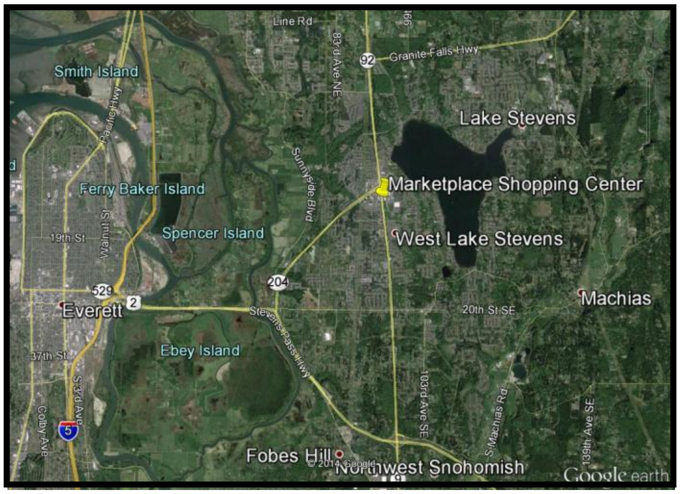
REMEDIAL INVESTIGATION/ FEASIBILITY STUDY

At the

LAKE STEVENS CLEANERS SITE



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EXECUTIVE SUMMARY

This report presents the results of Galloway Environmental, Inc.'s (GEI's) Remedial Investigation and Feasibility Study (RI/FS) of the Lake Stevens Cleaners Facility, 303 91st Avenue NE, Suite C-302, Lake Stevens, Washington 98258.

The Site is located in a commercial area in Lake Stevens, Washington approximately 4½ miles northeast of Everett's Central Business District and approximately ½ mile southwest of Lake Stevens in Snohomish County.

The Parcel consists of approximately 0.71 acres and is improved with a one story, built up, 3,840 square foot structure that was built in 1993. Lake Stevens Cleaners shares the building with the Boeing Employees Credit Union.

This RI/FS was prepared as part of the owner's response to the recent discovery of dry cleaning solvent impacts to soil and groundwater at the subject property. The owner would like to enter into the Washington Department of Ecology Voluntary Cleanup Program with the ultimate goal of receiving a "No Further Action" letter from the Washington State Department of Ecology (Ecology). The site is relatively simple in that the primary contaminants of concern are dry cleaning-related compounds — Tetrachloroethylene ("PCE") and Trichloroethylene ("TCE"). These compounds were confirmed to be present in soil and groundwater at concentrations above the currently allowable Washington State Model Toxics Control Act (MTCA Cleanup Regulation 173-340, Method A) Cleanup Levels in soil and groundwater.

ESA Purpose and Objectives

This RI presents the results of GEI's environmental soil and groundwater sampling at the property. This RI did not identify any drinking water wells that were likely to have been impacted by the off-site migration of these dry cleaning compounds from the site. Also, the majority of the contamination is buried beneath the soil outside of the dry cleaning facility and the potential for inhalation or dermal contact with the contaminants is minimal. Therefore, GEI concludes that this site does not currently present an imminent threat to human health or to the environment. However, a vapor intrusion study will be performed inside of the suite following remedial measures completed at the Site.

The FS targeted evaluating appropriate potential remedial technologies. These remedial options were targeted to: 1) Protect human health and the environment; 2) Comply with the applicable cleanup standards; 3) Comply with all relevant environmental regulations; and 4) Provide compliance monitoring, if necessary. We understand that an important goal of the remediation will be to provide permanent solutions for the cleanup and to minimize the amount of hazardous substances remaining at the site, to the maximum extent practicable.

Work Scope Performed by GEI during this RI/FS

This report incorporates the results of three previous environmental studies at the Site, summarized as follows *(See Section 9 — References).*

1. *Preliminary Subsurface Investigation for Lake Stevens Cleaners - ADR Environmental Group*

   This preliminary study consisted of collecting soil and vapor samples from inside and outside of the facility. The soil samples were field screened for potential dry cleaning solvent-related impacts to the Site's soil and or vapor. The samples from four direct push penetrations from beneath the concrete floor inside the facility in the area of the facilities dry cleaning units and from beneath the soil covered area in the landscaped area behind the facility. Laboratory analysis of samples confirmed soil and vapor impacts were present beneath the concrete and soil.

2. *<u>Focused Phase II Environmental Site Assessment at the Lake Stevens Cleaners Site — GEI</u>*

   GEI conducted a follow-up Phase II ESA at the facility to investigate whether groundwater impacts were present at the facility. The ESA consisted of soil and groundwater sampling outside of the facility. GEI collected soil and water samples from four direct push penetrations from the surface to the bottoms of the holes for field screening and laboratory analysis. The laboratory analysis of these samples confirmed that water was impacted outside of the facility.

3. *<u>RI/FS at the Lake Stevens Cleaners Site — GEI</u>*

   This Remedial Investigation/Feasibility Study consisted of installing and sampling soil and groundwater from four groundwater wells installed outside of the facility. Information gained in this RI assisted in developing an understanding of the extent of the impacts and the Site's groundwater flow regime. The FS was used to evaluate potential remedial options for the Site.

1.0 INTRODUCTION

Galloway Environmental, Inc. (GEI) has completed this Report of Investigation/ Feasibility Study (RI/FS) of the Lake Stevens Cleaners at the Marketplace Shopping Center in Lake Stevens, Washington on behalf of Lake Stevens Marketplace, LLC.

This RI/FS was prepared as part of the owner's response to the recent discovery of dry cleaning-related solvent impacts to soil and groundwater at the subject property.

The site is relatively simple in that the primary contaminants of concern (COCs) are Tetrachloroethylene (PCE) and Trichloroethylene (TCE) dry cleaning compounds. These COCs were confirmed to be present in soil and groundwater at the subject property above the currently allowable Washington State Model Toxics Control Act (MTCA Cleanup Regulation 173-340) Cleanup Levels (CULs).

The owner would like to enter into the Washington Department of Ecology's (Ecology's) Voluntary Cleanup Program (VCP) with the ultimate goal of receiving a "No Further Action" letter from the Agency.

This section (Section 1) provides general background information regarding the Site. Sections 2 and 3 summarize the scope and results of the field investigation. Section 4 discusses contaminant characteristics, fate, and transport of the COCs. Section 5 compares the results of the field investigation to the applicable cleanup regulations to determine whether remedial measures are necessary. Sections 6 identify various remedial options for the Site and Section 7 summarizes the proposed remedial options for the Site.

1.0.1 Site Location and Property Description

Snohomish County Assessor records list the property's address as 303 91st Avenue NE, Suite C-302, Everett, Washington 98258. The Site is located approximately 4½ miles northeast of Everett's Central Business District and approximately ½ mile southwest of Lake Stevens in Snohomish County, Washington *(See Figure 1-1 Site Location Map).*

Snohomish County Assessors records list the property as Parcel #00804000000107. The Site is situated in the NE¼ of Section 13, Township 29 North, Range 5 East.

1.0.2 General Facility Information and Operational History

The Parcel consists of approximately 0.71 acres and is improved with a one story, built up, 3,840 square foot structure that was built in 1993. The Lake Stevens Cleaners facility shares the building with the Boeing Employees Credit Union *(See Figure 1-2 — Site Plan & Vicinity Map).* Reportedly, the dry cleaning operation has been at the subject property since the construction of the shopping center in 1993.

1.0.3 Purpose and RIFS Objectives

The purpose of this RI/FS is to evaluate the nature, extent, and potential migration of contamination by performing data collection and analysis. The RI provides a focused methodology to define the extent and characteristics of dry cleaning solvent contamination at the site. The purpose of Feasibility Study (FS) is to identify remedial technologies, which are potentially applicable to cleanup of the halogentated solvents-contaminated soil and groundwater.

The results of the Remedial Investigation (RI) are compared to Washington State Model Toxics Control Act (MTCA- WAC 73-340) and the US Environmental Protection Agency (EPA) cleanup regulations. This information was subsequently used in preparation of the Feasibility Study (FS) to evaluate potential remedial alternatives for the site.

Evaluating the technical implementability of the technology and considering the site-specific conditions (e.g., extent of contamination and available space) reduces the number of potentially applicable technologies. The technology options are also evaluated with respect to the remedial action objectives.

Objectives for this RI/FS include the following:

- Review and summary of existing data for the project area
- Characterize the nature and extent of contamination in soil and groundwater in soil and groundwater on-site
- Determine the groundwater flow direction and gradient
- Develop cleanup levels
- Evaluate the threat that contaminated soil and groundwater poses to human health and the environment, if any, and
- Development of preliminary remedial alternatives for cleanup of contaminants of concern (COCs) in soil and groundwater

1.0.4 Involved Parties

Facility Name & Address

Lake Stevens Cleaners
303 91st Avenue NE, Suite C-302

Everett, Washington 98258

Property owners and addresses

Lake Stevens Marketplace, LLC
3502 Tieton Drive
Yakima, Washington 98902
Phone contact: Keith Therrien, Esq. (509) 453-8907

Environmental Consultant

Galloway Environmental, Inc.
Attn: Gary Galloway, LHG, REA, CHMM
3102 220th Place SE
Sammamish, Washington 98075-9540
Phone: (425) 688-8852

Ecology Project Manager

Not yet assigned

1.0.5 Proposed Land Use

The Owner intends to complete any necessary remedial actions on the property and remove all existing dry cleaning equipment from the site.

1.0.6 Regional Physiographic Conditions

The subject site is situated approximately ½ mile southwest of Lake Stevens at an elevation of about 350 feet above mean sea level.

The subject property is flat-lying and the topography in the vicinity of the site is gently sloping towards the northeast.

1.0.7 Climate

Western Washington State is characterized by a mild marine climate. While the average total annual precipitation is approximately 37 inches, most of the rain falls between October and April.

1.0.8 Previous Environmental Studies

GEI was provided a Preliminary Subsurface Investigation Report for Lake Stevens Cleaners by the ADR Environmental Group, dated December 6, 2013 *(See Appendix A — Previous Environmental Reports).*

ADR's report referenced two Phase 1 ESAs that had been completed by Krazan & Associates, one in April 2000 and the second report issued in August 2003 — GEI was not provided a copy of these reports. Krazan inspected the cleaners facility and conducted interviews of the facility's operators regarding the use of dry cleaning solvents. Krazan did not observe any cracks on the floor of the facility where these contaminants may have been spilled and subsequently leaked to the underlying soils. Based on these observations, Krazan concluded that no further assessment was necessary at the facility.

Preliminary Subsurface Investigation for Lake Stevens Cleaners - ADR Environmental Group

In October 2013, ADR subcontracted GEI to assist them in conducting a preliminary subsurface investigation within and adjacent to the cleaners facility. The investigation was targeted to assess whether potential dry cleaning compounds had impacted the underlying soil or vapors beneath the facility's concrete or in the landscaped area east of the facility *(See Appendix A — Previous Environmental Reports).* Based on the findings of the preliminary investigation, ADR concluded that these dry cleaning compounds were present in the soil and vapor at concentrations above the currently allowable Washington State action levels and recommended that additional site characterization of the Site was necessary to determine whether these contaminants pose a potential threat to human health or the environment.

Focused Phase II Environmental Site Assessment at the Lake Stevens Cleaners Site — GEI

GEI completed a Focused Phase II ESA at the property in November of 2014. The assessment included soil and groundwater sampling outside the perimeter of the structure. GEI collected soil samples from four direct push penetrations from the surface to the bottoms of the holes for field screening and laboratory analysis. The samples were field screened for obvious signs of contamination (i.e. photoionization detector (PID), discolored soil, obvious odors, etc.), which are sometimes characteristic of impacts to soil. The soil penetrations and sampling are summarized as follows:

- Two 20 foot deep penetrations were drilled west and north of the cleaners facility. Minor amounts of water was observed to seeping into the penetration at about seven feet below the bgs. We collected one soil and one groundwater sample from each penetration for analysis for the Chemicals of Concern (COCs - Halogenated Volatile Organic Compounds (HVOCs)).
- One ten foot deep penetration (P-3) was drilled in the asphalt parking area east of the cleaners facility. Water was observed at approximately the top of the dense glacial till surface — about 4 ½ feel bgs. GEI submitted one soil and one water sample from approximately 4 ½ feet bgs for laboratory analysis for the COCs.
- One 12 foot deep penetration (P-4) was drilled in the asphalt area south of the adjoining Rite Aid Pharmacy store, situated on the southern side of the cleaners facility. No water was encountered in the penetration — the drilling contractor could not penetrate deeper than 12 feet in the ground at this location due to the very dense nature of the glacial till encountered in the boring. GEI submitted one soil sample from approximately seven feet bgs for laboratory analysis for the COCs.

  Based on information gained in ADR's previous investigation *(See Appendix A — Previous Environmental Investigations)* and the results of this study, the following conclusions and recommendations were be made.

Conclusions

- ADR's study confirmed environmental impacts to the Site's soil beneath the concrete slab inside the facility (near the existing dry cleaning unit) and in the landscaped area behind the facility.
- GEI's follow-up Focused Phase II ESA confirmed impacts to the Site's groundwater in the samples collected east and north of the cleaners facility at depths ranging from approximately four to seven feet below the ground surface (bgs) — this depth represents the approximate depth to the very dense till surface.
- Based on these data, there appears to be two contaminant source areas: 1) The COCs appear to have leaked from the dry cleaning units to the soils beneath the concrete slab, and 2) Contaminants appear to have been spilled onto the soil exposed in the landscaped area east of the facility.

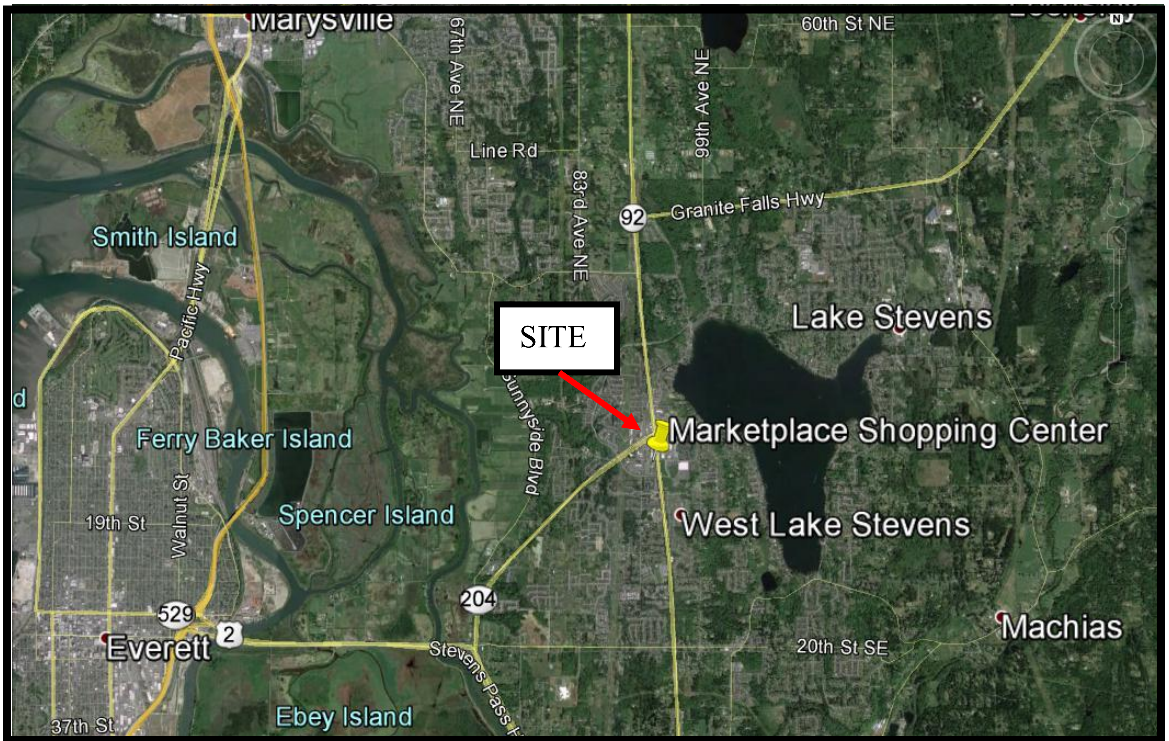

FIGURE 1-1 — SITE LOCATION MAP
Lake Stevens Cleaners RI/FS
Source: Google Maps 2013, GEI Project #35003

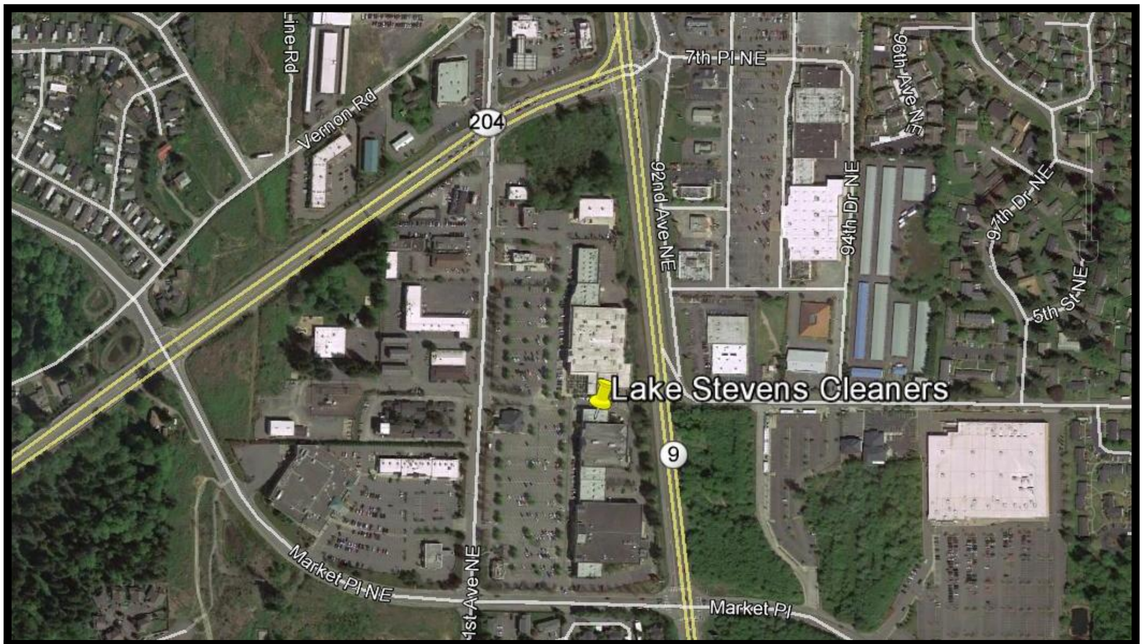

FIGURE 1-2 — SITE VICINTY MAP
Lake Stevens Cleaners RI/FS
Source: Google Maps 2013, GEI Project #34040

FIGURE 1-3 — SITE TOPOGRAPHIC MAP

Lake Stevens Cleaners RI/FS

Source: MyTopo.com, GEI Project #35003

1.1 REGIONAL AND SITE GEOLOGY

The subject property is located within the Puget Sound Lowland Physiologic Province, which covers most of Snohomish County. This north-south trending structural and topographic depression is bordered on its west side by the Olympic Mountains, and to the east by the Cascade Mountain foothills. The Puget Lowland is underlain by Tertiary volcanic and sedimentary bedrock, and has been filled to the present day land surface with Pleistocene glacial and non-glacial sediments.[1]

The present day landscape and underlying hydro-stratigraphy of Snohomish County are the result of repeated advances and retreats of Pleistocene continental glaciers, which inundated the Puget Lowland during recent geologic time. Over the past 300,000 years, at least six glacial and intervening interglacial episodes have affected the region. During this time, a large volume of glacial and interglacial material was deposited over the basin, resulting in complex accumulation of unconsolidated sediments, which is up to 3,000 feet thick in some places.

Within the coastal lowland, plateau segments 200 to 600 feet or more in altitude are separated by flat-bottomed, alluviated river gorges. The river flats in some cases represent the surface of as much as 500 to 600 feet of glacial and alluvial deposits backfilled into canyon arms of the ancestral drainage system.

The separate mesa-like plateaus of the Puget Sound lowland are more or less disconnected and altered segments of a former universal level. Their surfaces in general are smooth and gently rolling, terraces form along the margins, lumpy moraine deposits, and marshy depressions all diversify the surface in detail. This report (USGS WSP 1135) describes the area of the subject property as being in the “Intercity plateau” for the upland plain between the Puget Sound and the Snohomish River. The Intercity plateau is an undulating upland plain sloping southward from and are-shaped drainage divide that follows closely about its north, east, and western edges. The un-drained swales in the till plain are sites of impounded water, such as Silver and Thomas Lakes.

The Pleistocene deposits, occurring above sea level, consist of about 200 feet of Admiralty clay and as much as 1,000 feet of deposits of Vashon glaciation. The latter include as much as 300 feet of either clay or sand units of advance outwash, up to 150 feet thick of till, and variable thicknesses of outwash terrace and train material. The Admiralty clay is composed largely of clayey materials without important quantities of water. Similar clayey sediments are known to continue downward for more than 1,000 feet below sea level. The sand unit, and to a lesser extent, the clay unit are largely advance outwash of the Vashon glaciation. They are water-bearing, and the position of their groundwater reservoirs — in flat-shaped bodies perched on the Admiralty clay beneath the plateau surfaces and slopes, makes them particularly susceptible to useful development. The till is a persistent ground moraine deposit that mantles most of the area of the plateau segments and passes beneath most of the area of the plateau segments and passes beneath much of the outwash and alluvium of the valleys. The till is a great waster of precipitation; it sheds off to the creeks much water that would otherwise recharge the groundwater reservoirs. A small amount of water percolates irregularly through the till or accumulates in the soil zones on top, where it is tapped by

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[1] Groundwater Resources of Snohomish County Washington, USGS WSP 1135, by R. C. Newcomb

"hardpan" wells of small yield. Outwash terraces of gravels and sands, where they lie below the local water table, carry large quantities of ground water. The alluvial materials of the river valleys are good aquifers, but the water is iron-bearing in many places and is saline in places in the lower parts of the Snohomish Valleys.

Geologic mapping for the area *(See USGS Geologic Map of the Everett 7.5 Minute Quadrangle, Snohomish County, by J. P. Minard, 1985, MF-1748)* show the site as being underlain by Quaternary glacial advance outwash deposits. Advance outwash is described by Minard as being primarily composed of sand with some pebbles, cobbles, and localized silt areas.

Nearby studies by HWA Geosciences *(See Geotechnical Report, Pacific Avenue Overcrossing, HWA, dated October 28, 1999)* describe soil borings along Pacific Avenue between McDougall and Fulton Streets as encountering (from youngest to oldest) fill, native lacustrine clays, and advance outwash sands. Native clay was encountered underlying fills extending from 7.5 feet to 20 feet of depth. Typically, native clay consisted of medium stiff to stiff lean clay with some soft and highly plastic clay layers. Glacially consolidated advance outwash was encountered beneath the native clay deposits and extended to the bottoms of their borings. The advance outwash generally consisted of dense to very dense sand with varying gravel and silt content.

The US Department of Agriculture Soil Conservation Survey maps two soils series in the vicinity of the property – the Alderwood and Norma series of soils. The Alderwood soil series consists of moderately well drained soil with a perched water table developing for short periods during the winter and spring rainy seasons. Surface runoff is very slow to slow and erosion hazard is slight. The soil has the natural ability to support large loads.

Soils encountered by GEI during this study are summarized in GEI's Boring Logs, which are provided in Appendix A of this report.

1.2 REGIONAL AND SITE HYDROGEOLOGY

1.2.1 Groundwater Occurrence

GEI's groundwater measurements confirmed that water was present at approximately two to seven feet belowground and that groundwater gradient and flow direction was towards the northwest in January 2015 at a gradient of about 0.0111 feet vertical drop to 1 foot horizontal flow *(See Section 2.2.6— Groundwater Gradient and Flow Direction).*

1.2.2 Current Groundwater Use

The subject property is supplied water from a local municipal source.

1.2.3 Surface Water

On-site drainage is handled through on-site ground retention and storm drains. Surface drainage appears adequate as there is no evidence of standing water, creeks, or other drainages in the vicinity of the site.

2.0 *FIELD INVESTIGATION ACTIVITIES*

This investigation included soil and groundwater sampling outside the perimeter of the structure housing the dry cleaners facility.

The purpose of GEI's field investigation was to characterize the nature and the extent of the contaminants of concern (COCs) in on-site soil and groundwater, as well as to evaluate the potential for off-site contaminant migration. A phased approach was used, with field investigation activities conducted as part of all phases. The data obtained from each phase of the investigation was used to direct each subsequent phase. Previous studies confirmed dry cleaning solvent-related impacts to the Site's soil and groundwater *(See Section 1.0.8 — Previous Environmental Studies).* The following sections describe field activities performed during the RI.

The scope of work followed during this environmental investigation is summarized below and the chemical results of the sampling is discussed in Section 3 - Contaminant Nature and Distribution.

2.1 *SOIL INVESTIGATION*

Four soil borings were drilled on the property and were ultimately completed as groundwater monitoring wells during this RI. The locations of the wells are shown in Figure 3-1 — Site Plan and Sample Locations.

The borings were drilled to depths ranging from 13 to 15 feet below the ground surface (bgs). Drilling activities were field-documented by a GEI geologist *(see Appendix B — Borehole and Monitoring Well Completion Logs).*

Discrete soil samples were collected at five-foot intervals from the soil borings using a down hole, split spoon sampler. Soil samples and cuttings were visually examined and classified according to the Unified Soil Classification System (USCS). Completion logs for each borehole are presented in Appendix B. Soil samples were examined for obvious signs of contamination (i.e., discoloration, sheen, and obvious odor), and field screened for VOCs using a photoionization detector (PID). Soil samples were packed in laboratory-supplied containers, labeled, placed into a chilled cooler, and hand-delivered to the laboratory of their collection date for analysis.

2.1.1 *Hollow-Stem Auger Borings*

Cascade Drilling Co. provided a hollow stem auger drill rig (HSA) and crew to access subsurface soil samples for this study. Continuous soil samples were collected from the ground surface to a maximum depths ranging from 13 to 15 feet of depth for field screening and potential laboratory analysis.

In order to reduce the potential for cross contamination of samples collected during this study, the samplers and other down hole equipment were thoroughly cleaned and decontaminated between probe locations as per EPA SW846 recommended decontamination guidelines.

2.1.2 *Field Sampling and Screening of Soil Samples*

Soil samples were collected continuously from the ground surface to the maximum penetration depths using standard penetration techniques. Soil samples and cuttings were visually examined and classified according to the Unified Soil Classification System (USCS). The samples were field-screened for obvious signs of contamination (discolored soil, sheen, obvious odors, etc.), which are sometimes characteristic of petroleum compounds in the soil. Discrete soil samples were also field-tested using a photoionization detector (PID - Photovac 2010 or equivalent) to screen for volatile compounds in the samples. The PID was fully calibrated using a 100-ppm span gas and ambient air and the battery was fully charged prior to its use on-site. Detailed descriptions of observations made at each boring/probe have been provided in boring logs *(See Appendix B – Soil Boring Logs).*

Based on field observations and the objectives of this investigation, the field sampler selected representative soil samples from each location for laboratory analysis. The soil samples were collected according to EPA and Washington State Department of Ecology (Ecology) sampling and preservation guidelines. The samples were placed in laboratory supplied glass jars and 40-ml glass VOA vials with Teflon-lined septum caps. The samples were properly labeled, stored in a chilled container (with ice), and hand delivered to a Washington State certified laboratory in for testing for the targeted contaminants of concern (COCs).

2.1.3 *Chemical Analysis of Soil Samples*

GEI submitted the samples to a WDOE-certified laboratory test for Halogenated Volatile Organic Compounds (HVOCs) using EPA Method 8260C analysis.

All of the samples collected during this investigation were properly labeled with the sample location, depth, and date and time of collection.

2.2 *GROUNDWATER INVESTIGATION*

2.2.1 *Monitoring Well Installation*

As stated above, the four hollow-stem auger soil borings were converted to groundwater monitoring wells during this RI.

The wells are 2-inches in diameter and constructed with 0.010-inch slotted schedule-40 PVC screen with 2-inch diameter solid PVC riser. The wells are completed with traffic-rated flush-mounted monuments. The upper portion of the aquifer at the site is screened with a section of slotted PVC pipe. Cemex silica sand is placed in the boring outside of the screen to approximately one foot above the screen's top elevation. Detailed descriptions of each boring are provided in Appendix B.

2.2.2 *Well Development and Sampling*

GEI properly developed the wells and sampled the water from the wells using a dedicated, disposable PVC bailer in each of the monitoring wells. Three to five well casing volumes were purged from each well prior to testing the physical parameters of the water to confirm that the wells had been adequately developed. Specifically, temperature, conductivity, and pH were monitored to meet EPA SW-846 recommended guidelines during purging and prior to sampling. The final, stabilized measurements were recorded in a field logbook *(see Appendix B —*

The samples were properly labeled, stored in a chilled container (with blue ice), and hand delivered to OnSite Environmental Laboratory in Redmond, Washington for testing for the targeted COCs (dry cleaning compounds — Halogenated Volatile Organics using EPA Method 8260C).

2.2.3 Well Elevation Survey

On-site monitoring well locations were initially established in the field by measuring from structures with a field tape. After completion of the well installations, the elevation of the top-of-casing for the wells were surveyed relative to an arbitrary 100-foot datum established at the top of casing in the highest well.

2.2.4 Water Level Monitoring

Water levels were measured from the surveyed top-of-casing in each well using an electronic sounding device prior to sampling each well. Water level measurements and corresponding elevations are summarized in Appendix C — Water Sample Logs.

2.2.5 Chemical Analysis of Water Samples

GEI submitted the water samples to a WDOE-certified laboratory test for Halogenated Volatile Organic Compounds (HVOCs) using EPA Method 8260C analysis.

All of the samples collected during this investigation were placed in laboratory-supplied containers and properly labeled with the sample location, depth, and date and time of collection. The samples were stored in an iced cooler for delivery to the laboratory under standard chain-of-custody procedures.

2.2.6 Groundwater Gradient and Flow Direction

GEI’s groundwater measurements confirmed that water was present at approximately two to seven feet belowground and that groundwater gradient and flow direction was towards the northwest in January 2015 at a gradient of about 0.0111 feet vertical to 1 foot horizontal *(See Figure 3-1 – Site Plan and Sample Locations).*

3.0 CONTAMINANT NATURE AND DISTRIBUTION

This section presents chemical analytical results for soil and groundwater collected during the RI. Contaminant types, concentrations and distribution are summarized for each environmental media.

3.*1 CHEMICAL DATA QUALITY*

The GEI Project Manager reviewed the RI analytical results. In general, the data are complete and of known and acceptable quality. Data completeness and quality are discussed in the laboratory's Quality Assurance Reports included with laboratory analytical reports in Appendix C.

3.2 SOIL SAMPLE RESULTS

Laboratory analysis of the soil samples collected during this RI resulted in concentrations of COCs within the currently allowable Washington State Model Toxics Control Act Method A (MTCA) Cleanup Levels (CULs) for Unrestricted Land Use (ULU) in all of the soil borings *(See Table 3-1 — Sample Results Summary, below, and Appendix B — Soil Boring Logs).*

Laboratory analytical results of soil samples from previous studies confirmed the presence of TCE and/or PCE concentrations above the currently allowable MTCA Method A Cleanup Levels in the samples collected from beneath the facility's concrete floor and landscaped area behind the facility *(See Figure 3-1— Site Plan and Sample Locations).* All of the remaining COCs were either "not detected" or were detected at levels below the MTCA limits for all of the wells.

3.3 GROUND WATER SAMPLE RESULTS

GEI installed and sampled four groundwater-monitoring wells as part of this RI. Laboratory analysis of the water samples resulted in COCs concentrations above the currently allowable MTCA CULs in one of the wells installed during this RI *(See Table 3-1 — Sample Results Summary, below).*

Laboratory analytical results from previous studies confirmed the presence of TCE and/or PCE concentrations in the water above the currently allowable MTCA Method A Cleanup Levels in the probe penetrations situated north and east of the dry cleaning facility *(See Figure 3-1— Site Plan and Sample Locations).* All of the remaining COCs were either "not detected" or were detected at levels below the MTCA limits for all of the wells.

TABLE 3-1 — SAMPLE RESULTS SUMMARY (includes previous sampling)

Sample No. & depths (feet)	Media	Laboratory Analysis (mg/kg, ppm) See Figure 3-1 for sample locations				
		PCE	DCE	Chloroform	TCE	Remarks
B-1 @ 4'	Soil	**0.087**	ND	ND	ND	ADR Prelim. Report
B-2 @ 4'	"	**0.14**	"	"	"	"
B-3 @ 4'	"	ND	0.011	"	"	"
B-4 @ 4'	"	**0.065**	ND	"	"	"
P1@18'	"	ND	ND	"	"	GEI Phase II Report
P2@20'	"	0.025	"	"	"	'
P3@4'	"	ND	"	"	"	"
P4@7'	"	"	"	"	"	"
P1	Water	ND	ND	ND	ND	"
P2	"	**40**	"	"	"	"
P3	"	**31**	3.5	1.5	**0.78**	0.78
MW1@8'	Soil	ND	ND	ND	ND	GEI RI/FS data
MW2@8'	"	0.0082	"	"	"	"
MW3@8'	"	ND	0.0035	"	"	"
MW4@7'	"	"	ND	"	"	"
MW1	Water	ND	ND	ND	ND	"
MW2	"	**450**	"	"	"	"
MW3	"	ND	2.8	"	"	"
MW4	"	"	0.94	"	"	"
MTCA Method A Limit Revised 2013	Soil Water	0.05 5 µg/L	16000	800/32.3	0.03 5 µg/L	Method B CULs for PCE in soil = 480 mg/kg

PCE = Tetrachloroethene, DCE = Dichlorodifluoromethane, TCE = Trichloroethene
NA = Not Applicable
ND = Not Detected @ Practical Quantification Limits (see Appendix C - data sheets)
- - - = Not analyzed
Shaded cells = > MTCA Method A Unrestricted Land Use Limits

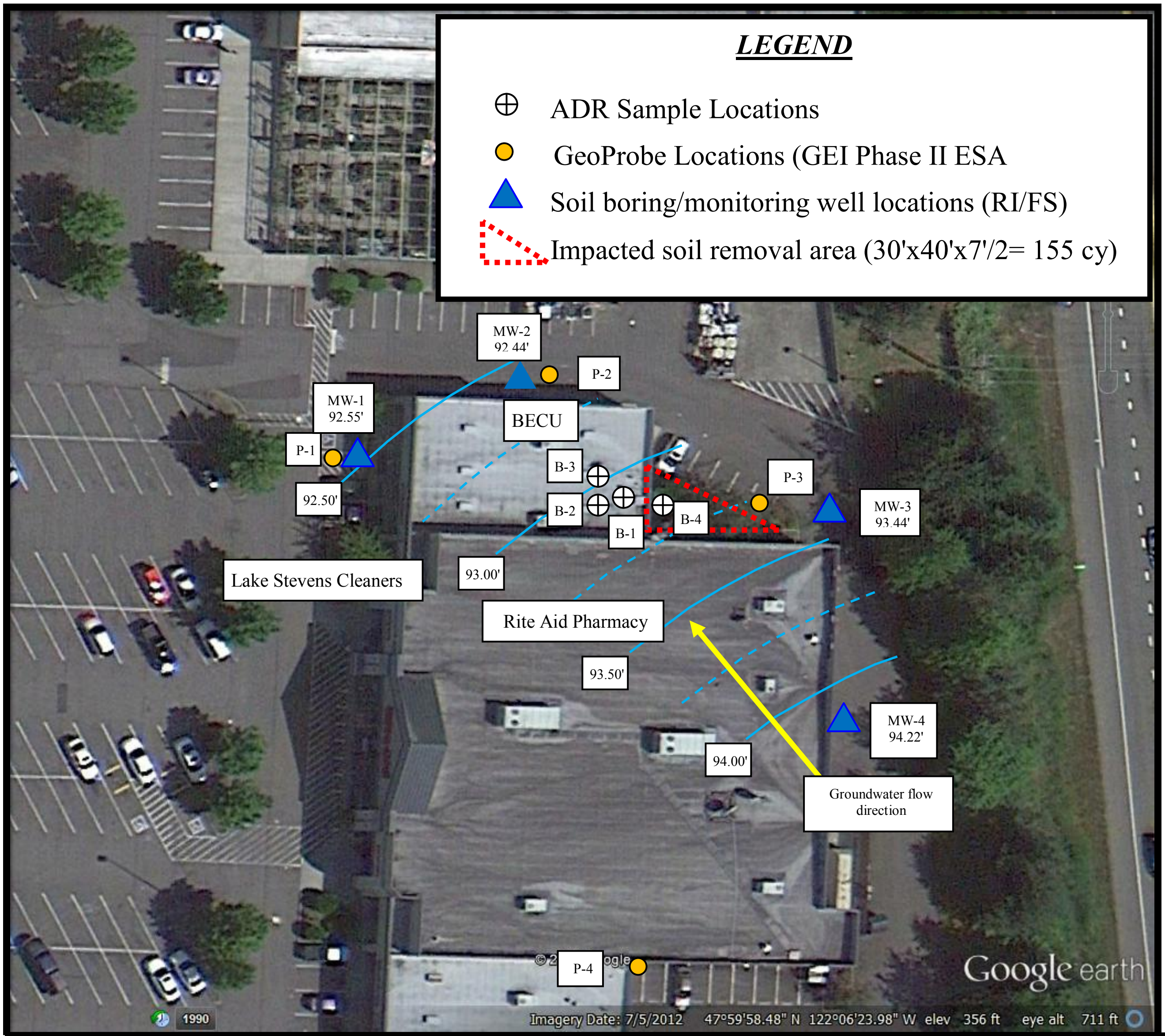

FIGURE 3-1 — SITE PLAN AND SAMPLE LOCATIONS
Lake Stevens Cleaners RI/FS
Source: MyTopo.com, GEI Project #35003

4.0 CONTAMINANT CHARACTERISTICS, FATE, AND TRANSPORT

Information provided in this section has been excerpted from the Agency for Toxic Substance and Disease Registry, United States Public Health Service, 1990.

4.1 CHARACTERISTICS OF CONTAMINANTS

4.1.1 Contaminant Characteristics

Tetrachloroethylene ("PCE") is a man-made substance widely used for dry cleaning fabrics and textiles and for metal-degreasing operations. It is also used as a starting material (building block) for the production of other man-made chemicals. Other names that may be used for Tetrachloroethylene include perchloroethylene, perc, PCE, perclene, and perchlor. Although Tetrachloroethylene is a liquid at room temperature, some of the liquid can be expected to evaporate into the air producing an ether-like odor; evaporation increases as temperature increases.

Trichloroethylene ("TCE") is also a man-made substance used for dry cleaning fabrics and textiles and for metal-degreasing operations. Most of the trichloroethylene used in the United States is released into the atmosphere from industrial degreasing operations.

4.1.2 Characterization of Hazardous and Toxic Effects

The primary contaminants of concern for this project are TCE and PCE.

PCE - Acute (short-term) and chronic (long-term) inhalation exposure to PCE can affect the human central nervous system (CNS), with symptoms such as dizziness, headaches, confusion, euphoria, facial numbness, and weakness. Liver, kidney, immunological, endocrine, and developmental effects have also been reported in humans. A recent analysis of available epidemiological studies reports trichloroethylene exposure to be associated with several types of cancers in humans, especially kidney, liver, cervix, and lymphatic system. Animal studies have reported increases in lung, liver, kidney, and testicular tumors and lymphoma. The Agency is currently reassessing the cancer classification of trichloroethylene.

TCE - When inhaled, TCE produces central nervous system depression resulting in general anesthesia. Its high blood solubility results in a less desirable slower induction of anesthesia. At low concentrations it is relatively non-irritating to the respiratory tract. Higher concentrations result in tachypnea. Many types of cardiac arrhythmias can occur and are exacerbated by epinephrine (adrenaline). It was noted in the 1940s that TCE reacted with carbon dioxide (CO_2) absorbing systems (soda lime) to produce dichloroacetylene and phosgene. Cranial nerve dysfunction (especially the fifth cranial nerve) was common when TCE anesthesia was given using CO_2 absorbing systems. These nerve deficits could last for months. Occasionally facial numbness was permanent. Muscle relaxation with TCE anesthesia sufficient for surgery was poor. For these reasons as well as problems with hepatotoxicity, TCE lost popularity in North America and Europe to more potent anesthetics such as halothane by the 1960s.

The symptoms of acute non-medical exposure are similar to those of alcohol intoxication, beginning with headache, dizziness, and confusion and progressing with increasing exposure to unconsciousness. Respiratory and circulatory depression can result in death.

Much of what is known about the human health effects of TCE is based on occupational exposures. Beyond the effects to the central nervous system, workplace exposure to trichloroethylene has been associated with toxic effects in the liver and kidney. Over time, occupational exposure limits on TCE have tightened, resulting in more stringent ventilation controls and personal protective equipment use by workers.

Due to low soil and water concentrations, inhalation risks are considered low. The open areas air circulation and low volatility of the potential compounds significantly decreases any potential for significant vapor formation.

4.2 FATE AND MIGRATION Of THE CONTAMINATION

TCE and PCE are mainly released to the environment in air and to a lesser extent in water and soil, due to industrial and consumer uses. In air, they are broken down by sunlight and by reaction with other chemicals present in the air.

When these compounds are spilled onto land, they attach loosely to nearby surface soil particles. They move from the soil into the air. Some may also move into groundwater.

Several mechanisms will primarily affect the fate of the residual soil contamination. These include leaching and downward migration due to infiltration of moisture, adsorption/desorption from soil, advection of dissolved constituents and biodegradation. Direct migration of free product has probably been a significant mechanism contributing to the movement of these solvents beneath sites in the past, but is no longer considered of significance, subsequent to the removal of the contaminated soils.

Biological degradation of these compounds in saturated soils at the site is expected to be the single largest mechanism affecting their fate if engineering controls (i.e., capping) are not instituted. This mechanism is recognized as being relatively slow in anaerobic conditions. Therefore, biodegradation would be expected to occur for many years.

4.3 CURRENT AND POTENTIAL EXPOSURE PATHWAYS

4.3.1 Pathways of Concern

Because TCE and PCE evaporate quickly, the most common exposure of these compounds are from breathing air containing them. They may also enter the body through drinking contaminated water or eating contaminated food. Because tetrachloroethylene does not pass through the skin to any significant extent, entry into the body this pathway is considered minimal.

Potential exposure of the compounds in the impacted soil remaining belowground is mainly limited to direct contact and inhalation during any future excavation and sampling, or potentially during any significant future site grading during redevelopment.

The surface and subsurface geology was studied in order to evaluate any features, such as paleochannels or man-made structures, which might act as a preferential pathway of hydrocarbon migration. Published geologic data and site-specific information reviewed for this RI/FS has not identified any potential natural or man-made structures that would provide a significant preferential migration pathway. There are no groundwater supply wells located on or adjacent to the property. There is no indication that significant concentrations of contaminants are leaving the property through groundwater migration.

4.3.2 Potential Mechanisms for Exposure

The potential exposure mechanisms include inhalation of volatilized chemicals, inhalation of dust, ingestion of contaminated soil or groundwater, and dermal contact.

Although these constituents are highly volatile, no organic vapors were measured in the breathing zone at the site using portable organic vapor analyzers during the field reconnaissance or remedial operations activities. Atmospheric dispersion and dilution should further minimize any potential impacts. Therefore, inhalation of volatilized chemicals from soil and groundwater at the site is not considered likely.

Any potential exposures through ingestion of contaminated soil and groundwater are limited. The contaminated soils are either at depth on-site. The shallow groundwater is not used as a source of drinking water. For the same reasons, the potential for dermal exposures to contaminated soil and groundwater is limited.

4.3.3 Terrestrial Ecological Evaluation

Based on our review of Ecology's Terrestrial Ecological Evaluation (TEE) Guidelines, the Site qualifies for consideration under Ecology's Simplified Evaluation" and that current and planned land use at the Site makes wildlife exposures unlikely. NOTE: Ecology's TEE evaluation forms will be submitted to Ecology with the Final Cleanup Report.

5.0 CLEANUP LEVELS

The Washington Department of Ecology (Ecology) has developed guidance for identifying constituent levels in various media, which are protective of human health and the environment (i.e., cleanup levels). As part of the Model Toxics Control Act (MTCA) Cleanup Regulation, appropriate cleanup levels for constituents of concern are defined as concentrations, which comply with all of the following requirements (WAC 173-340, as amended 2013):

- Concentrations established under Applicable or Relevant and Appropriate Requirements state and federal laws (ARARs)
- Concentrations estimated to result in no adverse effects on aquatic and terrestrial life
- Concentrations which are estimated to result in no acute or chronic toxic effects (non-carcinogenic) on human health, i.e. total hazard index is less than or equal to one
- Concentrations which are estimated to result in a total estimated cancer risk, summing individual risks, of less than or equal to one in one hundred thousand; and
- Concentrations which eliminate or minimize the potential for food chain contamination and other cross media contamination.

With lower limits set by background levels and the quantitation limits of current analytical methods, cleanup levels which meet the above criteria can be selected for constituents of concern at a waste site. To establish exposure conditions for the estimation of human health based cleanup levels (the third and fourth bullets), the Reasonable Maximum Exposures (RME) expected to occur under current and future site use conditions are identified. For application to the Lake Stevens Cleaners Site, the standard method for determining cleanup levels for individual constituents, Method A of the MTCA, was used.

5.0.1 Stepwise Procedure for Cleanup Level Development

Based upon this guidance, cleanup standards were devised using the stepwise approach described below.

1) The most stringent quantitative ARAR specific to the constituent and the medium, if any, was identified. The ARAR concentration limit was input to the risk equations for the RME scenario defined in the MTCA to determine whether the concentration met target risk levels.
2) If target risk goals were exceeded (or if no ARARs were available), a lower concentration which did meet target risk goals was calculated as the appropriate cleanup level.
3) If necessary, the cleanup level was lowered to prevent violations of cleanup levels in other media.
4) Whether the ARAR or a calculated risk-based value was the identified cleanup level, the concentration was compared to background levels, if available, and to practical quantitation limits of current analytical techniques as the lower limits of reasonable cleanup levels. For media in which multiple hazardous constituents are present, the target risk goals apply to the sum total of non- carcinogenic indices and carcinogenic

risks. Similarly, when the same individual is reasonably likely to be exposed to multiple media and pathways, the target risk goals apply to the sum total of non-carcinogenic indices and carcinogenic risks for all exposures.

5) Appropriate cleanup levels for exposure to the entire site are calculated by lowering individual cleanup levels for constituents contributing the largest portion of risk so that the sum total of all exposures, by all media and all pathways, does not exceed an HI of 1.0 and cancer risk of 1 x 10-5.

5.1 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Outlined below is an analysis of federal, state, and local regulations and standards that are potentially applicable to the Lake Stevens Cleaners site.

Resource Conservation and Recovery Act (RCRA)

RCRA Subtitle C provides standards for the management of hazardous waste. RCRA requirements would be triggered if materials at the site were hazardous wastes and the remedial activities at the site involved handling, treatment, storage or disposal of those materials.

The RCRA regulations identify solid wastes that are hazardous (through either lists of hazardous wastes or identification of four hazardous waste characteristics), and establish various administrative requirements for three categories of hazardous waste handlers. Those categories include generators, transporters, and owners/operators of treatment storage and disposal facilities (including waste piles). Subtitle C regulations also establish standards for the design and safe operation of those facilities, and impose restrictions on the land disposal of hazardous wastes.

RCRA requirements applicable to the site would be implemented through the EPA-authorized State Hazardous Waste Management Act and Dangerous Waste regulations (see discussion below). A recently promulgated federal requirement, which is applied by EPA until promulgation by the state, revised the toxicity characteristic (one of four characteristics used by EPA to identify hazardous waste).

The Department of Ecology has agreed with GEI that, based on PCE and TCE concentrations in the impacted soils, that these wastes do not designate as "Hazardous Wastes" under the State or Federal guidelines and can be disposed of as "Non Hazardous" wastes for disposal purposes at a Subtitle D landfill.

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)

CERCLA provides funding and enforcement authority for the remediation of hazardous waste sites created by past practices. Many businesses are also subject to reporting requirements for spills and certain categories of environmental releases. Under CERCLA, the National Contingency Plan (NCP) regulations establish a program for evaluating and placing the sites on the National Priorities List (Superfund). CERCLA requirements are ARARs only at sites that are on the Federal "Superfund" list. As no notification or state referral has occurred for this site, CERCLA and NCP standards are not applicable to this remedial action.

Washington Department of Ecology Hazardous Waste Management Act and Dangerous Waste Regulations

The Washington State regulatory program for hazardous waste management, authorized by EPA, generally parallels the federal requirements for hazardous waste handlers and technical standards for treatment, storage, and disposal facilities (including waste piles). As with the federal RCRA requirements, these regulations would be ARARs only if materials handled at this site were classified as "dangerous" or "extremely hazardous waste".

The State standards for determining a hazardous waste (referred to as dangerous or extremely hazardous wastes under state regulations) are more comprehensive than the federal standards. In addition to the hazardous waste lists and hazardous waste characteristics identified in the federal program, the State regulations include "persistent" dangerous wastes identified as wastes containing halogenated hydrocarbons or polynuclear aromatic hydrocarbons (PAHs).

As stated above, the Ecology has agreed with GEI that, based on PCE & TCE concentrations in the impacted soils, that these wastes do not designate as "Hazardous Wastes" under the State or Federal guidelines and can be treated of as "Non Hazardous" wastes for disposal purposes at a Subtitle D landfill.

Under the remedial approaches to be considered at this site, excavated materials may be temporarily stored on-site to await treatment or disposal off-site. Regulations require that such temporary storage of Dangerous Waste beyond 90 days would require application and receipt of a permit for a waste pile. Washington Administrative Code (WAC) standards outline specific administrative and technical standards for permitted wasted piles - these wastes are not considered as Dangerous Wastes. In general, the technical standards (WAC 173303-660) require the following:

- Liners and leachate collection systems
- Run-on, runoff control systems
- Groundwater monitoring
- Weekly inspections; and
- Removal of all waste, waste residues and contaminated subsurface soils at closure.

The conduct of the remedial action under a consent decree would alleviate the need to apply for a RCRA permit for storage beyond 90 days. However, under the authority of the consent decree, Ecology would still require the waste pile to meet "substantive" technical standards listed above. Since this soil and groundwater contamination is lower than thresholds for a dangerous waste, the media would not be required to meet these technical standards. Minimum standards for protection of human health and the environment (i.e., liners and covers over the material) may be required by Ecology upon review of the site work plan.

Ecology's Model Toxics Control act (MTCA)

As the state counterpart to CERCLA, MTCA provides funding and enforcement authority for the remediation of state hazardous waste sites created by past practices. Sites are identified through a reporting program of "hazardous substance" releases because of past practices. Specifically, owner/operators having information that a hazardous substance has been released to the environment and may be a threat to human health or the environment must report such information within 90 days of discovery.

Reports are followed by an initial site investigation and a more detailed site hazard assessment where required. Sites are then prioritized on a list of sites requiring further remedial action based on an Ecology ranking method.

In addition to complying with other relevant ARARs, MTCA also establishes general criteria for selecting cleanup actions and specific methodologies for designing cleanup levels. In general, Method A applies to routine actions with relatively few hazardous substances. Method A provides specific concentration levels for the most prevalent hazardous substances. Method B uses a risk assessment approach (using risk equations and standard exposure assumptions) to achieve an overall excess cancer risk of 1x10-6, or 10-5 for multiple hazardous substances. Method C allows a 10-5 risk level but places strict restrictions on future land use, requiring institutional controls.

Finally, MTCA provides several administrative options for conducting remedial actions. The "potentially liable person" (PLP) may undertake an independent remedial action without oversight or approval from Ecology. The PLP may undertake the action under the auspices of an approved consent decree enforceable by judicial action, or the remediation may take place under an agreed order. Cleanup levels, standards for conduct of the investigation and cleanup, and administrative options for conduct of the action at the site are discussed below.

5.2 SELECTION OFCLEANUP LEVELS

The site is relatively simple in that the primary contaminants of concern are all halogentated dry cleaning compounds. Those compounds are presented belowground in the area of the impacted source areas. These compounds include tetrachloroethylene and trichloroethylene.

The Washington State Department of Ecology (Ecology) has established cleanup standards and requirements for the cleanup of hazardous waste sites under MTCA (August 2001). MTCA defines a two-step approach for establishing cleanup requirements for individual sites: 1) Establishing Cleanup Standards; and 2) Selecting Cleanup Actions.

Methods for Establishing Cleanup Levels - MTCA provide three options for establishing cleanup levels: 1) Method A; 2) Method B; and 3) Method C. Each of these methods related to this site is summarized below.

A) Method A - Method A provides tables of cleanup levels for 25 to 30 of the most common hazardous substances found in soil and groundwater.

   Method A is applicable to this site.

B) Method B - Method B is risk-based approach to establishing cleanup levels at a contaminated site. Method B is divided into two tiers — standard and modified. Standard Method B used generic default assumptions to calculate cleanup levels.

Modified Method B provides for the use of chemical-specific or site-specific information to change selected default assumptions. This method calculates the required cleanup level sufficient to protect human health and ecological receptors. Potential receptors are identified based on groundwater modeling and specific chemical compounds present in the media.

Method B is applicable to this site. .

C) Method C - Method C is similar to Method B; however it is applicable only to "industrial" sites. This method may be applicable to this site.

Ecology's MTCA Cleanup Levels (MTCA promulgated by WAC 173-340) and federal drinking water standards were reviewed during this RI and considered with respect to the contaminant characteristics (i.e., mobility and degradation).

Either MTCA Method A or Method B (and possibly Method C) could be acceptable for the site. Given the relative routine nature of the contamination found at the Lake Stevens Cleaners site, and the limited number of hazardous substances, the Method A cleanup level may be most appropriate for this site.

Ecology has developed a guidance document for cleanup levels in soils for PCE and TCE. The appropriate levels at the Lake Stevens Cleaners site were determined utilizing the information available and considering the current land use in the vicinity of the site. These cleanup levels were established for the protection of public health and the environment in accordance with WAC 173-340. Therefore, the MTCA Method A Cleanup Levels for soil have been selected as the appropriate levels for the property.

5.2.1 MTCA Method A (Residential) Cleanup Levels

The MTCA Method A soil and water cleanup levels for "Unrestricted Land Uses" and "Industrial Properties" are set at the same levels for each of the contaminants of concern (COCs). The Method A CULs for this site are summarized as follows.

Media	Contaminant	CULs
Soil	TCE	0.03 mg/kg
Soil	PCE	0.05 mg/kg
Water	TCE	5 μg/L
Water	PCE	5 μg/L

5.3 POINTS OF COMPLIANCE

The points of compliance for the impacted soil and/or groundwater is considered to be the extent to which these COCs have been identified.

6.0 EVALUATION OF APPLICABLE REMEDIAL TECHNOLOGIES

The remedial investigation (RI) has served to identify the need for remedial action at the Lake Stevens Cleaners site. Based on this information, we have developed this feasibility study to identify and screen potentially applicable remedial technologies from a broad base of general remedial technology categories. We also recognize the need to incorporate the potential for the off-site migration of impacted groundwater from the site into the final design of the remedial action.

Standards for Conducting Remedial Investigations and Cleanup Actions

Standards for selecting a cleanup action applicable to the site are detailed in WAC 173-340-360. Briefly, those standards require: (1) the use of permanent solutions (i.e., solutions which treat the hazardous substances and meet cleanup standards without further remedial action); (2) reasonable restoration time frames; and (3) consideration of public concerns rose during the public comment period.

Under the standards, the cleanup technology chosen must minimize the amount of untreated hazardous substances remaining at a site. In addition, off-site transport and disposal of the contaminated soil and debris from the site is prohibited if the treatment technology exists which will both attain cleanup standards and is practicable.

Administrative Options for Conduct of the Remedial Action

As outlined above, WAC standards outline three options for conducting the remedial action: independent action, action under the auspices of a consent.

The WAC standards require that the cleanup level selected by the method described above must be attained at the point of compliance. Point of compliance for soils is generally defined as throughout the site from the ground surface to fifteen feet below the surface. Point of compliance for groundwater is generally considered to be at the extent to which impacted groundwater has been identified.

The remedial technologies must be evaluated for effectiveness, impacts on future development and use, implementability, and cost. This screening step identifies those alternatives with sufficient merit to undergo additional evaluation.

Following this screening, using a three-step process, remedial alternatives that may reach the Remedial Action Objectives are developed. The first step develops response criteria to evaluate the anticipated applicability of each alternative with respect to the protection of environmental and human health. Second, the Applicable or Relevant and Appropriate Requirements (ARARs) and performance requirements are identified and used to evaluate potential risks for each remedial action. Third, the costs and impacts on future use and development for these technically feasible technologies are compared.

Using MTCA (WAC 173-340-360, Selection of Cleanup Actions) as a model, we have targeted our discussion of appropriate remedial technologies to protect human health and the environment; comply with the applicable cleanup standards; comply with relevant environmental regulations; and provide compliance monitoring. We understand that an important goal of the remediation will be to provide permanent solutions for the cleanup and to minimize the amount of hazardous substances remaining at the site, to the extent practicable. With these goals in mind, we will present the remedial alternatives in Ecology's descending order of preference:

- Reuse or recycling
- Destruction or detoxification
- Separation or volume reduction followed by reuse, recycling, destruction, or detoxification of the residual hazardous substances
- Immobilization of hazardous substances
- On-site or off-site disposal at an engineered facility designed to minimize the future releases of hazardous substances and in accordance with applicable state and federal laws
- Isolation or containment with attendant engineering controls; and
- Institutional controls and monitoring.

6.1 REMEDIAL TECHNOLOGIES

The purpose of this section is to identify remedial technologies, which are potentially applicable to cleanup of the halogentated solvents-contaminated soil and groundwater

Evaluating the technical implementability of the technology and considering the site-specific conditions (e.g., extent of contamination and available space) reduces the number of potentially applicable technologies. The technology options are also evaluated with respect to the remedial action objectives.

6.2 REMEDIAL ACTION OBJECTIVES

Lake Stevens Marketplace, LLC ("owner") would like to enter into Ecology's Voluntary Cleanup Program (VCP) with the ultimate goal of receiving a "No Further Action" letter from the Agency.

The remedial action objectives for the Lake Stevens Cleaners Site are based on the assessment presented in the RI and are summarized as follows:

- Remove the impacted soil from the "source area(s)" to minimize the potential for the continued migration of the COCs; and
- Treat and/or monitor contaminant levels in groundwater in the vicinity of the site to ensure that contaminant concentrations in groundwater meet the MTCA Method A cleanup levels at the site's Points of Compliance.

The remedial action objectives for the Lake Stevens Cleaners site are to protect human health and the environment. To achieve the remedial action objectives for protecting human health, steps may need to be taken to eliminate or reduce exposure to contaminants of concern, which represent a threat to human health. Potential exposure routes to these contaminants have been evaluated in Section 5. To protect the environment, steps may need to be taken to restore and/or preserve the potential beneficial uses of resources (i.e., groundwater) at the site.

6.3 *REMEDIAL ACTION OPTIONS*

The RI has served to identify the need for remedial action at this site. Based on this information, this feasibility study has been developed to identify and screen potentially applicable remedial technologies from a broad base of general remedial technology categories.

Appropriate technologies, which are potentially applicable at the site, include the following:

<u>Water</u>

- Institutional Controls
- Groundwater monitoring
- Deed restrictions
- Access restrictions
- Hydraulic barriers
- Plume containment
- Air Sparging
- Bioremediation

<u>Soil</u>

- Soil treatment
- Incineration/Thermal Desorption
- Stabilization
- Bioremediation
- Chemical Treatment
- Ex-Situ Aeration
- Vapor Extraction
- On-site Containment
- Capping
- Off-site Disposal
- Incorporation into asphalt

6.3.1 *Groundwater*

6.3.1.1 *Institutional Controls*

Institutional controls are administrative or legal measures used to prevent activities that may compromise the integrity of a cleanup action. They are meant to prevent exposure to contamination remaining on site. Institutional controls may include environmental covenants (also known as "deed restrictions"), zoning restrictions, public health advisories, or other administrative tools. The most common institutional control is an environmental covenant. Environmental covenants are legal recorded documents that typically limit certain uses of the property, such as:

- Drilling a water supply well on the property.
- Disturbing pavement covering contaminated areas.
- Residential use of the property.

6.3.1.2 *Groundwater Monitoring*

Monitoring of groundwater is a potentially applicable alternative to the remediation of groundwater at the Lake Stevens Cleaners site, when performed in conjunction with the excavation and source removal alternative. A groundwater-monitoring program is an applicable technology to be used at the site to ensure that groundwater remains at or below MTCA Method A levels.

Long-term groundwater monitoring may be necessary if the CULs are not met following the remediation.

6.3.1.3 *Deed restrictions*

The use of a deed restriction is a method used to control or prohibit site redevelopment or use, groundwater use, site construction or all of the above. In lieu of any other institutional control, a deed restriction may be necessary to document the remaining presence of contaminated soils at the property, until such time as it is possible to demonstrate that soil contamination has naturally attenuated.

These restrictions may be necessary if the CULs are not met following the remediation.

6.3.1.4 *Access Restrictions*

Access restrictions, consisting of physical measures such as fencing to prevent contact with contaminated media, and to preserve the integrity of on-site measures, may be feasible until excavated soil is disposed of off-site. These restrictions may be necessary if the CULs are not met following the remediation.

6.3.1.5 *Plume Containment*

Affected groundwater may be treated in place by isolating the contaminated media and treating the materials without exposing them to the surface. These methods are generally the most cost-effective methods to use when remediation is necessary and time and cost constraints are minimal. However, sometimes these may be the only viable options because of accessibility, etc.

Hydraulic barriers include such things as slurry trench walls, grout curtains, block displacement, or sheet piling. These technologies block the flow of groundwater in the down-gradient direction. Barriers alone without groundwater extraction are only temporary measures since groundwater will tend to build up behind the barrier. Barriers tend to be very expensive and will provide little groundwater control without including extraction as a major component. For these reasons, hydraulic barrier systems for plume containment will not be considered further.

6.3.1.6 *Hydrodynamic Barriers*

These techniques may be applied to either the removal or treatment of materials that are present. Such techniques include subsurface drains and bottom liners, interceptor trenches with oil skimmers, and the combination of injection and withdrawal wells. Similar to hydraulic barriers, hydrodynamic barriers are very expensive and are applicable to sites where accessibility is a major constraint and the remedial options are limited.

These barriers typically are very expensive and will not be further evaluated for this site.

6.3.1.7 *Air Sparging*

A potential remediation method to be used may be air sparging, or *in situ* aeration. In this technology, compressed air is injected into the contaminated aquifer at depth below the static groundwater level. Air sparging works like an *in situ* air stripper, where a liquid phase to gas phase migration of the contaminant takes place. Air bubbles injected into the aquifer move upward through the water-filled pore spaces of the submerged soil. Volatile PCE contamination vaporizes into the air bubbles and is carried upward into the vadose zone. The contaminant-laden air may then captured by a soil vapor extraction (SVE) system operating above in the vadose zone above the injection area. The *in situ* treatment of soil and groundwater takes place without pumping groundwater and therefore no treatment and disposal of groundwater above ground is required.

6.3.1.8 *Bioremediation*

Biological treatment involves the use of naturally occurring (or added) bacteria to break down complex organic matter into non-toxic compounds. The bacteria use the organic contaminants as a source of energy and as building blocks for new bacterial cells. They produce carbon dioxide, water, and new bacteria from the organics they consume.

Several processes for treating contaminated soil using biological treatment are known. These include in-situ treatment and aboveground treatment. Each method may involve addition of oxygen, nitrogen, and other nutrients (the elements typically limiting effective biological growth and treatment).

Bioremediation is considered applicable for treatment of the chlorinated solvent-contaminated soils in the source area and groundwater at the site. Microorganisms designed to enhance the natural biodegradation of the contaminants may be added to the soil at the base of the "source area(s)" removals and the wells.

6.3.1.9 *Chemical Oxidation*

In these methods, oxidation and reduction methods are used to change the chemical form of a hazardous material to change its chemical composition to non-hazardous compounds or render it less toxic or to change it for handling or disposal purposes.

6.3.2 *Soil*

6.3.2.1 *Incineration/Thermal Desorption*

Soil incineration involves the application of sufficient heat to thermally destroy chemicals of concern that are present. The operation typically takes place in a kiln or similar furnace. Incineration is a technology that is effective for destruction of organic compounds. Soils containing high amounts of organic materials are best suited for incineration because combustion of the organic compounds release heat to assist the external heat supply. Incineration may pose air pollution problems — if not properly controlled and permitting may be a significant issue. Chlorinated solvent incineration may generate dioxin-affected emissions to the environment, if the incineration temperature is not high enough to completely destroy the chlorinated compounds — therefore low-temperature (about 350°F) is not suitable for chlorinated solvents.

Incineration of chlorinated solvent-affected media requires very high temperatures to completely destroy the chlorinated component of the wastes. Treatment costs at these high temperature (Hazardous Waste Incinerators) are very expensive. Due to the estimated hauling and incineration costs, this alternative will not be considered further.

6.3.2.2 ***Stabilization***

Stabilization of contaminated soils involves chemical and/or physical treatment to render the contaminants less mobile. This treatment can be effective in treating soils containing multiple contaminants. Stabilization of the soil can make the soil suitable for reuse on-site or land disposal by decreasing contaminant mobility. Stabilization may be effectively implemented only if it results in constituent waste extract concentrations that are below regulatory levels. Stabilization is usually applied to soils containing significant levels of metallic contaminants. It therefore will not be considered further for the Lake Stevens Cleaners property.

6.3.2.3 ***Bioremediation***

Biological treatment involves the use of naturally occurring (or added) bacteria to break down complex organic matter into non-toxic compounds. The bacteria use the organic contaminants as a source of energy and as building blocks for new bacterial cells. They produce carbon dioxide, water, and new bacteria from the organics they consume.

Several processes for treating contaminated soil using biological treatment are known. These include in-situ treatment and aboveground treatment. Each method may involve addition of oxygen, nitrogen, and other nutrients (the elements typically limiting effective biological growth and treatment).

Bioremediation is considered applicable for treatment of the chlorinated solvent-contaminated soils in the source area and groundwater at the site. Microorganisms designed to enhance the natural biodegradation of the contaminants may be added to the soils to enhance the biodegradation of the contaminants.

6.3.2.4 ***Chemical Treatment***

Oxidation and reduction methods are used to change the chemical form of a hazardous material to render it less toxic or to change it for handling or disposal purposes. Usually the material is then disposed of in a controlled landfill.

Chemical oxidation products can be used to produce an effective oxidation reaction comparable to that of Fenton's Reagent without a violent exothermic reaction and produces only minor, local changes to the Site's pH. The oxygen releasing compound may be added to the oxidation products for the purpose of stimulating the aerobic degradation of aerobically degradable compounds.

6.3.2.5 ***Ex Situ Aeration***

Aeration is a method of soil treatment, which transfers the volatile contaminant from the soil to the air. Once the contaminant is in the air, it is dispersed and may be broken into nontoxic compounds through oxidation, photodegradation, and other chemical and physical processes. Certain chemicals emitted to the air are resistant to degradation or degrade into other toxic or hazardous compounds. However, in general the dispersion of chemicals through soil aeration yields reduced risks to the health of the public. Therefore, this option will not be considered further for this site.

6.3.2.6 ***Vapor Extraction***

Properly engineered, soil vapor extraction (SVE) can successfully clean up organic vapor contamination in the vadose zone (the portion of the soil not saturated with water). Contaminants are removed in the vapor phase by drawing air through the soil pore spaces by application of a vacuum. Fresh air from the surface is drawn down through the vadose zone where it flushes contaminant vapors present in the pore spaces. The vapors are vented to the surface, removed from the soil, and adsorbed onto activated carbon.

Since some of the contamination is submerged, SVE alone will not be capable of remediating all of the contamination without additional remedial measures.

6.3.2.7 ***On-site Containment***

On-site containment consists of capping soils that are contaminated with chlorinated solvent compounds and may be an acceptable remedial alternative. Capping with a suitable impervious material will substantially reduce the leaching potential of the chemicals of concern remaining in the contaminated soil, which was not accessible during the interim action and will protect the groundwater resource.

Some of the impacted area is beneath the concrete floor inside the facility and is already capped with concrete. Impacted groundwater would need to be contained to not allow the continued migration of the contaminants in the groundwater, which typically is very expensive. Therefore, additional capping will not be considered further at this site.

6.3.2.8 ***Off-site Disposal***

In this technology, soil containing the impacted soils are excavated and hauled to a permitted landfill for disposal (and possibly treatment). This is a relatively inexpensive option and usually results in immediate source removal.

As stated above in Section 5.1 — ARARs, Ecology has agreed with GEI that, based on PCE and TCE concentrations in the impacted soils, that these wastes do not designate as "Hazardous Wastes" under the State or Federal guidelines and can be disposed of as "Non Hazardous" wastes for disposal purposes at a Subtitle D landfill.

This option may be used for the impacted soil in the “source area” outside the facility in the landscaped area.

6.3.2.9 ***Incorporation into Asphalt***

This option is not considered applicable to sites with chlorinated solvent-contaminated soils. Therefore, this technology will not be considered further.

6.4 *APPLICABLE TECHNOLOGIES*

The technologies that are applicable to the remediation at this Site are based upon the discussion in Section 6.3. Technologies that are applicable to the Site includes the following remedial options:

- Soil excavation with off-site disposal
- Chemical Oxidation
- In-situ bioremediation
- Air sparging
- Vapor extraction
- Long-term groundwater monitoring

6.5 *REMEDIAL ALTERNATIVES EVALUATION*

These applicable technologies have been grouped together to form complete remedial alternatives, which will meet the remedial action objectives. Groundwater monitoring would be required until the groundwater quality meets Ecology's CULs or it can be demonstrated that groundwater impacts do not represent risks to human health or the environment.

The alternatives developed are as follows:

Alternative 1 - No action
Alternative 2 - Soil excavation with off-site disposal and groundwater monitoring
Alternative 3 - Soil excavation and disposal, in-situ biotreatment, and groundwater monitoring
Alternative 4 - Soil excavation and disposal, in-situ biotreatment, air sparging, vapor extraction, and groundwater monitoring

The "No Action" alternative is considered for comparison purposes only.

As required by MTCA, this evaluation of cleanup alternatives is targeted to protect human health and the environment by "eliminating, reducing, or otherwise controlling risks posed through each exposure pathway and migration pathway". Each of the four alternatives developed for the site are described below and are evaluated based on the following criteria:

- Technical feasibility
- Protection of human health and the environment
- Long-term effectiveness
- Permanent toxicity and mobility reduction
- Compliance with regulatory requirements; and
- Cost.

6.5.1 *Alternative 1 - No Action*

Under the No Action alternative, no further remediation costs would be incurred developing the site. The no-action alternative is not likely to be acceptable to the regulatory agencies because the impacted soil and groundwater at the site contains chemical constituents exceeding MTCA cleanup levels and potential exposure routes to contaminants would not be eliminated.

6.5.2 *Alternative 2 - Soil Excavation with Off-Site Disposal*

Under this alternative, the soil containing concentrations of chlorinated solvents exceeding MTCA Method A levels would be excavated and hauled to a hazardous waste landfill. It is estimated that approximately 155 cubic yards (217 tons) of soil at the site exceeding MTCA cleanup levels in the "source area" requires disposal.

6.5.2.1 *Technical Feasibility*

This alternative is technically feasible and will effectively remove all accessible (source area) soils with concentrations exceeding MTCA Method A levels. The soils can be disposed of at a Subtitle D Non-Hazardous Waste landfill and permits will have to be obtained from the governing agencies.

This impacted soils removal option does not treat the impacted soil or groundwater downgradient of the source area. Natural degradation of contaminants in the affected soil and water may take several years to achieve regulatory cleanup levels in the water. Therefore, groundwater treatment is recommended with this option.

6.5.2.2 *Health and the Environment*

Excavation of and relocation of contaminated soil eliminates the exposure pathway to soil and prevents any additional leaching of contaminants from the source area into groundwater.

6.5.2.3 *Long-term Effectiveness*

Excavation of the contaminated soil would permanently clean up the soil at the site from the source area.

6.5.2.4 *Permanent Toxicity*

Excavation and removal of the soil from the site would eliminate the toxicity at the site. However, the toxicity of the material would persist in the disposal site.

6.5.2.5 *Compliance with Regulatory Requirements*

The off-site disposal facility will have acceptance criteria, which must be met. The permitting process for this alternative is expected to be relatively short. A deed restriction may be required to address the impacted soil remaining downgradient of the source areas on-site.

6.5.2.6 *Cost*

The off-site disposal of the impacted soil is estimated to be about $75,000, including any required analytical testing, permitting, haulage and the tipping fee.

6.5.3 *Alternative 3 - Soil Excavation with InSitu Biotreatment and Chemical Oxidation*

This alternative achieves the remedial goals of the cleanup within the owner's acceptable time frame. GEI estimates that MTCA/EPA cleanup levels will be achieved at the Site's Points of Compliance within one year of the system startup. This option would entail the following:

1) Impacted soil removals from the source area

2) Additional of chlorinated solvent degrading microorganisms and chemical oxidation products at the soil exposed at the base of the source area removals

6.5.3.1 *Technical Feasibility*

The implementation of this alternative would achieve the goals of the remedial action in a time frame that is acceptable to the owner(s) of the site. The insitu treatment options are intended to treat the residual COCs n soil and groundwater downgradient of the sources area(s).

6.5.3.2 *Health and the Environment*

Soil treatment would remediate the contamination at the site and would significantly reduce exposure pathways to the contaminated soil at the site. However, exposure pathways may develop during excavation and treatment.

6.5.3.3 *Long-Term Effectiveness*

These treatment technologies would permanently clean up soil and groundwater at the site.

6.5.3.4 *Permanent Toxicity*

These treatment technologies are would permanently clean up soil and groundwater at the site.

6.5.3.5 *Compliance with Regulatory Requirements*

The use of chemical oxidation and microorganisms in the groundwater would require an Underground Injection Permit from Ecology.

6.5.3.6 *Costs*

The source area removals and installation, the operation of the remediation systems, and groundwater monitoring for one year are estimated to be about $100,000.

6.5.4 *Alternative 4 - Soil Excavation with In-Situ Biotreatment, Air Sparging, Vapor Extraction, and Chemical Oxidation*

This alternative achieves the remedial goals of the cleanup within the owner's acceptable time frame. GEI estimates that MTCA/EPA cleanup levels will be achieved at the Site's Points of Compliance within one year of the system startup. This option would entail the following:

1. Impacted soil removals from the source area
2. Installation of a vapor extraction manifold at the base of the source area removals
3. Additional of chlorinated solvent degrading microorganisms and chemical oxidation products at the soil exposed at the extent of the source area removals
4. Installation of an air sparging system

6.5.4.1 *Technical Feasibility*

The implementation of this alternative would achieve the goals of the remedial action in a time frame that is acceptable to the owner(s) of the site. However, due to the limited volume of contaminate media at this Site, vapor extraction and air sparging may not be necessary to achieve the remediation action goals in an acceptable amount of time.

6.5.4.2 *Health and the Environment*

Soil treatment would remediate the contamination at the site and would significantly reduce exposure pathways to the contaminated soil at the site. However, exposure pathways may develop during excavation and treatment.

6.5.4.3 *Long-Term Effectiveness*

These treatment technologies are would permanently clean up soil and groundwater at the site.

6.5.4.4 *Permanent Toxicity*

These treatment technologies are would permanently clean up soil and groundwater at the site.

6.5.4.5 *Compliance with Regulatory Requirements*

The permitting of the vapor extraction process will require a Puget Sound Clean Air Agency (PSCAA) permit for the potential release of contaminants to the atmosphere. Also, the use of chemical oxidation and microorganisms in the groundwater would require an Underground Injection Permit from Ecology.

6.5.4.6 *Costs*

The source area removals and installation and operation of the remediation systems are estimated to be about $200,000.

7.0 SUMMARY OF REMEDIAL ALTERNATIVES EVALUATION

A summary of the costs, advantages and disadvantages for each alternative is presented in Table 7-1. These costs are based on certain assumptions and are specific to the site and the remedial alternative

TABLE 7-1 SUMMARY OF REMEDIAL ALTERNATIVES

Remedial Alternative	Estimated Total Costs	Advantages	Disadvantages
1) No Action	Not applicable	-Low costs -No cleanup time required	-Long-term liability -Does not meet regulatory requirements
2) Off-site disposal of source area soils	$75,000 (includes long-term groundwater monitoring)	-May meet regulatory requirements, but does not treat the impacted groundwater	-Least-cost alternative - May not achieve cleanup levels in groundwater an acceptable time frame -Potential long-term liability at an additional site
3) Off-site disposal of source area soils, bioremediation, and chemical oxidation	$100,000 (includes groundwater monitoring)	-Meets regulatory requirements -Permanent reduction in toxicity -Reduced long-term liability	-Will achieve cleanup goals at the site in a limited amount of time
4) Off-site disposal of source area soils, vapor extraction, air sparging, bioremediation, and chemical oxidation	$200,000 (includes groundwater monitoring)	-Meets regulatory requirements -Permanent reduction in toxicity -Reduced long-term liability	-Will achieve cleanup goals at the site in a minimum of time Air sparging and vapor extraction may not be necessary at this site due to the limited volume of impacted media.

7.1 PROPOSED REMEDIAL ALTERNATIVE DISCUSSION

Based on our comparison of potential remedial options, we proposed to use Remedial Alternative Number 3 — Excavation of accessible impacted soils, insitu chemical oxidation and bioremediation to remediate the dry cleaning solvent compounds at the Site. The insitu treatment compounds are briefly summarized as follows.

Microbial Treatment and Chemical Oxidation Products - CL-OUT is a highly-concentrated solution of live, strains of lyophilized (freeze-dried) Pseudomonas organisms that occur naturally in the earth's ecosystem. Cultures are free of pathogens and there is no artificial mutation or genetic engineering involved. "Hungry bacteria®" with only one purpose in life: to seek and destroy contaminated waste at its source, and then quickly convert it into harmless, naturally recyclable by-products.

CL-OUT microbes introduces a high population of effective hydrocarbon-degrading organisms into the treatment zone, often 100 to 1,000 times higher than the native bacterial population, thus reducing uncertainty and expediting cleanup. CL-OUT is a consortium of naturally-occurring microbes selected for their ability to degrade a wide range of halogenated volatile organic compounds. Potassium permanganate will be added to the water to cause the chemical oxidation of the compounds resulting in the formation of non-toxic compounds.

To ensure its reliability and effectiveness, CL-OUT undergoes a rigorous QA/QC protocol during its manufacture to make certain it is free of pathogenic microbes.

Approximately 10 pounds of freeze-dried microbes and 5 pounds of Potassium Permanganate will be mixed with water to achieve a 3% to 4% $KMnO4$ solution. The organisms and oxidation products will be applied under pressure into several direct-push drill holes beneath the floor inside of the dry cleaning suite and applied at the extent of the impacted soil removals.

8.0 SPECIAL TERMS AND CONDITIONS

This report is based upon the application of scientific principles and professional judgment to certain facts with resultant subjective interpretations. Professional judgments expressed herein are based upon the facts currently available within the limits of the existing data, scope of work, budget and schedule and may undergo revision as additional data are obtained. To the extent that more definitive conclusions are desired by the client than are warranted by the currently available facts, it is specifically GEI's intent that the conclusions and recommendations stated in our report is intended as guidance and not necessarily a firm course of action except where explicitly stated as such. WE MAKE NO WARRANTIES, EXPRESS OR IMPLIED INCLUDING WITHOUT LIMITATION, WARRANTIES AS TO MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

GEI makes no claims or guarantees with regard to this environmental review. These environmental services have been completed in accordance with the degree of skill and care required by customarily accepted good practices and procedures. This report should not be considered as a complete environmental assessment of the areas in question, but rather a preliminary report of existing conditions.

This report was prepared for the use of Lake Stevens Marketplace, LLC (“Client”) and the conclusions and recommendations presented in this report are based upon the agreed scope of work outlined in the report and the Contract for Professional Services between Client and Galloway Environmental, Inc. ("Consultant"). Use or misuse of this report, or the reliance upon the findings hereof by any parties other than the Client, is at their own risk. Neither Client nor Consultant make any representations or warranty to such other parties as to the accuracy or completeness of this report or to the suitability of its use by such other parties for any purpose whatever, known or unknown to Client or Consultant. Neither Client nor Consultant shall have any liability to, or indemnifies or holds harmless third parties for any losses incurred by the actual or purported use or misuse of this report.

GEI is not engaged in environmental auditing and reporting for the purpose of advertising, sales promotion, or endorsement of any client's interests, including raising investment capital or recommending investment decisions or other publicity purposes. The client acknowledges that any reports prepared by GEI are for the exclusive use of the client and agrees that GEI's reports or correspondences will not be used or reproduced in full or in part for such promotional purposes and may not be used or relied upon in any prospective or offering circular.

9.0 REFERENCES

Focused Phase II Environmental Site Assessment at Lake Stevens Cleaners, by GEI, dated November 11, 2014

Google Maps

Groundwater Resources of Snohomish County Washington, USGS WSP 1135, by R. C. Newcomb

Preliminary Subsurface Investigation Report for Lake Stevens Cleaners, by ADR Environmental Group, dated December 6, 2013

Snohomish County Assessor Records

Seattle Public Library records in Seattle

US Department of Agriculture Soil Conservation Survey Map

US Geological Survey Geologic Map 7.5' Quadrangle

APPENDIX A

PREVIOUS ENVIRONMENTAL INVESTIGATIONS

(Provided under separate cover)

APPENDIX B

SOIL BORING LOGS

GALLOWAY ENVIRONMENTAL, INC., 3102-220th PL SE, Sammamish, WA 98075, phone (425) 688-8852 **G**

Project No. 35003

SOIL BORING LOG

Sheet 1 of 4

Project Name Lake Stevens Cleaners
Boring No. MW-1
Date & Time Started 1/21/2015
Project Location 303 91st Ave NE, Lake Stevens
Boring Location See Figure 3-1
Drilling Contractor Cascade Drilling Co.
Drilling Method Hollow Stem Au
Total Depth 15'
Client Lake Stevens Marketplace
Sample Retrieval Method Spl Spoon
Diameter, Wt., Drop
Site Manager Gary Galloway
Logged By Gary Galloway
Max Depth 15'
Closure Method GW Wells
Water Depth 7'
Date & Time Completed January 21, 2015

Depth (feet)	Sample No.	Blows per 6"	PID/OVA(ppm)	Sheen	Odor	Discolored	**DESCRIPTION**
							Asphalt 0 to 0.25 feet bgs
							0.25' to 0.75' - Brown, fine to course grained sand, damp, medium
							dense (md), no odors or stains
							0.75' to 2' - Light gray,, course grained sand, damp, dense
							pieces of broken concrete, no odors, etc.
5							2' to 5' - Brown, medium to course grained sand, damp, dense
							pieces of broken concrete, no odors, etc.
			0.0				5' to 7' - Till - Grayish tan, silty to fine grained sand, damp, dense
							7' to 7.5' - Grayish tan with black, well-rounded gravel & pebbles
							(10%), wet
							7.5' to 15' - Tan, fine grained silty sand, dense, damp, no odors, etc.
10							
			0.0				
							Collect soil sample at 8'
							NOTE: Water appears to be seeping into hole from approx. 7'
15			0.0				
			0.0				
20							

Signature Gary Galloway

Date January 21, 2015

GALLOWAY ENVIRONMENTAL, INC., 3102-220th PL SE, Sammamish, WA 98075, phone (425) 688-8852

Project No. 35003

SOIL BORING LOG

Sheet 2 of 4

Project Name Lake Stevens Cleaners Boring No. MW-2 Date & Time Started 1/21/2015
Project Location 303 91st Ave NE, Lake Stevens Boring Location See Figure 3-1
Drilling Contractor Cascade Drilling Co. Drilling Method Hollow Stem Au Total Depth 15'
Client Lake Stevens Marketplace Sample Retrieval Method Spl Spoon Diameter, Wt., Drop
Site Manager Gary Galloway Logged By Gary Galloway Max Depth 15'
Closure Method GW Wells Water Depth 6.5" Date & Time Completed January 21, 2015

Depth (feet)	Sample No.	Blows per 6"	PID/OVA(ppm)	Sheen	Odor	Discolored	**DESCRIPTION**
							Asphalt 0 to 0.25 feet bgs
							0.25' to 0.75' - Brown, fine to course grained sand, damp, medium
							dense (md), no odors or stains
							0.75' to 2' - Light gray,, course grained sand, damp, dense
							pieces of broken concrete, no odors, etc.
5							2' to 5' - Brown, medium to course grained sand, damp, dense
							pieces of broken concrete, no odors, etc.
			0.0				5' to 7' - Till - Grayish tan, silty to fine grained sand, damp, dense
							7' to 7.5' - Grayish tan with black, well-rounded gravel & pebbles
							(10%), wet
							7.5' to 15' - Tan, fine grained silty sand, dense, damp, no odors, etc.
10							
			0.0				
							Collect soil sample at 8'
							NOTE: Water appears to be seeping into hole from approx. 6.5'
15			0.0				
20							

Signature Gary Galloway

Date **January 21, 2015**

Project No. 34040

SOIL BORING LOG

Sheet 3 of 4

Project Name Lake Stevens Cleaners Boring No. MW-3 Date & Time Started 1/27/2015
Project Location 303 91st Ave NE, Lake Stevens Boring Location See Figure 3-1
Drilling Contractor Cascade Drilling Co. Drilling Method HSA Total Depth 13'
Client LS Marketplace LLC Sample Retrieval Method Split spoon Diameter, Wt., Drop
Site Manager Gary Galloway Logged By Gary Galloway Max Depth 13'
Closure Method Bentonite Water Depth 3' Date & Time Completed 1/27/2015

Depth (feet)	Sample No.	Blows per 6"	PID/OVA(ppm)	Sheen	Odor	Discolored	**DESCRIPTION**
							Asphalt 0 to 0.25 feet bgs
							0.25' to 1' - Dark brown, top soil damp, medium dense (md)
			0.0				1' to 4' - Tan, fine grained silty sand, moist at bottom, md, no
							odors or stains
			5.6				4' to 5' - Dark brown, fine to med. grained sand, damp, dense.
5							5' to 10'- Till - Tan to light brown, fine grained silty sand, water at
							4.5' bgs,, no odors, etc.
			1.2				
			0.0				
10			0.0				
							Collect soil 8', PID = 0.0
15							
20							

Signature Gary Galloway

Date January 27, 2015

GALLOWAY ENVIRONMENTAL, INC., 3102-220th PL SE, Sammamish, WA 98075, phone (425) 688-8852

Project No. 34040

SOIL BORING LOG

Sheet 4 of 4

Project Name Lake Stevens Cleaners Boring No. MW-4 Date & Time Started 1/27/2014
Project Location 303 91st Ave NE, Lake Stevens Boring Location See Figure 3-1
Drilling Contractor Cascade Drilling Co. Drilling Method GeoProbe Total Depth 15'
Client Powers & Therrien Sample Retrieval Method Split spoon Diameter, Wt., Drop
Site Manager Gary Galloway Logged By Gary Galloway Max Depth 15'
Closure Method GW monitor well Water Depth 3' Date & Time Completed 1/27/2015

Depth (feet)	Sample No.	Blows per 6"	PID/OVA(ppm)	Sheen	Odor	Discolored	**DESCRIPTION**
							Asphalt 0 to 0.25 feet bgs
							0.25' to 1.25' - Grayish brown, crushed rock (base), dense, damp
			0.0				1.25' to 4' - Greenish gray, fine to course grained sand, damp, no
							odors or stains
			0.0				4' to 5' - Dark brown, fine to med. grained sand (top soil), damp,
5							medium dense to dense
			0.0				5' to 7.5'- Till - Tan to light brown, fine grained silty sand, damp
							very dense, no odors or stains
			0.0				7.5' to 12' - Tan, fine grained silty sand, damp, very dense, no
							odors or stains, minor water seeping from approximately 7'
							below the ground surface (not enough water to sample)
10			0.0				
							Collect soil sample from 8', PID = 0.0
15							
20							

Signature Gary Galloway

Date January 27, 2015

APPENDIX C

WATER SAMPLE LOGS

LAKE STEVENS CLEANERS - WATER ELEVATIONS AND SAMPLE LOG DATA SUMMARY

Date	Well #	Well Elevation (notch)	Water Elevation	Temperature °C	pH	Conductivity µS	Remarks
1/30/2015	MW-1	100'	92.55'	12.8	7.10	238	clear
“	MW-2	98.58'	92.44'	12.3	7.02	289	clear
“	MW-3	95.69'	93.44'	13.2	7.12	312	clear
“	MW-4	96.32'	94.22'	13.6	7.10	322	clear

APPENDIX D

LABORATORY ANALYTICAL RESULTS

OnSite Environmental Inc.

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

January 30, 2015

Gary Galloway
Galloway Environmental, Inc.
3102 220th Place SE
Sammamish, WA 98075

Re: Analytical Data for Project Lake Stevens Cleaners
Laboratory Reference No. 1501-133

Dear Gary:

Enclosed are the analytical results and associated quality control data for samples submitted on January 22, 2015.

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: January 30, 2015
Samples Submitted: January 22, 2015
Laboratory Reference: 1501-133
Project: Lake Stevens Cleaners

Case Narrative

Samples were collected on January 21, 2015 and received by the laboratory on January 22, 2015. They were maintained at the laboratory at a temperature of 2^{o}C to 6^{o}C.

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.

Halogenated Volatiles EPA 8260C 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: January 30, 2015
Samples Submitted: January 22, 2015
Laboratory Reference: 1501-133
Project: Lake Stevens Cleaners

HALOGENATED VOLATILES EPA 8260C
page 1 of 2

Matrix: Soil
Units: mg/kg

Analyte	**Result**	**PQL**	**Method**	**Date Prepared**	**Date Analyzed**	**Flags**
Client ID:	**MW1 @ 8'**					
Laboratory ID:	01-133-01					
Dichlorodifluoromethane	ND	0.00089	EPA 8260C	1-23-15	1-23-15	
Chloromethane	ND	0.0045	EPA 8260C	1-23-15	1-23-15	
Vinyl Chloride	ND	0.00089	EPA 8260C	1-23-15	1-23-15	
Bromomethane	ND	0.00089	EPA 8260C	1-23-15	1-23-15	
Chloroethane	ND	0.0045	EPA 8260C	1-23-15	1-23-15	
Trichlorofluoromethane	ND	0.00089	EPA 8260C	1-23-15	1-23-15	
1,1-Dichloroethene	ND	0.00089	EPA 8260C	1-23-15	1-23-15	
Iodomethane	ND	0.0045	EPA 8260C	1-23-15	1-23-15	
Methylene Chloride	ND	0.0045	EPA 8260C	1-23-15	1-23-15	
(trans) 1,2-Dichloroethene	ND	0.00089	EPA 8260C	1-23-15	1-23-15	
1,1-Dichloroethane	ND	0.00089	EPA 8260C	1-23-15	1-23-15	
2,2-Dichloropropane	ND	0.00089	EPA 8260C	1-23-15	1-23-15	
(cis) 1,2-Dichloroethene	ND	0.00089	EPA 8260C	1-23-15	1-23-15	
Bromochloromethane	ND	0.00089	EPA 8260C	1-23-15	1-23-15	
Chloroform	ND	0.00089	EPA 8260C	1-23-15	1-23-15	
1,1,1-Trichloroethane	ND	0.00089	EPA 8260C	1-23-15	1-23-15	
Carbon Tetrachloride	ND	0.00089	EPA 8260C	1-23-15	1-23-15	
1,1-Dichloropropene	ND	0.00089	EPA 8260C	1-23-15	1-23-15	
1,2-Dichloroethane	ND	0.00089	EPA 8260C	1-23-15	1-23-15	
Trichloroethene	ND	0.00089	EPA 8260C	1-23-15	1-23-15	
1,2-Dichloropropane	ND	0.00089	EPA 8260C	1-23-15	1-23-15	
Dibromomethane	ND	0.00089	EPA 8260C	1-23-15	1-23-15	
Bromodichloromethane	ND	0.00089	EPA 8260C	1-23-15	1-23-15	
2-Chloroethyl Vinyl Ether	ND	0.0045	EPA 8260C	1-23-15	1-23-15	
(cis) 1,3-Dichloropropene	ND	0.00089	EPA 8260C	1-23-15	1-23-15	
(trans) 1,3-Dichloropropene	ND	0.00089	EPA 8260C	1-23-15	1-23-15	

Date of Report: January 30, 2015
Samples Submitted: January 22, 2015
Laboratory Reference: 1501-133
Project: Lake Stevens Cleaners

HALOGENATED VOLATILES EPA 8260C
page 2 of 2

Analyte	**Result**	**PQL**	**Method**	**Date Prepared**	**Date Analyzed**	**Flags**
Client ID:	**MW1 @ 8'**					
Laboratory ID:	01-133-01					
1,1,2-Trichloroethane	ND	0.00089	EPA 8260C	1-23-15	1-23-15	
Tetrachloroethene	ND	0.00089	EPA 8260C	1-23-15	1-23-15	
1,3-Dichloropropane	ND	0.00089	EPA 8260C	1-23-15	1-23-15	
Dibromochloromethane	ND	0.00089	EPA 8260C	1-23-15	1-23-15	
1,2-Dibromoethane	ND	0.00089	EPA 8260C	1-23-15	1-23-15	
Chlorobenzene	ND	0.00089	EPA 8260C	1-23-15	1-23-15	
1,1,1,2-Tetrachloroethane	ND	0.00089	EPA 8260C	1-23-15	1-23-15	
Bromoform	ND	0.00089	EPA 8260C	1-23-15	1-23-15	
Bromobenzene	ND	0.00089	EPA 8260C	1-23-15	1-23-15	
1,1,2,2-Tetrachloroethane	ND	0.00089	EPA 8260C	1-23-15	1-23-15	
1,2,3-Trichloropropane	ND	0.00089	EPA 8260C	1-23-15	1-23-15	
2-Chlorotoluene	ND	0.00089	EPA 8260C	1-23-15	1-23-15	
4-Chlorotoluene	ND	0.00089	EPA 8260C	1-23-15	1-23-15	
1,3-Dichlorobenzene	ND	0.00089	EPA 8260C	1-23-15	1-23-15	
1,4-Dichlorobenzene	ND	0.00089	EPA 8260C	1-23-15	1-23-15	
1,2-Dichlorobenzene	ND	0.00089	EPA 8260C	1-23-15	1-23-15	
1,2-Dibromo-3-chloropropane	ND	0.0045	EPA 8260C	1-23-15	1-23-15	
1,2,4-Trichlorobenzene	ND	0.00089	EPA 8260C	1-23-15	1-23-15	
Hexachlorobutadiene	ND	0.0045	EPA 8260C	1-23-15	1-23-15	
1,2,3-Trichlorobenzene	ND	0.00089	EPA 8260C	1-23-15	1-23-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*114*	*76-131*				
Toluene-d8	*111*	*82-129*				
4-Bromofluorobenzene	*103*	*79-126*				

Date of Report: January 30, 2015
Samples Submitted: January 22, 2015
Laboratory Reference: 1501-133
Project: Lake Stevens Cleaners

HALOGENATED VOLATILES EPA 8260C

page 1 of 2

Matrix: Soil
Units: mg/kg

Analyte	**Result**	**PQL**	**Method**	**Date Prepared**	**Date Analyzed**	**Flags**
Client ID:	**MW2 @ 8'**					
Laboratory ID:	01-133-02					
Dichlorodifluoromethane	ND	0.00088	EPA 8260C	1-23-15	1-23-15	
Chloromethane	ND	0.0044	EPA 8260C	1-23-15	1-23-15	
Vinyl Chloride	ND	0.00088	EPA 8260C	1-23-15	1-23-15	
Bromomethane	ND	0.00088	EPA 8260C	1-23-15	1-23-15	
Chloroethane	ND	0.0044	EPA 8260C	1-23-15	1-23-15	
Trichlorofluoromethane	ND	0.00088	EPA 8260C	1-23-15	1-23-15	
1,1-Dichloroethene	ND	0.00088	EPA 8260C	1-23-15	1-23-15	
Iodomethane	ND	0.0044	EPA 8260C	1-23-15	1-23-15	
Methylene Chloride	ND	0.0044	EPA 8260C	1-23-15	1-23-15	
(trans) 1,2-Dichloroethene	ND	0.00088	EPA 8260C	1-23-15	1-23-15	
1,1-Dichloroethane	ND	0.00088	EPA 8260C	1-23-15	1-23-15	
2,2-Dichloropropane	ND	0.00088	EPA 8260C	1-23-15	1-23-15	
(cis) 1,2-Dichloroethene	ND	0.00088	EPA 8260C	1-23-15	1-23-15	
Bromochloromethane	ND	0.00088	EPA 8260C	1-23-15	1-23-15	
Chloroform	ND	0.00088	EPA 8260C	1-23-15	1-23-15	
1,1,1-Trichloroethane	ND	0.00088	EPA 8260C	1-23-15	1-23-15	
Carbon Tetrachloride	ND	0.00088	EPA 8260C	1-23-15	1-23-15	
1,1-Dichloropropene	ND	0.00088	EPA 8260C	1-23-15	1-23-15	
1,2-Dichloroethane	ND	0.00088	EPA 8260C	1-23-15	1-23-15	
Trichloroethene	ND	0.00088	EPA 8260C	1-23-15	1-23-15	
1,2-Dichloropropane	ND	0.00088	EPA 8260C	1-23-15	1-23-15	
Dibromomethane	ND	0.00088	EPA 8260C	1-23-15	1-23-15	
Bromodichloromethane	ND	0.00088	EPA 8260C	1-23-15	1-23-15	
2-Chloroethyl Vinyl Ether	ND	0.0044	EPA 8260C	1-23-15	1-23-15	
(cis) 1,3-Dichloropropene	ND	0.00088	EPA 8260C	1-23-15	1-23-15	
(trans) 1,3-Dichloropropene	ND	0.00088	EPA 8260C	1-23-15	1-23-15	

Date of Report: January 30, 2015
Samples Submitted: January 22, 2015
Laboratory Reference: 1501-133
Project: Lake Stevens Cleaners

HALOGENATED VOLATILES EPA 8260C

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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW2 @ 8'**					
Laboratory ID:	01-133-02					
1,1,2-Trichloroethane	ND	0.00088	EPA 8260C	1-23-15	1-23-15	
Tetrachloroethene	0.0082	0.00088	EPA 8260C	1-23-15	1-23-15	
1,3-Dichloropropane	ND	0.00088	EPA 8260C	1-23-15	1-23-15	
Dibromochloromethane	ND	0.00088	EPA 8260C	1-23-15	1-23-15	
1,2-Dibromoethane	ND	0.00088	EPA 8260C	1-23-15	1-23-15	
Chlorobenzene	ND	0.00088	EPA 8260C	1-23-15	1-23-15	
1,1,1,2-Tetrachloroethane	ND	0.00088	EPA 8260C	1-23-15	1-23-15	
Bromoform	ND	0.00088	EPA 8260C	1-23-15	1-23-15	
Bromobenzene	ND	0.00088	EPA 8260C	1-23-15	1-23-15	
1,1,2,2-Tetrachloroethane	ND	0.00088	EPA 8260C	1-23-15	1-23-15	
1,2,3-Trichloropropane	ND	0.00088	EPA 8260C	1-23-15	1-23-15	
2-Chlorotoluene	ND	0.00088	EPA 8260C	1-23-15	1-23-15	
4-Chlorotoluene	ND	0.00088	EPA 8260C	1-23-15	1-23-15	
1,3-Dichlorobenzene	ND	0.00088	EPA 8260C	1-23-15	1-23-15	
1,4-Dichlorobenzene	ND	0.00088	EPA 8260C	1-23-15	1-23-15	
1,2-Dichlorobenzene	ND	0.00088	EPA 8260C	1-23-15	1-23-15	
1,2-Dibromo-3-chloropropane	ND	0.0044	EPA 8260C	1-23-15	1-23-15	
1,2,4-Trichlorobenzene	ND	0.00088	EPA 8260C	1-23-15	1-23-15	
Hexachlorobutadiene	ND	0.0044	EPA 8260C	1-23-15	1-23-15	
1,2,3-Trichlorobenzene	ND	0.00088	EPA 8260C	1-23-15	1-23-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*116*	*76-131*				
Toluene-d8	*115*	*82-129*				
4-Bromofluorobenzene	*106*	*79-126*				

Date of Report: January 30, 2015
Samples Submitted: January 22, 2015
Laboratory Reference: 1501-133
Project: Lake Stevens Cleaners

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

Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB0123S1					
Dichlorodifluoromethane	ND	0.0010	EPA 8260C	1-23-15	1-23-15	
Chloromethane	ND	0.0050	EPA 8260C	1-23-15	1-23-15	
Vinyl Chloride	ND	0.0010	EPA 8260C	1-23-15	1-23-15	
Bromomethane	ND	0.0010	EPA 8260C	1-23-15	1-23-15	
Chloroethane	ND	0.0050	EPA 8260C	1-23-15	1-23-15	
Trichlorofluoromethane	ND	0.0010	EPA 8260C	1-23-15	1-23-15	
1,1-Dichloroethene	ND	0.0010	EPA 8260C	1-23-15	1-23-15	
Iodomethane	ND	0.0050	EPA 8260C	1-23-15	1-23-15	
Methylene Chloride	ND	0.0050	EPA 8260C	1-23-15	1-23-15	
(trans) 1,2-Dichloroethene	ND	0.0010	EPA 8260C	1-23-15	1-23-15	
1,1-Dichloroethane	ND	0.0010	EPA 8260C	1-23-15	1-23-15	
2,2-Dichloropropane	ND	0.0010	EPA 8260C	1-23-15	1-23-15	
(cis) 1,2-Dichloroethene	ND	0.0010	EPA 8260C	1-23-15	1-23-15	
Bromochloromethane	ND	0.0010	EPA 8260C	1-23-15	1-23-15	
Chloroform	ND	0.0010	EPA 8260C	1-23-15	1-23-15	
1,1,1-Trichloroethane	ND	0.0010	EPA 8260C	1-23-15	1-23-15	
Carbon Tetrachloride	ND	0.0010	EPA 8260C	1-23-15	1-23-15	
1,1-Dichloropropene	ND	0.0010	EPA 8260C	1-23-15	1-23-15	
1,2-Dichloroethane	ND	0.0010	EPA 8260C	1-23-15	1-23-15	
Trichloroethene	ND	0.0010	EPA 8260C	1-23-15	1-23-15	
1,2-Dichloropropane	ND	0.0010	EPA 8260C	1-23-15	1-23-15	
Dibromomethane	ND	0.0010	EPA 8260C	1-23-15	1-23-15	
Bromodichloromethane	ND	0.0010	EPA 8260C	1-23-15	1-23-15	
2-Chloroethyl Vinyl Ether	ND	0.0050	EPA 8260C	1-23-15	1-23-15	
(cis) 1,3-Dichloropropene	ND	0.0010	EPA 8260C	1-23-15	1-23-15	
(trans) 1,3-Dichloropropene	ND	0.0010	EPA 8260C	1-23-15	1-23-15	

Date of Report: January 30, 2015
Samples Submitted: January 22, 2015
Laboratory Reference: 1501-133
Project: Lake Stevens Cleaners

HALOGENATED VOLATILES EPA 8260C
METHOD BLANK QUALITY CONTROL
Page 2 of 2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB0123S1					
1,1,2-Trichloroethane	ND	0.0010	EPA 8260C	1-23-15	1-23-15	
Tetrachloroethene	ND	0.0010	EPA 8260C	1-23-15	1-23-15	
1,3-Dichloropropane	ND	0.0010	EPA 8260C	1-23-15	1-23-15	
Dibromochloromethane	ND	0.0010	EPA 8260C	1-23-15	1-23-15	
1,2-Dibromoethane	ND	0.0010	EPA 8260C	1-23-15	1-23-15	
Chlorobenzene	ND	0.0010	EPA 8260C	1-23-15	1-23-15	
1,1,1,2-Tetrachloroethane	ND	0.0010	EPA 8260C	1-23-15	1-23-15	
Bromoform	ND	0.0010	EPA 8260C	1-23-15	1-23-15	
Bromobenzene	ND	0.0010	EPA 8260C	1-23-15	1-23-15	
1,1,2,2-Tetrachloroethane	ND	0.0010	EPA 8260C	1-23-15	1-23-15	
1,2,3-Trichloropropane	ND	0.0010	EPA 8260C	1-23-15	1-23-15	
2-Chlorotoluene	ND	0.0010	EPA 8260C	1-23-15	1-23-15	
4-Chlorotoluene	ND	0.0010	EPA 8260C	1-23-15	1-23-15	
1,3-Dichlorobenzene	ND	0.0010	EPA 8260C	1-23-15	1-23-15	
1,4-Dichlorobenzene	ND	0.0010	EPA 8260C	1-23-15	1-23-15	
1,2-Dichlorobenzene	ND	0.0010	EPA 8260C	1-23-15	1-23-15	
1,2-Dibromo-3-chloropropane	ND	0.0050	EPA 8260C	1-23-15	1-23-15	
1,2,4-Trichlorobenzene	ND	0.0010	EPA 8260C	1-23-15	1-23-15	
Hexachlorobutadiene	ND	0.0050	EPA 8260C	1-23-15	1-23-15	
1,2,3-Trichlorobenzene	ND	0.0010	EPA 8260C	1-23-15	1-23-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*116*	*76-131*				
Toluene-d8	*112*	*82-129*				
4-Bromofluorobenzene	*106*	*79-126*				

Date of Report: January 30, 2015
Samples Submitted: January 22, 2015
Laboratory Reference: 1501-133
Project: Lake Stevens Cleaners

HALOGENATED VOLATILES EPA 8260C
SB/SBD QUALITY CONTROL

Matrix: Soil
Units: mg/kg

Analyte	**Result**		**Spike Level**		**Percent Recovery**		**Recovery Limits**	**RPD**	**RPD Limit**	**Flags**
SPIKE BLANKS										
Laboratory ID:	SB0123S1									
	SB	SBD	SB	SBD	SB	SBD				
1,1-Dichloroethene	**0.0426**	**0.0477**	0.0500	0.0500	85	95	66-129	11	15	
Benzene	**0.0483**	**0.0511**	0.0500	0.0500	97	102	71-123	6	15	
Trichloroethene	**0.0473**	**0.0493**	0.0500	0.0500	95	99	75-115	4	15	
Toluene	**0.0478**	**0.0506**	0.0500	0.0500	96	101	75-120	6	15	
Chlorobenzene	**0.0439**	**0.0461**	0.0500	0.0500	88	92	75-121	5	15	
Surrogate:										
Dibromofluoromethane					*103*	*106*	*76-131*			
Toluene-d8					*101*	*103*	*82-129*			
4-Bromofluorobenzene					*96*	*98*	*79-126*			

Date of Report: January 30, 2015
Samples Submitted: January 22, 2015
Laboratory Reference: 1501-133
Project: Lake Stevens Cleaners

% MOISTURE

Date Analyzed: 1-23-15

Client ID	Lab ID	% Moisture
MW1 @ 8'	01-133-01	11
MW2 @ 8'	01-133-02	9

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 diesel range are impacting lube oil range results.

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.

X1- Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Z -

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

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Chain of Custody

Page 1 of 1

Laboratory Number: 01-133

Company: GALLOWAY ENV.
Project Number: Lake Stevens Cleaners
Project Name: " " "
Project Manager: Gary Galloway
Sampled by: Gary Galloway

Turnaround Request (in working days)
(Check One)
☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☑ Standard (7 Days)
(TPH analysis 5 Days)
☐ ______ (other)

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx	Volatiles 8260C	Halogenated Volatiles 8260C	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A						% Moisture
1	MW1 @8'	1-21-15	10:00	S	4						X																X
2	MW2 @8'	↓	11:00	S	4						X																X

	Signature	Company	Date	Time
Relinquished		Galloway Env	1-22-15	15:15
Received			1/22/15	1515
Relinquished				
Received				
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions

Chromatograms with final report ☐

Data Package: Standard ☐ Level III ☐ Level IV ☐ Electronic Data Deliverables (EDDs) ☐ ______

OnSite
Environmental Inc.

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

January 28, 2015

Gary Galloway
Galloway Environmental, Inc.
3102 220th Place SE
Sammamish, WA 98075

Re: Analytical Data for Project 35004
Laboratory Reference No. 1501-184

Dear Gary:

Enclosed are the analytical results and associated quality control data for samples submitted on January 27, 2015.

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: January 28, 2015
Samples Submitted: January 27, 2015
Laboratory Reference: 1501-184
Project: 35004

Case Narrative

Samples were collected on January 27, 2015 and received by the laboratory on January 27, 2015. They were maintained at the laboratory at a temperature of 2°C to 6°C.

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.

Halogenated Volatiles EPA 8260C 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°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: January 28, 2015
Samples Submitted: January 27, 2015
Laboratory Reference: 1501-184
Project: 35004

HALOGENATED VOLATILES EPA 8260C
page 1 of 2

Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-3 @ 8'**					
Laboratory ID:	01-184-01					
Dichlorodifluoromethane	0.0035	0.00078	EPA 8260C	1-27-15	1-27-15	
Chloromethane	ND	0.0039	EPA 8260C	1-27-15	1-27-15	
Vinyl Chloride	ND	0.00078	EPA 8260C	1-27-15	1-27-15	
Bromomethane	ND	0.00078	EPA 8260C	1-27-15	1-27-15	
Chloroethane	ND	0.0039	EPA 8260C	1-27-15	1-27-15	
Trichlorofluoromethane	ND	0.00078	EPA 8260C	1-27-15	1-27-15	
1,1-Dichloroethene	ND	0.00078	EPA 8260C	1-27-15	1-27-15	
Iodomethane	ND	0.0039	EPA 8260C	1-27-15	1-27-15	
Methylene Chloride	ND	0.0039	EPA 8260C	1-27-15	1-27-15	
(trans) 1,2-Dichloroethene	ND	0.00078	EPA 8260C	1-27-15	1-27-15	
1,1-Dichloroethane	ND	0.00078	EPA 8260C	1-27-15	1-27-15	
2,2-Dichloropropane	ND	0.00078	EPA 8260C	1-27-15	1-27-15	
(cis) 1,2-Dichloroethene	ND	0.00078	EPA 8260C	1-27-15	1-27-15	
Bromochloromethane	ND	0.00078	EPA 8260C	1-27-15	1-27-15	
Chloroform	ND	0.00078	EPA 8260C	1-27-15	1-27-15	
1,1,1-Trichloroethane	ND	0.00078	EPA 8260C	1-27-15	1-27-15	
Carbon Tetrachloride	ND	0.00078	EPA 8260C	1-27-15	1-27-15	
1,1-Dichloropropene	ND	0.00078	EPA 8260C	1-27-15	1-27-15	
1,2-Dichloroethane	ND	0.00078	EPA 8260C	1-27-15	1-27-15	
Trichloroethene	ND	0.00078	EPA 8260C	1-27-15	1-27-15	
1,2-Dichloropropane	ND	0.00078	EPA 8260C	1-27-15	1-27-15	
Dibromomethane	ND	0.00078	EPA 8260C	1-27-15	1-27-15	
Bromodichloromethane	ND	0.00078	EPA 8260C	1-27-15	1-27-15	
2-Chloroethyl Vinyl Ether	ND	0.0039	EPA 8260C	1-27-15	1-27-15	
(cis) 1,3-Dichloropropene	ND	0.00078	EPA 8260C	1-27-15	1-27-15	
(trans) 1,3-Dichloropropene	ND	0.00078	EPA 8260C	1-27-15	1-27-15	

Date of Report: January 28, 2015
Samples Submitted: January 27, 2015
Laboratory Reference: 1501-184
Project: 35004

HALOGENATED VOLATILES EPA 8260C

page 2 of 2

Analyte	**Result**	**PQL**	**Method**	**Date Prepared**	**Date Analyzed**	**Flags**
Client ID:	**MW-3 @ 8'**					
Laboratory ID:	01-184-01					
1,1,2-Trichloroethane	ND	0.00078	EPA 8260C	1-27-15	1-27-15	
Tetrachloroethene	ND	0.00078	EPA 8260C	1-27-15	1-27-15	
1,3-Dichloropropane	ND	0.00078	EPA 8260C	1-27-15	1-27-15	
Dibromochloromethane	ND	0.00078	EPA 8260C	1-27-15	1-27-15	
1,2-Dibromoethane	ND	0.00078	EPA 8260C	1-27-15	1-27-15	
Chlorobenzene	ND	0.00078	EPA 8260C	1-27-15	1-27-15	
1,1,1,2-Tetrachloroethane	ND	0.00078	EPA 8260C	1-27-15	1-27-15	
Bromoform	ND	0.00078	EPA 8260C	1-27-15	1-27-15	
Bromobenzene	ND	0.00078	EPA 8260C	1-27-15	1-27-15	
1,1,2,2-Tetrachloroethane	ND	0.00078	EPA 8260C	1-27-15	1-27-15	
1,2,3-Trichloropropane	ND	0.00078	EPA 8260C	1-27-15	1-27-15	
2-Chlorotoluene	ND	0.00078	EPA 8260C	1-27-15	1-27-15	
4-Chlorotoluene	ND	0.00078	EPA 8260C	1-27-15	1-27-15	
1,3-Dichlorobenzene	ND	0.00078	EPA 8260C	1-27-15	1-27-15	
1,4-Dichlorobenzene	ND	0.00078	EPA 8260C	1-27-15	1-27-15	
1,2-Dichlorobenzene	ND	0.00078	EPA 8260C	1-27-15	1-27-15	
1,2-Dibromo-3-chloropropane	ND	0.0039	EPA 8260C	1-27-15	1-27-15	
1,2,4-Trichlorobenzene	ND	0.00078	EPA 8260C	1-27-15	1-27-15	
Hexachlorobutadiene	ND	0.0039	EPA 8260C	1-27-15	1-27-15	
1,2,3-Trichlorobenzene	ND	0.00078	EPA 8260C	1-27-15	1-27-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*112*	*76-131*				
Toluene-d8	*109*	*82-129*				
4-Bromofluorobenzene	*101*	*79-126*				

Date of Report: January 28, 2015
Samples Submitted: January 27, 2015
Laboratory Reference: 1501-184
Project: 35004

HALOGENATED VOLATILES EPA 8260C

page 1 of 2

Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-4 @ 8'**					
Laboratory ID:	01-184-02					
Dichlorodifluoromethane	ND	0.00082	EPA 8260C	1-27-15	1-27-15	
Chloromethane	ND	0.0041	EPA 8260C	1-27-15	1-27-15	
Vinyl Chloride	ND	0.00082	EPA 8260C	1-27-15	1-27-15	
Bromomethane	ND	0.00082	EPA 8260C	1-27-15	1-27-15	
Chloroethane	ND	0.0041	EPA 8260C	1-27-15	1-27-15	
Trichlorofluoromethane	ND	0.00082	EPA 8260C	1-27-15	1-27-15	
1,1-Dichloroethene	ND	0.00082	EPA 8260C	1-27-15	1-27-15	
Iodomethane	ND	0.0041	EPA 8260C	1-27-15	1-27-15	
Methylene Chloride	ND	0.0041	EPA 8260C	1-27-15	1-27-15	
(trans) 1,2-Dichloroethene	ND	0.00082	EPA 8260C	1-27-15	1-27-15	
1,1-Dichloroethane	ND	0.00082	EPA 8260C	1-27-15	1-27-15	
2,2-Dichloropropane	ND	0.00082	EPA 8260C	1-27-15	1-27-15	
(cis) 1,2-Dichloroethene	ND	0.00082	EPA 8260C	1-27-15	1-27-15	
Bromochloromethane	ND	0.00082	EPA 8260C	1-27-15	1-27-15	
Chloroform	ND	0.00082	EPA 8260C	1-27-15	1-27-15	
1,1,1-Trichloroethane	ND	0.00082	EPA 8260C	1-27-15	1-27-15	
Carbon Tetrachloride	ND	0.00082	EPA 8260C	1-27-15	1-27-15	
1,1-Dichloropropene	ND	0.00082	EPA 8260C	1-27-15	1-27-15	
1,2-Dichloroethane	ND	0.00082	EPA 8260C	1-27-15	1-27-15	
Trichloroethene	ND	0.00082	EPA 8260C	1-27-15	1-27-15	
1,2-Dichloropropane	ND	0.00082	EPA 8260C	1-27-15	1-27-15	
Dibromomethane	ND	0.00082	EPA 8260C	1-27-15	1-27-15	
Bromodichloromethane	ND	0.00082	EPA 8260C	1-27-15	1-27-15	
2-Chloroethyl Vinyl Ether	ND	0.0041	EPA 8260C	1-27-15	1-27-15	
(cis) 1,3-Dichloropropene	ND	0.00082	EPA 8260C	1-27-15	1-27-15	
(trans) 1,3-Dichloropropene	ND	0.00082	EPA 8260C	1-27-15	1-27-15	

Date of Report: January 28, 2015
Samples Submitted: January 27, 2015
Laboratory Reference: 1501-184
Project: 35004

HALOGENATED VOLATILES EPA 8260C
page 2 of 2

Analyte	**Result**	**PQL**	**Method**	**Date Prepared**	**Date Analyzed**	**Flags**
Client ID:	**MW-4 @ 8'**					
Laboratory ID:	01-184-02					
1,1,2-Trichloroethane	ND	0.00082	EPA 8260C	1-27-15	1-27-15	
Tetrachloroethene	ND	0.00082	EPA 8260C	1-27-15	1-27-15	
1,3-Dichloropropane	ND	0.00082	EPA 8260C	1-27-15	1-27-15	
Dibromochloromethane	ND	0.00082	EPA 8260C	1-27-15	1-27-15	
1,2-Dibromoethane	ND	0.00082	EPA 8260C	1-27-15	1-27-15	
Chlorobenzene	ND	0.00082	EPA 8260C	1-27-15	1-27-15	
1,1,1,2-Tetrachloroethane	ND	0.00082	EPA 8260C	1-27-15	1-27-15	
Bromoform	ND	0.00082	EPA 8260C	1-27-15	1-27-15	
Bromobenzene	ND	0.00082	EPA 8260C	1-27-15	1-27-15	
1,1,2,2-Tetrachloroethane	ND	0.00082	EPA 8260C	1-27-15	1-27-15	
1,2,3-Trichloropropane	ND	0.00082	EPA 8260C	1-27-15	1-27-15	
2-Chlorotoluene	ND	0.00082	EPA 8260C	1-27-15	1-27-15	
4-Chlorotoluene	ND	0.00082	EPA 8260C	1-27-15	1-27-15	
1,3-Dichlorobenzene	ND	0.00082	EPA 8260C	1-27-15	1-27-15	
1,4-Dichlorobenzene	ND	0.00082	EPA 8260C	1-27-15	1-27-15	
1,2-Dichlorobenzene	ND	0.00082	EPA 8260C	1-27-15	1-27-15	
1,2-Dibromo-3-chloropropane	ND	0.0041	EPA 8260C	1-27-15	1-27-15	
1,2,4-Trichlorobenzene	ND	0.00082	EPA 8260C	1-27-15	1-27-15	
Hexachlorobutadiene	ND	0.0041	EPA 8260C	1-27-15	1-27-15	
1,2,3-Trichlorobenzene	ND	0.00082	EPA 8260C	1-27-15	1-27-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*114*	*76-131*				
Toluene-d8	*111*	*82-129*				
4-Bromofluorobenzene	*101*	*79-126*				

Date of Report: January 28, 2015
Samples Submitted: January 27, 2015
Laboratory Reference: 1501-184
Project: 35004

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

Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB0127S1					
Dichlorodifluoromethane	ND	0.0010	EPA 8260C	1-27-15	1-27-15	
Chloromethane	ND	0.0050	EPA 8260C	1-27-15	1-27-15	
Vinyl Chloride	ND	0.0010	EPA 8260C	1-27-15	1-27-15	
Bromomethane	ND	0.0010	EPA 8260C	1-27-15	1-27-15	
Chloroethane	ND	0.0050	EPA 8260C	1-27-15	1-27-15	
Trichlorofluoromethane	ND	0.0010	EPA 8260C	1-27-15	1-27-15	
1,1-Dichloroethene	ND	0.0010	EPA 8260C	1-27-15	1-27-15	
Iodomethane	ND	0.0050	EPA 8260C	1-27-15	1-27-15	
Methylene Chloride	ND	0.0050	EPA 8260C	1-27-15	1-27-15	
(trans) 1,2-Dichloroethene	ND	0.0010	EPA 8260C	1-27-15	1-27-15	
1,1-Dichloroethane	ND	0.0010	EPA 8260C	1-27-15	1-27-15	
2,2-Dichloropropane	ND	0.0010	EPA 8260C	1-27-15	1-27-15	
(cis) 1,2-Dichloroethene	ND	0.0010	EPA 8260C	1-27-15	1-27-15	
Bromochloromethane	ND	0.0010	EPA 8260C	1-27-15	1-27-15	
Chloroform	ND	0.0010	EPA 8260C	1-27-15	1-27-15	
1,1,1-Trichloroethane	ND	0.0010	EPA 8260C	1-27-15	1-27-15	
Carbon Tetrachloride	ND	0.0010	EPA 8260C	1-27-15	1-27-15	
1,1-Dichloropropene	ND	0.0010	EPA 8260C	1-27-15	1-27-15	
1,2-Dichloroethane	ND	0.0010	EPA 8260C	1-27-15	1-27-15	
Trichloroethene	ND	0.0010	EPA 8260C	1-27-15	1-27-15	
1,2-Dichloropropane	ND	0.0010	EPA 8260C	1-27-15	1-27-15	
Dibromomethane	ND	0.0010	EPA 8260C	1-27-15	1-27-15	
Bromodichloromethane	ND	0.0010	EPA 8260C	1-27-15	1-27-15	
2-Chloroethyl Vinyl Ether	ND	0.0050	EPA 8260C	1-27-15	1-27-15	
(cis) 1,3-Dichloropropene	ND	0.0010	EPA 8260C	1-27-15	1-27-15	
(trans) 1,3-Dichloropropene	ND	0.0010	EPA 8260C	1-27-15	1-27-15	

Date of Report: January 28, 2015
Samples Submitted: January 27, 2015
Laboratory Reference: 1501-184
Project: 35004

HALOGENATED VOLATILES EPA 8260C
METHOD BLANK QUALITY CONTROL
Page 2 of 2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB0127S1					
1,1,2-Trichloroethane	ND	0.0010	EPA 8260C	1-27-15	1-27-15	
Tetrachloroethene	ND	0.0010	EPA 8260C	1-27-15	1-27-15	
1,3-Dichloropropane	ND	0.0010	EPA 8260C	1-27-15	1-27-15	
Dibromochloromethane	ND	0.0010	EPA 8260C	1-27-15	1-27-15	
1,2-Dibromoethane	ND	0.0010	EPA 8260C	1-27-15	1-27-15	
Chlorobenzene	ND	0.0010	EPA 8260C	1-27-15	1-27-15	
1,1,1,2-Tetrachloroethane	ND	0.0010	EPA 8260C	1-27-15	1-27-15	
Bromoform	ND	0.0010	EPA 8260C	1-27-15	1-27-15	
Bromobenzene	ND	0.0010	EPA 8260C	1-27-15	1-27-15	
1,1,2,2-Tetrachloroethane	ND	0.0010	EPA 8260C	1-27-15	1-27-15	
1,2,3-Trichloropropane	ND	0.0010	EPA 8260C	1-27-15	1-27-15	
2-Chlorotoluene	ND	0.0010	EPA 8260C	1-27-15	1-27-15	
4-Chlorotoluene	ND	0.0010	EPA 8260C	1-27-15	1-27-15	
1,3-Dichlorobenzene	ND	0.0010	EPA 8260C	1-27-15	1-27-15	
1,4-Dichlorobenzene	ND	0.0010	EPA 8260C	1-27-15	1-27-15	
1,2-Dichlorobenzene	ND	0.0010	EPA 8260C	1-27-15	1-27-15	
1,2-Dibromo-3-chloropropane	ND	0.0050	EPA 8260C	1-27-15	1-27-15	
1,2,4-Trichlorobenzene	ND	0.0010	EPA 8260C	1-27-15	1-27-15	
Hexachlorobutadiene	ND	0.0050	EPA 8260C	1-27-15	1-27-15	
1,2,3-Trichlorobenzene	ND	0.0010	EPA 8260C	1-27-15	1-27-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*116*	*76-131*				
Toluene-d8	*112*	*82-129*				
4-Bromofluorobenzene	*106*	*79-126*				

Date of Report: January 28, 2015
Samples Submitted: January 27, 2015
Laboratory Reference: 1501-184
Project: 35004

HALOGENATED VOLATILES EPA 8260C
SB/SBD QUALITY CONTROL

Matrix: Soil
Units: mg/kg

Analyte	**Result**		**Spike Level**		**Percent Recovery**		**Recovery Limits**	**RPD**	**RPD Limit**	**Flags**
SPIKE BLANKS										
Laboratory ID:	SB0127S1									
	SB	SBD	SB	SBD	SB	SBD				
1,1-Dichloroethene	**0.0540**	**0.0507**	0.0500	0.0500	108	101	66-129	6	15	
Benzene	**0.0532**	**0.0516**	0.0500	0.0500	106	103	71-123	3	15	
Trichloroethene	**0.0495**	**0.0490**	0.0500	0.0500	99	98	75-115	1	15	
Toluene	**0.0509**	**0.0494**	0.0500	0.0500	102	99	75-120	3	15	
Chlorobenzene	**0.0457**	**0.0436**	0.0500	0.0500	91	87	75-121	5	15	
Surrogate:										
Dibromofluoromethane					*105*	*103*	*76-131*			
Toluene-d8					*103*	*101*	*82-129*			
4-Bromofluorobenzene					*95*	*93*	*79-126*			

Date of Report: January 28, 2015
Samples Submitted: January 27, 2015
Laboratory Reference: 1501-184
Project: 35004

% MOISTURE

Date Analyzed: 1-27-15

Client ID	Lab ID	% Moisture
MW-3 @ 8'	01-184-01	11
MW-4 @ 8'	01-184-02	16

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 diesel range are impacting lube oil range results.

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.

X1- Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Z -

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

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Chain of Custody

Page 1 of 1

Laboratory Number: 01-184

Company: GALLOWAY ENV.
Project Number: 35004
Project Name: Lake Stevens Cleaners
Project Manager: Gary Galloway
Sampled by: Gary

Turnaround Request (in working days)
(Check One)
☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☒ Standard (7 Days) (TPH analysis 5 Days)
☐ ________ (other)

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx	Volatiles 8260C	Halogenated Volatiles 8260C	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A						% Moisture
1	MW-3@8'	1-27-15	0915	S							X																✓
2	MW-4@8'	"	1100	S							X																✓

	Signature	Company	Date	Time
Relinquished		Galloway Env.	1-27-15	12:45
Received		[illegible]	1/27/15	1245
Relinquished				
Received				
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions

Chromatograms with final report ☐

Data Package: Standard ☐ Level III ☐ Level IV ☐ Electronic Data Deliverables (EDDs) ☐ ________

OnSite
Environmental Inc.

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

February 4, 2015

Gary Galloway
Galloway Environmental, Inc.
3102 220th Place SE
Sammamish, WA 98075

Re: Analytical Data for Project 35004
Laboratory Reference No. 1502-004

Dear Gary:

Enclosed are the analytical results and associated quality control data for samples submitted on February 2, 2015.

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: February 4, 2015
Samples Submitted: February 2, 2015
Laboratory Reference: 1502-004
Project: 35004

Case Narrative

Samples were collected on January 31, 2015 and received by the laboratory on February 2, 2015. They were maintained at the laboratory at a temperature of 2^{o}C to 6^{o}C.

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: February 4, 2015
Samples Submitted: February 2, 2015
Laboratory Reference: 1502-004
Project: 35004

HALOGENATED VOLATILES EPA 8260C

page 1 of 2

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-1**					
Laboratory ID:	02-004-01					
Dichlorodifluoromethane	ND	0.26	EPA 8260C	2-3-15	2-3-15	
Chloromethane	ND	1.0	EPA 8260C	2-3-15	2-3-15	
Vinyl Chloride	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Bromomethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Chloroethane	ND	1.0	EPA 8260C	2-3-15	2-3-15	
Trichlorofluoromethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,1-Dichloroethene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Iodomethane	ND	1.0	EPA 8260C	2-3-15	2-3-15	
Methylene Chloride	ND	1.0	EPA 8260C	2-3-15	2-3-15	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,1-Dichloroethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
2,2-Dichloropropane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Bromochloromethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Chloroform	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,1,1-Trichloroethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Carbon Tetrachloride	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,1-Dichloropropene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,2-Dichloroethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Trichloroethene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,2-Dichloropropane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Dibromomethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Bromodichloromethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
2-Chloroethyl Vinyl Ether	ND	2.0	EPA 8260C	2-3-15	2-3-15	
(cis) 1,3-Dichloropropene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
(trans) 1,3-Dichloropropene	ND	0.20	EPA 8260C	2-3-15	2-3-15	

Date of Report: February 4, 2015
Samples Submitted: February 2, 2015
Laboratory Reference: 1502-004
Project: 35004

HALOGENATED VOLATILES EPA 8260C
page 2 of 2

Analyte	**Result**	**PQL**	**Method**	**Date Prepared**	**Date Analyzed**	**Flags**
Client ID:	**MW-1**					
Laboratory ID:	02-004-01					
1,1,2-Trichloroethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Tetrachloroethene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,3-Dichloropropane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Dibromochloromethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,2-Dibromoethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Chlorobenzene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,1,1,2-Tetrachloroethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Bromoform	ND	1.0	EPA 8260C	2-3-15	2-3-15	
Bromobenzene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,1,2,2-Tetrachloroethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,2,3-Trichloropropane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
2-Chlorotoluene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
4-Chlorotoluene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,3-Dichlorobenzene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,4-Dichlorobenzene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,2-Dichlorobenzene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,2-Dibromo-3-chloropropane	ND	1.0	EPA 8260C	2-3-15	2-3-15	
1,2,4-Trichlorobenzene	ND	0.31	EPA 8260C	2-3-15	2-3-15	
Hexachlorobutadiene	ND	0.31	EPA 8260C	2-3-15	2-3-15	
1,2,3-Trichlorobenzene	ND	0.33	EPA 8260C	2-3-15	2-3-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*104*	*79-122*				
Toluene-d8	*100*	*80-120*				
4-Bromofluorobenzene	*96*	*80-120*				

Date of Report: February 4, 2015
Samples Submitted: February 2, 2015
Laboratory Reference: 1502-004
Project: 35004

HALOGENATED VOLATILES EPA 8260C
page 1 of 2

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-2**					
Laboratory ID:	02-004-02					
Dichlorodifluoromethane	ND	2.6	EPA 8260C	2-3-15	2-3-15	
Chloromethane	ND	10	EPA 8260C	2-3-15	2-3-15	
Vinyl Chloride	ND	2.0	EPA 8260C	2-3-15	2-3-15	
Bromomethane	ND	2.0	EPA 8260C	2-3-15	2-3-15	
Chloroethane	ND	10	EPA 8260C	2-3-15	2-3-15	
Trichlorofluoromethane	ND	2.0	EPA 8260C	2-3-15	2-3-15	
1,1-Dichloroethene	ND	2.0	EPA 8260C	2-3-15	2-3-15	
Iodomethane	ND	10	EPA 8260C	2-3-15	2-3-15	
Methylene Chloride	ND	10	EPA 8260C	2-3-15	2-3-15	
(trans) 1,2-Dichloroethene	ND	2.0	EPA 8260C	2-3-15	2-3-15	
1,1-Dichloroethane	ND	2.0	EPA 8260C	2-3-15	2-3-15	
2,2-Dichloropropane	ND	2.0	EPA 8260C	2-3-15	2-3-15	
(cis) 1,2-Dichloroethene	ND	2.0	EPA 8260C	2-3-15	2-3-15	
Bromochloromethane	ND	2.0	EPA 8260C	2-3-15	2-3-15	
Chloroform	ND	2.0	EPA 8260C	2-3-15	2-3-15	
1,1,1-Trichloroethane	ND	2.0	EPA 8260C	2-3-15	2-3-15	
Carbon Tetrachloride	ND	2.0	EPA 8260C	2-3-15	2-3-15	
1,1-Dichloropropene	ND	2.0	EPA 8260C	2-3-15	2-3-15	
1,2-Dichloroethane	ND	2.0	EPA 8260C	2-3-15	2-3-15	
Trichloroethene	ND	2.0	EPA 8260C	2-3-15	2-3-15	
1,2-Dichloropropane	ND	2.0	EPA 8260C	2-3-15	2-3-15	
Dibromomethane	ND	2.0	EPA 8260C	2-3-15	2-3-15	
Bromodichloromethane	ND	2.0	EPA 8260C	2-3-15	2-3-15	
2-Chloroethyl Vinyl Ether	ND	20	EPA 8260C	2-3-15	2-3-15	
(cis) 1,3-Dichloropropene	ND	2.0	EPA 8260C	2-3-15	2-3-15	
(trans) 1,3-Dichloropropene	ND	2.0	EPA 8260C	2-3-15	2-3-15	

Date of Report: February 4, 2015
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HALOGENATED VOLATILES EPA 8260C
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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-2**					
Laboratory ID:	02-004-02					
1,1,2-Trichloroethane	ND	2.0	EPA 8260C	2-3-15	2-3-15	
Tetrachloroethene	450	2.0	EPA 8260C	2-3-15	2-3-15	
1,3-Dichloropropane	ND	2.0	EPA 8260C	2-3-15	2-3-15	
Dibromochloromethane	ND	2.0	EPA 8260C	2-3-15	2-3-15	
1,2-Dibromoethane	ND	2.0	EPA 8260C	2-3-15	2-3-15	
Chlorobenzene	ND	2.0	EPA 8260C	2-3-15	2-3-15	
1,1,1,2-Tetrachloroethane	ND	2.0	EPA 8260C	2-3-15	2-3-15	
Bromoform	ND	10	EPA 8260C	2-3-15	2-3-15	
Bromobenzene	ND	2.0	EPA 8260C	2-3-15	2-3-15	
1,1,2,2-Tetrachloroethane	ND	2.0	EPA 8260C	2-3-15	2-3-15	
1,2,3-Trichloropropane	ND	2.0	EPA 8260C	2-3-15	2-3-15	
2-Chlorotoluene	ND	2.0	EPA 8260C	2-3-15	2-3-15	
4-Chlorotoluene	ND	2.0	EPA 8260C	2-3-15	2-3-15	
1,3-Dichlorobenzene	ND	2.0	EPA 8260C	2-3-15	2-3-15	
1,4-Dichlorobenzene	ND	2.0	EPA 8260C	2-3-15	2-3-15	
1,2-Dichlorobenzene	ND	2.0	EPA 8260C	2-3-15	2-3-15	
1,2-Dibromo-3-chloropropane	ND	10	EPA 8260C	2-3-15	2-3-15	
1,2,4-Trichlorobenzene	ND	3.1	EPA 8260C	2-3-15	2-3-15	
Hexachlorobutadiene	ND	3.1	EPA 8260C	2-3-15	2-3-15	
1,2,3-Trichlorobenzene	ND	3.3	EPA 8260C	2-3-15	2-3-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*97*	*79-122*				
Toluene-d8	*92*	*80-120*				
4-Bromofluorobenzene	*90*	*80-120*				

Date of Report: February 4, 2015
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Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-3**					
Laboratory ID:	02-004-03					
Dichlorodifluoromethane	2.8	0.26	EPA 8260C	2-3-15	2-3-15	Y
Chloromethane	ND	1.0	EPA 8260C	2-3-15	2-3-15	
Vinyl Chloride	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Bromomethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Chloroethane	ND	1.0	EPA 8260C	2-3-15	2-3-15	
Trichlorofluoromethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,1-Dichloroethene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Iodomethane	ND	1.0	EPA 8260C	2-3-15	2-3-15	
Methylene Chloride	ND	1.0	EPA 8260C	2-3-15	2-3-15	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,1-Dichloroethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
2,2-Dichloropropane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Bromochloromethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Chloroform	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,1,1-Trichloroethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Carbon Tetrachloride	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,1-Dichloropropene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,2-Dichloroethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Trichloroethene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,2-Dichloropropane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Dibromomethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Bromodichloromethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
2-Chloroethyl Vinyl Ether	ND	2.0	EPA 8260C	2-3-15	2-3-15	
(cis) 1,3-Dichloropropene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
(trans) 1,3-Dichloropropene	ND	0.20	EPA 8260C	2-3-15	2-3-15	

Date of Report: February 4, 2015
Samples Submitted: February 2, 2015
Laboratory Reference: 1502-004
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Analyte	**Result**	**PQL**	**Method**	**Date Prepared**	**Date Analyzed**	**Flags**
Client ID:	**MW-3**					
Laboratory ID:	02-004-03					
1,1,2-Trichloroethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Tetrachloroethene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,3-Dichloropropane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Dibromochloromethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,2-Dibromoethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Chlorobenzene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,1,1,2-Tetrachloroethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Bromoform	ND	1.0	EPA 8260C	2-3-15	2-3-15	
Bromobenzene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,1,2,2-Tetrachloroethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,2,3-Trichloropropane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
2-Chlorotoluene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
4-Chlorotoluene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,3-Dichlorobenzene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,4-Dichlorobenzene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,2-Dichlorobenzene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,2-Dibromo-3-chloropropane	ND	1.0	EPA 8260C	2-3-15	2-3-15	
1,2,4-Trichlorobenzene	ND	0.31	EPA 8260C	2-3-15	2-3-15	
Hexachlorobutadiene	ND	0.31	EPA 8260C	2-3-15	2-3-15	
1,2,3-Trichlorobenzene	ND	0.33	EPA 8260C	2-3-15	2-3-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*104*	*79-122*				
Toluene-d8	*99*	*80-120*				
4-Bromofluorobenzene	*95*	*80-120*				

Date of Report: February 4, 2015
Samples Submitted: February 2, 2015
Laboratory Reference: 1502-004
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HALOGENATED VOLATILES EPA 8260C

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Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-4**					
Laboratory ID:	02-004-04					
Dichlorodifluoromethane	0.94	0.26	EPA 8260C	2-3-15	2-3-15	Y
Chloromethane	ND	1.0	EPA 8260C	2-3-15	2-3-15	
Vinyl Chloride	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Bromomethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Chloroethane	ND	1.0	EPA 8260C	2-3-15	2-3-15	
Trichlorofluoromethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,1-Dichloroethene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Iodomethane	ND	1.0	EPA 8260C	2-3-15	2-3-15	
Methylene Chloride	ND	1.0	EPA 8260C	2-3-15	2-3-15	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,1-Dichloroethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
2,2-Dichloropropane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Bromochloromethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Chloroform	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,1,1-Trichloroethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Carbon Tetrachloride	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,1-Dichloropropene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,2-Dichloroethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Trichloroethene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,2-Dichloropropane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Dibromomethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Bromodichloromethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
2-Chloroethyl Vinyl Ether	ND	2.0	EPA 8260C	2-3-15	2-3-15	
(cis) 1,3-Dichloropropene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
(trans) 1,3-Dichloropropene	ND	0.20	EPA 8260C	2-3-15	2-3-15	

Date of Report: February 4, 2015
Samples Submitted: February 2, 2015
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Project: 35004

HALOGENATED VOLATILES EPA 8260C

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Analyte	**Result**	**PQL**	**Method**	**Date Prepared**	**Date Analyzed**	**Flags**
Client ID:	**MW-4**					
Laboratory ID:	02-004-04					
1,1,2-Trichloroethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Tetrachloroethene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,3-Dichloropropane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Dibromochloromethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,2-Dibromoethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Chlorobenzene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,1,1,2-Tetrachloroethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Bromoform	ND	1.0	EPA 8260C	2-3-15	2-3-15	
Bromobenzene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,1,2,2-Tetrachloroethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,2,3-Trichloropropane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
2-Chlorotoluene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
4-Chlorotoluene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,3-Dichlorobenzene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,4-Dichlorobenzene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,2-Dichlorobenzene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,2-Dibromo-3-chloropropane	ND	1.0	EPA 8260C	2-3-15	2-3-15	
1,2,4-Trichlorobenzene	ND	0.31	EPA 8260C	2-3-15	2-3-15	
Hexachlorobutadiene	ND	0.31	EPA 8260C	2-3-15	2-3-15	
1,2,3-Trichlorobenzene	ND	0.33	EPA 8260C	2-3-15	2-3-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*102*	*79-122*				
Toluene-d8	*99*	*80-120*				
4-Bromofluorobenzene	*97*	*80-120*				

Date of Report: February 4, 2015
Samples Submitted: February 2, 2015
Laboratory Reference: 1502-004
Project: 35004

HALOGENATED VOLATILES EPA 8260C
METHOD BLANK QUALITY CONTROL
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Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB0203W1					
Dichlorodifluoromethane	ND	0.26	EPA 8260C	2-3-15	2-3-15	
Chloromethane	ND	1.0	EPA 8260C	2-3-15	2-3-15	
Vinyl Chloride	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Bromomethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Chloroethane	ND	1.0	EPA 8260C	2-3-15	2-3-15	
Trichlorofluoromethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,1-Dichloroethene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Iodomethane	ND	1.0	EPA 8260C	2-3-15	2-3-15	
Methylene Chloride	ND	1.0	EPA 8260C	2-3-15	2-3-15	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,1-Dichloroethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
2,2-Dichloropropane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Bromochloromethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Chloroform	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,1,1-Trichloroethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Carbon Tetrachloride	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,1-Dichloropropene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,2-Dichloroethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Trichloroethene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,2-Dichloropropane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Dibromomethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Bromodichloromethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
2-Chloroethyl Vinyl Ether	ND	2.0	EPA 8260C	2-3-15	2-3-15	
(cis) 1,3-Dichloropropene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
(trans) 1,3-Dichloropropene	ND	0.20	EPA 8260C	2-3-15	2-3-15	

Date of Report: February 4, 2015
Samples Submitted: February 2, 2015
Laboratory Reference: 1502-004
Project: 35004

HALOGENATED VOLATILES EPA 8260C
METHOD BLANK QUALITY CONTROL

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Analyte	**Result**	**PQL**	**Method**	**Date Prepared**	**Date Analyzed**	**Flags**
Laboratory ID:	MB0203W1					
1,1,2-Trichloroethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Tetrachloroethene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,3-Dichloropropane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Dibromochloromethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,2-Dibromoethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Chlorobenzene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,1,1,2-Tetrachloroethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
Bromoform	ND	1.0	EPA 8260C	2-3-15	2-3-15	
Bromobenzene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,1,2,2-Tetrachloroethane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,2,3-Trichloropropane	ND	0.20	EPA 8260C	2-3-15	2-3-15	
2-Chlorotoluene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
4-Chlorotoluene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,3-Dichlorobenzene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,4-Dichlorobenzene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,2-Dichlorobenzene	ND	0.20	EPA 8260C	2-3-15	2-3-15	
1,2-Dibromo-3-chloropropane	ND	1.0	EPA 8260C	2-3-15	2-3-15	
1,2,4-Trichlorobenzene	ND	0.31	EPA 8260C	2-3-15	2-3-15	
Hexachlorobutadiene	ND	0.31	EPA 8260C	2-3-15	2-3-15	
1,2,3-Trichlorobenzene	ND	0.33	EPA 8260C	2-3-15	2-3-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*102*	*79-122*				
Toluene-d8	*98*	*80-120*				
4-Bromofluorobenzene	*95*	*80-120*				

Date of Report: February 4, 2015
Samples Submitted: February 2, 2015
Laboratory Reference: 1502-004
Project: 35004

HALOGENATED VOLATILES EPA 8260C
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:	SB0203W1									
	SB	SBD	SB	SBD	SB	SBD				
1,1-Dichloroethene	**9.65**	**9.30**	10.0	10.0	97	93	64-138	4	16	
Benzene	**10.0**	**9.84**	10.0	10.0	100	98	76-125	1	14	
Trichloroethene	**9.36**	**8.61**	10.0	10.0	94	86	70-125	8	16	
Toluene	**9.54**	**9.22**	10.0	10.0	95	92	75-125	3	15	
Chlorobenzene	**9.43**	**9.15**	10.0	10.0	94	92	80-140	3	15	
Surrogate:										
Dibromofluoromethane					*96*	*100*	*79-122*			
Toluene-d8					*96*	*97*	*80-120*			
4-Bromofluorobenzene					*92*	*96*	*80-120*			

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 diesel range are impacting lube oil range results.

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.

X1- Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Z -

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

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Phone: (425) 883-3881 • www.onsite-env.com

Chain of Custody

Page 1 of 1

Laboratory Number: 02-004

Company: GALLOWAY ENV.
Project Number: 35004
Project Name: LK Stevens GW
Project Manager: Gary Galloway
Sampled by: Gary Galloway

Turnaround Request (in working days)
(Check One)
☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☒ Standard (7 Days) (TPH analysis 5 Days)
☐ ________ (other)

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx	Volatiles 8260C	Halogenated Volatiles 8260C	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A						% Moisture
1	MW-1	1/31/15	13:00	W	2						X																
2	2		13:20	W							X																
3	3		14:00	W							X																
4	4		14:30	W							X																

	Signature	Company	Date	Time
Relinquished		GALLOWAY	2/2/15	
Received		OSE	2/2/15	1126
Relinquished				
Received				
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions

Chromatograms with final report ☐

Data Package: Standard ☐ Level III ☐ Level IV ☐ Electronic Data Deliverables (EDDs) ☐ ________