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**Post-Cleanup Groundwater Confirmation
Sampling Event**

King County Housing Authority
Former Park Lake Homes Maintenance Center
9800 8th Avenue SW
Seattle, Washington

for

King County Housing Authority

October 27, 2015

GEOENGINEERS 

8410 154th Avenue NE
Redmond, Washington
425.861.6000

**Post-Cleanup Groundwater Confirmation
Sampling Event**

**KCHA Former Park Lake Homes Maintenance Center
9800 8th Avenue SW
Seattle, Washington**

File No. 1329-003-20

October 27, 2015

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INTRODUCTION AND BACKGROUND

This report presents the results of the 2015 groundwater quality assessment to document post-cleanup groundwater conditions associated with King County Housing Authority's (KCHA) former Park Lake Homes maintenance center. The address of the former maintenance center was 9800 8th Avenue Southwest in Seattle, Washington, within KCHA's low-income housing complex originally known Park Lake Homes Site I. Beginning in 2005, the Park Lake Homes Site I housing units, the maintenance center building, and much of the original World War II-era infrastructure, were demolished and removed and KCHA began redevelopment of the area into a new mixed-income housing and community services complex known as Greenbridge. Figure 1 presents a vicinity map of the project area. The layout of the former maintenance center in relation to existing buildings and streets associated with Greenbridge and surrounding properties is shown in Figure 2.

GeoEngineers completed a Phase I ESA of Park Lake Homes Site I for KCHA in 2002 (GeoEngineers 2003). Potential sources of contamination were identified in connection with the maintenance center, including two previous underground storage tank (USTs), floor drains/dry wells, a maintenance trench, an hydraulic hoist, and maintenance activities in the building that may have used or stored petroleum or other chemicals. One of the USTs had previously been removed by KCHA at an unknown date; its removal was confirmed by a 2004 geophysical survey [GeoEngineers 2004]. The second UST (1,000-gallon gasoline UST) had previously been removed in December 1998 (Bayley 1999). Former UST locations are indicated in Figure 2.

GeoEngineers completed subsurface characterization activities, consisting of soil exploration and sampling, for KCHA at the maintenance center in 2004 (GeoEngineers 2004). Soil samples from 15 environmental soil borings were tested to identify areas where cleanup actions were needed to remove contaminated soil resulting from historic releases at the maintenance center. In addition, a geophysics survey was performed to confirm that no USTs remained at the former maintenance center. Localized areas of petroleum-impacted soil (gasoline- and diesel-range hydrocarbons) were identified at the maintenance center at depths between approximately 4 and 10 feet below ground surface (bgs), based on the 2004 site characterization exploration borings. Halogenated volatile organic compounds (HVOCs) were not detected in the soil sample tested. No groundwater samples were obtained in connection with this 2004 pre-cleanup site characterization.

KCHA conducted an independent cleanup action at the maintenance center in accordance with the Model Toxics Control Act (MTCA) in 2005 (GeoEngineers 2005), following demolition of the maintenance building structures. Remedial excavation was performed at four localized areas of impacted soil at the former maintenance center. The locations of the four excavation areas are generally indicated in Figure 2, and included two areas of contaminated soil identified during the 2004 site characterization, and two areas of contaminated soil identified during 2005 earthwork activities in this area.

A total of approximately 2,296 tons of petroleum-impacted soil were removed from the four remedial excavations; the contamination soil was transported off-site for disposal at an approved facility. The maximum depths of the remedial excavations at the maintenance center ranged from approximately 4.5 to 18 feet bgs; groundwater seepage was observed at approximately 12 feet bgs in the deeper excavations. No seepage was observed on groundwater in the deeper excavations. Based on analytical results from cleanup confirmation soil samples obtained from the final limits of the 2005 remedial excavations,

gasoline- and diesel-range hydrocarbons, VOCs and/or PAHs either were not detected or were detected at concentrations less than MTCA Method A cleanup levels for unrestricted land use (GeoEngineers 2005).

The KCHA maintenance center UST removal report, 2004 site characterization report, and the 2005 independent cleanup report were all submitted to Ecology. The site is included in Ecology's database of independent cleanup sites, identified as Cleanup Site ID 8417 and Facility Site ID 2435391. Ecology databases also indicate a site address of 9900 8th Avenue Southwest.

Subsequent to the maintenance center MTCA cleanup, a significant quantity of soil was removed in 2007 from beneath the southern half of the former maintenance center and the adjacent area to the south (collectively known as "CV4") for the purpose of creating a temporary stormwater pond (Figure 2) for Greenbridge redevelopment activities. The pond excavation extended laterally and vertically beyond the southwesternmost cleanup excavation, to a maximum depth of 12 feet bgs (GeoEngineers 2008). No suspect contaminated soil was observed during excavation for the CV4 temporary detention pond. The pond was subsequently backfilled with structural fill soil.

An isolated area of shallow petroleum-impacted soil was encountered northeast of the former maintenance center in 2007, during mass grading activities by KCHA (Figure 2). The isolated area of impacted soil, approximately 225 cubic yards, was excavated by KCHA (GeoEngineers 2010a and 2010b). The source of the petroleum release at this location was not confirmed but was suspected to have likely been associated with either historic residential vehicle activity, construction equipment or localized fill (GeoEngineers 2010a and 2010b). Excavation confirmation samples were obtained in 2007 after removal of the 225 cubic yards of impacted soil; concentrations of diesel- and oil-range petroleum hydrocarbons in the samples were less than 100 milligrams per kilogram (mg/kg), significantly less than the MTCA cleanup of 2,000 mg/kg. There was no evidence of groundwater at this location.

CURRENT CONDITIONS

The former location of the maintenance center was significantly redeveloped after 2005; existing buildings and uses consist of multifamily residential housing, an asphalt parking lot, a concrete alleyway, and recreational open space (Figure 2). Multifamily residential housing and the community center building are present north of the former maintenance center. To the east is an open grass field referred to as Greenbridge 7. To the south is White Center Heights Elementary School and to the west is mixed-use multifamily residential buildings. Streets in the vicinity of the former maintenance center are shown in Figure 2 and include 8th Avenue SW to the west, 7th Avenue SW to the east, and SW 100th Street to the south. The majority of the adjacent properties are part of KCHA Greenbridge, with the exception of the White Center Heights Elementary School.

The ground surface topography in the footprint of, and directly surrounding, the former maintenance center between 8th Avenue SW and 7th Avenue SW is relatively flat with a gentle downward slope to the southwest. Surface water conveyance was significantly altered during the Greenbridge redevelopment relative to pre-development conveyance; existing stormwater runoff and conveyance features include grassy swales (with and without underdrains), retention ponds and rain gardens, in addition to traditional catch basins and subsurface storm drain piping in paved road areas.

PURPOSE AND SCOPE

The purpose of this 2015 groundwater quality assessment was to document that groundwater conditions meet MTCA cleanup levels following the successful 2005 cleanup of petroleum-related constituents in soil at the KCHA former maintenance center. The groundwater assessment was conducted at locations south, southeast and southwest of the former maintenance center, which are potentially downgradient of the 2005 remedial excavations, as well as east of the former maintenance center (cross-gradient). The boring locations were selected based on subsurface geologic and hydrogeologic conditions assessed during prior studies, the redeveloped nature of the site, and the footprint of the backfilled CV4 stormwater pond overlapping the former maintenance center. In addition, the 2015 explorations were located such that the geologic conditions observed, observed presence/absence of groundwater, and groundwater quality based on current chemical analytical data would confirm whether the historic releases at the maintenance center had impacted groundwater and whether there was a risk of contaminant migration to properties to the south, east or southeast. The 2015 borings were not completed directly within the footprint of the former maintenance center because those locations were less likely to be impacted given that the 2005 confirmation sampling indicated petroleum-related constituents were not detected in soil samples from the excavation limits and since 10 years have passed since the cleanup action was completed.

The scope of the cleanup confirmation groundwater assessment consisted of the following:

- Prepare a site health and safety plan for GeoEngineers' employees during exploration activities.
- Notify the public utilities notification service to mark public utilities in the right-of-way and easements, and confirm that each utility with infrastructure in the vicinity of the site had completed marking their utilities at each proposed drilling location.
- Observe drilling of eight direct push explorations in locations down- or cross-gradient of the former maintenance center. Obtain continuous core soil samples from each of the direct-push explorations. Field screen soil samples from the continuous cores for evidence of petroleum and volatiles using visual, water sheen and headspace vapor screening methods. Visually classify the samples in general accordance with ASTM D 2488 and maintain a detailed log of each boring. The borings extended to direct push refusal, which generally occurred at depths of 10- to 15-feet bgs.
- Collect grab groundwater samples where groundwater was present in the exploratory borings and submit the groundwater samples for chemical analysis of gasoline-range petroleum hydrocarbons by NWTPH-Gx; diesel- and heavy oil-range hydrocarbons by NWTPH-Dx and VOCs by EPA Method 8260.
- Evaluate the groundwater analytical results relative to Model Toxics Control Act (MTCA) cleanup levels.

EXPLORATIONS AND SAMPLING

Basis for Well Location Selection

GeoEngineers previously completed geotechnical and environmental studies across the Greenbridge site. Subsurface conditions in the vicinity of the project site are summarized in our 2007 geotechnical engineering report (GeoEngineers, 2007). The locations selected for post-cleanup groundwater confirmation borings were based on the hydrogeologic conditions anticipated in the vicinity of the former maintenance center based on our past experience, as follows:

- Shallow perched groundwater likely exists above very dense native soils consisting of silty sand and sandy silt that have very low permeability rates and form an aquitard below the alluvial soils.
- The aquitard is present directly below the ground surface at relatively shallow depths in the uplands west of 8th Avenue SW and east of 7th Avenue SW. Between these two streets, is a north south/southwest trending depression where a former drainage channel existed. Alluvium, peat and other recent stream deposits are present in the depression and were deposited on the aquitard layer. The aquitard is likely to be encountered at depths greater than 13 feet bgs within the center of the depression.
- Groundwater present above the low-permeability layer has a slight gradient to the south or southeast.

Eight direct-push borings (B-1 through B-8) were completed on September 30, 2015 to obtain groundwater samples for chemical analytical testing. The exploration locations were selected to be downgradient of the former maintenance center source areas, in areas where potentially impacted groundwater (if it exists) would most likely be encountered, and east of the former maintenance center (Figure 2). The borings were situated to the southwest, south and southeast of the former source areas to assess both the estimated eastern and western extent of the aquitard, and the quality and distribution of potentially-impacted groundwater (if present). Additional borings were situated directly east of the former Park Lake Homes maintenance center to assess the potential for groundwater contaminant migration (if any) to the east.

Soil and Hydrogeologic Conditions

The direct push exploration locations are shown in Figure 2. Field procedures and boring logs are presented in Appendix A. Soil encountered in the borings generally consisted of hard to very dense, gray or brown fine to medium sandy silt and silty sand with varying amounts of gravel and cobbles. Soil obtained from the direct push boring continuous cores was field screened for evidence of petroleum hydrocarbons and volatiles. Field screening results are indicated in the boring logs (Appendix A) and the cross-section in Figure 3. Field screening results did not indicate evidence of contaminated soil in the borings. There are no historical potential sources of soil contamination at the 2015 direct push locations; therefore, soil chemical analytical testing was not warranted.

The aquitard was encountered at the base of borings B-1 (1 foot bgs), B-5 (2 feet bgs), and B-6 (5 feet bgs), resulting in refusal of these direct push explorations. The observation of this aquitard in borings B-1, B-5 and B-6 reinforces the anticipated importance of this layer to the hydrogeology of the site, and the limitation of easterly and westerly groundwater flow. The cross section in Figure 3 indicates the depths at which the aquitard was reached, representing the interface between more permeable alluvial shallow soil and the deeper low-permeability soil.

Groundwater was observed in borings B-4, B-7 and B-8 during drilling at depths of approximately 11 to 12 feet bgs (Figure 3); groundwater was not encountered in the remaining borings. As shown in Figure 3, groundwater flow west of 8th Avenue SW and approximately 50-feet east of 7th Avenue SW, in the vicinity of the former Park Lake Homes maintenance center, is most likely confined by the aquitard. Shallow groundwater encountered in borings B-4, B-7 and B-8, immediately east of the former maintenance center, is most likely representative of perched groundwater, confined by the aquitard depression. Groundwater was not observed in borings B-2 and B-3, which are located directly south of the former maintenance center, even though the borings were completed to depths lower than the approximate groundwater elevations observed in borings B-4, B-7 and B-8.

Groundwater Sampling

Temporary groundwater monitoring wells consisting of a 5-foot long PVC well screen extending from 10 to 15 feet bgs, were installed in each boring. Groundwater samples were obtained using a low-flow peristaltic pump and dedicated disposable plastic tubing. Groundwater in the well casing was purged before sampling. The groundwater recharge in temporary wells B-4 and B-8 was sufficient for continuous pumping to purge and fill all sample jars. The groundwater recharge rate into temporary well B-7 was not sufficient for continuous pumping, so the well was left in place for approximately 4 hours, and pumped dry twice in order to purge and collect an adequate sample volume.

Groundwater samples were collected from B-4, B-7 and B-8 and submitted to Fremont Analytical (Fremont) in Seattle, Washington for chemical analysis of gasoline-range petroleum hydrocarbons by Northwest Method NWTPH-G/BTEX, diesel- and heavy oil-range petroleum hydrocarbons by Northwest Method NWTPH-Dx, and volatile organic compounds (VOCs) by US Environmental Protection Agency (EPA) Method 8260B. Chemical analytical results for the groundwater samples are summarized in Table 1. Laboratory reports are included in Appendix B.

Groundwater Chemical Analytical Results

Gasoline, diesel- and lube oil-range petroleum hydrocarbons and VOCs were not detected in the groundwater samples from B-4 and B-7. Diesel-range petroleum hydrocarbons were detected in the groundwater sample from B-8; the detected concentration (223 micrograms per liter [$\mu\text{g/L}$]) is less than the MTCA Method A cleanup level of 500 $\mu\text{g/L}$. Chemical analytical results are summarized in Table 1.

CONCLUSIONS

The field and sampling data obtained in September 2015 from the direct push borings indicate that shallow groundwater was not encountered in likely downgradient locations south of the former maintenance center, and that petroleum-related constituents and VOCs in shallow groundwater east/southeast of the former maintenance center either were not detected or the detected concentration (B-8, diesel-range petroleum hydrocarbons) was less than the MTCA cleanup level. There was no field screening evidence of petroleum or volatiles in soil from the direct push borings and no historical potential sources of soil contamination at the direct push boring locations.

Chemical contaminants were not detected in groundwater samples obtained from B-4 and B-7. The low-level diesel-range petroleum hydrocarbons detected in the groundwater sample at B-8 most likely represent residual impacts associated with the former maintenance center, in our opinion. There are no historical potential sources of contamination at the location of B-8. The concentration of diesel-range petroleum hydrocarbons in the B-8 groundwater sample was less than the MTCA Method A cleanup level. Post-cleanup groundwater quality is in compliance with MTCA based on the September 2015 explorations and sampling; therefore no further cleanup action is warranted at the former maintenance center in our opinion.

REFERENCES

- Bayley 1999, "Site Check/Site Assessment Report, Removal of Underground Storage Tank at Park Lake Homes Maintenance Shop, 9900 8th Avenue SW, Seattle, Washington 98106" by Emery Bayley, dated January 7, 1999
- GeoEngineers 2004 "Maintenance Center Environmental Soil Sampling, Former Park Lake Homes, 9900 8th Avenue Southwest, Seattle, Washington," dated April 14, 2004 for King County Housing Authority, GEI File 1329-003-04
- GeoEngineers 2005, "Final Cleanup Report, KCHA Maintenance Facility, Former Park Lake Homes, 9900 8th Avenue SW, Seattle, Washington," dated September 7, 2005 for King County Housing Authority, GEI File 1329-003-04
- GeoEngineers 2007, "Update Report, Geotechnical Engineering Services, Greenbridge Hope VI Redevelopment Project, King County, Washington," dated January 12, 2007 for King County Housing Authority, GEI File 1329-003-06
- GeoEngineers 2008, "Summary Letter, Geotechnical Construction Observation Services, CV4 Block - Rough Grading, Greenbridge Hope VI Redevelopment Project, King County, Washington," dated March 10, 2008 for King County Housing Authority, GEI File 1329-003-12
- GeoEngineers 2010a, "Phase I Environmental Site Assessment, Greenbridge V, Lots 1, 2, 12 and 13, Greenbridge Hope VI Redevelopment Project, Unincorporated King County, Washington," dated April 26, 2010 for King County Housing Authority, GEI File 1329-003-18
- GeoEngineers 2010b, "Letter Report, Phase II ESA, Greenbridge V and Adjacent Property, Greenbridge Hope VI Redevelopment Project, Unincorporated King County, Washington," dated April 26, 2010 for King County Housing Authority, GEI File 1329-003-18

LIMITATIONS

We have prepared this report for the exclusive use of the KCHA and their authorized agents. This report may be reviewed by others as identified by KCHA but others may not place legal reliance on this report. Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted environmental science practices in this area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood.

Any electronic form, facsimile or hard copy of the original document (email, text, table, and/or figure), if provided, and any attachments are only a copy of the original document. The original document is stored by GcoEngineers, Inc. and will serve as the official document of record.

Please refer to Appendix C, titled "Report Limitations and Guidelines for Use," for additional information pertaining to use of this report.

We appreciate the opportunity to continue our work with you on this project. If you have any questions please contact us.

Table 1
Cleanup Confirmation Groundwater Sample Chemical Analytical Data
Former Park Lake Homes Maintenance Center
9800 8th Avenue SW
Seattle, Washington
GeoEngineers File No. 1329-001-20

Exploration Location ¹	Sample ID	Date Sampled	Approximate Depth to Groundwater During Drilling (feet bgs)	Petroleum Hydrocarbons ² (µg/L)			VOCs ³ (µg/L)						
				Gasoline-Range	Diesel- Range	Lube Oil-Range ¹	Benzene	Toluene	Ethylbenzene	Total Xylenes	Methyl tert-butyl ether (MTBE)	1,2-Dibromoethane (EDB)	1,2-Dichloroethane (EDC)
B-1	No Groundwater Encountered	--	--	--	--	--	--	--	--	--	--	--	--
B-2	No Groundwater Encountered	--	--	--	--	--	--	--	--	--	--	--	--
B-3	No Groundwater Encountered	--	--	--	--	--	--	--	--	--	--	--	--
B-4	B-4-150930	09/30/15	11	<50.0	<50.1	<100	<1.00	<1.00	<1.00	<1.00	<1.00	<0.06	<1.00
B-5	No Groundwater Encountered	--	--	--	--	--	--	--	--	--	--	--	--
B-6	No Groundwater Encountered	--	--	--	--	--	--	--	--	--	--	--	--
B-7	B-7-150930	09/30/15	12	<50.0	<51.5	<103	<1.00	<1.00	<1.00	<1.00	<1.00	<0.06	<1.00
B-8	B-8-150930	09/30/15	11	<50.0	223	<99.9	<1.00	<1.00	<1.00	<1.00	<1.00	<0.06	<1.00
MTCA Method A Cleanup Levels				1,000/800 ⁴	500	500	5	1,000	700	1,000	20	0.01	5

Notes:

¹ Approximate exploration locations shown on Figure 2.

² Gasoline-range hydrocarbons analyzed by Northwest Method NWTPH-Gx. Diesel and heavy oil-range hydrocarbons analyzed by Northwest Method NWTPH-Dx.

³ Volatile organic compounds (VOCs) analyzed by EPA Method 8260. For VOCs, only compounds required for gasoline releases according to WAC 173-360, Table 830-1 are presented in the table. Refer to the laboratory report in Appendix B for the complete list of target analytes and detection limits.

⁴ When benzene is present, the gasoline-range cleanup level is 800 µg/L. When benzene is not present the gasoline range cleanup level is 1000 µg/L.

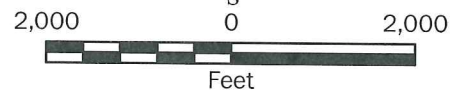
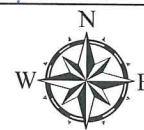
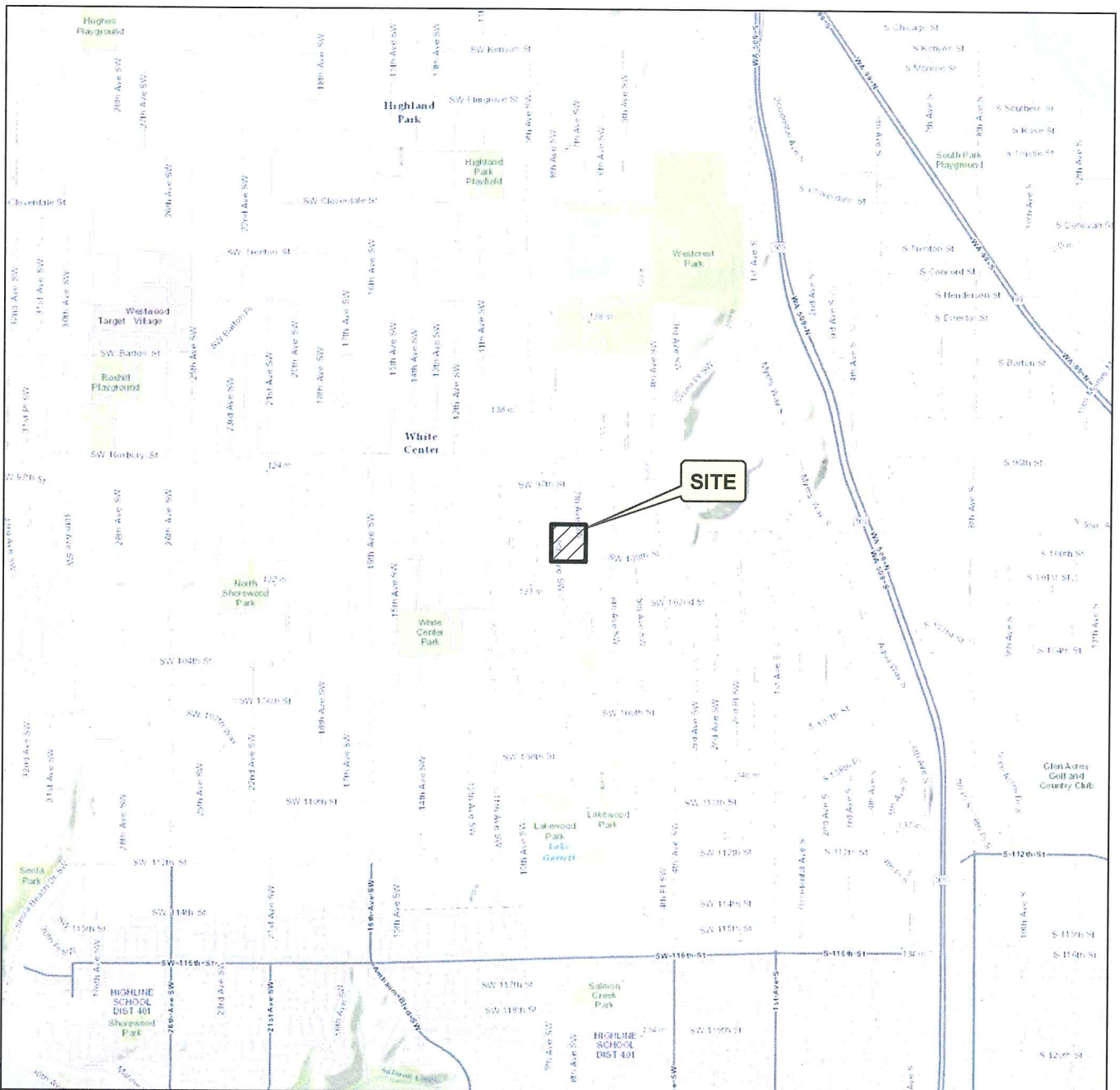
Chemical analytical testing by Fremont Analytical in Seattle, Washington. Refer to laboratory reports in Appendix B.

MTCA = Model Toxics Control Act

µg/L = micrograms per liter

bgs = below ground surface

Bolding indicates analyte was detected. Shading indicates that analyte was detected at concentrations greater than MTCA Method A cleanup levels.



Vicinity Map

Former Park Lake Homes Maintenance Center
Seattle, Washington



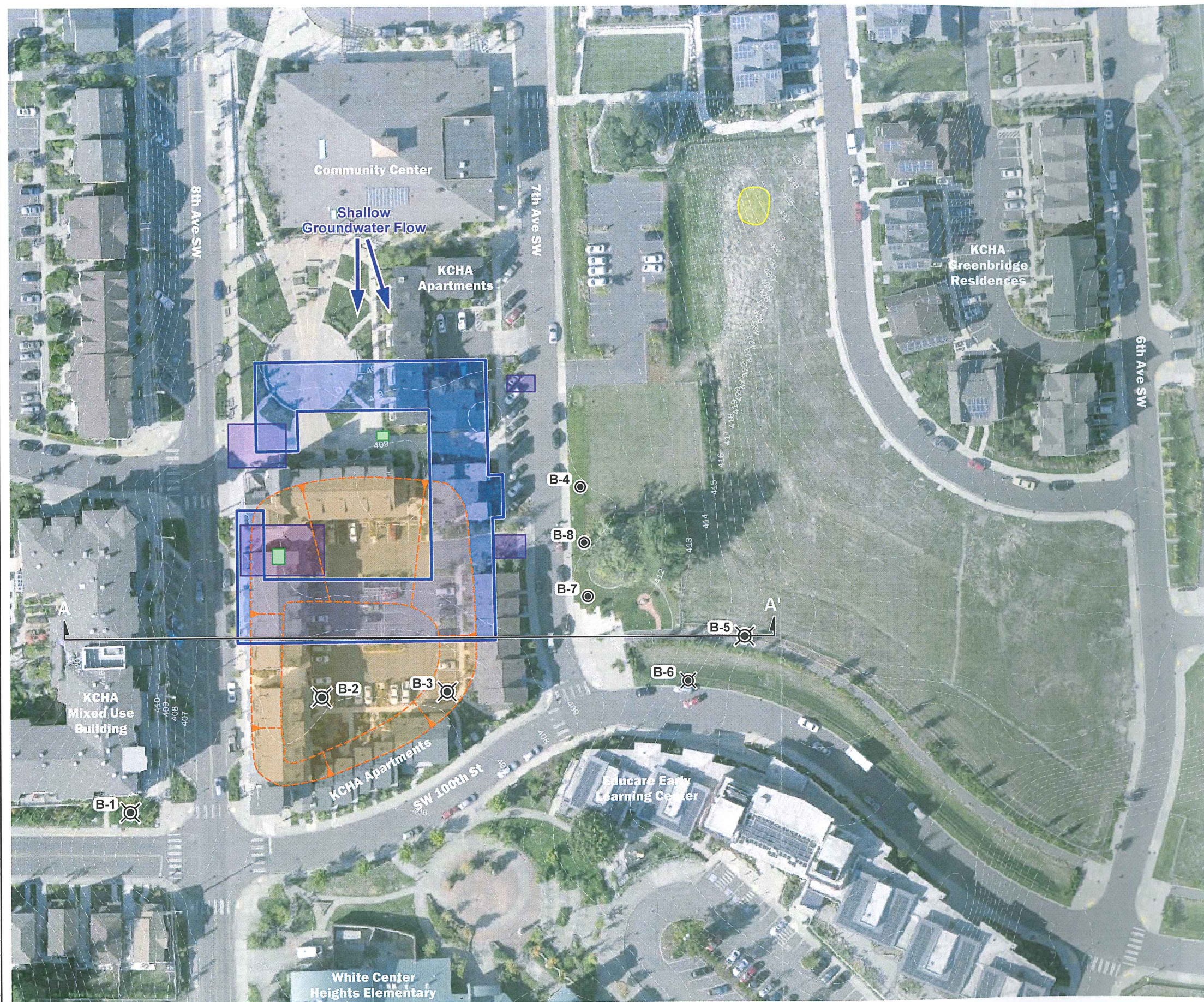
Figure 1

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

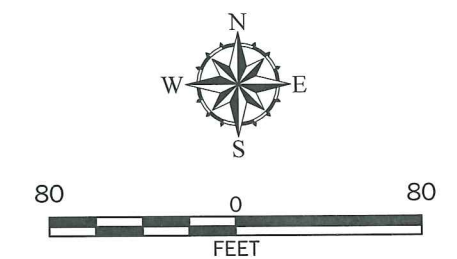
Data Source: Mapbox Open Street Map, 2015

Projection: NAD 1983 UTM Zone 10N

P:\1329003\20\CAD\1329003-20_Fig 2 (Site Plan).dwg TAB:Figure 2 Site Plan Date Exported: 10/23/15 - 11:24 by csticket



- Legend**
- ⊗ Direct Push Boring
No Groundwater Encountered (GeoEngineers, 2015)
 - ⊙ Direct Push Temporary Groundwater Monitoring Well (GeoEngineers, 2015)
 - A-A' Cross-Section Location, See Figure 3
 - ⬜ Approximate Footprint of Former Park Lake Homes Maintenance Center Building
 - ⬜ Approximate Location of Removed UST
 - ⬜ Approximate Location of 2005 Remedial Excavations - MTCA Cleanup at Maintenance Center
 - ⬜ Approximate July 2007 Soil Excavation Location
 - ⬜ Approximate Boundary of Backfilled CV4 Stormwater Pond Excavation



Notes:

1. The locations of all features shown are approximate.
 2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document.
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Data Source:

Imagery: Microsoft Bing September 2013
Topography: Puget Sound Lidar Consortium

Projection:

Horizontal: NAD 1983 State Plane Washington North
Vertical: NAVD88

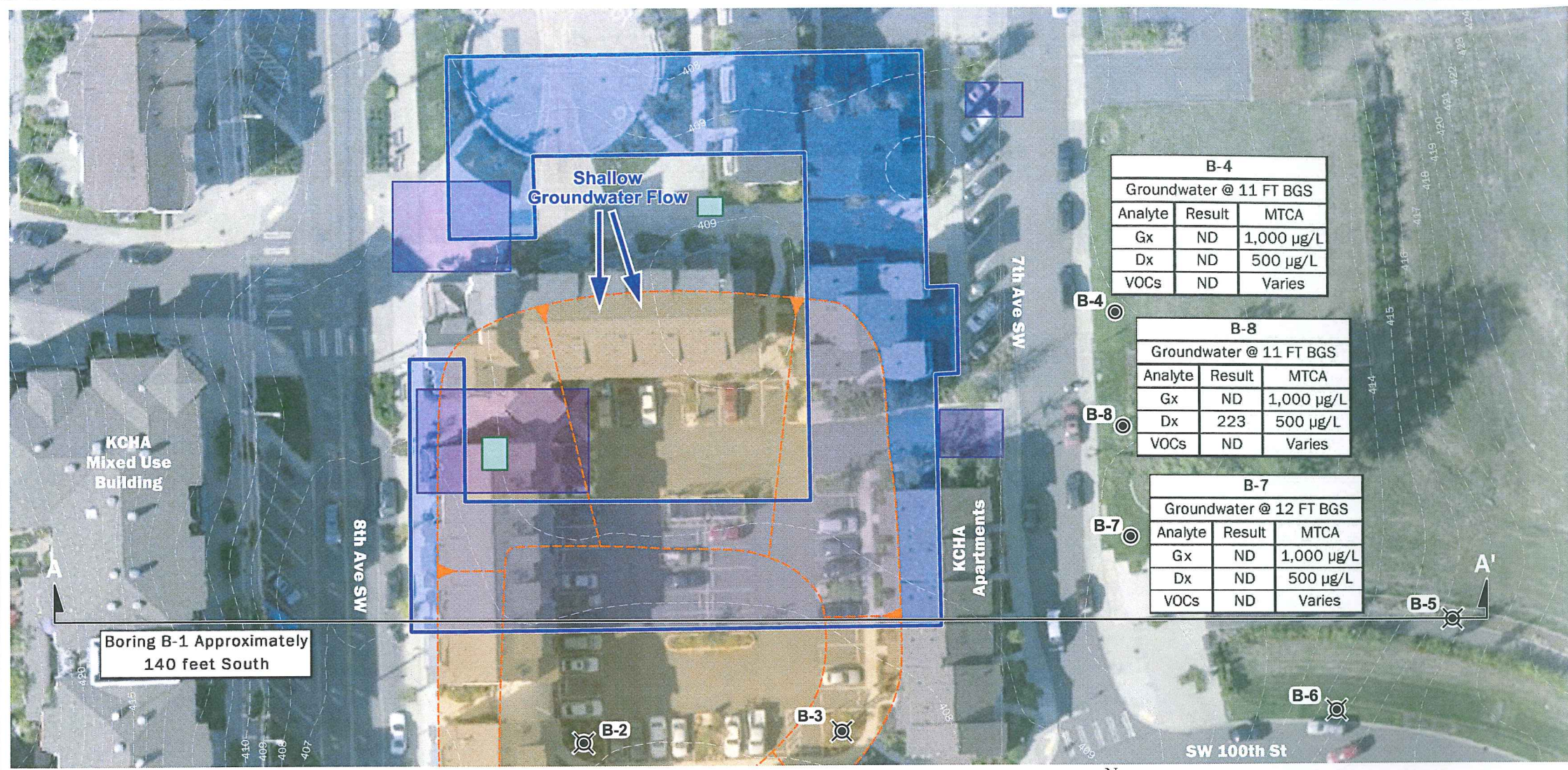
**Site Plan
Current Layout**

Former Park Lake Homes Maintenance Center
Seattle, Washington

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Figure 2

P:\1\1329003\20\CAD\1329003-20_Fig 3 (Section A).dwg TAB:Figure 3 Sec A Date Exported: 10/23/15 11:23 by csticke



Legend

- Direct Push Boring No Groundwater Encountered (GeoEngineers, 2015)
- Direct Push Temporary Groundwater Monitoring Well (GeoEngineers, 2015)
- Cross-Section Location
- Approximate Footprint of Former Park Lake Homes Maintenance Center Building
- Approximate Location of Removed UST
- Approximate Location of 2005 Remedial Excavations - MTCA Cleanup at Maintenance Center
- Approximate July 2007 Soil Excavation Location
- Approximate Boundary of Backfilled CV4 Stormwater Pond Excavation

Section

- Soil Sample with No Field Screening Evidence of Petroleum
- Well Screen
- Groundwater Sample, No Petroleum or VOC Concentrate Detected
- Groundwater Sample, Petroleum Concentrations Detected Less Than MTCA Method A Cleanup Levels

Data Boxes

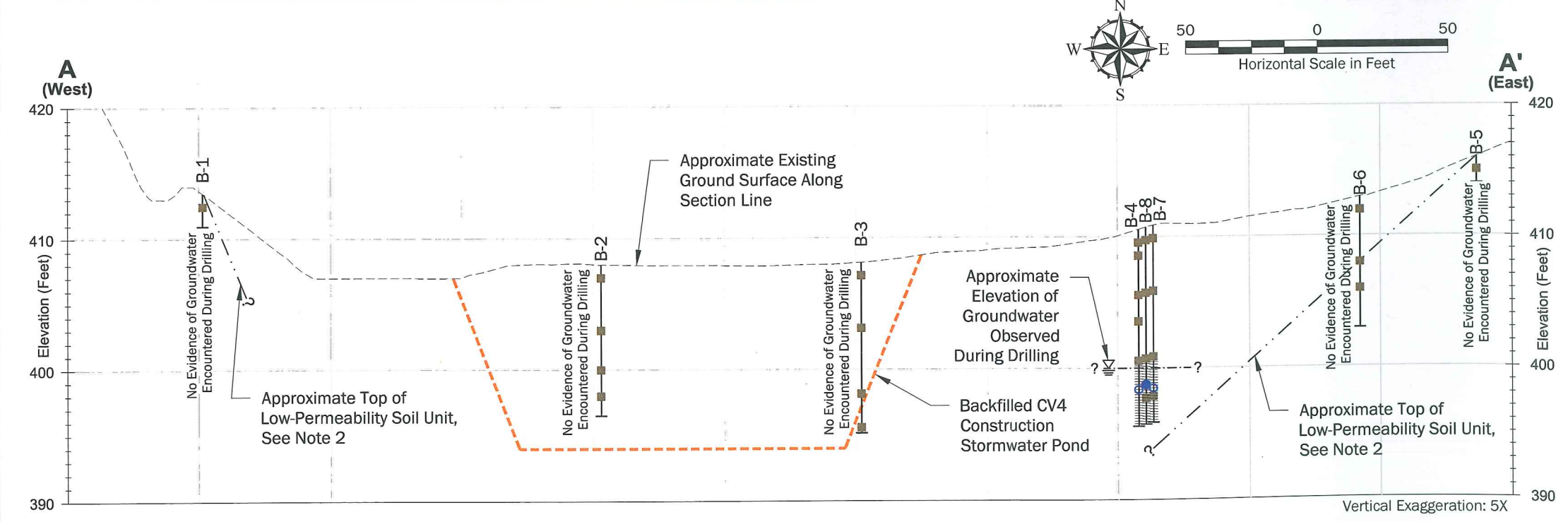
- BGS Below Ground Surface
- ND Non Detect
- VOCs Volatile Organic Compounds
- Gx Gasoline/BTEX
- Dx Diesel/Heavy Oil

Notes:

- Borings locations and elevations shown in cross-section are offset from the section line per approximate distances shown in the plan.
- There is an apparent depression at the top of the low permeability soil unit in the area between 8th Ave SW and 7th Ave SW.
- The locations of all features shown are approximate.
- This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

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Imagery: Microsoft Bing September 2013
Topography: Puget Sound Lidar Consortium

Projection:
Horizontal: NAD 1983 State Plane Washington North
Vertical: NAVD88



APPENDIX A

Field Procedures and Boring Logs

APPENDIX A

FIELD PROCEDURES AND BORING LOGS

Underground Utility Locate

Prior to drilling activities, an underground utility locate was conducted at the proposed boring locations to identify subsurface utilities and/or potential underground physical hazards. The underground utility check consisted of contacting a local utility alert service (1-call) and hiring a private utility locating service. The utilities notified by the local utility alert service were contacted directly to confirm known utilities had been located in all proposed boring locations.

Field Screening of Soil Samples

Soil samples obtained from the borings were screened in the field for evidence of contamination using: 1) visual examination; 2) sheen screening and 3) vapor headspace screening with a photo-ionization detector (PID). The results of headspace and sheen screening are included in the boring logs.

Visual screening consists of inspecting the soil for stains indicative of petroleum-related contamination. Visual screening is generally more effective when contamination is related to heavy petroleum hydrocarbons, such as motor oil or hydraulic oil, or when hydrocarbon concentrations are high. Sheen screening and headspace vapor screening are more sensitive methods that have been effective in detecting contamination at concentrations less than regulatory cleanup guidelines. Sheen screening involves placing soil in a pan of water and observing the water surface for signs of sheen. Sheen classifications are as follows:

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

Headspace vapor screening involves placing a soil sample in a plastic sample bag. Air is captured in the bag and the bag is shaken to expose the soil to the air trapped in the bag. The probe of a PID is inserted in the bag and the instrument measures the concentration of combustible vapor in the air removed from the sample headspace. The PID measures concentrations in ppm (parts per million) and is calibrated to isobutylene. The PID is designed to quantify combustible gas and organic vapor concentrations up to 2,500 ppm. A lower threshold of significance of 1 ppm was used in this application. Field screening results are site-specific and vary with soil type, soil moisture content, temperature and type of contaminant.

Groundwater Sampling

The borings were completed using direct-push drilling equipment operated by Cascade Drilling of Woodinville, Washington. Continuous soil cores were obtained from the direct push borings using 1.5-inch diameter, 5-foot long stainless steel sampler rods driven with a pneumatic hammer. Soil cores were examined for moisture content indicating the presence of groundwater. Once potential groundwater was observed in the soil core, the boring was advanced approximately 5-feet past the observed groundwater level. A 1-inch diameter temporary PVC monitoring well, with 5-feet of well screen at the base, was inserted into the open boring. Disposable plastic tubing was lowered within the temporary PVC well until it reached the bottom. The tubing was lifted approximately 2- to 3-feet above the bottom of the well. A peristaltic pump was used to withdraw groundwater from the well. The groundwater was allowed to purge from the well for several minutes or until the groundwater turbidity showed significant improvement relative to the initial purge water withdrawn. Once purging was complete, groundwater samples were placed directly from the new disposable plastic tubing into laboratory-prepared vials/jars for chemical analytical testing. The groundwater samples were then placed in a cooler with ice for transport to the laboratory within proper hold-times. Standard chain-of-custody procedures were followed in transporting the groundwater samples to the laboratory.

Soil Logging

A representative from our staff observed and classified the soil encountered. Soil in the explorations was visually classified in general accordance with ASTM D 2488-94. The boring logs are presented in this appendix.

Drill cuttings and decontamination/purge water generated during drilling activities were temporarily stored in one 20-gallon drum on a fenced KCHA property southeast of SW 97th Place and 4th Avenue SW, pending waste characterization and transportation for offsite disposal.

Boring Backfilling and Pavement Restoration

All direct-push borings were completed in lawn or bark-surfaced locations. The borings were backfilled with bentonite and the surface conditions was restored to generally match the surrounding surface.

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% RETAINED ON NO. 200 SIEVE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES
		GRAVELS WITH FINES (APPROPRIATE AMOUNT OF FINES)		GP	POORLY GRADED GRAVELS, GRAVEL - SAND MIXTURES
		CLEAN SANDS (LITTLE OR NO FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
		SANDS WITH FINES (APPROPRIATE AMOUNT OF FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS
		SANDS WITH FINES (APPROPRIATE AMOUNT OF FINES)		SP	POORLY-GRADED SANDS, GRAVELLY SAND
FINE GRAINED SOILS MORE THAN 50% PASSING NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS, ROCK FLOUR, CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS AND SILTS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS	

NOTE: Multiple symbols are used to indicate borderline or dual soil classifications

Sampler Symbol Descriptions

	2.4-inch I.D. split barrel
	Standard Penetration Test (SPT)
	Shelby tube
	Piston
	Direct-Push
	Bulk or grab
	Continuous Coring

Blowcount is recorded for driven samplers as the number of blows required to advance sampler 12 inches (or distance noted). See exploration log for hammer weight and drop.

A "P" indicates sampler pushed using the weight of the drill rig.

NOTE: The reader must refer to the discussion in the report text and the logs of explorations for a proper understanding of subsurface conditions. Descriptions on the logs apply only at the specific exploration locations and at the time the explorations were made; they are not warranted to be representative of subsurface conditions at other locations or times.

ADDITIONAL MATERIAL SYMBOLS

SYMBOLS		TYPICAL DESCRIPTIONS
GRAPH	LETTER	
	AC	Asphalt Concrete
	CC	Cement Concrete
	CR	Crushed Rock/Quarry Spalls
	TS	Topsoil/Forest Duff/Sod

Groundwater Contact



Measured groundwater level in exploration, well, or piezometer



Measured free product in well or piezometer

Graphic Log Contact



Distinct contact between soil strata or geologic units



Approximate location of soil strata change within a geologic soil unit

Material Description Contact



Distinct contact between soil strata or geologic units



Approximate location of soil strata change within a geologic soil unit

Laboratory / Field Tests

%F	Percent fines
AL	Atterberg limits
CA	Chemical analysis
CP	Laboratory compaction test
CS	Consolidation test
DS	Direct shear
HA	Hydrometer analysis
MC	Moisture content
MD	Moisture content and dry density
OC	Organic content
PM	Permeability or hydraulic conductivity
PI	Plasticity Index
PP	Pocket penetrometer
PPM	Parts per million
SA	Sieve analysis
TX	Triaxial compression
UC	Unconfined compression
VS	Vane shear

Sheen Classification

NS	No Visible Sheen
SS	Slight Sheen
MS	Moderate Sheen
HS	Heavy Sheen
NT	Not Tested

KEY TO EXPLORATION LOGS

APPENDIX B

Chemical Analytical Data

APPENDIX B

CHEMICAL ANALYTICAL DATA

Analytical Methods

Chain-of-custody procedures were followed during the transport of the groundwater samples to the analytical laboratory. The samples were held in cold storage pending extraction and/or analysis. The analytical results, analytical methods reference and laboratory quality control (QC) records are included in this appendix. The analytical results are also summarized in the text and tables of this report.

Analytical Data Review

The laboratory maintains an internal quality assurance program as documented in its laboratory quality assurance manual. The laboratory uses a combination of blanks, surrogate recoveries, duplicates, matrix spike recoveries, matrix spike duplicate recoveries, blank spike recoveries and blank spike duplicate recoveries to evaluate the validity of the analytical results. The laboratory also uses data quality goals for individual chemicals or groups of chemicals based on the long-term performance of the test methods. The data quality goals were included in the laboratory reports. The laboratory compared each group of samples with the existing data quality goals and noted any exceptions in the laboratory report. Data quality exceptions documented by the accredited laboratory were reviewed by GeoEngineers and are addressed in the data quality exception section of this appendix.

Analytical Data Review Summary

No data quality exceptions were noted in the laboratory reports.



Fremont
Analytical

3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

GeoEngineers, Inc. - Redmond
John Peters
8410 154th Ave. NE
Redmond, WA 98052

RE: Greenbridge V VI
Lab ID: 1509435

October 07, 2015

Attention John Peters:

Fremont Analytical, Inc. received 13 sample(s) on 9/30/2015 for the analyses presented in the following report.

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.
Gasoline by NWTPH-Gx
Volatile Organic Compounds by EPA Method 8260

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Mike Ridgeway
President



CLIENT: GeoEngineers, Inc. - Redmond
Project: Greenbridge V VI
Lab Order: 1509435

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
1509435-001	B-1-2.5	09/30/2015 8:35 AM	09/30/2015 5:07 PM
1509435-002	B-4-5.0	09/30/2015 9:50 AM	09/30/2015 5:07 PM
1509435-003	B-4-10.0	09/30/2015 10:00 AM	09/30/2015 5:07 PM
1509435-004	B-5-2.0	09/30/2015 9:00 AM	09/30/2015 5:07 PM
1509435-005	B-6-4.0	09/30/2015 1:45 PM	09/30/2015 5:07 PM
1509435-006	B-7-7	09/30/2015 11:00 AM	09/30/2015 5:07 PM
1509435-007	B-7-15	09/30/2015 11:10 AM	09/30/2015 5:07 PM
1509435-008	B-8-5	09/30/2015 2:45 PM	09/30/2015 5:07 PM
1509435-009	B-8-10	09/30/2015 2:40 PM	09/30/2015 5:07 PM
1509435-010	B-4-150930	09/30/2015 10:10 AM	09/30/2015 5:07 PM
1509435-011	B-7-150930	09/30/2015 11:15 AM	09/30/2015 5:07 PM
1509435-012	B-8-150930	09/30/2015 3:00 PM	09/30/2015 5:07 PM
1509435-013	Trip Blank	09/17/2015 5:00 PM	09/30/2015 5:07 PM



CLIENT: GeoEngineers, Inc. - Redmond
Project: Greenbridge V VI

I. SAMPLE RECEIPT:

Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:

Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:

Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Qualifiers:

- * - Flagged value is not within established control limits
- B - Analyte detected in the associated Method Blank
- D - Dilution was required
- E - Value above quantitation range
- H - Holding times for preparation or analysis exceeded
- I - Analyte with an internal standard that does not meet established acceptance criteria
- J - Analyte detected below LOQ
- N - Tentatively Identified Compound (TIC)
- Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF)
- S - Spike recovery outside accepted recovery limits
- ND - Not detected at the Reporting Limit

Acronyms:

- %Rec - Percent Recovery
- CCB - Continued Calibration Blank
- CCV - Continued Calibration Verification
- DF - Dilution Factor
- HEM - Hexane Extractable Material
- ICV - Initial Calibration Verification
- LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
- MB or MBLANK - Method Blank
- MDL - Method Detection Limit
- MS/MSD - Matrix Spike / Matrix Spike Duplicate
- PDS - Post Digestion Spike
- Ref Val - Reference Value
- RL - Reporting Limit
- RPD - Relative Percent Difference
- SD - Serial Dilution
- SGT - Silica Gel Treatment
- SPK - Spike
- Surr - Surrogate



Fremont

Analytical

Analytical Report

WO#: 1509435

Date Reported: 10/7/2015

Client: GeoEngineers, Inc. - Redmond

Collection Date: 9/30/2015 10:10:00 AM

Project: Greenbridge V VI

Lab ID: 1509435-010

Matrix: Water

Client Sample ID: B-4-150930

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<u>Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.</u>				Batch ID: 12039	Analyst: EC	
Diesel (Fuel Oil)	ND	50.1		µg/L	1	10/7/2015 8:21:00 AM
Heavy Oil	ND	100		µg/L	1	10/7/2015 8:21:00 AM
Surr: 2-Fluorobiphenyl	86.7	50-150		%REC	1	10/7/2015 8:21:00 AM
Surr: o-Terphenyl	97.7	50-150		%REC	1	10/7/2015 8:21:00 AM
<u>Gasoline by NWTPH-Gx</u>				Batch ID: R25269	Analyst: BC	
Gasoline	ND	50.0		µg/L	1	10/1/2015 6:55:00 PM
Surr: Toluene-d8	99.0	65-135		%REC	1	10/1/2015 6:55:00 PM
Surr: 4-Bromofluorobenzene	100	65-135		%REC	1	10/1/2015 6:55:00 PM
<u>Volatile Organic Compounds by EPA Method 8260</u>				Batch ID: R25264	Analyst: BC	
Dichlorodifluoromethane (CFC-12)	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
Chloromethane	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
Vinyl chloride	ND	0.200		µg/L	1	10/1/2015 6:55:00 PM
Bromomethane	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
Trichlorofluoromethane (CFC-11)	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
Chloroethane	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
1,1-Dichloroethene	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
Methylene chloride	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
trans-1,2-Dichloroethene	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
Methyl tert-butyl ether (MTBE)	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
1,1-Dichloroethane	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
2,2-Dichloropropane	ND	2.00		µg/L	1	10/1/2015 6:55:00 PM
cis-1,2-Dichloroethane	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
Chloroform	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
1,1,1-Trichloroethane (TCA)	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
1,1-Dichloropropene	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
Carbon tetrachloride	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
1,2-Dichloroethane (EDC)	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
Benzene	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
Trichloroethene (TCE)	ND	0.500		µg/L	1	10/1/2015 6:55:00 PM
1,2-Dichloropropane	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
Bromodichloromethane	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
Dibromomethane	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
cis-1,3-Dichloropropene	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
Toluene	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
trans-1,3-Dichloropropene	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM



Analytical Report

WO#: 1509435

Date Reported: 10/7/2015

Client: GeoEngineers, Inc. - Redmond

Collection Date: 9/30/2015 10:10:00 AM

Project: Greenbridge V VI

Lab ID: 1509435-010

Matrix: Water

Client Sample ID: B-4-150930

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<u>Volatile Organic Compounds by EPA Method 8260</u>				Batch ID: R25264	Analyst: BC	
1,1,2-Trichloroethane	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
1,3-Dichloropropane	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
Tetrachloroethene (PCE)	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
Dibromochloromethane	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
1,2-Dibromoethane (EDB)	ND	0.0600		µg/L	1	10/1/2015 6:55:00 PM
Chlorobenzene	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
1,1,1,2-Tetrachloroethane	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
Ethylbenzene	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
m,p-Xylene	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
o-Xylene	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
Styrene	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
Isopropylbenzene	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
Bromoform	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
1,1,2,2-Tetrachloroethane	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
n-Propylbenzene	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
Bromobenzene	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
1,3,5-Trimethylbenzene	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
2-Chlorotoluene	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
4-Chlorotoluene	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
tert-Butylbenzene	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
1,2,3-Trichloropropane	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
1,2,4-Trichlorobenzene	ND	2.00		µg/L	1	10/1/2015 6:55:00 PM
sec-Butylbenzene	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
4-Isopropyltoluene	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
1,3-Dichlorobenzene	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
1,4-Dichlorobenzene	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
n-Butylbenzene	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
1,2-Dichlorobenzene	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
1,2-Dibromo-3-chloropropane	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
1,2,4-Trimethylbenzene	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
Hexachlorobutadiene	ND	4.00		µg/L	1	10/1/2015 6:55:00 PM
Naphthalene	ND	1.00		µg/L	1	10/1/2015 6:55:00 PM
1,2,3-Trichlorobenzene	ND	4.00		µg/L	1	10/1/2015 6:55:00 PM
Surr: Dibromofluoromethane	98.3	45.4-152		%REC	1	10/1/2015 6:55:00 PM
Surr: Toluene-d8	98.4	40.1-139		%REC	1	10/1/2015 6:55:00 PM
Surr: 1-Bromo-4-fluorobenzene	99.4	64.2-128		%REC	1	10/1/2015 6:55:00 PM



Analytical Report

WO#: 1509435

Date Reported: 10/7/2015

Client: GeoEngineers, Inc. - Redmond

Collection Date: 9/30/2015 11:15:00 AM

Project: Greenbridge V VI

Lab ID: 1509435-011

Matrix: Water

Client Sample ID: B-7-150930

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<u>Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.</u>				Batch ID: 12039	Analyst: EC	
Diesel (Fuel Oil)	ND	51.5		µg/L	1	10/7/2015 7:49:00 AM
Heavy Oil	ND	103		µg/L	1	10/7/2015 7:49:00 AM
Surr: 2-Fluorobiphenyl	81.8	50-150		%REC	1	10/7/2015 7:49:00 AM
Surr: o-Terphenyl	79.9	50-150		%REC	1	10/7/2015 7:49:00 AM
<u>Gasoline by NWTPH-Gx</u>				Batch ID: R25269	Analyst: BC	
Gasoline	ND	50.0		µg/L	1	10/1/2015 7:24:00 PM
Surr: Toluene-d8	101	65-135		%REC	1	10/1/2015 7:24:00 PM
Surr: 4-Bromofluorobenzene	101	65-135		%REC	1	10/1/2015 7:24:00 PM
<u>Volatile Organic Compounds by EPA Method 8260</u>				Batch ID: R25264	Analyst: BC	
Dichlorodifluoromethane (CFC-12)	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
Chloromethane	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
Vinyl chloride	ND	0.200		µg/L	1	10/1/2015 7:24:00 PM
Bromomethane	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
Trichlorofluoromethane (CFC-11)	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
Chloroethane	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
1,1-Dichloroethene	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
Methylene chloride	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
trans-1,2-Dichloroethene	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
Methyl tert-butyl ether (MTBE)	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
1,1-Dichloroethane	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
2,2-Dichloropropane	ND	2.00		µg/L	1	10/1/2015 7:24:00 PM
cis-1,2-Dichloroethene	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
Chloroform	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
1,1,1-Trichloroethane (TCA)	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
1,1-Dichloropropene	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
Carbon tetrachloride	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
1,2-Dichloroethane (EDC)	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
Benzene	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
Trichloroethene (TCE)	ND	0.500		µg/L	1	10/1/2015 7:24:00 PM
1,2-Dichloropropane	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
Bromodichloromethane	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
Dibromomethane	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
cis-1,3-Dichloropropene	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
Toluene	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
trans-1,3-Dichloropropene	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM



Fremont

Analytical

Analytical Report

WO#: 1509435

Date Reported: 10/7/2015

Client: GeoEngineers, Inc. - Redmond

Collection Date: 9/30/2015 11:15:00 AM

Project: Greenbridge V VI

Lab ID: 1509435-011

Matrix: Water

Client Sample ID: B-7-150930

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Volatile Organic Compounds by EPA Method 8260				Batch ID: R25264	Analyst: BC	
1,1,2-Trichloroethane	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
1,3-Dichloropropane	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
Tetrachloroethene (PCE)	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
Dibromochloromethane	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
1,2-Dibromoethane (EDB)	ND	0.0800		µg/L	1	10/1/2015 7:24:00 PM
Chlorobenzene	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
1,1,1,2-Tetrachloroethane	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
Ethylbenzene	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
m,p-Xylene	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
o-Xylene	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
Styrene	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
Isopropylbenzene	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
Bromoform	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
1,1,2,2-Tetrachloroethane	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
n-Propylbenzene	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
Bromobenzene	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
1,3,5-Trimethylbenzene	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
2-Chlorotoluene	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
4-Chlorotoluene	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
tert-Butylbenzene	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
1,2,3-Trichloropropane	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
1,2,4-Trichlorobenzene	ND	2.00		µg/L	1	10/1/2015 7:24:00 PM
sec-Butylbenzene	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
4-Isopropyltoluene	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
1,3-Dichlorobenzene	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
1,4-Dichlorobenzene	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
n-Butylbenzene	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
1,2-Dichlorobenzene	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
1,2-Dibromo-3-chloropropane	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
1,2,4-Trimethylbenzene	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
Hexachlorobutadiene	ND	4.00		µg/L	1	10/1/2015 7:24:00 PM
Naphthalene	ND	1.00		µg/L	1	10/1/2015 7:24:00 PM
1,2,3-Trichlorobenzene	ND	4.00		µg/L	1	10/1/2015 7:24:00 PM
Surr: Dibromofluoromethane	98.2	45.4-152		%REC	1	10/1/2015 7:24:00 PM
Surr: Toluene-d8	98.0	40.1-139		%REC	1	10/1/2015 7:24:00 PM
Surr: 1-Bromo-4-fluorobenzene	99.7	64.2-128		%REC	1	10/1/2015 7:24:00 PM



Analytical Report

WO#: 1509435

Date Reported: 10/7/2015

Client: GeoEngineers, Inc. - Redmond

Collection Date: 9/30/2015 3:00:00 PM

Project: Greenbridge V VI

Lab ID: 1509435-012

Matrix: Water

Client Sample ID: B-8-150930

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Batch ID: 12039

Analyst: EC

Diesel (Fuel Oil)	ND	50.0		µg/L	1	10/7/2015 8:52:00 AM
Diesel Range Organics (C12-C24)	223	50.0		µg/L	1	10/7/2015 8:52:00 AM
Heavy Oil	ND	99.9		µg/L	1	10/7/2015 8:52:00 AM
Surr: 2-Fluorobiphenyl	85.2	50-150		%REC	1	10/7/2015 8:52:00 AM
Surr: o-Terphenyl	91.1	50-150		%REC	1	10/7/2015 8:52:00 AM

NOTES:

DRO - Indicates the presence of unresolved compounds eluting from dodecane through tetracosane (C12-C24).

Gasoline by NWTPH-Gx

Batch ID: R25269

Analyst: BC

Gasoline	ND	50.0		µg/L	1	10/1/2015 7:52:00 PM
Surr: Toluene-d8	99.3	65-135		%REC	1	10/1/2015 7:52:00 PM
Surr: 4-Bromofluorobenzene	99.3	65-135		%REC	1	10/1/2015 7:52:00 PM

Volatile Organic Compounds by EPA Method 8260

Batch ID: R25264

Analyst: BC

Dichlorodifluoromethane (CFC-12)	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
Chloromethane	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
Vinyl chloride	ND	0.200		µg/L	1	10/1/2015 7:52:00 PM
Bromomethane	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
Trichlorofluoromethane (CFC-11)	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
Chloroethane	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
1,1-Dichloroethane	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
Methylene chloride	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
trans-1,2-Dichloroethane	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
Methyl tert-butyl ether (MTBE)	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
1,1-Dichloroethane	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
2,2-Dichloropropane	ND	2.00		µg/L	1	10/1/2015 7:52:00 PM
cis-1,2-Dichloroethane	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
Chloroform	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
1,1,1-Trichloroethane (TCA)	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
1,1-Dichloropropene	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
Carbon tetrachloride	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
1,2-Dichloroethane (EDC)	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
Benzene	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
Trichloroethene (TCE)	ND	0.500		µg/L	1	10/1/2015 7:52:00 PM
1,2-Dichloropropane	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
Bromodichloromethane	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
Dibromomethane	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM



Analytical Report

WO#: 1509435

Date Reported: 10/7/2015

Client: GeoEngineers, Inc. - Redmond

Collection Date: 9/30/2015 3:00:00 PM

Project: Greenbridge V VI

Lab ID: 1509435-012

Matrix: Water

Client Sample ID: B-8-150930

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<u>Volatile Organic Compounds by EPA Method 8260</u>				Batch ID: R25264	Analyst: BC	
cis-1,3-Dichloropropene	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
Toluene	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
trans-1,3-Dichloropropene	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
1,1,2-Trichloroethane	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
1,3-Dichloropropane	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
Tetrachloroethene (PCE)	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
Dibromochloromethane	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
1,2-Dibromoethane (EDB)	ND	0.0800		µg/L	1	10/1/2015 7:52:00 PM
Chlorobenzene	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
1,1,1,2-Tetrachloroethane	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
Ethylbenzene	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
m,p-Xylene	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
o-Xylene	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
Styrene	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
Isopropylbenzene	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
Bromoform	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
1,1,2,2-Tetrachloroethane	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
n-Propylbenzene	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
Bromobenzene	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
1,3,5-Trimethylbenzene	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
2-Chlorotoluene	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
4-Chlorotoluene	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
tert-Butylbenzene	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
1,2,3-Trichloropropane	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
1,2,4-Trichlorobenzene	ND	2.00		µg/L	1	10/1/2015 7:52:00 PM
sec-Butylbenzene	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
4-Isopropyltoluene	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
1,3-Dichlorobenzene	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
1,4-Dichlorobenzene	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
n-Butylbenzene	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
1,2-Dichlorobenzene	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
1,2-Dibromo-3-chloropropane	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
1,2,4-Trimethylbenzene	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
Hexachlorobutadiene	ND	4.00		µg/L	1	10/1/2015 7:52:00 PM
Naphthalene	ND	1.00		µg/L	1	10/1/2015 7:52:00 PM
1,2,3-Trichlorobenzene	ND	4.00		µg/L	1	10/1/2015 7:52:00 PM
Surr: Dibromofluoromethane	99.1	45.4-152		%REC	1	10/1/2015 7:52:00 PM
Surr: Toluene-d8	98.1	40.1-139		%REC	1	10/1/2015 7:52:00 PM
Surr: 1-Bromo-4-fluorobenzene	98.0	64.2-128		%REC	1	10/1/2015 7:52:00 PM



Date: 10/7/2015

Work Order: 1509435

CLIENT: GeoEngineers, Inc. - Redmond

Project: Greenbridge V VI

QC SUMMARY REPORT

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Sample ID	MB-12039	SampType:	MBLK	Units:	µg/L	Prep Date:	10/5/2015	RunNo:	25324		
Client ID:	MBLKW	Batch ID:	12039			Analysis Date:	10/6/2015	SeqNo:	477662		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Diesel (Fuel Oil)
Heavy Oil
Surr: 2-Fluorobiphenyl
Surr: o-Terphenyl

ND
ND
55.4
57.4

69.2
71.8

50
50

150
150

Sample ID	LCS-12039	SampType:	LCS	Units:	µg/L	Prep Date:	10/5/2015	RunNo:	25324		
Client ID:	LCSW	Batch ID:	12039			Analysis Date:	10/6/2015	SeqNo:	477661		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Diesel (Fuel Oil)
Surr: 2-Fluorobiphenyl
Surr: o-Terphenyl

752
65.2
61.2

0
1,000
80.00
80.00

75.2
81.5
76.5

65
50
50

135
150
150

Sample ID	1510039-001ADUP	SampType:	DUP	Units:	µg/L	Prep Date:	10/5/2015	RunNo:	25324		
Client ID:	BATCH	Batch ID:	12039			Analysis Date:	10/6/2015	SeqNo:	477911		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Diesel (Fuel Oil)
Heavy Oil
Surr: 2-Fluorobiphenyl
Surr: o-Terphenyl

ND
ND
63.1
68.0

80.00
80.00

78.8
85.0

50
50

150
150

0
0

0
0

Sample ID	1509435-010ADUP	SampType:	DUP	Units:	µg/L	Prep Date:	10/5/2015	RunNo:	25324		
Client ID:	B-4-150930	Batch ID:	12039			Analysis Date:	10/7/2015	SeqNo:	477915		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Diesel (Fuel Oil)
Heavy Oil
Surr: 2-Fluorobiphenyl
Surr: o-Terphenyl

ND
ND
67.1
71.7

80.13
80.13

83.8
89.4

50
50

150
150

0
0

0
0



Date: 10/7/2015

Work Order: 1509435

CLIENT: GeoEngineers, Inc. - Redmond

Project: Greenbridge V VI

QC SUMMARY REPORT

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Sample ID	1509435-010ADUP	SampType:	DUP	Units:	µg/L	Prep Date:	10/5/2015	RunNo:	25324		
Client ID:	B-4-150930	Batch ID:	12039			Analysis Date:	10/7/2015	SeqNo:	477915		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual



Date: 10/7/2015

Work Order: 1509435

CLIENT: GeoEngineers, Inc. - Redmond

Project: Greenbridge V VI

QC SUMMARY REPORT

Gasoline by NWTPH-Gx

Sample ID: LCS-R25269	Sample Type: LCS	Units: µg/L	Prep Date: 10/1/2015	RunNo: 25269							
Client ID: LCSW	Batch ID: R25269		Analysis Date: 10/1/2015	SeqNo: 476469							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	476	50.0	500.0	0	95.2	65	135				
Surr: Toluene-d8	25.2		25.00		101	65	135				
Surr: 4-Bromofluorobenzene	24.8		25.00		99.3	65	135				

Sample ID: MB-R25269	Sample Type: MBLK	Units: µg/L	Prep Date: 10/1/2015	RunNo: 25269							
Client ID: MBLKW	Batch ID: R25269		Analysis Date: 10/1/2015	SeqNo: 476470							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	ND	50.0									
Surr: Toluene-d8	24.7		25.00		98.7	65	135				
Surr: 4-Bromofluorobenzene	25.3		25.00		101	65	135				

Sample ID: 1509435-012BDUP	SampleType: DUP	Units: µg/L	Prep Date: 10/1/2015	RunNo: 25269							
Client ID: B-8-150930	Batch ID: R25269		Analysis Date: 10/1/2015	SeqNo: 476465							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	ND	50.0						0		30	
Surr: Toluene-d8	24.8		25.00		99.3	65	135		0	0	
Surr: 4-Bromofluorobenzene	25.2		25.00		101	65	135		0	0	

Sample ID: 1509434-001ADUP	Sample Type: DUP	Units: µg/L	Prep Date: 10/1/2015	RunNo: 25269							
Client ID: BATCH	Batch ID: R25269		Analysis Date: 10/1/2015	SeqNo: 476460							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	ND	50.0						0		30	
Surr: Toluene-d8	24.9		25.00		99.5	65	135		0	0	
Surr: 4-Bromofluorobenzene	24.9		25.00		99.5	65	135		0	0	



Date: 10/7/2015

Work Order: 1509435

CLIENT: GeoEngineers, Inc. - Redmond

Project: Greenbridge V VI

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260

Sample ID	LCS-R25264	Batch ID	R25264	Result	RL	SPK value	SPK Ref Val	Units: µg/L	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Analyte															
Dichlorodifluoromethane (CFC-12)				20.7	1.00	20.00	0	0	104	43	136				
Chloromethane				19.9	1.00	20.00	0	0	99.3	43.9	139				
Vinyl chloride				20.0	0.200	20.00	0	0	100	53.6	139				
Bromomethane				22.4	1.00	20.00	0	0	112	42.5	152				
Trichlorofluoromethane (CFC-11)				19.9	1.00	20.00	0	0	99.7	63.7	133				
Chloroethane				18.6	1.00	20.00	0	0	92.8	53	141				
1,1-Dichloroethene				19.8	1.00	20.00	0	0	99.1	65.6	136				
Methylene chloride				19.2	1.00	20.00	0	0	96.0	67.1	131				
trans-1,2-Dichloroethene				19.2	1.00	20.00	0	0	96.1	71.7	129				
Methyl tert-butyl ether (MTBE)				16.7	1.00	20.00	0	0	83.6	67.7	131				
1,1-Dichloroethane				19.4	1.00	20.00	0	0	96.8	67.9	134				
2,2-Dichloropropane				21.2	2.00	20.00	0	0	106	33.7	152				
cis-1,2-Dichloroethene				19.0	1.00	20.00	0	0	95.0	71.1	130				
Chloroform				17.8	1.00	20.00	0	0	88.9	66.3	131				
1,1,1-Trichloroethane (TCA)				19.7	1.00	20.00	0	0	98.3	71	131				
1,1-Dichloropropene				17.7	1.00	20.00	0	0	88.5	74.5	126				
Carbon tetrachloride				19.1	1.00	20.00	0	0	95.4	66.2	134				
1,2-Dichloroethane (EDC)				16.2	1.00	20.00	0	0	81.0	68.8	123				
Benzene				19.8	1.00	20.00	0	0	99.1	69.3	132				
Trichloroethene (TCE)				18.0	0.500	20.00	0	0	90.0	65.2	136				
1,2-Dichloropropane				17.4	1.00	20.00	0	0	87.2	70.5	130				
Bromodichloromethane				18.6	1.00	20.00	0	0	93.2	67.2	137				
Dibromomethane				18.9	1.00	20.00	0	0	94.3	75.5	126				
cis-1,3-Dichloropropene				22.1	1.00	20.00	0	0	111	62.6	137				
Toluene				20.7	1.00	20.00	0	0	104	61.3	145				
trans-1,3-Dichloropropene				18.6	1.00	20.00	0	0	92.9	58.5	142				
1,1,2-Trichloroethane				17.2	1.00	20.00	0	0	85.9	71.7	131				
1,3-Dichloropropane				17.1	1.00	20.00	0	0	85.4	73.5	127				
Tetrachloroethene (PCE)				19.8	1.00	20.00	0	0	99.0	47.5	147				
Dibromochloromethane				22.5	1.00	20.00	0	0	113	67.2	134				
1,2-Dibromoethane (EDB)				19.1	0.0600	20.00	0	0	95.5	73.6	125				



Date: 10/7/2015

Work Order: 1509435

CLIENT: GeoEngineers, Inc. - Redmond

Project: Greenbridge V VI

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260

Sample ID	LCS-R25264	Batch ID	Result	RL	SPK value	SPK Ref Val	Units: µg/L	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Analyte														
Chlorobenzene	18.4		18.4	1.00	20.00	0	0	91.9	73.9	128				
1,1,1,2-Tetrachloroethane	20.5		20.5	1.00	20.00	0	0	103	76.8	124				
Ethylbenzene	20.4		20.4	1.00	20.00	0	0	102	72	130				
m,p-Xylene	41.2		41.2	1.00	40.00	0	0	103	70.3	134				
o-Xylene	20.7		20.7	1.00	20.00	0	0	104	72.1	131				
Styrene	19.1		19.1	1.00	20.00	0	0	95.4	64.3	140				
Isopropylbenzene	19.1		19.1	1.00	20.00	0	0	95.7	73.9	128				
Bromoforn	18.5		18.5	1.00	20.00	0	0	92.4	63.8	135				
1,1,2,2-Tetrachloroethane	17.0		17.0	1.00	20.00	0	0	84.9	62.9	132				
n-Propylbenzene	19.3		19.3	1.00	20.00	0	0	96.4	74.5	127				
Bromobenzene	18.2		18.2	1.00	20.00	0	0	90.8	71	131				
1,3,5-Trimethylbenzene	18.2		18.2	1.00	20.00	0	0	90.9	73.1	128				
2-Chlorotoluene	18.1		18.1	1.00	20.00	0	0	90.6	70.8	130				
4-Chlorotoluene	18.4		18.4	1.00	20.00	0	0	92.0	70.1	131				
tert-Butylbenzene	18.9		18.9	1.00	20.00	0	0	94.3	68.2	131				
1,2,3-Trichloropropane	16.5		16.5	1.00	20.00	0	0	82.6	67.7	131				
1,2,4-Trichlorobenzene	19.3		19.3	2.00	20.00	0	0	96.6	51.8	152				
sec-Butylbenzene	19.2		19.2	1.00	20.00	0	0	96.0	72	129				
4-Isopropyltoluene	19.6		19.6	1.00	20.00	0	0	97.8	69.2	130				
1,3-Dichlorobenzene	18.0		18.0	1.00	20.00	0	0	89.8	72.4	129				
1,4-Dichlorobenzene	21.0		21.0	1.00	20.00	0	0	105	70.6	128				
n-Butylbenzene	21.3		21.3	1.00	20.00	0	0	106	73.8	127				
1,2-Dichlorobenzene	17.2		17.2	1.00	20.00	0	0	86.1	74.2	129				
1,2-Dibromo-3-chloropropane	19.7		19.7	1.00	20.00	0	0	98.5	63.1	136				
1,2,4-Trimethylbenzene	18.3		18.3	1.00	20.00	0	0	91.4	73.4	127				
Hexachlorobutadiene	20.0		20.0	4.00	20.00	0	0	100	58.6	138				
Naphthalene	17.3		17.3	1.00	20.00	0	0	86.4	41.8	165				
1,2,3-Trichlorobenzene	18.1		18.1	4.00	20.00	0	0	90.3	48.7	156				
Surr: Dibromofluoromethane	24.8		24.8		25.00			99.1	45.4	152				
Surr: Toluene-d8	25.6		25.6		25.00			102	40.1	139				
Surr: 1-Bromo-4-fluorobenzene	24.7		24.7		25.00			98.7	64.2	128				



Date: 10/7/2015

Work Order: 1509435

CLIENT: GeoEngineers, Inc. - Redmond

Project: Greenbridge V VI

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260

Sample ID	LCS-R25264	SampleType:	LCS	Units: µg/L		Prep Date:	10/1/2015	RunNo:	25264				
Client ID:	LCSW	Batch ID:	R25264			Analysis Date:	10/1/2015	SeqNo:	476371				
Analyte		Result		RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Sample ID	MB-R25264	SampleType:	MBLK	Units: µg/L		Prep Date:	10/1/2015	RunNo:	25264				
Client ID:	MBLKW	Batch ID:	R25264			Analysis Date:	10/1/2015	SeqNo:	476372				
Analyte		Result		RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD RefVal	%RPD	RPDLimit	Qual

Dichlorodifluoromethane (CFC-12)	ND	1.00											
Chloromethane	ND	1.00											
Vinyl chloride	ND	0.200											
Bromomethane	ND	1.00											
Trichlorofluoromethane (CFC-11)	ND	1.00											
Chloroethane	ND	1.00											
1,1-Dichloroethene	ND	1.00											
Methylene chloride	ND	1.00											
trans-1,2-Dichloroethene	ND	1.00											
Methyl tert-butyl ether (MTBE)	ND	1.00											
1,1-Dichloroethane	ND	1.00											
2,2-Dichloropropane	ND	2.00											
cis-1,2-Dichloroethene	ND	1.00											
Chloroform	ND	1.00											
1,1,1-Trichloroethane (TCA)	ND	1.00											
1,1-Dichloropropene	ND	1.00											
Carbon tetrachloride	ND	1.00											
1,2-Dichloroethane (EDC)	ND	1.00											
Benzene	ND	1.00											
Trichloroethene (TCE)	ND	0.500											
1,2-Dichloropropane	ND	1.00											
Bromodichloromethane	ND	1.00											
Dibromomethane	ND	1.00											
cis-1,3-Dichloropropene	ND	1.00											
Toluene	ND	1.00											
trans-1,3-Dichloropropene	ND	1.00											



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Date: 10/7/2015

Work Order: 1509435

CLIENT: GeoEngineers, Inc. - Redmond

Project: Greenbridge V VI

QC SUMMARY REPORT
Volatile Organic Compounds by EPA Method 8260

Sample ID MB-R25264

Sample Type: MBLK

Run No: 25264

Client ID: MBLKW

Batch ID: R25264

Seq No: 476372

Analyte	Result	RL	SPK value	SPK Ref Val	Units: µg/L	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,2-Trichloroethane	ND	1.00										
1,3-Dichloropropane	ND	1.00										
Tetrachloroethene (PCE)	ND	1.00										
Dibromochloromethane	ND	1.00										
1,2-Dibromoethane (EDB)	ND	0.0600										
Chlorobenzene	ND	1.00										
1,1,1,2-Tetrachloroethane	ND	1.00										
Ethylbenzene	ND	1.00										
m,p-Xylene	ND	1.00										
o-Xylene	ND	1.00										
Styrene	ND	1.00										
Isopropylbenzene	ND	1.00										
Bromofarm	ND	1.00										
1,1,2,2-Tetrachloroethane	ND	1.00										
n-Propylbenzene	ND	1.00										
Bromobenzene	ND	1.00										
1,3,5-Trimethylbenzene	ND	1.00										
2-Chlorotoluene	ND	1.00										
4-Chlorotoluene	ND	1.00										
tert-Butylbenzene	ND	1.00										
1,2,3-Trichloropropane	ND	1.00										
1,2,4-Trichlorobenzene	ND	2.00										
sec-Butylbenzene	ND	1.00										
4-Isopropyltoluene	ND	1.00										
1,3-Dichlorobenzene	ND	1.00										
1,4-Dichlorobenzene	ND	1.00										
n-Butylbenzene	ND	1.00										
1,2-Dichlorobenzene	ND	1.00										
1,2-Dibromo-3-chloropropane	ND	1.00										
1,2,4-Trimethylbenzene	ND	1.00										
Hexachlorobutadiene	ND	4.00										



Date: 10/7/2015

Work Order: 1509435

CLIENT: GeoEngineers, Inc. - Redmond

Project: Greenbridge V VI

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260

Sample ID	MB-R25264	Sample Type: MBLK	Units: µg/L		Prep Date: 10/1/2015	RunNo: 25264					
Client ID: MBLKW	Batch ID: R25264				Analysis Date: 10/1/2015	SeqNo: 476372					
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	1.00									
1,2,3-Trichlorobenzene	ND	4.00									
Surr: Dibromofluoromethane	24.3		25.00		97.2	45.4	152				
Surr: Toluene-d8	24.4		25.00		97.7	40.1	139				
Surr: 1-Bromo-4-fluorobenzene	24.9		25.00		99.6	64.2	128				

Sample ID	1509435-012BDUP	SampleType: DUP	Units: µg/L	Prep Date: 10/1/2015	RunNo: 25264						
Client ID:	B-8-150930	Batch ID: R25264	Analysis Date: 10/1/2015	SeqNo: 476364							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	ND	1.00						0		30	
Chloromethane	ND	1.00						0		30	
Vinyl chloride	ND	0.200						0		30	
Bromomethane	ND	1.00						0		30	
Trichlorofluoromethane (CFC-11)	ND	1.00						0		30	
Chloroethane	ND	1.00						0		30	
1,1-Dichloroethene	ND	1.00						0		30	
Methylene chloride	ND	1.00						0		30	
trans-1,2-Dichloroethene	ND	1.00						0		30	
Methyl tert-butyl ether (MTBE)	ND	1.00						0		30	
1,1-Dichloroethane	ND	1.00						0		30	
2,2-Dichloropropane	ND	2.00						0		30	
cis-1,2-Dichloroethene	ND	1.00						0		30	
Chloroform	ND	1.00						0		30	
1,1,1-Trichloroethane (TCA)	ND	1.00						0		30	
1,1-Dichloropropene	ND	1.00						0		30	
Carbon tetrachloride	ND	1.00						0		30	
1,2-Dichloroethane (EDC)	ND	1.00						0		30	
Benzene	ND	1.00						0		30	
Trichloroethene (TCE)	ND	0.500						0		30	
1,2-Dichloropropane	ND	1.00						0		30	



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Work Order: 1509435

CLIENT: GeoEngineers, Inc. - Redmond

Project: Greenbridge V VI

QC SUMMARY REPORT
Volatile Organic Compounds by EPA Method 8260

Sample ID: 1509435-012BDUP		SampType: DUP	Units: µg/L		Prep Date: 10/1/2015	RunNo: 25264					
Client ID: B-8-150930	Batch ID: R25264				Analysis Date: 10/1/2015	SeqNo: 476364					
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Bromodichloromethane	ND	1.00						0		30	
Dibromomethane	ND	1.00						0		30	
cis-1,3-Dichloropropene	ND	1.00						0		30	
Toluene	ND	1.00						0		30	
trans-1,3-Dichloropropene	ND	1.00						0		30	
1,1,2-Trichloroethane	ND	1.00						0		30	
1,3-Dichloropropane	ND	1.00						0		30	
Tetrachloroethene (PCE)	ND	1.00						0		30	
Dibromochloromethane	ND	1.00						0		30	
1,2-Dibromoethane (EDB)	ND	0.0600						0		30	
Chlorobenzene	ND	1.00						0		30	
1,1,1,2-Tetrachloroethane	ND	1.00						0		30	
Ethylbenzene	ND	1.00						0		30	
m,p-Xylene	ND	1.00						0		30	
o-Xylene	ND	1.00						0		30	
Styrene	ND	1.00						0		30	
Isopropylbenzene	ND	1.00						0		30	
Bromoform	ND	1.00						0		30	
1,1,2,2-Tetrachloroethane	ND	1.00						0		30	
n-Propylbenzene	ND	1.00						0		30	
Bromobenzene	ND	1.00						0		30	
1,3,5-Trimethylbenzene	ND	1.00						0		30	
2-Chlorotoluene	ND	1.00						0		30	
4-Chlorotoluene	ND	1.00						0		30	
tert-Butylbenzene	ND	1.00						0		30	
1,2,3-Trichloropropane	ND	1.00						0		30	
1,2,4-Trichlorobenzene	ND	2.00						0		30	
sec-Butylbenzene	ND	1.00						0		30	
4-Isopropyltoluene	ND	1.00						0		30	
1,3-Dichlorobenzene	ND	1.00						0		30	
1,4-Dichlorobenzene	ND	1.00						0		30	



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Work Order: 1509435

CLIENT: GeoEngineers, Inc. - Redmond

Project: Greenbridge V VI

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260

Sample ID: 1509435-012BDUP		SampType: DUP		Units: µg/L		Prep Date: 10/1/2015		RunNo: 25264			
Client ID: B-8-150930		Batch ID: R25264				Analysis Date: 10/1/2015		SeqNo: 476364			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
n-Butylbenzene	ND	1.00						0		30	
1,2-Dichlorobenzene	ND	1.00						0		30	
1,2-Dibromo-3-chloropropane	ND	1.00						0		30	
1,2,4-Trimethylbenzene	ND	1.00						0		30	
Hexachlorobutadiene	ND	4.00						0		30	
Naphthalene	ND	1.00						0		30	
1,2,3-Trichlorobenzene	ND	4.00						0		30	
Surr: Dibromofluoromethane	24.7		25.00		98.7	45.4	152		0		
Surr: Toluene-d8	24.6		25.00		98.2	40.1	139		0		
Surr: 1-Bromo-4-fluorobenzene	24.9		25.00		99.5	64.2	128		0		

Sample ID: 1509434-001ADUP	SampType: DUP	Units: µg/L		Prep Date: 10/1/2015	RunNo: 25264						
Client ID: BATCH	Batch ID: R25264			Analysis Date: 10/1/2015	SeqNo: 476359						
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	ND	1.00						0		30	
Chloromethane	ND	1.00						0		30	
Vinyl chloride	ND	0.200						0		30	
Bromomethane	ND	1.00						0		30	
Trichlorofluoromethane (CFC-11)	ND	1.00						0		30	
Chloroethane	ND	1.00						0		30	
1,1-Dichloroethene	ND	1.00						0		30	
Methylene chloride	ND	1.00						0		30	
trans-1,2-Dichloroethene	ND	1.00						0		30	
Methyl tert-butyl ether (MTBE)	ND	1.00						0		30	
1,1-Dichloroethane	ND	1.00						0		30	
2,2-Dichloropropane	ND	2.00						0		30	
cis-1,2-Dichloroethene	ND	1.00						0		30	
Chloroform	ND	1.00						0		30	
1,1,1-Trichloroethane (TCA)	ND	1.00						0		30	
1,1-Dichloropropene	ND	1.00						0		30	



Date: 10/7/2015

Work Order: 1509435

CLIENT: GeoEngineers, Inc. - Redmond

Project: Greenbridge V VI

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260

Sample ID	1509434-001ADUP	SampType: DUP	Units: µg/L	Prep Date: 10/1/2015	RunNo: 25264						
Client ID: BATCH	Batch ID: R25264			Analysis Date: 10/1/2015	SeqNo: 476359						
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Carbon tetrachloride	ND	1.00						0		30	
1,2-Dichloroethane (EDC)	ND	1.00						0		30	
Benzene	ND	1.00						0		30	
Trichloroethene (TCE)	ND	0.500						0		30	
1,2-Dichloropropane	ND	1.00						0		30	
Bromodichloromethane	ND	1.00						0		30	
Dibromomethane	ND	1.00						0		30	
cis-1,3-Dichloropropene	ND	1.00						0		30	
Toluene	ND	1.00						0		30	
trans-1,3-Dichloropropene	ND	1.00						0		30	
1,1,2-Trichloroethane	ND	1.00						0		30	
1,3-Dichloropropane	ND	1.00						0		30	
Tetrachloroethene (PCE)	ND	1.00						0		30	
Dibromochloromethane	ND	1.00						0		30	
1,2-Dibromoethane (EDB)	ND	0.0600						0		30	
Chlorobenzene	ND	1.00						0		30	
1,1,1,2-Tetrachloroethane	ND	1.00						0		30	
Ethylbenzene	ND	1.00						0		30	
m,p-Xylene	ND	1.00						0		30	
o-Xylene	ND	1.00						0		30	
Styrene	ND	1.00						0		30	
Isopropylbenzene	ND	1.00						0		30	
Bromoform	ND	1.00						0		30	
1,1,2,2-Tetrachloroethane	ND	1.00						0		30	
n-Propylbenzene	ND	1.00						0		30	
Bromobenzene	ND	1.00						0		30	
1,3,5-Trimethylbenzene	ND	1.00						0		30	
2-Chlorotoluene	ND	1.00						0		30	
4-Chlorotoluene	ND	1.00						0		30	
tert-Butylbenzene	ND	1.00						0		30	
1,2,3-Trichloropropane	ND	1.00						0		30	



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Date: 10/7/2015

Work Order: 1509435

CLIENT: GeoEngineers, Inc. - Redmond

Project: Greenbridge V VI

QC SUMMARY REPORT
Volatile Organic Compounds by EPA Method 8260

Sample ID: 1509434-001ADUP	Batch ID: R25264	Sample Type: DUP	Units: µg/L	Prep Date: 10/1/2015	RunNo: 25264
Client ID: BATCH	Result	RL	SPK value	SPK Ref Val	SeqNo: 476359
Analyte	Result	RL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual
1,2,4-Trichlorobenzene	ND	2.00			0 30
sec-Butylbenzene	ND	1.00			0 30
4-Isopropyltoluene	ND	1.00			0 30
1,3-Dichlorobenzene	ND	1.00			0 30
1,4-Dichlorobenzene	ND	1.00			0 30
n-Butylbenzene	ND	1.00			0 30
1,2-Dichlorobenzene	ND	1.00			0 30
1,2-Dibromo-3-chloropropane	ND	1.00			0 30
1,2,4-Trimethylbenzene	ND	1.00			0 30
Hexachlorobutadiene	ND	4.00			0 30
Naphthalene	ND	1.00			0 30
1,2,3-Trichlorobenzene	ND	4.00			0 30
Surr: Dibromofluoromethane	24.8		25.00	45.4	152 0
Surr: Toluene-d8	24.7		25.00	40.1	139 0
Surr: 1-Bromo-4-fluorobenzene	24.6		25.00	64.2	128 0

Sample ID: 1509427-004AMS	Batch ID: R25264	Sample Type: MS	Units: µg/L	Prep Date: 10/2/2015	RunNo: 25264
Client ID: BATCH	Result	RL	SPK value	SPK Ref Val	SeqNo: 476349
Analyte	Result	RL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual
Dichlorodifluoromethane (CFC-12)	23.4	1.00	20.00	0	117 33.3 122
Chloromethane	21.5	0.500	20.00	0	107 48.2 145
Vinyl chloride	20.5	0.200	20.00	0	103 58.1 158
Bromomethane	23.3	0.500	20.00	0	116 31.5 135
Trichlorofluoromethane (CFC-11)	21.1	0.500	20.00	0	106 54.7 138
Chloroethane	19.5	0.500	20.00	0	97.5 48.9 143
1,1-Dichloroethene	22.6	0.500	20.00	0	113 63 141
Methylene chloride	20.8	1.00	20.00	0	104 61.6 135
trans-1,2-Dichloroethene	21.4	0.500	20.00	0	107 63.5 138
Methyl tert-butyl ether (MTBE)	21.3	1.00	20.00	0	107 60.9 132
1,1-Dichloroethane	24.0	0.500	20.00	0	120 67.8 136



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Date: 10/7/2015

Work Order: 1509435

CLIENT: GeoEngineers, Inc. - Redmond

Project: Greenbridge V VI

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260

Sample ID	1509427-004AMS	Sample Type	MS	Batch ID	R25264	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPD Limit	Qual
Analyte																
2,2-Dichloropropane			18.0				1.00	20.00	0	90.1	31.5	121				
cis-1,2-Dichloroethene			21.8				0.500	20.00	0	109	67.1	123				
Chloroform			21.8				1.00	20.00	0	109	66.7	136				
1,1,1-Trichloroethane (TCA)			21.6				0.500	20.00	0	108	64.2	146				
1,1-Dichloropropene			20.4				0.500	20.00	0	102	73.8	136				
Carbon tetrachloride			18.7				0.500	20.00	0	93.5	62.7	146				
1,2-Dichloroethane (EDC)			20.3				0.500	20.00	0	102	63.4	137				
Benzene			382				1.00	20.00	395.1	-64.4	65.4	138				SE
Trichloroethene (TCE)			26.3				0.500	20.00	0	132	60.4	134				
1,2-Dichloropropane			21.1				0.500	20.00	0	106	62.6	138				
Bromodichloromethane			28.1				0.500	20.00	0	140	59.4	139				S
Dibromomethane			23.2				0.500	20.00	0	116	63.6	139				
cis-1,3-Dichloropropene			24.8				0.500	20.00	0	124	63.8	132				
Toluene			298				1.00	20.00	280.9	85.5	64	139				E
trans-1,3-Dichloropropene			20.5				0.500	20.00	0	102	57.7	125				
1,1,2-Trichloroethane			21.7				0.500	20.00	0	109	59.4	127				
1,3-Dichloropropane			20.9				0.500	20.00	0	104	64.3	135				
Tetrachloroethene (PCE)			18.2				0.500	20.00	0	91.2	50.3	133				
Dibromochloromethane			23.0				0.500	20.00	0	115	61.6	139				
1,2-Dibromoethane (EDB)			22.9				0.200	20.00	0	114	63.2	134				
Chlorobenzene			18.0				0.500	20.00	0	90.2	65.8	134				
1,1,1,2-Tetrachloroethane			15.4				0.500	20.00	0	77.1	65.4	135				SE
Ethylbenzene			284				1.00	20.00	314.3	-150	64.5	136				SE
m,p-Xylene			1,060				1.00	40.00	1,192	-325	63.3	135				SE
o-Xylene			674				1.00	20.00	736.2	-310	65.4	134				SE
Styrene			69.5				1.00	20.00	0	347	59.1	134				S
Isopropylbenzene			89.4				1.00	20.00	100.6	-55.9	56	147				S
Bromoform			16.3				0.500	20.00	0	81.3	57.7	139				
1,1,2,2-Tetrachloroethane			19.5				0.500	20.00	0	97.4	59.8	146				
n-Propylbenzene			142				1.00	20.00	0	708	57.6	142				S
Bromobenzene			18.0				0.500	20.00	0	90.2	63.6	130				



Date: 10/7/2015

Work Order: 1509435

CLIENT: GeoEngineers, Inc. - Redmond

Project: Greenbridge V VI

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260

Sample ID: 1509427-004AMS	Batch ID: R25264	Result	RL	SPK value	SPK Ref Val	Units: µg/L	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Analyte													
1,3,5-Trimethylbenzene		217	1.00	20.00	250.2		-164	59.9	136				SE
2-Chlorotoluene		39.0	0.500	20.00	0		195	61.7	134				S
4-Chlorotoluene		79.7	0.500	20.00	0		398	58.4	134				S
tert-Butylbenzene		10.8	1.00	20.00	0		53.0	66.8	141				S
1,2,3-Trichloropropane		19.5	0.500	20.00	0		97.4	62.4	129				
1,2,4-Trichlorobenzene		12.0	1.00	20.00	0		59.9	50.9	133				
sec-Butylbenzene		18.9	1.00	20.00	0		94.6	56	146				
4-Isopropyltoluene		17.8	1.00	20.00	12.49		26.7	56.4	136				S
1,3-Dichlorobenzene		13.8	0.500	20.00	0		68.8	58.2	128				
1,4-Dichlorobenzene		16.5	0.500	20.00	0		82.4	60.1	123				
n-Butylbenzene		67.9	1.00	20.00	93.87		-130	54.6	135				SE
1,2-Dichlorobenzene		14.0	0.500	20.00	0		69.9	65.4	133				
1,2-Dibromo-3-chloropropane		54.0	0.500	20.00	0		270	51.8	142				S
1,2,4-Trimethylbenzene		339	1.00	20.00	416.4		-387	63.7	132				SE
Hexachlorobutadiene		5.30	2.00	20.00	0		26.5	58.1	130				S
Naphthalene		388	1.00	20.00	548.6		-803	54.5	132				SE
1,2,3-Trichlorobenzene		13.4	2.00	20.00	0		67.0	57	131				
Surr: Dibromofluoromethane		25.9		25.00			103	45.4	152				
Surr: Toluene-d8		29.8		25.00			119	40.1	139				
Surr: 1-Bromo-4-fluorobenzene		26.6		25.00			106	64.2	128				

NOTES: S - Spike recovery indicates a possible matrix effect. The method is in control as indicated by the Laboratory Control Sample (LCS).



Sample Log-In Check List

Client Name: **GEI1**
Logged by: **Erica Silva**

Work Order Number: **1509435**
Date Received: **9/30/2015 5:07:00 PM**

Chain of Custody

1. Is Chain of Custody complete? Yes ☒ No ☐ Not Present ☐
2. How was the sample delivered? Client

Log In

3. Coolers are present? Yes ☒ No ☐ NA ☐
4. Shipping container/cooler in good condition? Yes ☒ No ☐
5. Custody Seals present on shipping container/cooler?
(Refer to comments for Custody Seals not intact) Yes ☐ No ☐ Not Required ☒
6. Was an attempt made to cool the samples? Yes ☒ No ☐ NA ☐
7. Were all items received at a temperature of $>0^{\circ}\text{C}$ to 10.0°C * Yes ☐ No ☒ NA ☐

Please refer to Item Information

8. Sample(s) in proper container(s)? Yes ☒ No ☐
9. Sufficient sample volume for indicated test(s)? Yes ☒ No ☐
10. Are samples properly preserved? Yes ☒ No ☐
11. Was preservative added to bottles? Yes ☐ No ☒ NA ☐
12. Is there headspace in the VOA vials? Yes ☐ No ☒ NA ☐
13. Did all samples containers arrive in good condition(unbroken)? Yes ☒ No ☐
14. Does paperwork match bottle labels? Yes ☒ No ☐
15. Are matrices correctly identified on Chain of Custody? Yes ☒ No ☐
16. Is it clear what analyses were requested? Yes ☒ No ☐
17. Were all holding times able to be met? Yes ☒ No ☐

Special Handling (if applicable)

18. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☒

Person Notified:	_____	Date:	_____
By Whom:	_____	Via:	<input type="checkbox"/> eMail <input type="checkbox"/> Phone <input type="checkbox"/> Fax <input type="checkbox"/> In Person
Regarding:	_____		
Client Instructions:	_____		

19. Additional remarks:

Item Information

Item #	Temp $^{\circ}\text{C}$
Cooler	20.4
Sample	21.6
Temp Blank	19.8

* Note: DoD/ELAP and TNI require items to be received at $4^{\circ}\text{C} \pm 2^{\circ}\text{C}$



Fremont

ANALYTICAL

3600 Fremont Ave. N.
Seattle, WA 98103

Tel: 206-352-3790
Fax: 206-352-7178

Date: 9/30/15

Laboratory Project No. Internal:

1509435

Chain of Custody Record

Client:

Address:

City, State, Zip:

Telephone:

GREENWATER, INC.

8410 154th Ave. NE

Redmond, WA 98052

500-790-8570

Project Name:

Project No:

Location:

Report To (PM):

PM Email:

GREENWATER, INC.

1031-003-20

WATER CENTER

John Peters

Collected by: John Peters

john.peters@greenwater.com

*Matrix Codes: A = Air, AQ = Aquifer, B = Bulk, C = Other, P = Product, S = Soil, SD = Sediment, SI = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

Sample Name

Sample Date

Sample Time

Sample Type

(Material)

VOC (EPA 8260/8261)

SVOC (EPA 8270/8271)

PAH (EPA 8270/8271)

PCB (EPA 8082/8083)

Metals (EPA 8210/8211)

Total (T) / Dissolved (D)

Anions (EC) / Cations (EC)

Comments

1. B-1-25

9/30

835

S

2. B-2-20

3. B-4-5.0

950

S

4. B-4-10.0

1000

S

5. B-5-2.0

900

S

6. B-6-4.0

1345

S

7. B-7-7

1100

S

8. B-7-15

110

S

9. B-8-5

1445

S

10. B-8-10

1440

S

11. B-8-10

1440

S

12. B-8-10

1440

S

13. B-8-10

1440

S

14. B-8-10

1440

S

15. B-8-10

1440

S

16. B-8-10

1440

S

17. B-8-10

1440

S

18. B-8-10

1440

S

19. B-8-10

1440

S

20. B-8-10

1440

S

21. B-8-10

1440

S

22. B-8-10

1440

S

26 of 27



Chain of Custody Record

1509435

Page 2 of 2

Project Name: Casey and Jeff
Project No: 329-003-20 collected by: John Peters
Location: United States
Report To (PM): John Peters
And Email: peters@caseyjohners.com

*Matrix Codes: A = Air, AQ = Aquifer, B = Bulk, D = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water. DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

[illegible]

Distribution: White - Lab, Yellow - File, Pink - Plink - Originator

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APPENDIX C
Report Limitations and Guidelines for Use

APPENDIX C

REPORT LIMITATIONS AND GUIDELINES FOR USE¹

This appendix provides information to help you manage your risks with respect to the use of this report.

Read These Provisions Closely

Some clients, design professionals and contractors may not recognize that the geoscience practices (geotechnical engineering, geology and environmental science) are far less exact than other engineering and natural science disciplines. This lack of understanding can create unrealistic expectations that could lead to disappointments, claims and disputes. GeoEngineers includes these explanatory "limitations" provisions in our reports to help reduce such risks. Please confer with GeoEngineers if you are unclear how these "Report Limitations and Guidelines for Use" apply to your project or site.

Environmental Services Are Performed for Specific Purposes, Persons and Projects

This report has been prepared for the exclusive use of King County Housing Authority, their authorized agents and regulatory agencies. This report is not intended for use by others, and the information contained herein is not applicable to other sites.

GeoEngineers structures our services to meet the specific needs of our clients. For example, an environmental site assessment or remedial action study conducted for a property owner may not fulfill the needs of a prospective purchaser of the same property. Because each environmental study is unique, each environmental report is unique, prepared solely for the specific client and project site. No one except the King County Housing Authority and their authorized agents should rely on this plan without first conferring with GeoEngineers. This report should not be applied for any purpose or project except the one originally contemplated.

This Environmental Report Is Based on a Unique Set of Project-Specific Factors

This report applies to the former maintenance center located east of 8th Avenue SW and north of SW 100th Street in Seattle, Washington. GeoEngineers considered a number of unique, project-specific factors when establishing the scope of services for this project and report. Unless GeoEngineers specifically indicates otherwise, do not rely on this report if it was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

¹ Developed based on material provided by ASFE, Professional Firms Practicing in the GeoSciences, www.asfe.org.

If important changes are made after the date of this site assessment document, GeoEngineers should be given the opportunity to review our interpretations and recommendations and provide written modifications or confirmation, as appropriate.

Reliance Conditions for Third Parties

No third party may rely on the product of our services unless GeoEngineers agrees in advance, and in writing to such reliance. This is to provide our firm with reasonable protection against open-ended liability claims by third parties with whom there would otherwise be no contractual limits to their actions.

Environmental Regulations Are Always Evolving

Some substances may be present in the site vicinity in quantities or under conditions that may have led, or may lead, to contamination of the subject site, but are not included in current local, state or federal regulatory definitions of hazardous substances or do not otherwise present current potential liability. GeoEngineers cannot be responsible if the standards for appropriate inquiry, or regulatory definitions of hazardous substance, change or if more stringent environmental standards are developed in the future.

Subsurface Conditions Can Change

This report is based on conditions that existed at the time our site studies were performed. The findings and conclusions of this report may be affected by the passage of time, by manmade events such as construction on or adjacent to the site, by new releases of hazardous substances, or by natural events such as floods, earthquakes, slope instability or groundwater fluctuations. Always contact GeoEngineers before applying this report to determine if it is still applicable.

Soil and Groundwater End Use

The cleanup levels referenced in this report are site- and situation-specific. The cleanup levels may not be applicable for other sites or for other on-Site uses of the affected media (soil and/or groundwater). Note that hazardous substances may be present in some of the Site soil and/or groundwater at detectable concentrations that are less than the referenced cleanup levels. GeoEngineers should be contacted prior to the export of soil or groundwater from the subject Site or reuse of the affected media on Site to evaluate the potential for associated environmental liabilities. We cannot be responsible for potential environmental liability arising out of the transfer of soil and/or groundwater from the subject Site to another location or its reuse on Site in instances that we were not aware of or could not control.

Biological Pollutants

GeoEngineers' Scope of Work specifically excludes the investigation, detection, prevention or assessment of the presence of Biological Pollutants. Accordingly, this report does not include any interpretations, recommendations, findings, or conclusions regarding the detecting, assessing, preventing or abating of Biological Pollutants and no conclusions or inferences should be drawn regarding Biological Pollutants, as they may relate to this project. The term "Biological Pollutants" includes, but is not limited to, molds, fungi, spores, bacteria, and viruses, and/or any of their byproducts.

If Client desires these specialized services, they should be obtained from a consultant who offers services in this specialized field.

Do Not Redraw the Exploration Logs

Environmental scientists prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in an environmental report should never be redrawn for inclusion in other design drawings. Only photographic or electronic reproduction is acceptable, but recognize that separating logs from the report can elevate risk.

Geotechnical, Geologic and Environmental Reports Should Not Be Interchanged

The equipment, techniques and personnel used to perform an environmental study differ significantly from those used to perform a geotechnical or geologic study and vice versa. For that reason, a geotechnical engineering or geologic report does not usually relate any environmental findings, conclusions or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. Similarly, environmental reports are not used to address geotechnical or geologic concerns regarding a specific project.

Most Environmental Findings Are Professional Opinions

Our interpretations of subsurface conditions are based on field observations and chemical analytical data from the sampling locations at the site documented in past reports. Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. GeoEngineers reviewed field and laboratory data and then applied our professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ – sometimes significantly – from those indicated in this report. There is always a potential that areas of contamination exist in portions of the site that were not sampled or tested during this or previous studies. Our remedial action plan, conclusions and interpretations should not be construed as a warranty of the subsurface conditions.

