collected during the RI were analyzed for HVOCs. Historical results indicate that the source(s) of the HVOCs are located in the upgradient direction. In addition to the on-site wells, three upgradient wells were sampled (BI-3, BB-2, and BB-3; Figure 3-2). PCE, trichloroethylene (TCE), 1,2-dichloroethane (1,2-DCA), vinyl chloride (VC), 1,1-dichloroethene (1,1-DCE), and cis-1,2-dichloroethene (1,2-DCE) were detected in several wells. Only VC was detected at a concentration exceeding screening criteria in an on-site well (BLMW-3). The upgradient wells contained both PCE and VC at concentrations exceeding criteria.

Concentrations of HVOCs from the RI and 2009 CDM ROW investigation are shown on Figure 3-3. Groundwater impacts appear to be more extensive to the north and east with the highest concentration of PCE observed at BB-2 at 79 micrograms per liter (µg/l). Generally, concentrations of PCE decrease towards the south.

In monitoring well BLMW-8, groundwater samples were collected from depths of 12 and 25 feet bgs to assess for vertical concentration gradients. Although only 1,2-DCA, cis-1,2-DCE, and chloroform were detected in the samples, a trend of increasing concentration with depth exists.

3.1.8.3 Metals

Historical data from 2007 compiled by HWA showed a single MTCA exceedance of arsenic in the groundwater at BH-15. The result was discounted as extraneous and not likely the result of historical activities because elevated arsenic concentrations in alluvial aquifers of Snohomish and King Counties have been well documented as a regional issue (HWA 2007). A total of nine groundwater samples collected during the RI were analyzed for arsenic. Arsenic was detected in well BMW-3 at a concentration below the screening criterion.

3.2 SUMMARY OF CONTAMINANTS OF POTENTIAL CONCERN

Based on the above evaluation, the contaminants of potential concern (COPCs) for soil include:

- Total petroleum hydrocarbons (gasoline-, diesel-, and lube oil-range)
- Aromatic hydrocarbons (BTEX)
- SVOCs (including naphthalenes)
- Metals (barium and lead)

For groundwater, COPCs include:

- Total petroleum hydrocarbons
- Aromatic hydrocarbons
- HVOCs (from upgradient sources)

Regarding HVOCs: Per WAC 173-340-360(4)(d), “When area background concentrations would result in recontamination of the site to levels that exceed cleanup levels, that portion of the cleanup action which addresses cleanup below area background concentrations may be delayed until the off-site sources of hazardous substances are controlled.” WAC 173-340-200 defines area background as the concentrations of hazardous substances that are consistently present in the environment in the vicinity of a site which are the result of human activities unrelated to releases from that site. Although there are HVOC concentrations in groundwater at the Site, they are similar to area background concentrations and not associated with releases at the Site. Therefore, cleanup of the HVOCs in groundwater would not need to be addressed until the upgradient source area is controlled.

3.3 CONCEPTUAL SITE MODEL

The CSM for the Site identifies the primary contaminant sources, release mechanisms, transport mechanisms, secondary contaminant sources, potential pathways, and exposure routes. Existing chemical data, site characterization data, and identification of potential human and ecological receptors were used to develop the model presented in Figure 3-3. The CSM is discussed further below.

3.3.1 Primary Sources of Contamination and Primary Release Mechanisms

The primary contaminant source is the former gasoline service stations, including potential releases from tanks, dispensers, piping, and dumped products. The primary contaminants associated with the gasoline service stations include petroleum hydrocarbons, aromatic hydrocarbons, and SVOCs.

The primary potential release mechanisms for contaminants associated with the gasoline service station include leaks from fuel or lubricant storage systems (e.g., USTs, containers, piping, dispensers, etc.); accidental spills and leaks; spills from discarded containers of automotive fluid products such as motor oil, transmission fluid, and antifreeze; and possibly disposal of contaminants in former on-site septic systems.

HVOCs in groundwater are considered a secondary source as described below.

3.3.2 Secondary Sources and Release Mechanisms

When a released contaminant is retained in an environmental medium, such as soil, the medium functions as a secondary source for further chemical release. Secondary release mechanisms for contaminants potentially present at the Site include the following:

- Leaching from on-site soil to groundwater
- Leaching from upgradient soil to groundwater that migrates on to the site
- Volatilization from soil and groundwater to air
- Downgradient discharge from groundwater to surface water

The degree of contaminant leaching is controlled by chemical properties of the contaminants, groundwater chemical properties, physical properties of the soil, characteristics of the groundwater flow system, and precipitation recharge. Volatilization is controlled by the concentration and chemical properties of the contaminants, physical properties of the soil, and soil gas characteristics. Contaminant discharge from groundwater to surface water is controlled by the groundwater flow path and the concentrations present in groundwater at the point where it discharges into surface water.

Groundwater contaminated with HVOCs from upgradient sources represents a secondary contaminant source. The contaminant source(s) cannot currently be attributed to a specific location but likely include two known current and former dry cleaning businesses that are located upgradient (north) from the property. These properties consist of Bothell Service Center and Ultra Custom Care Cleaners (HWA 2007).

3.3.3 Pathways and Potential Receptors

An exposure pathway is a mechanism by which receptors are assumed to contact COPCs. The U.S. Environmental Protection Agency (EPA) (1989) describes a complete exposure pathway in terms of four components:

- A source and mechanism of chemical release (e.g., a release of COPCs to the subsurface)
- A retention or transport medium (e.g., groundwater)

- A receptor at a point of potential exposure to a contaminated medium (e.g., commercial worker in an on-site building located above the groundwater plume)
- An exposure route at the exposure point (e.g., inhalation of vapors)

If any of these four components is not present, then a potential exposure pathway is considered incomplete and is not evaluated further in a risk assessment. If all four components are present, a pathway is considered complete.

Potential exposure routes for human and ecological receptors include the following:

- **Dermal/Direct Contact**. Exposure to chemicals in soil may occur through direct contact with soil. Direct contact is a potential exposure route for current and future on-site workers, potential future residents, or visitors. Burrowing or ground-dwelling mammals and invertebrates may be exposed directly to the soil contaminants.
- **Inhalation.** Particulates from soil can be transported by air and inhaled by potential on-site and off-site receptors. Emissions of volatile chemicals from soil and groundwater may also be transported as vapors by air. Terrestrial biota could also be exposed to chemicals volatilizing to outdoor air, but if this exposure actually occurs the duration of exposure would be expected to be relatively short. Burrowing animals (e.g., shrew) may be exposed to volatile air contaminants in underground stagnant air while spending time within the burrow.
- **Ingestion**. Ingestion of chemicals in Site soil is a primary exposure route for human and ecological receptors. Uptake by plants is also a potential exposure route.

Potentially complete exposure pathways include the following:

- Current/future indoor retail worker:
  - Inhalation of vapors from the subsurface (groundwater and soil) in indoor air
  - Direct ingestion of contaminated groundwater used as drinking water
  - Incidental soil ingestion and dermal contact
- Current/future construction/utility worker:
  - Incidental soil ingestion and dermal contact
  - Inhalation of vapors from the subsurface soil in outdoor air
  - Inhalation of vapors from or dermal contact with groundwater in a trench or excavation
- Current/future Resident or Site visitor (adult and child):
  - Inhalation of vapors from the subsurface (groundwater and soil) in indoor air
  - Incidental soil ingestion and dermal contact
  - Direct ingestion of contaminated groundwater used as drinking water
- Ecological receptors
  - Incidental soil ingestion and dermal contact
  - Inhalation of vapors from the subsurface soil in outdoor air or in a burrow
  - Inhalation of vapors from or dermal contact with groundwater in a burrow

3.3.4 Fate and Transport

The primary contaminant transport mechanisms are advection and dispersion caused by seepage of groundwater through the Site's shallow aquifer. Petroleum constituents desorb from contaminated soil particles into groundwater and are transported in the downgradient direction where they may resorb to clean soil particles or continue to travel with flow. Site analytical data suggest that petroleum constituents are transported only a short distance at concentrations of concern. Dissolved petroleum constituents are typically subject to biodegradation by naturally occurring aerobic soil bacteria. Low dissolved oxygen concentrations measured in Site and upgradient wells suggest that sufficient oxygen is not available to support aerobic biodegradation (Table 3-2).

The HVOCs migrating on to the site with groundwater are subject to both aerobic and anaerobic degradation although measured dissolved oxygen levels suggest an anaerobic condition. An indication that anaerobic biodegradation is occurring is the presence of breakdown (daughter) products of commonly used solvents TCE and PCE. Daughter products, including VC, 1,1-DCE, cis-1,2-DCE, and trans-1,2-DCE, are not commonly manufactured and would only be present as daughter products. Cis-1,2-DCE and VC were detected in several Site monitoring wells, indicating that biodegradation of HVOCs is occurring.

Vapor migration from soil and/or groundwater is a potential transport mechanism at the Site. The occurrence of such migration has not been established. However, concentrations of volatile constituents in both soil and groundwater are such that there is a potential for vapor migration to occur.

3.4 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Cleanup actions under MTCA (WAC 173-340-710) require the identification of all ARARs. These requirements are defined as:

"Applicable" requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a site.

"Relevant and appropriate" requirements means those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a site, address problems or situations sufficiently similar to those encountered at the site that their use is well suited to the particular site.

The potential ARARs for the Site include three types:

- Chemical-specific
- Location-specific
- Action-specific

Chemical-specific ARARs are typically health- or risk-based values that when applied to site-specific conditions represent cleanup standards. Location-specific ARARs are related to the geographical position and/or physical condition of the site and may affect the type of remedial action selected. Action-specific ARARs are usually technology-based or activity-based requirements or limitations on actions or conditions taken with respect to specific hazardous substances. The action-specific requirements do not determine the selected remedial alternative, but indicate how or to what level a selected alternative must perform.

Potential ARARs were identified for each medium of potential concern. These potential ARARs are shown in Table 3-5.

3.5 ASSESSMENT OF RISK

Exposure to contaminants could occur via the potentially complete exposure pathways described in Section 3.3.3 above. Based on the nature of the Site and the extent of contamination, current risks appear limited. The likely greatest potential risk to human receptors is inhalation of contaminant vapors in the workplace. Note, however, that only one of the occupied buildings on the Site is underlain (partially) by contaminated soil and groundwater with the potential to cause vapor intrusion. The second most likely exposure risk is to construction workers during soil-disturbing activities. Ecological receptors have limited risk of exposure because the majority of the Site contains buildings or pavement. However, this risk increases under the future development scenario under which approximately the southern third of the Site may become park space (see Figure 1.1 in Appendix A).

These risks can be mitigated under a cleanup action that either removes the contaminants to levels that are protective to receptors or that places controls to prevent exposure. One example of a control is paving over contaminated soil to eliminate direct contact with this exposure route. Such risk mitigation was a primary factor used in evaluating cleanup action alternatives under the FS (described later in this document).

3.6 CLEANUP LEVELS SELECTION

Applicable cleanup levels for the Site were selected from WAC 173-340-720 through 173-340-760. A conservative approach was used to select standards that were most protective of human health and the environment for soil and groundwater. Selected standards used to evaluate media are listed below.

The following cleanup levels were selected for soil:

- MTCA Method A Soil Cleanup Levels for Unrestricted Land Use (WAC 173-340, Table 740-1).
- MTCA Ecological Indicator Soil Concentrations for Protection of Terrestrial Plants and Animals (Table 749-3).
- Background metals concentrations per Natural Background Soil Metals Concentrations in Washington State (Ecology 1994) for the Puget Sound area.

Background concentrations were used to assess whether metals detected in soil above the MTCA criteria were naturally occurring and not the result of past site uses.

For groundwater, the following cleanup levels were selected:

- MTCA Method A Cleanup Levels for Groundwater (WAC 173-340, Table 720-1).

3.7 SUMMARY OF RESULTS

RI results are summarized below to address data gaps identified in the RI/FS Work Plan:

- Petroleum contamination in soil and groundwater at the former gas station area is relatively well defined within the Site boundaries. Soil contamination extends into the SR 522 ROW where it is less well defined. The extent of the contaminated groundwater plume is limited to the vicinity of the Rotunda Park (similar to historical conditions).
- The backfill around the Horse Creek culvert does not appear to be a preferential pathway for contaminated groundwater.
- Horse Creek surface water does not appear to be significantly affecting nearby surface soils or groundwater.

- NAPL and/or contaminated groundwater from the adjacent Hertz Rental property does not appear to be affecting the Site.
- HVOCs, including PCE, TCE, and breakdown products, are migrating on to the site and are present in groundwater throughout the central and northern portions of the Site. Concentration distributions indicate that the HVOCs are migrating from an upgradient source. Site concentrations are generally below MTCA Method A cleanup levels.

3.8 FIELD DATA SHEETS

Field data sheets are on file and available on request.

4. FEASIBILITY STUDY

In this section, remediation alternatives are developed from remedial technologies to meet the goals of the cleanup in accordance with MTCA requirements and guidelines. The process of developing remediation alternatives begins with a broad overview of all types of remediation systems. A comprehensive list of technologies relevant to the Site was developed using professional knowledge and judgment, experience, and screening information prepared by EPA for use across the United States.

The list of technologies was given a cursory screening to eliminate any technologies that do not apply to the COCs or Site-specific conditions. The technologies retained were combined to create a range of alternatives that represent various approaches to achieving the RAOs.

As concluded in the RI, HVOCs have been identified in groundwater at concentrations exceeding MTCA Method A groundwater cleanup levels, but the data show this is related to one or more upgradient sources. As discussed in Section 3.2, per WAC 173-340-360(4)(d), if area background concentrations would result in recontamination of the Site to levels that exceed cleanup levels, that portion of the cleanup action which addresses cleanup below area background concentrations may be delayed until the off-site sources of hazardous substances are controlled. The HVOCs concentrations in groundwater at the Site are similar to area background concentrations and are not associated with releases at the Site. Cleanup of the HVOCs in groundwater will not be addressed until the upgradient source area is controlled. Therefore, no evaluation of groundwater contamination is included in this FS.

However, consistent with Revised Code of Washington (RCW) 70.105D.020(17)(iv)(C), proper management of contaminated groundwater that may be generated during remediation or site development activities would be required to ensure that potential exposure to the contaminated on-Site groundwater is reduced or eliminated. .

4.1 REMEDIAL ACTION OBJECTIVES

The following RAOs have been established for remediation alternatives:

- Achieve MTCA Method A soil and groundwater cleanup levels, thus reducing or eliminating human exposure through direct contact and inhalation of vapors.
- Reduce or eliminate risks to ecological receptors from contaminated soil and/or groundwater.
- Use permanent solutions to the maximum extent practicable (which includes consideration of cost-effectiveness).
- Verify the petroleum hydrocarbon-contaminated groundwater plume is stable or shrinking due to attenuation.
- Properly manage contaminated groundwater that may be generated during site development activities, and ensure that activities at the Site do not result in exposure to the contaminated groundwater that has migrated onto the site.

4.2 POINT OF COMPLIANCE

WAC 173-340-200 defines "point of compliance" as the point or points where cleanup levels established in accordance with WAC 173-340-720 through 173-340-760 shall be attained. The point of compliance (POC) for petroleum contamination in Site soils is the soils throughout the site, which is required when soil cleanup levels are established for protection of groundwater. In general, the MTCA Method A cleanup levels for petroleum constituents are based on protection of groundwater. The POC for Site soils for the protection of terrestrial ecological receptors is from the ground surface to a depth of 15 feet. The point of compliance for Site groundwater is established throughout the site from the uppermost level of the saturated zone extending vertically to the lowest most depth which could potentially be affected by the site.

4.3 REMEDIAL TECHNOLOGY SCREENING

EPA technology screening guidance provides an assessment of general classes of technologies classified by media (soil and water) and type of treatment (in situ, ex situ, chemical, biological, etc.). The guidance is relatively comprehensive and recent, and was used to identify potential technologies for the Site in conjunction with professional knowledge and judgment and experience. The EPA guidance is available on an interactive Web site, which contains the latest version—EPA Technology Screening Matrix and Reference Guide, Version 4.0 (EPA 2001). This technology screening guidance can be accessed at http://www.frtr.gov/scrntools.htm.

4.4 RELEVANT TECHNOLOGY CATEGORIES

The EPA technology screening guidance offers seven general categories of treatment applicable to soil and/or groundwater that include:

- In Situ Biological Treatment
- In Situ Physical/Chemical Treatment
- In Situ Thermal Treatment
- Ex Situ Biological Treatment
- Ex Situ Physical/Chemical Treatment
- Ex Situ Thermal Treatment
- Containment
- Because the Site is not a source of HVOC contamination in groundwater, the goal with respect to groundwater when considering cleanup technologies is proper management and disposal of groundwater that may be generated and ensuring that activities at the Site do not result in exposure of humans or the environment to the contaminated groundwater that has migrated onto the site, consistent with RCW 70.105D.020(17)(iv)(C)

4.5 INITIAL SCREENING OF APPLICABLE TECHNOLOGIES

This section describes the results of an initial screening of the applicable technologies identified in Section 4.4.

4.5.1 Screening Criteria

The following are the Site-specific conditions that serve as screening criteria to determine relevant technologies:

- Media: Subsurface soil (0 – 10 feet) and groundwater;
- Contaminants: Soil - Petroleum hydrocarbons; groundwater – petroleum hydrocarbons.
- Site Usage: Combination ROW, retail space, potential residential use, and green space.
- Other: Limited area for long-term ex situ treatment facilities; existing subsurface utilities, and infrastructure.

4.5.2 Screening of Applicable Technologies

For the seven relevant technology categories identified, Table 4-1 below provides a summary of the applicability screening of those technologies based on the specific Site circumstances. Technologies that are screened out because they are not applicable to the Site conditions and contaminants are lined out, and an explanation is provided for the reason for removal. A significant constraint is the requirement that the remedial action be performed concurrent with the realignment of SR 522 during summer 2010. Technologies that are retained for further evaluation are highlighted in bold.

4.5.3 Technologies Retained for Further Screening

For the treatment of petroleum-contaminated soil and groundwater, the treatment technologies retained for further screening are either ex situ or in situ. The in situ treatment technologies would be applied below ground, in the soil itself. All of the ex situ technologies would be applied above ground to excavated soil. Soil and groundwater treatment technologies retained for further detailed evaluation are as follows:

- Natural Attenuation (In Situ Biological)
- Chemical Oxidation/Enhanced Biodegradation (In Situ Physical/Chemical)
- Excavation and Off-site Disposal (Containment)
- Low Permeability Cap (Containment)

4.6 REMEDIAL ALTERNATIVE DEVELOPMENT

Three remedial alternatives were developed that implement one or more of the retained treatment technologies. Each alternative is described in detail below.

4.6.1 Alternative 1 - Monitored Natural Attenuation

An MNA alternative was developed to represent a cleanup approach involving a minimal level of effort and minimal (lower bound) costs.

General Technology Description

Alternative 1 consists of a combination of natural attenuation, capping resulting from pavements/buildings to be constructed, and institutional controls. Natural attenuation generally describes a range of physical and biological processes which, unaided, reduce the concentration, toxicity, or mobility of chemical contaminants. These processes take place whether or not other active cleanup measures are in place.

Low Permeability Cap

Caps can be used to:

- Minimize exposure on the surface of contamination left in place.
- Prevent vertical infiltration of water into site soils and mobilization of contamination to groundwater or soil.
- Contain waste while other remediations are being applied.

Capping is one of the most common techniques of remediation for soils because it is generally less expensive than other technologies and effectively manages the human and ecological risks associated with exposure to contaminated soils.

The most effective single-layer caps are composed of concrete or bituminous asphalt. It is used to form a surface barrier between the waste and the environment. An asphalt concrete cap would reduce leaching of contaminants from the soil to the aquifer below.

Capping does not lessen toxicity or volume of hazardous wastes, but does mitigate mobility. Caps are most effective where most of the underlying waste is above the water table. A cap, by itself, cannot prevent the horizontal flow of groundwater through the waste, only the vertical entry of water into the waste.

Groundwater monitoring is necessary to demonstrate that contaminant concentrations continue to decrease at a rate sufficient to ensure that they will not become a health threat or violate regulatory criteria. Monitoring should be designed to verify that potentially toxic transformation products are not created at levels that are a threat to human health; that a plume is not expanding; that there are not further releases that could affect the remedy; and that there are no changes in hydrogeological, geochemical, or microbiological parameters that might reduce the effectiveness of natural attenuation. Natural attenuation is not appropriate where imminent site risks are present.

Institutional controls provide protection from exposure through the use of non-engineered or legal controls that limit land or resource use, such as access controls and property restrictions. Although institutional controls provide no reduction of toxicity, volume, or mobility of contaminants, they can reduce or eliminate direct exposure pathways and resultant risk.

Alternative 1 Description

MNA corresponds to a No Action alternative and consists of monitoring the Site groundwater plume over a long-term period (a monitoring period of 10 years was selected) to ascertain that natural attenuation is occurring. This alternative includes placement of a physical barrier over the Site's contaminated soils as part of new road construction and future redevelopment under the Downtown Bothell Subarea Plan. Under this plan, a new multi-way boulevard will be constructed over the majority of the contaminated soil area. Paving for the new boulevard would act as a physical barrier to prevent direct contact with contaminated soil. Similarly, future retail buildings would be placed over contaminated soil not covered by the new boulevard. A vapor intrusion evaluation would be conducted for any occupied building constructed within 100 feet of the contaminated soil footprint or groundwater plume. If warranted, vapor intrusion mitigation measures would be designed into the new building(s).

Groundwater monitoring would be conducted semi-annually for 10 years after realignment of the roadway is complete. This alternative includes the implementation of institutional controls on the affected properties (such as deed restrictions) to ensure that current and future property owners are notified of the presence of the contamination and aware that precautions to avoid exposure are necessary. Two new monitoring wells and two existing wells will be used for monitoring (Figure 4-1).

4.6.2 Alternative 2 – In Situ Chemical Oxidation

An alternative based on in situ chemical oxidation was developed to represent an aggressive and innovative cleanup approach with a relatively high level of effort and upper bound costs.

General Technology Description

Chemical oxidation converts hazardous contaminants to non-hazardous or less toxic compounds that are more stable, less mobile, and/or inert. The oxidizing agents most commonly used are ozone, hydrogen peroxide, permanganate, proprietary formulations, and Fenton's Reagent (hydrogen peroxide mixed with an iron catalyst). Chemical oxidants have been able to cause the rapid and complete chemical destruction of many toxic organic chemicals. Other organics are amenable to partial degradation as an aid to subsequent bioremediation.

Historically, ex situ field applications were used because in situ delivery and mixing was difficult to accomplish and achieve an even distribution of oxidant within the soil matrix. Recently, in situ technologies have been developed that allow for adequate and repeatable mixing of many types of in situ soils to achieve results comparable to ex situ soil mixing. Therefore, ex situ chemical oxidation is eliminated from further analysis.

Alternative 2 Description

Alternative 2 would be implemented as an in situ remedial technology for the Site prior to the construction of the realignment of SR 522. RegenOx™ by Regenesis is the product used as the basis for Alternative 2. RegenOx™ uses a solid alkaline oxidant built around a sodium percarbonate complex, which is activated using a multi-part catalytic formula to maximize performance. The product is delivered as two parts that are combined and mixed into the subsurface using specialized mixing equipment. Once in contact with the soil, the combined product produces an effective oxidation reaction comparable to that of Fenton's Reagent yet without a violent exothermic hazard.

A bench-scale treatability test would be conducted to help refine the full-scale treatment approach for Alternative 2. Alternative 2 would consist of mixing the RegenOx™ with the contaminated soil to a depth of 10 feet bgs using specialized soil mixing equipment. The area of contaminated soil to be treated (Figure 4-1) is approximately 10,400 square feet. The soil mixing equipment would mix the contaminated soil while RegenOx™ is injected in a liquid slurry at a rate of 10 pounds per cubic yard. It is assumed a total of two treatments separated by a 1-week period will be necessary to significantly reduce soil concentrations. The treatment goal is to achieve cleanup levels in the soils. Confirmation soil samples would be collected concurrent with the mixing.

Residual groundwater contamination would be treated using in situ enhanced bioremediation. The specific in situ enhanced bioremediation technology selected for the Site involves mixing oxygen release compound (ORC™) with the soil at the same time as the RegenOx™ at a dosing rate of 1.5 pounds per cubic yard. ORC™ will provide oxygen to enhance the activity of naturally occurring aerobic bacteria, which feed on or "respirate" the hydrocarbons. The primary byproducts of this respiration are carbon dioxide and water.

Groundwater monitoring would be conducted quarterly for 1 year after the cleanup to assess groundwater conditions and verify that the contaminated groundwater plume is not expanding. It is anticipated that removal of the contaminant source (the contaminated soil) and ORC™ application will result in a shrinking plume that will ultimately disappear. This alternative includes the implementation of institutional controls on the affected properties in case cleanup levels are not met in soils and to control groundwater exposure risk. Two new monitoring wells and two existing wells will be used for monitoring (Figure 4-1).

Following the in situ remediation, residual soil and groundwater concentrations may remain that present a potential risk for vapor intrusion. A vapor intrusion evaluation would be conducted for any occupied building constructed within 100 feet of the contaminated soil footprint or groundwater plume. If warranted, vapor intrusion mitigation measures would be designed into the new building(s).

4.6.3 Alternative 3 - Excavation and Off-Site Disposal

An alternative consisting of excavation and off-Site disposal was developed to represent a level of effort and costs anticipated to fall somewhere between Alternatives 1 and 2.

General Technology Description

Contaminated material is excavated and transported to a permitted off-site disposal facility. The limits of removal are determined by field screening at the time of excavation. Confirmation samples are collected from the excavation sidewalls and bottom to confirm that all soil contaminated above cleanup levels is removed. The resulting excavation is backfilled with clean soil.

Alternative 3 Description

Approximately 3,370 cubic yards (cy) or 4,550 tons of contaminated soil would be excavated with heavy equipment (Figure 4-1). This volume assumes that contaminated soils exist between the depths of 3 and 10 feet bgs within the contaminated soil footprint. Soils between the depths of 0 and 3 feet bgs are assumed to be clean (1,450 cy). Clean and contaminated soil would be segregated based on field screening and stockpiled separately for confirmation testing. Soil that is confirmed to be contaminated would be trucked to a permitted landfill. A possible candidate landfill is the Roosevelt Regional Landfill in Klickitat County. Confirmation soil samples would be collected from the sidewalls and bottom of the excavation. It is estimated that a total of 25 excavation and stockpile samples would be collected and tested. Once the excavation is confirmed to be clean, it would be backfilled with a combination of clean stockpiled soil and imported structural fill.

Excavation to a depth of 10 feet bgs will require excavation dewatering. The average depth of groundwater is approximately 6 feet bgs. Dewatering water would be treated to remove sediments and contaminants to meet treatment standards before being discharged to the sanitary sewer.

Residual groundwater contamination will be treated using ORC^{TM} that is applied in slurry form with the soils used to backfill the excavation at a dosing rate of 1.5 pounds per cubic yard. ORC^{TM} would only be applied to soils below the anticipated seasonal high groundwater elevation.

Groundwater monitoring would be conducted quarterly for 1 year after the cleanup to assess groundwater conditions and verify that the contaminated groundwater plume is not expanding. It is anticipated that removal of the contaminant source (the contaminated soil) and ORC^{TM} application would result in a shrinking plume that would ultimately disappear. This alternative includes the implementation of institutional controls on the affected properties in case soil cleanup levels are not met and to control groundwater exposure risk. Two new monitoring wells and two existing wells will be used for monitoring (Figure 4-1).

Following the soil removal, residual soil and groundwater concentrations may remain that present a potential risk for vapor intrusion. A vapor intrusion evaluation would be conducted for any occupied building constructed within 100 feet of the contaminated soil footprint or groundwater plume. If warranted, vapor intrusion mitigation measures will be designed into the new building(s).

4.7 THRESHOLD REQUIREMENTS

MTCA requires that all cleanup actions meet the following threshold requirements to be considered viable [(WAC 173-340-360(2)(a)]:

- Protection of human health and the environment
- Compliance with cleanup standards
- Compliance with ARARs
- Provision for compliance monitoring

Each alternative is evaluated individually against the threshold criteria in the following sections.

4.7.1 Protection of Human Health and the Environment

As a threshold criterion, protection of human health and the environment addresses whether a remediation alternative would result in sufficiently low residual risk to human and ecological receptors after completion of the alternative.

All of the alternatives retained for further evaluation are protective of human health and the environment through a combination of physical barriers, institutional controls, contaminant destruction or removal, and compliance monitoring.

4.7.2 Compliance with Cleanup Standards

Compliance with cleanup standards is defined by meeting the requirements of WAC 173-340-700 through WAC 173-340-760.

Alternatives 2 and 3 would be in compliance with cleanup standards in that cleanup levels would be met at the points of compliance for soil and groundwater. Alternative 1 would not meet this criterion.

4.7.3 Compliance with ARARs

Compliance with ARARs for all alternatives requires, in addition to meeting cleanup standards, that the actions also meet location-specific and action-specific state and federal requirements. All remedial alternatives would be designed and implemented to meet the requirements of this threshold criterion.

4.7.4 Provide for Compliance Monitoring

Compliance monitoring requirements are defined at WAC 173-340-410. Compliance monitoring includes: 1) “protection monitoring” to confirm that human health and the environment are adequately protected during implementation of an alternative; 2) “performance monitoring” to confirm that cleanup standards or other performance standards have been attained; and 3) “conformation monitoring” to monitor the long-term effectiveness of the remedy after completion of the alternative.

For all three alternatives, health and safety protection monitoring would be conducted during implementation to ensure that the safety of workers, surrounding populations, and the environment are protected. Confirmation sampling performed for Alternatives 2 and 3 equate to the performance monitoring requirement and all three alternatives include groundwater monitoring that would evaluate the long-term effectiveness of each alternative.

4.7.5 Summary of Preliminary Alternative Screening

All of the alternatives retained for further evaluation meet all of the MTCA threshold requirements and were carried forward for further evaluation. An exception is Alternative 1, which did not meet the threshold criterion for compliance with cleanup standards. However this alternative is carried forward as a No Action alternative.

4.8 OTHER REQUIREMENTS

In addition to the threshold requirements, WAC 173-340-360(2) requires cleanup actions to meet “other requirements” or “additional requirements” that are part of the minimum requirements for the alternatives. These other requirements include the following:

- Use permanent solutions to the maximum extent practicable including consideration for public concerns.
- Provide for a reasonable restoration time frame.
- Consider additional performance criteria.

4.8.1 Permanent Solutions

Cleanup actions are required to use permanent solutions to the maximum extent practicable. A permanent solution is defined in MTCA as a cleanup action in which cleanup standards can be met without further action being required.

Alternatives 2 and 3 are permanent solutions in that contaminants in soil and groundwater are either treated or removed. Alternative 1 is not permanent because contaminated soil would not be removed and the time frame for natural attenuation of soil would be on the order of decades.

Formal procedures for determining whether a proposed cleanup action is permanent to the maximum extent practicable are provided in MTCA and are based on a disproportionate cost analysis in which alternatives are compared using a number of evaluation criteria. However, per WAC 173-340-360 (3)(d), a disproportionate cost analysis is not required if the cleanup action proposed is a permanent solution. A disproportionate cost analysis was not performed for this FS because the preferred alternative (Section 4.10) is a permanent solution.

4.8.2 Reasonable Restoration Time Frame

Specific requirements and procedures for determining whether a cleanup action provides for a reasonable restoration time frame, as required under WAC 173-340-360(2)(b)(i), are provided in WAC 173-340-360(4).

Factors to be considered when determining whether a cleanup action provides for a reasonable restoration time frame and a discussion regarding each alternative follow:

- Potential risk posed by the Site to human health and the environment—Currently, site risks are limited; thus, some flexibility in cleanup time frame is warranted.
- Practicability of achieving a shorter restoration time frame—The cleanup time frame varies from several years for Alternative 3, slightly longer for Alternative 2, and up to decades for Alternative 1.
- Current and future use of the Site, surrounding area, and associated resources that are or may be affected by releases from the Site—Future Site uses would not be substantially different than current usage in this context.
- Availability of alternative water supply—Municipal drinking water is available to the Site.
- Likely effectiveness and reliability of institutional controls—Institutional controls to limit or prevent exposure to contaminated soil and groundwater are likely to be effective and reliable.
- Ability to control and monitor migration of hazardous substances—Ability to control migration is high for all alternatives through groundwater monitoring.
- Toxicity of hazardous substances—Although the toxicity of some constituents is high, exposure risks are moderate, allowing for some flexibility in the cleanup time frame.
- Natural processes and reduced concentrations of hazardous substances—The natural degradation of petroleum hydrocarbons has been documented at numerous other sites.

Based on consideration of all the sub-criteria associated with the evaluation of the reasonable restoration time frame, as well as the various scenarios associated with the Site, Alternatives 2 and 3 provide restoration within a reasonable time frame. Alternative 1 does not because source material is left in the soil and groundwater.

4.8.3 Additional Performance Criteria

In addition to meeting the above minimum requirements, MTCA provides direction regarding the requirements of alternatives on a number of other performance criteria. These criteria and the performance of all alternatives based on these criteria are described below.

4.8.3.1 Institutional Controls and Financial Assurances

WAC 173-340-360(2)(e) requires cleanup actions to use institutional controls and financial assurances where required under WAC 173-340-440. Institutional controls are actions taken to limit or prohibit activities that may interfere with the integrity of an interim or cleanup action or that may result in exposure of hazardous substances at a site. They are required to ensure the continued protection of human health and the environment and the integrity of an interim action. Institutional controls may include:

- Physical measures
- Restriction on the use of the property or impacted resource
- Maintenance requirements for engineering controls
- Education programs
- Financial assurance

All three alternatives will require institutional controls to limit or prevent exposure to contaminated soil and/or groundwater.

4.8.3.2 Release and Migration

Cleanup actions under MTCA (WAC 173-340-360(2)(f)) are required to prevent or minimize present and future releases and migration of hazardous substances in the environment.

All three alternatives prevent the migration of hazardous substances through the use of caps, removal, destruction, containment, and monitoring.

4.8.3.3 Dilution and Dispersion

Cleanup actions under MTCA (WAC 173-340-360(2)(g)) cannot rely primarily on dilution and dispersion unless the incremental costs of any active remedial measure over the cost of dilution and dispersion grossly exceed the incremental degree of benefits of active remedial measures over the benefits of dilution and dispersion. None of the three alternatives rely on the use of dilution or dispersion to achieve cleanup levels or eliminate exposure pathways.

4.8.3.4 Remediation Levels

Cleanup actions under MTCA (WAC 173-340-360(2)(h) that use remediation levels will meet each of the minimum requirements specified above. Cleanup actions that use a remediation level are required, in part, to conduct a determination that a more permanent cleanup action is not practicable, based on a disproportionate cost analysis and a demonstration that the action is protective of human health and the environment. Remediation levels are not included as part of the implementation of the three remedial alternatives.

4.8.4 Summary of Other Requirements Screening

Based on the above evaluation, Alternatives 2 and 3 meet all other requirements criteria and are carried forward for detailed evaluation. Alternative 1 does not meet criteria for permanence or reasonable restoration time frame; however, it is carried forward for detailed evaluation because it corresponds to a No Action alternative.

4.9 DETAILED EVALUATION OF ALTERNATIVES

This section presents the results of a detailed evaluation of alternatives used to select the preferred alternative. Alternatives were compared based on effectiveness, implementability, public concern, and cost Effectiveness was evaluated in terms of protectiveness and ability to achieve the RAOs. The implementability of the alternatives depends on their technical feasibility, the availability of required resources, and administrative feasibility. Public concern reflects the anticipated level of adverse public reaction to each alternative. Costs were developed based on Engineer's estimates and experience from past similar projects.

The three selected alternatives are compared based on effectiveness, implementability, public concern, and cost in Table 4-2. Detailed breakdowns of the estimated cost for each alternative are provided in Tables 4-3 through 4-5.

4.10 PREFERRED ALTERNATIVE

This section discusses the selection of the preferred remedial alternative for both soil and groundwater remediation.

Excavation and removal of petroleum contaminated soil (Alternative 3) is the preferred alternative for the Site. This alternative meets the threshold criteria, provides a high likelihood of achieving the RAOs within a reasonable restoration time frame, and meets the additional performance criteria. Alternative 1 is not considered acceptable because it does not meet the MTCA requirements, or use of permanent solutions to the maximum extent practicable, or provide cleanup within a reasonable restoration time frame. Alternative 2, while feasible and likely to be effective, is more costly and provides less potential to meet RAOs within a reasonable time frame as does Alternative 3.

Groundwater monitoring will be conducted during four quarterly events as part of Alternative 3. It is recommended that the groundwater samples collected be analyzed for HVOCs during each quarterly event to provide an ongoing assessment of concentration trends. This data would aid potential future planning efforts regarding cleanup of the upgradient HVOCs sources. In addition to monitoring for HVOCs, any future Site development activities should include the proper management and disposal of contaminated groundwater generated by construction activities. If necessary, institutional controls should be implemented that will ensure that humans and the environment are not exposed to HVOCs in groundwater.

5. REFERENCES

AFCEE (Air Force Center for Environmental Excellence). 2004. Principles and Practices of Enhanced Anaerobic Bioremediation of Chlorinated Solvents. August 2004.

CDM. 2009. Draft Phase II Environmental Site Assessment, City of Bothell Crossroads Redevelopment Project, Bothell, Washington. Prepared for King County Solid Waste Division. June 26, 2009.

Ecology (Washington State Department of Ecology). 1994. Natural Background Soil Metals Concentrations in Washington State. Ecology Publication No. 94-115. October 1994.

Ecology. 2007. Model Toxics Control Act Cleanup Regulations. Washington Administrative Code (WAC) 173-340. November 2007.

ECOSS (Environmental Coalition of South Seattle). 2008. City of Bothell Revenue Development Area, Report on Tax Parcel History through 1972. Prepared for King County Solid Waste Division. January 2008.

EPA (U.S. Environmental Protection Agency). 1989. Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (Part A), Interim Final. Office of Emergency and Remedial Response, Washington, D.C. EPA/540/1-89/002. July 1989.

EPA. 2001. EPA Technology Screening Matrix and Reference Guide, Version 4.0. Available at: http://www.frtr.gov/scrntools.htm.

Kleinfelder. 1999a. Phase II Soil and Groundwater Exploration, Bothell Landing Shopping Plaza, Bothell, Washington. Prepared for Buck & Gordon, LLP. September 8, 1999.

Kleinfelder. 1999b. Groundwater Monitoring Well Installation and Sampling, Bothell Landing Shipping Plaza, Bothell, Washington. Prepared for Buck & Gordon, LLP. December 21, 1999.

Kleinfelder. 2006. Annual Groundwater Monitoring Report, Bothell Landing Shipping Plaza, Bothell, Washington. Prepared for Beta Commercial Properties. April 14, 2006.

HWA. 2007. Phase II Environmental Site Assessment, Beta Bothell Landing Property, Parcels No. 9457200015 & 9457200020, Bothell, Washington. Prepared for City of Bothell. November 1, 2007.

HWA. 2008. Phase II Environmental Site Assessment, Hertz Rentals Property, Bothell Washington. Prepared for City of Bothell. October 10, 2008.

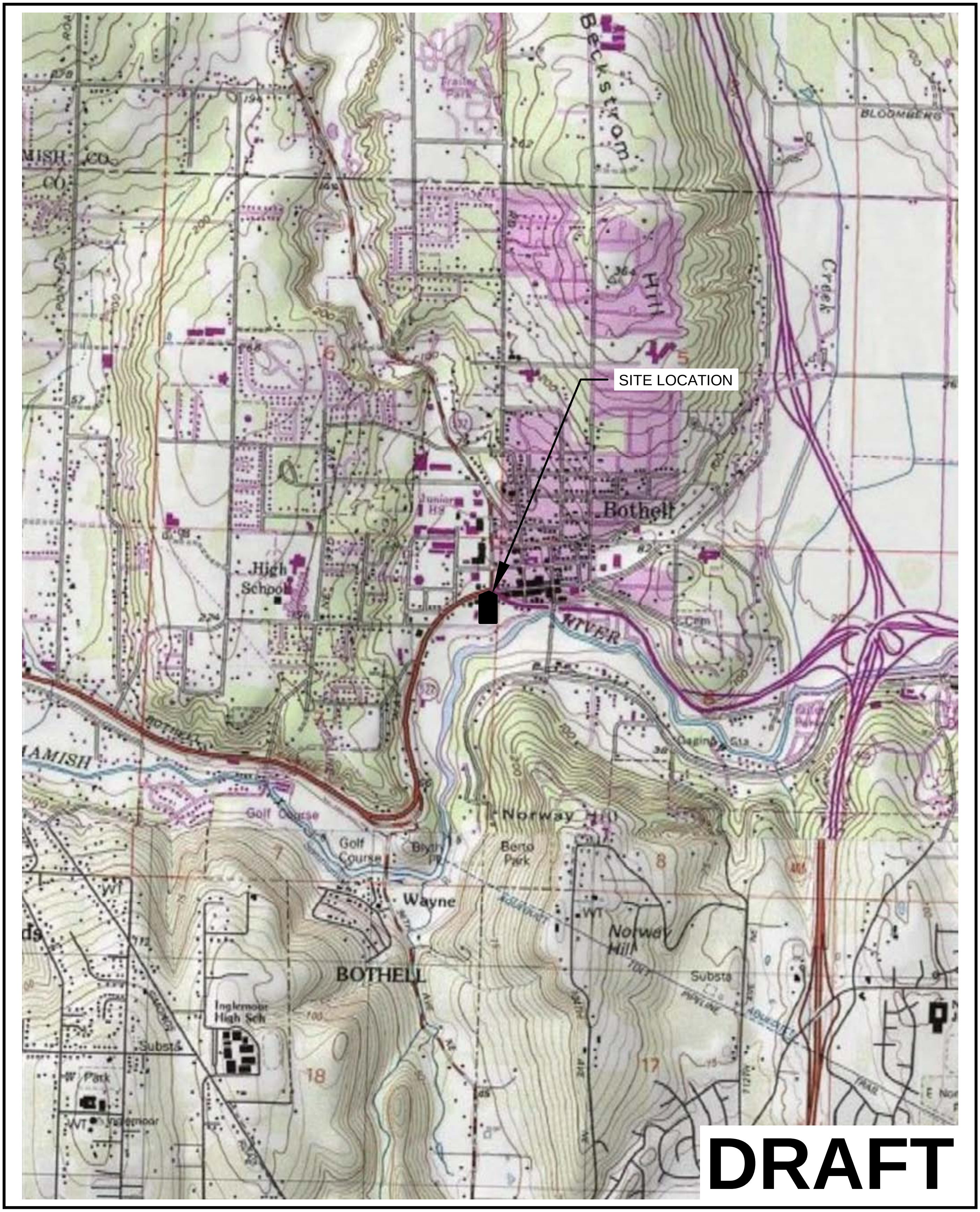
HWA. 2009a. Remedial Investigation and Feasibility Study Work Plan, Bothell Landing Property, Bothell, Washington. Prepared for City of Bothell. Compiled by Parametrix. August 26, 2009.

HWA. 2009b. Remedial Investigation and Feasibility Study Sampling and Analysis Plan, Bothell Landing Property, Bothell, Washington. Prepared for City of Bothell. Compiled by Parametrix. July 8, 2009.

PSI. 1998. Underground Storage Tank Removal and Site Assessment Report, Intersection of SR 522, SR 527, and Main Street, Bothell, Washington. Prepared for City of Bothell Department of Public Works. May 20, 1998.

Riley Group. 2007. Draft Phase I Environmental Site Assessment, Bothell Landing Property #1. May 29, 2007.

FIGURES



Parametrix DATE: Nov 20, 2009 FILE: BR1647019P02T0210_F-01-1

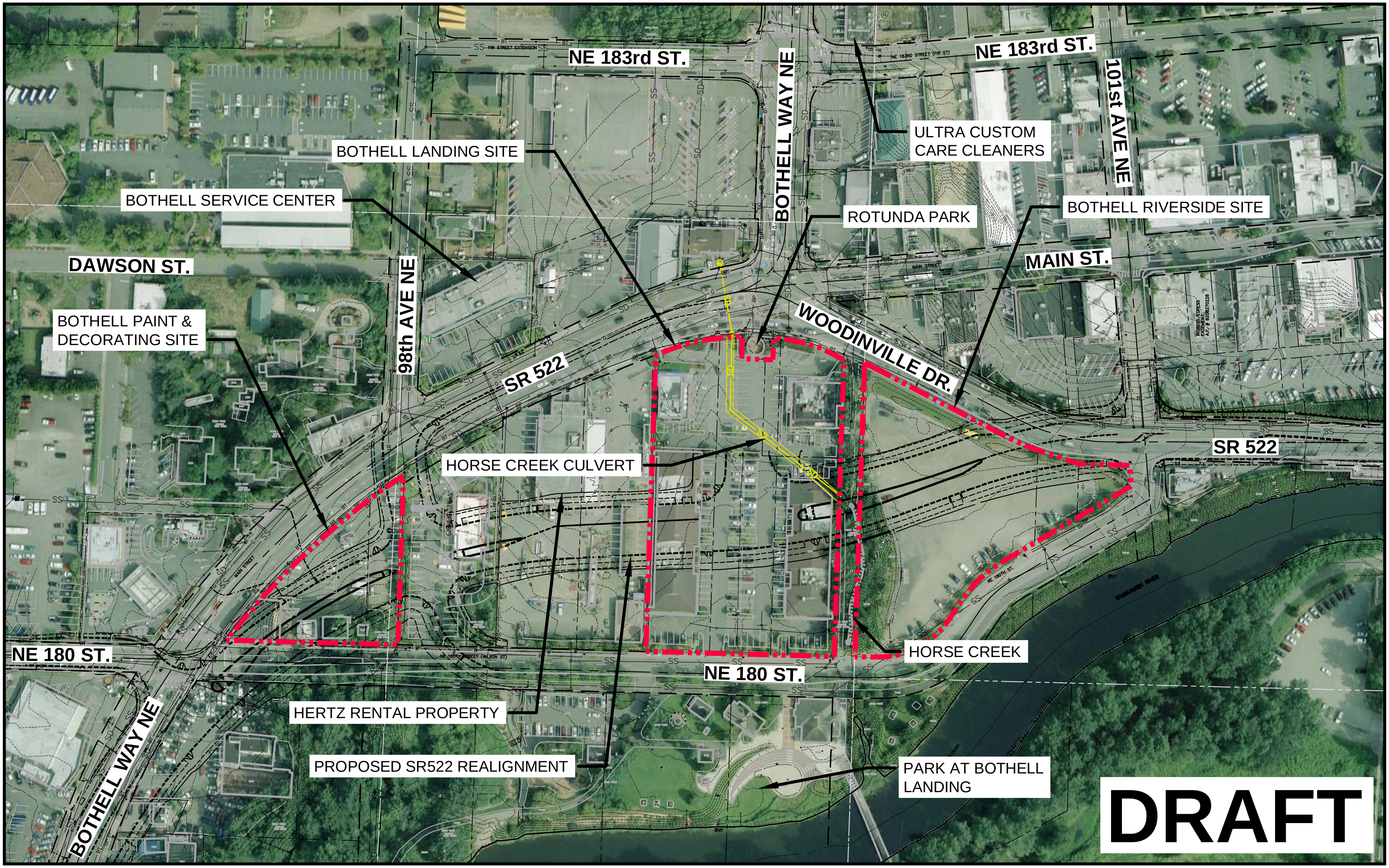
Image Source: USGS Bothell Quadrangle 1981

N

0 2,000

SCALE IN FEET

Figure 1-1
City of Bothell
Bothell Landing Site
Site Vicinity



Parametrix DATE: Nov 18, 2009 FILE: BR1647019P02T0210_F-01-2

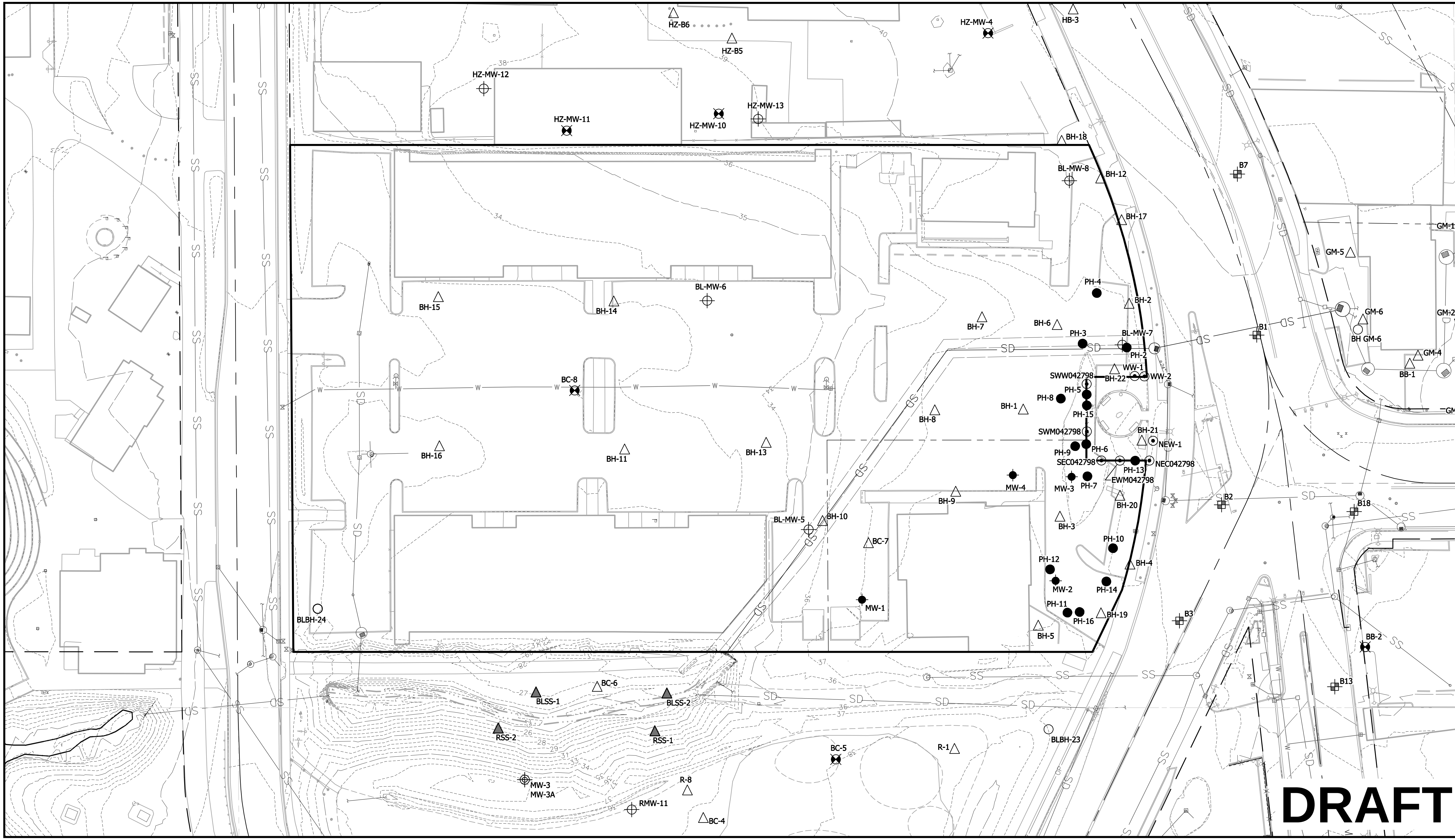
Image Source: © 2005 King County

N

0 200

SCALE IN FEET

Figure 1-2
City of Bothell
Bothell Landing Site
Site Vicinity and Adjacent Properties



Parametrix DATE: Dec 08, 2009 FILE: BR1647019P02T0210_F-02-1

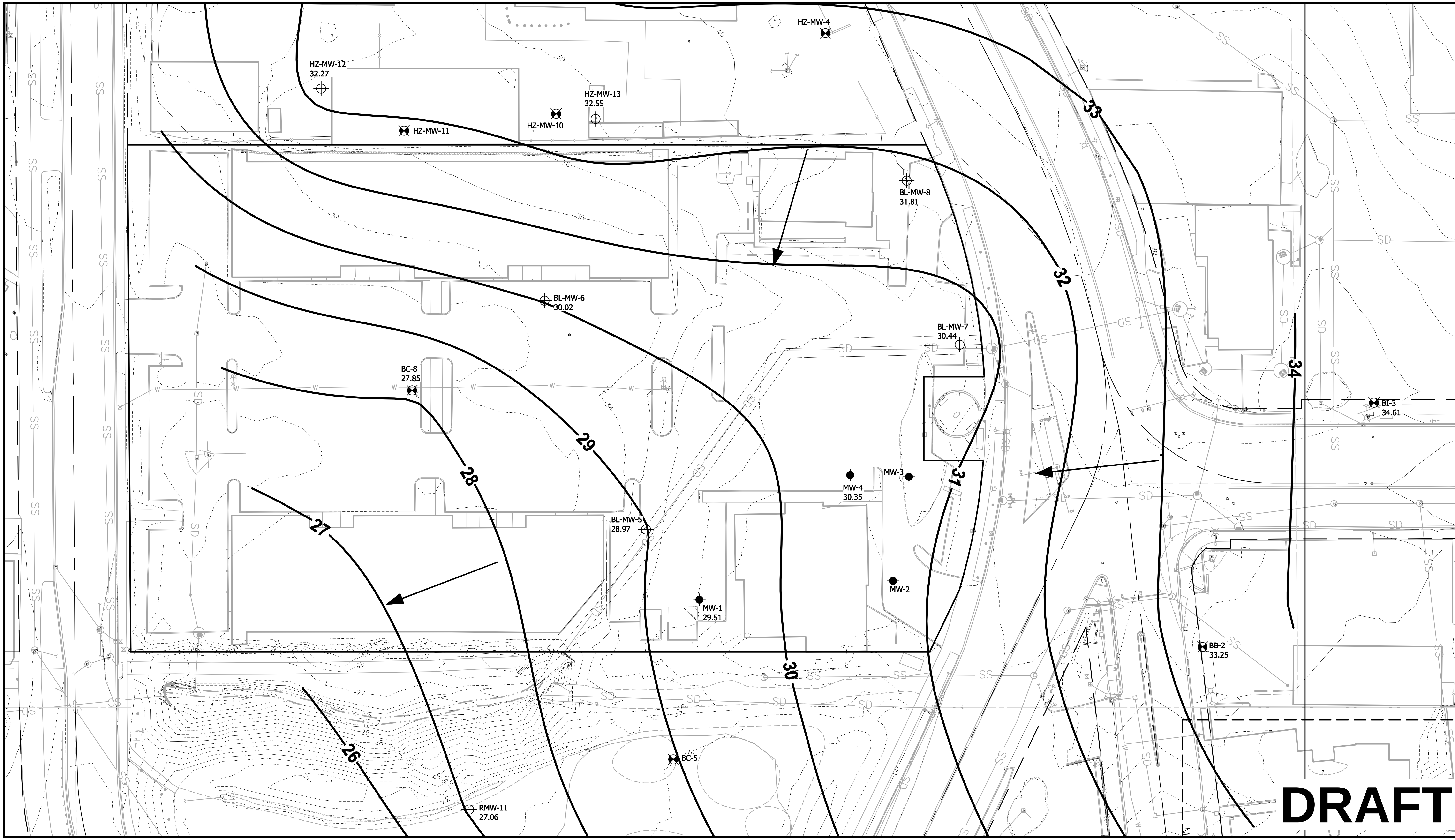
N

0 50
SCALE IN FEET

LEGEND

- PSI 1998 CLOSURE SAMPLE LOCATIONS
- KLEINFELDER 1999 BORING LOCATIONS
- KLEINFELDER 1999 WELL LOCATIONS
- HWA 2007 PHASE II ESA BORINGS
- HWA 2007 WELL LOCATIONS
- PMX 2009 RI/FS BORING LOCATIONS
- PMX 2009 RI/FS WELL LOCATIONS
- PMX 2009 RI/FS SURFACE SOIL LOCATIONS
- CDM 2009 ROW BORING LOCATIONS
- SITE BOUNDARY
- EXISTING BUILDING
- GTI 1992 FORMER WELL LOCATIONS

Figure 2-1
City of Bothell
Bothell Landing Site
Site Plan



Parametrix DATE: Nov 17, 2009 FILE: BR1647019P02T0210_F-02-2

N

0 50

SCALE IN FEET

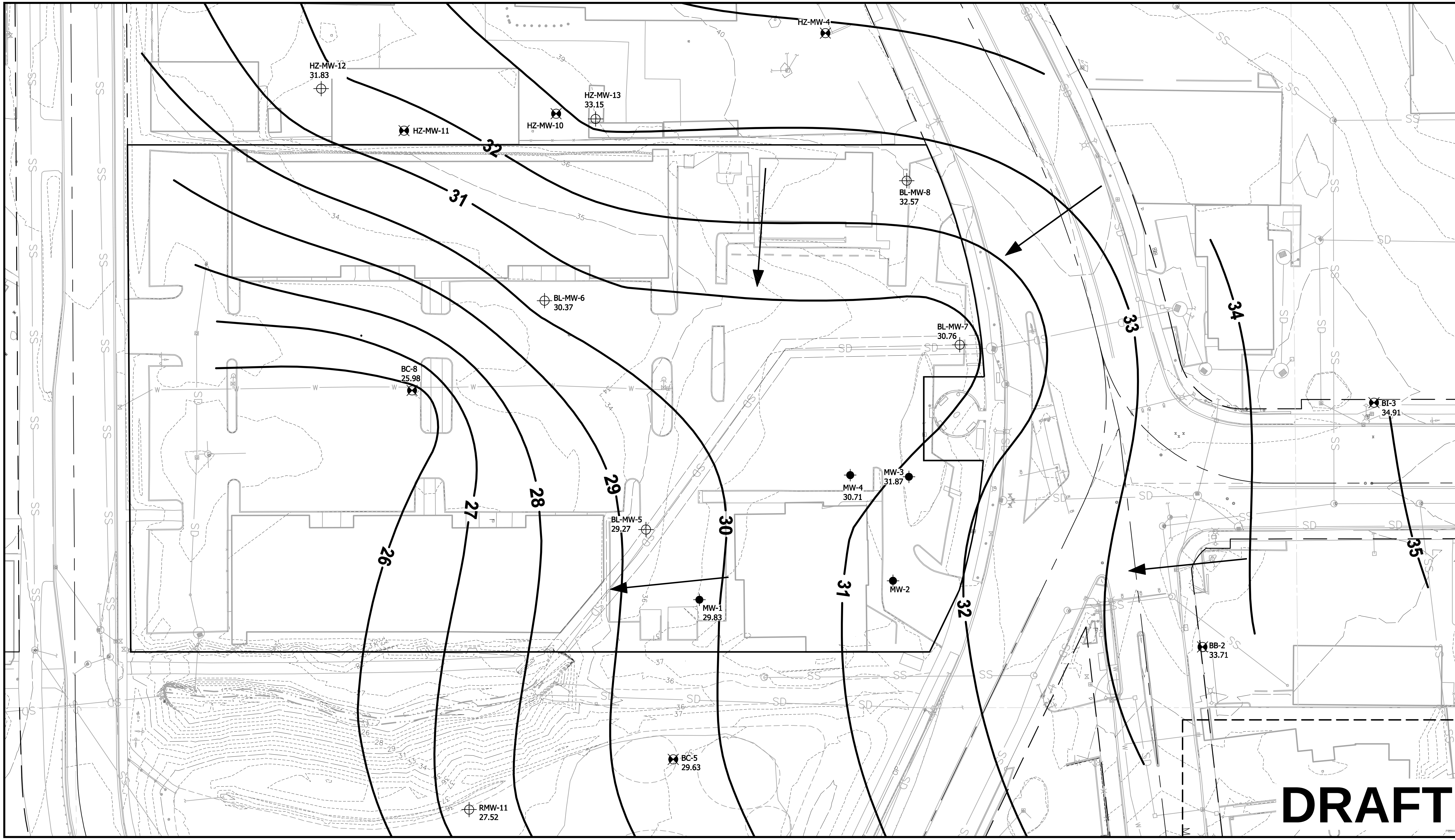
LEGEND

- HWA 2007 PHASE II ESA WELL LOCATIONS
- KLEINFELDER 1999 WELL LOCATIONS
- PMX 2009 RI/FS WELL LOCATIONS
- SITE BOUNDARY
- 27.06 GROUNDWATER TABLE ELEVATION MEASURED AT WELL ON 9/24/09
- 29 INFERRED POTENTIOMETRIC SURFACE ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION

NOTE:

CONTOUR DATUM: NAVD 88

Figure 2-2
City of Bothell
Bothell Landing Site
September 2009
Potentiometric Surface



Parametrix DATE: Nov 17, 2009 FILE: BR1647019P02T0210_F-02-3

N

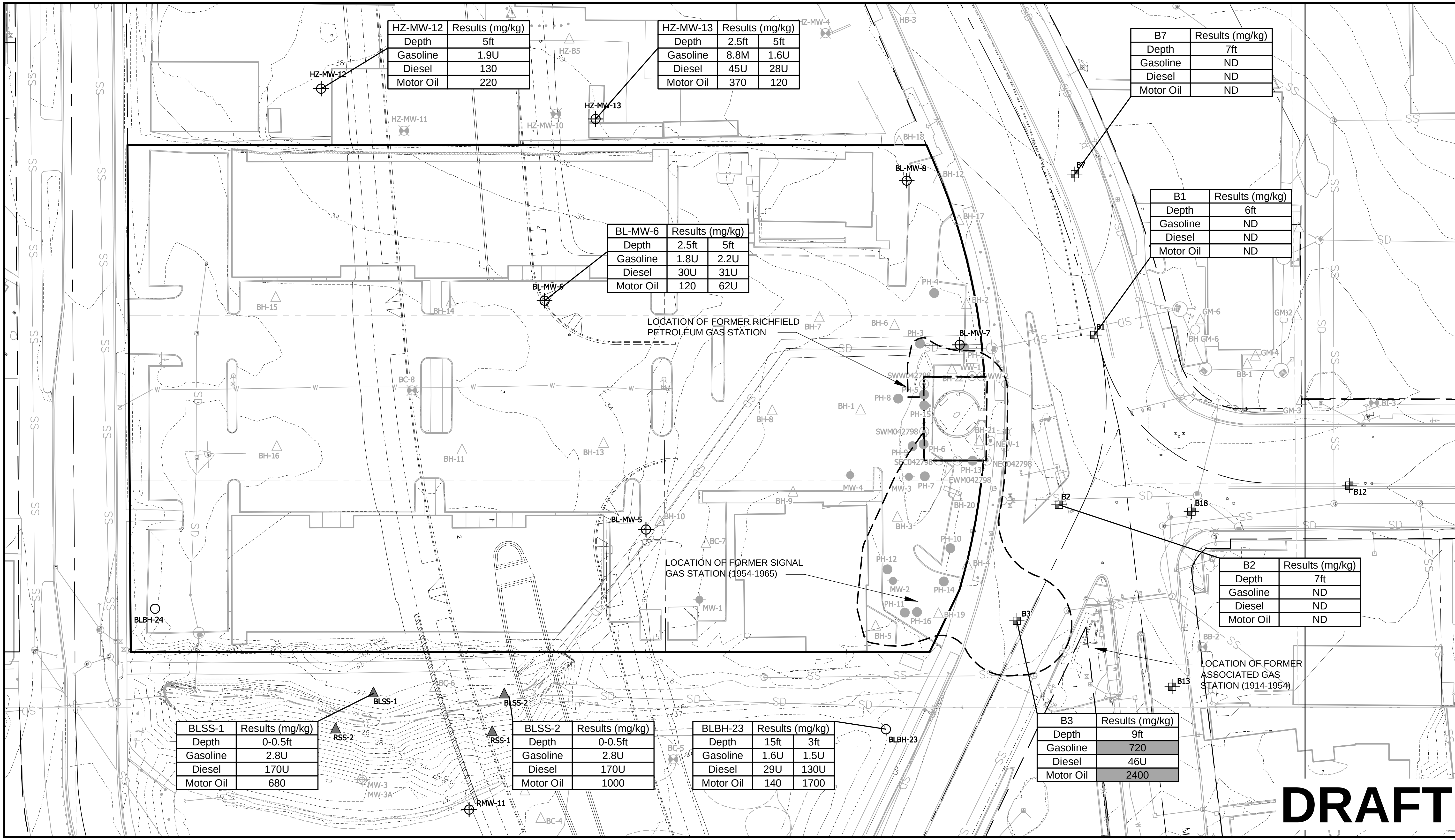
0 50
SCALE IN FEET

LEGEND

- HWA 2007 PHASE II ESA WELL LOCATIONS
- KLEINFELDER 1999 BORING LOCATIONS
- PMX 2009 RI/FS WELL LOCATIONS
- SITE BOUNDARY
- 27.06 GROUNDWATER TABLE ELEVATION MEASURED AT WELL ON 11/06/09
- 29 INFERRED POTENTIOMETRIC SURFACE ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION

NOTE:
CONTOUR DATUM: NAVD 88

Figure 2-3
City of Bothell
Bothell Landing Site
November 2009 Potentiometric Surface



HZ-MW-12	Results (mg/kg)
Depth	5ft
Gasoline	1.9U
Diesel	130
Motor Oil	220

HZ-MW-13	Results (mg/kg)	
Depth	2.5ft	5ft
Gasoline	8.8M	1.6U
Diesel	45U	28U
Motor Oil	370	120

B7	Results (mg/kg)
Depth	7ft
Gasoline	ND
Diesel	ND
Motor Oil	ND

B1	Results (mg/kg)
Depth	6ft
Gasoline	ND
Diesel	ND
Motor Oil	ND

BL-MW-6	Results (mg/kg)	
Depth	2.5ft	5ft
Gasoline	1.8U	2.2U
Diesel	30U	31U
Motor Oil	120	62U

B2	Results (mg/kg)
Depth	7ft
Gasoline	ND
Diesel	ND
Motor Oil	ND

BLSS-1	Results (mg/kg)
Depth	0-0.5ft
Gasoline	2.8U
Diesel	170U
Motor Oil	680

BLSS-2	Results (mg/kg)
Depth	0-0.5ft
Gasoline	2.8U
Diesel	170U
Motor Oil	1000

BLBH-23	Results (mg/kg)	
Depth	15ft	3ft
Gasoline	1.6U	1.5U
Diesel	29U	130U
Motor Oil	140	1700

B3	Results (mg/kg)
Depth	9ft
Gasoline	720
Diesel	46U
Motor Oil	2400

Parametrix DATE: Dec 08, 2009 FILE: BR1647019P02T0210_F-03-1

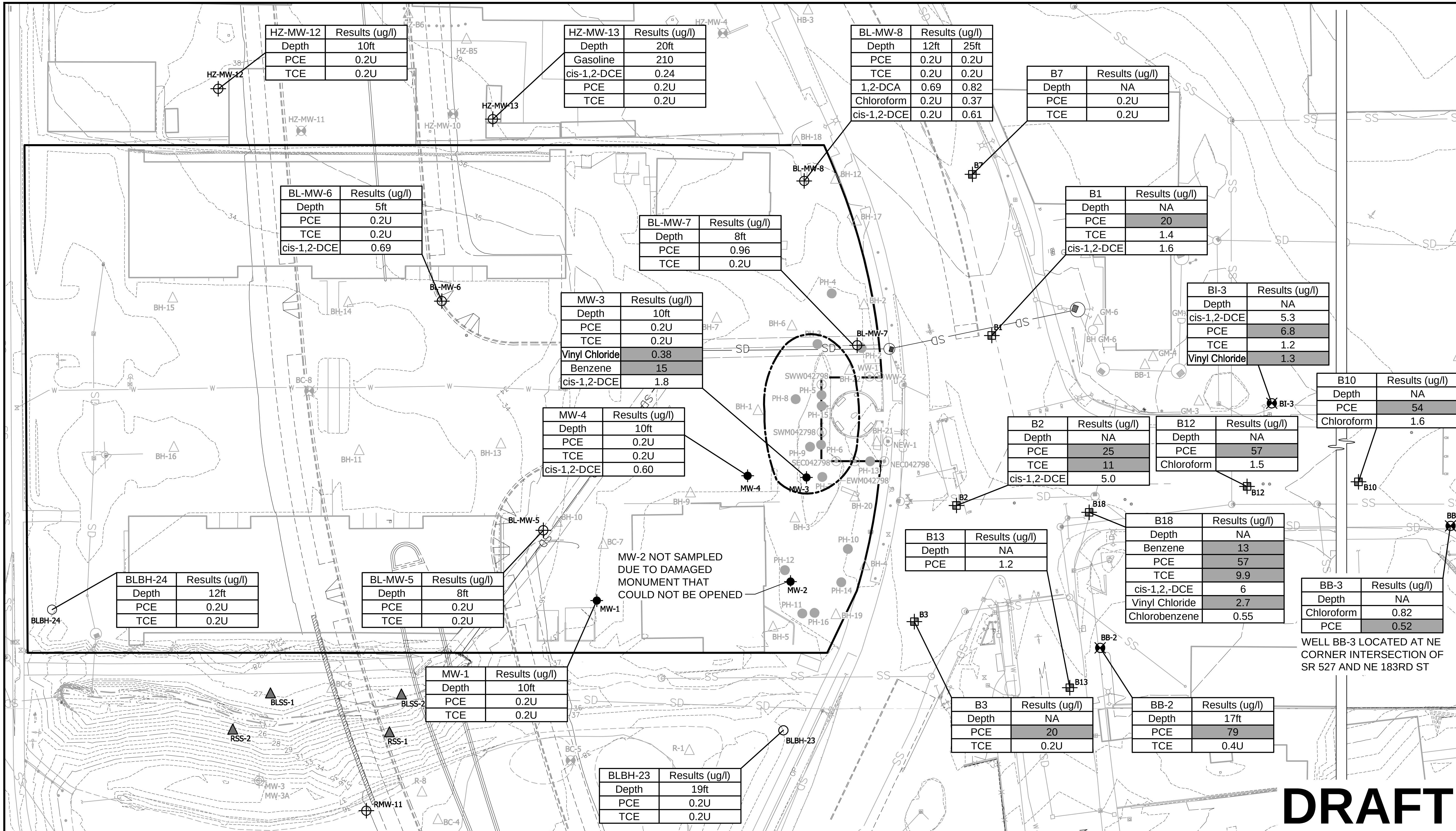
N

0 50
SCALE IN FEET

LEGEND

- PSI 1998 CLOSURE SAMPLE LOCATIONS
- KLEINFELDER 1999 BORING LOCATIONS
- KLEINFELDER 1999 WELL LOCATIONS
- HWA 2007 PHASE II ESA BORINGS
- HWA 2007 PHASE II ESA WELL LOCATIONS
- PMX 2009 RI/FS BORING LOCATIONS
- PMX 2009 RI/FS WELL LOCATIONS
- PMX 2009 RI/FS SURFACE SOIL LOCATIONS
- CDM 2009 ROW BORING LOCATIONS
- U ANALYTE NOT DETECTED AT GIVEN PRACTICAL QUANTITATION LIMIT
- M LAB IDENTIFIED SIMILAR TO MINERAL SPIRITS
- ND ANALYTE NOT DETECTED
- GTI 1992 FORMER WELL LOCATIONS
- APPROX LIMITS OF PETROLEUM IMPACTED SOILS BASED ON CURRENT AND PREVIOUS INVESTIGATIONS (CDM 2009, HWA 2007, KLEINFELDER 1999, PSI 1998)
- SITE BOUNDARY
- EXCEEDS MTCA METHOD A CLEAN UP LEVEL

Figure 3-1
City of Bothell
Bothell Landing Site
RI/FS Soil Results for
Total Petroleum Hydrocarbons



HZ-MW-12	Results (ug/l)
Depth	10ft
PCE	0.2U
TCE	0.2U

HZ-MW-13	Results (ug/l)
Depth	20ft
Gasoline	210
cis-1,2-DCE	0.24
PCE	0.2U
TCE	0.2U

BL-MW-8	Results (ug/l)	
Depth	12ft	25ft
PCE	0.2U	0.2U
TCE	0.2U	0.2U
1,2-DCA	0.69	0.82
Chloroform	0.2U	0.37
cis-1,2-DCE	0.2U	0.61

B7	Results (ug/l)
Depth	NA
PCE	0.2U
TCE	0.2U

BL-MW-6	Results (ug/l)
Depth	5ft
PCE	0.2U
TCE	0.2U
cis-1,2-DCE	0.69

BL-MW-7	Results (ug/l)
Depth	8ft
PCE	0.96
TCE	0.2U

B1	Results (ug/l)
Depth	NA
PCE	20
TCE	1.4
cis-1,2-DCE	1.6

MW-3	Results (ug/l)
Depth	10ft
PCE	0.2U
TCE	0.2U
Vinyl Chloride	0.38
Benzene	15
cis-1,2-DCE	1.8

BI-3	Results (ug/l)
Depth	NA
cis-1,2-DCE	5.3
PCE	6.8
TCE	1.2
Vinyl Chloride	1.3

B10	Results (ug/l)
Depth	NA
PCE	54
Chloroform	1.6

MW-4	Results (ug/l)
Depth	10ft
PCE	0.2U
TCE	0.2U
cis-1,2-DCE	0.60

B2	Results (ug/l)
Depth	NA
PCE	25
TCE	11
cis-1,2-DCE	5.0

B12	Results (ug/l)
Depth	NA
PCE	57
Chloroform	1.5

B13	Results (ug/l)
Depth	NA
PCE	1.2

B18	Results (ug/l)
Depth	NA
Benzene	13
PCE	57
TCE	9.9
cis-1,2,-DCE	6
Vinyl Chloride	2.7
Chlorobenzene	0.55

BB-3	Results (ug/l)
Depth	NA
Chloroform	0.82
PCE	0.52

BLBH-24	Results (ug/l)
Depth	12ft
PCE	0.2U
TCE	0.2U

BL-MW-5	Results (ug/l)
Depth	8ft
PCE	0.2U
TCE	0.2U

MW-1	Results (ug/l)
Depth	10ft
PCE	0.2U
TCE	0.2U

B3	Results (ug/l)
Depth	NA
PCE	20
TCE	0.2U

BB-2	Results (ug/l)
Depth	17ft
PCE	79
TCE	0.4U

BLBH-23	Results (ug/l)
Depth	19ft
PCE	0.2U
TCE	0.2U

Parametrix DATE: Dec 08, 2009 FILE: BR1647019P02T0210_F-03-2

N

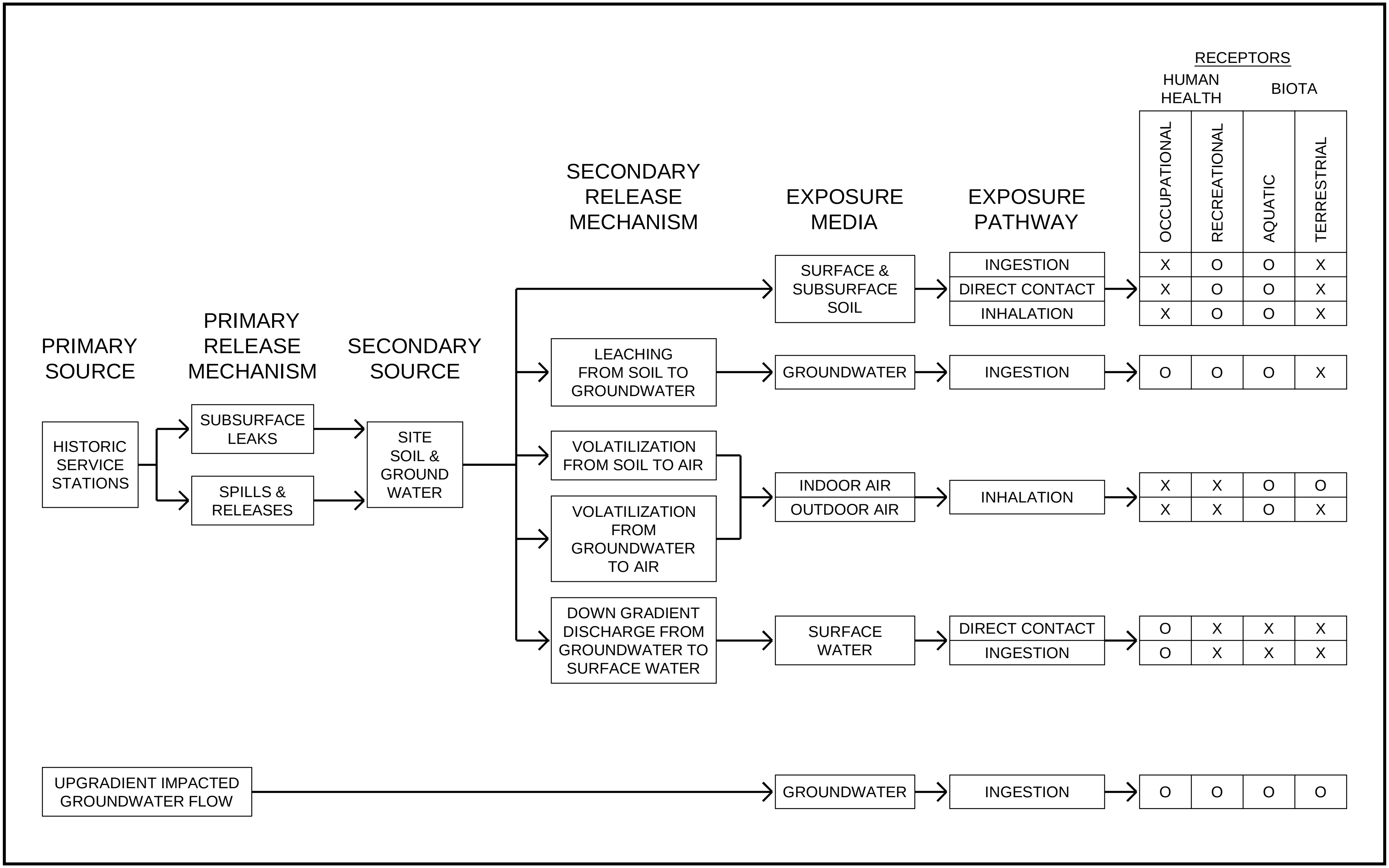
0 50

SCALE IN FEET

LEGEND

- PSI 1998 SOIL SAMPLE LOCATIONS
- KLEINFELDER 1999 BORING LOCATIONS
- KLEINFELDER 1999 WELL LOCATIONS
- HWA 2007 PHASE II ESA BORINGS
- HWA 2007 PHASE II ESA WELL LOCATIONS
- PMX 2009 RI/FS BORING LOCATIONS
- PMX 2009 RI/FS WELL LOCATIONS
- PMX 2009 RI/FS SURFACE SOIL LOCATIONS
- CDM 2009 ROW BORING LOCATIONS
- U ANALYTE NOT DETECTED AT GIVEN PRACTICAL QUANTITATION LIMIT
- SITE BOUNDARY
- EXCEEDS MTCA METHOD A CLEAN UP LEVEL
- GTI 1992 FORMER WELL LOCATIONS
- APPROX LIMITS OF PETROLEUM IMPACTED GROUNDWATER REPORTED BY HWA (HWA 2007) RI RESULTS SUPPORT THIS DELINEATION

Figure 3-2
City of Bothell
Bothell Landing Site
RI/FS Groundwater Results for Detected TPH, BTEX and HVOCs



Parametrix DATE: Nov 12, 2009 FILE: BR1647019P02T0210_F-03-3

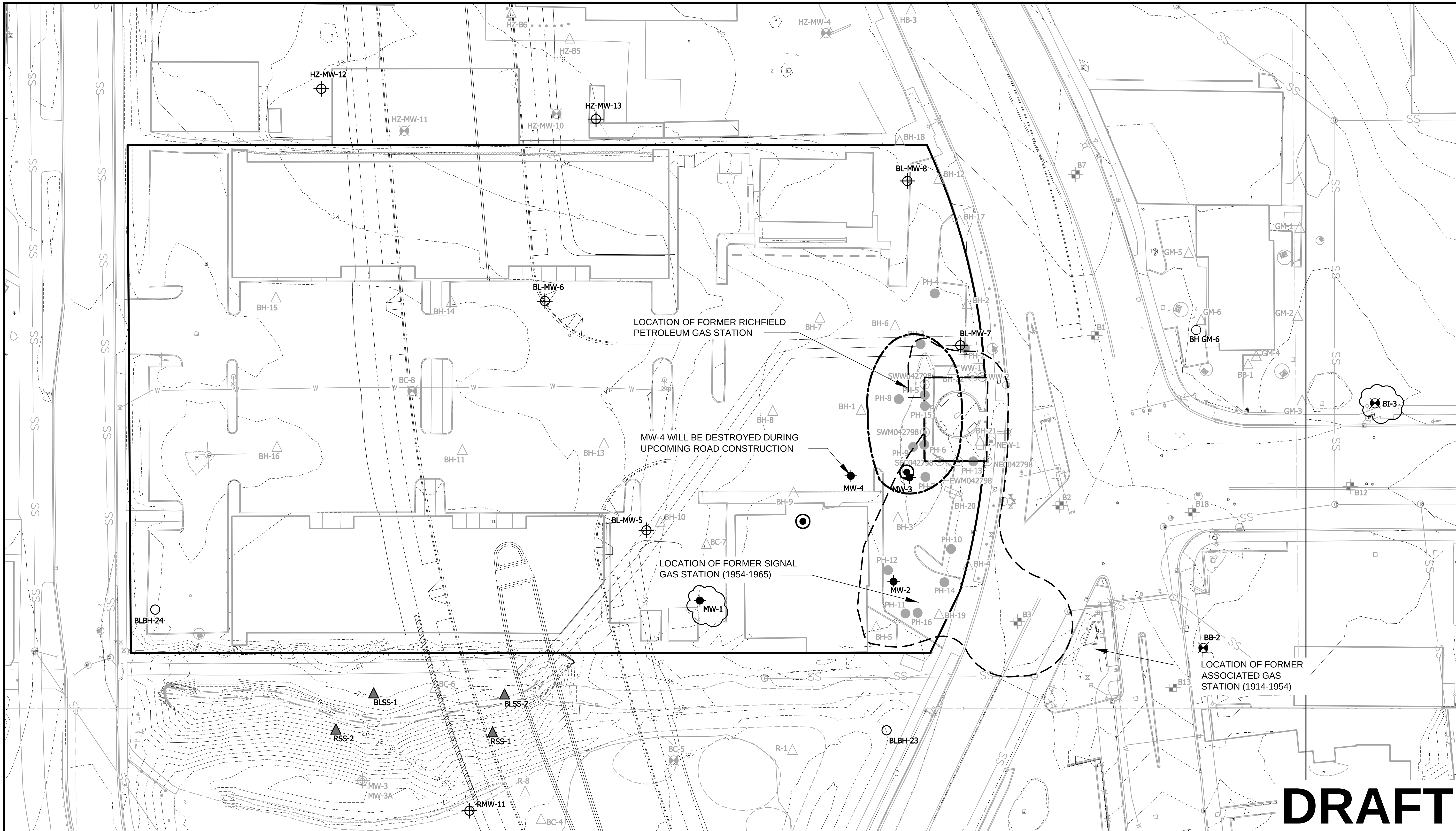
LEGEND

X COMPLETE

O INCOMPLETE

DRAFT

Figure 3-3
City of Bothell
Bothell Landing Site
Conceptual Site Model



Parametrix DATE: Dec 08, 2009 FILE: BR1647019P02T0210_F-04-1

N

0 50

SCALE IN FEET

LEGEND

- PSI 1998 CLOSURE SAMPLE LOCATIONS
- KLEINFELDER 1999 BORING LOCATIONS
- KLEINFELDER 1999 WELL LOCATIONS
- HWA 2007 PHASE II ESA BORINGS
- HWA 2007 PHASE II ESA WELL LOCATIONS
- PMX 2009 RI/FS BORING LOCATIONS
- PMX 2009 RI/FS WELL LOCATIONS
- PMX 2009 RI/FS SURFACE SOIL LOCATIONS
- CDM 2009 ROW BORING LOCATIONS
- GTI 1992 FORMER WELL LOCATIONS
- PROPOSED NEW MONITORING WELL
- EXISTING MONITORING WELL TO BE USED FOR LONG TERM MONITORING
- SITE BOUNDARY
- FOOTPRINT OF PETROLEUM CONTAMINATED SOIL TO BE ADDRESSED UNDER REMEDIAL ACTION ALTERNATIVES 1, 2, & 3
- PETROLEUM - IMPACTED GROUNDWATER PLUME TO BE ADDRESSED UNDER REMEDIAL ACTION ALTERNATIVES 1, 2, & 3

Figure 4-1
City of Bothell
Bothell Landing Site
Petroleum Soil & Groundwater Remedial Alternatives Plan

TABLES

Table 3-1. Summary of Soil Analytical Results

PARAMETERS	Units	Analytical Method	MTCA A	MTCA B soil to gw	Ecological Indicator Conc.	Sample No.: / Depth (ft): / Background	BLBH-23-3 / 3 / 9/4/2009	BLBH-23-15 / 15 / 9/4/2009	BLMW-6-2.5 / 2.5 / 9/4/2009	BLMW-6-7.5 / 7.5 / 9/4/2009	BLSS-1 0-0.5 / 0-0.5 / 9/9/2009	BLSS-2 0-0.5 / 0-0.5 / 9/9/2009	HZMW-12-5 / 5 / 9/8/2009	HZMW-13-2.5 / 2.5 / 9/8/2009	HZMW-13-5 / 5 / 9/8/2009
PETROLEUM HYDROCARBONS															
Diesel	mg/kg	NWTPH-Dx	2,000		200		130 U	29 U	30 U	31 U	170 U	170 U	130	45 U	28 U
Motor Oil	mg/kg	NWTPH-Dx	2,000				1,700	140	120	62 U	680	1,000	220	370	120
Gasoline	mg/kg	NWTPH-Gx	30/100*G		100		1.5 U	1.6 U	1.8 U	2.2 U	2.8 U	2.8 U	1.9 U	8.8 M	1.6 U
m,p-Xylene	µg/kg	SW8021B	9,000*XY				29 U	32 U	37 U	44 U	55 U	57 U	50	75	32 U
o-Xylene	µg/kg	SW8021B	9,000*XY				29 U	32 U	37 U	44 U	55 U	57 U	59	47	32 U
METALS															
Chromium	mg/kg	SW6010B	2000*CR		42	48.15	- -	- -	31	**45**	- -	- -	**60**	35	41
Lead	mg/kg	SW6010B	250	250	50	16.83	- -	- -	6 U	6.2 U	- -	- -	24	9.3	5.7 U
Mercury	mg/kg	SW7471A	2	2.088	0.1	0.07	- -	- -	0.026	0.025 U	- -	- -	0.027	0.022 U	0.027
VOLATILE ORGANICS															
All Analytes	µg/kg	SW8260B					- -	- -	ND	ND	ND	ND	ND	ND	ND
SEMIVOLATILE ORGANICS															
Naphthalene	µg/kg	SW8270D SIM	5,000*NA				6.9 U	7.7 U	7.9	8.2 U	- -	- -	8.2 U	7.5 U	7.6 U

NOTES:
- - - Not analyzed or not collected
- *CR = Chromium Standards based on Chromium III
- *G = 100 if no benzene and TEX < 1% gas; 30 for other mixtures
- *NA = Includes Naphthelene, 1-Methylnaphthalene, and 2-Methylnaphthalene
- *XY = Applies to the sum of all xylenes
- ND = Non-detect
- U = Not detected above the given practical quantitation limit
- M = Lab identified: similar to mineral spirits based on chromatogram
- **Bold** Bold values exceed Ecological Indicator Concentration

SOURCES: Background: 90th percentile Puget Sound (Ecology's Publication #94-115; 10/1994)
Model Toxics Control Act (MTCA) from WA Administrative Code 173-340-900
MTCA Method A Soil Cleanup Levels for Unrestricted Land Use: Table 740-1
MTCA Method B soil to groundwater: site-specific calculated
Ecological Indicator Concentrations: Table 749-3

UNITS:
- ft = feet
- mg/kg = milligram/kilogram
- µg/kg = microgram/kilogram

Table 3-2. Summary of Groundwater Analytical Results

PARAMETERS	Units	Analytical Method	MTCA A	Sample No.: / Depth (ft): / Date:	BI-3 / 6 / 9/24/2009	D-BI-3 / 6 / 9/24/2009	BB-2-17 / 17 / 9/18/2009	BB-3-16 / 16 / 9/17/2009	BLMW-1-10 / 10 / 9/16/2009	BLMW-3-10 / 10 / 9/17/2009	BLMW-4-10 / 10 / 9/16/2009	BLMW-4-10-2 / 10 / 9/16/2009	BLMW-5-8 / 8 / 9/16/2009	BLMW-6-5 / 5 / 9/16/2009
FIELD DATA														
Conductivity	mmhos/cm	Field			0.240	- -	0.259	0.329	0.263	0.367	0.382	- -	0.280	0.346
pH	std units	Field			6.72	- -	6.95	7.76	7.00	7.17	7.05	- -	7.01	7.22
Temperature	Celsius	Field			22.1	- -	17.9	18.5	17.9	20.9	19.4	- -	18.5	19.0
Dissolved Oxygen	mg/L	Field			2.37	- -	3.58	10.65	2.49	2.32	2.32	- -	2.47	2.37
PETROLEUM HYDROCARBONS														
Gasoline Range Hydrocarbons	mg/L	NWTPH-Gx	0.8/1*G		- -	- -	- -	- -	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U
Benzene	µg/L	SW8260	5		- -	- -	- -	- -	1 U	15	1 U	1 U	1 U	1 U
TOTAL METALS														
Arsenic	mg/L	200.8/6020	0.005		- -	- -	- -	- -	0.0033 U	0.0039	0.0033 U	0.0033 U	0.0033 U	- -
DISSOLVED METALS														
All Analytes	mg/L	200.8/6020			- -	- -	- -	- -	ND	ND	ND	ND	ND	- -
VOLATILE ORGANICS														
1,2-Dichloroethane	µg/L	SW8260	5		0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chloroform	µg/L	SW8260			0.2 U	0.2 U	0.4 U	0.82	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
cis-1,2-Dichloroethene	µg/L	SW8260			5.3	5.1	0.4 U	0.2 U	0.2 U	1.8	0.60	0.57	0.2 U	0.69
Methylene Chloride	µg/L	SW8260	5		1 U	1 U	2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	µg/L	SW8260	5		6.8	6.9	79	0.52	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Trichloroethene	µg/L	SW8260	5		1.2	1.2	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Vinyl Chloride	µg/L	SW8260	0.2		1.3	1.4	0.4 U	0.2 U	0.2 U	0.38	0.2 U	0.2 U	0.2 U	0.2 U

(Table Continues)

Table 3-2. Summary of Groundwater Analytical Results

PARAMETERS	Units	Analytical Method	MTCA A	Sample No.: / Depth (ft): / Date:	BLMW-7-8 / 8 / 9/16/2009	BLMW-8-12 / 12 / 9/16/2009	BLMW-8-25 / 25 / 9/4/2009	BLBH-23-19 / 19 / 9/4/2009	BLBH-24-12 / 12 / 9/4/2009	HZMW-12-10 / 10 / 9/17/2009	HZMW-13-10 / 10 / 9/17/2009
FIELD DATA											
Conductivity	mmhos/cm	Field			0.188	0.568	- -	- -	- -	0.960	1.17
pH	std units	Field			6.67	6.85	- -	- -	- -	6.74	7.19
Temperature	Celsius	Field			17.9	18.2	- -	- -	- -	19.8	20.1
Dissolved Oxygen	mg/L	Field			2.60	2.78	- -	- -	- -	2.39	2.31
PETROLEUM HYDROCARBONS											
Gasoline Range Hydrocarbons	mg/L	NWTPH-Gx	0.8/1*G		0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.210
Benzene	µg/L	SW8260	5		1 U	1 U	1 U	1 U	1 U	1 U	1 U
TOTAL METALS											
Arsenic	mg/L	200.8/6020	0.005		0.0033 U	0.0033 U	0.0033 U	0.0033 U	- -	- -	- -
DISSOLVED METALS											
All Analytes	mg/L	200.8/6020			ND	ND	- -	- -	- -	- -	- -
VOLATILE ORGANICS											
1,2-Dichloroethane	µg/L	SW8260	5		0.2 U	0.69	0.82	0.2 U	0.2 U	0.2 U	0.2 U
Chloroform	µg/L	SW8260			0.2 U	0.2 U	0.37	0.2 U	0.2 U	0.2 U	0.2 U
cis-1,2-Dichloroethene	µg/L	SW8260			0.2 U	0.2 U	0.61	0.2 U	0.2 U	0.2 U	0.24
Methylene Chloride	µg/L	SW8260	5		1 U	1 U	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	µg/L	SW8260	5		0.96	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Trichloroethene	µg/L	SW8260	5		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Vinyl Chloride	µg/L	SW8260	0.2		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U

NOTES:
- - - = Not analyzed or not collected
- ND = Non-detect
- U = Not detected above the given practical quantitation limit
- *G = 1 if no benzene ; 0.8 if benzene
- Shaded values exceed MTCA A

SOURCES:
Model Toxics Control Act (MTCA) from WA Administrative Code 173-340-900
MTCA Method A Cleanup Levels for Ground Water: Table 720-1

UNITS:
- ft = foot
- mmhos/cm = millimhos/centimeter
- mg/L = milligrams/liter
- µg/L = micrograms/liter

Table 3-3. Summary of Historical Soil Analytical Results

PARAMETERS	Units	Analytical Method	MTCA A	MTCA B soil to gw	Ecological Indicator Conc.	Sample No.: Depth (ft): Background	B1-6 6 4/6/2009	B2-7 7 4/2/2009	B3-9 9 4/3/2009	B7-9 9 4/1/2009	BC-6-2.5 2.5 6/23/2008	BC-7-7.5 7.5 06/02/2008	BC-8-7.5 7.5 06/02/2008	BH-2-6 6 7/9/2007	BH-3-6 6 7/9/2007
PETROLEUM HYDROCARBONS															
Diesel	mg/kg	NWTPH-Dx	2,000		200		- -	- -	46 U	- -	31 U	29 U	36 U	25.00 U	**9,300.00**
Motor Oil	mg/kg	NWTPH-Dx	2,000				- -	- -	2,400	- -	63 U	57 U	71 U	50.00 U	1,000.00 U
Gasoline	mg/kg	NWTPH-Gx	30/100*G		100		- -	- -	**720**	- -	6.7 U	6.3 U	8.5 U	3.00 U	**1,200.00**
Benzene	µg/kg	SW8021	30	4.483			- -	- -	0.006	- -	0.02 U	1.1 U	0.02 U	30 U	390
Toluene	µg/kg	SW8021	7,000		200,000		- -	- -	0.0011	- -	0.067 U	5.4 U	0.085 U	50 U	1300
Ethylbenzene	µg/kg	SW8021	6,000				- -	- -	0.012	- -	0.067 U	1.1 U	0.085 U	50 U	1200
m,p-Xylene	µg/kg	SW8021	9,000*XY				- -	- -	0.011	- -	0.067 U	2.2 U	0.085 U	- -	- -
Total Xylenes	µg/kg	SW8021	9,000*XY				- -	- -	- -	- -	- -	- -	- -	200 U	2700
METALS															
Arsenic	mg/kg	SW6010	20	2.803	7	7.30	- -	- -	- -	- -	- -	- -	- -	- -	5.00 U
Barium	mg/kg	SW6010			102		- -	- -	- -	- -	- -	- -	- -	- -	44.00
Chromium	mg/kg	SW6010	2,000*CR		42	48.15	- -	- -	- -	- -	- -	- -	- -	- -	31.00
Lead	mg/kg	SW6010	250	250	50	16.83	- -	- -	- -	- -	- -	- -	- -	- -	5.00 U
Mercury	mg/kg	SW7471A	2	2.088	0.1	0.07	- -	- -	- -	- -	- -	- -	- -	- -	0.02
VOLATILE ORGANICS															
2-Butanone	µg/kg	SW8260					- -	- -	- -	- -	- -	19	- -	- -	- -
Acetone	µg/kg	SW8260					- -	- -	- -	- -	- -	96	- -	- -	- -
Methylene Chloride	µg/kg	SW8260	20				4.9 U	7.9 U	940 U	5.2 U	- -	5.4 U	- -	- -	200.00 U
Tetrachloroethene	µg/kg	SW8260	50				5.4	1.6 U	190 U	1.2	- -	1.1 U	- -	- -	100.00 U
SEMIVOLATILE ORGANICS															
1-Methylnaphthalene	µg/kg	SW8270D SIM	5,000*NA				- -	- -	- -	- -	- -	- -	- -	- -	92,000.00
2-Methylnaphthalene	µg/kg	SW8270D SIM	5,000*NA				- -	- -	- -	- -	- -	- -	- -	- -	150,000.00
Acenaphthene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -	- -	- -	- -	7,000.00
Acenaphthylene	µg/kg	SW8270D SIM			20,000		- -	- -	- -	- -	- -	- -	- -	- -	1,800.00
Anthracene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -	- -	- -	- -	1,100.00
Chrysene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -	- -	- -	- -	70.00
Fluoranthene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -	- -	- -	- -	180.00
Fluorene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -	- -	- -	- -	9,500.00
Naphthalene	µg/kg	SW8270D SIM	5,000*NA				- -	- -	- -	- -	- -	- -	- -	- -	970.00
Phenanthrene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -	- -	- -	- -	13,000.00
Pyrene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -	- -	- -	- -	410.00
Total cPAHs Using Tox. Equiv.	µg/kg	SW8270D SIM	100				- -	- -	- -	- -	- -	- -	- -	- -	30.70

(Table continues)

Table 3-3. Summary of Historical Soil Analytical Results

PARAMETERS	Units	Analytical Method	MTCA A	MTCA B soil to gw	Ecological Indicator Conc.	Background	BH-3-10	BH-4-6	BH-5-6	BH-5-10	BH-6-6	BH-13-6	BH-14-2	BH-14-6	BH-15-2
						Sample No.:	BH-3-10	BH-4-6	BH-5-6	BH-5-10	BH-6-6	BH-13-6	BH-14-2	BH-14-6	BH-15-2
						Depth (ft):	10	6	6	10	6	6	2	6	2
							7/9/2007	7/9/2007	7/9/2007	7/9/2007	7/10/2007	7/9/2007	7/10/2007	7/10/2007	7/10/2007
PETROLEUM HYDROCARBONS															
Diesel	mg/kg	NWTPH-Dx	2,000		200		25.00 U	**670.00**	25.00 U	- -	25.00 U	25.00 U	25.00 U	25.00 U	25.00 U
Motor Oil	mg/kg	NWTPH-Dx	2,000				120.00	50.00 U	50.00 U	- -	50.00 U	65.00	50.00 U	50.00 U	50.00 U
Gasoline	mg/kg	NWTPH-Gx	30/100*G		100		3.00 U	**650.00**	**140.00**	3.00 U	3.00 U	- -	3.00 U	- -	3.00 U
Benzene	µg/kg	SW8021	30	4.483			30 U	300 U	50	30 U	30 U	- -	30 U	- -	30 U
Toluene	µg/kg	SW8021	7,000		200,000		50 U	1,000	400	50 U	50 U	- -	50 U	- -	50 U
Ethylbenzene	µg/kg	SW8021	6,000				50 U	500 U	110	50 U	50 U	- -	50 U	- -	50 U
m,p-Xylene	µg/kg	SW8021	9,000*XY				- -	- -	- -	- -	- -	- -	- -	- -	- -
Total Xylenes	µg/kg	SW8021	9,000*XY				200 U	2000 U	1500	200 U	200 U	- -	200 U	- -	200 U
METALS															
Arsenic	mg/kg	SW6010	20	2.803	7	7.30	- -	- -	- -	- -	- -	5.40	5.00 U	5.00 U	5.00 U
Barium	mg/kg	SW6010			102		- -	- -	- -	- -	- -	98.00	- -	**140.00**	- -
Chromium	mg/kg	SW6010	2,000*CR		42	48.15	- -	- -	- -	- -	- -	22.00	40.00	30.00	32.00
Lead	mg/kg	SW6010	250	250	50	16.83	- -	- -	- -	- -	- -	110.00	5.00 U	59.00	16.00
Mercury	mg/kg	SW7471A	2	2.088	0.1	0.07	- -	- -	- -	- -	- -	0.06	0.02	0.08	0.02 U
VOLATILE ORGANICS															
2-Butanone	µg/kg	SW8260					- -	- -	- -	- -	- -	- -	- -	- -	- -
Acetone	µg/kg	SW8260					- -	- -	- -	- -	- -	- -	- -	- -	- -
Methylene Chloride	µg/kg	SW8260	20				- -	200.00 U	200.00 U	- -	- -	- -	- -	- -	- -
Tetrachloroethene	µg/kg	SW8260	50				- -	100.00 U	100.00 U	- -	- -	- -	- -	- -	- -
SEMIVOLATILE ORGANICS															
1-Methylnaphthalene	µg/kg	SW8270D SIM	5,000*NA				- -	- -	- -	- -	- -	- -	- -	- -	- -
2-Methylnaphthalene	µg/kg	SW8270D SIM	5,000*NA				- -	- -	- -	- -	- -	- -	- -	- -	- -
Acenaphthene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -	- -	- -	- -	- -
Acenaphthylene	µg/kg	SW8270D SIM			20,000		- -	- -	- -	- -	- -	- -	- -	- -	- -
Anthracene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -	- -	- -	- -	- -
Chrysene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -	- -	- -	- -	- -
Fluoranthene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -	- -	- -	- -	- -
Fluorene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -	- -	- -	- -	- -
Naphthalene	µg/kg	SW8270D SIM	5,000*NA				- -	- -	- -	- -	- -	- -	- -	- -	- -
Phenanthrene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -	- -	- -	- -	- -
Pyrene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -	- -	- -	- -	- -
Total cPAHs Using Tox. Equiv.	µg/kg	SW8270D SIM	100				- -	- -	- -	- -	- -	- -	- -	- -	- -

(Table continues)

Table 3-3. Summary of Historical Soil Analytical Results

PARAMETERS	Units	Analytical Method	MTCA A	MTCA B soil to gw	Ecological Indicator Conc.	Sample No.: Depth (ft): Background	BH-15-6 6 7/10/2007	BH-18-10 10 8/9/2007	BH-19-6 6 8/9/2007	BH-20-6 6 8/9/2007	BH-21-6 6 8/9/2007
PETROLEUM HYDROCARBONS											
Diesel	mg/kg	NWTPH-Dx	2,000		200		25.00 U	- -	30 U	29 U	**1,500**
Motor Oil	mg/kg	NWTPH-Dx	2,000				50.00 U	- -	270	57 U	2,500
Gasoline	mg/kg	NWTPH-Gx	30/100*G		100		- -	6.3 U	6.3 U	9.1	4.9 U
Benzene	µg/kg	SW8021	30	4.483			- -	20 U	20 U	20 U	49 U
Toluene	µg/kg	SW8021	7,000		200,000		- -	63 U	63 U	59 U	250 U
Ethylbenzene	µg/kg	SW8021	6,000				- -	63 U	63 U	59 U	250 U
m,p-Xylene	µg/kg	SW8021	9,000*XY				- -	63 U	63 U	59 U	300
Total Xylenes	µg/kg	SW8021	9,000*XY				- -	- -	- -	- -	- -
METALS											
Arsenic	mg/kg	SW6010	20	2.803	7	7.30	5.00 U	- -	- -	- -	- -
Barium	mg/kg	SW6010			102		62.00	- -	- -	- -	- -
Chromium	mg/kg	SW6010	2,000*CR		42	48.15	37.00	- -	- -	- -	- -
Lead	mg/kg	SW6010	250	250	50	16.83	5.00 U	- -	- -	- -	- -
Mercury	mg/kg	SW7471A	2	2.088	0.1	0.07	0.08	- -	- -	- -	- -
VOLATILE ORGANICS											
2-Butanone	µg/kg	SW8260					- -	- -	- -	- -	- -
Acetone	µg/kg	SW8260					- -	- -	- -	- -	- -
Methylene Chloride	µg/kg	SW8260	20				- -	6.3 U	- -	3.7	140 U
Tetrachloroethene	µg/kg	SW8260	50				- -	1.3 U	- -	0.61 U	27 U
SEMIVOLATILE ORGANICS											
1-Methylnaphthalene	µg/kg	SW8270D SIM	5,000*NA				- -	- -	- -	- -	- -
2-Methylnaphthalene	µg/kg	SW8270D SIM	5,000*NA				- -	- -	- -	- -	- -
Acenaphthene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -
Acenaphthylene	µg/kg	SW8270D SIM			20,000		- -	- -	- -	- -	- -
Anthracene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -
Chrysene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -
Fluoranthene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -
Fluorene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -
Naphthalene	µg/kg	SW8270D SIM	5,000*NA				- -	- -	- -	- -	- -
Phenanthrene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -
Pyrene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -
Total cPAHs Using Tox. Equiv.	µg/kg	SW8270D SIM	100				- -	- -	- -	- -	- -

NOTES:
- - - = Not analyzed or not collected
- *CR = Chromium Standards based on Chromium III
- *G = 100 if no benzene and TEX < 1% gas; 30 for other mixtures
- *NA = Includes Naphthalene, 1-Methylnaphthalene, and 2-Methylnaphthalene
- *XY = Applies to the sum of all xylenes
- U = Not detected above the given practical quantitation limit
- Shaded values exceed MTCA
- **Bold** Bold values exceed Ecological Indicator Concentration

SOURCES: Background: 90th percentile Puget Sound (Ecology's Publication #94-115; 10/1994)
Model Toxics Control Act (MTCA) from WA Administrative Code 173-340-900
MTCA Method A Soil Cleanup Levels for Unrestricted Land Use: Table 740-1
MTCA Method B soil to groundwater: site-specific calculated
Ecological Indicator Concentrations: Table 749-3

UNITS:
- ft = feet
- mg/kg = milligram/kilogram
- µg/kg = microgram/kilogram

Table 3-4. Summary of Historical Groundwater Analytical Results

PARAMETERS	Units	Analytical Method	Sample No.: MTCA A	B1-W 4/6/2009	B2-W 4/2/2009	B3-W 4/3/2009	B7-W 4/1/2009	BC-8-W 9/5/2008	BH-2-W 7/9/2007	BH-6-W 7/10/2007	BH-8-W 7/10/2007	BH-9-W 7/10/2007	BH-11-W 7/9/2007	BH-12-W 7/10/2007	BH-12-W DUP 7/10/2007
PETROLEUM HYDROCARBONS															
Diesel Range Hydrocarbons	mg/L	NWTPH-Dx	0.5	- -	- -	- -	- -	0.26 U	0.130 U	0.130 U	0.130 U	0.130 U	0.150	0.130 U	- -
Gasoline Range Hydrocarbons	mg/L	NWTPH-Gx	0.8/1*G	- -	0.210	0.270	- -	0.100 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.086	- -
Benzene	µg/L	SW8260	5	- -	1.0 U	5.7	- -	0.2 U	2.00 U	1.00 U	1.00 U	1.00 U	1.00 U	2.00 U	2.00 U
Ethylbenzene	µg/L	SW8260	700	- -	1.0 U	3.5	- -	0.2 U	2.00 U	1.00 U	1.00 U	1.00 U	1.00 U	2.00 U	2.00 U
m,p-Xylene	µg/L	SW8260	1,000*XY	- -	1.3	4.1	- -	0.4 U	4.00 U	- -	- -	- -	- -	4.00 U	4.00 U
TOTAL METALS															
Arsenic	mg/L	SW7060	0.005	- -	- -	- -	- -	0.0033 U	- -	- -	- -	- -	0.049	- -	- -
Barium	mg/L	SW6010		- -	- -	- -	- -	0.045	- -	- -	- -	- -	1.200	- -	- -
Cadmium	mg/L	SW6010	0.005	- -	- -	- -	- -	0.0044 U	- -	- -	- -	- -	0.006	- -	- -
Chromium	mg/L	SW6010		- -	- -	- -	- -	0.011 U	- -	- -	- -	- -	0.260	- -	- -
Lead	mg/L	SW7421	0.015	- -	- -	- -	- -	0.0011 U	- -	- -	- -	- -	0.095	- -	- -
Mercury	mg/L	SW7471	0.002	- -	- -	- -	- -	0.0005 U	- -	- -	- -	- -	0.00041	- -	- -
DISSOLVED METALS															
Arsenic	mg/L	SW7060	0.005	- -	- -	- -	- -	0.003 U	- -	- -	- -	- -	0.004	- -	- -
Barium	mg/L	SW6010		- -	- -	- -	- -	0.028	- -	- -	- -	- -	0.24	- -	- -
Lead	mg/L	SW7421	0.015	- -	- -	- -	- -	0.001 U	- -	- -	- -	- -	0.003 U	- -	- -
Mercury	mg/L	SW7471	0.002	- -	- -	- -	- -	0.0005 U	- -	- -	- -	- -	0.0002 U	- -	- -
VOLATILE ORGANICS															
1,2-Dichloroethane	µg/L	SW8260	5	0.20 U	0.20 U	0.20 U	0.20 U	0.2 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	4.00	2.00 U
1,2-Dichloropropane	µg/L	SW8260		0.20 U	0.20 U	0.20 U	0.20 U	0.2 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U
Chlorobenzene	µg/L	SW8260		0.20 U	0.22	0.20 U	0.20 U	0.2 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U
cis-1,2-Dichloroethene	µg/L	SW8260		1.6	5.0	0.20 U	0.20 U	0.2 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U
Tetrachloroethene	µg/L	SW8260	5	20	25	20	0.20 U	0.2 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U
trans-1,2-Dichloroethene	µg/L	SW8260		0.20 U	0.20 U	0.20 U	0.20 U	0.2 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U
Trichloroethene	µg/L	SW8260	5	1.4	11	0.20 U	0.20 U	0.2 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U
Vinyl Chloride	µg/L	SW8260	0.2	0.20 U	0.20 U	0.20 U	0.20 U	0.94	0.20 U	0.20 U	0.20 U	0.20 U	- -	0.20 U	0.20 U
SEMIVOLATILE ORGANICS															
1-Methylnaphthalene	µg/L	SW8270D SIM		- -	- -	- -	- -	0.93	- -	- -	- -	- -	- -	- -	- -
2-Methylnaphthalene	µg/L	SW8270D SIM		- -	- -	- -	- -	0.18	- -	- -	- -	- -	- -	- -	- -
Acenaphthene	µg/L	SW8270D SIM		- -	- -	- -	- -	2.5	- -	- -	- -	- -	- -	- -	- -
Naphthalene	µg/L	SW8270D SIM	160	- -	- -	- -	- -	0.79	- -	- -	- -	- -	- -	- -	- -

(Table Continues)

Table 3-4. Summary of Historical Groundwater Analytical Results

PARAMETERS	Units	Analytical Method	Sample No.: MTCA A	BH-15-W 7/10/2007	BH-17-W 8/9/2007	BH-18-W 8/9/2007	BH-19-W 8/9/2007	BH-20-W 8/9/2007	BH-21-W 8/9/2007	BH-22-W 8/9/2007	MW-1 7/18/2007	MW-2 7/18/2007	MW-3 7/18/2007	MW-4 7/18/2007
PETROLEUM HYDROCARBONS														
Diesel Range Hydrocarbons	mg/L	NWTPH-Dx	0.5	0.130 U	- -	- -	0.27 U	0.28 U	0.26 U	0.27 U	0.130 U	0.130 U	0.130 U	0.130 U
Gasoline Range Hydrocarbons	mg/L	NWTPH-Gx	0.8/1*G	0.050 U	0.100 U	0.400 U	0.100 U	0.100 U	0.100 U	0.100 U	0.050 U	0.050 U	0.050 U	0.050 U
Benzene	µg/L	SW8260	5	1.00 U	1.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2 U	2 U	17	2 U
Ethylbenzene	µg/L	SW8260	700	1.00 U	1.0 U	12	1.0 U	1.0 U	1.0 U	1.0 U	2 U	2 U	2 U	2 U
m,p-Xylene	µg/L	SW8260	1,000*XY	- -	1.3	4.0 U	1.9	1.0 U	1.8	2.6	4 U	4 U	4 U	4 U
TOTAL METALS														
Arsenic	mg/L	SW7060	0.005	0.068	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Barium	mg/L	SW6010		1.000	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Cadmium	mg/L	SW6010	0.005	0.012	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Chromium	mg/L	SW6010		0.200	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Lead	mg/L	SW7421	0.015	0.025	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Mercury	mg/L	SW7471	0.002	0.00016	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
DISSOLVED METALS														
Arsenic	mg/L	SW7060	0.005	0.056	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Barium	mg/L	SW6010		0.38	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Lead	mg/L	SW7421	0.015	0.025	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Mercury	mg/L	SW7471	0.002	0.00016	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
VOLATILE ORGANICS														
1,2-Dichloroethane	µg/L	SW8260	5	- -	0.51	16	0.2 U	0.4 U	0.2 U	0.2 U	2 U	2 U	2 U	2 U
1,2-Dichloropropane	µg/L	SW8260		- -	0.2 U	0.31	0.2 U	0.4 U	0.2 U	0.2 U	2 U	2 U	2 U	2 U
Chlorobenzene	µg/L	SW8260		- -	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	2 U	2 U	2 U	2 U
cis-1,2-Dichloroethene	µg/L	SW8260		- -	0.2 U	0.2 U	0.2 U	0.83	1.8	3.2	2 U	2 U	2	2 U
Tetrachloroethene	µg/L	SW8260	5	- -	0.2 U	0.2 U	2.5	74	5.8	0.2 U	2 U	17	2 U	2 U
trans-1,2-Dichloroethene	µg/L	SW8260		- -	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	1.1	2 U	2 U	2 U	2 U
Trichloroethene	µg/L	SW8260	5	- -	0.2 U	0.2 U	0.2 U	3.2	7.4	0.84	2 U	2 U	2 U	2 U
Vinyl Chloride	µg/L	SW8260	0.2	- -	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
SEMIVOLATILE ORGANICS														
1-Methylnaphthalene	µg/L	SW8270D SIM		- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
2-Methylnaphthalene	µg/L	SW8270D SIM		- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Acenaphthene	µg/L	SW8270D SIM		- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Naphthalene	µg/L	SW8270D SIM	160	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

NOTES:
- - - = Not analyzed or not collected
- *G = 1 if no benzene ; 0.8 if benzene
- *XY = Applies to the sum of all xylenes
- U = Not detected above the given practical quantitation limit
- Shaded values exceed MTCA A

SOURCES:
Model Toxics Control Act (MTCA) from WA Administrative Code 173-340-900
MTCA Method A Cleanup Levels for Ground Water: Table 720-1

UNITS:
mg/L = milligrams/liter
µg/L = micrograms/liter

Table 3-5. Potential Applicable or Relevant and Appropriate Requirements (ARARs)

ARAR	Description	Applicability
Soil		
Model Toxics Control Act (WAC 173-340-740, -747)	MTCA regulates the investigation and cleanup of releases to the environment that may pose a threat to human health or the environment. Establishes cleanup levels for soil, including derivation of soil concentrations protective of groundwater.	MTCA cleanup levels are applicable to Site soil.
Groundwater		
Safe Drinking Water Act, Primary Drinking Water Regulations (40 Code of Federal Regulations [CFR] 141.50 and 141.61(a))	These regulations protect the quality of public drinking water supplies through regulation of chemical parameters and constituent concentrations as maximum concentration limits (MCLs).	MCLs are potentially relevant and appropriate where groundwater is a potential source of drinking water.
Model Toxics Control Act (WAC 173-340-720)	MTCA regulates the investigation and cleanup of releases to the environment that may pose a threat to human health or the environment. Establishes cleanup levels for groundwater.	MTCA cleanup levels are applicable to Site groundwater.
Surface Water		
Clean Water Act, Section 304, National Recommended Water Quality Criteria, EPA Office of Science and Technology (4304T, 2004).	There are no ambient water quality criteria for PCE for protection of freshwater organisms.	Surface water quality criteria are potentially relevant and appropriate to ambient surface water quality for point-source discharges to Horse Creek.
Clean Water Act, National Pollutant Discharge Elimination System (40 CFR Part 122) and Washington State National Pollutant Discharge Elimination System Permit Program (WAC 173-220).	The National Pollutant Discharge Elimination System (NPDES) program requires that permits be obtained for point-source discharges of pollutants to surface water. Under this regulation, a point-source discharge to a surface water body cannot cause an exceedance of water quality standards in the receiving water body outside the mixing zone.	Substantive regulatory requirements of the NPDES permit program are potentially applicable to the direct discharge of treated groundwater to a surface water body such as Horse Creek or Sammamish River.
Clean Water Act's National Toxics Rule (NTR) (40 CFR 131.36)	Provides values that have to be met for point-source discharges to surface water.	Potentially applicable to point-source discharges to Horse Creek should remedial activities cause release to surface water. If applicable, these values would have to be met at the mixing zone boundary established for the discharge.
Clean Water Act, General Pretreatment Regulations (40 CFR Part 403).	The regulations limit pollutants in wastewater discharges to sanitary sewer systems to protect publicly owned treatment works (POTWs) from accepting wastewater that would damage their system or cause them to exceed their NPDES permit discharge limits.	These regulations are potentially applicable to the discharge of treated groundwater to City of Bothell POTWs.
Washington State Water Quality Standards for Surface Waters (WAC 173-201A)	Washington State water quality standards protect freshwater aquatic life by specifying protection criteria by stretch of surface waters. WAC 173-201A provides limitations on other parameters such as turbidity, temperature, dissolved oxygen, and pH for protection of organisms. Tributaries of waters whose uses are designated salmon and trout spawning, core rearing and migration, or extraordinary primary contact recreation are protected at the same level as the waters themselves.	The substantive requirements of this regulation are potentially applicable for remedial actions affecting Horse Creek.
Washington Surface Water Quality Standards, Short-Term Modifications (WAC 173-201A-410)	Washington State provides for short-term modifications of standards for specific water bodies on a short-term basis when necessary to accommodate essential activities, respond to emergencies, or to otherwise protect the public interest.	These would be potentially applicable to remedial actions affecting Horse Creek.
Model Toxics Control Act (WAC 173-340-730)	MTCA regulates the investigation and cleanup of releases to the environment that may pose a threat to human health or the environment. Establishes cleanup levels for surface water.	MTCA cleanup levels may be applicable to the Site if remedial activities cause a release to surface water.
Air		
National Emission Standards for Hazardous Air Pollutants (NESHAPs) (40 CFR Part 261)	Establishes specific emissions levels allowed for toxic air pollutants.	Applicable to treatment alternatives that may emit toxic pollutants to the air.
Washington Clean Air Act and Implementing Regulations (WAC 173-400; WAC 173-460; WAC 173-490)	WAC 173-400 requires air emissions at the Site boundary to fall below the acceptable source impact limit (ASIL). WAC 173-400 also requires control of fugitive dust emissions during construction and defines general emission discharge treatment requirements. WAC 173-460 requires systemic control of new sources emitting air pollutants. WAC 173-490 sets emission standards and source control for volatile organic compounds.	Applicable for air stripping/sparging remedial technology.
Model Toxics Control Act (WAC 173-340-750)	MTCA regulates the investigation and cleanup of releases to the environment that may pose a threat to human health or the environment. Establishes cleanup levels for air.	MTCA cleanup levels may be applicable to the Site if remedial activities cause a release to air.

Table 3-5. Potential Applicable or Relevant and Appropriate Requirements (ARARs)

ARAR	Description	Applicability
Miscellaneous		
Protection of Wetlands, Executive Order 11990 (40 CFR Part 6, Appendix A)	This executive order mandates that response actions taken by federal agencies must be designed to avoid long- and short-term impacts to wetlands. If remediation activities are located near/in wetlands, the activities must be designed to avoid adverse impact to the wetlands wherever possible, including minimizing wetlands destruction and preserving wetland values.	This Act would be potentially applicable to remedial activities at the Site.
Endangered Species Act (50 CFR Parts 17, 402)	Section 7 of the Endangered Species Act (ESA) and 40 CFR Part 402 require that federal agencies consider the effects of their proposed actions on federal listed species. It requires consultation between the agency proposing the action and the U.S. Fish and Wildlife Service (USFWS) or National Oceanic and Atmospheric Administration (NOAA) Fisheries, as appropriate. Preparation of a biological assessment is conducted, addressing the potential effects to listed species in the area and methods to minimize those effects.	The ESA is potentially applicable to remedial actions at the Site because the USFWS has determined that federal threatened species (bald eagle and bull trout) may use the project area. Therefore, they could potentially be affected by these actions.
Native American Graves Protection and Repatriation Act (43 CFR Part 10)	Native American Graves Protection and Repatriation Act regulations protect Native American burials from desecration through the removal and trafficking of human remains and "cultural items," including funerary and sacred objects.	This Act is potentially applicable to remedial actions at the Site because it is possible that the disturbance of Native American materials could occur as a result of work in the stream bed or subsurface excavations elsewhere at the Site. Such materials are not known to be present at the Site, but could be inadvertently uncovered during soil or sediment removal.
National Historic Preservation Act (36 CFR Parts 60, 63, and 800)	National Historic Preservation Act (NHPA) regulations require federal agencies to consider the possible effects on historic sites or structures of actions proposed for federal funding or approval. Historic sites or structures as defined in the regulations are those on or eligible for the National Register of Historic Places, generally at least 50 years old.	This Act is potentially applicable to stream bed or other subsurface work at the Site. No such sites are known to be present in the area.
Washington Hazardous Waste Management Act (WAC 173-303)	Establishes standards for the generation, transport, treatment, storage, or disposal of designated dangerous waste in the state.	This regulation is potentially applicable to alternatives that would involve handling of contaminated media at the Site. The area of contamination policy allows contaminated media to be consolidated within the same area of a site without triggering Resource Conservation and Recovery Act or Washington dangerous waste regulations.
Department of Transportation of Hazardous Wastes (49 CFR 105 – 180)	Establishes specific U.S. Department of Transportation rules and technical guidelines for the off-site transport of hazardous materials.	Applicable to remedial activities that involve the off-site transportation of hazardous waste.
Washington Solid Waste Handling Standards (WAC 173-350)	Establishes standards for handling and disposal of solid non-hazardous waste in Washington.	These regulations are potentially applicable to solid nonhazardous wastes and are potentially relevant and appropriate to on-site remedial actions governing contaminated media management.
Washington Water Well Construction Act Regulations (WAC 173-160)	Provides requirements for water well construction.	These regulations are potentially applicable to the installation, operation, or closure of monitoring and treatment wells at the Site.

Table 4-1. Applicability Screening of Technologies

Technology	Applicability	Screening Comments
In Situ Biological Treatment		
Enhanced biodegradation	Applicable	
Natural attenuation	Applicable	
~~Bioventing~~	Not applicable	Minimally effective on heavy oil-range petroleum hydrocarbon products.
~~Phytoremediation~~	Not applicable	Not applicable due to Site usage.
In Situ Physical/ Chemical Treatment		
Chemical Oxidation	Applicable	
~~Electrokinetic Separation~~	Not applicable	Not applicable to COCs.
~~Fracturing~~	Not applicable	Not applicable due to depth of contaminants.
~~Soil Flushing~~	Not applicable	Creates additional waste streams for treatment.
~~Soil Vapor Extraction~~	Not applicable	Not applicable to all COCs.
~~Solidification/Stabilization~~	Not applicable	Not applicable to COCs.
In Situ Thermal Treatment		
~~Thermal Treatment~~	Not applicable	Requires additional treatment technologies to remove COCs.
Ex Situ Biological Treatment		
~~Biopiles~~	Not applicable	Replacement back into excavation not feasible due to time constraints.
~~Composting~~	Not applicable	Replacement back into excavation not feasible due to time constraints.
~~Landfarming~~	Not applicable	Replacement back into excavation not feasible due to time constraints.
~~Slurry Phase Biological Treatment~~	Not applicable	Creates additional waste streams for treatment.
Ex Situ Physical/Chemical Treatment		
~~Chemical Extraction~~	Not applicable	Creates additional waste streams for treatment.
Chemical Reduction/Oxidation	Applicable	
~~Separation~~	Not applicable	Not applicable to COCs.
~~Soil Washing~~	Not applicable	Creates additional waste streams for treatment.
~~Solidification/Stabilization~~	Not applicable	Not applicable to COCs.
Ex Situ Thermal Treatment		
~~Hot Gas Decontamination~~	Not applicable	Not applicable to COCs.
~~Incineration~~	Not applicable	Cost prohibitive compared with other alternatives of similar effectiveness.
~~Open Burn/Open Detonation~~	Not applicable	Not applicable to COCs.
~~Pyrolysis~~	Not applicable	Creates additional waste streams for treatment.
~~Thermal Desorption~~	Not applicable	Creates additional waste streams for treatment.
Containment		
Excavation and Off-site Disposal	Applicable	
Low Permeability Cap	Applicable	Used to prevent direct contact.
~~Cap Enhancements/Alternatives~~	Not applicable	Not applicable due to Site usage.

Note: Technologies in bold are retained, those that are lined out are dropped

Table 4-2. Cleanup Action Alternatives Analysis

Alternative	Description	Effectiveness	Implementability	Public Concern	Estimated Cost
1. Monitored Natural Attenuation	Leave contamination in place. Monitor groundwater biannually for a minimum of 10 years.	Low	High	High	$214,798
2. In Situ Chemical Oxidation	Treat contamination in-situ using soil mixing, chemical oxidation, and application of ORC™. Monitor groundwater quarterly for 1 year.	Medium	Medium	Low	$1,027,296
3. Excavation and Off-Site Removal	Excavate and remove contaminated soils. Treat groundwater with application of ORC™ in backfill. Monitor groundwater quarterly for 1 year.	High	High	Low	$888,489

Table 4-3. Cost Estimate for Alternative 1 Monitored Natural Attenuation – 10 years

Item	Quantity	Units	Unit Cost	Capital Cost	O&M Cost Annual	O&M Cost Present Worth[1]	Source
Environmental Oversight							
Institutional Controls							
Land Use Restrictions[1]	1	LS	$12,000	$12,000	$500	$7,143	Engineer's Est.
Monitoring Well Installation	2	ea	$4,000	$8,000			Similar Project
Groundwater Monitoring							
Develop Sampling and Analysis Plan	1	LS	$5,000	$5,000			Engineer's Est.
Sample Collection (Semi-Annual)	20	ea	$4,000		$8,000	$56,189	Engineer's Est.
Sample Analysis (Semi-Annual)	20	ea	$3,000		$6,000	$42,141	Engineer's Est.
Reporting (20 memos)	20	LS	$2,500		$5,000	$35,118	Engineer's Est.
Subtotal				**$25,000**			
Operation and Maintenance Subtotal						$140,591	
O&M Project Management and Support	10% of O&M Present Worth					$14,059	
O&M Contingency	25% of O&M Present Worth					$35,148	
Operation and Maintenance Total						**$189,798**	
NET PRESENT WORTH						**$214,798**	

Notes:
[1] Annual institutional control costs occur each year in perpetuity.
[2] Discount rate of 7 percent used for all present worth calculations.

Table 4-4. Cost Estimate for Alternative 2
In Situ Chemical Oxidation

Item	Quantity	Units	Unit Cost	Capital Cost	O&M Cost Annual	O&M Cost Present Worth[2]	Source
Construction							
Bench-Scale Treatability Test	1	LS	$10,000	$10,000			Similar Project
Mobilization	1	LS	$120,000	$120,000			Similar Project
Alternative Implementation							
Mix Site Soils - 2 Passes	7,700	cy	$40	$308,000			Similar Project
RegenOx	54,000	lb	$2.5	$135,000			Similar Project
Portland Cement for Soil Stabilization	260	Ton	$130	$33,800			Engineer’s Est.
ORC™	4,050	lb	$10	$40,500			Similar Project
Subtotal				$647,300			
Contingency	25% of Construction Cost			$162,000			
Construction/Project Management	3% of Construction Cost			$19,000			
Engineering (PS&E)	3% of Construction Cost			$19,000			
Construction Cost Subtotal				**$847,300**			
Sales Tax			**8.9%**	**$75,410**			
Environmental Oversight							
Institutional Controls							
Land Use Restrictions[1]	1	LS	$12,000	$12,000	$500	$7,143	Engineer's Est.
Cleanup Action Plan	1	LS	$9,000	$9,000			Engineer's Est.
Oversight and Sample Collection	1	LS	$10,000	$10,000			Engineer's Est.
Sample Analysis	15	ea	$200	$3,000			Engineer's Est.
Reporting	1	LS	$5,000	$5,000			Engineer's Est.
Monitoring Well Installation	2	ea	$4,000	$8,000			Similar Project
Groundwater Monitoring							
Sample Collection (Quarterly)	4	ea	$4,000		$16,000	$14,953	Engineer's Est.
Sample Analysis (Quarterly)	4	ea	$3,000		$12,000	$11,215	Engineer's Est.

Table 4-4. Cost Estimate for Alternative 2
In Situ Chemical Oxidation

					O&M Cost		
Item	**Quantity**	**Units**	**Unit Cost**	**Capital Cost**	**Annual**	**Present Worth[2]**	**Source**
Reporting (3 memos + 1 sum. report)	1	LS	$10,000		$10,000	$9,346	Engineer's Est.
Subtotal				**$47,000**			
Operation and Maintenance Subtotal						$42,657	
O&M Project Management and Support	10% of O&M Present Worth					$4,266	
O&M Contingency	25% of O&M Present Worth					$10,664	
Operation and Maintenance Total						**$57,587**	
NET PRESENT WORTH						**$1,027,296**	

Notes:
[1] Annual institutional control costs occur each year in perpetuity.
[2] Discount rate of 7 percent used for all present worth calculations.

Table 4-5. Cost Estimate for Alternative 3
Excavation and Offsite Disposal

Item	Quantity	Units	Unit Cost	Capital Cost	O&M Cost Annual	O&M Cost Present Worth[2]	Source
Construction							
Mobilization	1	LS	$50,000	$50,000			Engineer's Est.
Alternative Implementation							
Excavate, Stockpile, and Replace Clean Overburden	1,450	cy	$15	$21,750			Similar Project
Excavate, Stockpile, Haul, and Dispose of Contaminated Soil	4,550	Ton	$70	$318,500			Similar Project
Import, Place, and Compact Granular Common Borrow	4,550	Ton	$15.00	$68,250			Similar Project
Dewater Excavation, Treat and Dispose of Water	1	LS	$50,000	$50,000			Similar Project
Apply ORC™ to Backfill	4,050	lb	$10.00	$40,500			Similar Project
Subtotal				$549,000			
Contingency	25% of Construction Cost			$137,000			
Construction/Project Management	3% of Construction Cost			$16,000			
Engineering (PS&E)	3% of Construction Cost			$16,000			
Construction Cost Subtotal				**$718,000**			
Sales Tax			**8.9%**	**$63,902**			
Environmental Oversight							
Institutional Controls							
Land Use Restrictions[1]	1	LS	$12,000	$12,000	$500	$7,143	Engineer's Est.
Cleanup Action Plan	1	LS	$9,000	$9,000			Engineer's Est.
Oversight and Sample Collection	1	LS	$10,000	$10,000			Engineer's Est.
Sample Analysis	25	ea	$200	$5,000			Engineer's Est.
Reporting	1	LS	$5,000	$5,000			Engineer's Est.
Monitoring Well Installation	2	ea	$4,000	$8,000			Similar Project
Groundwater Monitoring							

Table 4-5. Cost Estimate for Alternative 3
Excavation and Offsite Disposal

Item	Quantity	Units	Unit Cost	Capital Cost	O&M Cost Annual	O&M Cost Present Worth[2]	Source
Sample Collection (Quarterly)	4	ea	$4,000		$16,000	$14,953	Engineer's Est.
Sample Analysis (Quarterly)	4	ea	$3,000		$12,000	$11,215	Engineer's Est.
Reporting (3 memos + 1 summary report)	1	LS	$10,000		$10,000	$9,346	Engineer's Est.
Subtotal				**$49,000**			
Operation and Maintenance Subtotal						$42,657	
O&M Project Management and Support	10% of O&M Present Worth					$4,266	
O&M Contingency	25% of O&M Present Worth					$10,664	
Operation and Maintenance Total						**$57,587**	
NET PRESENT WORTH						**$888,489**	

Notes:
[1] Annual institutional control costs occur each year in perpetuity.
[2] Discount rate of 7 percent used for all present worth calculations.

APPENDIX A

Bothell Downtown Subarea Plan (Figure 1.1)

C. The Envisioned Future Downtown

This section provides an overview of the desired physical outcomes intended to result from implementing the combined regulations and planned public actions contained in this Plan.

The Downtown Subarea is composed of a multitude of privately held properties and miles of public rights-of-way under public ownership. The overarching purpose of the Downtown Plan is to orchestrate investment in changes made to this multiplicity of properties to produce greater value than any separate development could achieve, by providing a common purpose that all investors can rely upon, contribute to, and derive value from. This section describes the common purpose to which all investments shall be directed: a vision of the future that is sufficiently specific to provide a common purpose, yet broad enough to respond to opportunities and to the changes in the marketplace that will inevitably arise.

Note: The specific outcomes described and illustrated in this section are not part of the formal regulating code, and new development proposals will not be required to mimic the specific designs presented in the illustrations.

Fig. 1.1 A vision of potential future development in downtown Bothell showing one scenario focusing on redevelopment in the core area

APPENDIX B

Boring Logs

RELATIVE DENSITY OR CONSISTENCY VERSUS SPT N-VALUE

COHESIONLESS SOILS			COHESIVE SOILS		
Density	N (blows/ft)	Approximate Relative Density(%)	Consistency	N (blows/ft)	Approximate Undrained Shear Strength (psf)
Very Loose	0 to 4	0 - 15	Very Soft	0 to 2	<250
Loose	4 to 10	15 - 35	Soft	2 to 4	250 - 500
Medium Dense	10 to 30	35 - 65	Medium Stiff	4 to 8	500 - 1000
Dense	30 to 50	65 - 85	Stiff	8 to 15	1000 - 2000
Very Dense	over 50	85 - 100	Very Stiff	15 to 30	2000 - 4000
			Hard	over 30	>4000

USCS SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GROUP DESCRIPTIONS	
Coarse Grained Soils More than 50% Retained on No. 200 Sieve Size	Gravel and Gravelly Soils More than 50% of Coarse Fraction Retained on No. 4 Sieve	Clean Gravel (little or no fines)	GW	Well-graded GRAVEL
			GP	Poorly-graded GRAVEL
		Gravel with Fines (appreciable amount of fines)	GM	Silty GRAVEL
			GC	Clayey GRAVEL
	Sand and Sandy Soils 50% or More of Coarse Fraction Passing No. 4 Sieve	Clean Sand (little or no fines)	SW	Well-graded SAND
			SP	Poorly-graded SAND
		Sand with Fines (appreciable amount of fines)	SM	Silty SAND
			SC	Clayey SAND
Fine Grained Soils 50% or More Passing No. 200 Sieve Size	Silt and Clay	Liquid Limit Less than 50%	ML	SILT
			CL	Lean CLAY
			OL	Organic SILT/Organic CLAY
	Silt and Clay	Liquid Limit 50% or More	MH	Elastic SILT
			CH	Fat CLAY
			OH	Organic SILT/Organic CLAY
Highly Organic Soils			PT	PEAT

TEST SYMBOLS

%F	Percent Fines
AL	Atterberg Limits: PL = Plastic Limit, LL = Liquid Limit
CBR	California Bearing Ratio
CN	Consolidation
DD	Dry Density (pcf)
DS	Direct Shear
GS	Grain Size Distribution
K	Permeability
MD	Moisture/Density Relationship (Proctor)
MR	Resilient Modulus
PID	Photoionization Device Reading
PP	Pocket Penetrometer Approx. Compressive Strength (tsf)
SG	Specific Gravity
TC	Triaxial Compression
TV	Torvane Approx. Shear Strength (tsf)
UC	Unconfined Compression

SAMPLE TYPE SYMBOLS

- 2.0" OD Split Spoon (SPT) (140 lb. hammer with 30 in. drop)
- Shelby Tube
- 3-1/4" OD Split Spoon with Brass Rings
- Small Bag Sample
- Large Bag (Bulk) Sample
- Core Run
- Non-standard Penetration Test (3.0" OD split spoon)

GROUNDWATER SYMBOLS

- Groundwater Level (measured at time of drilling)
- Groundwater Level (measured in well or open hole after water level stabilized)

COMPONENT DEFINITIONS

COMPONENT	SIZE RANGE
Boulders	Larger than 12 in
Cobbles	3 in to 12 in
Gravel	3 in to No 4 (4.5mm)
Coarse gravel	3 in to 3/4 in
Fine gravel	3/4 in to No 4 (4.5mm)
Sand	No. 4 (4.5 mm) to No. 200 (0.074 mm)
Coarse sand	No. 4 (4.5 mm) to No. 10 (2.0 mm)
Medium sand	No. 10 (2.0 mm) to No. 40 (0.42 mm)
Fine sand	No. 40 (0.42 mm) to No. 200 (0.074 mm)
Silt and Clay	Smaller than No. 200 (0.074mm)

COMPONENT PROPORTIONS

PROPORTION RANGE	DESCRIPTIVE TERMS
< 5%	Clean
5 - 12%	Slightly (Clayey, Silty, Sandy)
12 - 30%	Clayey, Silty, Sandy, Gravelly
30 - 50%	Very (Clayey, Silty, Sandy, Gravelly)
Components are arranged in order of increasing quantities.	

NOTES: Soil classifications presented on exploration logs are based on visual and laboratory observation. Soil descriptions are presented in the following general order:

Density/consistency, color, modifier (if any) GROUP NAME, additions to group name (if any), moisture content. Proportion, gradation, and angularity of constituents, additional comments. (GEOLOGIC INTERPRETATION)

Please refer to the discussion in the report text as well as the exploration logs for a more complete description of subsurface conditions.

MOISTURE CONTENT

DRY	Absence of moisture, dusty, dry to the touch.
MOIST	Damp but no visible water.
WET	Visible free water, usually soil is below water table.

HWA GEOSCIENCES INC.

Bothell Crossroads RI/FS
Bothell, Washington

LEGEND OF TERMS AND SYMBOLS USED ON EXPLORATION LOGS

PROJECT NO.: 2007-098-800 FIGURE: 1

DRILLING COMPANY: Cascade Drilling, Inc.
SURFACE ELEVATION: ± feet
DRILLING METHOD: CME 75 Truck-mounted 8-inch HSA
SAMPLING METHOD: D&M Split Spoon with 300 lb hammer
LOCATION: Bothell Landing property, adj. to Horse Creek culvert

DATE STARTED: 9/4/2009
DATE COMPLETED: 9/4/2009
LOGGED BY: V. Atkins

DEPTH (feet)	USCS SOIL CLASS	DESCRIPTION	SAMPLE TYPE	PEN. RESISTANCE (blows/6 inches)	PID (ppm)	NOTES
0	SM	ASPHALT Brown silty SAND and GRAVEL (FILL), dry grading moist.				Cement surface seal and flush mount monument 2-inch Sch. 40 PVC casing #2/12 filter sand
5		Medium dense gray to brown silty SAND with gravel (FILL), moist grading wet. Encounter large debris or foundation at 7.5 feet bgs. Move boring twice to avoid.	■	3/4/6	0	2-inch Sch. 40 PVC 10-slot screen ∇
10		Loose dark brown silty SAND, trace wood, wet.	■	11/5/2	0	

Boring completed to 11.5 feet bgs.
Ground water encountered at 7 feet bgs.
Boring completed as monitoring well.

NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

HWA GEOSCIENCES INC.

Bothell Crossroads RI/FS
Bothell, Washington

MONITORING WELL:
BLMW-5

PAGE: 1 of 1

PROJECT NO.: 2007-098-800 FIGURE:

MWELL 2007-098-800.GPJ 9/23/09

DRILLING COMPANY: Cascade Drilling, Inc.
DRILLING METHOD: CME 75 Truck-mounted 8-inch HSA
SAMPLING METHOD: D&M Split Spoon with 300 lb hammer
LOCATION: Bothell Landing property, west-central property

SURFACE ELEVATION: ± feet

DATE STARTED: 9/4/2009
DATE COMPLETED: 9/4/2009
LOGGED BY: V. Atkins

DEPTH (feet)	USCS SOIL CLASS	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	PEN. RESISTANCE (blows/6 inches)	OTHER TESTS	PID (ppm)	NOTES
0	SM	ASPHALT						Cement surface seal and flush mount monument
		Brown silty SAND with gravel (FILL), dry grading moist.						2-inch Sch. 40 PVC casing
		Medium dense gray silty SAND with wood fragments, moist.	■		9/9/11		-	#2/12 filter sand
5		As above, grading wet.	■		4/2/2		-	2-inch Sch. 40 PVC 10-slot screen
	OL							
	ML	Dark brown organic SILT with peat fragments.						
		Soft gray with yellow-orange mottling fine sandy SILT with peat seams, moist grading wet.	■		2/3/3		-	
	SM	Loose gray silty fine SAND with silt interbeds, trace peat and wood fragments, wet.						
10		Medium dense gray fine SAND with silt interbeds, wet.	■		5/8/13		-	
15		Dense gray silty SAND with wood fragments, wet.	■		20/24/18		-	

Boring completed to 16.5 feet bgs.
Ground water encountered at 6 feet bgs.
Boring completed as monitoring well.

NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

HWA GEOSCIENCES INC.

Bothell Crossroads RI/FS
Bothell, Washington

MONITORING WELL:
BLMW-6

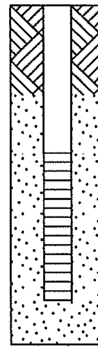
PROJECT NO.: 2007-098-800 FIGURE:

MWELL 2007-098-800.GPJ 9/23/09

DRILLING COMPANY: Cascade Drilling, Inc. SURFACE ELEVATION: ± feet DATE STARTED: 9/4/2009
DRILLING METHOD: CME 75 Truck-mounted 8-inch HSA DATE COMPLETED: 9/4/2009
SAMPLING METHOD: D&M Split Spoon with 300 lb hammer LOGGED BY: V. Atkins
LOCATION: Bothell Landing property, adj. to Horse Creek culvert

DEPTH (feet)	USCS SOIL CLASS	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	PEN. RESISTANCE (blows/6 inches)	OTHER TESTS	PID (ppm)	NOTES
0	GM	ASPHALT						Cement surface seal and flush mount monument; 2-inch Sch. 40 PVC casing
	SM	Brown silty GRAVEL (FILL), dry.						
		Loose brown silty SAND with gravel (FILL), dry grading moist.						#2/12 filter sand
5		As above, moist grading wet.	■		4/4/4		0.9	2-inch Sch. 40 PVC 10-slot screen
10		Medium dense brown silty SAND with gravel, wet.	■		6/7/4		0	
	OL	Medium stiff dark brown organic SILT with gray medium sand interbeds and peat fragments, wet.						

Boring completed to 11.5 feet bgs.
Ground water encountered at 6 feet bgs.
Boring completed as monitoring well.



NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

HWA GEOSCIENCES INC.

Bothell Crossroads RI/FS
Bothell, Washington

MONITORING WELL:
BLMW-7

PAGE: 1 of 1

PROJECT NO.: 2007-098-800 FIGURE:

MWELL 2007-098-800.GPJ 9/23/09

DRILLING COMPANY: Cascade Drilling, Inc. SURFACE ELEVATION: ± feet DATE STARTED: 9/4/2009
DRILLING METHOD: CME 75 Truck-mounted 8-inch HSA DATE COMPLETED: 9/4/2009
SAMPLING METHOD: D&M Split Spoon with 300 lb hammer LOGGED BY: V. Atkins
LOCATION: Bothell Landing property, northwest property

DEPTH (feet)	SYMBOL	USCS SOIL CLASS	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	PEN. RESISTANCE (blows/6 inches)	OTHER TESTS	PID (ppm)	WELL COMPLETION SCHEMATIC	NOTES
0			Brown silty TOPSOIL with roots.							Cement surface seal and flush mount monument 2-inch Sch. 40 PVC casing
		SM	Brown silty medium SAND with gravel (FILL), dry.							#2/12 filter sand
5			Medium dense brown silty SAND with root material, dry grading moist.	■		10/11/12		0		2-inch Sch. 40 PVC 10-slot screen
10			Medium stiff brown grading gray SILT with sand, moist grading wet.	■		3/4/5		0.2		
15			Medium stiff brown sandy SILT, wet.	■		6/11/22		0		
20			Stiff brown sandy SILT, wet.	■		26/50-6"		0		

Boring completed to 21.5 feet bgs.
Ground water encountered at 10 feet bgs.
Boring completed as monitoring well.

NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

HWA GEOSCIENCES INC.

Bothell Crossroads RI/FS
Bothell, Washington

MONITORING WELL:
BLMW-8

PROJECT NO.: 2007-098-800 FIGURE:

DRILLING COMPANY: Cascade Drilling, Inc. SURFACE ELEVATION: ± feet DATE STARTED: 9/8/2009
DRILLING METHOD: CME 75 Truck-mounted 8-inch HSA DATE COMPLETED: 9/8/2009
SAMPLING METHOD: D&M Split Spoon with 300 lb hammer LOGGED BY: V. Atkins
LOCATION: Hertz property, east boundary

DEPTH (feet)	USCS SOIL CLASS	DESCRIPTION	PEN. RESISTANCE (blows/6 inches)	PID (ppm)	NOTES
0	SM	ASPHALT			Cement surface seal and flush mount monument
		Medium dense gray silty SAND with gravel (FILL), dry grading moist.			2-inch Sch. 40 PVC casing
			11/10/5	-	Hydrated bentonite seal
5		As above,slight hydrocarbon odor.			
		Medium dense gray-brown silty SAND with gravel, trace wood fragments, moist. Slight hydrocarbon odor.	7/5/5	4	▼
			7/8/6	-	#2/12 filter sand
10	SM	Loose gray to dark gray silty SAND, moist grading wet.	3/4/3	-	▽ 2-inch Sch. 40 PVC 10-slot screen
15		Loose dark gray-brown silty SAND with gravel, wet.	3/4/4	-	
20		Loose dark gray silty SAND with peat, wet.	4/4/4	-	Hydrated bentonite backfill
25			2/2/4		
	OL	Soft red-brown organic SILT, wet.			

Boring completed to 26.5 feet bgs.
Ground water encountered at 10 feet bgs.
Boring completed as monitoring well.

NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

HWA GEOSCIENCES INC.

Bothell Crossroads RI/FS
Bothell, Washington

MONITORING WELL:
HZMW-12

PROJECT NO.: 2007-098-800 FIGURE:

DRILLING COMPANY: Cascade Drilling, Inc. SURFACE ELEVATION: ± feet DATE STARTED: 9/8/2009
DRILLING METHOD: CME 75 Truck-mounted 8-inch HSA DATE COMPLETED: 9/8/2009
SAMPLING METHOD: D&M Split Spoon with 300 lb hammer LOGGED BY: V. Atkins
LOCATION: Hertz property, east boundary

DEPTH (feet)	USCS SOIL CLASS	DESCRIPTION	PEN. RESISTANCE (blows/6 inches)	OTHER TESTS	PID (ppm)	NOTES
0	SM	Asphalt				Cement surface seal and flush mount monument
		Red-brown to yellow-brown silty angular GRAVEL and SAND (FILL), dry				2-inch Sch. 40 PVC casing
	SM	Loose brown grading gray-green silty SAND with gravel, moist, slight petroleum odor.	4/3/2		15	#2/12 filter sand
5		Loose gray silty SAND with gravel, moist grading wet, slight petroleum odor.	0/1/1		20	2-inch Sch. 40 PVC 10-slot screen
		As above, wet, no odor.	1/1/1		-	
10		Loose dark gray silty SAND with wood fragments, wet.	2/2/2		-	
15		Loose dark gray silty SAND with organic silt layer and wood fragments, wet.	2/2/8		-	

Boring completed to 16.5 feet bgs.
Ground water encountered at 7 feet bgs.
Boring completed as monitoring well.

NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

HWA GEOSCIENCES INC.

Bothell Crossroads RI/FS
Bothell, Washington

MONITORING WELL:
HZMW-13

PROJECT NO.: 2007-098-800 FIGURE:

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	U.S.C.S. NAME	SOIL DESCRIPTION
													SURFACE: Asphalt
0	CONCRETE EMBEDDED FLUSH WELL MONUMENT (0-2')												2" Asphalt
	BENTONITE CHIP SEAL (2-4')											SP	SAND, light gray, moist, loose, poorly-graded, medium grained. (FILL)
5	BLANK 2" dia. PVC PIPE (2-5') 10/20 COLORADO SILICA SAND PACK (4-15')								7 12 17		S-1	SM	Silty SAND, lighty gray-brown, moist to wet, medium dense, trace fine gravel.
	2" dia. PVC WITH 0.01" SLOT SCREEN (5-15')	∇											- wet
10									4 3 5		S-2	ML	Sandy SILT, gray, wet, medium stiff, layered (1/2" with peat).
15													Bottom of boring at 15 feet on 11/17/99. Groundwater observed at 7 feet bgs.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

DATE DRILLED: 11-17-99
LOGGED BY: T. Stott
REVIEWED BY: S.Dwyer

SURFACE ELEVATION (feet):
TOTAL DEPTH (feet): 15.0
DIAMETER OF BORING (in): 4 1/4

DRILLING METHOD: HSA Auger
DRILLER: Cascade Drilling
CASING SIZE:

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NUMBER: 60-1995-01

Buck and Gordon
Bothell Landing

BORING LOG
MW-1

FIGURE
A - 1

PAGE 1 of 1

APPROV: ______ BY: ______

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	MOISTURE CONTENT(%)	PLASTIC LIMIT(%)	LIQUID LIMIT(%)	% PASSING No. 200 SIEVE	OTHER TESTS	PID (ppm)	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	U.S.C.S. NAME	SOIL DESCRIPTION
													SURFACE: Asphalt
0	CONCRETE EMBEDDED FLUSH WELL MONUMENT (0-2')												2" Asphalt
												SP	SAND, light gray, moist to wet, loose, poorly-graded, moderate petroleum odor. (FILL)
	BENTONITE CHIP SEAL (2-4')												
	BLANK 2" dia. PVC PIPE (2-5')								3 2 3		S-1		
5	10/20 COLORADO SILICA SAND PACK (4-15')												
	2" dia. PVC WITH 0.01" SLOT SCREEN (5-15')												- wet
												SM	Silty SAND, gray, wet, medium dense.
10									6 12 16		S-2		
												SP	Fine SAND, gray, wet, poorly graded, dense.
15									13 19 21		S-3		
													Bottom of boring at 16 feet on 11/17/99. Groundwater observed at 7.5 feet bgs.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

DATE DRILLED: 11-17-99
LOGGED BY: T. Stott
REVIEWED BY: S. Dwyer

SURFACE ELEVATION (feet):
TOTAL DEPTH (feet): 15.0
DIAMETER OF BORING (in): 4 1/4

DRILLING METHOD: HSA Auger
DRILLER: Cascade Drilling
CASING SIZE:

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING
PROJECT NUMBER: 60-1995-01

Buck and Gordon
Bothell Landing

BORING LOG
MW-2

FIGURE
A - 2
PAGE 1 of 1

APPROV: ______ BY: ______

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	U.S.C.S. NAME	SOIL DESCRIPTION
							SURFACE: Asphalt
0	CONCRETE EMBEDDED FLUSH WELL MONUMENT (0-2')						2" Asphalt
	BENTONITE CHIP SEAL (2-4')					SM	Silty SAND, light gray-brown, moist to wet, medium dense, trace medium gravel, strong petroleum odor.
5	BLANK 2" dia. PVC PIPE (2-5')		5 5 13	X	S-1		- layer of asphalt 1" thick
	10/20 COLORADO SILICA SAND PACK (4-15')	▽					- wet
	2" dia. PVC WITH 0.01" SLOT SCREEN (5-15')						
10			9 10 12	X	S-2	SM/ML	Silty SAND interbedded with SILT, gray, wet, medium dense, very stiff, moderate petroleum odor.
						SM	Silty SAND, gray, wet, medium dense.
15							Bottom of boring at 15 feet on 11/17/99. Groundwater observed at 7 feet bgs.

TESTING PROGRAM — LABORATORY: MOISTURE CONTENT(%), PLASTIC LIMIT(%), LIQUID LIMIT(%), % PASSING No. 200 SIEVE, OTHER TESTS; FIELD: PID (ppm)

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

DATE DRILLED: 11-17-99
LOGGED BY: T. Stott
REVIEWED BY: S. Dwyer

SURFACE ELEVATION (feet):
TOTAL DEPTH (feet): 15.0
DIAMETER OF BORING (in): 4 1/4

DRILLING METHOD: HSA Auger
DRILLER: Cascade Drilling
CASING SIZE:

APPROV: ____ BY: ____

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING
PROJECT NUMBER: 60-1995-01

Buck and Gordon
Bothell Landing

BORING LOG
MW-3

FIGURE A - 3

PAGE 1 of 1

BORING LOG MW-4

DEPTH (feet)	WELL/PIEZO CONSTRUCTION	WATER LEVEL	BLOWS/6 in** (uncorrected)	SAMPLER *	SAMPLE NUMBER	U.S.C.S. NAME	SOIL DESCRIPTION
							SURFACE: Asphalt
0	CONCRETE EMBEDDED FLUSH WELL MONUMENT (0-2')						2" Asphalt
	BENTONITE CHIP SEAL (2-4')					GP/ GM	Sandy, silty, fine, GRAVEL, moist, medium dense. (FILL)
5	BLANK 2" dia. PVC PIPE (2-5') 10/20 COLORADO SILICA SAND PACK (4-15')		11 14 7		S-1	GP	Sandy fine GRAVEL, moist with wood and peat layers, medium dense.
	2" dia. PVC WITH 0.01" SLOT SCREEN (5-15')					SM	Silty SAND, gray-brown, moist to wet, medium dense.
10			4 7 9		S-2	GM	Silty SAND interbedded with SILT, gray, wet, medium dense, very stiff, moderate petroleum odor.
							Silty SAND, gray, wet, medium dense.
15							

Testing program columns (Laboratory: MOISTURE CONTENT(%), PLASTIC LIMIT(%), LIQUID LIMIT(%), % PASSING No. 200 SIEVE, OTHER TESTS; Field: PID (ppm)) — no entries.

Bottom of boring at 15 feet on 11/17/99.
Groundwater observed at 9 feet bgs.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: ______ BY: ______

DATE DRILLED: 11-17-99
LOGGED BY: T. Stott
REVIEWED BY: S. Dwyer

SURFACE ELEVATION (feet):
TOTAL DEPTH (feet): 15.0
DIAMETER OF BORING (in): 4 1/4

DRILLING METHOD: HSA Auger
DRILLER: Cascade Drilling
CASING SIZE:

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING
PROJECT NUMBER: 60-1995-01

Buck and Gordon
Bothell Landing

BORING LOG
MW-4

FIGURE
A - 4

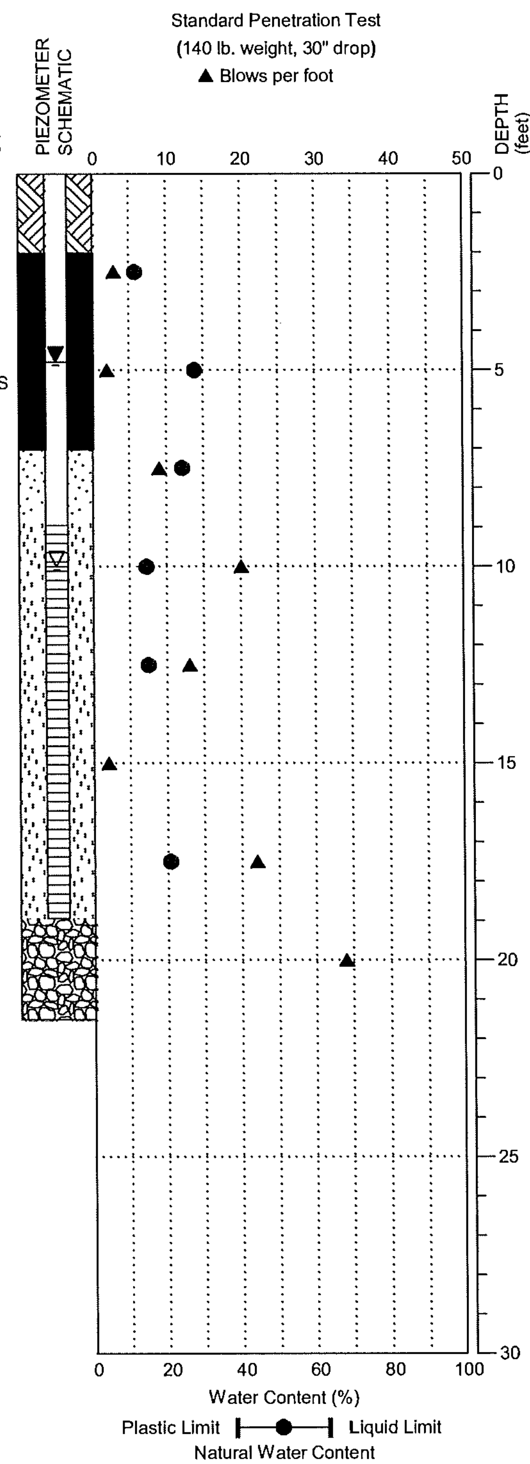
DRILLING COMPANY: Holocene Drilling
SURFACE ELEVATION: 39.00 ± feet
DRILLING METHOD: Hollow-Stem Auger, Mobile B-61 truck rig
SAMPLING METHOD: SPT with Autohammer
LOCATION: See Figure 2

DATE STARTED: 6/4/2008
DATE COMPLETED: 6/4/2008
LOGGED BY: J. Speck

DEPTH (feet)	USCS SOIL CLASS	DESCRIPTION	SAMPLE TYPE / SAMPLE NUMBER	PEN. RESISTANCE (blows/6 inches)	OTHER TESTS
0	SM	Surface comprised of approximately 5 inches of concrete (sidewalk). Loose, dark brown to gray, gravelly, silty fine to medium SAND with gravel, moist. Some cobbles near surface. **(FILL)**	S-1	2-2-1	
5	ML	Very soft to stiff, olive gray to gray, very sandy SILT, moist to wet. **(ALLUVIUM)** Trace decomposing wood near 5 feet below ground surface (bgs). Olive gray to brown in sample at 7.5 feet bgs. Some lenses of fine to medium sand. One inch lense sandy silt with oxidation staining at 8.8 feet bgs.	S-2 S-3	0-1-1 2-3-6	GS
10	SP	Medium dense, gray, gravelly, fine to coarse SAND, wet. **(RECESSIONAL OUTWASH)** Washed appearance noted in sample at 10'.	S-4	7-13-7	
	SM	Medium dense, yellow brown, silty, fine SAND, wet. Some coarse sand near bottom of sample at 12.5 feet bgs.	S-5	4-7-6	
15	SP SM	Loose to dense, yellow brown to olive brown, slightly silty, fine SAND, wet. Two one inch lenses of sandy silt near 16 feet bgs. Lenses of olive gray, silty, fine sand and yellow brown, fine to coarse sand noted in sample at 17.5 feet bgs.	S-6 S-7	0-1-1 6-10-12	
20	SP SM	Dense, yellow brown to olive brown, fine gravelly, slightly silty to silty fine to medium SAND, wet. **(ADVANCE OUTWASH)** Oxidation stains at 18.8' below ground surface.	S-8	5-15-19	

Exploration completed at 21.5 feet below ground surface.

Ground water noted at 10 feet below ground surface during exploration. Ground water noted at 4.78 below ground surface on 06/09/08.



NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

HWA GEOSCIENCES INC.

SR 522 PRELOAD RECOMMENDATIONS
BOTHELL CROSSROADS PROJECT
BOTHELL, WASHINGTON

BORING:
BB- 2

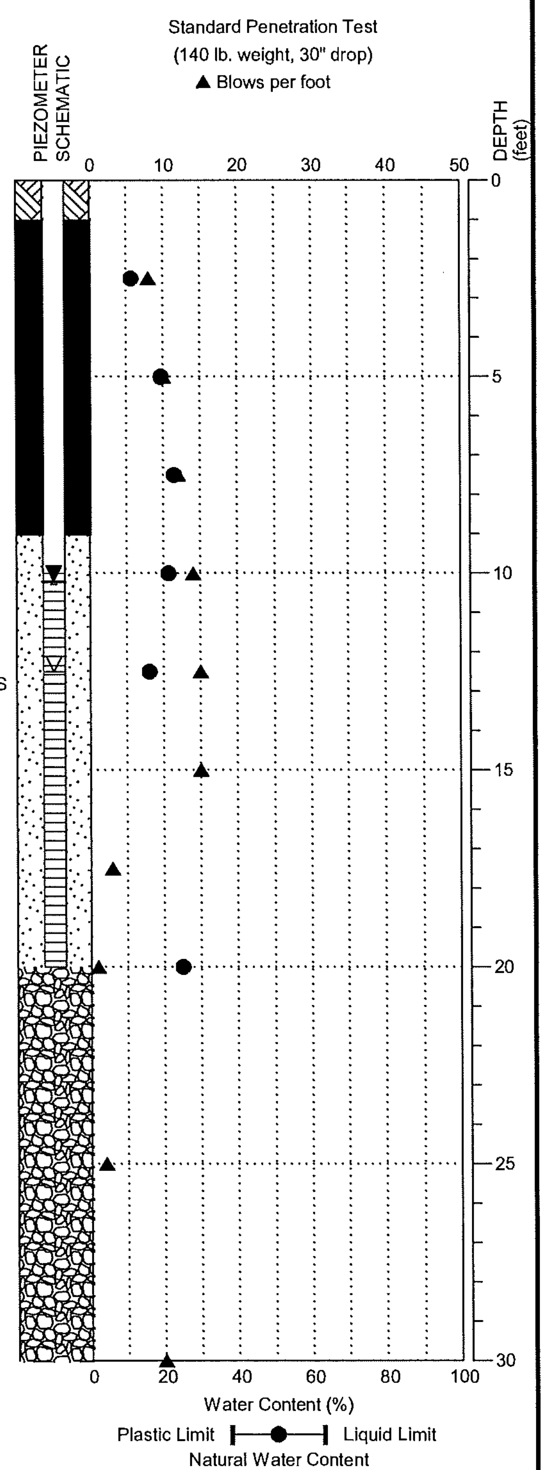
PAGE: 1 of 1

PROJECT NO.: 2007-098 FIGURE: 2

DRILLING COMPANY: Holocene Drilling
SURFACE ELEVATION: 42.50 ± feet
DRILLING METHOD: Hollow-Stem Auger, Mobile B-61 truck rig
SAMPLING METHOD: SPT with Autohammer
LOCATION: See Figure 2

DATE STARTED: 6/6/2008
DATE COMPLETED: 6/6/2008
LOGGED BY: J. Speck

DEPTH (feet)	USCS SOIL CLASS	DESCRIPTION	SAMPLE NUMBER	PEN. RESISTANCE (blows/6 inches)	OTHER TESTS
0	SM	Surface comprised of approximately 6 inches of concrete (sidewalk). Loose, yellow brown, silty, gravelly SAND, moist. **(FILL)**	S-1	3-2-6	
5	SM	Medium dense, olive gray, silty SAND, moist, with faint laminations and oxide staining. **(ALLUVIUM/RECESSIONAL OUTWASH)** Low sample recovery.	S-2	4-5-5	
	SP	Loose to medium dense, yellow brown, fine to medium SAND, moist to wet. **(RECESSIONAL OUTWASH)**	S-3	4-6-6	
10		2-inch lens of gravelly SAND at 10.75 feet.	S-4	5-7-7	
	SP	Medium dense, yellow brown, gravelly, fine to medium SAND, wet. Ground water seepage observed at 12.5 feet below the ground surface.	S-5	4-8-7	GS
15		Heave noted at 15 to 17.5 feet below ground surface.	S-6	1-6-9	
	SP	Loose, yellow brown, fine to medium SAND, wet.	S-7	0-1-2	
20		Understated blow counts in this layer due to heave.	S-8	1-0-1	
25			S-9	0-1-1	
30		Water added to auger before sampling at 30 feet below			



NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

HWA GEOSCIENCES INC.

SR 522 PRELOAD RECOMMENDATIONS
BOTHELL CROSSROADS PROJECT
BOTHELL, WASHINGTON

BORING:
BB- 3

PROJECT NO.: 2007-098 FIGURE: 3

PZO 2007098.GPJ 8/31/09

DRILLING COMPANY: Holocene Drilling SURFACE ELEVATION: 42.50 ± feet DATE STARTED: 6/6/2008

DRILLING METHOD: Hollow-Stem Auger, Mobile B-61 truck rig DATE COMPLETED: 6/6/2008

SAMPLING METHOD: SPT with Autohammer LOGGED BY: J. Speck

LOCATION: See Figure 2

DEPTH (feet)	SYMBOL	USCS SOIL CLASS	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	PEN. RESISTANCE (blows/6 inches)	OTHER TESTS	PIEZOMETER SCHEMATIC
30			ground surface.		S-10	6-2-8		
			Exploration terminated at 31.5 feet below the ground surface (bgs). Ground water seepage was observed at 12.5 feet bgs during the exploration. Ground water measured at 10.2 feet bgs on 6/6/2008.					

Standard Penetration Test
(140 lb. weight, 30" drop)
▲ Blows per foot

0 10 20 30 40 50

DEPTH (feet): 30, 35, 40, 45, 50, 55, 60

0 20 40 60 80 100

Water Content (%)

Plastic Limit ⊢—●—⊣ Liquid Limit

Natural Water Content

NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

HWA GEOSCIENCES INC.

SR 522 PRELOAD RECOMMENDATIONS
BOTHELL CROSSROADS PROJECT
BOTHELL, WASHINGTON

BORING:
BB- 3

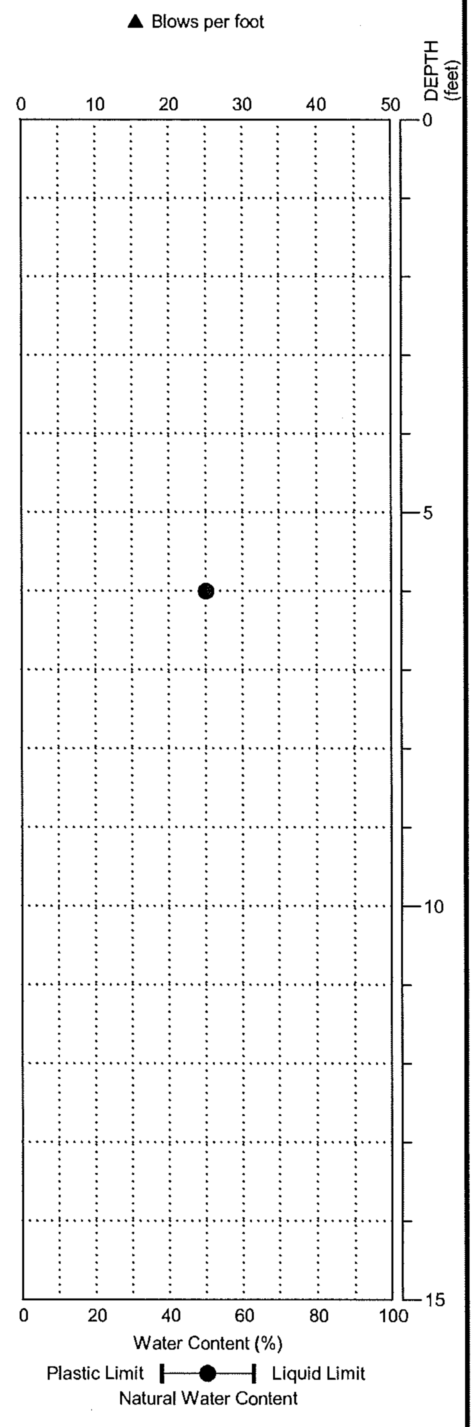
PROJECT NO.: 2007-098 FIGURE: 3

DRILLING COMPANY: ESN Northwest
DRILLING METHOD: Truck-mounted GeoProbe
SAMPLING METHOD: HDPE-lined Macrocore sampler
SURFACE ELEVATION: 39.30 ± feet

LOCATION: See Figure 2
DATE STARTED: 1/5/2009
DATE COMPLETED: 1/5/2009
LOGGED BY: J. Speck

DEPTH (feet)	SYMBOL	USCS SOIL CLASS	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	PEN. RESISTANCE (blows/6 inches)	OTHER TESTS	GROUNDWATER
0			Four inches of concrete.		S-1			
		SP	Yellow brown, fine to medium SAND, moist. Trace gravel. **(FILL)**		S-2			
		SM	Dark brown, gravelly, silty, fine to medium SAND, wet. Scattered cobbles noted. Color grades to dark yellow brown at 4 feet. Ground water observed at 5 feet below ground surface.		S-3			
5		SM	Gray, very silty, fine SAND, moist to wet. **(RECESSIONAL OUTWASH)** Interbedded with lenses of dark brown peat (less than 2 inches thick) in sample from 6 to 8 feet below ground surface.		S-4		GS	∇
					S-5			
10					S-6			

Boring completed at 12 feet below ground surface.
Ground water encountered at 5.0 feet bgs.



For a proper understanding of the nature of subsurface conditions, this exploration log should be read in conjunction with the text of the geotechnical report.

NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

HWA GEOSCIENCES INC.

SR 522 PRELOAD RECOMMENDATIONS
BOTHELL CROSSROADS PROJECT
BOTHELL, WASHINGTON

GEOPROBE:
BI- 3

PAGE: 1 of 1

PROJECT NO.: 2007-098 FIGURE: 13

BORING 2007098.GPJ 8/26/09

Boring Log B1

Other Tests	Sample No.	Moisture Content (%)	Dry Density (pcf)	PID (ppm) [reading/background]	Penetration Resistance (blows / 6 in.)	Depth (feet)	Sample	USCS	Symbol	DESCRIPTION	Elev. (feet)
										8" Asphalt.	
										8" Concrete.	
										Silty SAND (SM), olive-gray, with fine to coarse gravel (20%), rounded, diam. 1/4-1", medium dense, moist.	
				0.5		2					
						4					
	B1-6										
				0.8		6					
								SM			
	B1-W					▽8				Decreasing gravel (5-10%), becomes wet.	
				0.9							
						10					
						12					
						14				Boring terminated at 14 ft bgs. Groundwater encountered at 8 ft bgs.	
						16					
						18					
						20					

Station:

Surface Elevation:

Logged By: AW

Drill Rig: DPT

Equipment/Hammer: Continuous Core/

Date Completed: 4-6-09

King County
Bothell Crossroads Redevelopment Project
Bothell, Washington

Boring Log B1 Figure: C2
Project No: 19897.68445 1 of 1

CDM

NEIS_BORING_LOG 19897-68445-BOTHELL ROW.GPJ CDM_BLLV.GDT 5/22/09 REV.

Boring Log B2

Other Tests	Sample No.	Moisture Content (%)	Dry Density (pcf)	PID (ppm) [reading/background]	Penetration Resistance (blows / 6 in.)	Depth (feet)	Sample	USCS	Symbol	DESCRIPTION	Elev. (feet)
						0–0.67				8" Asphalt.	
						0.67–1.33				8" Concrete. Empty steel pipe in concrete at 13-14 inches bgs.	
						1.33–4.5		SM		Silty SAND (SM), tan, with fine gravel (20%).	
						4.5–5.5		ML		Sandy SILT (ML), black, some organic material (rootlets), moist (Marsh Deposit).	
	B2-7 B19-7					5.5–12		SM		Silty SAND (SM), tan, medium dense, wet, odor.	
	B2-W B19-W					8				Becomes saturated.	
						12				Boring terminated at 12 ft bgs. Groundwater encountered at 8 ft bgs.	

Station:
Surface Elevation:
Logged By: AW

Drill Rig: DPT
Equipment/Hammer: Continuous Core/
Date Completed: 4-2-09

King County
Bothell Crossroads Redevelopment Project
Bothell, Washington

Boring Log B2
Project No: 19897.68445

Figure: C3

CDM

NEIS_BORING_LOG 19897-68445-BOTHELL ROW.GPJ CDM_BLLV.GDT 5/22/09 REV.

Boring Log B3

Other Tests	Sample No.	Moisture Content (%)	Dry Density (pcf)	PID (ppm) [reading/background]	Penetration Resistance (blows / 6 in.)	Depth (feet)	Sample	USCS	Symbol	DESCRIPTION	Elev. (feet)
						0				8" Asphalt.	
										8" Concrete.	
						2		SM		Silty SAND (SM), tan, with gravel (20%), medium dense, moist.	
										Becomes black, odor.	
						4					
										No recovery.	
						6		ML		Sandy SILT (ML), black, stiff, wet, odor (Marsh Deposit).	
						8					
	B3-9										
						10				Decreasing organics.	
						▽				Increasing sand, becomes saturated.	
										Decreasing sand, increasing silt.	
						12					
						14				Boring terminated at 14 ft bgs. Groundwater encountered at 11 ft bgs.	
						16					
						18					
						20					

Station:
Surface Elevation:
Logged By: AW

Drill Rig: DPT
Equipment/Hammer: Continuous Core/
Date Completed: 4-3-09

King County
Bothell Crossroads Redevelopment Project
Bothell, Washington

Boring Log B3 Figure: C4
Project No: 19897.68445 1 of 1

CDM

Boring Log B7

Other Tests	Sample No.	Moisture Content (%)	Dry Density (pcf)	PID (ppm) [reading/background]	Penetration Resistance (blows / 6 in.)	Depth (feet)	USCS	DESCRIPTION	Elev. (feet)
								8" Asphalt.	
								8" Concrete.	
						2		Silty SAND (SM), yellow-red, with gravel (15%), gravel is subangular, medium dense, moist.	
				0.6		4		Increasing density, gravel becomes rounded.	
						6	SM		
				0.8		8		Decreasing gravel, sand becomes medium grained, becomes wet.	
	B7-9			0.8					
						10		Becomes saturated at 10 ft bgs.	
								SILT (ML), light gray, stiff, wet.	
						12	ML		
						14			
								Boring terminated at 14 ft bgs. Groundwater encountered at 10 ft bgs.	
						16			
						18			
						20			

Station: ______
Surface Elevation: ______
Logged By: AW

Drill Rig: DPT
Equipment/Hammer: Continuous Core/
Date Completed: 4-1-09

King County
Bothell Crossroads Redevelopment Project
Bothell, Washington

CDM

Boring Log B7 — Figure: C8
Project No: 19897.68445 — 1 of 1

Parametrix, Inc.

BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 555-1647-019 02/0303
PROJECT NAME Bothell Crossing
LOCATION Landing
COORDINATES
DRILLING METHOD Direct Push
SAMPLING METHOD
GROUND ELEVATION

BORING/WELL NUMBER # BLBH-23
DATE COMPLETED 9/4/2009
TOTAL DEPTH OF BORING 20'
INITIAL WATER LEVEL ▽
STATIC WATER LEVEL ▼ 17'
LOGGED BY Lily Vagelatos
TOP OF CASING ELEVATION

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft.)	U.S.C.S.	GRAPHIC LOG	DESCRIPTION SOIL: Group Name, Group Symbol, Color, Plasticity, Grain Size, Moisture Content, Density/Compaction, Miscellaneous	DEPTH (ft.)	WELL DIAGRAM
		50"						0-2" grass & vegetation 2"-2' topsoil, ~~loamy~~ silty sand. Brown/Tan? 2'-3' Brown silty sand		
					5			3'-5' grey brown silty sand & gravel	5	
		10" hit Rock						5'-10' low Recovery Brown silty sand & gravel		
		50"			10			10'-11' brown silty sand & gravel, Damp 11'-15 tan/grey silty clay	10	
		50"			15			15'-17' Brown sandy silty clay 17'-20' saturated grey brown sand.	15	
					20			use geo prob screen From ~16' - 21'	20	
					25				25	

Continued Next Page

Parametrix, Inc.

BORING/WELL CONSTRUCTION LOG

PROJECT NUMBER 555 1647 019 02/0303

PROJECT NAME Bothell Crossing

LOCATION Landing

COORDINATES

DRILLING METHOD Direct Push

SAMPLING METHOD

GROUND ELEVATION

BORING/WELL NUMBER # BLBH-24

DATE COMPLETED 9/4/2009

TOTAL DEPTH OF BORING 15'

INITIAL WATER LEVEL ▽ 10'

STATIC WATER LEVEL ▼

LOGGED BY Lily Vagelatos

TOP OF CASING ELEVATION

PID (ppm)	BLOW COUNTS	RECOVERY (inches)	SAMPLE ID.	EXTENT	DEPTH (ft.)	U.S.C.S.	GRAPHIC LOG
		50"			0–5		ASPHALT
		55"			5–10		ASPHALT
		50"			10–15		

DESCRIPTION

SOIL: Group Name, Group Symbol, Color, Plasticity, Grain Size, Moisture Content, Density/Compaction, Miscellaneous

0-4" asphalt

4" - 1.5' Tan/Brown silty sand and gravel.

1.5-2' Tan/Brown silty sandy clay w/ gravel

2'-5' Grey silty sand d gravel

5'-6' grey silty sand + gravel

6'-6.25' asphalt

6.25'-8' grey silty sand + gravel

8'-8.5' grey sand

8.5'-10' grey/brown ~~clay~~ peet

10-11' grey silty sand

11-11.5 grey silty clay

11.5-12 tan/grey silty sand

12'-13' grey silty sand clay

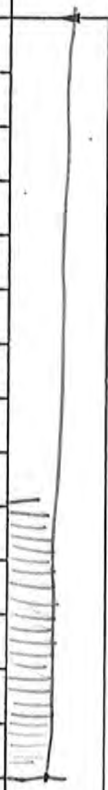
13-15' peet

screen 9'-14'

no staining, no odor

DEPTH (ft.) 5, 10, 15, 20, 25

WELL DIAGRAM



Continued Next Page

BWC BLANK 2/4/99

APPENDIX C

Analytical Data Validation and Laboratory Results

APPENDIX C1

Data Validation Memorandum

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

411 108th AVENUE NE, SUITE 1800
BELLEVUE, WA 98004-5571
T. 425.458.6200 F. 425.458.6363
www.parametrix.com

TECHNICAL MEMORANDUM

Date:	October 9, 2009
To:	Project File
From:	Annika Deutsch
Subject:	City of Bothell Landing Property September 2009 Data Validation
cc:	David Dinkuhn
Project Number:	555-1647-019-02-0204
Project Name:	Bothell Hazardous Materials On-Call

INTRODUCTION

This technical memorandum summarizes the results of an internal quality assurance/quality control (QA/QC) review of analytical results for soil and groundwater samples collected on September 4, 8, 9, 16, 17, and 24, 2009. Nine soil samples, 17 groundwater samples, two rinsate blanks, and two trip blanks were submitted to OnSite Environmental, Inc. (OnSite; Redmond, WA) for analysis.

All nine soil samples were analyzed for diesel extended (Dx); gasoline extended (Gx); benzene, toluene, ethylbenzene, and xylenes (BTEX); and percent moisture. Seven of these samples were also analyzed for halogenated organic compounds (HVOCs). Five of these soil samples were also analyzed for naphthalenes and total Model Toxics Control Act (MTCA) metals. Two of these samples were also analyzed for naphthalenes. Fourteen of the groundwater samples were analyzed for Dx, Gx/BTEX, and HVOCs. Nine of these groundwater samples were also analyzed for total arsenic, of which seven were analyzed for dissolved arsenic. Four groundwater samples were analyzed only for HVOCs. Both rinsate blanks were analyzed for Dx, Gx/BTEX, and HVOCs, and one was also analyzed for polycyclic aromatic hydrocarbons and total MTCA metals. The trip blanks were analyzed for HVOCs.

Final laboratory data were submitted to Parametrix via a Tier II-type data report (OnSite Laboratory Reference Number 09-055, 09-067, 09-082, 09-165, 09-181, 09-226). All data and analytical QC elements were reviewed against laboratory and method QC criteria, and qualifiers were applied where judged appropriate.

DATA REVIEW SUMMARY

All samples collected were prepared and analyzed using standard methods. All method holding times were met.

All analyses requested on the COC were conducted.

No trip blank, rinsate blank, or laboratory method blank contamination was observed, with the following exceptions:

- One rinsate blank had a detection of Chloroform (0.23 µg/L); however, all associated samples were non-detect. Therefore, no data were qualified as a result of this rinsate blank contamination.

- One method blank (09-165) had a detection of Methylene Chloride (2.1 µg/L); however, all associated samples were non-detect. Therefore, no data were qualified as a result of this method blank contamination.

All other analytical QC results were in control, indicating acceptable analytical accuracy and precision, with the exception of the following:

- According to the OnSite's case narratives, Internal Standard 1,4-Dichlorobenzene-d4 did not meet acceptance criteria for sample BLSS-2 0-6" (09-082) due to sample matrix interference. Therefore, HVOCs from Bromobenzene through 1,2,3-Trichlorobenzene for BLSS-2 0-6" (none detected at PQL) were qualified "UJ" for estimated non-detect.

The lab noted that the detection of gasoline in sample HZMW-13-2.5 (09-067) was, based on the chromatogram, similar to mineral spirits. Two field duplicates were collected for this site: BLMW-4-10/BLMW-4-10-2 (09-165) and B1-3/D-B1-3 (09-226). The results of these field duplicates were acceptable. Table 1 summarizes all data qualified based on this review (i.e., does not include laboratory qualified data).

Table 1. Qualified Riverside Property Soil Data

Sample ID	Matrix	Analyte	Result	Qualifier	Reason
BLSS-2 0-6"	Soil	Bromobenzene	<0.0013	UJ	OnSite internal standard not met.
BLSS-2 0-6"	Soil	1,1,2,2-Tetrachloroethane	<0.0013	UJ	OnSite internal standard not met.
BLSS-2 0-6"	Soil	1,2,3-Trichloropropane	<0.0013	UJ	OnSite internal standard not met.
BLSS-2 0-6"	Soil	2-Chlorotoluene	<0.0013	UJ	OnSite internal standard not met.
BLSS-2 0-6"	Soil	4-Chlorotoluene	<0.0013	UJ	OnSite internal standard not met.
BLSS-2 0-6"	Soil	1,3-Dichlorobenzene	<0.0013	UJ	OnSite internal standard not met.
BLSS-2 0-6"	Soil	1,4-Dichlorobenzene	<0.0013	UJ	OnSite internal standard not met.
BLSS-2 0-6"	Soil	1,2-Dichlorobenzene	<0.0013	UJ	OnSite internal standard not met.
BLSS-2 0-6"	Soil	1,2-Dibromo-3-chloropropane	<0.0067	UJ	OnSite internal standard not met.
BLSS-2 0-6"	Soil	1,2,4-Trichlorobenzene	<0.0013	UJ	OnSite internal standard not met.
BLSS-2 0-6"	Soil	Hexachlorobutadiene	<0.0067	UJ	OnSite internal standard not met.
BLSS-2 0-6"	Soil	1,2,3-Trichlorobenzene	<0.0013	UJ	OnSite internal standard not met.
HZMW-13-2.5	Soil	TPH-Gas	8.8	M	Chromatogram similar to mineral spirits.

M OnSite noted that the chromatogram is similar to mineral spirits.
UJ Analyte was not detected at the PQL. Concentration reported should be considered an estimate due to internal standards not met.
Units mg/kg

CONCLUSION

All samples were analyzed within holding times, and appropriate standard methods were used. No trip blank contamination was observed. One rinsate blank was contaminated with Chloroform and one method blank was contaminated with Methylene Chloride; however, none of the associated samples had detections. Analytical accuracy and precision were determined to be generally acceptable based on this review. Field duplicate results were acceptable. All data reported should be considered valid as qualified and acceptable for further use.

Soil Analytical Results

PARAMETERS	Units	Analytical Method	MTCA A	MTCA B soil to gw	Ecological Indicator Conc.	Sample No.: Depth (ft): Background	BLBH-23-3 3 9/4/2009	BLBH-23-15 15 9/4/2009	BLMW-6-2.5 2.5 9/4/2009	BLMW-6-7.5 7.5 9/4/2009	BLSS-1 0-0.5 0-0.5 9/9/2009	BLSS-2 0-0.5 0-0.5 9/9/2009	HZMW-12-5 5 9/8/2009	HZMW-13-2.5 2.5 9/8/2009	HZMW-13-5 5 9/8/2009
PETROLEUM HYDROCARBONS															
Diesel	mg/kg	NWTPH-Dx	2,000		200		130 U	29 U	30 U	31 U	170 U	170 U	130	45 U	28 U
Motor Oil	mg/kg	NWTPH-Dx	2,000				1,700	140	120	62 U	680	1,000	220	370	120
Gasoline	mg/kg	NWTPH-Gx	30/100*G		100		1.5 U	1.6 U	1.8 U	2.2 U	2.8 U	2.8 U	1.9 U	8.8 M	1.6 U
Benzene	µg/kg	SW8021B	30	4.483			20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Toluene	µg/kg	SW8021B	7,000		200,000		29 U	32 U	37 U	44 U	55 U	57 U	39 U	30 U	32 U
Ethylbenzene	µg/kg	SW8021B	6,000				29 U	32 U	37 U	44 U	55 U	57 U	39 U	30 U	32 U
m,p-Xylene	µg/kg	SW8021B	9,000*XY				29 U	32 U	37 U	44 U	55 U	57 U	50	75	32 U
o-Xylene	µg/kg	SW8021B	9,000*XY				29 U	32 U	37 U	44 U	55 U	57 U	59	47	32 U
METALS															
Arsenic	mg/kg	SW6010B	20	2.803	7	7.30	- -	- -	6 U	6.2 U	- -	- -	6.2 U	5.6 U	5.7 U
Cadmium	mg/kg	SW6010B	2	0.69	4	0.77	- -	- -	0.6 U	0.62 U	- -	- -	0.62 U	0.56 U	0.57 U
Chromium	mg/kg	SW6010B	2000*CR		42	48.15	- -	- -	31	**45**	- -	- -	**60**	35	41
Lead	mg/kg	SW6010B	250	250	50	16.83	- -	- -	6 U	6.2 U	- -	- -	24	9.3	5.7 U
Mercury	mg/kg	SW7471A	2	2.088	0.1	0.07	- -	- -	0.026	0.025 U	- -	- -	0.027	0.022 U	0.027
VOLATILE ORGANICS															
1,1,1,2-Tetrachlor	µg/kg	SW8260B					- -	- -	0.53 U	0.6 U	1.3 U	1 U	0.52 U	0.46 U	0.62 U
1,1,1-Trichloroeth	µg/kg	SW8260B					- -	- -	0.53 U	0.6 U	1.3 U	1 U	0.52 U	0.46 U	0.62 U
1,1,2,2-Tetrachlor	µg/kg	SW8260B					- -	- -	0.53 U	0.6 U	1.3 UJ	1 U	0.52 U	0.46 U	0.62 U
1,1,2-Trichloroeth	µg/kg	SW8260B					- -	- -	0.53 U	0.6 U	1.3 U	1 U	0.52 U	0.46 U	0.62 U
1,1-Dichloroethan	µg/kg	SW8260B					- -	- -	0.53 U	0.6 U	1.3 U	1 U	0.52 U	0.46 U	0.62 U
1,1-Dichloroethen	µg/kg	SW8260B					- -	- -	0.53 U	0.6 U	1.3 U	1 U	0.52 U	0.46 U	0.62 U
1,1-Dichloroprope	µg/kg	SW8260B					- -	- -	0.53 U	0.6 U	1.3 U	1 U	0.52 U	0.46 U	0.62 U
1,2,3-Trichlorober	µg/kg	SW8260B			20,000		- -	- -	0.53 U	0.6 U	1.3 UJ	1 U	0.52 U	0.46 U	0.62 U
1,2,3-Trichloropro	µg/kg	SW8260B					- -	- -	0.53 U	0.6 U	1.3 UJ	1 U	0.52 U	0.46 U	0.62 U
1,2,4-Trichlorober	µg/kg	SW8260B			20,000		- -	- -	0.53 U	0.6 U	1.3 UJ	1 U	0.52 U	0.46 U	0.62 U
1,2-Dibromo-3-chl	µg/kg	SW8260B					- -	- -	2.6 U	3 U	6.7 UJ	5.2 U	2.6 U	2.3 U	3.1 U
1,2-Dibromoethan	µg/kg	SW8260B					- -	- -	0.53 U	0.6 U	1.3 U	1 U	0.52 U	0.46 U	0.62 U
1,2-Dichlorobenze	µg/kg	SW8260B					- -	- -	0.53 U	0.6 U	1.3 UJ	1 U	0.52 U	0.46 U	0.62 U
1,2-Dichloroethan	µg/kg	SW8260B					- -	- -	0.53 U	0.6 U	1.3 U	1 U	0.52 U	0.46 U	0.62 U
1,2-Dichloropropa	µg/kg	SW8260B			700,000		- -	- -	0.53 U	0.6 U	1.3 U	1 U	0.52 U	0.46 U	0.62 U
1,3-Dichlorobenze	µg/kg	SW8260B					- -	- -	0.53 U	0.6 U	1.3 UJ	1 U	0.52 U	0.46 U	0.62 U
1,3-Dichloropropa	µg/kg	SW8260B					- -	- -	0.53 U	0.6 U	1.3 U	1 U	0.52 U	0.46 U	0.62 U
1,4-Dichlorobenze	µg/kg	SW8260B			20,000		- -	- -	0.53 U	0.6 U	1.3 UJ	1 U	0.52 U	0.46 U	0.62 U
2,2-Dichloropropa	µg/kg	SW8260B					- -	- -	0.53 U	0.6 U	1.3 U	1 U	0.52 U	0.46 U	0.62 U
2-Chloroethyl Viny	µg/kg	SW8260B					- -	- -	2.6 U	3 U	6.7 U	5.2 U	2.6 U	2.3 U	3.1 U
2-Chlorotoluene	µg/kg	SW8260B					- -	- -	0.53 U	0.6 U	1.3 UJ	1 U	0.52 U	0.46 U	0.62 U
4-Chlorotoluene	µg/kg	SW8260B					- -	- -	0.53 U	0.6 U	1.3 UJ	1 U	0.52 U	0.46 U	0.62 U
Bromobenzene	µg/kg	SW8260B					- -	- -	0.53 U	0.6 U	1.3 UJ	1 U	0.52 U	0.46 U	0.62 U
Bromochlorometh	µg/kg	SW8260B					- -	- -	0.53 U	0.6 U	1.3 U	1 U	0.52 U	0.46 U	0.62 U
Bromodichlorome	µg/kg	SW8260B					- -	- -	0.53 U	0.6 U	1.3 U	1 U	0.52 U	0.46 U	0.62 U
Bromoform	µg/kg	SW8260B					- -	- -	0.53 U	0.6 U	1.3 U	1 U	0.52 U	0.46 U	0.62 U
Bromomethane	µg/kg	SW8260B					- -	- -	0.53 U	0.6 U	1.3 U	1 U	0.52 U	0.46 U	0.62 U
Carbon Tetrachlo	µg/kg	SW8260B					- -	- -	0.53 U	0.6 U	1.3 U	1 U	0.52 U	0.46 U	0.62 U
Chlorobenzene	µg/kg	SW8260B			40,000		- -	- -	0.53 U	0.6 U	1.3 U	1 U	0.52 U	0.46 U	0.62 U
Chloroethane	µg/kg	SW8260B					- -	- -	2.6 U	3 U	6.7 U	5.2 U	2.6 U	2.3 U	3.1 U
Chloroform	µg/kg	SW8260B					- -	- -	0.53 U	0.6 U	1.3 U	1 U	0.52 U	0.46 U	0.62 U

Soil Analytical Results

PARAMETERS	Units	Analytical Method	MTCA A	MTCA B soil to gw	Ecological Indicator Conc.	Sample No.: Depth (ft): Background	BLBH-23-3 3 9/4/2009	BLBH-23-15 15 9/4/2009	BLMW-6-2.5 2.5 9/4/2009	BLMW-6-7.5 7.5 9/4/2009	BLSS-1 0-0.5 0-0.5 9/9/2009	BLSS-2 0-0.5 0-0.5 9/9/2009	HZMW-12-5 5 9/8/2009	HZMW-13-2.5 2.5 9/8/2009	HZMW-13-5 5 9/8/2009
VOLATILE ORGANICS (continued)															
Chloromethane	µg/kg	SW8260B					- -	- -	2.6 U	3 U	6.7 U	5.2 U	2.6 U	2.3 U	3.1 U
cis-1,2-Dichloroet	µg/kg	SW8260B					- -	- -	0.53 U	0.6 U	1.3 U	1 U	0.52 U	0.46 U	0.62 U
cis-1,3-Dichloropr	µg/kg	SW8260B					- -	- -	0.53 U	0.6 U	1.3 U	1 U	0.52 U	0.46 U	0.62 U
Dibromochlorome	µg/kg	SW8260B					- -	- -	0.53 U	0.6 U	1.3 U	1 U	0.52 U	0.46 U	0.62 U
Dibromomethane	µg/kg	SW8260B					- -	- -	0.53 U	0.6 U	1.3 U	1 U	0.52 U	0.46 U	0.62 U
Dichlorodifluorom	µg/kg	SW8260B					- -	- -	0.53 U	0.6 U	1.3 U	1 U	0.52 U	0.46 U	0.62 U
Hexachlorobutadi	µg/kg	SW8260B					- -	- -	2.6 U	3 U	6.7 UJ	5.2 U	2.6 U	2.3 U	3.1 U
Methyl Iodide	µg/kg	SW8260B					- -	- -	2.6 U	3 U	6.7 U	5.2 U	2.6 U	2.3 U	3.1 U
Methylene Chloric	µg/kg	SW8260B	20				- -	- -	2.6 U	3 U	6.7 U	5.2 U	2.6 U	2.3 U	3.1 U
Tetrachloroethene	µg/kg	SW8260B	50				- -	- -	0.53 U	0.6 U	1.3 U	1 U	0.52 U	0.46 U	0.62 U
trans-1,2-Dichloro	µg/kg	SW8260B					- -	- -	0.53 U	0.6 U	1.3 U	1 U	0.52 U	0.46 U	0.62 U
trans-1,3-Dichloro	µg/kg	SW8260B					- -	- -	0.53 U	0.6 U	1.3 U	1 U	0.52 U	0.46 U	0.62 U
Trichloroethene	µg/kg	SW8260B	30				- -	- -	0.53 U	0.6 U	1.3 U	1 U	0.52 U	0.46 U	0.62 U
Trichlorofluorome	µg/kg	SW8260B					- -	- -	0.53 U	0.6 U	1.3 U	1 U	0.52 U	0.46 U	0.62 U
Vinyl Chloride	µg/kg	SW8260B					- -	- -	0.53 U	0.6 U	1.3 U	1 U	0.52 U	0.46 U	0.62 U
SEMIVOLATILE ORGANICS															
1-Methylnaphthale	µg/kg	SW8270D SIM	5,000*NA				6.9 U	7.7 U	7.9 U	8.2 U	- -	- -	8.2 U	7.5 U	7.6 U
2-Methylnaphthale	µg/kg	SW8270D SIM	5,000*NA				6.9 U	7.7 U	7.9 U	8.2 U	- -	- -	8.2 U	7.5 U	7.6 U
Naphthalene	µg/kg	SW8270D SIM	5,000*NA				6.9 U	7.7 U	7.9	8.2 U	- -	- -	8.2 U	7.5 U	7.6 U

NOTES:
- - - Not analyzed or not collected
- *CR = Chromium Standards based on Chromium III
- *G = 100 if no benzene and TEX < 1% gas; 30 for other mixtures
- *NA = Includes Naphthalene, 1-Methylnaphthalene, and 2-Methylnaphthalene
- *XY = Applies to the sum of all xylenes
- ND = Non-detect
- U = Not detected above the given practical quantitation limit
- M = Lab identified: similar to mineral spirits based on chromatogram
- **Bold** Bold values exceed Ecological Indicator Concentration

SOURCES: Background: 90th percentile Puget Sound (Ecology's Publication #94-115; 10/1994)
Model Toxics Control Act (MTCA) from WA Administrative Code 173-340-900
MTCA Method A Soil Cleanup Levels for Unrestricted Land Use: Table 740-1
MTCA Method B soil to groundwater: site-specific calculated
Ecological Indicator Concentrations: Table 749-3

UNITS:
- ft = feet
- mg/kg = milligram/kilogram
- µg/kg = microgram/kilogram

Groundwater Analytical Results

				Sample No.:	BI-3	D-BI-3	BB-2-17	BB-3-16	BLMW-1-10	BLMW-3-10	BLMW-4-10	BLMW-4-10-2	BLMW-5-8	BLMW-6-5
		Analytical		Depth (ft):	6	6	17	16	10	10	10	10	8	5
PARAMETERS	**Units**	**Method**	**MTCA A**	**Date:**	**9/24/2009**	**9/24/2009**	**9/18/2009**	**9/17/2009**	**9/16/2009**	**9/17/2009**	**9/16/2009**	**9/16/2009**	**9/16/2009**	**9/16/2009**
FIELD DATA														
Conductivity	mmhos/cm	Field			0.240	- -	0.259	0.329	0.263	0.367	0.382	- -	0.280	0.346
pH	std units	Field			6.72	- -	6.95	7.76	7.00	7.17	7.05	- -	7.01	7.22
Temperature	Celsius	Field			22.1	- -	17.9	18.5	17.9	20.9	19.4	- -	18.5	19.0
Dissolved Oxygen	mg/L	Field			2.37	- -	3.58	10.65	2.49	2.32	2.32	- -	2.47	2.37
PETROLEUM HYDROCARBONS														
Diesel Range Hydrocarbons	mg/L	NWTPH-Dx	1		- -	- -	- -	- -	0.28 U	0.28 U	0.29 U	0.28 U	0.27 U	0.25 U
Motor Oil	mg/L	NWTPH-Dx	1		- -	- -	- -	- -	0.44 U	0.44 U	0.46 U	0.45 U	0.44 U	0.4 U
Gasoline Range Hydrocarbons	mg/L	NWTPH-Gx	0.8/1*G		- -	- -	- -	- -	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U
Benzene	µg/L	SW8260	5		- -	- -	- -	- -	1 U	15	1 U	1 U	1 U	1 U
Toluene	µg/L	SW8260	1,000		- -	- -	- -	- -	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	µg/L	SW8260	700		- -	- -	- -	- -	1 U	1 U	1 U	1 U	1 U	1 U
m,p-Xylene	µg/L	SW8260	1,000*XY		- -	- -	- -	- -	1 U	1 U	1 U	1 U	1 U	1 U
o-Xylene	µg/L	SW8260	1,000*XY		- -	- -	- -	- -	1 U	1 U	1 U	1 U	1 U	1 U
TOTAL METALS														
Arsenic	mg/L	200.8/6020	0.005		- -	- -	- -	- -	0.0033 U	0.0039	0.0033 U	0.0033 U	0.0033 U	- -
Cadmium	mg/L	200.8/6020	0.005		- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Chromium	mg/L	200.8/6020			- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Lead	mg/L	200.8/6020	0.015		- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Mercury	mg/L	200.8/6020	0.002		- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
DISSOLVED METALS														
Arsenic	mg/L	200.8/6020	0.005		- -	- -	- -	- -	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	- -
VOLATILE ORGANICS														
1,1,1,2-Tetrachloroethane	µg/L	SW8260			0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,1-Trichloroethane	µg/L	SW8260	200		0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,2,2-Tetrachloroethane	µg/L	SW8260			0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,2-Trichloroethane	µg/L	SW8260			0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1-Dichloroethane	µg/L	SW8260			0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1-Dichloroethene	µg/L	SW8260			0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1-Dichloropropene	µg/L	SW8260			0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2,3-Trichlorobenzene	µg/L	SW8260			0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2,3-Trichloropropane	µg/L	SW8260			0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2,4-Trichlorobenzene	µg/L	SW8260			0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dibromo-3-chloropropane	µg/L	SW8260			1 U	1 U	2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromoethane	µg/L	SW8260			0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichlorobenzene	µg/L	SW8260			0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichloroethane	µg/L	SW8260	5		0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichloropropane	µg/L	SW8260			0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3-Dichlorobenzene	µg/L	SW8260			0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3-Dichloropropane	µg/L	SW8260			0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,4-Dichlorobenzene	µg/L	SW8260			0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2,2-Dichloropropane	µg/L	SW8260			0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2-Chloroethyl Vinyl Ether	µg/L	SW8260			1 U	1 U	2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Chlorotoluene	µg/L	SW8260			0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
4-Chlorotoluene	µg/L	SW8260			0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Bromobenzene	µg/L	SW8260			0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Bromochloromethane	µg/L	SW8260			0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U

Groundwater Analytical Results

PARAMETERS	Units	Analytical Method	MTCA A	Sample No.: / Depth (ft): / Date:	BI-3 / 6 / 9/24/2009	D-BI-3 / 6 / 9/24/2009	BB-2-17 / 17 / 9/18/2009	BB-3-16 / 16 / 9/17/2009	BLMW-1-10 / 10 / 9/16/2009	BLMW-3-10 / 10 / 9/17/2009	BLMW-4-10 / 10 / 9/16/2009	BLMW-4-10-2 / 10 / 9/16/2009	BLMW-5-8 / 8 / 9/16/2009	BLMW-6-5 / 5 / 9/16/2009
VOLATILE ORGANICS (continued)														
Bromoform	µg/L	SW8260			1 U	1 U	2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromomethane	µg/L	SW8260			0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Carbon Tetrachloride	µg/L	SW8260			0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chlorobenzene	µg/L	SW8260			0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chloroethane	µg/L	SW8260			1 U	1 U	2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	µg/L	SW8260			0.2 U	0.2 U	0.4 U	0.82	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chloromethane	µg/L	SW8260			1 U	1 U	2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	µg/L	SW8260			5.3	5.1	0.4 U	0.2 U	0.2 U	1.8	0.60	0.57	0.2 U	0.69
cis-1,3-Dichloropropene	µg/L	SW8260			0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Dibromochloromethane	µg/L	SW8260			0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Dibromomethane	µg/L	SW8260			0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Dichlorodifluoromethane	µg/L	SW8260			0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Hexachlorobutadiene	µg/L	SW8260			0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Methyl Iodide	µg/L	SW8260			1 U	1 U	2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene Chloride	µg/L	SW8260	5		1 U	1 U	2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	µg/L	SW8260	5		6.8	6.9	79	0.52	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
trans-1,2-Dichloroethene	µg/L	SW8260			0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
trans-1,3-Dichloropropene	µg/L	SW8260			0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Trichloroethene	µg/L	SW8260	5		1.2	1.2	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Trichlorofluoromethane	µg/L	SW8260			0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Vinyl Chloride	µg/L	SW8260	0.2		1.3	1.4	0.4 U	0.2 U	0.2 U	0.38	0.2 U	0.2 U	0.2 U	0.2 U

Groundwater Analytical Results

PARAMETERS	Units	Analytical Method	MTCA A	Sample No.: / Depth (ft): / Date:	BLMW-7-8 / 8 / 9/16/2009	BLMW-8-12 / 12 / 9/16/2009	BLMW-8-25 / 25 / 9/4/2009	BLBH-23-19 / 19 / 9/4/2009	BLBH-24-12 / 12 / 9/4/2009	HZMW-12-10 / 10 / 9/17/2009	HZMW-13-10 / 10 / 9/17/2009
FIELD DATA											
Conductivity	mmhos/cm	Field			0.188	0.568	- -	- -	- -	0.960	1.17
pH	std units	Field			6.67	6.85	- -	- -	- -	6.74	7.19
Temperature	Celsius	Field			17.9	18.2	- -	- -	- -	19.8	20.1
Dissolved Oxygen	mg/L	Field			2.60	2.78	- -	- -	- -	2.39	2.31
PETROLEUM HYDROCARBONS											
Diesel Range Hydrocarbons	mg/L	NWTPH-Dx	1		0.25 U	0.32 U	0.3 U	0.32 U	0.32 U	0.27 U	0.27 U
Motor Oil	mg/L	NWTPH-Dx	1		0.4 U	0.5 U	0.47 U	0.51 U	0.51 U	0.43 U	0.44 U
Gasoline Range Hydrocarbons	mg/L	NWTPH-Gx	0.8/1*G		0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.210
Benzene	µg/L	SW8260	5		1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	µg/L	SW8260	1,000		1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	µg/L	SW8260	700		1 U	1 U	1 U	1 U	1 U	1 U	1 U
m,p-Xylene	µg/L	SW8260	1,000*XY		1 U	1 U	1 U	1 U	1 U	1 U	1 U
o-Xylene	µg/L	SW8260	1,000*XY		1 U	1 U	1 U	1 U	1 U	1 U	1 U
TOTAL METALS											
Arsenic	mg/L	200.8/6020	0.005		0.0033 U	0.0033 U	0.0033 U	0.0033 U	- -	- -	- -
Cadmium	mg/L	200.8/6020	0.005		- -	- -	- -	- -	- -	- -	- -
Chromium	mg/L	200.8/6020			- -	- -	- -	- -	- -	- -	- -
Lead	mg/L	200.8/6020	0.015		- -	- -	- -	- -	- -	- -	- -
Mercury	mg/L	200.8/6020	0.002		- -	- -	- -	- -	- -	- -	- -
DISSOLVED METALS											
Arsenic	mg/L	200.8/6020	0.005		0.003 U	0.003 U	- -	- -	- -	- -	- -
VOLATILE ORGANICS											
1,1,1,2-Tetrachloroethane	µg/L	SW8260			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,1-Trichloroethane	µg/L	SW8260	200		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,2,2-Tetrachloroethane	µg/L	SW8260			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,2-Trichloroethane	µg/L	SW8260			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1-Dichloroethane	µg/L	SW8260			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1-Dichloroethene	µg/L	SW8260			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1-Dichloropropene	µg/L	SW8260			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2,3-Trichlorobenzene	µg/L	SW8260			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2,3-Trichloropropane	µg/L	SW8260			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2,4-Trichlorobenzene	µg/L	SW8260			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dibromo-3-chloropropane	µg/L	SW8260			1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromoethane	µg/L	SW8260			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichlorobenzene	µg/L	SW8260			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichloroethane	µg/L	SW8260	5		0.2 U	0.69	0.82	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichloropropane	µg/L	SW8260			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3-Dichlorobenzene	µg/L	SW8260			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3-Dichloropropane	µg/L	SW8260			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,4-Dichlorobenzene	µg/L	SW8260			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2,2-Dichloropropane	µg/L	SW8260			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2-Chloroethyl Vinyl Ether	µg/L	SW8260			1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Chlorotoluene	µg/L	SW8260			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
4-Chlorotoluene	µg/L	SW8260			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Bromobenzene	µg/L	SW8260			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Bromochloromethane	µg/L	SW8260			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U

Groundwater Analytical Results

PARAMETERS	Units	Analytical Method	MTCA A	Sample No.: / Depth (ft): / Date:	BLMW-7-8 8 9/16/2009	BLMW-8-12 12 9/16/2009	BLMW-8-25 25 9/4/2009	BLBH-23-19 19 9/4/2009	BLBH-24-12 12 9/4/2009	HZMW-12-10 10 9/17/2009	HZMW-13-10 10 9/17/2009
VOLATILE ORGANICS (continued)											
Bromoform	µg/L	SW8260			1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromomethane	µg/L	SW8260			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Carbon Tetrachloride	µg/L	SW8260			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chlorobenzene	µg/L	SW8260			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chloroethane	µg/L	SW8260			1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	µg/L	SW8260			0.2 U	0.2 U	0.37	0.2 U	0.2 U	0.2 U	0.2 U
Chloromethane	µg/L	SW8260			1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	µg/L	SW8260			0.2 U	0.2 U	0.61	0.2 U	0.2 U	0.2 U	0.24
cis-1,3-Dichloropropene	µg/L	SW8260			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Dibromochloromethane	µg/L	SW8260			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Dibromomethane	µg/L	SW8260			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Dichlorodifluoromethane	µg/L	SW8260			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Hexachlorobutadiene	µg/L	SW8260			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Methyl Iodide	µg/L	SW8260			1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene Chloride	µg/L	SW8260	5		1 U	1 U	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	µg/L	SW8260	5		0.96	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
trans-1,2-Dichloroethene	µg/L	SW8260			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
trans-1,3-Dichloropropene	µg/L	SW8260			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Trichloroethene	µg/L	SW8260	5		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Trichlorofluoromethane	µg/L	SW8260			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Vinyl Chloride	µg/L	SW8260	0.2		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U

NOTES:
- - - = Not analyzed or not collected
- ND = Non-detect
- U = Not detected above the given practical quantitation limit
- *G = 1 if no benzene ; 0.8 if benzene
- *XY = Applies to the sum of all xylenes
- Shaded values exceed MTCA A

SOURCES:
- Model Toxics Control Act (MTCA) from WA Administrative Code 173-340-900
  - MTCA Method A Cleanup Levels for Ground Water: Table 720-1

UNITS:
- ft = foot
- mmhos/cm = millimhos/centimeter
- mg/L = milligrams/liter
- µg/L = micrograms/liter

APPENDIX C2

Analytical Laboratory Reports

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

411 108th AVENUE NE, SUITE 1800
BELLEVUE, WA 98004-5571
T. 425.458.6200 F. 425.458.6363
www.parametrix.com

TECHNICAL MEMORANDUM

Date:	October 9, 2009
To:	Project File
From:	Annika Deutsch
Subject:	City of Bothell Landing Property September 2009 Data Validation
cc:	David Dinkuhn
Project Number:	555-1647-019-02-0204
Project Name:	Bothell Hazardous Materials On-Call

INTRODUCTION

This technical memorandum summarizes the results of an internal quality assurance/quality control (QA/QC) review of analytical results for soil and groundwater samples collected on September 4, 8, 9, 16, 17, and 24, 2009. Nine soil samples, 17 groundwater samples, two rinsate blanks, and two trip blanks were submitted to OnSite Environmental, Inc. (OnSite; Redmond, WA) for analysis.

All nine soil samples were analyzed for diesel extended (Dx); gasoline extended (Gx); benzene, toluene, ethylbenzene, and xylenes (BTEX); and percent moisture. Seven of these samples were also analyzed for halogenated organic compounds (HVOCs). Five of these soil samples were also analyzed for naphthalenes and total Model Toxics Control Act (MTCA) metals. Two of these samples were also analyzed for naphthalenes. Fourteen of the groundwater samples were analyzed for Dx, Gx/BTEX, and HVOCs. Nine of these groundwater samples were also analyzed for total arsenic, of which seven were analyzed for dissolved arsenic. Four groundwater samples were analyzed only for HVOCs. Both rinsate blanks were analyzed for Dx, Gx/BTEX, and HVOCs, and one was also analyzed for polycyclic aromatic hydrocarbons and total MTCA metals. The trip blanks were analyzed for HVOCs.

Final laboratory data were submitted to Parametrix via a Tier II-type data report (OnSite Laboratory Reference Number 09-055, 09-067, 09-082, 09-165, 09-181, 09-226). All data and analytical QC elements were reviewed against laboratory and method QC criteria, and qualifiers were applied where judged appropriate.

DATA REVIEW SUMMARY

All samples collected were prepared and analyzed using standard methods. All method holding times were met.

All analyses requested on the COC were conducted.

No trip blank, rinsate blank, or laboratory method blank contamination was observed, with the following exceptions:

- One rinsate blank had a detection of Chloroform (0.23 µg/L); however, all associated samples were non-detect. Therefore, no data were qualified as a result of this rinsate blank contamination.

- One method blank (09-165) had a detection of Methylene Chloride (2.1 μg/L); however, all associated samples were non-detect. Therefore, no data were qualified as a result of this method blank contamination.

All other analytical QC results were in control, indicating acceptable analytical accuracy and precision, with the exception of the following:

- According to the OnSite's case narratives, Internal Standard 1,4-Dichlorobenzene-d4 did not meet acceptance criteria for sample BLSS-2 0-6" (09-082) due to sample matrix interference. Therefore, HVOCs from Bromobenzene through 1,2,3-Trichlorobenzene for BLSS-2 0-6" (none detected at PQL) were qualified "UJ" for estimated non-detect.

The lab noted that the detection of gasoline in sample HZMW-13-2.5 (09-067) was, based on the chromatogram, similar to mineral spirits. Two field duplicates were collected for this site: BLMW-4-10/BLMW-4-10-2 (09-165) and B1-3/D-B1-3 (09-226). The results of these field duplicates were acceptable. Table 1 summarizes all data qualified based on this review (i.e., does not include laboratory qualified data).

Table 1. Qualified Riverside Property Soil Data

Sample ID	Matrix	Analyte	Result	Qualifier	Reason
BLSS-2 0-6"	Soil	Bromobenzene	<0.0013	UJ	OnSite internal standard not met.
BLSS-2 0-6"	Soil	1,1,2,2-Tetrachloroethane	<0.0013	UJ	OnSite internal standard not met.
BLSS-2 0-6"	Soil	1,2,3-Trichloropropane	<0.0013	UJ	OnSite internal standard not met.
BLSS-2 0-6"	Soil	2-Chlorotoluene	<0.0013	UJ	OnSite internal standard not met.
BLSS-2 0-6"	Soil	4-Chlorotoluene	<0.0013	UJ	OnSite internal standard not met.
BLSS-2 0-6"	Soil	1,3-Dichlorobenzene	<0.0013	UJ	OnSite internal standard not met.
BLSS-2 0-6"	Soil	1,4-Dichlorobenzene	<0.0013	UJ	OnSite internal standard not met.
BLSS-2 0-6"	Soil	1,2-Dichlorobenzene	<0.0013	UJ	OnSite internal standard not met.
BLSS-2 0-6"	Soil	1,2-Dibromo-3-chloropropane	<0.0067	UJ	OnSite internal standard not met.
BLSS-2 0-6"	Soil	1,2,4-Trichlorobenzene	<0.0013	UJ	OnSite internal standard not met.
BLSS-2 0-6"	Soil	Hexachlorobutadiene	<0.0067	UJ	OnSite internal standard not met.
BLSS-2 0-6"	Soil	1,2,3-Trichlorobenzene	<0.0013	UJ	OnSite internal standard not met.
HZMW-13-2.5	Soil	TPH-Gas	8.8	M	Chromatogram similar to mineral spirits.

M OnSite noted that the chromatogram is similar to mineral spirits.
UJ Analyte was not detected at the PQL. Concentration reported should be considered an estimate due to internal standards not met.
Units mg/kg

CONCLUSION

All samples were analyzed within holding times, and appropriate standard methods were used. No trip blank contamination was observed. One rinsate blank was contaminated with Chloroform and one method blank was contaminated with Methylene Chloride; however, none of the associated samples had detections. Analytical accuracy and precision were determined to be generally acceptable based on this review. Field duplicate results were acceptable. All data reported should be considered valid as qualified and acceptable for further use.

OnSite Environmental Inc.
14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

September 15, 2009

David Dinkuhn
Parametrix, Inc.
4660 Kitsap Way, Suite A
Bremerton, WA 98312

Re: Analytical Data for Project 555-1647-019 02/0203 / Landing
Laboratory Reference No. 0909-055

Dear David:

Enclosed are the analytical results and associated quality control data for samples submitted on September 4, 2009.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

Case Narrative

Samples were collected on September 4, 2009, and received by the laboratory on September 4, 2009. They were maintained at the laboratory at a temperature of 2°C to 6°C except as noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

<u>NWTPH Gx/BTEX and Halogenated Volatiles EPA 8260B Analysis</u>

Per EPA Method 5035A, samples were received by the laboratory in pre-weighed 40 mL VOA vials within 48 hours of sample collection. They were stored in a freezer at between -7°C and -20°C until extraction or analysis.

Any other QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

NWTPH-Gx/BTEX

Date Extracted: 9-9-09
Date Analyzed: 9-9-09

Matrix: Soil
Units: mg/kg (ppm)

Client ID:	**BLBH-23-3**			**BLBH-23-15**		
Lab ID:	09-055-01			09-055-02		
	Result	Flags	PQL	**Result**	Flags	PQL
Benzene	**ND**		0.020	**ND**		0.020
Toluene	**ND**		0.029	**ND**		0.032
Ethyl Benzene	**ND**		0.029	**ND**		0.032
m,p-Xylene	**ND**		0.029	**ND**		0.032
o-Xylene	**ND**		0.029	**ND**		0.032
TPH-Gas	**ND**		1.5	**ND**		1.6
Surrogate Recovery:						
Fluorobenzene	97%			106%		

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

NWTPH-Gx/BTEX

Date Extracted: 9-9-09
Date Analyzed: 9-9-09

Matrix: Soil
Units: mg/kg (ppm)

Client ID:	**BLMW-6-2.5**			**BLMW-6-7.5**		
Lab ID:	09-055-06			09-055-07		
	Result	Flags	PQL	**Result**	Flags	PQL
Benzene	**ND**		0.020	**ND**		0.020
Toluene	**ND**		0.037	**ND**		0.044
Ethyl Benzene	**ND**		0.037	**ND**		0.044
m,p-Xylene	**ND**		0.037	**ND**		0.044
o-Xylene	**ND**		0.037	**ND**		0.044
TPH-Gas	**ND**		1.8	**ND**		2.2
Surrogate Recovery:						
Fluorobenzene	108%			97%		

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

NWTPH-Gx/BTEX
METHOD BLANK QUALITY CONTROL

Date Extracted: 9-9-09
Date Analyzed: 9-9-09

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: MB0909S1

	Result	Flags	PQL
Benzene	**ND**		0.020
Toluene	**ND**		0.050
Ethyl Benzene	**ND**		0.050
m,p-Xylene	**ND**		0.050
o-Xylene	**ND**		0.050
TPH-Gas	**ND**		5.0
Surrogate Recovery:			
Fluorobenzene	91%		

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

NWTPH-Gx/BTEX
DUPLICATE QUALITY CONTROL

Date Extracted: 9-9-09
Date Analyzed: 9-9-09

Matrix: Soil
Units: mg/kg (ppm)

Lab ID:	09-055-02 **Original**	09-055-02 **Duplicate**	**RPD**	**Flags**
Benzene	**ND**	**ND**	NA	
Toluene	**ND**	**ND**	NA	
Ethyl Benzene	**ND**	**ND**	NA	
m,p-Xylene	**ND**	**ND**	NA	
o-Xylene	**ND**	**ND**	NA	
TPH-Gas	**ND**	**ND**	NA	
Surrogate Recovery:				
Fluorobenzene	106%	106%		

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

NWTPH-Gx/BTEX
SB/SBD QUALITY CONTROL

Date Extracted: 9-9-09
Date Analyzed: 9-9-09

Matrix: Soil
Units: mg/kg (ppm)

Spike Level: 1.00 ppm

Lab ID:	SB0909S1 **SB**	Percent Recovery	SBD0909S1 **SBD**	Percent Recovery	**RPD**	**Flags**
Benzene	**0.923**	**92**	**0.932**	**93**	1	
Toluene	**0.943**	**94**	**0.944**	**94**	0	
Ethyl Benzene	**0.971**	**97**	**0.971**	**97**	0	
m,p-Xylene	**0.984**	**98**	**0.979**	**98**	0	
o-Xylene	**0.989**	**99**	**0.983**	**98**	1	

Surrogate Recovery:		
Fluorobenzene	93%	91%

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

NWTPH-Gx/BTEX

Date Extracted: 9-8-09
Date Analyzed: 9-8-09

Matrix: Water
Units: ug/L (ppb)

Client ID:	**BLBH-23-19**			**BLMW-8-25**		
Lab ID:	09-055-03			09-055-04		
	Result	Flags	PQL	**Result**	Flags	PQL
Benzene	**ND**		1.0	**ND**		1.0
Toluene	**ND**		1.0	**ND**		1.0
Ethyl Benzene	**ND**		1.0	**ND**		1.0
m,p-Xylene	**ND**		1.0	**ND**		1.0
o-Xylene	**ND**		1.0	**ND**		1.0
TPH-Gas	**ND**		100	**ND**		100
Surrogate Recovery:						
Fluorobenzene	88%			88%		

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

NWTPH-Gx/BTEX

Date Extracted: 9-8-09
Date Analyzed: 9-8-09

Matrix: Water
Units: ug/L (ppb)

Client ID: **BLBH-24-12**
Lab ID: 09-055-05

	Result	Flags	PQL
Benzene	**ND**		1.0
Toluene	**ND**		1.0
Ethyl Benzene	**ND**		1.0
m,p-Xylene	**ND**		1.0
o-Xylene	**ND**		1.0
TPH-Gas	**ND**		100

Surrogate Recovery:
Fluorobenzene 85%

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

NWTPH-Gx/BTEX
METHOD BLANK QUALITY CONTROL

Date Extracted: 9-8-09
Date Analyzed: 9-8-09

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0908W1

	Result	Flags	PQL
Benzene	**ND**		1.0
Toluene	**ND**		1.0
Ethyl Benzene	**ND**		1.0
m,p-Xylene	**ND**		1.0
o-Xylene	**ND**		1.0
TPH-Gas	**ND**		100

Surrogate Recovery:
Fluorobenzene 88%

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

NWTPH-Gx/BTEX
DUPLICATE QUALITY CONTROL

Date Extracted: 9-8-09
Date Analyzed: 9-8-09

Matrix: Water
Units: ug/L (ppb)

Lab ID:	09-056-01 **Original**	09-056-01 **Duplicate**	**RPD**	**Flags**
Benzene	**ND**	**ND**	NA	
Toluene	**ND**	**ND**	NA	
Ethyl Benzene	**ND**	**ND**	NA	
m,p-Xylene	**ND**	**ND**	NA	
o-Xylene	**ND**	**ND**	NA	
TPH-Gas	**ND**	**ND**	NA	
Surrogate Recovery:				
Fluorobenzene	85%	85%		

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

NWTPH-Gx/BTEX
SB/SBD QUALITY CONTROL

Date Extracted: 9-8-09
Date Analyzed: 9-8-09

Matrix: Water
Units: ug/L (ppb)

Spike Level: 50.0 ppb

Lab ID:	SB0908W1 **SB**	Percent Recovery	SBD0908W1 **SBD**	Percent Recovery	**RPD**	**Flags**
Benzene	**48.9**	**98**	**48.7**	**97**	0	
Toluene	**47.4**	**95**	**47.0**	**94**	1	
Ethyl Benzene	**46.5**	**93**	**46.3**	**93**	1	
m,p-Xylene	**46.8**	**94**	**46.3**	**93**	1	
o-Xylene	**47.3**	**95**	**47.0**	**94**	1	

Surrogate Recovery:		
Fluorobenzene	90%	89%

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

NWTPH-Dx

Date Extracted: 9-8-09
Date Analyzed: 9-8-09

Matrix: Soil
Units: mg/kg (ppm)

Client ID:	**BLBH-23-3**	**BLBH-23-15**	**BLMW-6-2.5**
Lab ID:	09-055-01	09-055-02	09-055-06
Diesel Range:	**ND**	**ND**	**ND**
PQL:	130	29	30
Identification:	---	---	---
Lube Oil Range:	**1700**	**140**	**120**
PQL:	260	57	60
Identification:	Lube Oil	Lube Oil	Lube Oil
Surrogate Recovery			
o-Terphenyl:	122%	77%	114%
Flags:	Y	Y	Y

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

NWTPH-Dx

Date Extracted:	9-8-09
Date Analyzed:	9-8-09
Matrix:	Soil
Units:	mg/kg (ppm)

Client ID:	**BLMW-6-7.5**
Lab ID:	09-055-07
Diesel Range:	**ND**
PQL:	31
Identification:	---
Lube Oil Range:	**ND**
PQL:	62
Identification:	---
Surrogate Recovery	
o-Terphenyl:	94%
Flags:	Y

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

NWTPH-Dx
METHOD BLANK QUALITY CONTROL

Date Extracted: 9-8-09
Date Analyzed: 9-8-09

Matrix: Soil
Units: mg/kg (ppm)

Lab ID:	MB0908S1
Diesel Range:	**ND**
PQL:	25
Identification:	---
Lube Oil Range:	**ND**
PQL:	50
Identification:	---
Surrogate Recovery	
o-Terphenyl:	86%
Flags:	Y

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

NWTPH-Dx
DUPLICATE QUALITY CONTROL

Date Extracted: 9-8-09
Date Analyzed: 9-8-09

Matrix: Soil
Units: mg/kg (ppm)

Lab ID:	09-044-07	09-044-07 DUP
Diesel Range:	**ND**	**ND**
PQL:	25	25
RPD:	N/A	
Surrogate Recovery		
o-Terphenyl:	119%	100%
Flags:	Y	Y

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

NWTPH-Dx

Date Extracted: 9-8-09
Date Analyzed: 9-9-09

Matrix: Water
Units: mg/L (ppm)

Client ID:	**BLBH-23-19**	**BLMW-8-25**	**BLBH-24-12**
Lab ID:	09-055-03	09-055-04	09-055-05
Diesel Range:	**ND**	**ND**	**ND**
PQL:	0.32	0.30	0.32
Identification:	---	---	---
Lube Oil Range:	**ND**	**ND**	**ND**
PQL:	0.51	0.47	0.51
Identification:	---	---	---
Surrogate Recovery			
o-Terphenyl:	107%	87%	92%
Flags:	Y	Y	Y

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

NWTPH-Dx
METHOD BLANK QUALITY CONTROL

Date Extracted: 9-8-09
Date Analyzed: 9-9-09

Matrix: Water
Units: mg/L (ppm)

Lab ID:	MB0908W1
Diesel Range:	**ND**
PQL:	0.25
Identification:	---
Lube Oil Range:	**ND**
PQL:	0.40
Identification:	---
Surrogate Recovery	
o-Terphenyl:	73%
Flags:	Y

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

NWTPH-Dx
DUPLICATE QUALITY CONTROL

Date Extracted: 9-8-09
Date Analyzed: 9-9-09

Matrix: Water
Units: mg/L (ppm)

Lab ID:	09-058-02	09-058-02 DUP
Diesel Range:	**ND**	**ND**
PQL:	0.26	0.26
RPD:	N/A	
Surrogate Recovery		
o-Terphenyl:	77%	88%
Flags:	Y	Y

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
Page 1 of 2

Date Extracted:	9-8-09
Date Analyzed:	9-8-09
Matrix:	Soil
Units:	mg/kg (ppm)
Lab ID:	09-055-06
Client ID:	**BLMW-6-2.5**

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.00053
Chloromethane	ND		0.0026
Vinyl Chloride	ND		0.00053
Bromomethane	ND		0.00053
Chloroethane	ND		0.0026
Trichlorofluoromethane	ND		0.00053
1,1-Dichloroethene	ND		0.00053
Iodomethane	ND		0.0026
Methylene Chloride	ND		0.0026
(trans) 1,2-Dichloroethene	ND		0.00053
1,1-Dichloroethane	ND		0.00053
2,2-Dichloropropane	ND		0.00053
(cis) 1,2-Dichloroethene	ND		0.00053
Bromochloromethane	ND		0.00053
Chloroform	ND		0.00053
1,1,1-Trichloroethane	ND		0.00053
Carbon Tetrachloride	ND		0.00053
1,1-Dichloropropene	ND		0.00053
1,2-Dichloroethane	ND		0.00053
Trichloroethene	ND		0.00053
1,2-Dichloropropane	ND		0.00053
Dibromomethane	ND		0.00053
Bromodichloromethane	ND		0.00053
2-Chloroethyl Vinyl Ether	ND		0.0026
(cis) 1,3-Dichloropropene	ND		0.00053
(trans) 1,3-Dichloropropene	ND		0.00053

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
Page 2 of 2

Lab ID: 09-055-06
Client ID: BLMW-6-2.5

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.00053
Tetrachloroethene	ND		0.00053
1,3-Dichloropropane	ND		0.00053
Dibromochloromethane	ND		0.00053
1,2-Dibromoethane	ND		0.00053
Chlorobenzene	ND		0.00053
1,1,1,2-Tetrachloroethane	ND		0.00053
Bromoform	ND		0.00053
Bromobenzene	ND		0.00053
1,1,2,2-Tetrachloroethane	ND		0.00053
1,2,3-Trichloropropane	ND		0.00053
2-Chlorotoluene	ND		0.00053
4-Chlorotoluene	ND		0.00053
1,3-Dichlorobenzene	ND		0.00053
1,4-Dichlorobenzene	ND		0.00053
1,2-Dichlorobenzene	ND		0.00053
1,2-Dibromo-3-chloropropane	ND		0.0026
1,2,4-Trichlorobenzene	ND		0.00053
Hexachlorobutadiene	ND		0.0026
1,2,3-Trichlorobenzene	ND		0.00053

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	97	55-125
Toluene-d8	95	56-127
4-Bromofluorobenzene	80	54-130

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
Page 1 of 2

Date Extracted:	9-8-09
Date Analyzed:	9-8-09
Matrix:	Soil
Units:	mg/kg (ppm)
Lab ID:	09-055-07
Client ID:	**BLMW-6-7.5**

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.00060
Chloromethane	ND		0.0030
Vinyl Chloride	ND		0.00060
Bromomethane	ND		0.00060
Chloroethane	ND		0.0030
Trichlorofluoromethane	ND		0.00060
1,1-Dichloroethene	ND		0.00060
Iodomethane	ND		0.0030
Methylene Chloride	ND		0.0030
(trans) 1,2-Dichloroethene	ND		0.00060
1,1-Dichloroethane	ND		0.00060
2,2-Dichloropropane	ND		0.00060
(cis) 1,2-Dichloroethene	ND		0.00060
Bromochloromethane	ND		0.00060
Chloroform	ND		0.00060
1,1,1-Trichloroethane	ND		0.00060
Carbon Tetrachloride	ND		0.00060
1,1-Dichloropropene	ND		0.00060
1,2-Dichloroethane	ND		0.00060
Trichloroethene	ND		0.00060
1,2-Dichloropropane	ND		0.00060
Dibromomethane	ND		0.00060
Bromodichloromethane	ND		0.00060
2-Chloroethyl Vinyl Ether	ND		0.0030
(cis) 1,3-Dichloropropene	ND		0.00060
(trans) 1,3-Dichloropropene	ND		0.00060

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B

Lab ID: 09-055-07
Client ID: BLMW-6-7.5

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.00060
Tetrachloroethene	ND		0.00060
1,3-Dichloropropane	ND		0.00060
Dibromochloromethane	ND		0.00060
1,2-Dibromoethane	ND		0.00060
Chlorobenzene	ND		0.00060
1,1,1,2-Tetrachloroethane	ND		0.00060
Bromoform	ND		0.00060
Bromobenzene	ND		0.00060
1,1,2,2-Tetrachloroethane	ND		0.00060
1,2,3-Trichloropropane	ND		0.00060
2-Chlorotoluene	ND		0.00060
4-Chlorotoluene	ND		0.00060
1,3-Dichlorobenzene	ND		0.00060
1,4-Dichlorobenzene	ND		0.00060
1,2-Dichlorobenzene	ND		0.00060
1,2-Dibromo-3-chloropropane	ND		0.0030
1,2,4-Trichlorobenzene	ND		0.00060
Hexachlorobutadiene	ND		0.0030
1,2,3-Trichlorobenzene	ND		0.00060

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	98	55-125
Toluene-d8	98	56-127
4-Bromofluorobenzene	84	54-130

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
METHOD BLANK QUALITY CONTROL
Page 1 of 2

Date Extracted: 9-8-09
Date Analyzed: 9-8-09

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: MB0908S1

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.0010
Chloromethane	ND		0.0050
Vinyl Chloride	ND		0.0010
Bromomethane	ND		0.0010
Chloroethane	ND		0.0050
Trichlorofluoromethane	ND		0.0010
1,1-Dichloroethene	ND		0.0010
Iodomethane	ND		0.0050
Methylene Chloride	ND		0.0050
(trans) 1,2-Dichloroethene	ND		0.0010
1,1-Dichloroethane	ND		0.0010
2,2-Dichloropropane	ND		0.0010
(cis) 1,2-Dichloroethene	ND		0.0010
Bromochloromethane	ND		0.0010
Chloroform	ND		0.0010
1,1,1-Trichloroethane	ND		0.0010
Carbon Tetrachloride	ND		0.0010
1,1-Dichloropropene	ND		0.0010
1,2-Dichloroethane	ND		0.0010
Trichloroethene	ND		0.0010
1,2-Dichloropropane	ND		0.0010
Dibromomethane	ND		0.0010
Bromodichloromethane	ND		0.0010
2-Chloroethyl Vinyl Ether	ND		0.0050
(cis) 1,3-Dichloropropene	ND		0.0010
(trans) 1,3-Dichloropropene	ND		0.0010

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
METHOD BLANK QUALITY CONTROL
Page 2 of 2

Lab ID: MB0908S1

Compound	**Results**	**Flags**	**PQL**
1,1,2-Trichloroethane	ND		0.0010
Tetrachloroethene	ND		0.0010
1,3-Dichloropropane	ND		0.0010
Dibromochloromethane	ND		0.0010
1,2-Dibromoethane	ND		0.0010
Chlorobenzene	ND		0.0010
1,1,1,2-Tetrachloroethane	ND		0.0010
Bromoform	ND		0.0010
Bromobenzene	ND		0.0010
1,1,2,2-Tetrachloroethane	ND		0.0010
1,2,3-Trichloropropane	ND		0.0010
2-Chlorotoluene	ND		0.0010
4-Chlorotoluene	ND		0.0010
1,3-Dichlorobenzene	ND		0.0010
1,4-Dichlorobenzene	ND		0.0010
1,2-Dichlorobenzene	ND		0.0010
1,2-Dibromo-3-chloropropane	ND		0.0050
1,2,4-Trichlorobenzene	ND		0.0010
Hexachlorobutadiene	ND		0.0050
1,2,3-Trichlorobenzene	ND		0.0010

Surrogate	**Percent Recovery**	**Control Limits**
Dibromofluoromethane	102	55-125
Toluene-d8	93	56-127
4-Bromofluorobenzene	91	54-130

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
SB/SBD QUALITY CONTROL

Date Extracted: 9-8-09
Date Analyzed: 9-8-09

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: SB0908S1

Compound	Spike Amount	SB	Percent Recovery	SBD	Percent Recovery	Recovery Limits	Flags
1,1-Dichloroethene	0.0500	0.0425	85	0.0420	84	70-130	
Benzene	0.0500	0.0443	89	0.0422	84	70-128	
Trichloroethene	0.0500	0.0421	84	0.0408	82	70-124	
Toluene	0.0500	0.0416	83	0.0429	86	73-123	
Chlorobenzene	0.0500	0.0418	84	0.0415	83	73-115	

	RPD	RPD Limit	Flags
1,1-Dichloroethene	1	16	
Benzene	5	15	
Trichloroethene	3	14	
Toluene	3	14	
Chlorobenzene	1	13	

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
Page 1 of 2

Date Extracted:	9-8-09
Date Analyzed:	9-8-09
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	09-055-03
Client ID:	**BLBH-23-19**

Compound	**Results**	**Flags**	**PQL**
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		1.0
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		1.0
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B

Lab ID: 09-055-03
Client ID: BLBH-23-19

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	ND		0.20
1,3-Dichloropropane	ND		0.20
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	86	71-126
Toluene-d8	94	76-116
4-Bromofluorobenzene	90	70-123

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
Page 1 of 2

Date Extracted: 9-8-09
Date Analyzed: 9-8-09

Matrix: Water
Units: ug/L (ppb)

Lab ID: 09-055-04
Client ID: BLMW-8-25

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		1.0
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		1.0
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	0.61		0.20
Bromochloromethane	ND		0.20
Chloroform	0.37		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	0.82		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B

Lab ID: 09-055-04
Client ID: BLMW-8-25

Compound	**Results**	**Flags**	**PQL**
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	ND		0.20
1,3-Dichloropropane	ND		0.20
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	**Percent Recovery**	**Control Limits**
Dibromofluoromethane	89	71-126
Toluene-d8	93	76-116
4-Bromofluorobenzene	90	70-123

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
Page 1 of 2

Date Extracted: 9-8-09
Date Analyzed: 9-8-09

Matrix: Water
Units: ug/L (ppb)

Lab ID: 09-055-05
Client ID: BLBH-24-12

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		1.0
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		1.0
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
Page 2 of 2

Lab ID: 09-055-05
Client ID: BLBH-24-12

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	ND		0.20
1,3-Dichloropropane	ND		0.20
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	81	71-126
Toluene-d8	87	76-116
4-Bromofluorobenzene	86	70-123

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
METHOD BLANK QUALITY CONTROL
Page 1 of 2

Date Extracted: 9-8-09
Date Analyzed: 9-8-09

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0908W1

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		1.0
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		1.0
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
METHOD BLANK QUALITY CONTROL
Page 2 of 2

Lab ID: MB0908W1

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	ND		0.20
1,3-Dichloropropane	ND		0.20
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	85	71-126
Toluene-d8	91	76-116
4-Bromofluorobenzene	91	70-123

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
SB/SBD QUALITY CONTROL

Date Extracted: 9-8-09
Date Analyzed: 9-8-09

Matrix: Water
Units: ug/L (ppb)

Lab ID: SB0908W1

Compound	Spike Amount	SB	Percent Recovery	SBD	Percent Recovery	Recovery Limits	Flags
1,1-Dichloroethene	10.0	9.56	96	9.77	98	70-130	
Benzene	10.0	9.69	97	9.91	99	70-130	
Trichloroethene	10.0	9.92	99	9.95	100	70-123	
Toluene	10.0	9.93	99	10.0	100	77-120	
Chlorobenzene	10.0	10.2	102	10.0	100	73-115	

	RPD	RPD Limit	Flags
1,1-Dichloroethene	2	21	
Benzene	2	18	
Trichloroethene	0	18	
Toluene	1	17	
Chlorobenzene	2	18	

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

NAPHTHALENES by EPA 8270D/SIM

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**BLBH-23-3**					
Laboratory ID:	09-055-01					
Naphthalene	**ND**	0.0069	EPA 8270/SIM	9-8-09	9-10-09	
2-Methylnaphthalene	**ND**	0.0069	EPA 8270/SIM	9-8-09	9-10-09	
1-Methylnaphthalene	**ND**	0.0069	EPA 8270/SIM	9-8-09	9-10-09	
Surrogate:	***Percent Recovery***	***Control Limits***				
2-Fluorobiphenyl	***75***	***39 - 103***				
Pyrene-d10	***102***	***39 - 115***				
Terphenyl-d14	***97***	***50 - 118***				

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

NAPHTHALENES by EPA 8270D/SIM

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**BLBH-23-15**					
Laboratory ID:	09-055-02					
Naphthalene	**ND**	0.0077	EPA 8270/SIM	9-8-09	9-10-09	
2-Methylnaphthalene	**ND**	0.0077	EPA 8270/SIM	9-8-09	9-10-09	
1-Methylnaphthalene	**ND**	0.0077	EPA 8270/SIM	9-8-09	9-10-09	
Surrogate:	***Percent Recovery***	***Control Limits***				
2-Fluorobiphenyl	***78***	***39 - 103***				
Pyrene-d10	***96***	***39 - 115***				
Terphenyl-d14	***94***	***50 - 118***				

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

NAPHTHALENES by EPA 8270D/SIM

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**BLMW-6-2.5**					
Laboratory ID:	09-055-06					
Naphthalene	**0.0079**	0.0079	EPA 8270/SIM	9-8-09	9-10-09	
2-Methylnaphthalene	**ND**	0.0079	EPA 8270/SIM	9-8-09	9-10-09	
1-Methylnaphthalene	**ND**	0.0079	EPA 8270/SIM	9-8-09	9-10-09	
Surrogate:	***Percent Recovery***	***Control Limits***				
2-Fluorobiphenyl	***82***	***39 - 103***				
Pyrene-d10	***94***	***39 - 115***				
Terphenyl-d14	***95***	***50 - 118***				

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

NAPHTHALENES by EPA 8270D/SIM

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**BLMW-6-7.5**					
Laboratory ID:	09-055-07					
Naphthalene	**ND**	0.0082	EPA 8270/SIM	9-8-09	9-10-09	
2-Methylnaphthalene	**ND**	0.0082	EPA 8270/SIM	9-8-09	9-10-09	
1-Methylnaphthalene	**ND**	0.0082	EPA 8270/SIM	9-8-09	9-10-09	
Surrogate:	***Percent Recovery***	***Control Limits***				
2-Fluorobiphenyl	***69***	***39 - 103***				
Pyrene-d10	***77***	***39 - 115***				
Terphenyl-d14	***78***	***50 - 118***				

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

NAPHTHALENES by EPA 8270D/SIM
METHOD BLANK QUALITY CONTROL

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB0908S1					
Naphthalene	**ND**	0.0067	EPA 8270/SIM	9-8-09	9-10-09	
2-Methylnaphthalene	**ND**	0.0067	EPA 8270/SIM	9-8-09	9-10-09	
1-Methylnaphthalene	**ND**	0.0067	EPA 8270/SIM	9-8-09	9-10-09	
Surrogate:	***Percent Recovery***	***Control Limits***				
2-Fluorobiphenyl	***71***	***39 - 103***				
Pyrene-d10	***95***	***39 - 115***				
Terphenyl-d14	***95***	***50 - 118***				

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

NAPHTHALENES by EPA 8270D/SIM
MS/MSD QUALITY CONTROL

Matrix: Soil
Units: mg/Kg

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
MATRIX SPIKES											
Laboratory ID:	09-044-11										
	MS	MSD	MS	MSD		MS	MSD				
Naphthalene	**0.0626**	**0.0635**	0.0833	0.0833	ND	75	76	29 - 104	1	27	
Acenaphthylene	**0.0825**	**0.0823**	0.0833	0.0833	ND	99	99	44 - 111	0	20	
Acenaphthene	**0.0666**	**0.0666**	0.0833	0.0833	ND	80	80	45 - 108	0	19	
Fluorene	**0.0718**	**0.0718**	0.0833	0.0833	ND	86	86	49 - 113	0	16	
Phenanthrene	**0.0673**	**0.0688**	0.0833	0.0833	ND	81	83	43 - 124	2	36	
Anthracene	**0.0835**	**0.0858**	0.0833	0.0833	ND	100	103	51 - 115	3	17	
Fluoranthene	**0.0837**	**0.0855**	0.0833	0.0833	ND	100	103	42 - 140	2	27	
Pyrene	**0.0775**	**0.0794**	0.0833	0.0833	ND	93	95	40 - 140	2	30	
Benzo[a]anthracene	**0.0867**	**0.0896**	0.0833	0.0833	ND	104	108	33 - 134	3	21	
Chrysene	**0.0693**	**0.0712**	0.0833	0.0833	ND	83	85	32 - 141	3	21	
Benzo[b]fluoranthene	**0.0892**	**0.0905**	0.0833	0.0833	ND	107	109	35 - 139	1	32	
Benzo[k]fluoranthene	**0.0765**	**0.0793**	0.0833	0.0833	ND	92	95	44 - 124	4	23	
Benzo[a]pyrene	**0.0811**	**0.0834**	0.0833	0.0833	ND	97	100	34 - 130	3	28	
Indeno(1,2,3-c,d)pyrene	**0.0862**	**0.0869**	0.0833	0.0833	ND	103	104	50 - 127	1	20	
Dibenz[a,h]anthracene	**0.0967**	**0.0972**	0.0833	0.0833	ND	116	117	58 - 122	1	15	
Benzo[g,h,i]perylene	**0.0917**	**0.0921**	0.0833	0.0833	ND	110	111	47 - 126	0	21	
Surrogate:											
2-Fluorobiphenyl						***77***	***75***	***39 - 103***			
Pyrene-d10						***97***	***97***	***39 - 115***			
Terphenyl-d14						***94***	***95***	***50 - 118***			

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

TOTAL ARSENIC
EPA 200.8

Date Extracted: 9-8-09
Date Analyzed: 9-8-09

Matrix: Water
Units: ug/L (ppb)

Client ID	Lab ID	Result	PQL
BLBH-23-19	09-055-03	**ND**	3.3
BLMW-8-25	09-055-04	**ND**	3.3

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

TOTAL ARSENIC
EPA 200.8
METHOD BLANK QUALITY CONTROL

Date Extracted: 9-8-09
Date Analyzed: 9-8-09

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0908W1

Analyte	Method	Result	PQL
Arsenic	200.8	**ND**	3.3

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

TOTAL ARSENIC
EPA 200.8
DUPLICATE QUALITY CONTROL

Date Extracted: 9-8-09
Date Analyzed: 9-8-09

Matrix: Water
Units: ug/L (ppb)

Lab ID: 09-024-01

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Arsenic	**229**	**226**	1	3.3	

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

TOTAL ARSENIC
EPA 200.8
MS/MSD QUALITY CONTROL

Date Extracted: 9-8-09
Date Analyzed: 9-8-09

Matrix: Water
Units: ug/L (ppb)

Lab ID: 09-024-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Arsenic	110	**350**	110	**360**	120	3	

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

TOTAL METALS
EPA 6010B/7471A

Date Extracted: 9-9&11-09
Date Analyzed: 9-9&11-09

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 09-055-06
Client ID: **BLMW-6-2.5**

Analyte	Method	Result	PQL
Arsenic	6010B	**ND**	6.0
Cadmium	6010B	**ND**	0.60
Chromium	6010B	**31**	0.60
Lead	6010B	**ND**	6.0
Mercury	7471A	**0.026**	0.024

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

TOTAL METALS
EPA 6010B/7471A

Date Extracted: 9-9&11-09
Date Analyzed: 9-9&11-09

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 09-055-07
Client ID: **BLMW-6-7.5**

Analyte	Method	Result	PQL
Arsenic	6010B	**ND**	6.2
Cadmium	6010B	**ND**	0.62
Chromium	6010B	**45**	0.62
Lead	6010B	**ND**	6.2
Mercury	7471A	**ND**	0.025

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

TOTAL METALS
EPA 6010B
METHOD BLANK QUALITY CONTROL

Date Extracted: 9-11-09
Date Analyzed: 9-11-09

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: MB0911S1

Analyte	Method	Result	PQL
Arsenic	6010B	**ND**	5.0
Cadmium	6010B	**ND**	0.50
Chromium	6010B	**ND**	0.50
Lead	6010B	**ND**	5.0

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

TOTAL METALS
EPA 7471A
METHOD BLANK QUALITY CONTROL

Date Extracted: 9-9-09
Date Analyzed: 9-9-09

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: MB0909S1

Analyte	Method	Result	PQL
Mercury	7471A	**ND**	0.020

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

TOTAL METALS
EPA 6010B
DUPLICATE QUALITY CONTROL

Date Extracted: 9-11-09
Date Analyzed: 9-11-09

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 09-057-07

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Arsenic	**ND**	**ND**	NA	5.0	
Cadmium	**1.03**	**0.917**	12	0.50	
Chromium	**39.5**	**35.6**	11	0.50	
Lead	**72.1**	**72.9**	1	5.0	

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

TOTAL METALS
EPA 7471A
DUPLICATE QUALITY CONTROL

Date Extracted: 9-9-09
Date Analyzed: 9-9-09

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 09-060-01

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Mercury	**ND**	**0.0464**	NA	0.020	

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

TOTAL METALS
EPA 6010B
MS/MSD QUALITY CONTROL

Date Extracted: 9-11-09
Date Analyzed: 9-11-09

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 09-057-07

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Arsenic	100	**95.7**	96	**94.8**	95	1	
Cadmium	50	**47.9**	94	**49.6**	97	4	
Chromium	100	**150**	111	**143**	103	5	
Lead	250	**287**	86	**302**	92	5	

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

TOTAL METALS
EPA 7471A
MS/MSD QUALITY CONTROL

Date Extracted: 9-9-09
Date Analyzed: 9-9-09

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 09-060-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Mercury	0.50	**0.509**	102	**0.533**	107	5	

Date of Report: September 15, 2009
Samples Submitted: September 4, 2009
Laboratory Reference: 0909-055
Project: 555-1647-019 02/0203 / Landing

% MOISTURE

Date Analyzed: 9-8-09

Client ID	Lab ID	% Moisture
BLBH-23-3	09-055-01	3
BLBH-23-15	09-055-02	13
BLMW-6-2.5	09-055-06	16
BLMW-6-7.5	09-055-07	19

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in the diesel range are impacting the lube oil range result.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical ____________.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

Y - Sample extract treated with an acid/silica gel cleanup procedure.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

OnSite Environmental Inc.

Phone: (425) 883-3881 • Fax: (425) 885-4603

Chain of Custody

Company: Parametrix

Project Number: 555-1647-019 02/0203

Project Name: Bothell Crossing Landing

Project Manager: David Dinkhun

Sampled by: L. Vagelatos

Turnaround Request (in working days)

(Check One)

- ☐ Same Day
- ☐ 1 Day
- ☐ 2 Day
- ☐ 3 Day
- ☒ Standard (7 working days) (TPH analysis 5 working days)
- ☐ ______ (other)

Laboratory Number: 09-055

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270D	PAHs by 8270D / SIM	PCBs by 8082	Pesticides by 8081A	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664	Naphthalenes 8270 SIM	Arsenic	MTCA Metals: As, Cd, Cr, Hg, Pb				% Moisture
1	BLBH-23-3	9/4/09	0841	Soil	3		X	X											X						X
2	BLBH-23-15	9/4/09	0845	Soil	3		X	X											X						↓
3	BLBH-23-19	9/4/09	0900	H_2O	8		X	X		X										X					
4	BLMW-8-25	9/4/09	1145	H_2O	8		X	X		X										X					
5	BLBH-24-12	9/4/09	1300	H_2O	~~8~~ 7		X	X		X															
6	BLMW-6-2.5	9/4/09	1125	Soil	5		X	X		X									X		X				X
7	BLMW-6-7.5	9/4/09	1130	Soil	5		X	X		X									X		X				↓

	Signature	Company	Date	Time
Relinquished by	Lily Vagelatos	Parametrix	9/4/9	1645
Received by	[signature]	OSE	9/4/09	1645
Relinquished by				
Received by				
Relinquished by				
Received by				

Reviewed by/Date

Reviewed by/Date

Comments/Special Instructions:

Chromatograms with final report ☐

DISTRIBUTION LEGEND: White - OnSite Copy Yellow - Report Copy Pink - Client Copy

OnSite Environmental Inc.
14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

September 18, 2009

David Dinkuhn
Parametrix, Inc.
4660 Kitsap Way, Suite A
Bremerton, WA 98312

Re: Analytical Data for Project 555-1647-019 02/0203
Laboratory Reference No. 0909-067

Dear David:

Enclosed are the analytical results and associated quality control data for samples submitted on September 8, 2009.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: September 18, 2009
Samples Submitted: September 8, 2009
Laboratory Reference: 0909-067
Project: 555-1647-019 02/0203

Case Narrative

Samples were collected on September 8, 2009, and received by the laboratory on September 9, 2009. They were maintained at the laboratory at a temperature of $2^{o}C$ to $6^{o}C$ except as noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

NWTPH Gx/BTEX and Halogenated Volatiles EPA 8260B (soil) Analysis

Per EPA Method 5035A, samples were received by the laboratory in pre-weighed 40 mL VOA vials within 48 hours of sample collection. They were stored in a freezer at between $-7^{o}C$ and $-20^{o}C$ until extraction or analysis.

Any other QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.

Date of Report: September 18, 2009
Samples Submitted: September 8, 2009
Laboratory Reference: 0909-067
Project: 555-1647-019 02/0203

NWTPH-Dx

Date Extracted: 9-9-09
Date Analyzed: 9-9-09

Matrix: Soil
Units: mg/kg (ppm)

Client ID:	**HZMW-13-2.5**	**HZMW-13-5**	**HZMW-12-5**
Lab ID:	09-067-01	09-067-02	09-067-03
Diesel Range:	**ND**	**ND**	**130**
PQL:	45	28	31
Identification:	---	---	Diesel Fuel#1
Lube Oil Range:	**370**	**120**	**220**
PQL:	56	57	62
Identification:	Lube Oil	Lube Oil	Lube Oil
Surrogate Recovery			
o-Terphenyl:	87%	79%	77%
Flags:	Y,U1	Y	Y

Date of Report: September 18, 2009
Samples Submitted: September 8, 2009
Laboratory Reference: 0909-067
Project: 555-1647-019 02/0203

NWTPH-Dx
METHOD BLANK QUALITY CONTROL

Date Extracted:	9-9-09
Date Analyzed:	9-9-09
Matrix:	Soil
Units:	mg/kg (ppm)

Lab ID:	MB0909S1
Diesel Range:	**ND**
PQL:	25
Identification:	---
Lube Oil Range:	**ND**
PQL:	50
Identification:	---
Surrogate Recovery	
o-Terphenyl:	97%
Flags:	Y

Date of Report: September 18, 2009
Samples Submitted: September 8, 2009
Laboratory Reference: 0909-067
Project: 555-1647-019 02/0203

NWTPH-Dx
DUPLICATE QUALITY CONTROL

Date Extracted: 9-9-09
Date Analyzed: 9-9-09

Matrix: Soil
Units: mg/kg (ppm)

Lab ID:	09-052-01	09-052-01 DUP
Diesel Range:	**ND**	**ND**
PQL:	25	25
RPD:	N/A	
Surrogate Recovery		
o-Terphenyl:	80%	81%
Flags:	Y	Y

Date of Report: September 18, 2009
Samples Submitted: September 8, 2009
Laboratory Reference: 0909-067
Project: 555-1647-019 02/0203

NWTPH-Dx

Date Extracted:	9-9-09
Date Analyzed:	9-9-09
Matrix:	Water
Units:	mg/L (ppm)

Client ID:	**RB090809**
Lab ID:	09-067-04
Diesel Range:	**ND**
PQL:	0.26
Identification:	---
Lube Oil Range:	**ND**
PQL:	0.42
Identification:	---
Surrogate Recovery	
o-Terphenyl:	67%
Flags:	Y

Date of Report: September 18, 2009
Samples Submitted: September 8, 2009
Laboratory Reference: 0909-067
Project: 555-1647-019 02/0203

NWTPH-Dx
METHOD BLANK QUALITY CONTROL

Date Extracted:	9-9-09
Date Analyzed:	9-9-09
Matrix:	Water
Units:	mg/L (ppm)

Lab ID:	MB0909W1
Diesel Range:	**ND**
PQL:	0.25
Identification:	---
Lube Oil Range:	**ND**
PQL:	0.40
Identification:	---
Surrogate Recovery	
o-Terphenyl:	72%
Flags:	Y

Date of Report: September 18, 2009
Samples Submitted: September 8, 2009
Laboratory Reference: 0909-067
Project: 555-1647-019 02/0203

NWTPH-Dx
DUPLICATE QUALITY CONTROL

Date Extracted: 9-9-09
Date Analyzed: 9-9-09

Matrix: Water
Units: mg/L (ppm)

Lab ID:	09-067-04	09-067-04 DUP
Diesel Range:	**ND**	**ND**
PQL:	0.26	0.26
RPD:	N/A	
Surrogate Recovery		
o-Terphenyl:	67%	74%
Flags:	Y	Y

Date of Report: September 18, 2009
Samples Submitted: September 8, 2009
Laboratory Reference: 0909-067
Project: 555-1647-019 02/0203

NWTPH-Gx/BTEX

Date Extracted: 9-10-09
Date Analyzed: 9-11-09

Matrix: Soil
Units: mg/kg (ppm)

Client ID:	**HZMW-13-2.5**			**HZMW-13-5**		
Lab ID:	09-067-01			09-067-02		
	Result	Flags	PQL	**Result**	Flags	PQL
Benzene	**ND**		0.020	**ND**		0.020
Toluene	**ND**		0.030	**ND**		0.032
Ethyl Benzene	**ND**		0.030	**ND**		0.032
m,p-Xylene	**0.075**		0.030	**ND**		0.032
o-Xylene	**0.047**		0.030	**ND**		0.032
TPH-Gas	**8.8**	**Z**	1.5	**ND**		1.6
Surrogate Recovery:						
Fluorobenzene	93%			91%		

Date of Report: September 18, 2009
Samples Submitted: September 8, 2009
Laboratory Reference: 0909-067
Project: 555-1647-019 02/0203

NWTPH-Gx/BTEX

Date Extracted: 9-10-09
Date Analyzed: 9-11-09

Matrix: Soil
Units: mg/kg (ppm)

Client ID: **HZMW-12-5**
Lab ID: 09-067-03

	Result	Flags	PQL
Benzene	**ND**		0.020
Toluene	**ND**		0.039
Ethyl Benzene	**ND**		0.039
m,p-Xylene	**0.050**		0.039
o-Xylene	**0.059**		0.039
TPH-Gas	**ND**		1.9
Surrogate Recovery:			
Fluorobenzene	116%		

Date of Report: September 18, 2009
Samples Submitted: September 8, 2009
Laboratory Reference: 0909-067
Project: 555-1647-019 02/0203

NWTPH-Gx/BTEX
METHOD BLANK QUALITY CONTROL

Date Extracted: 9-10-09
Date Analyzed: 9-10-09

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: MB0910S1

	Result	Flags	PQL
Benzene	**ND**		0.020
Toluene	**ND**		0.050
Ethyl Benzene	**ND**		0.050
m,p-Xylene	**ND**		0.050
o-Xylene	**ND**		0.050
TPH-Gas	**ND**		5.0
Surrogate Recovery:			
Fluorobenzene	98%		

Date of Report: September 18, 2009
Samples Submitted: September 8, 2009
Laboratory Reference: 0909-067
Project: 555-1647-019 02/0203

NWTPH-Gx/BTEX
DUPLICATE QUALITY CONTROL

Date Extracted: 9-10-09
Date Analyzed: 9-11-09

Matrix: Soil
Units: mg/kg (ppm)

Lab ID:	09-067-01 **Original**	09-067-01 **Duplicate**	**RPD**	**Flags**
Benzene	**ND**	**ND**	NA	
Toluene	**ND**	**ND**	NA	
Ethyl Benzene	**ND**	**ND**	NA	
m,p-Xylene	**0.0668**	**0.0493**	30	
o-Xylene	**0.0415**	**0.0336**	21	
TPH-Gas	**7.84**	**7.89**	1	
Surrogate Recovery:				
Fluorobenzene	93%	97%		

Date of Report: September 18, 2009
Samples Submitted: September 8, 2009
Laboratory Reference: 0909-067
Project: 555-1647-019 02/0203

NWTPH-Gx/BTEX
SB/SBD QUALITY CONTROL

Date Extracted: 9-10-09
Date Analyzed: 9-10-09

Matrix: Soil
Units: mg/kg (ppm)

Spike Level: 1.00 ppm

Lab ID:	SB0910S1 **SB**	Percent Recovery	SBD0910S1 **SBD**	Percent Recovery	**RPD**	**Flags**
Benzene	**0.968**	**97**	**0.966**	**97**	0	
Toluene	**0.985**	**99**	**0.971**	**97**	1	
Ethyl Benzene	**1.01**	**101**	**0.993**	**99**	2	
m,p-Xylene	**1.02**	**102**	**1.00**	**100**	2	
o-Xylene	**1.02**	**102**	**1.01**	**101**	1	

Surrogate Recovery:		
Fluorobenzene	97%	94%

Date of Report: September 18, 2009
Samples Submitted: September 8, 2009
Laboratory Reference: 0909-067
Project: 555-1647-019 02/0203

NWTPH-Gx/BTEX

Date Extracted: 9-9-09
Date Analyzed: 9-9-09

Matrix: Water
Units: ug/L (ppb)

Client ID: **RB090809**
Lab ID: 09-067-04

	Result	Flags	PQL
Benzene	**ND**		1.0
Toluene	**ND**		1.0
Ethyl Benzene	**ND**		1.0
m,p-Xylene	**ND**		1.0
o-Xylene	**ND**		1.0
TPH-Gas	**ND**		100

Surrogate Recovery:
Fluorobenzene 86%

Date of Report: September 18, 2009
Samples Submitted: September 8, 2009
Laboratory Reference: 0909-067
Project: 555-1647-019 02/0203

NWTPH-Gx/BTEX
METHOD BLANK QUALITY CONTROL

Date Extracted: 9-9-09
Date Analyzed: 9-9-09

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0909W2

	Result	Flags	PQL
Benzene	**ND**		1.0
Toluene	**ND**		1.0
Ethyl Benzene	**ND**		1.0
m,p-Xylene	**ND**		1.0
o-Xylene	**ND**		1.0
TPH-Gas	**ND**		100

Surrogate Recovery:
Fluorobenzene 86%

Date of Report: September 18, 2009
Samples Submitted: September 8, 2009
Laboratory Reference: 0909-067
Project: 555-1647-019 02/0203

NWTPH-Gx/BTEX
DUPLICATE QUALITY CONTROL

Date Extracted: 9-9-09
Date Analyzed: 9-9-09

Matrix: Water
Units: ug/L (ppb)

Lab ID:	09-062-03 **Original**	09-062-03 **Duplicate**	**RPD**	**Flags**
Benzene	**ND**	**ND**	NA	
Toluene	**ND**	**ND**	NA	
Ethyl Benzene	**ND**	**ND**	NA	
m,p-Xylene	**ND**	**ND**	NA	
o-Xylene	**ND**	**ND**	NA	
TPH-Gas	**ND**	**ND**	NA	
Surrogate Recovery:				
Fluorobenzene	87%	87%		

Date of Report: September 18, 2009
Samples Submitted: September 8, 2009
Laboratory Reference: 0909-067
Project: 555-1647-019 02/0203

NWTPH-Gx/BTEX
SB/SBD QUALITY CONTROL

Date Extracted: 9-9-09
Date Analyzed: 9-9-09

Matrix: Water
Units: ug/L (ppb)

Spike Level: 50.0 ppb

Lab ID:	SB0909W1 **SB**	Percent Recovery	SBD0909W1 **SBD**	Percent Recovery	**RPD**	**Flags**
Benzene	**47.1**	**94**	**48.7**	**97**	3	
Toluene	**44.5**	**89**	**46.3**	**93**	4	
Ethyl Benzene	**43.5**	**87**	**45.0**	**90**	4	
m,p-Xylene	**43.4**	**87**	**45.0**	**90**	4	
o-Xylene	**44.6**	**89**	**46.2**	**93**	4	

Surrogate Recovery:		
Fluorobenzene	86%	87%

Date of Report: September 18, 2009
Samples Submitted: September 8, 2009
Laboratory Reference: 0909-067
Project: 555-1647-019 02/0203

HALOGENATED VOLATILES by EPA 8260B
page 1 of 2

Date Extracted: 9-9-09
Date Analyzed: 9-9-09

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 09-067-01
Client ID: HZMW-13-2.5

Compound	**Results**	**Flags**	**PQL**
Dichlorodifluoromethane	ND		0.00046
Chloromethane	ND		0.0023
Vinyl Chloride	ND		0.00046
Bromomethane	ND		0.00046
Chloroethane	ND		0.0023
Trichlorofluoromethane	ND		0.00046
1,1-Dichloroethene	ND		0.00046
Iodomethane	ND		0.0023
Methylene Chloride	ND		0.0023
(trans) 1,2-Dichloroethene	ND		0.00046
1,1-Dichloroethane	ND		0.00046
2,2-Dichloropropane	ND		0.00046
(cis) 1,2-Dichloroethene	ND		0.00046
Bromochloromethane	ND		0.00046
Chloroform	ND		0.00046
1,1,1-Trichloroethane	ND		0.00046
Carbon Tetrachloride	ND		0.00046
1,1-Dichloropropene	ND		0.00046
1,2-Dichloroethane	ND		0.00046
Trichloroethene	ND		0.00046
1,2-Dichloropropane	ND		0.00046
Dibromomethane	ND		0.00046
Bromodichloromethane	ND		0.00046
2-Chloroethyl Vinyl Ether	ND		0.0023
(cis) 1,3-Dichloropropene	ND		0.00046
(trans) 1,3-Dichloropropene	ND		0.00046

Date of Report: September 18, 2009
Samples Submitted: September 8, 2009
Laboratory Reference: 0909-067
Project: 555-1647-019 02/0203

HALOGENATED VOLATILES by EPA 8260B
page 2 of 2

Lab ID: 09-067-01
Client ID: HZMW-13-2.5

Compound	**Results**	**Flags**	**PQL**
1,1,2-Trichloroethane	ND		0.00046
Tetrachloroethene	ND		0.00046
1,3-Dichloropropane	ND		0.00046
Dibromochloromethane	ND		0.00046
1,2-Dibromoethane	ND		0.00046
Chlorobenzene	ND		0.00046
1,1,1,2-Tetrachloroethane	ND		0.00046
Bromoform	ND		0.00046
Bromobenzene	ND		0.00046
1,1,2,2-Tetrachloroethane	ND		0.00046
1,2,3-Trichloropropane	ND		0.00046
2-Chlorotoluene	ND		0.00046
4-Chlorotoluene	ND		0.00046
1,3-Dichlorobenzene	ND		0.00046
1,4-Dichlorobenzene	ND		0.00046
1,2-Dichlorobenzene	ND		0.00046
1,2-Dibromo-3-chloropropane	ND		0.0023
1,2,4-Trichlorobenzene	ND		0.00046
Hexachlorobutadiene	ND		0.0023
1,2,3-Trichlorobenzene	ND		0.00046

Surrogate	**Percent Recovery**	**Control Limits**
Dibromofluoromethane	102	55-125
Toluene-d8	96	56-127
4-Bromofluorobenzene	88	54-130

Date of Report: September 18, 2009
Samples Submitted: September 8, 2009
Laboratory Reference: 0909-067
Project: 555-1647-019 02/0203

HALOGENATED VOLATILES by EPA 8260B
page 1 of 2

Date Extracted: 9-9-09
Date Analyzed: 9-9-09

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 09-067-02
Client ID: **HZMW-13-5**

Compound	**Results**	**Flags**	**PQL**
Dichlorodifluoromethane	ND		0.00062
Chloromethane	ND		0.0031
Vinyl Chloride	ND		0.00062
Bromomethane	ND		0.00062
Chloroethane	ND		0.0031
Trichlorofluoromethane	ND		0.00062
1,1-Dichloroethene	ND		0.00062
Iodomethane	ND		0.0031
Methylene Chloride	ND		0.0031
(trans) 1,2-Dichloroethene	ND		0.00062
1,1-Dichloroethane	ND		0.00062
2,2-Dichloropropane	ND		0.00062
(cis) 1,2-Dichloroethene	ND		0.00062
Bromochloromethane	ND		0.00062
Chloroform	ND		0.00062
1,1,1-Trichloroethane	ND		0.00062
Carbon Tetrachloride	ND		0.00062
1,1-Dichloropropene	ND		0.00062
1,2-Dichloroethane	ND		0.00062
Trichloroethene	ND		0.00062
1,2-Dichloropropane	ND		0.00062
Dibromomethane	ND		0.00062
Bromodichloromethane	ND		0.00062
2-Chloroethyl Vinyl Ether	ND		0.0031
(cis) 1,3-Dichloropropene	ND		0.00062
(trans) 1,3-Dichloropropene	ND		0.00062

Date of Report: September 18, 2009
Samples Submitted: September 8, 2009
Laboratory Reference: 0909-067
Project: 555-1647-019 02/0203

HALOGENATED VOLATILES by EPA 8260B
page 2 of 2

Lab ID: 09-067-02
Client ID: HZMW-13-5

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.00062
Tetrachloroethene	ND		0.00062
1,3-Dichloropropane	ND		0.00062
Dibromochloromethane	ND		0.00062
1,2-Dibromoethane	ND		0.00062
Chlorobenzene	ND		0.00062
1,1,1,2-Tetrachloroethane	ND		0.00062
Bromoform	ND		0.00062
Bromobenzene	ND		0.00062
1,1,2,2-Tetrachloroethane	ND		0.00062
1,2,3-Trichloropropane	ND		0.00062
2-Chlorotoluene	ND		0.00062
4-Chlorotoluene	ND		0.00062
1,3-Dichlorobenzene	ND		0.00062
1,4-Dichlorobenzene	ND		0.00062
1,2-Dichlorobenzene	ND		0.00062
1,2-Dibromo-3-chloropropane	ND		0.0031
1,2,4-Trichlorobenzene	ND		0.00062
Hexachlorobutadiene	ND		0.0031
1,2,3-Trichlorobenzene	ND		0.00062

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	100	55-125
Toluene-d8	98	56-127
4-Bromofluorobenzene	91	54-130

Date of Report: September 18, 2009
Samples Submitted: September 8, 2009
Laboratory Reference: 0909-067
Project: 555-1647-019 02/0203

HALOGENATED VOLATILES by EPA 8260B
page 1 of 2

Date Extracted: 9-9-09
Date Analyzed: 9-9-09

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 09-067-03
Client ID: HZMW-12-5

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.00052
Chloromethane	ND		0.0026
Vinyl Chloride	ND		0.00052
Bromomethane	ND		0.00052
Chloroethane	ND		0.0026
Trichlorofluoromethane	ND		0.00052
1,1-Dichloroethene	ND		0.00052
Iodomethane	ND		0.0026
Methylene Chloride	ND		0.0026
(trans) 1,2-Dichloroethene	ND		0.00052
1,1-Dichloroethane	ND		0.00052
2,2-Dichloropropane	ND		0.00052
(cis) 1,2-Dichloroethene	ND		0.00052
Bromochloromethane	ND		0.00052
Chloroform	ND		0.00052
1,1,1-Trichloroethane	ND		0.00052
Carbon Tetrachloride	ND		0.00052
1,1-Dichloropropene	ND		0.00052
1,2-Dichloroethane	ND		0.00052
Trichloroethene	ND		0.00052
1,2-Dichloropropane	ND		0.00052
Dibromomethane	ND		0.00052
Bromodichloromethane	ND		0.00052
2-Chloroethyl Vinyl Ether	ND		0.0026
(cis) 1,3-Dichloropropene	ND		0.00052
(trans) 1,3-Dichloropropene	ND		0.00052

Date of Report: September 18, 2009
Samples Submitted: September 8, 2009
Laboratory Reference: 0909-067
Project: 555-1647-019 02/0203

HALOGENATED VOLATILES by EPA 8260B
page 2 of 2

Lab ID: 09-067-03
Client ID: HZMW-12-5

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.00052
Tetrachloroethene	ND		0.00052
1,3-Dichloropropane	ND		0.00052
Dibromochloromethane	ND		0.00052
1,2-Dibromoethane	ND		0.00052
Chlorobenzene	ND		0.00052
1,1,1,2-Tetrachloroethane	ND		0.00052
Bromoform	ND		0.00052
Bromobenzene	ND		0.00052
1,1,2,2-Tetrachloroethane	ND		0.00052
1,2,3-Trichloropropane	ND		0.00052
2-Chlorotoluene	ND		0.00052
4-Chlorotoluene	ND		0.00052
1,3-Dichlorobenzene	ND		0.00052
1,4-Dichlorobenzene	ND		0.00052
1,2-Dichlorobenzene	ND		0.00052
1,2-Dibromo-3-chloropropane	ND		0.0026
1,2,4-Trichlorobenzene	ND		0.00052
Hexachlorobutadiene	ND		0.0026
1,2,3-Trichlorobenzene	ND		0.00052

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	103	55-125
Toluene-d8	100	56-127
4-Bromofluorobenzene	88	54-130

Date of Report: September 18, 2009
Samples Submitted: September 8, 2009
Laboratory Reference: 0909-067
Project: 555-1647-019 02/0203

HALOGENATED VOLATILES by EPA 8260B
METHOD BLANK QUALITY CONTROL
page 1 of 2

Date Extracted: 9-9-09
Date Analyzed: 9-9-09

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: MB0909S1

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.0010
Chloromethane	ND		0.0050
Vinyl Chloride	ND		0.0010
Bromomethane	ND		0.0010
Chloroethane	ND		0.0050
Trichlorofluoromethane	ND		0.0010
1,1-Dichloroethene	ND		0.0010
Iodomethane	ND		0.0050
Methylene Chloride	ND		0.0050
(trans) 1,2-Dichloroethene	ND		0.0010
1,1-Dichloroethane	ND		0.0010
2,2-Dichloropropane	ND		0.0010
(cis) 1,2-Dichloroethene	ND		0.0010
Bromochloromethane	ND		0.0010
Chloroform	ND		0.0010
1,1,1-Trichloroethane	ND		0.0010
Carbon Tetrachloride	ND		0.0010
1,1-Dichloropropene	ND		0.0010
1,2-Dichloroethane	ND		0.0010
Trichloroethene	ND		0.0010
1,2-Dichloropropane	ND		0.0010
Dibromomethane	ND		0.0010
Bromodichloromethane	ND		0.0010
2-Chloroethyl Vinyl Ether	ND		0.0050
(cis) 1,3-Dichloropropene	ND		0.0010
(trans) 1,3-Dichloropropene	ND		0.0010

Date of Report: September 18, 2009
Samples Submitted: September 8, 2009
Laboratory Reference: 0909-067
Project: 555-1647-019 02/0203

HALOGENATED VOLATILES by EPA 8260B
METHOD BLANK QUALITY CONTROL
page 2 of 2

Lab ID: MB0909S1

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.0010
Tetrachloroethene	ND		0.0010
1,3-Dichloropropane	ND		0.0010
Dibromochloromethane	ND		0.0010
1,2-Dibromoethane	ND		0.0010
Chlorobenzene	ND		0.0010
1,1,1,2-Tetrachloroethane	ND		0.0010
Bromoform	ND		0.0010
Bromobenzene	ND		0.0010
1,1,2,2-Tetrachloroethane	ND		0.0010
1,2,3-Trichloropropane	ND		0.0010
2-Chlorotoluene	ND		0.0010
4-Chlorotoluene	ND		0.0010
1,3-Dichlorobenzene	ND		0.0010
1,4-Dichlorobenzene	ND		0.0010
1,2-Dichlorobenzene	ND		0.0010
1,2-Dibromo-3-chloropropane	ND		0.0050
1,2,4-Trichlorobenzene	ND		0.0010
Hexachlorobutadiene	ND		0.0050
1,2,3-Trichlorobenzene	ND		0.0010

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	103	55-125
Toluene-d8	102	56-127
4-Bromofluorobenzene	97	54-130

Date of Report: September 18, 2009
Samples Submitted: September 8, 2009
Laboratory Reference: 0909-067
Project: 555-1647-019 02/0203

HALOGENATED VOLATILES by EPA 8260B
SB/SBD QUALITY CONTROL

Date Extracted: 9-9-09
Date Analyzed: 9-9-09

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: SB0909S1

Compound	Spike Amount	SB	Percent Recovery	SBD	Percent Recovery	Recovery Limits	Flags
1,1-Dichloroethene	0.0500	0.0436	87	0.0453	91	70-130	
Benzene	0.0500	0.0431	86	0.0438	88	70-128	
Trichloroethene	0.0500	0.0415	83	0.0425	85	70-124	
Toluene	0.0500	0.0424	85	0.0436	87	73-123	
Chlorobenzene	0.0500	0.0431	86	0.0430	86	73-115	

	RPD	RPD Limit	Flags
1,1-Dichloroethene	4	16	
Benzene	2	15	
Trichloroethene	2	14	
Toluene	3	14	
Chlorobenzene	0	13	

Date of Report: September 18, 2009
Samples Submitted: September 8, 2009
Laboratory Reference: 0909-067
Project: 555-1647-019 02/0203

HALOGENATED VOLATILES by EPA 8260B
page 1 of 2

Date Extracted: 9-10-09
Date Analyzed: 9-10-09

Matrix: Water
Units: ug/L (ppb)

Lab ID: 09-067-04
Client ID: RB 090809

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		1.0
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		1.0
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
Bromochloromethane	ND		0.20
Chloroform	0.23		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20

Date of Report: September 18, 2009
Samples Submitted: September 8, 2009
Laboratory Reference: 0909-067
Project: 555-1647-019 02/0203

HALOGENATED VOLATILES by EPA 8260B
page 2 of 2

Lab ID: 09-067-04
Client ID: RB 090809

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	ND		0.20
1,3-Dichloropropane	ND		0.20
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	83	71-126
Toluene-d8	91	76-116
4-Bromofluorobenzene	90	70-123

Date of Report: September 18, 2009
Samples Submitted: September 8, 2009
Laboratory Reference: 0909-067
Project: 555-1647-019 02/0203

HALOGENATED VOLATILES by EPA 8260B
page 1 of 2

Date Extracted: 9-10-09
Date Analyzed: 9-10-09

Matrix: Water
Units: ug/L (ppb)

Lab ID: 09-067-05
Client ID: **TRIP BLANK 090809**

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		1.0
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		1.0
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20

Date of Report: September 18, 2009
Samples Submitted: September 8, 2009
Laboratory Reference: 0909-067
Project: 555-1647-019 02/0203

HALOGENATED VOLATILES by EPA 8260B
page 2 of 2

Lab ID: 09-067-05
Client ID: TRIP BLANK 090809

Compound	**Results**	**Flags**	**PQL**
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	ND		0.20
1,3-Dichloropropane	ND		0.20
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	**Percent Recovery**	**Control Limits**
Dibromofluoromethane	87	71-126
Toluene-d8	92	76-116
4-Bromofluorobenzene	93	70-123

Date of Report: September 18, 2009
Samples Submitted: September 8, 2009
Laboratory Reference: 0909-067
Project: 555-1647-019 02/0203

HALOGENATED VOLATILES by EPA 8260B
METHOD BLANK QUALITY CONTROL
page 1 of 2

Date Extracted: 9-10-09
Date Analyzed: 9-10-09

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0910W1

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		1.0
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		1.0
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20

Date of Report: September 18, 2009
Samples Submitted: September 8, 2009
Laboratory Reference: 0909-067
Project: 555-1647-019 02/0203

HALOGENATED VOLATILES by EPA 8260B
METHOD BLANK QUALITY CONTROL
page 2 of 2

Lab ID: MB0910W1

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	ND		0.20
1,3-Dichloropropane	ND		0.20
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	88	71-126
Toluene-d8	92	76-116
4-Bromofluorobenzene	89	70-123

Date of Report: September 18, 2009
Samples Submitted: September 8, 2009
Laboratory Reference: 0909-067
Project: 555-1647-019 02/0203

HALOGENATED VOLATILES by EPA 8260B
SB/SBD QUALITY CONTROL

Date Extracted: 9-10-09
Date Analyzed: 9-10-09

Matrix: Water
Units: ug/L (ppb)

Lab ID: SB0910W1

Compound	Spike Amount	SB	Percent Recovery	SBD	Percent Recovery	Recovery Limits	Flags
1,1-Dichloroethene	10.0	9.84	98	9.38	94	70-130	
Benzene	10.0	10.0	100	9.72	97	70-130	
Trichloroethene	10.0	10.4	104	9.73	97	70-123	
Toluene	10.0	10.2	102	9.89	99	77-120	
Chlorobenzene	10.0	10.5	105	9.98	100	73-115	

	RPD	RPD Limit	Flags
1,1-Dichloroethene	5	21	
Benzene	3	18	
Trichloroethene	7	18	
Toluene	3	17	
Chlorobenzene	5	18	

Date of Report: September 18, 2009
Samples Submitted: September 8, 2009
Laboratory Reference: 0909-067
Project: 555-1647-019 02/0203

TOTAL METALS
EPA 6010B/7471A

Date Extracted: 9-14&15-09
Date Analyzed: 9-15-09

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 09-067-01
Client ID: **HZMW-13-2.5**

Analyte	Method	Result	PQL
Arsenic	6010B	**ND**	5.6
Cadmium	6010B	**ND**	0.56
Chromium	6010B	**35**	0.56
Lead	6010B	**9.3**	5.6
Mercury	7471A	**ND**	0.022

Date of Report: September 18, 2009
Samples Submitted: September 8, 2009
Laboratory Reference: 0909-067
Project: 555-1647-019 02/0203

TOTAL METALS
EPA 6010B/7471A

Date Extracted: 9-14&15-09
Date Analyzed: 9-15-09

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 09-067-02
Client ID: **HZMW-13-5**

Analyte	Method	Result	PQL
Arsenic	6010B	**ND**	5.7
Cadmium	6010B	**ND**	0.57
Chromium	6010B	**41**	0.57
Lead	6010B	**ND**	5.7
Mercury	7471A	**0.027**	0.023

Date of Report: September 18, 2009
Samples Submitted: September 8, 2009
Laboratory Reference: 0909-067
Project: 555-1647-019 02/0203

TOTAL METALS
EPA 6010B/7471A

Date Extracted: 9-14&15-09
Date Analyzed: 9-15-09

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 09-067-03
Client ID: **HZMW-12-5**

Analyte	Method	Result	PQL
Arsenic	6010B	**ND**	6.2
Cadmium	6010B	**ND**	0.62
Chromium	6010B	**60**	0.62
Lead	6010B	**24**	6.2
Mercury	7471A	**0.027**	0.025

Date of Report: September 18, 2009
Samples Submitted: September 8, 2009
Laboratory Reference: 0909-067
Project: 555-1647-019 02/0203

TOTAL METALS
EPA 6010B/7471A
METHOD BLANK QUALITY CONTROL

Date Extracted:	9-14&15-09
Date Analyzed:	9-15-09
Matrix:	Soil
Units:	mg/kg (ppm)
Lab ID:	MB0914S2&MB0915S1

Analyte	Method	Result	PQL
Arsenic	6010B	**ND**	5.0
Cadmium	6010B	**ND**	0.50
Chromium	6010B	**ND**	0.50
Lead	6010B	**ND**	5.0
Mercury	7471A	**ND**	0.020

Date of Report: September 18, 2009
Samples Submitted: September 8, 2009
Laboratory Reference: 0909-067
Project: 555-1647-019 02/0203

TOTAL METALS
EPA 6010B/7471A
DUPLICATE QUALITY CONTROL

Date Extracted: 9-14&15-09
Date Analyzed: 9-15-09

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 09-100-01

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Arsenic	**ND**	**ND**	NA	5.0	
Cadmium	**ND**	**ND**	NA	0.50	
Chromium	**24.2**	**22.3**	8	0.50	
Lead	**ND**	**ND**	NA	5.0	
Mercury	**ND**	**ND**	NA	0.020	

Date of Report: September 18, 2009
Samples Submitted: September 8, 2009
Laboratory Reference: 0909-067
Project: 555-1647-019 02/0203

TOTAL METALS
EPA 6010B/7471A
MS/MSD QUALITY CONTROL

Date Extracted: 9-14&15-09
Date Analyzed: 9-15-09

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 09-100-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Arsenic	100	**98.4**	98	**100**	100	2	
Cadmium	50	**50.3**	101	**50.2**	100	0	
Chromium	100	**125**	101	**129**	105	3	
Lead	250	**239**	95	**237**	95	1	
Mercury	0.50	**0.473**	95	**0.473**	95	0	

Date of Report: September 18, 2009
Samples Submitted: September 8, 2009
Laboratory Reference: 0909-067
Project: 555-1647-019 02/0203

NAPHTHALENES by EPA 8270D/SIM

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**HZMW-13-2.5**					
Laboratory ID:	09-067-01					
Naphthalene	**ND**	0.0075	EPA 8270/SIM	9-11-09	9-12-09	
2-Methylnaphthalene	**ND**	0.0075	EPA 8270/SIM	9-11-09	9-12-09	
1-Methylnaphthalene	**ND**	0.0075	EPA 8270/SIM	9-11-09	9-12-09	
Surrogate:	***Percent Recovery***	***Control Limits***				
2-Fluorophenol	***75***	***19 - 97***				
Phenol-d6	***76***	***22 - 108***				
Nitrobenzene-d5	***69***	***21 - 106***				
2-Fluorobiphenyl	***74***	***29 - 107***				
2,4,6-Tribromophenol	***80***	***44 - 121***				
Terphenyl-d14	***77***	***37 - 120***				
Client ID:	**HZMW-13-5**					
Laboratory ID:	09-067-02					
Naphthalene	**ND**	0.0076	EPA 8270/SIM	9-11-09	9-12-09	
2-Methylnaphthalene	**ND**	0.0076	EPA 8270/SIM	9-11-09	9-12-09	
1-Methylnaphthalene	**ND**	0.0076	EPA 8270/SIM	9-11-09	9-12-09	
Surrogate:	***Percent Recovery***	***Control Limits***				
2-Fluorophenol	***69***	***19 - 97***				
Phenol-d6	***71***	***22 - 108***				
Nitrobenzene-d5	***64***	***21 - 106***				
2-Fluorobiphenyl	***74***	***29 - 107***				
2,4,6-Tribromophenol	***88***	***44 - 121***				
Terphenyl-d14	***83***	***37 - 120***				
Client ID:	**HZMW-12-5**					
Laboratory ID:	09-067-03					
Naphthalene	**ND**	0.0082	EPA 8270/SIM	9-11-09	9-12-09	
2-Methylnaphthalene	**ND**	0.0082	EPA 8270/SIM	9-11-09	9-12-09	
1-Methylnaphthalene	**ND**	0.0082	EPA 8270/SIM	9-11-09	9-12-09	
Surrogate:	***Percent Recovery***	***Control Limits***				
2-Fluorophenol	***72***	***19 - 97***				
Phenol-d6	***74***	***22 - 108***				
Nitrobenzene-d5	***67***	***21 - 106***				
2-Fluorobiphenyl	***75***	***29 - 107***				
2,4,6-Tribromophenol	***94***	***44 - 121***				
Terphenyl-d14	***83***	***37 - 120***				

Date of Report: September 18, 2009
Samples Submitted: September 8, 2009
Laboratory Reference: 0909-067
Project: 555-1647-019 02/0203

NAPHTHALENES by EPA 8270D/SIM
METHOD BLANK QUALITY CONTROL

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB0911S1					
Naphthalene	**ND**	0.0067	EPA 8270/SIM	9-11-09	9-12-09	
2-Methylnaphthalene	**ND**	0.0067	EPA 8270/SIM	9-11-09	9-12-09	
1-Methylnaphthalene	**ND**	0.0067	EPA 8270/SIM	9-11-09	9-12-09	
Surrogate:	***Percent Recovery***	***Control Limits***				
2-Fluorophenol	***56***	***19 - 97***				
Phenol-d6	***58***	***22 - 108***				
Nitrobenzene-d5	***52***	***21 - 106***				
2-Fluorobiphenyl	***59***	***29 - 107***				
2,4,6-Tribromophenol	***73***	***44 - 121***				
Terphenyl-d14	***78***	***37 - 120***				

Date of Report: September 18, 2009
Samples Submitted: September 8, 2009
Laboratory Reference: 0909-067
Project: 555-1647-019 02/0203

NAPHTHALENES by EPA 8270D/SIM
MS/MSD QUALITY CONTROL

Matrix: Soil
Units: mg/Kg

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
MATRIX SPIKES											
Laboratory ID:	09-091-08										
	MS	MSD	MS	MSD		MS	MSD				
Phenol	**1.13**	**1.10**	1.33	1.33	ND	85	83	38 - 97	3	30	
2-Chlorophenol	**1.14**	**1.14**	1.33	1.33	ND	86	86	28 - 102	0	38	
1,4-Dichlorobenzene	**0.528**	**0.524**	0.667	0.667	ND	79	79	14 - 84	1	41	
N-Nitroso-di-n-propylamine	**0.557**	**0.544**	0.667	0.667	ND	84	82	25 - 104	2	39	
1,2,4-Trichlorobenzene	**0.523**	**0.529**	0.667	0.667	ND	78	79	23 - 93	1	37	
4-Chloro-3-methylphenol	**1.23**	**1.22**	1.33	1.33	ND	92	92	49 - 113	1	31	
Acenaphthene	**0.566**	**0.572**	0.667	0.667	ND	85	86	37 - 101	1	40	
4-Nitrophenol	**1.27**	**1.24**	1.33	1.33	ND	95	93	30 - 136	2	31	
2,4-Dinitrotoluene	**0.599**	**0.606**	0.667	0.667	ND	90	91	36 - 122	1	32	
Pentachlorophenol	**1.42**	**1.39**	1.33	1.33	ND	107	105	15 - 143	2	34	
Pyrene	**0.711**	**0.748**	0.667	0.667	0.132	87	92	24 - 138	5	39	
Surrogate:											
2-Fluorophenol						***78***	***74***	***19 - 97***			
Phenol-d6						***75***	***75***	***22 - 108***			
Nitrobenzene-d5						***74***	***72***	***21 - 106***			
2-Fluorobiphenyl						***75***	***75***	***29 - 107***			
2,4,6-Tribromophenol						***80***	***81***	***44 - 121***			
Terphenyl-d14						***78***	***81***	***37 - 120***			

Date of Report: September 18, 2009
Samples Submitted: September 8, 2009
Laboratory Reference: 0909-067
Project: 555-1647-019 02/0203

% MOISTURE

Date Analyzed: 9-9-09

Client ID	Lab ID	% Moisture
HZMW-13-2.5	09-067-01	11
HZMW-13-5	09-067-02	12
HZMW-12-5	09-067-03	19

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in the diesel range are impacting the lube oil range result.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical ____________.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

Y - Sample extract treated with an acid/silica gel cleanup procedure.

Z - The chromatogram is similar to mineral spirits.

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

HWA GEOSCIENCES INC.
19730 64th Ave. W., Suite 200, Lynnwood, WA 98036 (425) 774-0106

Chain of Custody and Laboratory Analysis Request

09-067

DATE: 9/8/09

PAGE: 1 of 1

PROJECT NAME: Bothell RI/FS #:

SITE CODE: Bothell Landing 555-1647-019 02/0203

SAMPLERS NAME: Atkins PHONE: 206-794-3124

SAMPLERS SIGNATURE: [signature]

~~HWA~~ CONTACT: Dave Pinkham PHONE: 360-850-5318

Parametrix

HWA SAMPLE ID	DATE	TIME	MATRIX	LAB ID	# OF BOTTLE	NWTPH-Dx	NWTPH-Gx/BTEX	~~8021~~ 8260 HVOC	MTCA Metals	8270 SIM (Napthalene)										% Moisture	REMARKS
HZMW-13-2.5	9/8/09	815	Soil	1	6	/	/	/	/	/										X	
HZMW-13-5		820	Soil	2	6	/	/	/	/	/										↓	
HZMW-12-5		1000	Soil	3	6	/	/	/	/	/										↓	
RB090809		1100	H2O	4	6	/	/	/													
Trip Blank 090809		1130	H2O	5	2			X													

	PRINT NAME	SIGNATURE	COMPANY	DATE	TIME	REMARKS
Relinquished by:	Vance Atkins	[signature]	HWA	9/8/09	1505	
Received by:	Van	Van	Speedy	9/8/09	1505	
Relinquished by:	Van	Van	Speedy	9/8/09	1525	
Received by:	Blair Goodrow	On Site Env	On Site Env	9/8/09	1525	

DISTRIBUTION: WHITE - Return to HWA; YELLOW - Retain by Lab; PINK - Retain by Sampler

OnSite Environmental Inc.
14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

September 17, 2009

Scott Elkind
Parametrix
411 108th Avenue NE, Suite 1800
Bellevue, WA 98004

Re:	Analytical Data for Project 555-1647-019 02/0203 / Landing
	Laboratory Reference No. 0909-082

Dear Scott:

Enclosed are the analytical results and associated quality control data for samples submitted on September 9, 2009.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: September 17, 2009
Samples Submitted: September 9, 2009
Laboratory Reference: 0909-082
Project: 555-1647-019 02/0203 / Landing

Case Narrative

Samples were collected on September 9, 2009, and received by the laboratory on September 9, 2009. They were maintained at the laboratory at a temperature of 2^oC to 6^oC except as noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

NWTPH Gx/BTEX Analysis

Per EPA Method 5035A, samples were received by the laboratory in pre-weighed 40 mL VOA vials within 48 hours of sample collection. They were stored in a freezer at between -7^oC and -20^oC until extraction or analysis.

Any other QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.

Halogenated Volatiles EPA 8260B Analysis

Per EPA Method 5035A, samples were received by the laboratory in pre-weighed 40 mL VOA vials within 48 hours of sample collection. They were stored in a freezer at between -7^oC and -20^oC until extraction or analysis.

Internal Standard 1,4-Dichlorobenzene-d4 does not meet acceptance criteria for sample BLSS-2 0-6" due to sample matrix effects. The sample was re-analyzed with similar results. All results, including Practical Quantitation Limits, from Bromobenzene onward should be considered estimates.

Any other QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.

Date of Report: September 17, 2009
Samples Submitted: September 9, 2009
Laboratory Reference: 0909-082
Project: 555-1647-019 02/0203 / Landing

NWTPH-Gx/BTEX

Date Extracted: 9-11-09
Date Analyzed: 9-11&14-09

Matrix: Soil
Units: mg/kg (ppm)

Client ID:	**BLSS-1 0-6"**			**BLSS-2 0-6"**		
Lab ID:	09-082-01			09-082-02		
	Result	Flags	PQL	**Result**	Flags	PQL
Benzene	**ND**		0.020	**ND**		0.020
Toluene	**ND**		0.055	**ND**		0.057
Ethyl Benzene	**ND**		0.055	**ND**		0.057
m,p-Xylene	**ND**		0.055	**ND**		0.057
o-Xylene	**ND**		0.055	**ND**		0.057
TPH-Gas	**ND**		2.8	**ND**		2.8
Surrogate Recovery:						
Fluorobenzene	85%			73%		

Date of Report: September 17, 2009
Samples Submitted: September 9, 2009
Laboratory Reference: 0909-082
Project: 555-1647-019 02/0203 / Landing

NWTPH-Gx/BTEX
METHOD BLANK QUALITY CONTROL

Date Extracted: 9-11-09
Date Analyzed: 9-11-09

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: MB0911S1

	Result	Flags	PQL
Benzene	**ND**		0.020
Toluene	**ND**		0.050
Ethyl Benzene	**ND**		0.050
m,p-Xylene	**ND**		0.050
o-Xylene	**ND**		0.050
TPH-Gas	**ND**		2.5
Surrogate Recovery:			
Fluorobenzene	90%		

Date of Report: September 17, 2009
Samples Submitted: September 9, 2009
Laboratory Reference: 0909-082
Project: 555-1647-019 02/0203 / Landing

NWTPH-Gx/BTEX
DUPLICATE QUALITY CONTROL

Date Extracted: 9-11-09
Date Analyzed: 9-11-09

Matrix: Soil
Units: mg/kg (ppm)

Lab ID:	09-081-01 **Original**	09-081-01 **Duplicate**	**RPD**	**Flags**
Benzene	**ND**	**ND**	NA	
Toluene	**ND**	**ND**	NA	
Ethyl Benzene	**ND**	**ND**	NA	
m,p-Xylene	**ND**	**ND**	NA	
o-Xylene	**ND**	**ND**	NA	
TPH-Gas	**ND**	**ND**	NA	
Surrogate Recovery:				
Fluorobenzene	110%	109%		

Date of Report: September 17, 2009
Samples Submitted: September 9, 2009
Laboratory Reference: 0909-082
Project: 555-1647-019 02/0203 / Landing

NWTPH-Gx/BTEX
SB/SBD QUALITY CONTROL

Date Extracted: 9-11-09
Date Analyzed: 9-11-09

Matrix: Soil
Units: mg/kg (ppm)

Spike Level: 1.00 ppm

Lab ID:	SB0911S1 **SB**	Percent Recovery	SBD0911S1 **SBD**	Percent Recovery	**RPD**	**Flags**
Benzene	**0.972**	**97**	**0.955**	**96**	2	
Toluene	**1.06**	**106**	**1.01**	**101**	5	
Ethyl Benzene	**1.01**	**101**	**0.993**	**99**	2	
m,p-Xylene	**1.09**	**109**	**1.05**	**105**	4	
o-Xylene	**1.03**	**103**	**1.01**	**101**	2	
Surrogate Recovery:						
Fluorobenzene	94%		93%			

Date of Report: September 17, 2009
Samples Submitted: September 9, 2009
Laboratory Reference: 0909-082
Project: 555-1647-019 02/0203 / Landing

NWTPH-Dx

Date Extracted: 9-10-09
Date Analyzed: 9-10-09

Matrix: Soil
Units: mg/kg (ppm)

Client ID:	**BLSS-1**	**BLSS-2**
Lab ID:	09-082-01	09-082-02
Diesel Range:	**ND**	**ND**
PQL:	170	170
Identification:	---	---
Lube Oil Range:	**680**	**1000**
PQL:	330	350
Identification:	Lube Oil	Lube Oil
Surrogate Recovery		
o-Terphenyl:	91%	90%
Flags:	Y	Y

Date of Report: September 17, 2009
Samples Submitted: September 9, 2009
Laboratory Reference: 0909-082
Project: 555-1647-019 02/0203 / Landing

NWTPH-Dx
METHOD BLANK QUALITY CONTROL

Date Extracted: 9-10-09
Date Analyzed: 9-10-09

Matrix: Soil
Units: mg/kg (ppm)

Lab ID:	MB0910S1
Diesel Range:	**ND**
PQL:	25
Identification:	---
Lube Oil Range:	**ND**
PQL:	50
Identification:	---
Surrogate Recovery	
o-Terphenyl:	99%
Flags:	Y

Date of Report: September 17, 2009
Samples Submitted: September 9, 2009
Laboratory Reference: 0909-082
Project: 555-1647-019 02/0203 / Landing

NWTPH-Dx
DUPLICATE QUALITY CONTROL

Date Extracted: 9-10-09
Date Analyzed: 9-10-09

Matrix: Soil
Units: mg/kg (ppm)

Lab ID:	09-061-01	09-061-01 DUP
Diesel Range:	**ND**	**ND**
PQL:	25	25
RPD:	N/A	
Surrogate Recovery		
o-Terphenyl:	89%	76%
Flags:	Y	Y

Date of Report: September 17, 2009
Samples Submitted: September 9, 2009
Laboratory Reference: 0909-082
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
Page 1 of 2

Date Extracted: 9-10-09
Date Analyzed: 9-10-09

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 09-082-01
Client ID: BLSS-1 0-6"

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.0013
Chloromethane	ND		0.0067
Vinyl Chloride	ND		0.0013
Bromomethane	ND		0.0013
Chloroethane	ND		0.0067
Trichlorofluoromethane	ND		0.0013
1,1-Dichloroethene	ND		0.0013
Iodomethane	ND		0.0067
Methylene Chloride	ND		0.0067
(trans) 1,2-Dichloroethene	ND		0.0013
1,1-Dichloroethane	ND		0.0013
2,2-Dichloropropane	ND		0.0013
(cis) 1,2-Dichloroethene	ND		0.0013
Bromochloromethane	ND		0.0013
Chloroform	ND		0.0013
1,1,1-Trichloroethane	ND		0.0013
Carbon Tetrachloride	ND		0.0013
1,1-Dichloropropene	ND		0.0013
1,2-Dichloroethane	ND		0.0013
Trichloroethene	ND		0.0013
1,2-Dichloropropane	ND		0.0013
Dibromomethane	ND		0.0013
Bromodichloromethane	ND		0.0013
2-Chloroethyl Vinyl Ether	ND		0.0067
(cis) 1,3-Dichloropropene	ND		0.0013
(trans) 1,3-Dichloropropene	ND		0.0013

Date of Report: September 17, 2009
Samples Submitted: September 9, 2009
Laboratory Reference: 0909-082
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B

Lab ID: 09-082-01
Client ID: BLSS-1 0-6"

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.0013
Tetrachloroethene	ND		0.0013
1,3-Dichloropropane	ND		0.0013
Dibromochloromethane	ND		0.0013
1,2-Dibromoethane	ND		0.0013
Chlorobenzene	ND		0.0013
1,1,1,2-Tetrachloroethane	ND		0.0013
Bromoform	ND		0.0013
Bromobenzene	ND		0.0013
1,1,2,2-Tetrachloroethane	ND		0.0013
1,2,3-Trichloropropane	ND		0.0013
2-Chlorotoluene	ND		0.0013
4-Chlorotoluene	ND		0.0013
1,3-Dichlorobenzene	ND		0.0013
1,4-Dichlorobenzene	ND		0.0013
1,2-Dichlorobenzene	ND		0.0013
1,2-Dibromo-3-chloropropane	ND		0.0067
1,2,4-Trichlorobenzene	ND		0.0013
Hexachlorobutadiene	ND		0.0067
1,2,3-Trichlorobenzene	ND		0.0013

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	102	55-125
Toluene-d8	101	56-127
4-Bromofluorobenzene	79	54-130

Date of Report: September 17, 2009
Samples Submitted: September 9, 2009
Laboratory Reference: 0909-082
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
Page 1 of 2

Date Extracted: 9-9-09
Date Analyzed: 9-9-09

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 09-082-02
Client ID: BLSS-2 0-6"

Compound	**Results**	**Flags**	**PQL**
Dichlorodifluoromethane	ND		0.0010
Chloromethane	ND		0.0052
Vinyl Chloride	ND		0.0010
Bromomethane	ND		0.0010
Chloroethane	ND		0.0052
Trichlorofluoromethane	ND		0.0010
1,1-Dichloroethene	ND		0.0010
Iodomethane	ND		0.0052
Methylene Chloride	ND		0.0052
(trans) 1,2-Dichloroethene	ND		0.0010
1,1-Dichloroethane	ND		0.0010
2,2-Dichloropropane	ND		0.0010
(cis) 1,2-Dichloroethene	ND		0.0010
Bromochloromethane	ND		0.0010
Chloroform	ND		0.0010
1,1,1-Trichloroethane	ND		0.0010
Carbon Tetrachloride	ND		0.0010
1,1-Dichloropropene	ND		0.0010
1,2-Dichloroethane	ND		0.0010
Trichloroethene	ND		0.0010
1,2-Dichloropropane	ND		0.0010
Dibromomethane	ND		0.0010
Bromodichloromethane	ND		0.0010
2-Chloroethyl Vinyl Ether	ND		0.0052
(cis) 1,3-Dichloropropene	ND		0.0010
(trans) 1,3-Dichloropropene	ND		0.0010

Date of Report: September 17, 2009
Samples Submitted: September 9, 2009
Laboratory Reference: 0909-082
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
Page 2 of 2

Lab ID: 09-082-02
Client ID: BLSS-2 0-6"

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.0010
Tetrachloroethene	ND		0.0010
1,3-Dichloropropane	ND		0.0010
Dibromochloromethane	ND		0.0010
1,2-Dibromoethane	ND		0.0010
Chlorobenzene	ND		0.0010
1,1,1,2-Tetrachloroethane	ND		0.0010
Bromoform	ND		0.0010
Bromobenzene	ND		0.0010
1,1,2,2-Tetrachloroethane	ND		0.0010
1,2,3-Trichloropropane	ND		0.0010
2-Chlorotoluene	ND		0.0010
4-Chlorotoluene	ND		0.0010
1,3-Dichlorobenzene	ND		0.0010
1,4-Dichlorobenzene	ND		0.0010
1,2-Dichlorobenzene	ND		0.0010
1,2-Dibromo-3-chloropropane	ND		0.0052
1,2,4-Trichlorobenzene	ND		0.0010
Hexachlorobutadiene	ND		0.0052
1,2,3-Trichlorobenzene	ND		0.0010

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	102	55-125
Toluene-d8	91	56-127
4-Bromofluorobenzene	77	54-130

Date of Report: September 17, 2009
Samples Submitted: September 9, 2009
Laboratory Reference: 0909-082
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
METHOD BLANK QUALITY CONTROL
Page 1 of 2

Date Extracted: 9-9-09
Date Analyzed: 9-9-09

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: MB0909S1

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.0010
Chloromethane	ND		0.0050
Vinyl Chloride	ND		0.0010
Bromomethane	ND		0.0010
Chloroethane	ND		0.0050
Trichlorofluoromethane	ND		0.0010
1,1-Dichloroethene	ND		0.0010
Iodomethane	ND		0.0050
Methylene Chloride	ND		0.0050
(trans) 1,2-Dichloroethene	ND		0.0010
1,1-Dichloroethane	ND		0.0010
2,2-Dichloropropane	ND		0.0010
(cis) 1,2-Dichloroethene	ND		0.0010
Bromochloromethane	ND		0.0010
Chloroform	ND		0.0010
1,1,1-Trichloroethane	ND		0.0010
Carbon Tetrachloride	ND		0.0010
1,1-Dichloropropene	ND		0.0010
1,2-Dichloroethane	ND		0.0010
Trichloroethene	ND		0.0010
1,2-Dichloropropane	ND		0.0010
Dibromomethane	ND		0.0010
Bromodichloromethane	ND		0.0010
2-Chloroethyl Vinyl Ether	ND		0.0050
(cis) 1,3-Dichloropropene	ND		0.0010
(trans) 1,3-Dichloropropene	ND		0.0010

Date of Report: September 17, 2009
Samples Submitted: September 9, 2009
Laboratory Reference: 0909-082
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
METHOD BLANK QUALITY CONTROL
Page 2 of 2

Lab ID: MB0909S1

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.0010
Tetrachloroethene	ND		0.0010
1,3-Dichloropropane	ND		0.0010
Dibromochloromethane	ND		0.0010
1,2-Dibromoethane	ND		0.0010
Chlorobenzene	ND		0.0010
1,1,1,2-Tetrachloroethane	ND		0.0010
Bromoform	ND		0.0010
Bromobenzene	ND		0.0010
1,1,2,2-Tetrachloroethane	ND		0.0010
1,2,3-Trichloropropane	ND		0.0010
2-Chlorotoluene	ND		0.0010
4-Chlorotoluene	ND		0.0010
1,3-Dichlorobenzene	ND		0.0010
1,4-Dichlorobenzene	ND		0.0010
1,2-Dichlorobenzene	ND		0.0010
1,2-Dibromo-3-chloropropane	ND		0.0050
1,2,4-Trichlorobenzene	ND		0.0010
Hexachlorobutadiene	ND		0.0050
1,2,3-Trichlorobenzene	ND		0.0010

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	103	55-125
Toluene-d8	102	56-127
4-Bromofluorobenzene	97	54-130

Date of Report: September 17, 2009
Samples Submitted: September 9, 2009
Laboratory Reference: 0909-082
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
METHOD BLANK QUALITY CONTROL
Page 1 of 2

Date Extracted: 9-10-09
Date Analyzed: 9-10-09

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: MB0910S1

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.0010
Chloromethane	ND		0.0050
Vinyl Chloride	ND		0.0010
Bromomethane	ND		0.0010
Chloroethane	ND		0.0050
Trichlorofluoromethane	ND		0.0010
1,1-Dichloroethene	ND		0.0010
Iodomethane	ND		0.0050
Methylene Chloride	ND		0.0050
(trans) 1,2-Dichloroethene	ND		0.0010
1,1-Dichloroethane	ND		0.0010
2,2-Dichloropropane	ND		0.0010
(cis) 1,2-Dichloroethene	ND		0.0010
Bromochloromethane	ND		0.0010
Chloroform	ND		0.0010
1,1,1-Trichloroethane	ND		0.0010
Carbon Tetrachloride	ND		0.0010
1,1-Dichloropropene	ND		0.0010
1,2-Dichloroethane	ND		0.0010
Trichloroethene	ND		0.0010
1,2-Dichloropropane	ND		0.0010
Dibromomethane	ND		0.0010
Bromodichloromethane	ND		0.0010
2-Chloroethyl Vinyl Ether	ND		0.0050
(cis) 1,3-Dichloropropene	ND		0.0010
(trans) 1,3-Dichloropropene	ND		0.0010

Date of Report: September 17, 2009
Samples Submitted: September 9, 2009
Laboratory Reference: 0909-082
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
METHOD BLANK QUALITY CONTROL
Page 2 of 2

Lab ID: MB0910S1

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.0010
Tetrachloroethene	ND		0.0010
1,3-Dichloropropane	ND		0.0010
Dibromochloromethane	ND		0.0010
1,2-Dibromoethane	ND		0.0010
Chlorobenzene	ND		0.0010
1,1,1,2-Tetrachloroethane	ND		0.0010
Bromoform	ND		0.0010
Bromobenzene	ND		0.0010
1,1,2,2-Tetrachloroethane	ND		0.0010
1,2,3-Trichloropropane	ND		0.0010
2-Chlorotoluene	ND		0.0010
4-Chlorotoluene	ND		0.0010
1,3-Dichlorobenzene	ND		0.0010
1,4-Dichlorobenzene	ND		0.0010
1,2-Dichlorobenzene	ND		0.0010
1,2-Dibromo-3-chloropropane	ND		0.0050
1,2,4-Trichlorobenzene	ND		0.0010
Hexachlorobutadiene	ND		0.0050
1,2,3-Trichlorobenzene	ND		0.0010

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	101	55-125
Toluene-d8	103	56-127
4-Bromofluorobenzene	95	54-130

Date of Report: September 17, 2009
Samples Submitted: September 9, 2009
Laboratory Reference: 0909-082
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
SB/SBD QUALITY CONTROL

Date Extracted: 9-9-09
Date Analyzed: 9-9-09

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: SB0909S1

Compound	Spike Amount	SB	Percent Recovery	SBD	Percent Recovery	Recovery Limits	Flags
1,1-Dichloroethene	0.0500	0.0436	87	0.0453	91	70-130	
Benzene	0.0500	0.0431	86	0.0438	88	70-128	
Trichloroethene	0.0500	0.0415	83	0.0425	85	70-124	
Toluene	0.0500	0.0424	85	0.0436	87	73-123	
Chlorobenzene	0.0500	0.0431	86	0.0430	86	73-115	

	RPD	RPD Limit	Flags
1,1-Dichloroethene	4	16	
Benzene	2	15	
Trichloroethene	2	14	
Toluene	3	14	
Chlorobenzene	0	13	

Date of Report: September 17, 2009
Samples Submitted: September 9, 2009
Laboratory Reference: 0909-082
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
SB/SBD QUALITY CONTROL

Date Extracted: 9-10-09
Date Analyzed: 9-10-09

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: SB0910S1

Compound	Spike Amount	SB	Percent Recovery	SBD	Percent Recovery	Recovery Limits	Flags
1,1-Dichloroethene	0.0500	0.0444	89	0.0449	90	70-130	
Benzene	0.0500	0.0444	89	0.0445	89	70-128	
Trichloroethene	0.0500	0.0445	89	0.0454	91	70-124	
Toluene	0.0500	0.0458	92	0.0459	92	73-123	
Chlorobenzene	0.0500	0.0452	90	0.0442	88	73-115	

	RPD	RPD Limit	Flags
1,1-Dichloroethene	1	16	
Benzene	0	15	
Trichloroethene	2	14	
Toluene	0	14	
Chlorobenzene	2	13	

Date of Report: September 17, 2009
Samples Submitted: September 9, 2009
Laboratory Reference: 0909-082
Project: 555-1647-019 02/0203 / Landing

% MOISTURE

Date Analyzed: 9-9-09

Client ID	Lab ID	% Moisture
BLSS-1 0-6”	09-082-01	25
BLSS-2 0-6”	09-082-02	28

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in the diesel range are impacting the lube oil range result.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical ____________.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

Y - Sample extract treated with an acid/silica gel cleanup procedure.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

Chain of Custody

OnSite Environmental Inc.

Phone: (425) 883-3881 • Fax: (425) 885-4603

Page ______ of ______

Laboratory Number: 09-082

Company: Parametrix

Project Number: 555 1647019 02 0203

Project Name: Bothell Crossing Landing

Project Manager: Scott Eklind

Sampled by: S Matthews

Turnaround Request (in working days)

(Check One)

- [ ] Same Day
- [ ] 1 Day
- [ ] 2 Day
- [ ] 3 Day
- [x] Standard (7 working days) (TPH analysis 5 working days)
- [ ] ______ (other)

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270D	PAHs by 8270D / SIM	PCBs by 8082	Pesticides by 8081A	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664							% Moisture
1	BLSS-1 0-6"	9/9/09	1220	soil	6		X	X		X															X
2	BLSS-2 0-6"	9/9/09	1200	soil	6		X	X		X															X

	Signature	Company	Date	Time
Relinquished by	S Matthews	ParaMetrix	9/9/09	1345
Received by	[illegible]	OnSite Env	9/9/09	1345
Relinquished by				
Received by				
Relinquished by				
Received by				

Reviewed by/Date

Reviewed by/Date

Comments/Special Instructions:

Chromatograms with final report ☐

DISTRIBUTION LEGEND: White - OnSite Copy Yellow - Report Copy Pink - Client Copy

OnSite
Environmental Inc.

14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

September 30, 2009

David Dinkuhn
Parametrix, Inc.
4660 Kitsap Way, Suite A
Bremerton, WA 98312

Re: Analytical Data for Project 555-1647-019 02/0203 / Landing
Laboratory Reference No. 0909-165

Dear David:

Enclosed are the analytical results and associated quality control data for samples submitted on September 17, 2009.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

Case Narrative

Samples were collected on September 16 and 17, 2009, and received by the laboratory on September 17, 2009. They were maintained at the laboratory at a temperature of 2^{o}C to 6^{o}C except as noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

NWTPH-Gx/BTEX

Date Extracted: 9-21-09
Date Analyzed: 9-21-09

Matrix: Water
Units: ug/L (ppb)

Client ID:	**BLMW-6-5**			**BLMW-5-8**		
Lab ID:	09-165-01			09-165-02		
	Result	Flags	PQL	**Result**	Flags	PQL
Benzene	**ND**		1.0	**ND**		1.0
Toluene	**ND**		1.0	**ND**		1.0
Ethyl Benzene	**ND**		1.0	**ND**		1.0
m,p-Xylene	**ND**		1.0	**ND**		1.0
o-Xylene	**ND**		1.0	**ND**		1.0
TPH-Gas	**ND**		100	**ND**		100
Surrogate Recovery:						
Fluorobenzene	95%			98%		

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

NWTPH-Gx/BTEX

Date Extracted: 9-21-09
Date Analyzed: 9-21-09

Matrix: Water
Units: ug/L (ppb)

Client ID:	**BLMW-7-8**			**BLMW-4-10-2**		
Lab ID:	09-165-03			09-165-04		
	Result	Flags	PQL	**Result**	Flags	PQL
Benzene	**ND**		1.0	**ND**		1.0
Toluene	**ND**		1.0	**ND**		1.0
Ethyl Benzene	**ND**		1.0	**ND**		1.0
m,p-Xylene	**ND**		1.0	**ND**		1.0
o-Xylene	**ND**		1.0	**ND**		1.0
TPH-Gas	**ND**		100	**ND**		100
Surrogate Recovery:						
Fluorobenzene	96%			98%		

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

NWTPH-Gx/BTEX

Date Extracted: 9-21-09
Date Analyzed: 9-21-09

Matrix: Water
Units: ug/L (ppb)

Client ID:	**BLMW-4-10**			**BLMW-8-12**		
Lab ID:	09-165-05			09-165-06		
	Result	Flags	PQL	**Result**	Flags	PQL
Benzene	**ND**		1.0	**ND**		1.0
Toluene	**ND**		1.0	**ND**		1.0
Ethyl Benzene	**ND**		1.0	**ND**		1.0
m,p-Xylene	**ND**		1.0	**ND**		1.0
o-Xylene	**ND**		1.0	**ND**		1.0
TPH-Gas	**ND**		100	**ND**		100
Surrogate Recovery:						
Fluorobenzene	97%			101%		

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

NWTPH-Gx/BTEX

Date Extracted: 9-21-09
Date Analyzed: 9-21-09

Matrix: Water
Units: ug/L (ppb)

Client ID:	**BLMW-1-10**			**BLMW-3-10**		
Lab ID:	09-165-07			09-165-08		
	Result	Flags	PQL	**Result**	Flags	PQL
Benzene	**ND**		1.0	**15**		1.0
Toluene	**ND**		1.0	**ND**		1.0
Ethyl Benzene	**ND**		1.0	**ND**		1.0
m,p-Xylene	**ND**		1.0	**ND**		1.0
o-Xylene	**ND**		1.0	**ND**		1.0
TPH-Gas	**ND**		100	**ND**		100
Surrogate Recovery:						
Fluorobenzene	97%			98%		

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

NWTPH-Gx/BTEX

Date Extracted: 9-21-09
Date Analyzed: 9-21-09

Matrix: Water
Units: ug/L (ppb)

Client ID:	**HZMW-12-10**			**HZMW-13-10**		
Lab ID:	09-165-09			09-165-10		
	Result	Flags	PQL	**Result**	Flags	PQL
Benzene	**ND**		1.0	**ND**		1.0
Toluene	**ND**		1.0	**ND**		1.0
Ethyl Benzene	**ND**		1.0	**ND**		1.0
m,p-Xylene	**ND**		1.0	**ND**		1.0
o-Xylene	**ND**		1.0	**ND**		1.0
TPH-Gas	**ND**		100	**210**		100
Surrogate Recovery:						
Fluorobenzene	97%			97%		

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

NWTPH-Gx/BTEX
METHOD BLANK QUALITY CONTROL

Date Extracted: 9-21-09
Date Analyzed: 9-21-09

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0921W1

	Result	Flags	PQL
Benzene	**ND**		1.0
Toluene	**ND**		1.0
Ethyl Benzene	**ND**		1.0
m,p-Xylene	**ND**		1.0
o-Xylene	**ND**		1.0
TPH-Gas	**ND**		100

Surrogate Recovery:
Fluorobenzene 99%

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

NWTPH-Gx/BTEX
DUPLICATE QUALITY CONTROL

Date Extracted: 9-21-09
Date Analyzed: 9-21-09

Matrix: Water
Units: ug/L (ppb)

Lab ID:	09-172-02 **Original**	09-172-02 **Duplicate**	**RPD**	**Flags**
Benzene	**ND**	**ND**	NA	
Toluene	**ND**	**ND**	NA	
Ethyl Benzene	**ND**	**ND**	NA	
m,p-Xylene	**ND**	**ND**	NA	
o-Xylene	**ND**	**ND**	NA	
TPH-Gas	**ND**	**ND**	NA	
Surrogate Recovery:				
Fluorobenzene	99%	98%		

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

NWTPH-Gx/BTEX
SB/SBD QUALITY CONTROL

Date Extracted: 9-21-09
Date Analyzed: 9-21-09

Matrix: Water
Units: ug/L (ppb)

Spike Level: 50.0 ppb

Lab ID:	SB0921W1 **SB**	Percent Recovery	SBD0921W1 **SBD**	Percent Recovery	**RPD**	**Flags**
Benzene	**50.5**	**101**	**51.8**	**104**	3	
Toluene	**52.9**	**106**	**54.7**	**109**	3	
Ethyl Benzene	**55.0**	**110**	**57.2**	**114**	4	
m,p-Xylene	**56.0**	**112**	**58.0**	**116**	4	
o-Xylene	**55.7**	**111**	**57.8**	**116**	4	

Surrogate Recovery:						
Fluorobenzene	101%		99%			

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

NWTPH-Dx

Date Extracted: 9-24-09
Date Analyzed: 9-24-09

Matrix: Water
Units: mg/L (ppm)

Client ID:	**BLMW-6-5**	**BLMW-5-8**	**BLMW-7-8**
Lab ID:	09-165-01	09-165-02	09-165-03
Diesel Range:	**ND**	**ND**	**ND**
PQL:	0.25	0.27	0.25
Identification:	---	---	---
Lube Oil Range:	**ND**	**ND**	**ND**
PQL:	0.40	0.44	0.40
Identification:	---	---	---
Surrogate Recovery			
o-Terphenyl:	77%	79%	79%
Flags:	Y	Y	Y

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

NWTPH-Dx

Date Extracted: 9-24-09
Date Analyzed: 9-24-09

Matrix: Water
Units: mg/L (ppm)

Client ID:	**BLMW-4-10-2**	**BLMW-4-10**	**BLMW-8-12**
Lab ID:	09-165-04	09-165-05	09-165-06
Diesel Range:	**ND**	**ND**	**ND**
PQL:	0.28	0.29	0.32
Identification:	---	---	---
Lube Oil Range:	**ND**	**ND**	**ND**
PQL:	0.45	0.46	0.50
Identification:	---	---	---
Surrogate Recovery			
o-Terphenyl:	79%	86%	87%
Flags:	Y	Y	Y

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

NWTPH-Dx

Date Extracted: 9-24-09
Date Analyzed: 9-24-09

Matrix: Water
Units: mg/L (ppm)

Client ID:	**BLMW-1-10**	**BLMW-3-10**	**HZMW-12-10**
Lab ID:	09-165-07	09-165-08	09-165-09
Diesel Range:	**ND**	**ND**	**ND**
PQL:	0.28	0.28	0.27
Identification:	---	---	---
Lube Oil Range:	**ND**	**ND**	**ND**
PQL:	0.44	0.44	0.43
Identification:	---	---	---
Surrogate Recovery			
o-Terphenyl:	86%	80%	74%
Flags:	Y	Y	Y

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

NWTPH-Dx

Date Extracted:	9-24-09
Date Analyzed:	9-24-09
Matrix:	Water
Units:	mg/L (ppm)

Client ID:	**HZMW-13-10**
Lab ID:	09-165-10
Diesel Range:	**ND**
PQL:	0.27
Identification:	---
Lube Oil Range:	**ND**
PQL:	0.44
Identification:	---
Surrogate Recovery	
o-Terphenyl:	76%
Flags:	Y

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

NWTPH-Dx
METHOD BLANK QUALITY CONTROL

Date Extracted:	9-24-09
Date Analyzed:	9-24-09
Matrix:	Water
Units:	mg/L (ppm)

Lab ID:	MB0924W1
Diesel Range:	**ND**
PQL:	0.25
Identification:	---
Lube Oil Range:	**ND**
PQL:	0.40
Identification:	---
Surrogate Recovery	
o-Terphenyl:	80%
Flags:	Y

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

NWTPH-Dx
DUPLICATE QUALITY CONTROL

Date Extracted: 9-24-09
Date Analyzed: 9-24-09

Matrix: Water
Units: mg/L (ppm)

Lab ID:	09-165-02	09-165-02 DUP
Diesel Range:	**ND**	**ND**
PQL:	0.27	0.27
RPD:	N/A	
Surrogate Recovery		
o-Terphenyl:	79%	76%
Flags:	Y	Y

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
page 1 of 2

Date Extracted:	9-21-09
Date Analyzed:	9-21-09
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	09-165-01
Client ID:	**BLMW-6-5**

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		1.0
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		1.0
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	0.69		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
page 2 of 2

Lab ID: 09-165-01
Client ID: BLMW-6-5

Compound	**Results**	**Flags**	**PQL**
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	ND		0.20
1,3-Dichloropropane	ND		0.20
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	**Percent Recovery**	**Control Limits**
Dibromofluoromethane	92	71-126
Toluene-d8	92	76-116
4-Bromofluorobenzene	94	70-123

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
page 1 of 2

Date Extracted: 9-21-09
Date Analyzed: 9-21-09

Matrix: Water
Units: ug/L (ppb)

Lab ID: 09-165-02
Client ID: BLMW-5-8

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		1.0
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		1.0
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
page 2 of 2

Lab ID: 09-165-02
Client ID: BLMW-5-8

Compound	**Results**	**Flags**	**PQL**
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	ND		0.20
1,3-Dichloropropane	ND		0.20
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	**Percent Recovery**	**Control Limits**
Dibromofluoromethane	86	71-126
Toluene-d8	86	76-116
4-Bromofluorobenzene	88	70-123

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
page 1 of 2

Date Extracted: 9-21-09
Date Analyzed: 9-21-09

Matrix: Water
Units: ug/L (ppb)

Lab ID: 09-165-03
Client ID: BLMW-7-8

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		1.0
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		1.0
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B

Lab ID: 09-165-03
Client ID: BLMW-7-8

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	0.96		0.20
1,3-Dichloropropane	ND		0.20
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	88	71-126
Toluene-d8	91	76-116
4-Bromofluorobenzene	89	70-123

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
page 1 of 2

Date Extracted: 9-21-09
Date Analyzed: 9-21-09

Matrix: Water
Units: ug/L (ppb)

Lab ID: 09-165-04
Client ID: BLMW-4-10-2

Compound	**Results**	**Flags**	**PQL**
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		1.0
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		1.0
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	0.57		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B

Lab ID: 09-165-04
Client ID: BLMW-4-10-2

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	ND		0.20
1,3-Dichloropropane	ND		0.20
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	84	71-126
Toluene-d8	86	76-116
4-Bromofluorobenzene	86	70-123

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
page 1 of 2

Date Extracted: 9-21-09
Date Analyzed: 9-21-09

Matrix: Water
Units: ug/L (ppb)

Lab ID: 09-165-05
Client ID: BLMW-4-10

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		1.0
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		1.0
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	0.60		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
page 2 of 2

Lab ID: 09-165-05
Client ID: BLMW-4-10

Compound	**Results**	**Flags**	**PQL**
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	ND		0.20
1,3-Dichloropropane	ND		0.20
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	**Percent Recovery**	**Control Limits**
Dibromofluoromethane	89	71-126
Toluene-d8	90	76-116
4-Bromofluorobenzene	95	70-123

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
page 1 of 2

Date Extracted: 9-21-09
Date Analyzed: 9-21-09

Matrix: Water
Units: ug/L (ppb)

Lab ID: 09-165-06
Client ID: BLMW-8-12

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		1.0
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		1.0
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	0.69		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
page 2 of 2

Lab ID: 09-165-06
Client ID: BLMW-8-12

Compound	**Results**	**Flags**	**PQL**
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	ND		0.20
1,3-Dichloropropane	ND		0.20
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	**Percent Recovery**	**Control Limits**
Dibromofluoromethane	79	71-126
Toluene-d8	91	76-116
4-Bromofluorobenzene	88	70-123

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
page 1 of 2

Date Extracted:	9-21-09
Date Analyzed:	9-21-09
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	09-165-07
Client ID:	**BLMW-1-10**

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		1.0
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		1.0
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
page 2 of 2

Lab ID: 09-165-07
Client ID: BLMW-1-10

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	ND		0.20
1,3-Dichloropropane	ND		0.20
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	87	71-126
Toluene-d8	85	76-116
4-Bromofluorobenzene	86	70-123

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
page 1 of 2

Date Extracted: 9-21-09
Date Analyzed: 9-21-09

Matrix: Water
Units: ug/L (ppb)

Lab ID: 09-165-08
Client ID: BLMW-3-10

Compound	**Results**	**Flags**	**PQL**
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		1.0
Vinyl Chloride	0.38		0.20
Bromomethane	ND		0.20
Chloroethane	ND		1.0
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	1.8		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
page 2 of 2

Lab ID: 09-165-08
Client ID: BLMW-3-10

Compound	**Results**	**Flags**	**PQL**
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	ND		0.20
1,3-Dichloropropane	ND		0.20
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	**Percent Recovery**	**Control Limits**
Dibromofluoromethane	81	71-126
Toluene-d8	87	76-116
4-Bromofluorobenzene	88	70-123

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
page 1 of 2

Date Extracted: 9-21-09
Date Analyzed: 9-21-09

Matrix: Water
Units: ug/L (ppb)

Lab ID: 09-165-09
Client ID: HZMW-12-10

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		1.0
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		1.0
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
page 2 of 2

Lab ID: 09-165-09
Client ID: HZMW-12-10

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	ND		0.20
1,3-Dichloropropane	ND		0.20
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	81	71-126
Toluene-d8	86	76-116
4-Bromofluorobenzene	87	70-123

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
page 1 of 2

Date Extracted:	9-21-09
Date Analyzed:	9-21-09
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	09-165-10
Client ID:	**HZMW-13-10**

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		1.0
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		1.0
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	0.24		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
page 2 of 2

Lab ID: 09-165-10
Client ID: HZMW-13-10

Compound	**Results**	**Flags**	**PQL**
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	ND		0.20
1,3-Dichloropropane	ND		0.20
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	**Percent Recovery**	**Control Limits**
Dibromofluoromethane	80	71-126
Toluene-d8	89	76-116
4-Bromofluorobenzene	88	70-123

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
METHOD BLANK QUALITY CONTROL
page 1 of 2

Date Extracted: 9-21-09
Date Analyzed: 9-21-09

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0921W1

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		1.0
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		1.0
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	2.1		1.0
(trans) 1,2-dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
METHOD BLANK QUALITY CONTROL
page 2 of 2

Lab ID: MB0921W1

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	ND		0.20
1,3-Dichloropropane	ND		0.20
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	85	71-126
Toluene-d8	91	76-116
4-Bromofluorobenzene	89	70-123

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
SB/SBD QUALITY CONTROL

Date Extracted: 9-21-09
Date Analyzed: 9-21-09

Matrix: Water
Units: ug/L (ppb)

Lab ID: SB0921W1

Compound	Spike Amount	SB	Percent Recovery	SBD	Percent Recovery	Recovery Limits	Flags
1,1-Dichloroethene	10.0	8.54	85	8.51	85	70-130	
Benzene	10.0	9.28	93	9.52	95	70-130	
Trichloroethene	10.0	9.55	96	9.57	96	70-123	
Toluene	10.0	9.39	94	9.78	98	77-120	
Chlorobenzene	10.0	9.80	98	9.65	97	73-115	

	RPD	RPD Limit	Flags
1,1-Dichloroethene	0	21	
Benzene	3	18	
Trichloroethene	0	18	
Toluene	4	17	
Chlorobenzene	2	18	

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

TOTAL ARSENIC
EPA 200.8

Date Extracted: 9-28-09
Date Analyzed: 9-28-09

Matrix: Water
Units: ug/L (ppb)

Client ID	Lab ID	Result	PQL
BLMW-5-8	09-165-02	**ND**	3.3
BLMW-7-8	09-165-03	**ND**	3.3
BLMW-4-10-2	09-165-04	**ND**	3.3
BLMW-4-10	09-165-05	**ND**	3.3
BLMW-8-12	09-165-06	**ND**	3.3
BLMW-1-10	09-165-07	**ND**	3.3
BLMW-3-10	09-165-08	**3.9**	3.3

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

TOTAL ARSENIC
EPA 200.8
METHOD BLANK QUALITY CONTROL

Date Extracted:	9-28-09
Date Analyzed:	9-28-09
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	MB0928W2

Analyte	Method	Result	PQL
Arsenic	200.8	**ND**	3.3

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

TOTAL ARSENIC
EPA 200.8
DUPLICATE QUALITY CONTROL

Date Extracted: 9-28-09
Date Analyzed: 9-28-09

Matrix: Water
Units: ug/L (ppb)

Lab ID: 09-180-02

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Arsenic	**ND**	**7.5**	NA	3.3	

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

TOTAL ARSENIC
EPA 200.8
MS/MSD QUALITY CONTROL

Date Extracted: 9-28-09
Date Analyzed: 9-28-09

Matrix: Water
Units: ug/L (ppb)

Lab ID: 09-180-02

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Arsenic	110	**113**	103	**113**	103	0	

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

DISSOLVED ARSENIC
EPA 200.8

Date Analyzed: 9-23-09

Matrix: Water
Units: ug/L (ppb)

Client ID	Lab ID	Result	PQL
BLMW-5-8	09-165-02	**ND**	3.0
BLMW-7-8	09-165-03	**ND**	3.0
BLMW-4-10-2	09-165-04	**ND**	3.0
BLMW-4-10	09-165-05	**ND**	3.0
BLMW-8-12	09-165-06	**ND**	3.0
BLMW-1-10	09-165-07	**ND**	3.0
BLMW-3-10	09-165-08	**ND**	3.0

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

DISSOLVED ARSENIC
EPA 200.8
METHOD BLANK QUALITY CONTROL

Date Analyzed: 9-23-09

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0923D1

Analyte	Method	Result	PQL
Arsenic	200.8	**ND**	3.0

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

DISSOLVED ARSENIC
EPA 200.8
DUPLICATE QUALITY CONTROL

Date Analyzed: 9-23-09

Matrix: Water
Units: ug/L (ppb)

Lab ID: 09-130-02

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Arsenic	**5.08**	**4.90**	4	3.0	

Date of Report: September 30, 2009
Samples Submitted: September 17, 2009
Laboratory Reference: 0909-165
Project: 555-1647-019 02/0203 / Landing

DISSOLVED ARSENIC
EPA 200.8
MS/MSD QUALITY CONTROL

Date Analyzed: 9-23-09

Matrix: Water
Units: ug/L (ppb)

Lab ID: 09-130-02

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Arsenic	200	**227**	111	**224**	109	2	

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in the diesel range are impacting the lube oil range result.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical ____________.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

Y - Sample extract treated with an acid/silica gel cleanup procedure.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

OnSite Environmental Inc.

Phone: (425) 883-3881 • Fax: (425) 885-4603

Chain of Custody

Company: Parametrix

Project Number:

Project Name: Bothell Crossing, Landing

Project Manager: David Dinkuhn

Sampled by: L. Vagelatos

Turnaround Request (in working days)

(Check One)

☐ Same Day ☐ 1 Day

☐ 2 Day ☐ 3 Day

☐ Standard (7 working days) (TPH analysis 5 working days)

☐ ______ (other)

Laboratory Number: 09-165

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270D	PAHs by 8270D / SIM	PCBs by 8082	Pesticides by 8081A	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664	Total As	Diss. As (Filtered)					% Moisture
1	BLMW-6-5	9/16/09	1040	H_2O	7		X	X		X									~~X~~	~~X~~					
2	BLMW-5-8	9/16/09	1400	H_2O	9		X	X		X									X	X					
3	BLMW-7-8	9/16/09	1200	H_2O	9		X	X		X									X	X					
4	BLMW-4-10-2	9/16/09	1620	H_2O	9		X	X		X									X	X					
5	BLMW-4-10	9/16/09	1615	H_2O	9		X	X		X									X	X					
6	BLMW-8-12	9/16/09	0930	H_2O	9		X	X		X									X	X					
7	BLMW-1-10	9/16/09	1505	H_2O	9		X	X		X									X	X					
8	BLMW-3-10	9/17/09	1010	H_2O	9		X	X		X									X	X					
9	HZMW-12-10	↓	1250	H_2O	7		X	X		X															
10	HZMW-13-10	↓	1150	H_2O	7		X	X		X															

	Signature	Company	Date	Time
Relinquished by	Lily Vagelatos	Parametrix	9/17/09	1605
Received by	Van	Speedy	9/17/09	1605
Relinquished by	Van	Speedy	9/17/09	1630
Received by	[illegible]	OnSite Env	9/17/09	1630
Relinquished by				
Received by				

Comments/Special Instructions:

Reviewed by/Date

Reviewed by/Date

Chromatograms with final report ☐

DISTRIBUTION LEGEND: White - OnSite Copy Yellow - Report Copy Pink - Client Copy

OnSite Environmental Inc.
14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

October 1, 2009

David Dinkuhn
Parametrix, Inc.
4660 Kitsap Way, Suite A
Bremerton, WA 98312

Re: Analytical Data for Project 555-1647-019 02/0203 / Landing
Laboratory Reference No. 0909-181

Dear David:

Enclosed are the analytical results and associated quality control data for samples submitted on September 18, 2009.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: October 1, 2009
Samples Submitted: September 18, 2009
Laboratory Reference: 0909-181
Project: 555-1647-019 02/0203 / Landing

Case Narrative

Samples were collected on September 17 and 18, 2009, and received by the laboratory on September 18, 2009. They were maintained at the laboratory at a temperature of $2^{o}C$ to $6^{o}C$ except as noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Date of Report: October 1, 2009
Samples Submitted: September 18, 2009
Laboratory Reference: 0909-181
Project: 555-1647-019 02/0203 / Landing

NWTPH-Gx/BTEX

Date Extracted: 9-22-09
Date Analyzed: 9-22-09

Matrix: Water
Units: ug/L (ppb)

Client ID: **BB-3-R**
Lab ID: 09-181-01

	Result	Flags	PQL
Benzene	**ND**		1.0
Toluene	**ND**		1.0
Ethyl Benzene	**ND**		1.0
m,p-Xylene	**ND**		1.0
o-Xylene	**ND**		1.0
TPH-Gas	**ND**		100

Surrogate Recovery:
Fluorobenzene 94%

Date of Report: October 1, 2009
Samples Submitted: September 18, 2009
Laboratory Reference: 0909-181
Project: 555-1647-019 02/0203 / Landing

NWTPH-Gx/BTEX
METHOD BLANK QUALITY CONTROL

Date Extracted: 9-22-09
Date Analyzed: 9-22-09

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0922W2

	Result	Flags	PQL
Benzene	**ND**		1.0
Toluene	**ND**		1.0
Ethyl Benzene	**ND**		1.0
m,p-Xylene	**ND**		1.0
o-Xylene	**ND**		1.0
TPH-Gas	**ND**		100
Surrogate Recovery:			
Fluorobenzene	96%		

Date of Report: October 1, 2009
Samples Submitted: September 18, 2009
Laboratory Reference: 0909-181
Project: 555-1647-019 02/0203 / Landing

NWTPH-Gx/BTEX
DUPLICATE QUALITY CONTROL

Date Extracted: 9-22-09
Date Analyzed: 9-22-09

Matrix: Water
Units: ug/L (ppb)

Lab ID:	09-180-02 **Original**	09-180-02 **Duplicate**	**RPD**	**Flags**
Benzene	**ND**	**ND**	NA	
Toluene	**ND**	**ND**	NA	
Ethyl Benzene	**ND**	**ND**	NA	
m,p-Xylene	**ND**	**ND**	NA	
o-Xylene	**ND**	**ND**	NA	
TPH-Gas	**ND**	**ND**	NA	
Surrogate Recovery:				
Fluorobenzene	95%	95%		

Date of Report: October 1, 2009
Samples Submitted: September 18, 2009
Laboratory Reference: 0909-181
Project: 555-1647-019 02/0203 / Landing

NWTPH-Gx/BTEX
SB/SBD QUALITY CONTROL

Date Extracted: 9-22-09
Date Analyzed: 9-22-09

Matrix: Water
Units: ug/L (ppb)

Spike Level: 50.0 ppb

Lab ID:	SB0922W1 **SB**	Percent Recovery	SBD0922W1 **SBD**	Percent Recovery	**RPD**	**Flags**
Benzene	**49.6**	**99**	**51.6**	**103**	4	
Toluene	**53.2**	**106**	**55.8**	**112**	5	
Ethyl Benzene	**55.8**	**112**	**59.0**	**118**	6	
m,p-Xylene	**56.8**	**114**	**59.7**	**119**	5	
o-Xylene	**55.9**	**112**	**59.0**	**118**	5	

Surrogate Recovery:			
Fluorobenzene	98%		98%

Date of Report: October 1, 2009
Samples Submitted: September 18, 2009
Laboratory Reference: 0909-181
Project: 555-1647-019 02/0203 / Landing

NWTPH-Dx

Date Extracted:	9-24-09
Date Analyzed:	9-24-09
Matrix:	Water
Units:	mg/L (ppm)

Client ID:	**BB-3-R**
Lab ID:	09-181-01
Diesel Range:	**ND**
PQL:	0.31
Identification:	---
Lube Oil Range:	**ND**
PQL:	0.50
Identification:	---
Surrogate Recovery	
o-Terphenyl:	97%
Flags:	Y

Date of Report: October 1, 2009
Samples Submitted: September 18, 2009
Laboratory Reference: 0909-181
Project: 555-1647-019 02/0203 / Landing

NWTPH-Dx
METHOD BLANK QUALITY CONTROL

Date Extracted:	9-24-09
Date Analyzed:	9-24-09
Matrix:	Water
Units:	mg/L (ppm)

Lab ID:	MB0924W1
Diesel Range:	**ND**
PQL:	0.25
Identification:	---
Lube Oil Range:	**ND**
PQL:	0.40
Identification:	---
Surrogate Recovery	
o-Terphenyl:	80%
Flags:	Y

Date of Report: October 1, 2009
Samples Submitted: September 18, 2009
Laboratory Reference: 0909-181
Project: 555-1647-019 02/0203 / Landing

NWTPH-Dx
DUPLICATE QUALITY CONTROL

Date Extracted: 9-24-09
Date Analyzed: 9-24-09

Matrix: Water
Units: mg/L (ppm)

Lab ID:	09-181-01	09-181-01 DUP
Diesel Range:	**ND**	**ND**
PQL:	0.31	0.29
RPD:	N/A	
Surrogate Recovery		
o-Terphenyl:	97%	83%
Flags:	Y	Y

Date of Report: October 1, 2009
Samples Submitted: September 18, 2009
Laboratory Reference: 0909-181
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
Page 1 of 2

Date Extracted:	9-23-09
Date Analyzed:	9-23-09
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	09-181-01
Client ID:	**BB-3-R**

Compound	**Results**	**Flags**	**PQL**
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		1.0
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		1.0
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	1.2	H	1.0
(trans) 1,2-Dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20

Date of Report: October 1, 2009
Samples Submitted: September 18, 2009
Laboratory Reference: 0909-181
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B

Lab ID: 09-181-01
Client ID: BB-3-R

Compound	**Results**	**Flags**	**PQL**
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	ND		0.20
1,3-Dichloropropane	ND		0.20
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	**Percent Recovery**	**Control Limits**
Dibromofluoromethane	97	71-126
Toluene-d8	91	76-116
4-Bromofluorobenzene	81	70-123

Date of Report: October 1, 2009
Samples Submitted: September 18, 2009
Laboratory Reference: 0909-181
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
Page 1 of 2

Date Extracted:	9-23-09
Date Analyzed:	9-23-09
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	09-181-02
Client ID:	**BB-3-16**

Compound	**Results**	**Flags**	**PQL**
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		1.0
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		1.0
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
Bromochloromethane	ND		0.20
Chloroform	0.82		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	0.22		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20

Date of Report: October 1, 2009
Samples Submitted: September 18, 2009
Laboratory Reference: 0909-181
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
Page 2 of 2

Lab ID: 09-181-02
Client ID: BB-3-16

Compound	**Results**	**Flags**	**PQL**
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	0.52		0.20
1,3-Dichloropropane	ND		0.20
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	**Percent Recovery**	**Control Limits**
Dibromofluoromethane	98	71-126
Toluene-d8	92	76-116
4-Bromofluorobenzene	80	70-123

Date of Report: October 1, 2009
Samples Submitted: September 18, 2009
Laboratory Reference: 0909-181
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
Page 1 of 2

Date Extracted: 9-23-09
Date Analyzed: 9-23-09

Matrix: Water
Units: ug/L (ppb)

Lab ID: 09-181-03
Client ID: BB-2-17

Compound	**Results**	**Flags**	**PQL**
Dichlorodifluoromethane	ND		0.40
Chloromethane	ND		2.0
Vinyl Chloride	ND		0.40
Bromomethane	ND		0.40
Chloroethane	ND		2.0
Trichlorofluoromethane	ND		0.40
1,1-Dichloroethene	ND		0.40
Iodomethane	ND		2.0
Methylene Chloride	ND		2.0
(trans) 1,2-Dichloroethene	ND		0.40
1,1-Dichloroethane	ND		0.40
2,2-Dichloropropane	ND		0.40
(cis) 1,2-Dichloroethene	ND		0.40
Bromochloromethane	ND		0.40
Chloroform	ND		0.40
1,1,1-Trichloroethane	ND		0.40
Carbon Tetrachloride	ND		0.40
1,1-Dichloropropene	ND		0.40
1,2-Dichloroethane	ND		0.40
Trichloroethene	ND		0.40
1,2-Dichloropropane	ND		0.40
Dibromomethane	ND		0.40
Bromodichloromethane	ND		0.40
2-Chloroethyl Vinyl Ether	ND		2.0
(cis) 1,3-Dichloropropene	ND		0.40
(trans) 1,3-Dichloropropene	ND		0.40

Date of Report: October 1, 2009
Samples Submitted: September 18, 2009
Laboratory Reference: 0909-181
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
Page 2 of 2

Lab ID: 09-181-03
Client ID: BB-2-17

Compound	**Results**	**Flags**	**PQL**
1,1,2-Trichloroethane	ND		0.40
Tetrachloroethene	79		0.40
1,3-Dichloropropane	ND		0.40
Dibromochloromethane	ND		0.40
1,2-Dibromoethane	ND		0.40
Chlorobenzene	ND		0.40
1,1,1,2-Tetrachloroethane	ND		0.40
Bromoform	ND		2.0
Bromobenzene	ND		0.40
1,1,2,2-Tetrachloroethane	ND		0.40
1,2,3-Trichloropropane	ND		0.40
2-Chlorotoluene	ND		0.40
4-Chlorotoluene	ND		0.40
1,3-Dichlorobenzene	ND		0.40
1,4-Dichlorobenzene	ND		0.40
1,2-Dichlorobenzene	ND		0.40
1,2-Dibromo-3-chloropropane	ND		2.0
1,2,4-Trichlorobenzene	ND		0.40
Hexachlorobutadiene	ND		0.40
1,2,3-Trichlorobenzene	ND		0.40

Surrogate	**Percent Recovery**	**Control Limits**
Dibromofluoromethane	97	71-126
Toluene-d8	92	76-116
4-Bromofluorobenzene	83	70-123

Date of Report: October 1, 2009
Samples Submitted: September 18, 2009
Laboratory Reference: 0909-181
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
METHOD BLANK QUALITY CONTROL
Page 1 of 2

Date Extracted: 9-23-09
Date Analyzed: 9-23-09

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0923W1

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		1.0
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		1.0
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20

Date of Report: October 1, 2009
Samples Submitted: September 18, 2009
Laboratory Reference: 0909-181
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
METHOD BLANK QUALITY CONTROL
Page 2 of 2

Lab ID: MB0923W1

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	ND		0.20
1,3-Dichloropropane	ND		0.20
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	97	71-126
Toluene-d8	92	76-116
4-Bromofluorobenzene	81	70-123

Date of Report: October 1, 2009
Samples Submitted: September 18, 2009
Laboratory Reference: 0909-181
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
SB/SBD QUALITY CONTROL

Date Extracted: 9-23-09
Date Analyzed: 9-23-09

Matrix: Water
Units: ug/L (ppb)

Lab ID: SB0923W1

Compound	Spike Amount	SB	Percent Recovery	SBD	Percent Recovery	Recovery Limits	Flags
1,1-Dichloroethene	10.0	8.59	86	9.00	90	70-130	
Benzene	10.0	9.55	96	10.2	102	70-130	
Trichloroethene	10.0	9.97	100	10.5	105	70-123	
Toluene	10.0	10.1	101	10.5	105	77-120	
Chlorobenzene	10.0	9.34	93	9.66	97	73-115	

	RPD	RPD Limit	Flags
1,1-Dichloroethene	5	21	
Benzene	7	18	
Trichloroethene	5	18	
Toluene	4	17	
Chlorobenzene	3	18	

Date of Report: October 1, 2009
Samples Submitted: September 18, 2009
Laboratory Reference: 0909-181
Project: 555-1647-019 02/0203 / Landing

PAHs by EPA 8270D/SIM

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**BB-3-R**					
Laboratory ID:	09-181-01					
Naphthalene	**ND**	0.10	EPA 8270/SIM	9-22-09	9-22-09	
2-Methylnaphthalene	**ND**	0.10	EPA 8270/SIM	9-22-09	9-22-09	
1-Methylnaphthalene	**ND**	0.10	EPA 8270/SIM	9-22-09	9-22-09	
Acenaphthylene	**ND**	0.10	EPA 8270/SIM	9-22-09	9-22-09	
Acenaphthene	**ND**	0.10	EPA 8270/SIM	9-22-09	9-22-09	
Fluorene	**ND**	0.10	EPA 8270/SIM	9-22-09	9-22-09	
Phenanthrene	**ND**	0.10	EPA 8270/SIM	9-22-09	9-22-09	
Anthracene	**ND**	0.10	EPA 8270/SIM	9-22-09	9-22-09	
Fluoranthene	**ND**	0.10	EPA 8270/SIM	9-22-09	9-22-09	
Pyrene	**ND**	0.10	EPA 8270/SIM	9-22-09	9-22-09	
Benzo[a]anthracene	**ND**	0.010	EPA 8270/SIM	9-22-09	9-22-09	
Chrysene	**ND**	0.010	EPA 8270/SIM	9-22-09	9-22-09	
Benzo[b]fluoranthene	**ND**	0.010	EPA 8270/SIM	9-22-09	9-22-09	
Benzo[k]fluoranthene	**ND**	0.010	EPA 8270/SIM	9-22-09	9-22-09	
Benzo[a]pyrene	**ND**	0.010	EPA 8270/SIM	9-22-09	9-22-09	
Indeno(1,2,3-c,d)pyrene	**ND**	0.010	EPA 8270/SIM	9-22-09	9-22-09	
Dibenz[a,h]anthracene	**ND**	0.010	EPA 8270/SIM	9-22-09	9-22-09	
Benzo[g,h,i]perylene	**ND**	0.010	EPA 8270/SIM	9-22-09	9-22-09	
Surrogate:	***Percent Recovery***	***Control Limits***				
2-Fluorobiphenyl	***83***	***35 - 100***				
Pyrene-d10	***86***	***27 - 108***				
Terphenyl-d14	***83***	***36 - 125***				

Date of Report: October 1, 2009
Samples Submitted: September 18, 2009
Laboratory Reference: 0909-181
Project: 555-1647-019 02/0203 / Landing

PAHs by EPA 8270D/SIM
METHOD BLANK QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB0922W1					
Naphthalene	**ND**	0.10	EPA 8270/SIM	9-22-09	9-22-09	
2-Methylnaphthalene	**ND**	0.10	EPA 8270/SIM	9-22-09	9-22-09	
1-Methylnaphthalene	**ND**	0.10	EPA 8270/SIM	9-22-09	9-22-09	
Acenaphthylene	**ND**	0.10	EPA 8270/SIM	9-22-09	9-22-09	
Acenaphthene	**ND**	0.10	EPA 8270/SIM	9-22-09	9-22-09	
Fluorene	**ND**	0.10	EPA 8270/SIM	9-22-09	9-22-09	
Phenanthrene	**ND**	0.10	EPA 8270/SIM	9-22-09	9-22-09	
Anthracene	**ND**	0.10	EPA 8270/SIM	9-22-09	9-22-09	
Fluoranthene	**ND**	0.10	EPA 8270/SIM	9-22-09	9-22-09	
Pyrene	**ND**	0.10	EPA 8270/SIM	9-22-09	9-22-09	
Benzo[a]anthracene	**ND**	0.010	EPA 8270/SIM	9-22-09	9-22-09	
Chrysene	**ND**	0.010	EPA 8270/SIM	9-22-09	9-22-09	
Benzo[b]fluoranthene	**ND**	0.010	EPA 8270/SIM	9-22-09	9-22-09	
Benzo[k]fluoranthene	**ND**	0.010	EPA 8270/SIM	9-22-09	9-22-09	
Benzo[a]pyrene	**ND**	0.010	EPA 8270/SIM	9-22-09	9-22-09	
Indeno(1,2,3-c,d)pyrene	**ND**	0.010	EPA 8270/SIM	9-22-09	9-22-09	
Dibenz[a,h]anthracene	**ND**	0.010	EPA 8270/SIM	9-22-09	9-22-09	
Benzo[g,h,i]perylene	**ND**	0.010	EPA 8270/SIM	9-22-09	9-22-09	
Surrogate:	***Percent Recovery***	***Control Limits***				
2-Fluorobiphenyl	***82***	***35 - 100***				
Pyrene-d10	***93***	***27 - 108***				
Terphenyl-d14	***87***	***36 - 125***				

Date of Report: October 1, 2009
Samples Submitted: September 18, 2009
Laboratory Reference: 0909-181
Project: 555-1647-019 02/0203 / Landing

PAHs by EPA 8270D/SIM
SB/SBD QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB0922W1									
	SB	SBD	SB	SBD	SB	SBD				
Naphthalene	**0.395**	**0.424**	0.500	0.500	79	85	35 - 111	7	30	
Acenaphthylene	**0.408**	**0.432**	0.500	0.500	82	86	30 - 109	6	30	
Acenaphthene	**0.410**	**0.441**	0.500	0.500	82	88	46 - 101	7	29	
Fluorene	**0.423**	**0.450**	0.500	0.500	85	90	50 - 104	6	25	
Phenanthrene	**0.413**	**0.438**	0.500	0.500	83	88	55 - 97	6	23	
Anthracene	**0.432**	**0.456**	0.500	0.500	86	91	49 - 101	5	32	
Fluoranthene	**0.434**	**0.452**	0.500	0.500	87	90	59 - 102	4	23	
Pyrene	**0.448**	**0.467**	0.500	0.500	90	93	62 - 104	4	22	
Benzo[a]anthracene	**0.423**	**0.437**	0.500	0.500	85	87	57 - 100	3	25	
Chrysene	**0.423**	**0.443**	0.500	0.500	85	89	58 - 103	5	25	
Benzo[b]fluoranthene	**0.429**	**0.468**	0.500	0.500	86	94	61 - 100	9	27	
Benzo[k]fluoranthene	**0.431**	**0.455**	0.500	0.500	86	91	53 - 103	5	30	
Benzo[a]pyrene	**0.425**	**0.443**	0.500	0.500	85	89	35 - 107	4	32	
Indeno(1,2,3-c,d)pyrene	**0.389**	**0.404**	0.500	0.500	78	81	47 - 105	4	34	
Dibenz[a,h]anthracene	**0.385**	**0.382**	0.500	0.500	77	76	39 - 108	1	33	
Benzo[g,h,i]perylene	**0.383**	**0.391**	0.500	0.500	77	78	41 - 104	2	40	
Surrogate:										
2-Fluorobiphenyl					***80***	***94***	***35 - 100***			
Pyrene-d10					***84***	***88***	***27 - 108***			
Terphenyl-d14					***83***	***90***	***36 - 125***			

Date of Report: October 1, 2009
Samples Submitted: September 18, 2009
Laboratory Reference: 0909-181
Project: 555-1647-019 02/0203 / Landing

TOTAL METALS
EPA 200.8/7470A

Date Extracted: 9-28&29-09
Date Analyzed: 9-29-09

Matrix: Water
Units: ug/L (ppb)

Lab ID: 09-181-01
Client ID: BB-3-R

Analyte	Method	Result	PQL
Arsenic	200.8	**ND**	3.3
Cadmium	200.8	**ND**	4.4
Chromium	200.8	**ND**	6.7
Lead	200.8	**ND**	1.1
Mercury	7470A	**ND**	0.20

Date of Report: October 1, 2009
Samples Submitted: September 18, 2009
Laboratory Reference: 0909-181
Project: 555-1647-019 02/0203 / Landing

TOTAL METALS
EPA 200.8/7470A
METHOD BLANK QUALITY CONTROL

Date Extracted: 9-28&29-09
Date Analyzed: 9-29-09

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0928W2&MB0929W2

Analyte	Method	Result	PQL
Arsenic	200.8	**ND**	3.3
Cadmium	200.8	**ND**	4.4
Chromium	200.8	**ND**	6.7
Lead	200.8	**ND**	1.1
Mercury	7470A	**ND**	0.20

Date of Report: October 1, 2009
Samples Submitted: September 18, 2009
Laboratory Reference: 0909-181
Project: 555-1647-019 02/0203 / Landing

TOTAL METALS
EPA 200.8/7470A
DUPLICATE QUALITY CONTROL

Date Extracted: 9-28&29-09
Date Analyzed: 9-29-09

Matrix: Water
Units: ug/L (ppb)

Lab ID: 09-180-02

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Arsenic	**ND**	**ND**	NA	3.3	
Cadmium	**ND**	**ND**	NA	4.4	
Chromium	**ND**	**ND**	NA	6.7	
Lead	**ND**	**ND**	NA	1.1	
Mercury	**ND**	**ND**	NA	0.20	

Date of Report: October 1, 2009
Samples Submitted: September 18, 2009
Laboratory Reference: 0909-181
Project: 555-1647-019 02/0203 / Landing

TOTAL METALS
EPA 200.8/7470A
MS/MSD QUALITY CONTROL

Date Extracted: 9-28&29-09
Date Analyzed: 9-29-09

Matrix: Water
Units: ug/L (ppb)

Lab ID: 09-180-02

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Arsenic	110	**111**	101	**109**	99	2	
Cadmium	110	**115**	104	**112**	102	2	
Chromium	110	**109**	99	**106**	96	3	
Lead	110	**114**	104	**112**	102	1	
Mercury	12.5	**11.8**	94	**11.8**	94	0	

OnSite
Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in the diesel range are impacting the lube oil range result.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical ____________.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

Y - Sample extract treated with an acid/silica gel cleanup procedure.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

OnSite Environmental Inc.
Phone: (425) 883-3881 • Fax: (425) 885-4603

Chain of Custody

Company: PMX

Project Number:

Project Name: Bothell Crossing, Landing

Project Manager: David Dinkuhn

Sampled by: L. Vagelatos

Turnaround Request (in working days)

(Check One)

- ☐ Same Day
- ☐ 1 Day
- ☐ 2 Day
- ☐ 3 Day
- ☐ Standard (7 working days) (TPH analysis 5 working days)
- ☐ ______ (other)

Laboratory Number: 09-181

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270D	PAHs by 8270D / SIM	PCBs by 8082	Pesticides by 8081A	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664	MTCA Metals As, Cr, Cd, Hg, Pb	Total ~~Pb~~ As ~~Pb~~	Diss. As				% Moisture
1	BB-3-R	9/17/09	1550	H_2O	10		X	X		X		X							X						
2	BB-3-16	9/17/09	1510	H_2O	3					X															
3	BB-2-12	9/18/09	0845	H_2O	3					X															

	Signature	Company	Date	Time
Relinquished by	Lily Vagelatos	Parametrix	9/18/09	1650
Received by	[illegible]	OnSite Env	9/18/09	1650
Relinquished by				
Received by				
Relinquished by				
Received by				

Comments/Special Instructions:

Reviewed by/Date

Reviewed by/Date

Chromatograms with final report ☐

DISTRIBUTION LEGEND: White - OnSite Copy Yellow - Report Copy Pink - Client Copy

OnSite Environmental Inc.
14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

September 30, 2009

David Dinkuhn
Parametrix, Inc.
4660 Kitsap Way, Suite A
Bremerton, WA 98312

Re: Analytical Data for Project 555-1647-019 02/0203 / Landing
Laboratory Reference No. 0909-226

Dear David:

Enclosed are the analytical results and associated quality control data for samples submitted on September 24, 2009.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: September 30, 2009
Samples Submitted: September 24, 2009
Laboratory Reference: 0909-226
Project: 555-1647-019 02/0203 / Landing

Case Narrative

Samples were collected on September 24, 2009, and received by the laboratory on September 24, 2009. They were maintained at the laboratory at a temperature of $2^{o}C$ to $6^{o}C$ except as noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Date of Report: September 30, 2009
Samples Submitted: September 24, 2009
Laboratory Reference: 0909-226
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
Page 1 of 2

Date Extracted:	9-25-09
Date Analyzed:	9-25-09
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	09-226-01
Client ID:	**D-B1-3**

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		1.0
Vinyl Chloride	1.4		0.20
Bromomethane	ND		0.20
Chloroethane	ND		1.0
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	5.1		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	1.2		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20

Date of Report: September 30, 2009
Samples Submitted: September 24, 2009
Laboratory Reference: 0909-226
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
Page 2 of 2

Lab ID: 09-226-01
Client ID: D-B1-3

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	6.9		0.20
1,3-Dichloropropane	ND		0.20
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	94	71-126
Toluene-d8	94	76-116
4-Bromofluorobenzene	83	70-123

Date of Report: September 30, 2009
Samples Submitted: September 24, 2009
Laboratory Reference: 0909-226
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
Page 1 of 2

Date Extracted:	9-25-09
Date Analyzed:	9-25-09
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	09-226-02
Client ID:	**B1-3**

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		1.0
Vinyl Chloride	1.3		0.20
Bromomethane	ND		0.20
Chloroethane	ND		1.0
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	5.3		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	1.2		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20

Date of Report: September 30, 2009
Samples Submitted: September 24, 2009
Laboratory Reference: 0909-226
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
Page 2 of 2

Lab ID: 09-226-02
Client ID: B1-3

Compound	**Results**	**Flags**	**PQL**
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	6.8		0.20
1,3-Dichloropropane	ND		0.20
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	**Percent Recovery**	**Control Limits**
Dibromofluoromethane	94	71-126
Toluene-d8	93	76-116
4-Bromofluorobenzene	84	70-123

Date of Report: September 30, 2009
Samples Submitted: September 24, 2009
Laboratory Reference: 0909-226
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
Page 1 of 2

Date Extracted:	9-25-09
Date Analyzed:	9-25-09
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	09-226-03
Client ID:	**Trip Blank**

Compound	**Results**	**Flags**	**PQL**
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		1.0
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		1.0
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20

Date of Report: September 30, 2009
Samples Submitted: September 24, 2009
Laboratory Reference: 0909-226
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
Page 2 of 2

Lab ID: 09-226-03
Client ID: **Trip Blank**

Compound	**Results**	**Flags**	**PQL**
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	ND		0.20
1,3-Dichloropropane	ND		0.20
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	**Percent Recovery**	**Control Limits**
Dibromofluoromethane	98	71-126
Toluene-d8	93	76-116
4-Bromofluorobenzene	81	70-123

Date of Report: September 30, 2009
Samples Submitted: September 24, 2009
Laboratory Reference: 0909-226
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
METHOD BLANK QUALITY CONTROL

Date Extracted: 9-25-09
Date Analyzed: 9-25-09

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0925W1

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		1.0
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		1.0
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Iodomethane	ND		1.0
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
Bromochloromethane	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	ND		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20

Date of Report: September 30, 2009
Samples Submitted: September 24, 2009
Laboratory Reference: 0909-226
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
METHOD BLANK QUALITY CONTROL
Page 2 of 2

Lab ID: MB0925W1

Compound	Results	Flags	PQL
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	ND		0.20
1,3-Dichloropropane	ND		0.20
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		1.0
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		0.20
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	98	71-126
Toluene-d8	91	76-116
4-Bromofluorobenzene	82	70-123

Date of Report: September 30, 2009
Samples Submitted: September 24, 2009
Laboratory Reference: 0909-226
Project: 555-1647-019 02/0203 / Landing

HALOGENATED VOLATILES by EPA 8260B
SB/SBD QUALITY CONTROL

Date Extracted: 9-25-09
Date Analyzed: 9-25-09

Matrix: Water
Units: ug/L (ppb)

Lab ID: SB0925W1

Compound	Spike Amount	SB	Percent Recovery	SBD	Percent Recovery	Recovery Limits	Flags
1,1-Dichloroethene	10.0	8.92	89	8.92	89	70-130	
Benzene	10.0	9.92	99	10.2	102	70-130	
Trichloroethene	10.0	10.7	107	10.8	108	70-123	
Toluene	10.0	10.5	105	10.8	108	77-120	
Chlorobenzene	10.0	9.54	95	9.57	96	73-115	

	RPD	RPD Limit	Flags
1,1-Dichloroethene	0	21	
Benzene	2	18	
Trichloroethene	1	18	
Toluene	2	17	
Chlorobenzene	0	18	

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in the diesel range are impacting the lube oil range result.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical ____________.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

Y - Sample extract treated with an acid/silica gel cleanup procedure.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

OnSite Environmental Inc.
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Chain of Custody

Laboratory Number: 09-226

Company: Parametrix

Project Number: 555 1647 019 02 0203

Project Name: Bothell Crossing Landing

Project Manager: David Dinkuhn

Sampled by: S. Matthews

Turnaround Request (in working days)

(Check One)

- ☐ Same Day
- ☐ 1 Day
- ☐ 2 Day
- ☐ 3 Day
- ☒ Standard (7 working days) (TPH analysis 5 working days)
- ☐ ______ (other)

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270D / SIM	PAHs by 8270D / SIM	PCBs by 8082	Pesticides by 8081A	Herbicides by 8151A	Total RCRA Metals (8)	TCLP Metals	HEM by 1664							% Moisture
1	D-B1-3	9/24/09	1450	W	3					X															
2	B1-3	↓	1530	↓	3					X															
3	Trip Blank	↓		↓	2					X															

	Signature	Company	Date	Time
Relinquished by	S. Matthews	PMX	9/24/09	1605
Received by	[signature]	OSE	9/24/09	16:05
Relinquished by				
Received by				
Relinquished by				
Received by				

Comments/Special Instructions:

Reviewed by/Date

Reviewed by/Date

Chromatograms with final report ☐

DISTRIBUTION LEGEND: White - OnSite Copy Yellow - Client Copy

APPENDIX C3

Physical Laboratory Reports

OnSite Environmental Inc.
14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

October 21, 2009

David Dinkuhn
Parametrix, Inc.
4660 Kitsap Way, Suite A
Bremerton, WA 98312

Re: Analytical Data for Project 555-1647-019 02/0203, Landing
Laboratory Reference No. 0910-170

Dear David:

Enclosed are the analytical results and associated quality control data for samples submitted on September 8, 2009.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

HWA GEOSCIENCES INC.
Geotechnical & Pavement Engineering • Hydrogeology • Geoenvironmental • Inspection & Testing

October 21, 2009
HWA Project No. 2007-098-23 Task 801

On-Site Environmental, Inc.
14648 NE 95th Street
Redmond, Washington 98052

Attention: Mr. David Baumeister

Subject: **SOIL LABORATORY TESTING REPORT**
Physical Properties and Hydraulic Conductivity
Bothell Landing
Bothell, Washington

Dear Mr. Baumeister;

As requested, HWA GeoSciences Inc. (HWA) performed laboratory testing for the subject project. Herein we present the results of our laboratory analyses, which are summarized on the attached reports. The laboratory testing program was performed in general accordance with your instructions and appropriate ASTM Standards as outlined below.

SAMPLE DESCRIPTION: The subject project soil samples were delivered to our laboratory on September 8, 2009 by OSE personnel. The samples were enclosed in brass rings and plastic bags. We understand than some of the samples are potentially contaminated.

MOISTURE CONTENT OF SOIL: The moisture content of the samples were determined in general accordance with **ASTM D 2216**. The indicated moisture content is based on the dry weight of soil, and is presented in Figure 1.

PARTICLE SIZE ANALYSIS OF SOILS: Selected samples were tested to determine the particle distribution of material in general accordance with **ASTM D422 (wet sieve method)**. The results are summarized on the attached Particle Size Analysis reports, Figure 1, which also provides information regarding the classification of the sample and the moisture content at the time of testing.

LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS (ATTERBERG LIMITS): Selected samples were tested using method **ASTM D 4318**. One of the samples consisted of sand and was non-plastic. An attempt was made to run the silt sample, but it also was non-plastic. The results are reported on the attached Liquid Limit, Plastic Limit, and Plasticity Index report, Figure 2.

19730 - 64th Avenue W.
Suite 200
Lynnwood, WA 98036.5957

Tel: 425.774.0106
Fax: 425.774.2714
www.hwageo.com

MOISTURE CONTENT, ASH, AND ORGANIC MATTER: Selected samples were tested in general accordance with method **ASTM D 2974**, using ash content method 'C' (burned at 440° C). The test results are summarized below. The results are percent by weight of dry soil.

Table 1 – Organic Material Content of Soils

Sample	Ash Content (%)	Organic Content (%)
BLMW-8 @ 15 ft	99.12	0.88
BLMW-8 @ 20 ft	99.37	0.63

PERMEABILITY OF GRANULAR SOILS (CONSTANT HEAD METHOD): Initially, an attempt was made to measure the hydraulic conductivity of sample BPMW-8 at 20 ft in a flexible wall apparatus. However, the permeability was too high for that method to work accurately. The sample was then transferred to a rigid wall apparatus and the conductivity was measured in general accordance with method **ASTM D2434**. The results are summarized in Table 2 below:

Table 2 – Permeability of Granular Soils

Sample	Moisture Content (%)	Dry Density (PCF)	Hydraulic Conductivity (cm/sec)
BLMW-8 @ 20 Feet	20.0	109.7	2.4×10^{-3}

HYDRAULIC CONDUCTIVITY OF SOIL (FLEXI-WALL TRIAXIAL CHAMBER METHOD): The hydraulic conductivity of sample BLMW-8 @ 15 ft was measured in general accordance with method **ASTM D5084**. The sample was removed from the brass rings, trimmed, and weighed prior to placement within a flexible membrane within a triaxial pressure chamber. An effective confining pressure of 1.5 psi was applied to simulate near-surface ground conditions. Saturation was induced by subjecting the test specimen to a flow gradient of about 5 generated by a back-pressure differential of 2 psi and testing was conducted until inflow was approximately equal to outflow and the hydraulic conductivity was essential steady. The test results are presented in detail on Figure 3.

CLOSURE: Experience has shown that test values on soil and other natural materials vary with each representative sample. As such, HWA has no knowledge as to the extent and quantity of material the tested samples may represent. HWA also makes no warranty as to how representative either the samples tested or the test results obtained are to actual field conditions. It is a well established fact that sampling methods present varying degrees of disturbance that affect sample representativeness.

No copy should be made of this report except in its entirety.

We appreciate the opportunity to provide laboratory testing services on this project. Should you have any questions or comments, or if we may be of further service, please call.

Sincerely,

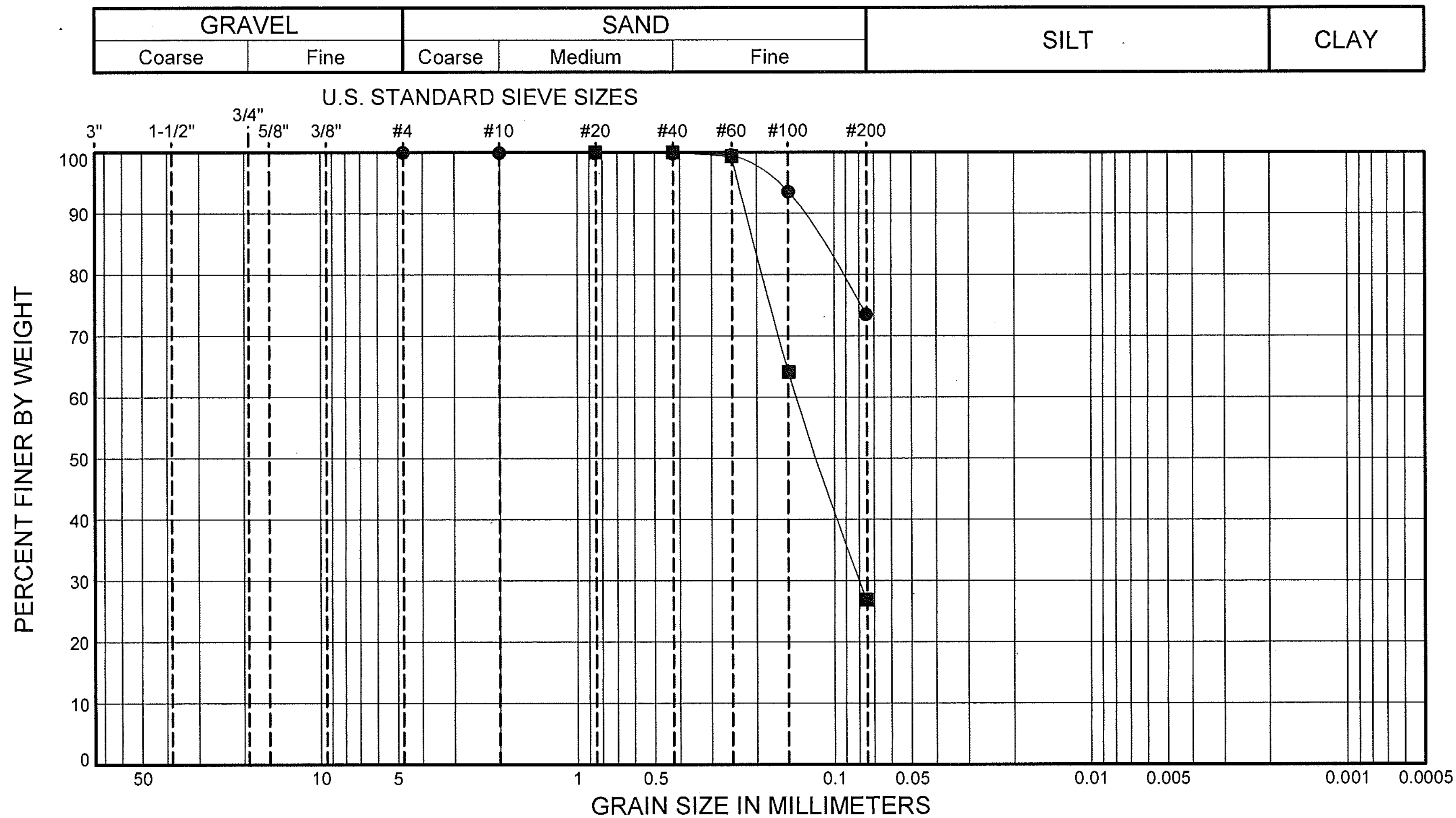
HWA GEOSCIENCES INC.

Harold Benny
Materials Laboratory Manager

Steven E. Greene, L.G., L.E.G.
Vice President

Attachments

Figure 1	Particle Size Analysis of Soils
Figure 2	Liquid Limit, Plastic Limit and Plasticity Index of Soils
Figure 3	Hydraulic Conductivity of Soils



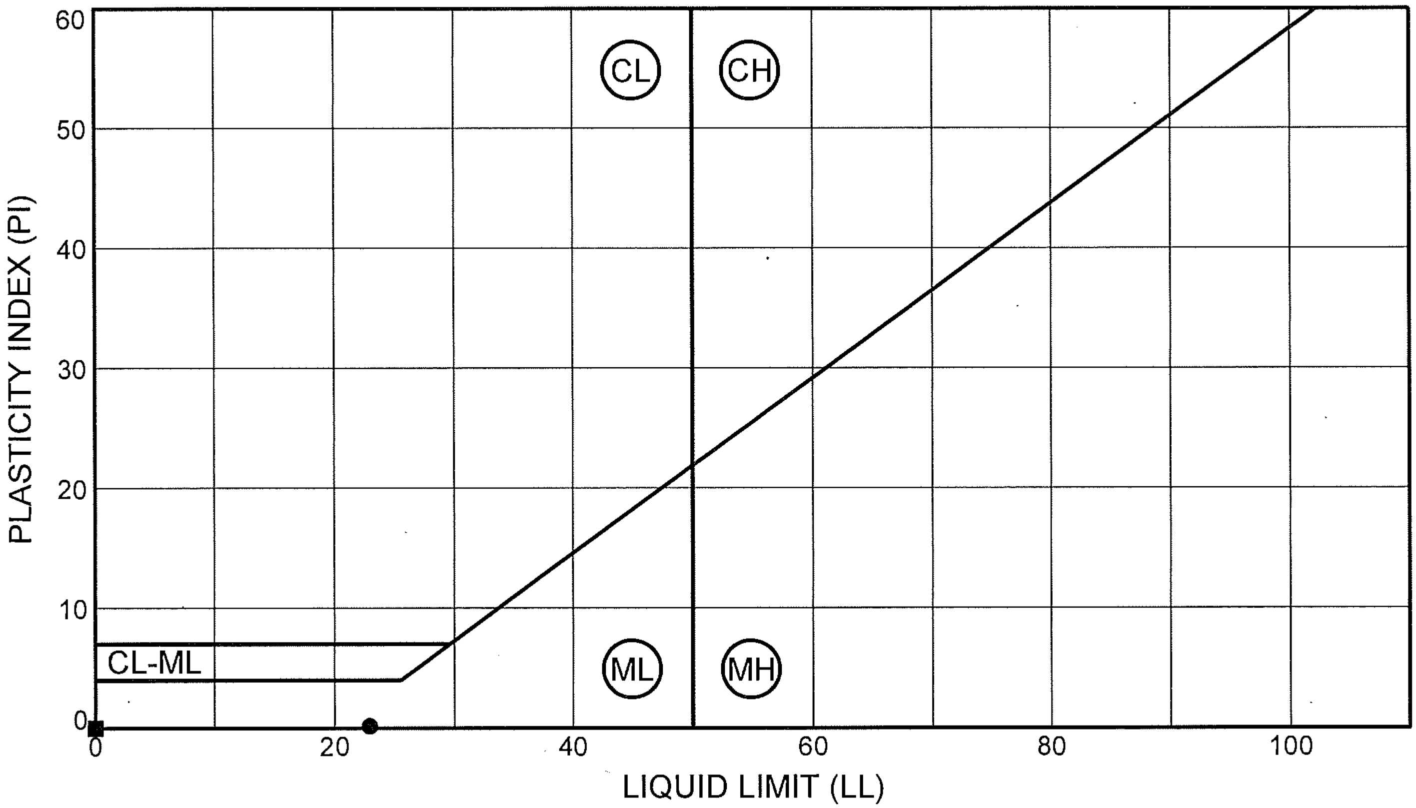
SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION OF SOIL- ASTM D2487 Group Symbol and Name	% MC	LL	PL	PI	Gravel %	Sand %	Fines %
●	BLMW8		15.0 - 16.0	(ML) Grayish brown, SILT with sand (0.88% organics)	21	23	23	NP	0.0	26.5	73.5
■	BLMW8		20.0 - 21.0	(SM) Gray, silty SAND (0.63% organics)	18	NP	NP	NP	0.0	73.1	26.9

HWA GEOSCIENCES INC.

Bothell Landing
On-Site Environmental

PARTICLE-SIZE ANALYSIS OF SOILS METHOD ASTM D422

PROJECT NO.: 2007-098 T801 FIGURE: 1



SYMBOL	SAMPLE		DEPTH (ft)	CLASSIFICATION	% MC	LL	PL	PI	% Fines
●	BLMW8		15.0 - 16.0	(ML) Grayish brown, SILT with sand (0.88% organics)	21	23	23	NP	73.5
■	BLMW8		20.0 - 21.0	(SM) Gray, silty SAND (0.63% organics)	18	NP	NP	NP	26.9

HWA GEOSCIENCES INC.

Bothell Landing
On-Site Environmental

LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS METHOD ASTM D4318

PROJECT NO.: 2007-098 T801 FIGURE: 2

Hydraulic Conductivity (a.k.a. Permeability) Test Report

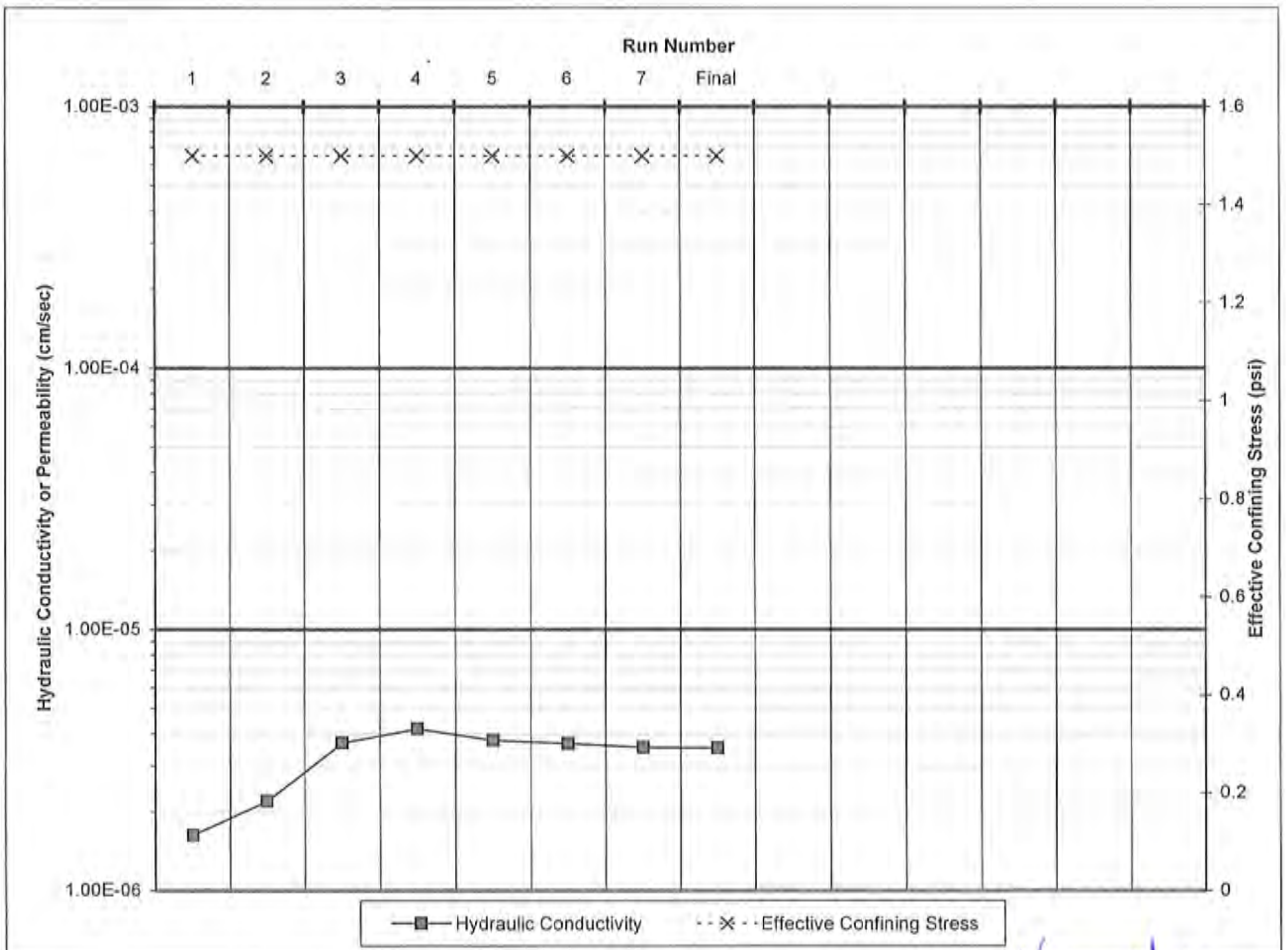
Method ASTM D 5084

HWA GEOSCIENCES INC.

Project	Bothell RI/FS
Client	City of Bothell
Project number	2007-098
Date	09/16/2009
Technician	HB
Sample point	BLMW-8
Sample number	15
Sample depth	15
Sample description	SILT with sand (ML)

Assumed Specific Gravity	2.65		
Initial Sample Area (cm2)	28.94	Final Sample Area (cm2)	28.94
Initial Sample Length (cm)	12.51	Final Sample Length (cm)	12.51
Initial Sample Volume (cc)	362.2	Final Sample Volume (cc)	362.2
Initial moisture (%)	21.5	Final moisture (%)	20.7
Initial wet unit wt. (pcf)	128.9	Final wet unit weight (pcf)	129.7
Initial dry unit wt. (pcf)	106.1	Final dry unit weight (pcf)	107.4
Initial void ratio	0.559	Final void ratio	0.539
Initial porosity	0.358	Final porosity	0.350
Initial saturation (%)	102.0	Final saturation (%)	101.8

Run No.	Hydraulic Conductivity (cm/s)	Running Average of 4 Readings (cm/s)	Maximum % Deviation from Average (should be less than 25%)	Flow Ratio (0.75 to 1.25 required)	Effective Confining Stress (psi)	Other Information
1	1.6E-06	n.a.		0.75	1.5	Maximum Gradient
2	2.2E-06	n.a.		1.08	1.5	7.1
3	3.7E-06	n.a.		0.95	1.5	Minimum Gradient
4	4.2E-06	2.9E-06	44.2%	0.65	1.5	3.4
5	3.8E-06	3.4E-06	36.3%	1.00	1.5	Max. Back Pressure (psi)
6	3.7E-06	3.8E-06	9.1%	1.00	1.5	18.0
7	3.5E-06	3.8E-06	10.1%	0.95	1.5	Min. Back Pressure (psi)
Final	3.5E-06	$\boxed{3.6E-06}$	4.0%	1.06	1.5	18.0



Checked by: [signature]

FIGURE: 3

APPENDIX C4

Data Tables

Historical Soil Analytical Results

PARAMETERS	Units	Analytical Method	MTCA A	MTCA B soil to gw	Ecological Indicator Conc.	Sample No.: Depth (ft): Background	B1-6 6 4/6/2009	B2-7 7 4/2/2009	B3-9 9 4/3/2009	B7-9 9 4/1/2009	BC-6-2.5 2.5 6/23/2008	BC-7-7.5 7.5 06/02/2008	BC-8-7.5 7.5 06/02/2008	BH-2-6 6 7/9/2007	BH-3-6 6 7/9/2007
PETROLEUM HYDROCARBONS															
Diesel	mg/kg	NWTPH-Dx	2,000		200		- -	- -	46 U	- -	31 U	29 U	36 U	25.00 U	**9,300.00**
Motor Oil	mg/kg	NWTPH-Dx	2,000				- -	- -	2,400	- -	63 U	57 U	71 U	50.00 U	1,000.00 U
Gasoline	mg/kg	NWTPH-Gx	30/100*G		100		- -	- -	**720**	- -	6.7 U	6.3 U	8.5 U	3.00 U	**1,200.00**
Benzene	µg/kg	SW8021	30	4.483			- -	- -	0.006	- -	0.02 U	1.1 U	0.02 U	30 U	390
Toluene	µg/kg	SW8021	7,000		200,000		- -	- -	0.0011	- -	0.067 U	5.4 U	0.085 U	50 U	1300
Ethylbenzene	µg/kg	SW8021	6,000				- -	- -	0.012	- -	0.067 U	1.1 U	0.085 U	50 U	1200
m,p-Xylene	µg/kg	SW8021	9,000*XY				- -	- -	0.011	- -	0.067 U	2.2 U	0.085 U	- -	- -
o-Xylene	µg/kg	SW8021	9,000*XY				- -	- -	**0.00051**	- -	0.067 U	1.1 U	0.085 U	- -	- -
Total Xylenes	µg/kg	SW8021	9,000*XY				- -	- -	- -	- -	- -	- -	- -	200 U	2700
METALS															
Arsenic	mg/kg	SW6010	20	2.803	7	7.30	- -	- -	- -	- -	- -	- -	- -	- -	5.00 U
Barium	mg/kg	SW6010			102		- -	- -	- -	- -	- -	- -	- -	- -	44.00
Cadmium	mg/kg	SW6010	2	0.69	4	0.77	- -	- -	- -	- -	- -	- -	- -	- -	1.00 U
Chromium	mg/kg	SW6010	2,000*CR		42	48.15	- -	- -	- -	- -	- -	- -	- -	- -	31.00
Lead	mg/kg	SW6010	250	250	50	16.83	- -	- -	- -	- -	- -	- -	- -	- -	5.00 U
Selenium	mg/kg	SW6010			0.3		- -	- -	- -	- -	- -	- -	- -	- -	5.00 U
Silver	mg/kg	SW6010			2		- -	- -	- -	- -	- -	- -	- -	- -	5.00 U
Mercury	mg/kg	SW7471A	2	2.088	0.1	0.07	- -	- -	- -	- -	- -	- -	- -	- -	0.02
VOLATILE ORGANICS															
2-Butanone	µg/kg	SW8260					- -	- -	- -	- -	- -	19	- -	- -	- -
2-Chloroethyl Vinyl Ether	µg/kg	SW8260					4.9 U	7.9 U	940 U	5.2 U	- -	5.4 U	- -	- -	- -
2-Chlorotoluene	µg/kg	SW8260					0.99 U	1.6 U	190 U	1.0 U	- -	1.1 U	- -	- -	100.00 U
2-Hexanone	µg/kg	SW8260					- -	- -	- -	- -	- -	5.4 U	- -	- -	- -
4-Chlorotoluene	µg/kg	SW8260					0.99 U	1.6 U	190 U	1.0 U	- -	1.1 U	- -	- -	100.00 U
Acetone	µg/kg	SW8260					- -	- -	- -	- -	- -	96	- -	- -	- -
Bromobenzene	µg/kg	SW8260					0.99 U	1.6 U	190 U	1.0 U	- -	1.1 U	- -	- -	100.00 U
Bromochloromethane	µg/kg	SW8260					0.99 U	1.6 U	190 U	1.0 U	- -	1.1 U	- -	- -	100.00 U
Bromodichloromethane	µg/kg	SW8260					0.99 U	1.6 U	190 U	1.0 U	- -	1.1 U	- -	- -	100.00 U
Bromoform	µg/kg	SW8260					0.99 U	1.6 U	190 U	1.0 U	- -	1.1 U	- -	- -	100.00 U
Bromomethane	µg/kg	SW8260					0.99 U	1.6 U	190 U	1.0 U	- -	1.1 U	- -	- -	100.00 U
Carbon Disulfide	µg/kg	SW8260					- -	- -	- -	- -	- -	1.1 U	- -	- -	- -
Carbon Tetrachloride	µg/kg	SW8260					0.99 U	1.6 U	190 U	1.0 U	- -	1.1 U	- -	- -	100.00 U
Chlorobenzene	µg/kg	SW8260			40,000		0.99 U	1.6 U	190 U	1.0 U	- -	1.1 U	- -	- -	100.00 U
Chloroethane	µg/kg	SW8260					4.9 U	7.9 U	940 U	5.2 U	- -	5.4 U	- -	- -	100.00 U
Chloroform	µg/kg	SW8260					0.99 U	1.6 U	190 U	1.0 U	- -	1.1 U	- -	- -	100.00 U
Chloromethane	µg/kg	SW8260					4.9 U	7.9 U	940 U	5.2 U	- -	5.4 U	- -	- -	100.00 U
cis-1,2-Dichloroethene	µg/kg	SW8260					0.99 U	1.6 U	190 U	1.0 U	- -	1.1 U	- -	- -	100.00 U
cis-1,3-Dichloropropene	µg/kg	SW8260					0.99 U	1.6 U	190 U	1.0 U	- -	1.1 U	- -	- -	100.00 U
Dibromochloromethane	µg/kg	SW8260					0.99 U	1.6 U	190 U	1.0 U	- -	1.1 U	- -	- -	100.00 U
Dibromomethane	µg/kg	SW8260					0.99 U	1.6 U	190 U	1.0 U	- -	1.1 U	- -	- -	100.00 U
Dichlorodifluoromethane	µg/kg	SW8260					0.99 U	1.6 U	190 U	1.0 U	- -	5.4 U	- -	- -	100.00 U
Hexachlorobutadiene	µg/kg	SW8260					4.9 U	7.9 U	940 U	5.2 U	- -	5.4 U	- -	- -	100.00 U
Isopropylbenzene	µg/kg	SW8260					- -	- -	- -	- -	- -	1.1 U	- -	- -	- -
Methyl Iodide	µg/kg	SW8260					4.9 U	7.9 U	940 U	5.2 U	- -	5.4 U	- -	- -	- -
Methyl Isobutyl Ketone	µg/kg	SW8260					- -	- -	- -	- -	- -	5.4 U	- -	- -	- -
Methyl t-Butyl Ether	µg/kg	SW8260	100				- -	- -	- -	- -	- -	1.1 U	- -	- -	- -

Historical Soil Analytical Results

PARAMETERS	Units	Analytical Method	MTCA A	MTCA B soil to gw	Ecological Indicator Conc.	Sample No.: Depth (ft): Background	B1-6 6 4/6/2009	B2-7 7 4/2/2009	B3-9 9 4/3/2009	B7-9 9 4/1/2009	BC-6-2.5 2.5 6/23/2008	BC-7-7.5 7.5 06/02/2008	BC-8-7.5 7.5 06/02/2008	BH-2-6 6 7/9/2007	BH-3-6 6 7/9/2007
VOLATILE ORGANICS (continued)															
Methylene Chloride	µg/kg	SW8260	20				4.9 U	7.9 U	940 U	5.2 U	- -	5.4 U	- -	- -	200.00 U
Naphthalene	µg/kg	SW8260	500				- -	- -	- -	- -	- -	1.1 U	- -	- -	- -
n-Butylbenzene	µg/kg	SW8260					- -	- -	- -	- -	- -	1.1 U	- -	- -	- -
n-Propylbenzene	µg/kg	SW8260					- -	- -	- -	- -	- -	1.1 U	- -	- -	- -
p-Isopropyltoluene	µg/kg	SW8260					- -	- -	- -	- -	- -	1.1 U	- -	- -	- -
sec-Butylbenzene	µg/kg	SW8260					- -	- -	- -	- -	- -	1.1 U	- -	- -	- -
Styrene	µg/kg	SW8260			300,000		- -	- -	- -	- -	- -	1.1 U	- -	- -	- -
tert-Butylbenzene	µg/kg	SW8260					- -	- -	- -	- -	- -	1.1 U	- -	- -	- -
Tetrachloroethene	µg/kg	SW8260	50				5.4	1.6 U	190 U	1.2	- -	1.1 U	- -	- -	100.00 U
trans-1,2-Dichloroethene	µg/kg	SW8260					0.99 U	1.6 U	190 U	1.0 U	- -	1.1 U	- -	- -	100.00 U
trans-1,3-Dichloropropene	µg/kg	SW8260					0.99 U	1.6 U	190 U	1.0 U	- -	1.1 U	- -	- -	100.00 U
Trichloroethene	µg/kg	SW8260	30				0.99 U	1.6 U	190 U	1.0 U	- -	1.1 U	- -	- -	100.00 U
Trichlorofluoromethane	µg/kg	SW8260					0.99 U	1.6 U	190 U	1.0 U	- -	1.1 U	- -	- -	100.00 U
Vinyl Acetate	µg/kg	SW8260					- -	- -	- -	- -	- -	5.4 U	- -	- -	- -
Vinyl Chloride	µg/kg	SW8260					0.99 U	1.6 U	190 U	1.0 U	- -	5.4 U	- -	- -	100.00 U
SEMIVOLATILE ORGANICS															
1-Methylnaphthalene	µg/kg	SW8270D SIM	5,000*NA				- -	- -	- -	- -	- -	- -	- -	- -	92,000.00
2-Methylnaphthalene	µg/kg	SW8270D SIM	5,000*NA				- -	- -	- -	- -	- -	- -	- -	- -	150,000.00
Acenaphthene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -	- -	- -	- -	7,000.00
Acenaphthylene	µg/kg	SW8270D SIM			20,000		- -	- -	- -	- -	- -	- -	- -	- -	1,800.00
Anthracene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -	- -	- -	- -	1,100.00
Benzo(a)anthracene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -	- -	- -	- -	40.00 U
Benzo(a)pyrene	µg/kg	SW8270D SIM			12,000		- -	- -	- -	- -	- -	- -	- -	- -	40.00 U
Benzo(b)fluoranthene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -	- -	- -	- -	40.00 U
Benzo(g,h,i)perylene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -	- -	- -	- -	40.00 U
Benzo(k)fluoranthene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -	- -	- -	- -	40.00 U
Chrysene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -	- -	- -	- -	70.00
Dibenz(a,h)anthracene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -	- -	- -	- -	40.00 U
Fluoranthene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -	- -	- -	- -	180.00
Fluorene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -	- -	- -	- -	9,500.00
Indeno(1,2,3-cd)pyrene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -	- -	- -	- -	40.00 U
Naphthalene	µg/kg	SW8270D SIM	5,000*NA				- -	- -	- -	- -	- -	- -	- -	- -	970.00
Phenanthrene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -	- -	- -	- -	13,000.00
Pyrene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -	- -	- -	- -	410.00
Total cPAHs Using Tox. Equiv.	µg/kg	SW8270D SIM	100				- -	- -	- -	- -	- -	- -	- -	- -	30.70

Historical Soil Analytical Results

PARAMETERS	Units	Analytical Method	MTCA A	MTCA B soil to gw	Ecological Indicator Conc.	Sample No.:	BH-3-10	BH-4-6	BH-5-6	BH-5-10	BH-6-6	BH-13-6	BH-14-2	BH-14-6	BH-15-2
						Depth (ft):	10	6	6	10	6	6	2	6	2
						Background	7/9/2007	7/9/2007	7/9/2007	7/9/2007	7/10/2007	7/9/2007	7/10/2007	7/10/2007	7/10/2007
PETROLEUM HYDROCARBONS															
Diesel	mg/kg	NWTPH-Dx	2,000		200		25.00 U	**670.00**	25.00 U	- -	25.00 U	25.00 U	25.00 U	25.00 U	25.00 U
Motor Oil	mg/kg	NWTPH-Dx	2,000				120.00	50.00 U	50.00 U	- -	50.00 U	65.00	50.00 U	50.00 U	50.00 U
Gasoline	mg/kg	NWTPH-Gx	30/100*G		100		3.00 U	**650.00**	**140.00**	3.00 U	3.00 U	- -	3.00 U	- -	3.00 U
Benzene	µg/kg	SW8021	30	4.483			30 U	300 U	50	30 U	30 U	- -	30 U	- -	30 U
Toluene	µg/kg	SW8021	7,000		200,000		50 U	1,000	400	50 U	50 U	- -	50 U	- -	50 U
Ethylbenzene	µg/kg	SW8021	6,000				50 U	500 U	110	50 U	50 U	- -	50 U	- -	50 U
m,p-Xylene	µg/kg	SW8021	9,000*XY				- -	- -	- -	- -	- -	- -	- -	- -	- -
o-Xylene	µg/kg	SW8021	9,000*XY				- -	- -	- -	- -	- -	- -	- -	- -	- -
Total Xylenes	µg/kg	SW8021	9,000*XY				200 U	2000 U	1500	200 U	200 U	- -	200 U	- -	200 U
METALS															
Arsenic	mg/kg	SW6010	20	2.803	7	7.30	- -	- -	- -	- -	- -	5.40	5.00 U	5.00 U	5.00 U
Barium	mg/kg	SW6010			102		- -	- -	- -	- -	- -	98.00	- -	**140.00**	- -
Cadmium	mg/kg	SW6010	2	0.69	4	0.77	- -	- -	- -	- -	- -	1.00 U	1.00 U	1.00 U	1.00 U
Chromium	mg/kg	SW6010	2,000*CR		42	48.15	- -	- -	- -	- -	- -	22.00	40.00	30.00	32.00
Lead	mg/kg	SW6010	250	250	50	16.83	- -	- -	- -	- -	- -	110.00	5.00 U	59.00	16.00
Selenium	mg/kg	SW6010			0.3		- -	- -	- -	- -	- -	5.00 U	- -	5.00 U	- -
Silver	mg/kg	SW6010			2		- -	- -	- -	- -	- -	5.00 U	- -	5.00 U	- -
Mercury	mg/kg	SW7471A	2	2.088	0.1	0.07	- -	- -	- -	- -	- -	0.06	0.02	0.08	0.02 U
VOLATILE ORGANICS															
2-Butanone	µg/kg	SW8260					- -	- -	- -	- -	- -	- -	- -	- -	- -
2-Chloroethyl Vinyl Ether	µg/kg	SW8260					- -	- -	- -	- -	- -	- -	- -	- -	- -
2-Chlorotoluene	µg/kg	SW8260					- -	100.00 U	100.00 U	- -	- -	- -	- -	- -	- -
2-Hexanone	µg/kg	SW8260					- -	- -	- -	- -	- -	- -	- -	- -	- -
4-Chlorotoluene	µg/kg	SW8260					- -	100.00 U	100.00 U	- -	- -	- -	- -	- -	- -
Acetone	µg/kg	SW8260					- -	- -	- -	- -	- -	- -	- -	- -	- -
Bromobenzene	µg/kg	SW8260					- -	100.00 U	100.00 U	- -	- -	- -	- -	- -	- -
Bromochloromethane	µg/kg	SW8260					- -	100.00 U	100.00 U	- -	- -	- -	- -	- -	- -
Bromodichloromethane	µg/kg	SW8260					- -	100.00 U	100.00 U	- -	- -	- -	- -	- -	- -
Bromoform	µg/kg	SW8260					- -	100.00 U	100.00 U	- -	- -	- -	- -	- -	- -
Bromomethane	µg/kg	SW8260					- -	100.00 U	100.00 U	- -	- -	- -	- -	- -	- -
Carbon Disulfide	µg/kg	SW8260					- -	- -	- -	- -	- -	- -	- -	- -	- -
Carbon Tetrachloride	µg/kg	SW8260					- -	100.00 U	100.00 U	- -	- -	- -	- -	- -	- -
Chlorobenzene	µg/kg	SW8260			40,000		- -	100.00 U	100.00 U	- -	- -	- -	- -	- -	- -
Chloroethane	µg/kg	SW8260					- -	100.00 U	100.00 U	- -	- -	- -	- -	- -	- -
Chloroform	µg/kg	SW8260					- -	100.00 U	100.00 U	- -	- -	- -	- -	- -	- -
Chloromethane	µg/kg	SW8260					- -	100.00 U	100.00 U	- -	- -	- -	- -	- -	- -
cis-1,2-Dichloroethene	µg/kg	SW8260					- -	100.00 U	100.00 U	- -	- -	- -	- -	- -	- -
cis-1,3-Dichloropropene	µg/kg	SW8260					- -	100.00 U	100.00 U	- -	- -	- -	- -	- -	- -
Dibromochloromethane	µg/kg	SW8260					- -	100.00 U	100.00 U	- -	- -	- -	- -	- -	- -
Dibromomethane	µg/kg	SW8260					- -	100.00 U	100.00 U	- -	- -	- -	- -	- -	- -
Dichlorodifluoromethane	µg/kg	SW8260					- -	100.00 U	100.00 U	- -	- -	- -	- -	- -	- -
Hexachlorobutadiene	µg/kg	SW8260					- -	100.00 U	100.00 U	- -	- -	- -	- -	- -	- -
Isopropylbenzene	µg/kg	SW8260					- -	- -	- -	- -	- -	- -	- -	- -	- -
Methyl Iodide	µg/kg	SW8260					- -	- -	- -	- -	- -	- -	- -	- -	- -
Methyl Isobutyl Ketone	µg/kg	SW8260					- -	- -	- -	- -	- -	- -	- -	- -	- -
Methyl t-Butyl Ether	µg/kg	SW8260	100				- -	- -	- -	- -	- -	- -	- -	- -	- -

Historical Soil Analytical Results

PARAMETERS	Units	Analytical Method	MTCA A	MTCA B soil to gw	Ecological Indicator Conc.	Sample No.: Depth (ft): Background	BH-3-10 10 7/9/2007	BH-4-6 6 7/9/2007	BH-5-6 6 7/9/2007	BH-5-10 10 7/9/2007	BH-6-6 6 7/10/2007	BH-13-6 6 7/9/2007	BH-14-2 2 7/10/2007	BH-14-6 6 7/10/2007	BH-15-2 2 7/10/2007
VOLATILE ORGANICS (continued)															
Methylene Chloride	µg/kg	SW8260	20				- -	200.00 U	200.00 U	- -	- -	- -	- -	- -	- -
Naphthalene	µg/kg	SW8260	500				- -	- -	- -	- -	- -	- -	- -	- -	- -
n-Butylbenzene	µg/kg	SW8260					- -	- -	- -	- -	- -	- -	- -	- -	- -
n-Propylbenzene	µg/kg	SW8260					- -	- -	- -	- -	- -	- -	- -	- -	- -
p-Isopropyltoluene	µg/kg	SW8260					- -	- -	- -	- -	- -	- -	- -	- -	- -
sec-Butylbenzene	µg/kg	SW8260					- -	- -	- -	- -	- -	- -	- -	- -	- -
Styrene	µg/kg	SW8260			300,000		- -	- -	- -	- -	- -	- -	- -	- -	- -
tert-Butylbenzene	µg/kg	SW8260					- -	- -	- -	- -	- -	- -	- -	- -	- -
Tetrachloroethene	µg/kg	SW8260	50				- -	100.00 U	100.00 U	- -	- -	- -	- -	- -	- -
trans-1,2-Dichloroethene	µg/kg	SW8260					- -	100.00 U	100.00 U	- -	- -	- -	- -	- -	- -
trans-1,3-Dichloropropene	µg/kg	SW8260					- -	100.00 U	100.00 U	- -	- -	- -	- -	- -	- -
Trichloroethene	µg/kg	SW8260	30				- -	100.00 U	100.00 U	- -	- -	- -	- -	- -	- -
Trichlorofluoromethane	µg/kg	SW8260					- -	100.00 U	100.00 U	- -	- -	- -	- -	- -	- -
Vinyl Acetate	µg/kg	SW8260					- -	- -	- -	- -	- -	- -	- -	- -	- -
Vinyl Chloride	µg/kg	SW8260					- -	100.00 U	100.00 U	- -	- -	- -	- -	- -	- -
SEMIVOLATILE ORGANICS															
1-Methylnaphthalene	µg/kg	SW8270D SIM	5,000*NA				- -	- -	- -	- -	- -	- -	- -	- -	- -
2-Methylnaphthalene	µg/kg	SW8270D SIM	5,000*NA				- -	- -	- -	- -	- -	- -	- -	- -	- -
Acenaphthene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -	- -	- -	- -	- -
Acenaphthylene	µg/kg	SW8270D SIM			20,000		- -	- -	- -	- -	- -	- -	- -	- -	- -
Anthracene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -	- -	- -	- -	- -
Benzo(a)anthracene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -	- -	- -	- -	- -
Benzo(a)pyrene	µg/kg	SW8270D SIM			12,000		- -	- -	- -	- -	- -	- -	- -	- -	- -
Benzo(b)fluoranthene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -	- -	- -	- -	- -
Benzo(g,h,i)perylene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -	- -	- -	- -	- -
Benzo(k)fluoranthene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -	- -	- -	- -	- -
Chrysene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -	- -	- -	- -	- -
Dibenz(a,h)anthracene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -	- -	- -	- -	- -
Fluoranthene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -	- -	- -	- -	- -
Fluorene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -	- -	- -	- -	- -
Indeno(1,2,3-cd)pyrene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -	- -	- -	- -	- -
Naphthalene	µg/kg	SW8270D SIM	5,000*NA				- -	- -	- -	- -	- -	- -	- -	- -	- -
Phenanthrene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -	- -	- -	- -	- -
Pyrene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -	- -	- -	- -	- -
Total cPAHs Using Tox. Equiv.	µg/kg	SW8270D SIM	100				- -	- -	- -	- -	- -	- -	- -	- -	- -

Historical Soil Analytical Results

PARAMETERS	Units	Analytical Method	MTCA A	MTCA B soil to gw	Ecological Indicator Conc.	Sample No.: Depth (ft): Background	BH-15-6 6 7/10/2007	BH-18-10 10 8/9/2007	BH-19-6 6 8/9/2007	BH-20-6 6 8/9/2007	BH-21-6 6 8/9/2007
PETROLEUM HYDROCARBONS											
Diesel	mg/kg	NWTPH-Dx	2,000		200		25.00 U	- -	30 U	29 U	**1,500**
Motor Oil	mg/kg	NWTPH-Dx	2,000				50.00 U	- -	270	57 U	2,500
Gasoline	mg/kg	NWTPH-Gx	30/100*G		100		- -	6.3 U	6.3 U	9.1	4.9 U
Benzene	µg/kg	SW8021	30	4.483			- -	20 U	20 U	20 U	49 U
Toluene	µg/kg	SW8021	7,000		200,000		- -	63 U	63 U	59 U	250 U
Ethylbenzene	µg/kg	SW8021	6,000				- -	63 U	63 U	59 U	250 U
m,p-Xylene	µg/kg	SW8021	9,000*XY				- -	63 U	63 U	59 U	300
o-Xylene	µg/kg	SW8021	9,000*XY				- -	63 U	63 U	59 U	250 U
Total Xylenes	µg/kg	SW8021	9,000*XY				- -	- -	- -	- -	- -
METALS											
Arsenic	mg/kg	SW6010	20	2.803	7	7.30	5.00 U	- -	- -	- -	- -
Barium	mg/kg	SW6010			102		62.00	- -	- -	- -	- -
Cadmium	mg/kg	SW6010	2	0.69	4	0.77	1.00 U	- -	- -	- -	- -
Chromium	mg/kg	SW6010	2,000*CR		42	48.15	37.00	- -	- -	- -	- -
Lead	mg/kg	SW6010	250	250	50	16.83	5.00 U	- -	- -	- -	- -
Selenium	mg/kg	SW6010			0.3		5.00 U	- -	- -	- -	- -
Silver	mg/kg	SW6010			2		5.00 U	- -	- -	- -	- -
Mercury	mg/kg	SW7471A	2	2.088	0.1	0.07	0.08	- -	- -	- -	- -
VOLATILE ORGANICS											
2-Butanone	µg/kg	SW8260					- -	- -	- -	- -	- -
2-Chloroethyl Vinyl Ether	µg/kg	SW8260					- -	1.3 U	- -	0.61 U	27 U
2-Chlorotoluene	µg/kg	SW8260					- -	1.3 U	- -	0.61 U	27 U
2-Hexanone	µg/kg	SW8260					- -	- -	- -	- -	- -
4-Chlorotoluene	µg/kg	SW8260					- -	1.3 U	- -	0.61 U	27 U
Acetone	µg/kg	SW8260					- -	- -	- -	- -	- -
Bromobenzene	µg/kg	SW8260					- -	1.3 U	- -	0.61 U	27 U
Bromochloromethane	µg/kg	SW8260					- -	1.3 U	- -	0.61 U	27 U
Bromodichloromethane	µg/kg	SW8260					- -	1.3 U	- -	0.61 U	27 U
Bromoform	µg/kg	SW8260					- -	1.3 U	- -	0.61 U	27 U
Bromomethane	µg/kg	SW8260					- -	1.3 U	- -	0.61 U	27 U
Carbon Disulfide	µg/kg	SW8260					- -	- -	- -	- -	- -
Carbon Tetrachloride	µg/kg	SW8260					- -	1.3 U	- -	0.61 U	27 U
Chlorobenzene	µg/kg	SW8260			40,000		- -	1.3 U	- -	0.61 U	27 U
Chloroethane	µg/kg	SW8260					- -	6.3 U	- -	3.1 U	140 U
Chloroform	µg/kg	SW8260					- -	1.3 U	- -	0.61 U	27 U
Chloromethane	µg/kg	SW8260					- -	1.3 U	- -	0.61 U	27 U
cis-1,2-Dichloroethene	µg/kg	SW8260					- -	1.3 U	- -	0.61 U	27 U
cis-1,3-Dichloropropene	µg/kg	SW8260					- -	1.3 U	- -	0.61 U	27 U
Dibromochloromethane	µg/kg	SW8260					- -	1.3 U	- -	0.61 U	27 U
Dibromomethane	µg/kg	SW8260					- -	1.3 U	- -	0.61 U	27 U
Dichlorodifluoromethane	µg/kg	SW8260					- -	1.3 U	- -	0.61 U	27 U
Hexachlorobutadiene	µg/kg	SW8260					- -	6.3 U	- -	3.1 U	140 U
Isopropylbenzene	µg/kg	SW8260					- -	- -	- -	- -	- -
Methyl Iodide	µg/kg	SW8260					- -	6.3 U	- -	3.1 U	140 U
Methyl Isobutyl Ketone	µg/kg	SW8260					- -	- -	- -	- -	- -
Methyl t-Butyl Ether	µg/kg	SW8260	100				- -	- -	- -	- -	- -

Historical Soil Analytical Results

PARAMETERS	Units	Analytical Method	MTCA A	MTCA B soil to gw	Ecological Indicator Conc.	Sample No.: Depth (ft): Background	BH-15-6 6 7/10/2007	BH-18-10 10 8/9/2007	BH-19-6 6 8/9/2007	BH-20-6 6 8/9/2007	BH-21-6 6 8/9/2007
VOLATILE ORGANICS (continued)											
Methylene Chloride	µg/kg	SW8260	20				- -	6.3 U	- -	3.7	140 U
Naphthalene	µg/kg	SW8260	500				- -	- -	- -	- -	- -
n-Butylbenzene	µg/kg	SW8260					- -	- -	- -	- -	- -
n-Propylbenzene	µg/kg	SW8260					- -	- -	- -	- -	- -
p-Isopropyltoluene	µg/kg	SW8260					- -	- -	- -	- -	- -
sec-Butylbenzene	µg/kg	SW8260					- -	- -	- -	- -	- -
Styrene	µg/kg	SW8260			300,000		- -	- -	- -	- -	- -
tert-Butylbenzene	µg/kg	SW8260					- -	- -	- -	- -	- -
Tetrachloroethene	µg/kg	SW8260	50				- -	1.3 U	- -	0.61 U	27 U
trans-1,2-Dichloroethene	µg/kg	SW8260					- -	1.3 U	- -	0.61 U	27 U
trans-1,3-Dichloropropene	µg/kg	SW8260					- -	1.3 U	- -	0.61 U	27 U
Trichloroethene	µg/kg	SW8260	30				- -	1.3 U	- -	0.61 U	27 U
Trichlorofluoromethane	µg/kg	SW8260					- -	1.3 U	- -	0.61 U	27 U
Vinyl Acetate	µg/kg	SW8260					- -	- -	- -	- -	- -
Vinyl Chloride	µg/kg	SW8260					- -	1.3 U	- -	0.61 U	27 U
SEMIVOLATILE ORGANICS											
1-Methylnaphthalene	µg/kg	SW8270D SIM	5,000*NA				- -	- -	- -	- -	- -
2-Methylnaphthalene	µg/kg	SW8270D SIM	5,000*NA				- -	- -	- -	- -	- -
Acenaphthene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -
Acenaphthylene	µg/kg	SW8270D SIM			20,000		- -	- -	- -	- -	- -
Anthracene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -
Benzo(a)anthracene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -
Benzo(a)pyrene	µg/kg	SW8270D SIM			12,000		- -	- -	- -	- -	- -
Benzo(b)fluoranthene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -
Benzo(g,h,i)perylene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -
Benzo(k)fluoranthene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -
Chrysene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -
Dibenz(a,h)anthracene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -
Fluoranthene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -
Fluorene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -
Indeno(1,2,3-cd)pyrene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -
Naphthalene	µg/kg	SW8270D SIM	5,000*NA				- -	- -	- -	- -	- -
Phenanthrene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -
Pyrene	µg/kg	SW8270D SIM					- -	- -	- -	- -	- -
Total cPAHs Using Tox. Equiv.	µg/kg	SW8270D SIM	100				- -	- -	- -	- -	- -

NOTES:
- - - = Not analyzed or not collected
- *CR = Chromium Standards based on Chromium III
- *G = 100 if no benzene and TEX < 1% gas; 30 for other mixtures
- *NA = Includes Naphthalene, 1-Methylnaphthalene, and 2-Methylnaphthalene
- *XY = Applies to the sum of all xylenes
- U = Not detected above the given practical quantitation limit
- Shaded values exceed MTCA
- **Bold** Bold values exceed Ecological Indicator Concentration

SOURCES: Background: 90th percentile Puget Sound (Ecology's Publication #94-115; 10/1994)
Model Toxics Control Act (MTCA) from WA Administrative Code 173-340-900
MTCA Method A Soil Cleanup Levels for Unrestricted Land Use: Table 740-1
MTCA Method B soil to groundwater: site-specific calculated
Ecological Indicator Concentrations: Table 749-3

UNITS:
- ft = feet
- mg/kg = milligram/kilogram
- µg/kg = microgram/kilogram

Historical Groundwater Analytical Results

PARAMETERS	Units	Analytical Method	Sample No.: MTCA A	B1-W 4/6/2009	B2-W 4/2/2009	B3-W 4/3/2009	B7-W 4/1/2009	BC-8-W 9/5/2008	BH-2-W 7/9/2007	BH-6-W 7/10/2007	BH-8-W 7/10/2007	BH-9-W 7/10/2007	BH-11-W 7/9/2007	BH-12-W 7/10/2007	BH-12-W DUP 7/10/2007
PETROLEUM HYDROCARBONS															
Diesel Range Hydrocarbons	mg/L	NWTPH-Dx	0.5	- -	- -	- -	- -	0.26 U	0.130 U	0.130 U	0.130 U	0.130 U	0.150	0.130 U	- -
Motor Oil	mg/L	NWTPH-Dx	0.5	- -	- -	- -	- -	0.41 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	0.250 U	- -
Gasoline Range Hydrocarbons	mg/L	NWTPH-Gx	0.8/1*G	- -	0.210	0.270	- -	0.100 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.086	- -
Benzene	µg/L	SW8260	5	- -	1.0 U	5.7	- -	0.2 U	2.00 U	1.00 U	1.00 U	1.00 U	1.00 U	2.00 U	2.00 U
Toluene	µg/L	SW8260	1,000	- -	1.0 U	1.0 U	- -	1 U	2.00 U	1.00 U	1.00 U	1.00 U	1.00 U	2.00 U	2.00 U
Ethylbenzene	µg/L	SW8260	700	- -	1.0 U	3.5	- -	0.2 U	2.00 U	1.00 U	1.00 U	1.00 U	1.00 U	2.00 U	2.00 U
m,p-Xylene	µg/L	SW8260	1,000*XY	- -	1.3	4.1	- -	0.4 U	4.00 U	- -	- -	- -	- -	4.00 U	4.00 U
o-Xylene	µg/L	SW8260	1,000*XY	- -	1.0 U	1.0 U	- -	0.2 U	2.00 U	- -	- -	- -	- -	2.00 U	2.00 U
Total Xylenes			1,000*XY	- -	- -	- -	- -	- -	- -	3.00 U	3.00 U	3.00 U	3.00 U	- -	- -
TOTAL METALS															
Arsenic	mg/L	SW7060	0.005	- -	- -	- -	- -	0.0033 U	- -	- -	- -	- -	0.049	- -	- -
Barium	mg/L	SW6010		- -	- -	- -	- -	0.045	- -	- -	- -	- -	1.200	- -	- -
Cadmium	mg/L	SW6010	0.005	- -	- -	- -	- -	0.0044 U	- -	- -	- -	- -	0.006	- -	- -
Chromium	mg/L	SW6010		- -	- -	- -	- -	0.011 U	- -	- -	- -	- -	0.260	- -	- -
Lead	mg/L	SW7421	0.015	- -	- -	- -	- -	0.0011 U	- -	- -	- -	- -	0.095	- -	- -
Mercury	mg/L	SW7471	0.002	- -	- -	- -	- -	0.0005 U	- -	- -	- -	- -	0.00041	- -	- -
Selenium	mg/L	SW6010		- -	- -	- -	- -	0.0056 U	- -	- -	- -	- -	0.040 U	- -	- -
Silver	mg/L	SW6010		- -	- -	- -	- -	0.011 U	- -	- -	- -	- -	0.030 U	- -	- -
DISSOLVED METALS															
Arsenic	mg/L	SW7060	0.005	- -	- -	- -	- -	0.003 U	- -	- -	- -	- -	0.004	- -	- -
Barium	mg/L	SW6010		- -	- -	- -	- -	0.028	- -	- -	- -	- -	0.24	- -	- -
Cadmium	mg/L	SW6010	0.005	- -	- -	- -	- -	0.004 U	- -	- -	- -	- -	0.005 U	- -	- -
Chromium	mg/L	SW6010	0.05	- -	- -	- -	- -	0.010 U	- -	- -	- -	- -	0.007 U	- -	- -
Lead	mg/L	SW7421	0.015	- -	- -	- -	- -	0.001 U	- -	- -	- -	- -	0.003 U	- -	- -
Mercury	mg/L	SW7471	0.002	- -	- -	- -	- -	0.0005 U	- -	- -	- -	- -	0.0002 U	- -	- -
Selenium	mg/L	SW6010		- -	- -	- -	- -	0.005 U	- -	- -	- -	- -	0.040 U	- -	- -
Silver	mg/L	SW6010		- -	- -	- -	- -	0.010 U	- -	- -	- -	- -	0.030 U	- -	- -
VOLATILE ORGANICS															
1,1,1,2-Tetrachloroethane	µg/L	SW8260		0.20 U	0.20 U	0.20 U	0.20 U	0.2 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U
1,1,1-Trichloroethane	µg/L	SW8260	200	0.20 U	0.20 U	0.20 U	0.20 U	0.2 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U
1,1,2,2-Tetrachloroethane	µg/L	SW8260		0.20 U	0.20 U	0.20 U	0.20 U	0.2 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U
1,1,2-Trichloroethane	µg/L	SW8260		0.20 U	0.20 U	0.20 U	0.20 U	0.2 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U
1,1-Dichloroethane	µg/L	SW8260		0.20 U	0.20 U	0.20 U	0.20 U	0.2 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U
1,1-Dichloroethene	µg/L	SW8260		0.20 U	0.20 U	0.20 U	0.20 U	0.2 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U
1,1-Dichloropropene	µg/L	SW8260		0.20 U	0.20 U	0.20 U	0.20 U	0.2 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U
1,2,3-Trichlorobenzene	µg/L	SW8260		0.20 U	0.20 U	0.20 U	0.20 U	0.2 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U
1,2,3-Trichloropropane	µg/L	SW8260		0.20 U	0.20 U	0.20 U	0.20 U	0.2 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U
1,2,4-Trichlorobenzene	µg/L	SW8260		0.20 U	0.20 U	0.20 U	0.20 U	0.2 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U
1,2,4-Trimethylbenzene	µg/L	SW8260		- -	- -	- -	- -	0.2 U	2.00 U	- -	- -	- -	- -	2.00 U	2.00 U
1,2-Dibromo-3-chloropropane	µg/L	SW8260		1.0 U	1.0 U	1.0 U	1.0 U	1 U	10.00 U	10.00 U	10.00 U	10.00 U	- -	10.00 U	10.00 U
1,2-Dibromoethane	µg/L	SW8260		0.20 U	0.20 U	0.20 U	0.20 U	0.2 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U
1,2-Dichlorobenzene	µg/L	SW8260		0.20 U	0.20 U	0.20 U	0.20 U	0.2 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U
1,2-Dichloroethane	µg/L	SW8260	5	0.20 U	0.20 U	0.20 U	0.20 U	0.2 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	4.00	2.00 U
1,2-Dichloropropane	µg/L	SW8260		0.20 U	0.20 U	0.20 U	0.20 U	0.2 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U
1,3,5-Trimethylbenzene	µg/L	SW8260		- -	- -	- -	- -	0.2 U	2.00 U	- -	- -	- -	- -	2.00 U	2.00 U
1,3-Dichlorobenzene	µg/L	SW8260		0.20 U	0.20 U	0.20 U	0.20 U	0.2 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U
1,3-Dichloropropane	µg/L	SW8260		0.20 U	0.20 U	0.20 U	0.20 U	0.2 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U

Historical Groundwater Analytical Results

PARAMETERS	Units	Analytical Method	Sample No.: MTCA A	B1-W 4/6/2009	B2-W 4/2/2009	B3-W 4/3/2009	B7-W 4/1/2009	BC-8-W 9/5/2008	BH-2-W 7/9/2007	BH-6-W 7/10/2007	BH-8-W 7/10/2007	BH-9-W 7/10/2007	BH-11-W 7/9/2007	BH-12-W 7/10/2007	BH-12-W DUP 7/10/2007
VOLATILE ORGANICS (continued)															
1,4-Dichlorobenzene	µg/L	SW8260		0.20 U	0.20 U	0.20 U	0.20 U	0.2 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U
2,2-Dichloropropane	µg/L	SW8260		0.20 U	0.20 U	0.20 U	0.20 U	0.2 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U
2-Butanone	µg/L	SW8260		- -	- -	- -	- -	5 U	10.00 U	- -	- -	- -	- -	10.00 U	10.00 U
2-Chloroethylvinylether	µg/L	SW8260		1.0 U	1.0 U	1.0 U	1.0 U	1 U	- -	- -	- -	- -	- -	- -	- -
2-Chlorotoluene	µg/L	SW8260		0.20 U	0.20 U	0.20 U	0.20 U	0.2 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U
2-Hexanone	µg/L	SW8260		- -	- -	- -	- -	2 U	10.00 U	- -	- -	- -	- -	10.00 U	10.00 U
4-Chlorotoluene	µg/L	SW8260		0.20 U	0.20 U	0.20 U	0.20 U	0.2 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U
4-Methyl-2-Pentanone (MIBK)	µg/L	SW8260		- -	- -	- -	- -	- -	10.00 U	- -	- -	- -	- -	10.00 U	10.00 U
Acetone	µg/L	SW8260		- -	- -	- -	- -	5 U	25.00 U	- -	- -	- -	- -	25.00 U	25.00 U
Acrylonitrile	µg/L	SW8260		- -	- -	- -	- -	- -	10.00 U	- -	- -	- -	- -	10.00 U	10.00 U
Bromobenzene	µg/L	SW8260		0.20 U	0.20 U	0.20 U	0.20 U	0.2 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U
Bromochloromethane	µg/L	SW8260		0.20 U	0.20 U	0.20 U	0.20 U	0.2 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U
Bromodichloromethane	µg/L	SW8260		0.20 U	0.20 U	0.20 U	0.20 U	0.2 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U
Bromoform	µg/L	SW8260		1.0 U	1.0 U	1.0 U	1.0 U	1 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U
Bromomethane	µg/L	SW8260		0.20 U	0.20 U	0.20 U	0.20 U	0.2 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U
Carbon Disulfide	µg/L	SW8260		- -	- -	- -	- -	0.2 U	- -	- -	- -	- -	- -	- -	- -
Carbon Tetrachloride	µg/L	SW8260		0.20 U	0.20 U	0.20 U	0.20 U	0.2 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U
Chlorobenzene	µg/L	SW8260		0.20 U	0.22	0.20 U	0.20 U	0.2 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U
Chloroethane	µg/L	SW8260		1.0 U	1.0 U	1.0 U	1.0 U	1 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U
Chloroform	µg/L	SW8260		0.20 U	0.20 U	0.20 U	0.20 U	0.2 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U
Chloromethane	µg/L	SW8260		1.0 U	1.0 U	1.0 U	1.0 U	1 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U
cis-1,2-Dichloroethene	µg/L	SW8260		1.6	5.0	0.20 U	0.20 U	0.2 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U
cis-1,3-Dichloropropene	µg/L	SW8260		0.20 U	0.20 U	0.20 U	0.20 U	0.2 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U
Dibromochloromethane	µg/L	SW8260		0.20 U	0.20 U	0.20 U	0.20 U	0.2 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U
Dibromomethane	µg/L	SW8260		0.20 U	0.20 U	0.20 U	0.20 U	0.2 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U
Dichlorodifluoromethane	µg/L	SW8260		0.20 U	0.20 U	0.20 U	0.20 U	0.2 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U
Hexachlorobutadiene	µg/L	SW8260		0.20 U	0.20 U	0.20 U	0.20 U	0.2 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U
Isopropylbenzene (Cumene)	µg/L	SW8260		- -	- -	- -	- -	0.2 U	2.00 U	- -	- -	- -	- -	2.00 U	2.00 U
Methyl Iodide	µg/L	SW8260		1.0 U	1.0 U	1.0 U	1.0 U	1 U	- -	- -	- -	- -	- -	- -	- -
Methyl Isobutyl Ketone	µg/L	SW8260		- -	- -	- -	- -	2 U	- -	- -	- -	- -	- -	- -	- -
Methyl t-Butyl Ether	µg/L	SW8260	20	- -	- -	- -	- -	0.2 U	2.00 U	- -	- -	- -	- -	2.00 U	2.00 U
Methylene Chloride	µg/L	SW8260	5	2.0 U	2.0 U	2.0 U	2.0 U	1 U	5.00 U	5.00 U	5.00 U	5.00 U	- -	5.00 U	5.00 U
Naphthalene	µg/L	SW8260	160	- -	- -	- -	- -	1 U	2.00 U	- -	- -	- -	- -	2.00 U	2.00 U
n-Butylbenzene	µg/L	SW8260		- -	- -	- -	- -	0.2 U	2.00 U	- -	- -	- -	- -	2.00 U	2.00 U
n-Propylbenzene	µg/L	SW8260		- -	- -	- -	- -	0.2 U	2.00 U	- -	- -	- -	- -	2.00 U	2.00 U
p-Isopropyltoluene	µg/L	SW8260		- -	- -	- -	- -	0.2 U	2.00 U	- -	- -	- -	- -	2.00 U	2.00 U
sec-Butylbenzene	µg/L	SW8260		- -	- -	- -	- -	0.2 U	2.00 U	- -	- -	- -	- -	2.00 U	2.00 U
Styrene	µg/L	SW8260		- -	- -	- -	- -	0.2 U	2.00 U	- -	- -	- -	- -	2.00 U	2.00 U
tert-Butylbenzene	µg/L	SW8260		- -	- -	- -	- -	0.2 U	2.00 U	- -	- -	- -	- -	2.00 U	2.00 U
Tetrachloroethene	µg/L	SW8260	5	20	25	20	0.20 U	0.2 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U
trans-1,2-Dichloroethene	µg/L	SW8260		0.20 U	0.20 U	0.20 U	0.20 U	0.2 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U
trans-1,3-Dichloropropene	µg/L	SW8260		0.20 U	0.20 U	0.20 U	0.20 U	0.2 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U
Trichloroethene	µg/L	SW8260	5	1.4	11	0.20 U	0.20 U	0.2 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U
Trichlorofluoromethane	µg/L	SW8260		0.20 U	0.20 U	0.20 U	0.20 U	0.2 U	2.00 U	2.00 U	2.00 U	2.00 U	- -	2.00 U	2.00 U
Vinyl Acetate	µg/L	SW8260		- -	- -	- -	- -	2 U	- -	- -	- -	- -	- -	- -	- -
Vinyl Chloride	µg/L	SW8260	0.2	0.20 U	0.20 U	0.20 U	0.20 U	0.94	0.20 U	0.20 U	0.20 U	0.20 U	- -	0.20 U	0.20 U

Historical Groundwater Analytical Results

PARAMETERS	Units	Analytical Method	Sample No.: MTCA A	B1-W 4/6/2009	B2-W 4/2/2009	B3-W 4/3/2009	B7-W 4/1/2009	BC-8-W 9/5/2008	BH-2-W 7/9/2007	BH-6-W 7/10/2007	BH-8-W 7/10/2007	BH-9-W 7/10/2007	BH-11-W 7/9/2007	BH-12-W 7/10/2007	BH-12-W DUP 7/10/2007
SEMIVOLATILE ORGANICS															
1-Methylnaphthalene	µg/L	SW8270D SIM		- -	- -	- -	- -	0.93	- -	- -	- -	- -	- -	- -	- -
2-Methylnaphthalene	µg/L	SW8270D SIM		- -	- -	- -	- -	0.18	- -	- -	- -	- -	- -	- -	- -
Acenaphthene	µg/L	SW8270D SIM		- -	- -	- -	- -	2.5	- -	- -	- -	- -	- -	- -	- -
Acenaphthylene	µg/L	SW8270D SIM		- -	- -	- -	- -	0.097 U	- -	- -	- -	- -	- -	- -	- -
Anthracene	µg/L	SW8270D SIM		- -	- -	- -	- -	0.097 U	- -	- -	- -	- -	- -	- -	- -
Benzo(a)anthracene	µg/L	SW8270D SIM		- -	- -	- -	- -	0.0097 U	- -	- -	- -	- -	- -	- -	- -
Benzo(a)pyrene	µg/L	SW8270D SIM	0.1	- -	- -	- -	- -	0.0097 U	- -	- -	- -	- -	- -	- -	- -
Benzo(b)fluoranthene	µg/L	SW8270D SIM		- -	- -	- -	- -	0.0097 U	- -	- -	- -	- -	- -	- -	- -
Benzo(g,h,i)perylene	µg/L	SW8270D SIM		- -	- -	- -	- -	0.0097 U	- -	- -	- -	- -	- -	- -	- -
Benzo(k)fluoranthene	µg/L	SW8270D SIM		- -	- -	- -	- -	0.0097 U	- -	- -	- -	- -	- -	- -	- -
Chrysene	µg/L	SW8270D SIM		- -	- -	- -	- -	0.0097 U	- -	- -	- -	- -	- -	- -	- -
Dibenz(a,h)anthracene	µg/L	SW8270D SIM		- -	- -	- -	- -	0.0097 U	- -	- -	- -	- -	- -	- -	- -
Fluoranthene	µg/L	SW8270D SIM		- -	- -	- -	- -	0.097 U	- -	- -	- -	- -	- -	- -	- -
Fluorene	µg/L	SW8270D SIM		- -	- -	- -	- -	0.097 U	- -	- -	- -	- -	- -	- -	- -
Indeno(1,2,3-cd)pyrene	µg/L	SW8270D SIM		- -	- -	- -	- -	0.0097 U	- -	- -	- -	- -	- -	- -	- -
Naphthalene	µg/L	SW8270D SIM	160	- -	- -	- -	- -	0.79	- -	- -	- -	- -	- -	- -	- -
Phenanthrene	µg/L	SW8270D SIM		- -	- -	- -	- -	0.097 U	- -	- -	- -	- -	- -	- -	- -
Pyrene	µg/L	SW8270D SIM		- -	- -	- -	- -	0.097 U	- -	- -	- -	- -	- -	- -	- -

Historical Groundwater Analytical Results

PARAMETERS	Units	Analytical Method	Sample No.: MTCA A	BH-15-W 7/10/2007	BH-17-W 8/9/2007	BH-18-W 8/9/2007	BH-19-W 8/9/2007	BH-20-W 8/9/2007	BH-21-W 8/9/2007	BH-22-W 8/9/2007	MW-1 7/18/2007	MW-2 7/18/2007	MW-3 7/18/2007	MW-4 7/18/2007
PETROLEUM HYDROCARBONS														
Diesel Range Hydrocarbons	mg/L	NWTPH-Dx	0.5	0.130 U	- -	- -	0.27 U	0.28 U	0.26 U	0.27 U	0.130 U	0.130 U	0.130 U	0.130 U
Motor Oil	mg/L	NWTPH-Dx	0.5	0.250 U	- -	- -	0.44 U	0.45 U	0.41 U	0.44 U	0.250 U	0.250 U	0.250 U	0.250 U
Gasoline Range Hydrocarbons	mg/L	NWTPH-Gx	0.8/1*G	0.050 U	0.100 U	0.400 U	0.100 U	0.100 U	0.100 U	0.100 U	0.050 U	0.050 U	0.050 U	0.050 U
Benzene	µg/L	SW8260	5	1.00 U	1.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2 U	2 U	17	2 U
Toluene	µg/L	SW8260	1,000	1.00 U	1.0 U	4.0 U	1.1	1.0 U	1.4	1.6	2 U	2 U	2 U	2 U
Ethylbenzene	µg/L	SW8260	700	1.00 U	1.0 U	12	1.0 U	1.0 U	1.0 U	1.0 U	2 U	2 U	2 U	2 U
m,p-Xylene	µg/L	SW8260	1,000*XY	- -	1.3	4.0 U	1.9	1.0 U	1.8	2.6	4 U	4 U	4 U	4 U
o-Xylene	µg/L	SW8260	1,000*XY	- -	1.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2 U	2 U	2 U	2 U
Total Xylenes			1,000*XY	3.00 U	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
TOTAL METALS														
Arsenic	mg/L	SW7060	0.005	0.068	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Barium	mg/L	SW6010		1.000	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Cadmium	mg/L	SW6010	0.005	0.012	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Chromium	mg/L	SW6010		0.200	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Lead	mg/L	SW7421	0.015	0.025	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Mercury	mg/L	SW7471	0.002	0.00016	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Selenium	mg/L	SW6010		0.040 U	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Silver	mg/L	SW6010		0.030 U	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
DISSOLVED METALS														
Arsenic	mg/L	SW7060	0.005	0.056	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Barium	mg/L	SW6010		0.38	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Cadmium	mg/L	SW6010	0.005	0.005 U	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Chromium	mg/L	SW6010	0.05	0.007 U	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Lead	mg/L	SW7421	0.015	0.025	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Mercury	mg/L	SW7471	0.002	0.00016	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Selenium	mg/L	SW6010		0.040 U	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Silver	mg/L	SW6010		0.030 U	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
VOLATILE ORGANICS														
1,1,1,2-Tetrachloroethane	µg/L	SW8260		- -	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	2 U	2 U	2 U	2 U
1,1,1-Trichloroethane	µg/L	SW8260	200	- -	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	2 U	2 U	2 U	2 U
1,1,2,2-Tetrachloroethane	µg/L	SW8260		- -	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	2 U	2 U	2 U	2 U
1,1,2-Trichloroethane	µg/L	SW8260		- -	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	2 U	2 U	2 U	2 U
1,1-Dichloroethane	µg/L	SW8260		- -	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	2 U	2 U	2 U	2 U
1,1-Dichloroethene	µg/L	SW8260		- -	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	2 U	2 U	2 U	2 U
1,1-Dichloropropene	µg/L	SW8260		- -	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	2 U	2 U	2 U	2 U
1,2,3-Trichlorobenzene	µg/L	SW8260		- -	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	2 U	2 U	2 U	2 U
1,2,3-Trichloropropane	µg/L	SW8260		- -	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	2 U	2 U	2 U	2 U
1,2,4-Trichlorobenzene	µg/L	SW8260		- -	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	2 U	2 U	2 U	2 U
1,2,4-Trimethylbenzene	µg/L	SW8260		- -	- -	- -	- -	- -	- -	- -	2 U	2 U	2 U	2 U
1,2-Dibromo-3-chloropropane	µg/L	SW8260		- -	1 U	1 U	1 U	2 U	1 U	1 U	10 U	10 U	10 U	10 U
1,2-Dibromoethane	µg/L	SW8260		- -	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	2 U	2 U	2 U	2 U
1,2-Dichlorobenzene	µg/L	SW8260		- -	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	2 U	2 U	2 U	2 U
1,2-Dichloroethane	µg/L	SW8260	5	- -	0.51	16	0.2 U	0.4 U	0.2 U	0.2 U	2 U	2 U	2 U	2 U
1,2-Dichloropropane	µg/L	SW8260		- -	0.2 U	0.31	0.2 U	0.4 U	0.2 U	0.2 U	2 U	2 U	2 U	2 U
1,3,5-Trimethylbenzene	µg/L	SW8260		- -	- -	- -	- -	- -	- -	- -	2 U	2 U	2 U	2 U
1,3-Dichlorobenzene	µg/L	SW8260		- -	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	2 U	2 U	2 U	2 U
1,3-Dichloropropane	µg/L	SW8260		- -	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	2 U	2 U	2 U	2 U

Historical Groundwater Analytical Results

PARAMETERS	Units	Analytical Method	Sample No.: MTCA A	BH-15-W 7/10/2007	BH-17-W 8/9/2007	BH-18-W 8/9/2007	BH-19-W 8/9/2007	BH-20-W 8/9/2007	BH-21-W 8/9/2007	BH-22-W 8/9/2007	MW-1 7/18/2007	MW-2 7/18/2007	MW-3 7/18/2007	MW-4 7/18/2007
VOLATILE ORGANICS (continued)														
1,4-Dichlorobenzene	µg/L	SW8260		- -	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	2 U	2 U	2 U	2 U
2,2-Dichloropropane	µg/L	SW8260		- -	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	2 U	2 U	2 U	2 U
2-Butanone	µg/L	SW8260		- -	- -	- -	- -	- -	- -	- -	10 U	10 U	10 U	10 U
2-Chloroethylvinylether	µg/L	SW8260		- -	1 U	1 U	1 U	2 U	1 U	1 U	- -	- -	- -	- -
2-Chlorotoluene	µg/L	SW8260		- -	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	2 U	2 U	2 U	2 U
2-Hexanone	µg/L	SW8260		- -	- -	- -	- -	- -	- -	- -	10 U	10 U	10 U	10 U
4-Chlorotoluene	µg/L	SW8260		- -	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	2 U	2 U	2 U	2 U
4-Methyl-2-Pentanone (MIBK)	µg/L	SW8260		- -	- -	- -	- -	- -	- -	- -	10 U	10 U	10 U	10 U
Acetone	µg/L	SW8260		- -	- -	- -	- -	- -	- -	- -	25 U	25 U	25 U	25 U
Acrylonitrile	µg/L	SW8260		- -	- -	- -	- -	- -	- -	- -	10 U	10 U	10 U	10 U
Bromobenzene	µg/L	SW8260		- -	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	2 U	2 U	2 U	2 U
Bromochloromethane	µg/L	SW8260		- -	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	2 U	2 U	2 U	2 U
Bromodichloromethane	µg/L	SW8260		- -	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	2 U	2 U	2 U	2 U
Bromoform	µg/L	SW8260		- -	1 U	1 U	1 U	2 U	1 U	1 U	2 U	2 U	2 U	2 U
Bromomethane	µg/L	SW8260		- -	1 U	1 U	1 U	2 U	1 U	1 U	2 U	2 U	2 U	2 U
Carbon Disulfide	µg/L	SW8260		- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Carbon Tetrachloride	µg/L	SW8260		- -	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	2 U	2 U	2 U	2 U
Chlorobenzene	µg/L	SW8260		- -	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	2 U	2 U	2 U	2 U
Chloroethane	µg/L	SW8260		- -	1 U	1 U	1 U	2 U	1 U	1 U	2 U	2 U	2 U	2 U
Chloroform	µg/L	SW8260		- -	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	2 U	2 U	2 U	2 U
Chloromethane	µg/L	SW8260		- -	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	2 U	2 U	2 U	2 U
cis-1,2-Dichloroethene	µg/L	SW8260		- -	0.2 U	0.2 U	0.2 U	0.83	1.8	3.2	2 U	2 U	2	2 U
cis-1,3-Dichloropropene	µg/L	SW8260		- -	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	2 U	2 U	2 U	2 U
Dibromochloromethane	µg/L	SW8260		- -	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	2 U	2 U	2 U	2 U
Dibromomethane	µg/L	SW8260		- -	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	2 U	2 U	2 U	2 U
Dichlorodifluoromethane	µg/L	SW8260		- -	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	2 U	2 U	2 U	2 U
Hexachlorobutadiene	µg/L	SW8260		- -	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	2 U	2 U	2 U	2 U
Isopropylbenzene (Cumene)	µg/L	SW8260		- -	- -	- -	- -	- -	- -	- -	2 U	2 U	2 U	2 U
Methyl Iodide	µg/L	SW8260		- -	1 U	1 U	1 U	2 U	1 U	1 U	- -	- -	- -	- -
Methyl Isobutyl Ketone	µg/L	SW8260		- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Methyl t-Butyl Ether	µg/L	SW8260	20	- -	- -	- -	- -	- -	- -	- -	2 U	2 U	2 U	2 U
Methylene Chloride	µg/L	SW8260	5	- -	1 U	1 U	1 U	2 U	1 U	1 U	5 U	5 U	5 U	5 U
Naphthalene	µg/L	SW8260	160	- -	- -	- -	- -	- -	- -	- -	2 U	2 U	2 U	2 U
n-Butylbenzene	µg/L	SW8260		- -	- -	- -	- -	- -	- -	- -	2 U	2 U	2 U	2 U
n-Propylbenzene	µg/L	SW8260		- -	- -	- -	- -	- -	- -	- -	2 U	2 U	5	2 U
p-Isopropyltoluene	µg/L	SW8260		- -	- -	- -	- -	- -	- -	- -	2 U	2 U	2 U	2 U
sec-Butylbenzene	µg/L	SW8260		- -	- -	- -	- -	- -	- -	- -	2 U	2 U	2 U	2 U
Styrene	µg/L	SW8260		- -	- -	- -	- -	- -	- -	- -	2 U	2 U	2 U	2 U
tert-Butylbenzene	µg/L	SW8260		- -	- -	- -	- -	- -	- -	- -	2 U	2 U	2 U	2 U
Tetrachloroethene	µg/L	SW8260	5	- -	0.2 U	0.2 U	2.5	74	5.8	0.2 U	2 U	17	2 U	2 U
trans-1,2-Dichloroethene	µg/L	SW8260		- -	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	1.1	2 U	2 U	2 U	2 U
trans-1,3-Dichloropropene	µg/L	SW8260		- -	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	2 U	2 U	2 U	2 U
Trichloroethene	µg/L	SW8260	5	- -	0.2 U	0.2 U	0.2 U	3.2	7.4	0.84	2 U	2 U	2 U	2 U
Trichlorofluoromethane	µg/L	SW8260		- -	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	2 U	2 U	2 U	2 U
Vinyl Acetate	µg/L	SW8260		- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Vinyl Chloride	µg/L	SW8260	0.2	- -	0.2 U	0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U

Historical Groundwater Analytical Results

PARAMETERS	Units	Analytical Method	Sample No.: MTCA A	BH-15-W 7/10/2007	BH-17-W 8/9/2007	BH-18-W 8/9/2007	BH-19-W 8/9/2007	BH-20-W 8/9/2007	BH-21-W 8/9/2007	BH-22-W 8/9/2007	MW-1 7/18/2007	MW-2 7/18/2007	MW-3 7/18/2007	MW-4 7/18/2007
SEMIVOLATILE ORGANICS														
1-Methylnaphthalene	µg/L	SW8270D SIM		- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
2-Methylnaphthalene	µg/L	SW8270D SIM		- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Acenaphthene	µg/L	SW8270D SIM		- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Acenaphthylene	µg/L	SW8270D SIM		- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Anthracene	µg/L	SW8270D SIM		- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Benzo(a)anthracene	µg/L	SW8270D SIM		- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Benzo(a)pyrene	µg/L	SW8270D SIM	0.1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Benzo(b)fluoranthene	µg/L	SW8270D SIM		- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Benzo(g,h,i)perylene	µg/L	SW8270D SIM		- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Benzo(k)fluoranthene	µg/L	SW8270D SIM		- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Chrysene	µg/L	SW8270D SIM		- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Dibenz(a,h)anthracene	µg/L	SW8270D SIM		- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Fluoranthene	µg/L	SW8270D SIM		- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Fluorene	µg/L	SW8270D SIM		- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Indeno(1,2,3-cd)pyrene	µg/L	SW8270D SIM		- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Naphthalene	µg/L	SW8270D SIM	160	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Phenanthrene	µg/L	SW8270D SIM		- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Pyrene	µg/L	SW8270D SIM		- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

NOTES:
- - - = Not analyzed or not collected
- *G = 1 if no benzene ; 0.8 if benzene
- *XY = Applies to the sum of all xylenes
- U = Not detected above the given practical quantitation limit
- Shaded values exceed MTCA A

SOURCES:

Model Toxics Control Act (MTCA) from WA Administrative Code 173-340-900

MTCA Method A Cleanup Levels for Ground Water: Table 720-1

UNITS:

mg/L = milligrams/liter

µg/L = micrograms/liter