Soil and Groundwater Assessment

Ellensburg City West 8th Street ROW
Site Assessment
Ellensburg, Washington

for
Washington State Department of Ecology

August 2, 2021

GeoEngineers
Earth Science + Technology

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Ellensburg City West 8th Street ROW
Site Assessment
Ellensburg, Washington

File No. 0504-169-00

August 2, 2021

Prepared for:

Washington State Department of Ecology
Toxics Cleanup Program - Central Region Office
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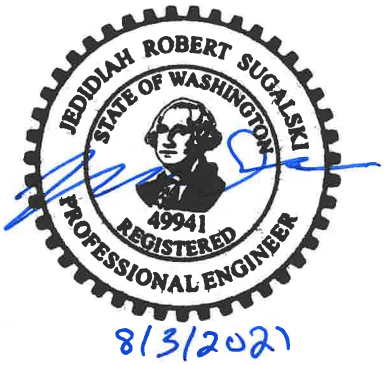

8/3/2021

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Table of Contents

1.0 INTRODUCTION

This report describes soil and groundwater assessment activities and results at the Ellensburg City West 8th Street Right of Way (ROW) site (herein designated the site) located on the 700 block of West University Way (formerly West 8th Street) in Ellensburg, Washington, as shown in Figure 1, Vicinity Map. Based on recent aerial imagery, the site is adjacent to and north of the Ward Rugh Inc. commercial building and the ground surface is mainly covered with asphalt concrete pavement (ACP). The Washington State Department of Ecology (Ecology) reference numbers for the site include Facility Site ID 77737583 and Cleanup Site ID 1928.

This assessment report has been prepared by GeoEngineers for Ecology under Ecology Master Contract No. C1900044, work assignment number GEI029. This report describes the site history, field activities, observations and chemical analytical results associated with soil and groundwater samples collected at the site. The purpose of this assessment was to characterize soil and groundwater contaminants and define the extent of documented heavy oil-range petroleum hydrocarbon (ORPH) contamination observed in an exploratory trench excavated during a 1994 site investigation.

2.0 SITE DESCRIPTION AND BACKGROUND

The site is located on the 700 block of West University Way (formerly West 8th Street) in Ellensburg, Washington. The site is bound by a commercial trucking yard to the west, commercial parking lot and building to the north, North Wenas Street to the east and the Ward Rugh Inc. commercial property to the south. An above ground storage tank (AST) containing petroleum products is present northwest of the adjacent Ward Rugh Inc. commercial building. GeoEngineers was not able to determine the contents or volume of the AST during the field assessment activities.

In 1991, petroleum contaminated soil (PCS) was encountered during assessment and remediation of a 2,000-gallon gasoline underground storage tank (UST) at the adjacent Ward Rugh site (PLSA Engineering & Surveying, 1991). During the investigation and cleanup activities, it appeared that ORPH contamination might have been migrating onto the Ward Rugh site from the 8th Street ROW. We understand soil samples were collected in 1994 from an exploratory trench excavated within the ROW and analyzed for total petroleum hydrocarbons (TPH). The PCS identified in the trench placed within the ROW was characterized as heavy ORPH and did not appear to be related to the contaminants observed and related to the gasoline release at the Ward Rugh site. Analytical results from the exploratory trench were not available for review.

Cleanup activities at the neighboring Ward Rugh site have been conducted and the site has received a No Further Action (NFA) determination from Ecology. This current site assessment was conducted to investigate the presence of petroleum contamination to the north of the Ward Rugh site within the 8th Street ROW.

3.0 FIELD ACTIVITIES

The following sections describe field activities including advancing direct-push borings and a discussion on observed subsurface conditions.

3.1. Direct Push Soil Assessment

Initial site reconnaissance occurred on May 18, 2021. During this visit, site access was assessed, and proposed soil boring locations were marked using white spray paint. Site utilities located near the boring locations were identified and marked by a subcontracted private utility locate service (Utilities Plus) during the initial site visit.

Direct push drilling was conducted on May 25, 2021. Cascade Drilling (Cascade) advanced five borings (GEI029-B1 through GEI029-B5) near the exploratory trench with documented PCS. Boring locations were determined using aerial imagery and figures from previous reports. Boring locations are shown in Figure 2, Site Plan.

The borings were advanced to approximately 10 feet below ground surface (bgs). Drilling for each boring was terminated after the second drill rod run after groundwater was encountered. Soil samples recovered from the direct push borings were field screened in accordance with the Work Plan (GeoEngineers, 2021). The following summarizes the results of field screening and selection of soil samples for laboratory chemical analysis.

- Field screening indicated the potential presence of petroleum contamination in GEI029-B1 at about 5½ to 6 feet bgs. This was indicated by a photoionization detector (PID) reading of 1.3 parts per million (ppm); therefore, soil from this interval was selected for laboratory analysis. A PID reading of 3.4 (ppm) was obtained at about 1-foot bgs, but it is unlikely that this was the result of a release related to the documented PCS at this depth, and the PID reading could have been influenced from the asphalt.
- Field screening did not indicate the potential presence of petroleum contamination in GEI029-B2; therefore, the soil sample collected for laboratory analysis was obtained just above the groundwater interface at 5½ to 6 feet bgs.
- Field screening indicated the potential presence of petroleum contamination in GEI029-B3 at about 6½ to 7 feet bgs. This was indicated by a PID reading of 1.4 ppm; therefore, soil from this interval was selected for laboratory analysis.
- Field screening indicated the potential presence of petroleum contamination in GEI029-B4 at about 6 to 6½ feet bgs. This was indicated by a PID reading of 1.7 ppm and a slight sheen; therefore, soil from this interval was selected for laboratory analysis. The depth interval selected for analysis was the only depth in this boring where soil had a PID reading greater than 1 ppm or evidence of a sheen.
- Field screening indicated the potential presence of petroleum contamination in GEI029-B5 at about 6 to 6½ feet bgs. This was indicated by a PID reading of 10.4 ppm and a slight sheen; therefore, soil from this interval was selected for laboratory analysis.

After selecting a soil sample for chemical analysis from each boring, grab groundwater samples were collected by installing a new and temporary 5-foot section of 1-inch-diameter well screen into the boring. Groundwater was then purged using a peristaltic pump using low-flow sampling techniques for approximately 15 minutes. At the completion of the 15-minute purge interval, a grab groundwater sample was collected.

Cascade backfilled each boring with bentonite chips, hydrated the chips and used cold-patch asphalt to cover the surface of the boring. Excess soil cuttings were placed in a 55-gallon drum, labeled and stored

on site, pending analysis and disposal. Boing logs associated with the borings are included in Appendix A. The Work Plan developed to guide field activities is included as Appendix B.

3.2. Subsurface Conditions

The site surface consisted of 3 inches of asphalt concrete. Soil observed below the surface in GEI029-B1 through GEI029-B5 consisted of brown fine to coarse sand to about 1½ to 3 feet bgs. Below the brown sand was brown sandy silt to about 5 to 6 feet bgs. Below the brown silt was brown fine to coarse gravel with silt to the depths explored.

Groundwater was encountered at about 5½ to 6½ feet bgs. Based on our review of site documents, groundwater likely flows to the southwest. Groundwater tends to rise during the irrigation season (April-October) and then lowers when the irrigation systems are turned off (PLSA Engineering & Surveying, 1991).

4.0 CHEMICAL ANALYTICAL RESULTS

The following sections describe soil and groundwater chemical analytical results. Laboratory reports and a data validation report are included in Appendix C.

4.1. Soil Chemical Analytical Results

Five soil samples were submitted to Eurofins TestAmerica (Eurofins TA) for analyses of the following contaminants of concern (COCs):

- Gasoline-Range Petroleum Hydrocarbons (GRPH) using Northwest Method NWTPH-Gx;
- Diesel-Range Petroleum Hydrocarbons (DRPH) and Oil-Range Petroleum Hydrocarbons (ORPH) using Northwest Method NWTPH-Dx; and
- Benzene, toluene, ethylbenzene and xylene (BTEX) using Environmental Protection Agency (EPA) Method 8260D.

Chemical analytical results are summarized and compared to Washington Model Toxics Control Act (MTCA) Method A cleanup levels for unrestricted land use in Summary of Chemical Analytical Results - Soil, Table 1. DRPH and ORPH were detected at concentrations less than the respective MTCA Method A cleanup levels for unrestricted land use in soil from GEI029-B1, GEI029-B2, GEI029-B3 and GEI029-B5. COCs were not detected at concentrations greater than the laboratory reporting limit in soil from GEI029-B4. Other COCs (GRPH and BTEX compounds) were not detected at concentrations greater than the laboratory reporting limits in the samples analyzed.

4.2. Groundwater Chemical Analytical Results

Five groundwater samples and one duplicate groundwater sample were submitted to Eurofins TA for analyses of the following COCs:

- GRPH using Northwest Method NWTPH-Gx;
- DRPH and ORPH using Northwest Method NWTPH-Dx; and
- BTEX using EPA Method 8260D.

Chemical analytical results are summarized and compared to MTCA Method A cleanup levels for unrestricted land use in Summary of Chemical Analytical Results – Groundwater, Table 2. GRPH was detected at a concentration less than the respective MTCA Method A cleanup level in groundwater from GEI029-B1. DRPH and/or ORPH were detected at concentrations less than the respective MTCA Method A cleanup levels in groundwater from GEI029-B1 through GEI029-B4. Other COCs were not detected above laboratory reporting limits in the samples analyzed.

4.3. Groundwater Quality Parameters

During groundwater purging, temperature, pH, specific conductivity, dissolved oxygen (DO), oxygen-reduction potential (ORP) and turbidity were measured in the field using a calibrated YSI Pro DSS multi-parameter meter equipped with a flow-through cell. Reported field parameters reflect conditions at the conclusion of purging the temporary groundwater sampling point. Field measurement results are summarized below in Table 3.

TABLE 3. WATER QUALITY PARAMETERS

Sample Identification	Date Sampled	pH	Specific Conductivity (µS/m)	ORP (mV)	DO (mg/L)	Turbidity (NTU)	Temperature (°C)
GEI029-B1	5/25/2021	6.75	429.1	-157.6	1.00	294.00	15.5
GEI029-B2	5/25/2021	6.62	394.3	-80.4	0.99	199.12	15.2
GEI029-B3	5/25/2021	6.70	598.0	-379.0	0.31	590.73	15.8
GEI029-B4	5/25/2021	6.68	428.1	-70.5	1.08	663.40	14.4
GEI029-B5	5/25/2021	6.63	375.2	-5.8	0.97	30.36	14.4

Notes:
µS/M = microSiemens per meter; mV = millivolts; NTU = nephelometric turbidity units;
mg/L = milligrams per liter; °C = degrees centigrade;

5.0 SUMMARY AND CONCLUSIONS

Five direct push soil borings were advanced at the site on May 25, 2021. Soil and groundwater samples were collected from each boring and one sample of each media type from each boring was submitted for analysis of GRPH, DRPH, ORPH and BTEX.

Laboratory chemical analyses of soil and groundwater samples obtained from the five borings indicated COCs were less than the MTCA Method A cleanup levels. The results of this soil and groundwater assessment for the Ellensburg City West 8th Street ROW site do not warrant additional remedial action.

6.0 LIMITATIONS

We have prepared this report for the exclusive use of Ecology and their authorized agents.

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. The conclusions and opinions presented in this report are based on our professional knowledge, judgment and experience. No warranty or other conditions, express or implied, should be understood.

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

7.0 REFERENCES

GeoEngineers, Inc. 2021. Work Plan, Ellensburg City West 8th Street ROW Site Assessment, Ellensburg, Washington." April 22, 2021. GEI File Number 0504-169-00.

PLSA Engineering & Surveying. 1991. Site Assessment Report on Petroleum Release, City of Ellensburg, West Eighth Avenue Right-of-Way, Ellensburg, Washington. March 4, 1991.

TABLES

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Table 1

Summary of Chemical Analytical Results - Soil[1]

Ellensburg City 8th Street ROW

Ellensburg, Washington

			Location ID	GEI029-B1		GEI029-B2		GEI029-B3		GEI029-B4		GEI029-B5	
			Sample ID	GEI029-B1 (5.5-6)		GEI029-B2 (5.5-6)		GEI029-B3 (6.5-7)		GEI029-B4 (6-6.5)		GEI029-B5 (6-6.5)	
			Sample Date	5/25/2021		5/25/2021		5/25/2021		5/25/2021		5/25/2021	
			Start Depth	5.5		5.5		6.5		6		6	
			End Depth	6		6		7		6.5		6.5	
			Depth Unit	ft		ft		ft		ft		ft	
Method	**Analyte**	**Units**	**MTCA Method A Cleanup Level[5]**										
NWTPH-GX[2]	Gasoline-range hydrocarbons	mg/kg	30/100[6]	6.7	U	9.3	U	6.3	U	6.3	U	5.9	U
NWTPH-DX[3]	Diesel-range hydrocarbons	mg/kg	2,000	**14**	**J**	**140**	**J**	**55**	**J**	12	U	**98**	**J**
	Lube oil-range hydrocarbons	mg/kg	2,000	**140**		**1,700**		**700**		31	U	**760**	
BTEX[4]	Benzene	mg/kg	0.03	0.027	U	0.037	U	0.025	U	0.025	U	0.024	U
	Ethylbenzene	mg/kg	6	0.13	U	0.19	U	0.13	U	0.13	U	0.12	U
	Toluene	mg/kg	7	0.13	U	0.19	U	0.13	U	0.13	U	0.12	U
	Total Xylenes	mg/kg	9	0.80	U	1.1	U	0.76	U	0.75	U	0.71	U
	Xylene, m-,p-	mg/kg	NE	0.54	U	0.75	U	0.51	U	0.50	U	0.47	U
	Xylene, o-	mg/kg	NE	0.27	U	0.37	U	0.25	U	0.25	U	0.24	U

Notes:

[1]Samples analyzed by Eurofins TestAmerica located in Spokane Valley, Washington.

[2]Gasoline-range petroleum hydrocarbons analyzed using Northwest Method NWTPH-Gx.

[3]Diesel and Oil-range petroleum hydrocarbons analyzed using Northwest Method NWTPH-Dx.

[4]Benzene, toluene, ethylbenzene and xylenes (BTEX) analyzed using EPA Method 8260D.

[5]MTCA Method A unrestricted land use cleanup levels (CUL).

[6]Gasoline-range petroleum hydrocarbons cleanup level when benzene is present / no detectable benzene.

mg/kg = milligrams per kilogram; NE = not established

U = analyte was not detected above the laboratory reporting or method detection limit (RL or MDL, respectively).

J = estimated concentration.

Bold indicates analyte was detected.

Blue shading indicates the laboratory reporting limit exceeded the referenced cleanup level.

Table 2

Summary of Chemical Analytical Results - Groundwater[1]

Ellensburg City 8th Street ROW

Ellensburg, Washington

			Location ID	GEI029-B1		GEI029-B1		GEI029-B2		GEI029-B3		GEI029-B4		GEI029-B5	
			Sample ID	GEI029-B1-052521		GEI029-DUP-052521		GEI029-B2-052521		GEI029-B3-052521		GEI029-B4-052521		GEI029-B5-052521	
			Sample Date	5/25/2021		5/25/2021		5/25/2021		5/25/2021		5/25/2021		5/25/2021	
Method	**Analyte**	**Units**	**MTCA Method A Cleanup Level[5]**												
NWTPH-GX[2]	Gasoline-range hydrocarbons	µg/L	1,000/800[6]	**170**		150	U	150	U	150	U	150	U	150	U
NWTPH-DX[3]	Diesel-range hydrocarbons	mg/L	0.500	0.23	U	0.23	U	**0.11**	**J**	0.24	U	0.23	U	0.23	U
	Lube oil-range hydrocarbons	mg/L	0.500	**0.14**	**J**	**0.12**	**J**	**0.37**	**J**	**0.19**	**J**	**0.14**	**J**	0.38	U
BTEX[4]	Benzene	µg/L	5	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U
	Ethylbenzene	µg/L	700	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
	Toluene	µg/L	1,000	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
	Total Xylenes	µg/L	1,000	3.0	U	3.0	U	3.0	U	3.0	U	3.0	U	3.0	U
	Xylene, m-,p-	µg/L	NE	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
	Xylene, o-	µg/L	NE	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U

Notes:

[1]Samples analyzed by Eurofins TestAmerica located in Spokane Valley, Washington.

[2]Gasoline-range petroleum hydrocarbons analyzed using Northwest Method NWTPH-Gx.

[3]Diesel and Oil-range petroleum hydrocarbons analyzed using Northwest Method NWTPH-Dx.

[4]Benzene, toluene, ethylbenzene and xylenes (BTEX) analyzed using EPA Method 8260D.

[5]MTCA Method A unrestricted land use cleanup levels (CUL).

[6]Gasoline-range petroleum hydrocarbons cleanup levels when benzene is present / no detectable benzene.

mg/L = milligrams per liter; µg/L = micrograms per liter, NE = not established

U = analyte was not detected above the laboratory reporting or method detection limit (RL or MDL, respectively).

J = estimated concentration.

Bold indicates analyte was detected.

FIGURES

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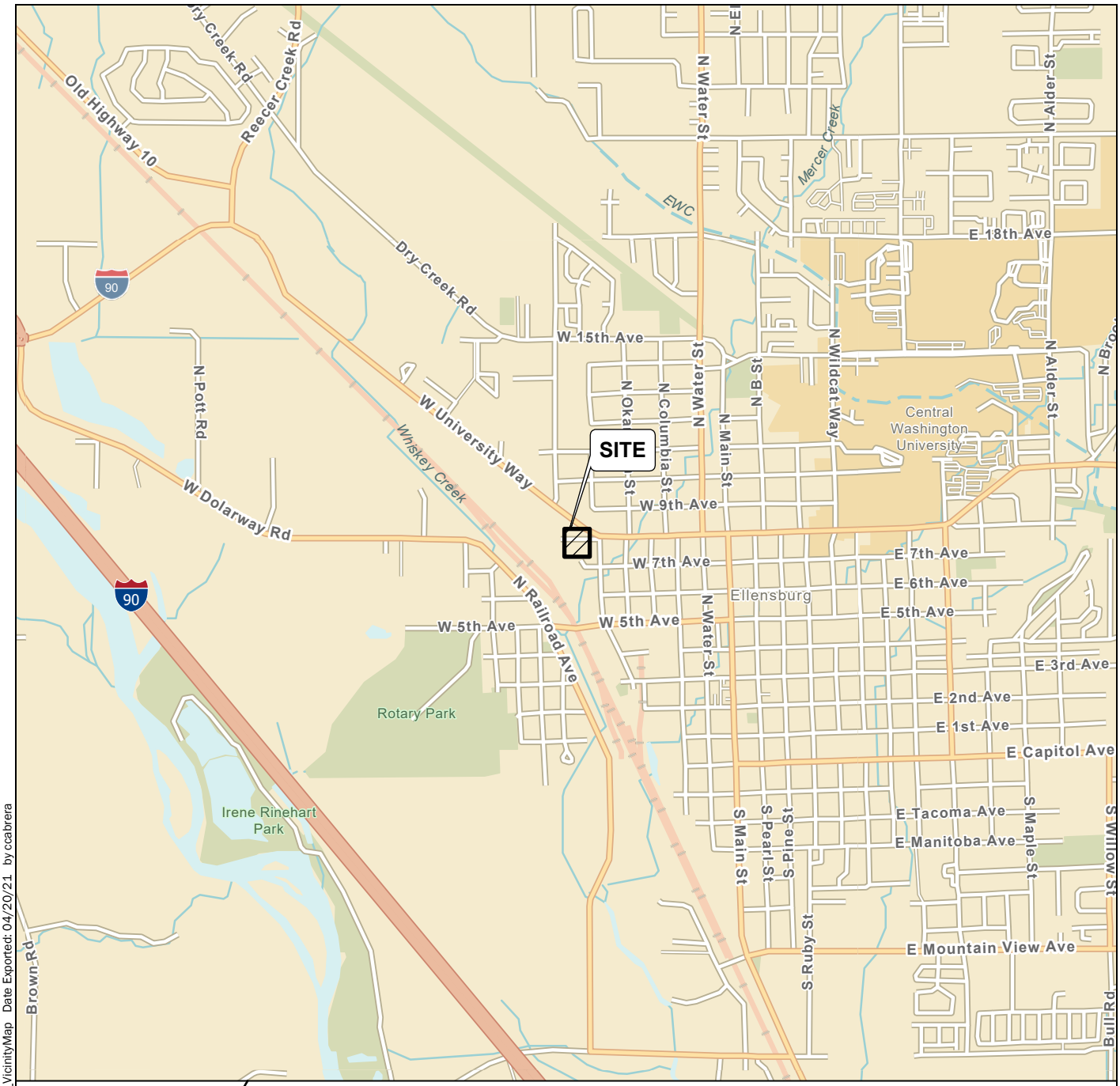

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Feet

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: ESRI

Projection: NAD 1983 StatePlane Washington South FIPS 4602 Feet

Vicinity Map

Ellensburg City West 8th Street ROW
Ellensburg, Washington

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Figure 1

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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: ESRI Clarity.
Parcels and roads from Kittitas County GIS.

Projection: NAD 1983 StatePlane Washington South FIPS 4602 Feet

Legend

- Boring Number and Approximate Location (GeoEngineers, 2021)
- Historical Soil Sample Location with COC Concentrations Less Than MTCA Method A Criteria (PLSA Engineering & Surveying 1991)
- Historical Groundwater Sample Location with COC Concentrations Less than MTCA Method A Criteria (PLSA Engineering & Surveying 1991)
- OH — Overhead Power
- Above Ground Storage Tank (AST)
- Approximate Shop Building Location
- Approximate 1991 Exploratory Trench Location
- Approximate 1991 Fuel Tank Basin Excavation Location
- Waste Oil Tank Basin

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Site Plan

Ellensburg City West 8th Street ROW
Ellensburg, Washington

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Figure 2

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APPENDICES

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APPENDIX A
Boring Logs

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
MORE THAN 50% RETAINED ON NO. 200 SIEVE	SAND AND SANDY SOILS	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS
				SP	POORLY-GRADED SANDS, GRAVELLY SAND
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	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
MORE THAN 50% PASSING NO. 200 SIEVE	SILTS AND CLAYS	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

ADDITIONAL MATERIAL SYMBOLS

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

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

Approximate contact between soil strata

Material Description Contact

Contact between geologic units

Contact between soil of the same geologic unit

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.

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

"WOH" indicates sampler pushed using the weight of the hammer.

Laboratory / Field Tests

%F	Percent fines
%G	Percent gravel
AL	Atterberg limits
CA	Chemical analysis
CP	Laboratory compaction test
CS	Consolidation test
DD	Dry density
DS	Direct shear
HA	Hydrometer analysis
MC	Moisture content
MD	Moisture content and dry density
Mohs	Mohs hardness scale
OC	Organic content
PM	Permeability or hydraulic conductivity
PI	Plasticity index
PL	Point load test
PP	Pocket penetrometer
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

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.

Key to Exploration Logs

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Figure A-1

Drilled: Start 5/25/2021 End 5/25/2021	Total Depth (ft): 10	Logged By: JDO Checked By: JRS	Driller: Cascade Drilling	Drilling Method: Direct Push	
Surface Elevation (ft) Vertical Datum: 1519 NAVD88		Hammer Data: N/A		Drilling Equipment: GeoProbe 7822DT	
Easting (X) Northing (Y): 1626133 607599		System Datum: WA State Plane South NAD83 (feet)		Groundwater Date Measured: 5/25/2021	Depth to Water (ft): 5.53 / Elevation (ft): 1513.47

Notes: A temporary 1-inch well was installed on 5/25/2021 to a depth of 10 feet

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample / Sample Name Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0	48					AC	3 inches of asphalt			
							SP	Brown fine to coarse sand with gravel, trace silt (medium dense, moist)	NS	3.4	
							ML	Brown sandy silt with occasional gravel (medium stiff, moist)	NS	1.3	
1515	5	30		GEI029-B1 (5.5-6) CA			GP-GM	Brown fine to coarse gravel with silt and sand (medium dense, moist)	NS	1.3	
								Becomes wet			
1510	10										

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on USGS Topo. Vertical approximated based on USGS Topo.

Log of Boring GEI029-B-1

GeoEngineers

Project: Ellensburg City West 8th Street ROW
Project Location: Ellensburg, Washington
Project Number: 0504-169-00

Figure A-2
Sheet 1 of 1

Drilled	Start	End	Total Depth (ft)	Logged By	Checked By	Driller	Drilling Method
	5/25/2021	5/25/2021	10	JDO	JRS	Cascade Drilling	Direct Push

Surface Elevation (ft) Vertical Datum	1519 NAVD88	Hammer Data	N/A	Drilling Equipment	GeoProbe 7822DT
Easting (X) Northing (Y)	1626120 607606	System Datum	WA State Plane South NAD83 (feet)	Groundwater Date Measured	Depth to Water (ft) / Elevation (ft)
				5/25/2021	5.94 / 1513.06

Notes: A temporary 1-inch well was installed on 5/25/2021 to a depth of 10 feet

Elevation (feet)	Depth (feet)	FIELD DATA: Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0		30						AC	3 inches of asphalt			
									SP	Brown fine to coarse sand with gravel, trace silt (medium dense, moist)	NS	<1	
									ML	Brown sandy silt with occasional gravel (medium stiff, moist)	NS	<1	
1515													
	5		18			GEI029-B2 (5.5-6) CA			GP-GM	Brown fine to coarse gravel with silt and sand (medium dense, moist)	NS	<1	
										Becomes wet			
1510													
	10												

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on USGS Topo. Vertical approximated based on USGS Topo.

Log of Boring GEI029-B-2

GeoEngineers

Project: Ellensburg City West 8th Street ROW
Project Location: Ellensburg, Washington
Project Number: 0504-169-00

Drilled	Start	End	Total Depth (ft)	Logged By	Checked By	Driller	Drilling Method
	5/25/2021	5/25/2021	10	JDO	JRS	Cascade Drilling	Direct Push

Surface Elevation (ft) Vertical Datum	1519 NAVD88	Hammer Data	N/A	Drilling Equipment	GeoProbe 7822DT
Easting (X) Northing (Y)	1626111 607616	System Datum	WA State Plane South NAD83 (feet)	Groundwater Date Measured	Depth to Water (ft) / Elevation (ft)
				5/25/2021	6.28 / 1512.72

Notes: A temporary 1-inch well was installed on 5/25/2021 to a depth of 10 feet

Elevation (feet)	Depth (feet)	FIELD DATA: Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0		36						AC	3 inches of asphalt			
									SP	Brown fine to coarse sand with gravel, trace silt (medium dense, moist)	NS	1.1	
									ML	Brown sandy silt with occasional gravel (medium stiff, moist)	NS	<1	
1515	5		48								NS	<1	
						GEI029-B3 (6.5-7) CA			GP-GM	Brown fine to coarse gravel with silt and sand (medium dense, moist)	NS	1.4	
										Becomes wet			
1510	10												

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on USGS Topo. Vertical approximated based on USGS Topo.

Log of Boring GEI029-B-3

GeoEngineers

Project: Ellensburg City West 8th Street ROW
Project Location: Ellensburg, Washington
Project Number: 0504-169-00

Figure A-4
Sheet 1 of 1

Drilled	Start	End	Total Depth (ft)	Logged By	Checked By	Driller	Drilling Method
	5/25/2021	5/25/2021	10	JDO	JRS	Cascade Drilling	Direct Push

Surface Elevation (ft) Vertical Datum	Hammer Data	Drilling Equipment
1519 NAVD88	N/A	GeoProbe 7822DT

Easting (X) Northing (Y)	System Datum	Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)
1626134 607613	WA State Plane South NAD83 (feet)	5/25/2021	6.25	1512.75

Notes: A temporary 1-inch well was installed on 5/25/2021 to a depth of 10 feet

Elevation (feet)	Depth (feet)	FIELD DATA: Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0		48						AC	3 inches of asphalt			
									SP	Brown fine to coarse sand with gravel, trace silt (medium dense, moist)	NS	<1	
1515									ML	Brown sandy silt with occasional gravel (medium stiff, moist)	NS	<1	
	5		48						SM	Reddish-brown silty fine sand (medium dense, moist)			
						GEI029-B4 (6-6.5) CA					SS	1.7	
										Becomes wet			
1510									GP-GM	Brown fine to coarse gravel with sand and silt (medium dense, wet)			
	10												

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on USGS Topo. Vertical approximated based on USGS Topo.

Log of Boring GEI029-B-4

GeoEngineers

Project: Ellensburg City West 8th Street ROW
Project Location: Ellensburg, Washington
Project Number: 0504-169-00

Figure A-5
Sheet 1 of 1

Drilled	Start	End	Total Depth (ft)	Logged By	Checked By	Driller	Drilling Method
	5/25/2021	5/25/2021	10	JDO	JRS	Cascade Drilling	Direct Push

Surface Elevation (ft) Vertical Datum	1519 NAVD88	Hammer Data	N/A	Drilling Equipment	GeoProbe 7822DT
Easting (X) Northing (Y)	1626111 607596	System Datum	WA State Plane South NAD83 (feet)	Groundwater Date Measured	Depth to Water (ft) / Elevation (ft)
				5/25/2021	5.53 / 1513.47

Notes: A temporary 1-inch well was installed on 5/25/2021 to a depth of 10 feet

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample / Sample Name Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0	24					AC	3 inches of asphalt			
							SP	Brown fine to coarse sand with gravel, trace silt (medium dense, moist)	NS	3.4	
							ML	Brown sandy silt with occasional gravel (medium stiff, moist)	NS	<1	
1515	5	48					GP-GM	Brown fine to coarse gravel with sand and silt (medium dense, moist)	SS	10.4	
				1GEI029-B5 (6-6.5) CA				Becomes wet			
1510	10										

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on USGS Topo. Vertical approximated based on USGS Topo.

Log of Boring GEI029-B-5

GeoEngineers

Project: Ellensburg City West 8th Street ROW
Project Location: Ellensburg, Washington
Project Number: 0504-169-00

Figure A-6
Sheet 1 of 1

APPENDIX B
Work Plan

Work Plan

Ellensburg City West 8th Street ROW
Site Assessment
Ellensburg, Washington

for
Washington State Department of Ecology

April 22, 2021

GeoEngineers
Earth Science + Technology

Work Plan

Ellensburg City West 8th Street ROW
Site Assessment
Ellensburg, Washington

for
Washington State Department of Ecology

April 22, 2021

GeoEngineers

523 East Second Avenue
Spokane, Washington 99202
509.363.3125

Work Plan

Ellensburg City West 8th Street ROW
Site Assessment
Ellensburg, Washington

File No. 0504-169-00

April 22, 2021

Prepared for:

Washington State Department of Ecology
Eastern Regional Office
4601 North Monroe Street
Spokane, Washington 99205

Attention: Jill Scheffer

Prepared by: Bryce K. Hanson

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523 East Second Avenue
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Jedidiah R. Sugalski, PE
Project Manager

Bruce D. Williams
Principal

JML:BKH:JRS:JEP:BDW:mce

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APPENDICES

1.0 INTRODUCTION

This Work Plan presents the scope of work and approach to conduct a soil and, if encountered, groundwater assessment at the Ellensburg City West 8th Street ROW site (herein designated the site) located on the 700 block of West University Way (formerly West 8th Street) in Ellensburg, Washington, as shown in Figure 1, Vicinity Map. Based on recent aerial imagery, the site is adjacent to the Ward Rugh Inc. commercial building and is occupied by asphalt concrete pavement (ACP). What appears to be an above ground storage tank (AST) is present northwest of the adjacent Ward Rugh Inc. commercial building.

This Work Plan has been prepared by GeoEngineers for the State of Washington Department of Ecology (Ecology) under Ecology Master Contract No. C1900044, work assignment number GEI029. The purpose of this assessment is to characterize soil and groundwater contaminants and define the extent of documented heavy oil-range petroleum hydrocarbon (ORPH) contamination observed in an exploratory trench excavated during a 1994 site investigation. Data generated from this assessment will support a no further action (NFA) determination or planning potential remedial actions within the defined project area to address ecological and human health risks associated with historical contamination.

A sampling plan, with a description of field assessment procedures is provided in Appendix A; the Quality Assurance Project Plan (QAPP) and the Health and Safety Plan (HASP) are presented as Appendices B and C, respectively. The Work Plan is organized as follows:

- Site Description and Background – Section 2.0
- Field Investigation Activities – Section 3.0
- Schedule – Section 4.0
- References – Section 5.0

2.0 SITE DESCRIPTION AND BACKGROUND

The site is located on the 700 block of West University Way (formerly West 8th Street) in Ellensburg, Washington. The site is bound by a commercial trucking yard to the west, commercial parking lot and building to the north, North Wenas Street to the east and the Ward Rugh Inc. commercial property to the south.

In 1994, Petroleum contaminated soil (PCS) was encountered at the site during assessment and remediation of a 2,000-gallon underground storage tank (UST) at the adjacent Ward Rugh site. It is our understanding that soil samples were collected from an exploratory trench excavated at the site and analyzed for total petroleum hydrocarbons (TPH). The PCS identified on the site was characterized as heavy oil-range petroleum hydrocarbons (ORPH) and is assumed not to be related to the gasoline release at the Ward Rugh site.

Based on our review of site documents and our experience in the general area of the site, groundwater is likely to occur at depths ranging from approximately 8 to 10 feet below ground surface (bgs) and likely flows to the southwest. Subsurface soil is anticipated to consist of gravel with various amounts of silt, sand and cobbles.

To investigate the potential extent of PCS and potential impacts to groundwater, we plan to advance direct-push soil borings, install temporary well sampling points, collect soil and groundwater samples from the borings and submit the samples for laboratory chemical analyses of gasoline- and diesel-range petroleum hydrocarbons (GRPH and DRPH, respectively), ORPH and benzene, toluene, ethylbenzene, and xylenes (BTEX). Temporary well points will be installed, and groundwater samples will only be collected if observed field conditions indicate the potential for groundwater contamination.

3.0 FIELD INVESTIGATION ACTIVITIES

The tasks described below reflect the proposed field activities. The specific tasks conducted at the site may change in response to conditions encountered in the field or as additional information is obtained. Adjustments to the tasks listed will be mutually agreed upon by Ecology and GeoEngineers and authorized prior to implementation.

Field investigation activities will include the following:

- Coordinate underground utility locating using the State of Washington Utility Notification and Utilities Plus, LLC (Utilities Plus) for private utility locating. Per state regulations, GeoEngineers will mobilize to/from the site from Spokane, Washington to mark the proposed boring locations prior to initiating the locate request.
- Complete the City of Ellensburg right-of-way (ROW) permit.
- Mobilize to/from the site from Spokane, Washington to conduct the sampling event.
- Conduct 1 day of subsurface assessment using direct-push drilling techniques. The number, location and depth of the borings will depend on field conditions (such as field screening evidence of contamination, accessibility, soil conditions and depth to groundwater). In general, the borings will be advanced near the location of the exploratory trench with documented PCS. Borings will be stepped out from these initial boring points as evidence of contamination is encountered and upon Ecology concurrence. Proposed exploration locations are shown on Figure 2, Site Plan. Soil samples will be collected from 5-foot intervals using a continuous core sampler for field screening and potential chemical analysis. Borings will be advanced to a depth of 15 bgs (three drilling runs) or a minimum of 2 feet below the groundwater interface, whichever is shallower. Soil samples will be collected per procedures outlined in Appendix A for direct push sampling.
- Observe, field screen and document subsurface soil conditions using a qualified field engineer or geologist. Field screening will consist of visual observation, water sheen testing and headspace vapor measurements using a photoionization detector (PID).
- If groundwater is encountered, then the boring will be advanced a minimum of 2 feet below the groundwater interface and a temporary groundwater sampling point will be installed to collect a grab groundwater sample. A minimum of one duplicate groundwater sample will also be collected per each temporary groundwater sampling point. Grab groundwater samples will be collected per procedures outlined in Appendix A.
- Backfill borings with bentonite clay and surface completed with gravel, asphalt or concrete patch to match the existing ground surface.

- Submit a minimum of one soil sample and one grab groundwater sample (if groundwater is encountered) from each boring to a qualified laboratory for chemical analysis. The soil sample with the greatest field screening indication of potential contamination or the closest sample collected above the groundwater interface, if present, will be submitted for analysis. Samples will be submitted for analysis under a standard turnaround time of 10 business days and standard chain-of-custody record. Soil and groundwater samples submitted from the site will be analyzed for the following potential contaminants:
    - GRPH using Northwest Method NWTPH-Gx;
    - DRPH and ORPH using Northwest Method NWTPH-Dx; and
    - BTEX using Environmental Protection Agency (EPA) Method 8260D.
- Submit a minimum of one trip blank for soil and one for water (if groundwater is encountered) for analysis of GRPH and BTEX.
- Drum and label investigation-derived waste (IDW). A qualified contractor will be retained to profile and transport the IDW for disposal at a permitted facility if contaminants greater than the respective Model Toxics Control Ave (MTCA) Method A cleanup levels are detected in the soil and groundwater samples analyzed by the laboratory. We assume IDW will be nonhazardous if the IDW requires off-site disposal.
- Compare soil and groundwater laboratory analytical reports to MTCA Method A cleanup levels.
- Prepare a site assessment report that provides field and laboratory data, comparison of the analytical results to MTCA and recommendations, as needed. The report will include field procedures, tables, figures and historical site information, as appropriate.
- Enter laboratory analytical data results into Ecology's Environmental Information Management (EIM) database.

4.0 SCHEDULE

The fieldwork will be conducted in May 2021 and completed in 1 day. We expect to receive laboratory analytical reports within 2 weeks after submitting the samples to the laboratory. Our report will be completed within a month following receipt of the laboratory analytical reports.

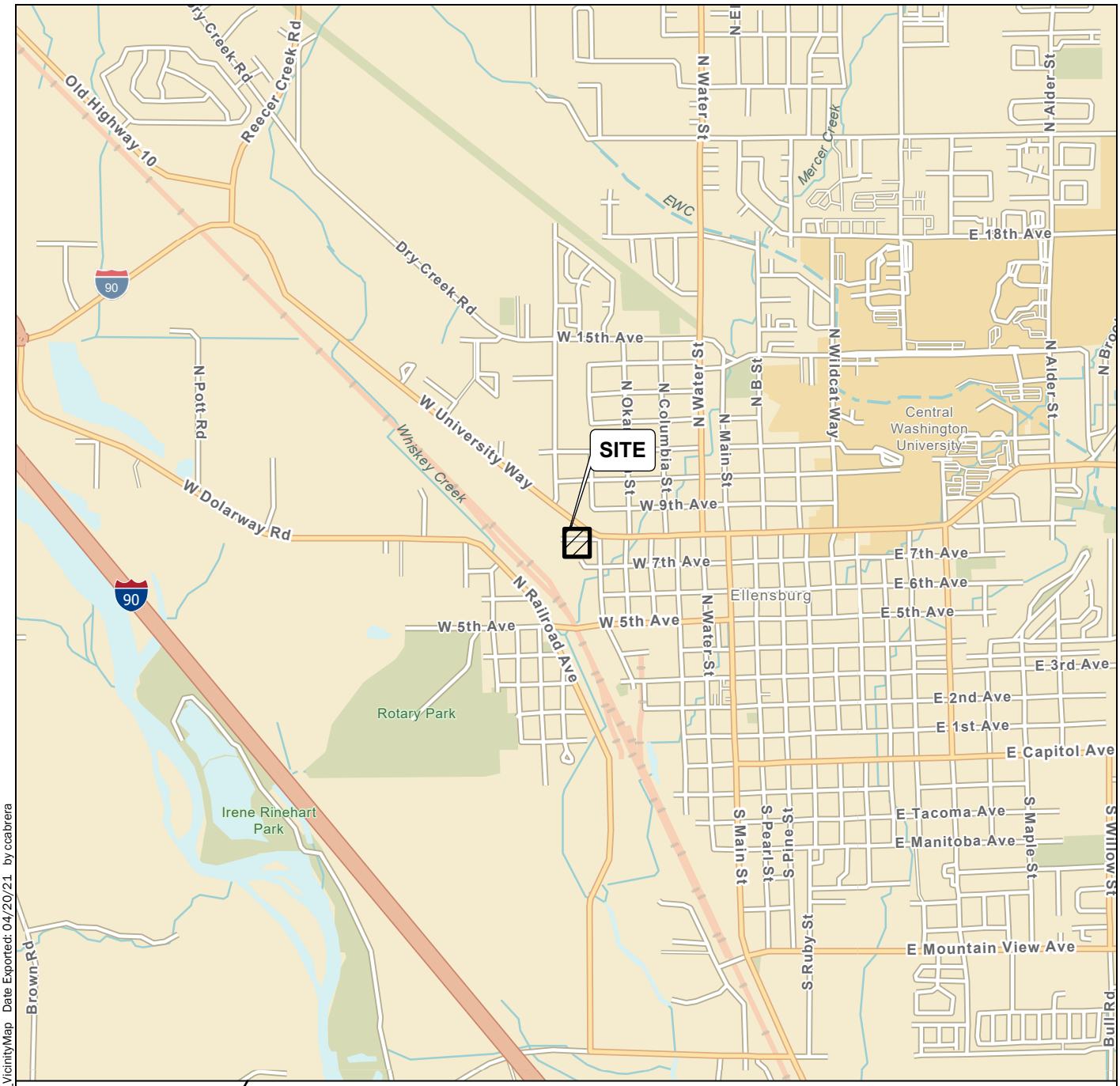
5.0 REFERENCES

Hart Crowser. Work Plan, Ward Rugh Groundwater Quality Investigation, 710 W. University Way Ellensburg, Washington. November 8, 2017.

PLSA Engineering & Surveying. Site Assessment Report on Petroleum Release City of Ellensburg West Eighth Avenue Right-Of-Way, Ellensburg, Washington. Jon No. 91052 March 1991.

FIGURES

GeoEngineers



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Feet

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: ESRI

Projection: NAD 1983 StatePlane Washington South FIPS 4602 Feet

Vicinity Map

Ellensburg City West 8th Street ROW
Ellensburg, Washington

GeoEngineers

Figure 1

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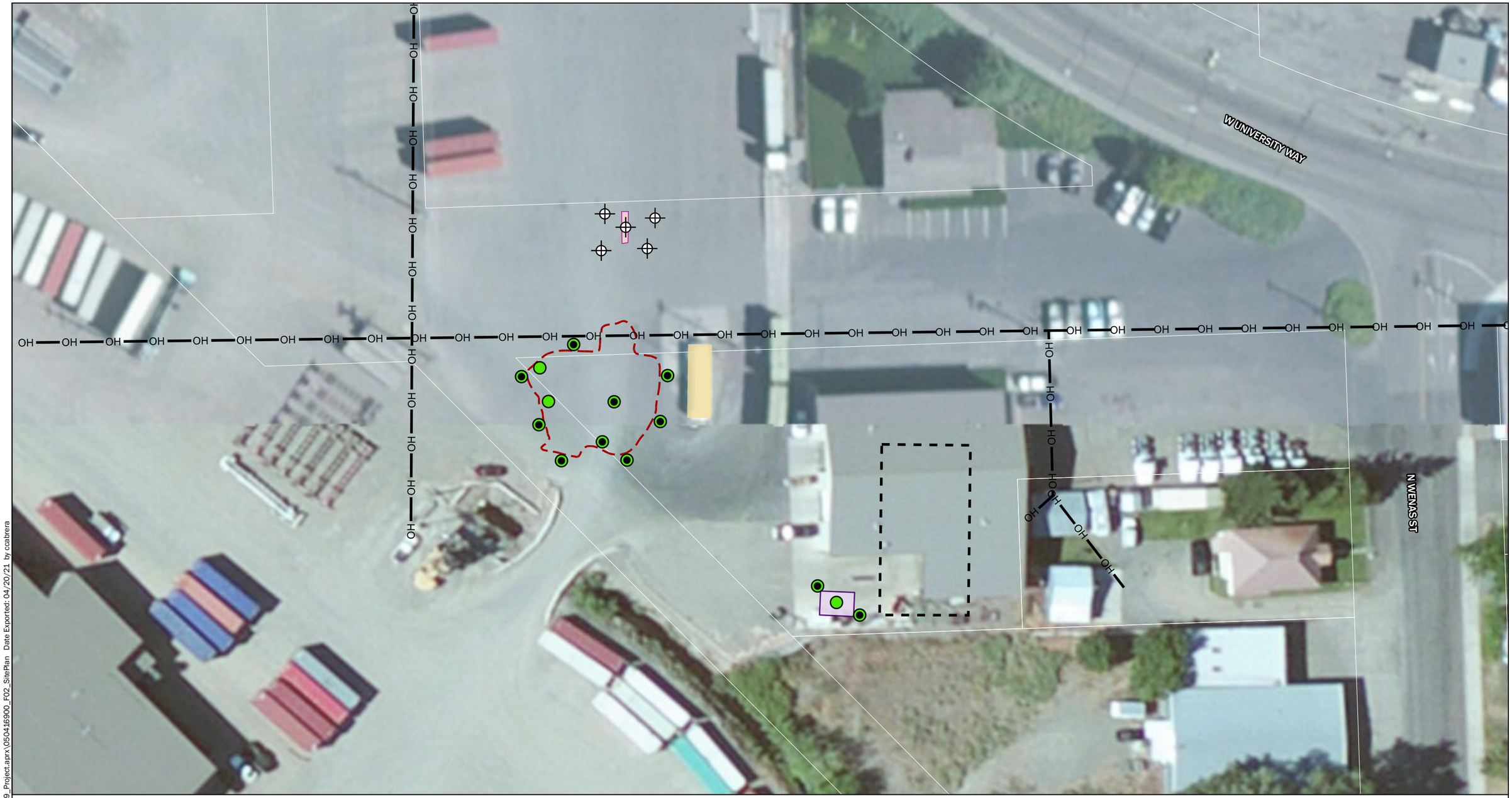

Proposed Exploration Location

Historical Soil Sample Location with Results Less Than MTCA Method A Criteria (PLSA Engineering & Surveying 1991)

Historical Groundwater Sample Location With Results Less than MTCA Method A Criteria (PLSA Engineering & Surveying 1991)

OH Overhead Power

Above Ground Storage Tank (AST)

Approximate Shop Building Location

Approximate 1991 Exploratory Trench Location

Approximate 1991 Fuel Tank Basin Excavation Location

Waste Oil Tank Basin

Data Source: ESRI Clarity.
Parcels and roads from Kittitas County GIS.

N W E S

50 0 50

Feet

Site Plan

Ellensburg City West 8th Street ROW
Ellensburg, Washington

GeoEngineers

Figure 2

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Legend

APPENDICES

GeoEngineers

APPENDIX A
Field Assessment Procedures

APPENDIX A
FIELD ASSESSMENT PROCEDURES

STANDARD PROCEDURES

This section contains standard procedures for field data collection that are anticipated during the site assessment at the Ellensburg City West 8th Street ROW site in Ellensburg, Washington including the following:

- Collecting soil samples from direct-push soil borings;
- Groundwater sampling (if encountered);
- Field screening methods;
- Decontamination procedures;
- Handling of investigation-derived waste (IDW);
- Sample location control;
- Field measurement and observation documentation; and
- Sample identification.

Collecting Soil Samples from Soil Borings

Drilling will be conducted by a State of Washington licensed driller and supervised by a trained GeoEngineers field engineer or geologist. Soil samples will be collected continuously during drilling (direct-push) using 5-foot acrylic slip-sleeve samplers.

Each boring will be monitored by a GeoEngineers field representative to observe and classify the soil encountered and prepare a detailed log of each boring. Soil encountered in the borings will be classified in the field in general accordance with ASTM International (ASTM) D2488-17, the Standard Practice for Description and Identification of Soils (Visual-Manual Procedure).

Soil samples from each sampling interval will be field screened for the presence of contaminants using the procedures described below to determine which sample will be submitted for chemical analysis. Based on field indicators, a minimum of one soil sample from each boring exhibiting the greatest level of contamination, as indicated by field screening, will be submitted for laboratory analysis. Additional samples may be submitted based on field screening results and as approved by the Washington State Department of Ecology (Ecology).

Soil selected for analysis will be removed from the sampler using a new or decontaminated soil knife, clean nitrile gloves, transferred into a laboratory-prepared container, labeled with a waterproof pen, and placed on “blue ice” or wet ice in a clean, plastic-lined cooler. Each sample will be documented on a boring log and chain-of-custody (COC) and will include sample name, sample collection date and time, sample type, sample depth (relative to ground surface), requested analyses and sampler name. Soil samples for volatile organic compound (VOC) analyses (e.g., benzene, toluene, ethylbenzene and xylenes [BTEX]) will be collected consistent with Environmental Protection Agency (EPA) Method 5035A (EPA 2002) and preserved in accordance with Ecology Implementation Memorandum 5 (Ecology 2004) and EPA (1998).

Sampling equipment will be decontaminated between each sampling attempt as described in the Decontamination Procedures Section. The sample coolers will be delivered to the analytical laboratory under standard COC procedures described in the Quality Assurance Project Plan (QAPP) (Appendix B).

Groundwater Sampling

Groundwater (if encountered) will be collected as a grab sample from the direct-push soil borings.

Groundwater Grab Sampling

If groundwater is encountered in the soil borings, grab samples will be collected and analyzed in the field as described below. Depth to groundwater relative to the top of the drill casing will be measured to the nearest 0.01 foot using an electronic water-level indicator as with sampling from a monitoring well (see previous Depth to Groundwater Section) and recorded in the field notes. The water level-indicator will be decontaminated with Liquinox® solution wash and a distilled water rinse prior to use in each boring.

Following depth to groundwater measurement, a groundwater sample will be collected from the open boring consistent with the EPA's low-flow groundwater sampling procedure, as described in EPA (2017) and Puls and Barcelona (1996). Dedicated tubing and a peristaltic pump will be used for groundwater purging and sampling. Each boring will be purged for approximately 15 minutes before collecting the sample. During purging activities, water quality parameters, including pH, temperature, conductivity, dissolved oxygen (DO), oxidation reduction potential (ORP) and turbidity, will be measured using a multi-parameter meter equipped with a flow-through cell.

Samples will not be collected from the boring if it has measurable free product. Field water quality measurements and depth-to-water measurements will be recorded on a Well Purging-Field Water Quality Measurement Form. Groundwater samples will be transferred in the field to laboratory-prepared sample containers and kept cool during transport to the testing laboratory. COC procedures will be observed from the time of sample collection to delivery to the testing laboratory consistent with the QAPP.

Field Screening Methods

Field screening methods will be used to select samples for laboratory chemical analysis.

A GeoEngineers field representative will perform visual and physical field screening tests on soil samples and record the observations on the field boring log and in the field notebook. Field screening results will be used to aid in the selection of soil samples for laboratory chemical analysis. The sample from each boring showing the highest likelihood of petroleum contamination, based on field screening, will be selected for laboratory analysis. The remaining samples may be submitted to the laboratory and held, pending the results of the samples submitted for analysis.

Screening methods will include (1) visual examination; (2) water-sheen screening; and (3) headspace vapor screening using a photo-ionization detector (PID). Visual screening consists of inspecting the soil for discoloration indicative of the presence of petroleum-impacted material in the sample.

Water-sheen screening involves placing soil in water and observing the water surface for signs of sheen. Sheen classifications are as follows:

- **No Sheen (NS)** No visible sheen on the water surface;
- **Slight Sheen (SS)** Light, colorless, dull sheen; spread is irregular, not rapid; sheen dissipates rapidly. Natural organic matter in the soil might produce a slight sheen;
- **Moderate Sheen (MS)** Light to heavy sheen; might have some color/iridescence; spread is irregular to flowing, may be rapid; few remaining areas of no sheen on water surface; and
- **Heavy Sheen (HS)** Heavy sheen with color/iridescence; spread is rapid; entire water surface might be covered with sheen.

Water sheen testing equipment will be disposable or decontaminated before field screening each sample using a Liquinox® soap solution with a water rinse. Used testing equipment and/or decontamination water will be stored on-site in a labeled Washington State Department of Transportation (DOT)-approved drum pending disposal with other IDW.

Headspace vapor screening involves placing a soil sample into a sealed plastic bag and measuring the airspace VOC vapor concentrations in parts per million (ppm) with a PID. Once a soil sample is placed in a sealed plastic bag with air space, the bag is shaken to expose the soil to the air trapped in the bag. The probe of the PID, calibrated to isobutylene following the manufacturer's instructions, is inserted into a small opening in the bag seal and the VOC concentration is measured. The PID typically is designed to quantify VOC vapor concentrations in the range between 1 and 2,000 ppm with an accuracy of ±10 percent of the reading, and between 2,000 and 5,000 ppm with an accuracy of ±20 percent of the reading.

Decontamination Procedures

The objective of the decontamination procedures described herein is to minimize the potential for cross-contamination between sample locations. A designated decontamination area will be established for decontamination of drilling equipment and reusable sampling equipment. Drilling equipment will be cleaned by water jetting using high-pressure/low-volume cleaning equipment.

Sampling equipment will be decontaminated in accordance with the following procedures before each sampling attempt or measurement.

1. Brush equipment with a nylon brush to remove large particulate matter.
2. Rinse with potable tap water.
3. Wash with non-phosphate detergent solution (Liquinox® and potable tap water).
4. Rinse with potable tap water.
5. Rinse with distilled water.

Handling of IDW

IDW, which consists mainly of drill cuttings and decontamination/purge water, typically will be placed in DOT-approved 55-gallon drums. Each drum will be labeled with the project name, general contents and date. The drummed IDW will be stored on site at a location approved by the site owner pending analysis and disposal.

Disposable items, such as sample tubing, disposable bailers, bailer line, gloves and protective overalls, paper towels, etc., will be placed in plastic bags after use and deposited in trash receptacles for disposal.

Sample Location Control

Horizontal sample control will be maintained throughout the project. Horizontal control will be established using measuring tapes or a hand-held global positioning system (GPS) meter accurate to approximately ±15 lateral feet. Boring locations also will be established by measuring their distance relative to permanent site features.

Sample Handling and Custody Requirements

Samples will be handled in accordance with the QAPP (Appendix B). A complete discussion of the sample identification and custody procedures is provided in the QAPP.

Field Measurements and Observations Documentation

Field measurements and observations will be recorded in a project field notebook. Daily logs will be dated and pages will be consecutively numbered. Entries will be recorded directly and legibly in the daily log and signed and dated by the person conducting the work. If changes are made, the changes will not obscure the previous entry, and the changes will be signed and dated. At a minimum, the following data will be recorded in the log book:

- Purpose and location of investigation;
- Location of activity;
- Site or sampling area sketch showing sample locations and distances to fixed reference points;
- Date and time of sampling;
- Type of sample (matrix);
- Designation as a discrete or composite sample;
- Sample identification number (should match with what is on jar and COC);
- Soil sample top and bottom depth (below ground surface [bgs]);
- Sample preservation (if any);
- Sampling equipment used;
- Field measurements and screening observations (e.g., odor, color, staining, sheens, etc.);
- Field conditions that are pertinent to the integrity of the samples (e.g., weather conditions, performance of the sampling equipment, sample depth control, sample disturbance, etc.);
- Relevant comments regarding field activities; and
- Shipping arrangements (including overnight air bill number, if applicable) and receiving laboratory.

Information will be recorded in the log book with enough detail so that field activities can be reconstructed without reliance on personnel memory. In addition to the sampling information, the following specific information also will be recorded in the field log for each day of sampling:

- Team members and their responsibilities;
- Time of arrival/entry on site and time of site departure;
- Other personnel present at the site;
- Summary of pertinent meetings or discussions with regulatory agency or contractor personnel;
- Deviations from sampling plans, site safety plans and QAPP procedures;
- Changes in personnel and responsibilities with reasons for the changes;
- Levels of safety protection; and
- Calibration readings for any equipment used and equipment model and serial number.

Sample Identification

Sample identification is important to provide concise data management and to quickly determine sample location and date when comparing multiple samples. Soil samples for each site will adhere to the following general format:

Site Number - Location ID (Depth)

Site numbers are established by Ecology's work assignment number in the format GEIxxx. For example, a soil sample collected at the Ellensburg City West 8th Street ROW (work assignment No. GEI029) at boring location B1 at a depth interval of 5 to 6 feet shall be labeled as GEI029-B1(5-6).

Grab groundwater samples will have the following general format:

Site Number-Location ID-Date

For example, groundwater sampled from boring location B1 at the Ellensburg City West 8th Street ROW on May 1, 2021 will be labeled as GEI029-B1-050121.

Groundwater sampled from wells will be labelled similarly, with the well number replacing the location number. Following the example above, groundwater sampled from MW-01 will be labelled as GEI029-MW01-050121.

REFERENCES

ASTM D2488. 2017. Standard Practice for Description and Identification of Soils (Visual-Manual Procedures).

Puls, R. W. and M.J. Barcelona. 1996. "Low-flow (Minimal Drawdown) Ground-water Sampling Procedures." EPA Ground Water Issue. April. p.1-9.

U.S. Environmental Protection Agency. 2017. Region 1, "Low Stress (Low-Flow) Purging and Sampling Procedure for the Collection of Ground Water Samples from Monitoring Wells." EPA SOP No. GW4, Revision No. 4., September 19, 2017.

U.S. Environmental Protection Agency. 1998. "Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW_846)." Revision 5, April.

U.S. Environmental Protection Agency. 2002. Method 5035A (SW-846). Closed-System Purge-and-Trap and Extraction for Volatile Organics in Soil and Waste Samples. Draft Revision 1. Washington, D.C. July 2002.

U.S. Environmental Protection Agency. 2007. Method 6200 (SW-846). Field Portable X-Ray Fluorescence Spectrometry for the Determination of Elemental Concentrations in soil and Sediment. Washington, D.C. February 2007.

Washington State Department of Ecology. 2004. "Collecting and Preparing Soil Samples for VOC Analysis."

APPENDIX B
Quality Assurance Project Plan

APPENDIX B
QUALITY ASSURANCE PROJECT PLAN

This Quality Assurance Project Plan (QAPP) was developed to guide laboratory analyses for soil and groundwater samples collected as part of the assessment conducted for the Washington State Department of Ecology (Ecology) under Ecology Contract C1900044, individual work assignment GEI029. The QAPP presents the objectives, procedures, organization, functional activities and specific Quality Assurance (QA) and Quality Control (QC) activities designed to achieve data quality goals established for the projects. This QAPP is based on Ecology guidelines (Ecology 2016) and the Environmental Protection Agency (EPA) Requirements for Quality Assurance Project Plans (EPA 2001) and related guidelines (EPA 2002).

Throughout the projects, environmental measurements will be conducted to produce data that are scientifically valid, of known and acceptable quality and meet established objectives. QA/QC procedures will be implemented so that precision, accuracy, representativeness, completeness and comparability (PARCC) of data generated meet the specified data quality objectives to the extent possible.

PROJECT ORGANIZATION AND RESPONSIBILITY

Descriptions of the responsibilities, lines of authority and communication for the key positions to QA/QC are provided below. This organization facilitates the efficient production of project work, allows for an independent quality review and permits resolution of QA issues before submittal.

Project Leadership and Management

The Project Manager's (PM) duties consist of providing concise technical work statements for project tasks, selecting project team members, determining subcontractor participation, establishing budgets and schedules, adhering to budgets and schedules, providing technical oversight, and providing overall production and review of project deliverables. Jedidiah R. Sugalski, Professional Engineer (PE) is the PM for activities at the site. The Principal-in-Charge, Bruce Williams, is responsible to Ecology for fulfilling contractual and administrative control of the project.

Field Coordinator

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

- Provides technical direction to the field staff.
- Develops schedules and allocates resources for field tasks.
- Coordinates data collection activities to be consistent with information requirements.
- Supervises the compilation of field data and laboratory analytical results.
- Assures that data are correctly and completely reported.
- Implements and oversees field sampling in accordance with project plans.
- Supervises field personnel.
- Coordinates work with on-site subcontractors.

- Schedules sample shipment, if necessary, with the analytical laboratory.
- Monitors that appropriate sampling, testing and measurement procedures are followed.
- Coordinates the transfer of field data, sample tracking forms, and logbooks to the PM for data reduction and validation.
- Participates in QA corrective actions, as required.

The Field Coordinator for each work assignment will be drawn from our pool of experienced staff since fieldwork will be conducted concurrently at multiple sites. Staff that will serve as Field Coordinator could include Joshua Lee, Bryce Hanson, or Justin Orr.

QA Leader

The GeoEngineers QA Leader is under the direction of Jedidiah Sugalski and Bruce Williams, who are responsible for the project's overall QA. The QA Leader is responsible for coordinating QA/QC activities as they relate to the acquisition of field data. Denell Warren is the QA Leader. The QA Leader has the following responsibilities:

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

Laboratory Management

The Ecology-accredited subcontracted laboratory (Eurofins TestAmerica Laboratories, Inc. [TestAmerica] of Spokane Valley, Washington) conducting sample analyses for this project is required to obtain approval from the QA Leader before the initiation of sample analysis to assure that the laboratory QA plan complies with the project QA objectives. The Laboratory's QA Coordinator (Randee Arrington) administers the Laboratory QA Plan and is responsible for QC. Specific responsibilities of this position include:

- Ensures implementation of the QA Plan.
- Serves as the laboratory point of contact.
- Activates corrective action for out-of-control events.
- Issues the final laboratory QA/QC report.
- Administers QA sample analysis.

- Complies with the specifications established in the project plans as related to laboratory services.
- Participates in QA audits and compliance inspections.

DATA QUALITY OBJECTIVES

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

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

The sampling design, field procedures, laboratory procedures and QC procedures are set up to provide high-quality data for use in this project. Specific data quality factors that may affect data usability include quantitative factors (precision, bias, accuracy, completeness and reporting limits) and qualitative factors (representativeness and comparability). The measurement quality objectives (MQO) associated with these data quality factors are summarized in Tables B-1 (soil) and B-2 (groundwater) and are discussed below.

Analytes and Matrices of Concern

Samples of soil and/or groundwater will be collected from up to 10 direct-push explorations during the assessment. Tables B-3 (soil) and B-4 (groundwater) summarize the analyses to be performed at the site for soil and groundwater, respectively.

Detection Limits

Analytical methods have quantitative limitations at a given statistical level of confidence that are often expressed as the method detection limit (MDL). Individual instruments often can detect but not accurately quantify compounds at concentrations lower than the MDL, referred to as the instrument detection limit (IDL). Although results reported near the MDL or IDL provide insight to site conditions, QA dictates that analytical methods achieve a consistently reliable level of detection known as the practical quantitation limit (PQL). The contract laboratory will provide numerical results for all analytes and report them as detected above the PQL or undetected at the PQL.

Achieving a stated detection limit for a given analyte is helpful in providing statistically useful data. Intended data uses, such as comparison to numerical criteria or risk assessments, typically dictate specific project target reporting limits (TRLs) necessary to fulfill stated objectives. The PQL for contaminants of potential concern (COPCs) at the site is presented in Tables B-1 and B-2 for soil and groundwater, respectively. These reporting limits were obtained from TestAmerica, the Ecology-accredited lab that will be analyzing the samples. Other criteria include State of Washington (WAC 173-201) water quality criteria and federal ambient water quality criteria (AWQC). The analytical methods and processes selected will provide PQLs less than the TRLs under ideal conditions. However, the reporting limits in Tables B-1 through B-2 are considered targets because several factors may influence final detection limits. First, moisture and other

physical conditions of soil affect detection limits. Second, analytical procedures may require sample dilutions or other practices to accurately quantify a particular analyte at concentrations above the range of the instrument. The effect is that other analytes could be reported as undetected but at a value much higher than a specified TRL. Data users must be aware that high non-detect values, although correctly reported, can bias statistical summaries and careful interpretation is required to correctly characterize site conditions.

Precision

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

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

Where

D_1 = Concentration of analyte in sample.
D_2 = Concentration of analyte in duplicate sample.

The calculation applies to split samples, replicate analyses, duplicate spiked environmental samples (matrix spike duplicates) and laboratory control duplicates. The RPD will be calculated for samples and compared to the applicable criteria. Precision can also be expressed as the percent difference (%D) between replicate analyses. Persons performing the evaluation must review one or more pertinent documents (EPA 2017a,b) that address criteria exceedances and courses of action. Relative percent difference goals for this effort are 30 percent in groundwater and 40 percent in soil for all analyses, unless the duplicate sample values are within 5 times the reporting limit. In this case, the absolute difference is used instead of the RPD. The absolute difference control limit is equal to the lowest reporting limit of the two samples for water and two times the lowest reporting limit of the two samples for soil.

Accuracy

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

Accuracy will be expressed as the percent recovery of a surrogate compound (also known as "system monitoring compound"), a matrix spike (MS) result, or from a standard reference material where:

$$Recovery\,(\%) = \frac{Sample\ Result}{Spike\ Amount}\ X\ 100$$

Persons performing the evaluation must review one or more pertinent documents (EPA 2017a,b) that address criteria exceedances and courses of action. Accuracy criteria for surrogate spikes, MS and laboratory control spikes (LCS) are found in Tables B-1 and B-2 of this QAPP.

Representativeness, Completeness and Comparability

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

- Comparing actual sampling procedures to those delineated within the Work Plan and this QAPP.
- Comparing analytical results of field duplicates to determine the variations in the analytical results.
- Invalidating non-representative data or identifying data to be classified as questionable or qualitative. Only representative data will be used in subsequent data reduction, validation and reporting activities.

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

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

Holding Times

Holding times are defined as the time between sample collection and extraction, sample collection and analysis, or sample extraction and analysis. Some analytical methods specify a holding time for analysis only. For many methods, holding times may be extended by sample preservation techniques in the field. If a sample exceeds a holding time, then the results may be biased low. For example, if the extraction holding time for volatile analysis of soil sample is exceeded, then the possibility exists that some of the organic constituents have volatilized from the sample or degraded. Results for that analysis will be qualified as estimated to indicate that the reported results may be lower than actual site conditions. Holding times are presented in Tables B-3 and B-4.

Blanks

According to the *National Functional Guidelines for Organic Data Review* (EPA 2017b), "The purpose of laboratory (or field) blank analysis is to determine the existence and magnitude of contamination resulting from laboratory (or field) activities. The criteria for evaluation of blanks apply to any blank associated with the samples (e.g., method blanks, instrument blanks, trip blanks and equipment blanks)." Trip blanks are

placed with samples during shipment; method blanks are created during sample preparation and follow samples throughout the analysis process.

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

SAMPLE COLLECTION, HANDLING AND CUSTODY

Sampling procedures are provided in Section 3 and Appendix A of this Work Plan.

Sampling Equipment Decontamination

Sampling equipment decontamination procedures are described in Appendix A of the Work Plan.

Sample Containers and Labeling

The Field Coordinator will establish field protocol to manage field sample collection, handling and documentation. Soil and groundwater samples obtained during this study will be placed in appropriate laboratory-prepared containers. Sample containers and preservatives are listed in Tables B-3 and B-4.

Sample containers will be labeled with the following information at the time of collection:

- Project name and number;
- Sample name, which will include a reference to depth if appropriate; and
- Date and time of collection.

The sample collection activities will be noted in the field log books. The Field Coordinator will monitor consistency between the Work Plan, sample containers/labels, field log books and the chain-of-custody (COC).

Sample Storage

Samples will be placed in a cooler with “blue ice” or double-bagged “wet ice” immediately after they are collected. The objective of the cold storage will be to attain a sample temperature of 4 degrees Celsius. Holding times will be observed during sample storage. Holding times for the project analyses are summarized in Tables B-3 and B-4.

Sample Shipment

The samples will be transported and delivered to the analytical laboratory in the coolers. Field personnel will transport and hand-deliver samples that are being submitted to a local laboratory for analysis. Samples that are being submitted from a remote location for analysis will be transported by a commercial express mailing service on an overnight basis or returning field personnel. The Field Coordinator will monitor that the shipping container (cooler) has been properly secured using clear packing tape and custody seals.

Measures will be implemented to minimize the potential for sample breakage, which includes packaging materials and placing sample bottles in the cooler in a manner intended to minimize damage. Sample

bottles will be wrapped with bubble wrap or other protective material before being place in coolers. Trip blanks will be included in coolers with groundwater samples.

Chain-of-Custody Records

Field personnel are responsible for the security of samples from the time the samples are taken until the samples have been received by the shipper or laboratory. A COC form will be completed at the end of each field day for samples being shipped to the laboratory. Information to be included on the COC form includes:

- Project name and number.
- Sample identification number.
- Date and time of sampling.
- Sample matrix (soil, water, etc.) and number of containers from each sampling point, including preservatives used.
- Depth of subsurface soil sample.
- Analyses to be performed.
- Names of sampling personnel and transfer of custody acknowledgment spaces.
- Shipping information including shipping container number.

The original COC record will be signed by a member of the field team and bear a unique tracking number. Field personnel shall retain carbon copies and place the original and remaining copies in a sealed plastic bag, placed within the cooler or taped to the inside lid of the cooler before sealing the container for shipment. This record will accompany the samples during transit by carrier to the laboratory.

Laboratory Custody Procedures

The laboratory will follow their standard operating procedures (SOPs) to document sample handling from time of receipt (sample log-in) to reporting. Documentation will include at a minimum, the analyst's name or initial, time and date.

CALIBRATION PROCEDURES

Field Instrumentation

Equipment and instrumentation calibration facilitate accurate and reliable field measurements. Field and laboratory equipment used on the project will be calibrated and adjusted in general accordance with the manufacturer's recommendations. Methods and intervals of calibration and maintenance will be based on the type of equipment, stability characteristics, required accuracy, intended use and environmental conditions. The basic calibration frequencies are described below.

The photoionization detector (PID) used for vapor measurements will be calibrated daily, if required (based on the model used), for site safety monitoring purposes in general accordance with the manufacturer's specifications. If daily calibration is not required for a specific PID model, calibration of the PID will be checked to make sure it is up to date. The calibration results will be recorded in the field logbook.

Laboratory Instrumentation

For analytical chemistry, calibration procedures will be performed in general accordance with the methods cited and laboratory SOPs. Calibration documentation will be retained at the laboratory and readily available for a period of 6 months.

DATA REPORTING AND LABORATORY DELIVERABLES

Laboratories will report data in formatted hardcopy and digital form. Analytical laboratory measurements will be recorded in standard formats that display, at a minimum, the field sample identification, the laboratory identification, reporting units, qualifiers, analytical method, analyte tested, analytical result, extraction and analysis dates, and detection limit (PQL only). Each sample delivery group will be accompanied by sample receipt forms and a case narrative identifying data quality issues. Laboratory electronic data deliverable (EDD) formats will be established by GeoEngineers, Inc., with the contract laboratory. Final results will be sent to the PM.

Chromatograms will be provided for samples analyzed by Northwest Methods NWTPH-Gx. The laboratory will assure the full heights of all peaks appear on the chromatograms and the same horizontal time scale is used to allow for comparisons to other chromatograms.

INTERNAL QC

Table B-5 summarizes the types and frequency of QC samples to be collected during the site characterization, including both field QC and laboratory QC samples.

Field QC

Field QC samples serve as a control and check mechanism to monitor the consistency of sampling methods and the influence of off-site factors on environmental samples. Off-site factors include airborne volatile organic compounds (VOCs) and potable water used in drilling activities.

Field Duplicates

In addition to replicate analyses performed in the laboratory, field duplicates also serve as measures for precision. Under ideal field conditions, field duplicates (referred to as splits), are created when a volume of the sample matrix is thoroughly mixed, placed in separate containers and identified as different samples. Analysis of duplicates test both the precision and consistency of laboratory analytical procedures and methods, and the consistency of the sampling techniques used by field personnel.

One field duplicate will be collected during each groundwater sampling event, including groundwater samples collected from direct-push borings. The duplicate sample will be analyzed for the COPCs specified for the given well.

Trip Blanks

Trip blanks will accompany soil and groundwater sample containers submitted for VOC analyses during shipment and sampling periods. Trip blanks will be analyzed on a one per cooler basis.

Laboratory QC

Laboratory QC procedures will be evaluated through a formal data validation process. The analytical laboratory will follow standard method procedures that include specified QC monitoring requirements. These requirements will vary by method but generally include:

- Method blanks
- Internal standards
- Calibrations
- MS/matrix spike duplicates (MSD)
- LCS/laboratory control spike duplicates (LCSD)
- Laboratory replicates or duplicates
- Surrogate spikes

Laboratory Blanks

Laboratory procedures employ the use of several types of blanks but the most commonly used blank for QA/QC assessments are method blanks. Method blanks are laboratory QC samples that consist of either a soil-like material having undergone a contaminant destruction process or high-performance liquid-chromatography (HPLC) water. Method blanks are extracted and analyzed with each batch of environmental samples undergoing analysis. Method blanks are particularly useful during volatiles analysis since VOCs can be transported in the laboratory through the vapor phase. If a substance is found in the method blank, then one (or more) of the following occurred:

- Measurement apparatus or containers were not properly cleaned and contained contaminants.
- Reagents used in the process were contaminated with a substance(s) of interest.
- Contaminated analytical equipment was not properly cleaned.
- Volatile substances in the air with high solubility or affinities toward the sample matrix contaminated the samples during preparation or analysis.

It is difficult to determine which of the above scenarios took place if blank contamination occurs. However, it is assumed that the conditions that affected the blanks also likely affected the project samples. Given method blank results, validation rules assist in determining which substances in samples are considered "real," and which ones are attributable to the analytical process. Furthermore, the guidelines state, ". . . there may be instances where little or no contamination was present in the associated blank, but qualification of the sample is deemed necessary. Contamination introduced through dilution water is one example."

Calibrations

Several types of calibrations are used, depending on the method, to determine whether the methodology is 'in control' by verifying the linearity of the calibration curve and to assure that the sample results reflect accurate and precise measurements. The main calibrations used are initial calibrations, daily calibrations and continuing calibration verification.

MS/MSD

MS/MSD samples are used to assess influences or interferences caused by the physical or chemical properties of the sample itself. For example, extreme pH affects the results of semivolatile organic compounds (SVOCs), or the presence of a compound may interfere with accurate quantitation of another analyte. MS/MSD data is reviewed in combination with other QC monitoring data to determine matrix effects. In some cases, matrix affects cannot be determined due to dilution and/or high levels of related substances in the sample. A MS is evaluated by spiking a known amount of one or more of the target analytes ideally at a concentration of 5 to 10 times higher than the sample result. A percent recovery is calculated by subtracting the sample result from the spike result, dividing by the spiked amount and multiplying by 100.

The samples for the MS and MSD analyses should be collected from a boring or sampling location that is believed to exhibit low-level contamination. A sample from an area of low-level contamination is needed because the objective of MS/MSD analyses is to determine the presence of matrix interferences, which can best be achieved with low levels of contaminants. Additional sample volume will be collected for these analyses. This MS/MSD sample will be a composite to achieve a level of representativeness and reproducibility in the data.

LCS/LCSD

Also known as blanks spikes, LCSs are similar to MSs in that a known amount of one or more of the target analytes are spiked into a prepared media and a percent recovery of the spiked substances are calculated. The primary difference between a MS and LCS is that the LCS media is considered "clean" or contaminant free. For example, HPLC water is typically used for LCS water analyses. The purpose of an LCS is to help assess the overall accuracy and precision of the analytical process including sample preparation, instrument performance and analyst performance. LCS data must be reviewed in context with other controls to determine if out-of-control events occur.

Laboratory Replicates/Duplicates

Laboratories often utilize MS/MSDs, LCS/LCSDs and/or replicates to assess precision. Replicates are a second analysis of a field-collected environmental sample. Replicates can be split at varying stages of the sample preparation and analysis process, but most commonly occur as a second analysis on the extracted media.

Surrogate Spikes

The purposes of using a surrogate are to verify the accuracy of the instrument being used and extraction procedures. Surrogates are substances similar to, but not one of, the target analytes. A known concentration of surrogate is added to the sample and passed through the instrument, noting the surrogate recovery. Each surrogate used has an acceptable range of percent recovery. If a surrogate recovery is low, sample results may be biased low and depending on the recovery value, a possibility of false negatives may exist. Conversely, when recoveries are above the specified range of acceptance a possibility of false positives exist, although non-detected results are considered accurate.

DATA REDUCTION AND ASSESSMENT PROCEDURES

Data Reduction

Data reduction involves the conversion or transcription of field and analytical data to a useable format. The laboratory personnel will reduce the analytical data for review by the QA Leader and PM.

Field Measurement Evaluation

Field data will be reviewed at the end of each day by following the QC checks outlined below and procedures in the Work Plan. Field data documentation will be checked against the applicable criteria as follows:

- Sample collection information.
- Field instrumentation and calibration.
- Sample collection protocol.
- Sample containers, preservation and volume.
- Field QC samples collected at the frequency specified.
- Sample documentation and COC protocols.
- Sample shipment.

Cooler receipt forms and sample condition forms provided by the laboratory will be reviewed for out-of-control incidents. The final report will contain what effects, if any, an incident has on data quality. Sample collection information will be reviewed for correctness before inclusion in a final report.

Field QC Evaluation

A field QC evaluation will be conducted by reviewing field log books and daily reports, discussing field activities with staff and reviewing field QC samples (trip blanks and field duplicates). Trip blanks will be evaluated using the same criteria as method blanks.

Precision for field duplicate soil will not be evaluated because even a well-mixed sample is not entirely homogenous due to sampling procedures, soil conditions and contaminant transport mechanisms. Grab groundwater duplicate samples are also highly variable because of sampling procedures and borehole conditions and are therefore not reliable measures of precision.

Laboratory Data QC Evaluation

The laboratory data assessment will consist of a formal review of the following QC parameters:

- Holding times
- Method blanks
- MS/MSD
- LCS/LCSD
- Surrogate spikes
- Replicates

In addition to these QC mechanisms, other documentation such as cooler receipt forms and case narratives will be reviewed to fully evaluate laboratory QA/QC.

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Table B-1

Soil Measurement Quality Objective and Target Reporting Limits

Ellensburg City West 8th Street ROW

Ellensburg, Washington

				LCS/LCSD			MS/MSD			
Analyte	Method	MDL (mg/kg)	PQL (mg/kg)	Lower	Upper	RPD	Lower	Upper	RPD	MTCA Cleanup Level (mg/kg)
VOCs (BTEX)										
Benzene	EPA 8260D	0.0100	0.02	76	129	25	76	129	25	0.03
Ethylbenzene	EPA 8260D	0.0162	0.1	77	126	25	77	126	25	6
Toluene	EPA 8260D	0.0133	0.1	77	131	25	77	131	25	7
m, p-Xylene	EPA 8260D	0.0287	0.4	78	130	23	78	130	23	--
o-Xylene	EPA 8260D	0.0230	0.2	77	129	25	77	129	25	--
Xylene (Total)	EPA 8260D	Derived as sum of m, o, and p isomers								9
TPH										
Gasoline Range Organics	NWTPH-Gx	1.80	5	74	124	20	50	133	20	30/100[1]
Diesel Range Organics	NWTPH-Dx	4.19	10	50	150	25	70.1	139	25	2,000
Heavy Oil Range Organics	NWTPH-Dx	5	25	50	150	25	50	150	25	2,000

Notes:

[1]Model Toxics Control Act (MTCA) Method A cleanup level for gasoline-range petroleum hydrocarbons is 100 mg/kg if benzene is not detected and the total concentrations of ethylbenzene, toluene and xylenes are less than 1 percent of the gasoline mixture; otherwise, the cleanup level is 30 mg/kg.

Practical quantitation limits (PQLs) based on information provided by Eurofins TestAmerica Laboratories.

mg/kg = milligrams per kilogram; NE = Not established;

MDL = method detection limit; LCS = laboratory control spike; LCSD = laboratory control spike duplicate; MS = matrix spike; MSD = matrix spike duplicate; RPD = relative percent difference;

EPA = Environmental Protection Agency; VOCs = volatile organic compounds; TPH = total petroleum hydrocarbons

BTEX = benzene, toluene, ethylbenzene and xylenes

Table B-2

Groundwater Measurement Quality Objective and Target Reporting Limits

Ellensburg City West 8th Street ROW

Ellensburg, Washington

				LCS/LCSD			MS/MSD			DUP	MTCA Cleanup Level (µg/L)
Analyte	Method	MDL (µg/L)	PQL (µg/L)	Lower	Upper	RPD	Lower	Upper	RPD	RPD	
VOCs (BTEX)											
Benzene	EPA 8260D	0.093	0.4	80	126	18	80	126	18	--	5
Ethylbenzene	EPA 8260D	0.198	1	80	128	18	80	128	18	--	700
Toluene	EPA 8260D	0.312	1	80	129	18	80	129	18	--	1,000
m-Xylene (coelute) p-Xylene	EPA 8260D	0.280	2	80	127	18	80	127	18	--	--
o-Xylene	EPA 8260D	0.162	1	80	126	17	80	126	17	--	--
Xylene (Total)	EPA 8260D	Derived as sum of m, o and p isomers									1,000
TPH											
Gasoline Range Organics	NWTPH-Gx	70.4	150	80	120	20	56	126	20	35	1,000/800[1]
Diesel Range Organics	NWTPH-Dx	240	110	50	150	25	54.5	136	32.5	25	500
Heavy Oil Range Organics	NWTPH-Dx	300	120	50	150	25	50	150	25	25	500

Notes:

[1]Model Toxics Control Act (MTCA) Method A cleanup level for gasoline-range petroleum hydrocarbons is 1,000 µg/L if benzene is not detected and the total concentrations of ethylbenzene, toluene and xylenes are less than 1 percent of the gasoline mixture; otherwise the cleanup level is 800 µg/L.

Practical quantitation limits (PQLs) based on information provided by Eurofins TestAmerica Laboratories.

µg/L = micrograms per liter; -- = Not established; DUP = duplicate; MCL = maximum contaminant level

MDL = method detection limit; LCS = laboratory control spike; LCSD = laboratory control spike duplicate; MS = matrix spike; MSD = matrix spike duplicate; RPD = relative percent difference; EPA = Environmental Protection Agency; VOCs = volatile organic compounds; TPH = total petroleum hydrocarbons; BTEX = benzene, toluene, ethylbenzene and xylenes

Table B-3

Soil Test Methods, Sample Containers, Preservation and Holding Time[1]

Ellensburg City West 8th Street ROW

Ellensburg, Washington

Analysis	Matrix	Method	Minimum Sample Size	Sample Containers	Sample Preservation	Holding Times
VOCs (BTEX)	Soil	EPA 8260D	30 g	2 pre-weighed 40 mL VOA vials preserved with MeOH; 4 oz jar (for dry-weight correction)	MeOH; <Cool 6°C	14 days from collection to analysis
GRPH	Soil	NWTPH-Gx	30 g	2 pre-weighed 40 mL VOA vials preserved with MeOH; 4 oz jar (for dry-weight correction)	MeOH; Cool <6°C	14 days from collection to analysis
DRPH/ORPH	Soil	NWTPH-Dx	30 g	4 or 8 oz glass wide-mouth with Teflon™-lined lid	Cool <6°C	14 days from collection to extraction and 40 days from extraction to analysis

Notes:

[1]Holding times are based on elapsed time from date of collection.

VOCs = volatile organic compounds; MeOH = Methanol; VOA = volatile organic analysis

g = gram; mL = milliliters; C = Celsius

GRPH = gasoline-range petroleum hydrocarbons; DRPH = diesel-range petroleum hydrocarbons; ORPH = oil-range petroleum hydrocarbons

EPA = Environmental Protection Agency; BTEX = benzene, toluene, ethylbenzene and xylenes

Table B-4

Water Test Methods, Sample Containers, Preservation and Holding Time[1]

Ellensburg City West 8th Street ROW

Ellensburg, Washington

Analysis	Matrix	Method	Minimum Sample Size	Sample Containers	Sample Preservation	Holding Times
VOCs (BTEX)	Water	EPA 8260D	120ml	3 - 40 mL VOA	HCL pH<2, Cool <6°C	14 days from collection to analysis
GRPH	Water	NWTPH-Gx	80ml	3 - 40 mL VOA	HCL pH<2, Cool <6°C	14 days from collection to analysis
DRPH/ORPH	Water	NWTPH-Dx	250 ml	1 - 250 mL amber glass with Teflon™- lined cap	HCl pH<2; Cool <6°C	14 days from collection to extraction and 40 days from extraction to analysis

Notes:

[1]Holding times are based on elapsed time from date of collection.

VOC = volatile organic compound; VOA = volatile organic analysis; HCl = hydrochloric acid;

g = gram; mL = milliliters; C = Celsius

GRPH = gasoline-range petroleum hydrocarbons; DRPH = diesel-range petroleum hydrocarbons; ORPH = oil-range petroleum hydrocarbons;

BTEX = benzene, toluene, ethylbenzene and xylenes

Table B-5

Quality Control Samples Type and Frequency

Ellensburg City West 8th Street ROW

Ellensburg, Washington

Parameter	Field QC		Laboratory QC			
	Field Duplicate	Trip Blanks	Method Blanks	LCS	MS / MSD	Lab Duplicates
VOCs (BTEX)	1 per groundwater event	1 per soil event and 1 per water event	1/batch	1/batch	1/batch	1/batch
GRPH	1 per groundwater event	1 per soil event and 1 per water event	1/batch	1/batch	1/batch	1/batch
DRPH/ORPH	1 per groundwater event	None	1/batch	1/batch	1/batch	1/batch

Notes:

No more than 20 field samples can be contained in one batch.

VOCs = volatile organic compounds; PAHs = polycyclic aromatic hydrocarbons;

GRPH = gasoline-range petroleum hydrocarbons; DRPH = diesel-range petroleum hydrocarbons; ORPH = oil-range petroleum hydrocarbons

LCS = Laboratory control sample; MS = Matrix spike sample; MSD = Matrix spike duplicate sample; BTEX = benzene, toluene, ethylbenzene and xylenes

APPENDIX C
Health and Safety Plan

APPENDIX C
HEALTH AND SAFETY PLAN
ELLENSBURG CITY WEST 8TH STREET ROW SITE ASSESSMENT
CENTRAL REGION
MASTER CONTRACT C1900044. GEI029

GENERAL PROJECT INFORMATION

This Health and Safety Plan (HASP) is to be used in conjunction with the GeoEngineers Safety Program Manual. Together, the written safety programs and this HASP constitute the site safety plan for this site. This plan is to be used by GeoEngineers personnel on this site and must be available on site. If the work entails potential exposures to other substances or unusual situations, additional safety and health information will be included, and the plan will be approved by the GeoEngineers Health and Safety Manager. All plans are to be used in conjunction with current standards and policies outlined in the GeoEngineers Health and Safety Program Manual.

TABLE C-1. GENERAL PROJECT INFORMATION

Project Name:	**Ellensburg City West 8th Street ROW, Ellensburg, Washington**
Project Number:	0504-169-00
Type of Project:	Direct-Push Site Assessment
Project Address:	710 West 8th Street, Ellensburg, WA 98926
Start/Completion:	April 2021/December 2021
Subcontractors:	Cascade Drilling – direct-push drilling Eurofins TestAmerica, Inc. – laboratory analyses TBD – IDW disposal Utilities Plus, Inc. – private utility locating

Liability Clause - This Site Safety Plan is intended for use by GeoEngineers Employees only. It does not extend to the other contractors or subcontractors working on this site. If requested by subcontractors, this site safety plan may be used as a minimum guideline for those entities to develop safety plans or procedures for their own staff to work under. In this case, Form 3 shall be signed by the subcontractor.

All personnel participating in this project must receive initial health and safety orientation (Form 1). Thereafter, brief tailgate safety meetings will be held as deemed necessary by the Site Safety and Health Supervisor.

The orientation and the tailgate safety meetings shall include a discussion of emergency response, site communications and site hazards.

TABLE C-2 ORGANIZATION CHART

Chain of Command	Title	Name	Telephone Numbers
1	Principal-in-Charge	Bruce Williams	O: 509.363.2814 C: 509.954.6614
2	Project Manager	Jedidiah R. Sugalski	O: 509.209.2830 C: 509.991.4471
3	Site Safety and Health Officer (SSO); will vary by site	Bryce Hanson	O: 509.209.2818 C: 360.269.3237
		Joshua Lee	O: 509.209.2832 C: 406.239.7810
		Justin Orr	O: 509.209.3125 C: 406.890.1310
4	Health and Safety Program Manager (HSM)	Mary Lou Sullivan	O: 253.722.2425 C: 360.633.9821
5	Field Engineer/Geologist; will vary by site	Bryce Hanson/Joshua Lee/ /Justin Orr	See SSO contact info above
6	Subcontractor(s)	Environmental West (driller) Utilities Plus, LLC (utility locate) Eurofins TestAmerica (chemical analysis) TDB (IDW)	O: 509.534.2740 O: 509.945.9840 O: 509.924.9200 TBD
7	Current Owner (c/o Ecology Project Manager)	Jill Scheffer	O: 509.454.7834 C: 509.571-4162

Functional Responsibility

Project Manager (PM), Jedidiah R. Sugalski

A PM is assigned to manage the activities of various projects and is responsible to the principal-in-charge of the project. The PM is responsible for assessing the hazards present at a job site and incorporating the appropriate safety measures for field staff protection into the field briefing and/or Site Safety Plan. He or she is also responsible for assuring that appropriate HASPs complying with this manual are developed. The PM will provide a summary of chemical analysis to personnel completing the HASP. PMs shall also see that their project budgets consider health and safety costs. The PM shall keep the HSM informed of the project's health- and safety-related matters as necessary. The PM shall designate the project Site Safety Officer (SSO) and help the SSO implement the specifications of the HASP. The PM is responsible for communicating information in site safety plans and checklists to appropriate field personnel. Additionally, the PM and SSO shall hold a site safety briefing before any field activities begin. The PM is responsible for transmitting health and safety information to the SSO when appropriate.

Site Safety and Health Supervisor

The SSO will have the on-site responsibility and authority to modify and stop work or remove personnel from the site if working conditions change that may affect on-site and off-site health and safety. The SSO will be the main contact for any on-site emergency situation. The SSO is First Aid and CPR qualified and has current Hazardous Waste Operations and Emergency Response (HAZWOPER) training. The SSO is responsible for implementing and enforcing the project safety program and safe work practices during site activities. The SSO shall conduct daily safety meetings, perform air monitoring as required, conduct site safety inspections as required, coordinate emergency medical care, and ensure personnel are wearing the appropriate personal protective equipment (PPE). The SSO shall have advanced fieldwork experience and shall be familiar with health and safety requirements specific to the project. The SSO has the authority to suspend site activities if unsafe conditions are reported or observed.

Duties of the SSO include the following:

- Implementing the HASP in the field and monitoring compliance with its guidelines by staff.
- Being sure that all GeoEngineers field personnel have met the training and medical examination requirements. Advising other contractor employees of these requirements.
- Maintaining adequate and functioning safety supplies and equipment at the site.
- Setting up work zones, markers, signs and security systems, if necessary.
- Performing or supervising air quality measurements. Communicating information on these measurements to GeoEngineers field staff and subcontractor personnel.
- Communicating health and safety requirements and site hazards to field personnel, subcontractors and contractor employees, and site visitors.
- Directing personnel to wear PPE and guiding compliance with all health and safety practices in the field.
- Consulting with the PM regarding new or unanticipated site conditions, including emergency response activities. If monitoring detects concentrations of potentially hazardous substances at or above the established exposure limits, notify/consult with the PM. Consult with the PM and the HSM regarding new or unanticipated site conditions, including emergency response activities. If field monitoring indicates concentrations of potentially hazardous substances at or above the established exposure limits, the HSM must be notified, and corrective action taken.
- Documenting all site accidents, illnesses and unsafe activities or conditions, and reporting them to the PM and the HSM.
- Directing decontamination operations of equipment and personnel.

Field Employees

All employees working on site that have the potential of coming in contact with hazardous substances or physical hazards are responsible for participating in the health and safety program and complying with the site-specific health and safety plans. These employees are required to:

- Participate and be familiar with the health and safety program as described in this manual.
- Notify the SSO that when there is need to stop work to address an unsafe situation.

- Comply with the HASP and acknowledge understanding of the plan.
- Report to the SSO, PM or HSM any unsafe conditions and all facts pertaining to incidents or accidents that could result in physical injury or exposure to hazardous materials.
- Participate in health and safety training, including initial 40-hour Occupational Safety and Health Administration (OSHA) course, annual 8-hour HAZWOPER refresher, and First Aid/cardiopulmonary resuscitation (CPR) training.
- Participate in the medical surveillance program if applicable.
- Schedule and take a respirator fit test annually.
- Any field employee working on site may stop work if the employee believes the work is unsafe.

Contractors under GeoEngineers Supervision

Contractors working on the site under GeoEngineers supervision or direct control that have the potential of coming in contact with hazardous substances or physical hazards shall have their own health and safety program that is in line with the site-specific health and safety plan.

Health and Safety Manager, Mary Lou Sullivan

GeoEngineers' Health and Safety Program Manager (HSM) is responsible for implementing and promoting employee participation in the program. The HSM issues directives, advisories and information regarding health and safety to the technical staff. Additionally, the HSM has the authority to audit on-site compliance with HASPs, suspend work or modify work practices for safety reasons, and dismiss from the site any GeoEngineers or subcontractor employees whose conduct on the site endangers the health and safety of themselves or others.

TABLE C-3. FIELD PERSONNEL TRAINING RECORDS

Name of Employee On-Site	Level of HAZWOPER Training (24-/40-hour)	Date of 40-Hour/8-Hour Refresher Training	First Aid/ Cardiopulmonary Resuscitation (CPR)
Joshua Lee	40-hr (Supervisor)	1/22/2021	1/28/2020
Bryce Hanson	40-hr	3/31/2021	2/3/2021
Justin Orr	40-hr	1/13/2021	11/12/2020

SITE DESCRIPTION, MAP AND FIELD ACTIVITIES

The project description and a map of the site layout are provided as part of the work plan on Figures 1 and 2. Work zones will be established around the drill rig, backhoe, excavator, borings, and monitoring wells, if applicable, at each site. In general, work zones will be within a 10-foot radius of an investigation activity.

TABLE C-4. LIST OF FIELD ACTIVITIES

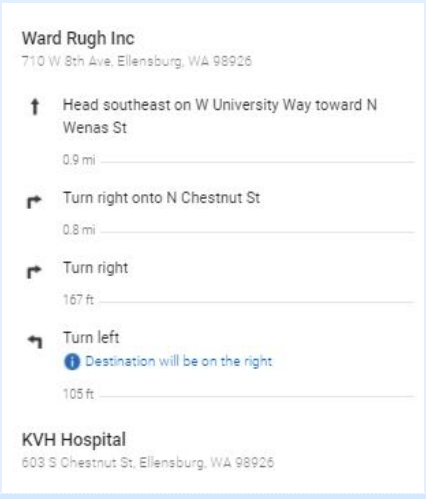
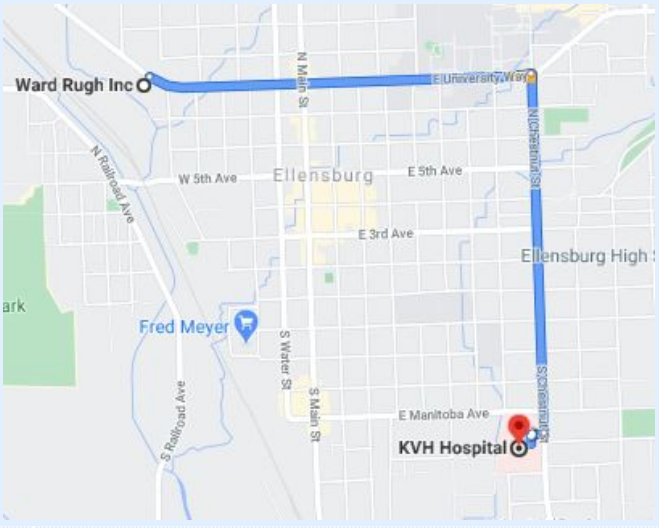
Check the Activities to be Completed during the Project	
X	Site reconnaissance
X	Direct-Push exploration
	Test Pit exploration

Check the Activities to be Completed during the Project	
	Soil Vapor Extraction (SVE) system operation
X	Soil sample collection
X	Groundwater Sampling
X	Field screening of contaminated media
X	Soil Vapor measurements
X	Groundwater depth and free product measurement (if any)
	Soil stockpile testing
	Remedial excavation
	Monitoring well installation
	Monitoring well development

EMERGENCY INFORMATION

In the case on an emergency requiring medical treatment, the location of the nearest hospital and route is provided in Table C-5. Other emergency procedures are described in the following section.

TABLE C-5. EMERGENCY INFORMATION

Hospital Name and Address:	**KVD Hospital** 603 S Chestnut St Ellensburg, Washington 98926
Phone Numbers (Hospital ER):	509.962.9841 or 911
Distance:	1.8 mile
Route to Hospital:	 
Ambulance:	911
Poison Control:	800.222.1222
Police:	911
Fire:	911

Location of Nearest Telephone:	Cell phones are carried by field personnel.
Nearest Fire Extinguisher:	Located in the GeoEngineers' vehicle on site.
Nearest First-Aid Kit:	Located in the GeoEngineers' vehicle on site.

Standard Emergency Procedures

1. Get help
    a. Send another worker to phone 911 (if necessary)
    b. As soon as feasible, notify GeoEngineers' project manager
2. Reduce risk to injured person
    c. Turn off equipment
    d. Move person from injury location (if possible)
    e. Keep person warm
    f. Perform CPR (if necessary)
3. Transport injured person to medical treatment facility (if necessary)
    g. By ambulance (if necessary) or GeoEngineers vehicle
    h. Stay with person at medical facility
    i. Keep GeoEngineers manager apprised of situation and notify human resources manager of situation

HAZARD ANALYSIS

A hazard analysis has been completed as part of preparation of this HASP. The hazard analysis was performed taking into account the known and potential hazards at the site and surrounding areas, as wells as the planned work activities. The results of the hazard analysis are presented in this section. The hazard assessment will be evaluated each day before beginning work. Updates will be made as necessary and documented in the Job Hazard Analyses (JHA) Form 3 or daily field log.

Physical Hazards

The following are known applicable physical hazards.

TABLE C-6. PHYSICAL HAZARDS

X	Drill rigs
	Backhoes
X	Overhead hazards/powerlines
X	Tripping/puncture hazards
X	Snow, rain, ice, freezing temperatures
X	Heat/Cold, Humidity
X	Utilities/utility locate

X	Contaminated soil
X	Contaminated groundwater
X	Unusual traffic hazard – Street traffic
X	Loud noise
	Excavators
	Front End Loader/Forklifts
	Excavations/trenching (1:1.5 slopes for Type C soil if entering the excavation)
	Shored/braced excavation if greater than 4 feet of depth

- Utility checklist will be completed as required for the location to prevent drilling or digging into utilities. Note: These procedures should be added to the standard GeoEngineers utility checklist.
- Lifting hazards: use proper techniques, mechanical devices, where appropriate.
- Terrain obstacles: terrain could be soft and activities will be conducted to minimize lawn damage and the potential for vehicles to get stuck.
- Personnel will wear high-visibility vests for increased visibility by vehicle and equipment operators.
- Field personnel will be aware at all times of the location and motion of heavy equipment in the area of work to ensure a safe distance between personnel and the equipment. Personnel will be visible to the operator at all times and will remain out of the swing and/or direction of the equipment apparatus. Personnel will approach operating heavy equipment only when they are certain the operator has indicated that it is safe to do so through hand signal or other acceptable means.
- Heavy equipment and/or vehicles are not anticipated.
- Heavy equipment and/or vehicles used on this site will not work within 20 feet of overhead utility lines without first ensuring that the lines are not energized. This distance may be reduced to 10 feet, depending on the client and the use of a safety watch. Note: If it is later determined that overhead lines are a hazard on this job site, a copy the overhead lines safety section from the HASP Supplemental document shall be attached.
- Don't operate equipment around overhead power lines unless you are authorized and trained to do so. If an object (scaffolds, crane, etc.) must be moved in the area of overhead power lines, appoint a competent worker whose sole responsibility is to observe the clearance between the power lines and the object. Warn others if the minimum distance is not maintained.
- Never touch an overhead line if it has been brought down by machinery or has fallen. Never assume lines are dead. When a machine is in contact with an overhead line, DO NOT allow anyone to come near or touch the machine. Stay away from the machine and summon outside assistance. Never touch a person who is in contact with a live power line.
- If you are in a vehicle that is in contact with an overhead power line, DON'T LEAVE THE VEHICLE. As long as you stay inside and avoid touching metal on the vehicle, you may avoid an electrical hazard. If you need to get out to summon help or because of fire, jump out without touching any wires or the machine, keep your feet together, and hop to safety.

- Personnel will avoid tripping hazards, steep slopes, pit and other hazardous encumbrances. If it becomes necessary to work within 6 feet of the edge of a pit, slope, pier or other potentially hazardous area, appropriate fall protection measures will be implemented by the Site Safety and Health Supervisor in accordance with Occupational Safety and Health Administration (OSHA)/Division of Occupational Safety and Health (DOSH) regulations and the GeoEngineers *Safety Program manual*.
- Excessive levels of noise (exceeding 85 decibels [dBA]) are anticipated. Personnel potentially exposed will wear ear plugs or muffs with a noise reduction rating of at least 25 dBA whenever it becomes difficult to carry on a conversation 6 feet away from a co-worker or whenever noise levels become bothersome. (Increasing the distance from the source will decrease the noise level noticeably.)
- Cold stress control measures will be implemented according to the GeoEngineers Health and Safety Program to prevent frost nip (superficial freezing of the skin), frost bite (deep tissue freezing), or hypothermia (lowering of the core body temperature). Heated break areas and warm beverages shall be available during periods of cold weather.
- Heat stress control measures required for this site will be implemented according to GeoEngineers Health and Safety Program with water provided on site.

TABLE C-7. ENGINEERING CONTROLS

	Trench shoring (1:1 slope for Type B Soils)
X	Locate work spaces upwind/wind direction monitoring
X	Other soil covers (as needed)
	Other (specify _____

Chemical Hazards

This section includes all chemical hazards that have been identified to date at the site.

TABLE C-8 CHEMICALS POTENTIAL CHEMICAL HAZARDS AT THE SITE

Compound/ Description	OSHA PEL Exposure Limits	NIOSH/ACGIH TLV Exposure Limits/IDLH	Exposure Routes	Toxic Characteristics
Gasoline	300ppm (TWA) 500 ppm (STEL)	300-ppm 8-hour TWA and a 500-ppm 15-minute STEL	Ingestion, inhalation, skin absorption, skin and eye contact	Irritated eyes, skin, mucous membrane; fatigue; blurred vision; dizziness; slurred speech; confusion; convulsions; and headache; dermatitis.
Diesel fuel	None established by OSHA	ACGIH: 100 mg/m^3 (as total hydrocarbons)	Inhalation, absorption, skin and eye contact	Irritated eyes, skin, and mucous membrane; fatigue; blurred vision; dizziness; slurred speech; confusion; convulsions; and headache, and dermatitis

Compound/ Description	OSHA PEL Exposure Limits	NIOSH/ACGIH TLV Exposure Limits/IDLH	Exposure Routes	Toxic Characteristics
Benzene	1 ppm (TWA) 5 ppm (STEL)	NIOSH REL: 0.1 ppm (TWA) Ca 1 ppm (STEL) 500 ppm (IDLH) ACGIH TLV: 0.5 ppm (TWA) 2.5 ppm (STEL)	Inhalation, absorption	Irritation of eyes, skin, nose, respiratory system, dizziness, headache, nausea, staggered gait, anorexia, exhaustion, dermatitis, bone marrow depression (leukemia).
Toluene	200 ppm (TWA) 300 ppm (C)	ACGIH: 20 ppm (TWA); NIOSH: 100 ppm (REL) 500 ppm (IDLH)	Inhalation, absorption	Irritation to eyes, nose, exhaustion, confusion, dizziness, headaches, dilated pupils, euphoria, anxiety, teary eyes, muscle fatigue, insomnia, paresthesia, dermatitis, liver and kidney damage.
Ethylbenzene	100 ppm (TWA)	ACGIH: 20 ppm (TWA) NIOSH: 100 ppm (REL) 800 ppm (IDLH)	Inhalation, absorption	Irritation to eyes, skin, respiratory system, burning of skin, dermatitis.
Xylenes	100 ppm (TWA)	ACGIH: 100 ppm (TWA) 150 ppm (ST) NIOSH: 100 ppm (REL) 900 ppm (IDLH)	Inhalation, absorption	Irritation to eyes, skin, nose, throat, dizziness, excitement, drowsiness, incoordination, staggering gait, corneal vacuolization, anorexia, nausea, vomiting, abdominal pain, dermatitis.
Naphthalene	10 ppm (TWA)	ACGIH: 10 ppm (TWA) NIOSH: 10 ppm (REL) 250 ppm (IDLH)	Inhalation, absorption,	Upper respiratory tract irritation, cataracts, hemolytic anemia

Notes:

REL = NIOSH Recommended Exposure Limit.
NIOSH = National Institute for Occupational Safety and Health
mg/m^3 = micrograms per cubic meter
STEL = short-term exposure limit
PEL = permissible exposure limit
C = Ceiling
ACGIH = American Conference of Governmental Industrial Hygienists
TLV-TWA = Threshold limit value- time weighted average for no more than 8 hours (ACGIH)
IDLH = Immediately dangerous to life or health if exposed for more than 30 minutes (NIOSH)

Gasoline

Gasoline is a known animal carcinogen, but unknown relevance to humans. Benzene, a gasoline component is a known human carcinogen. Exposure can produce a wide range of health effects depending on the amount and timing of exposure. Exposure may irritate the eyes, skin, respiratory tract and may also affect the central nervous system.

Diesel Fuel

Diesel fuels are similar to fuel oils used for heating (fuel oils no. 1, no. 2 and no. 4). All fuel oils consist of complex mixtures of aliphatic and aromatic hydrocarbons. Diesel fuels predominantly contain a mixture of C10 through C19 hydrocarbons, which include approximately 64 percent aliphatic hydrocarbons, 1 to 2 percent olefinic hydrocarbons, and 35 percent aromatic hydrocarbons. Workers may be exposed to fuel oils through their skin without adequate protection, such as gloves, boots, coveralls, or other protective clothing. Breathing diesel fuel vapors for a long time may damage your kidneys, increase your blood pressure, or lower your blood's ability to clot. Constant skin contact (for example, washing) with diesel fuel may also damage your kidneys. The International Agency for Research on Cancer (IARC) has determined that residual (heavy) fuel oils and marine diesel fuel are possibly carcinogenic to humans (Group 2B classification).

Residue from aged diesel fuel can irritate the skin, if left in contact for too long. Degraded fuel can irritate the skin and mucous membranes, if contact is made. Exercising good personal hygiene and cleaning off PPE post-work and prior to re-donning safety equipment will minimize potential contact. More on Total Petroleum Hydrocarbons health effects in the Agency for Toxic Substances and Disease Registry (ATSDR) Toxicological Profile document here: https://www.atsdr.cdc.gov/ToxProfiles/TP.asp?id=424&tid=75

Benzene

Benzene is a central nervous system depressant. Symptoms include headache, nausea, tremors, and fatigue, but these typically do not occur until exposure concentrations are in excess of 150 ppm. There is significant evidence that chronic exposures are carcinogenic causing a progressively malignant disease of the blood-forming organs. Contact with liquid benzene may cause blistering and dermatitis. In addition, benzene can be absorbed through unprotected skin and eye and mucous membranes. Benzene vapors can cause transient eye irritation. The mean air odor threshold for benzene is 34 ppm. Benzene's ionization potential (IP) is 9.25 eV and its vapor pressure is 75 mm Hg. Benzene has an ACGIG A1 designation, a Confirmed Human Carcinogen (leukemia). It also has a skin notation, indicating the potentially significant contribution to the overall exposure by the cutaneous route; including mucous membranes and the eyes, by contact with vapors, liquids and solids.

Ethylbenzene

Ethylbenzene is a highly flammable, colorless liquid and VOC with an odor similar to that of gasoline. It is commonly used in the production of polystyrene, a highly used plastic material. Exposure primarily comes through off-gas vapor. Low amounts of ethylbenzene exposure are not considered immediately harmful, however longer-term toxicity and carcinogenicity is still under study. Common symptoms of exposure include eye and mucous membrane irritation, respiratory irritation, and dermatitis. OSHA, ACGIH and NIOSH currently have a PEL of 100 ppm for ethylbenzene. Ethylbenzene is considered an ACGIH A3 carcinogen, which is a confirmed animal carcinogen.

Toluene

Toluene is a colorless, water-insoluble liquid and VOC used commonly in paint thinners, contact cement and some glues. Toluene residue can off-gas, and inhalation of low to moderate levels of toluene can cause confusion, tiredness, weakness, memory loss, and other harmful effects. The odor of toluene gas is similar to that of paint thinner. OSHA has prescribed a PEL of 200 ppm while ACGIH has a lower PEL of 20 ppm. While ACGIH considers toluene an A4 carcinogen, Not Classified as a Human Carcinogen, the chemical's known adverse effect on hearing is currently being investigated further.

Xylene

Xylene is a colorless, flammable liquid and VOC commonly used in the petrochemical industry as well as being used in commercial gasoline and aircraft fuels. It has a sweet odor. Xylene exposure can irritate the eyes, nose, skin, and throat as well as cause headaches, dizziness, and confusion. Both OSHA and WA-DOSH prescribe a PEL of 100 ppm for xylene. It is an ACGIH A4 carcinogen; Not Classified as a Human Carcinogen.

Naphthalene

Naphthalene is a colorless to brown solid VOC with a distinctive smell of mothballs, one of its primary uses. Naphthalene is also used as a household fumigant, and precursor chemical to many other industrial substances. Naphthalene exposure has numerous negative health effects associated with its exposure. Including fatigue, lack of appetite, confusion, nausea, vomiting, diarrhea, blood in the urine, and jaundice. OSHA and NIOSH have regulated a PEL of 10 ppm. Naphthalene is considered an ACGIH A3 carcinogen, which is a confirmed animal carcinogen.

Biological Hazards

Site personnel shall avoid contact with or exposures to potential biological hazards encountered.

TABLE C-9. BIOLOGICAL HAZARDS AND PROCEDURES

Y/N	Hazard	Procedures
N	Poison Ivy or other vegetation	Avoid contact
Y	Insects or snakes	Avoid contact
Y	COVID-19	Refer to COVID-specific JHA

Site personnel shall avoid contact with or exposures to potential biological hazards encountered. Follow JHA specific to COVID-19 required protocols.

Additional Hazards (Update in Daily Log)

Include evaluation of:

- Physical Hazards (equipment, traffic, tripping, heat stress, cold stress and others)
- Chemical Hazards (odors, spills, free product, airborne particulates and others present)
- Biological Hazards (COVID-19, snakes, spiders, other animals, poison ivy and others present)

AIR MONITORING PLAN

An air monitoring plan has been prepared as part of development of this HASP. The air monitoring plan is based on the results of the chemical exposure assessment and the known and potential inhalation hazards on site. The air monitoring plan addresses steps necessary to limit worker exposure. Non-occupational exposures are not addressed in this plan.

Work upwind if at all possible.

Check Instrumentation to be Used

☐ Multi-Gas Detector (may include oxygen, carbon monoxide, hydrogen sulfide, lower explosive limit)

☐ Dust Monitor

☒ Other (photoionization detector [PID])

Check Monitoring Frequency/Locations and Type (Specify: Work Space, Borehole, Breathing Zone):

☐ Continuous during soil disturbance activities or handling samples (Work Space)

☐ 15 minutes

☐ 30 minutes

☒ Hourly (Breathing Zone)

Additional Personal Air Monitoring for Specific Chemical Exposure

Action Levels for Volatile Organic Chemicals

- The workspace will be monitored using a photoionization detector (PID). These instruments must be properly maintained, calibrated and charged (refer to the instrument manuals for details). Zero this meter in the same relative humidity as the area in which it will be used and allow at least a 10-minute warm-up prior to zeroing. Do not zero in a contaminated area.
- An initial vapor measurement survey of the site should be conducted to detect "hot spots" if contaminated soil is exposed at the surface. Vapor measurement surveys of the workspace should be conducted at least hourly or more often if persistent petroleum-related odors are detected. Additionally, if vapor concentrations exceed 5 parts per million (ppm) above background continuously for a 5-minute period as measured in the breathing zone, upgrade to Level C personal protective equipment (PPE) or move to a non-contaminated area.
- Standard industrial hygiene/safety procedure is to require that action be taken to reduce worker exposure to organic vapors when vapor concentrations exceed one-half the threshold limit value (TLV). Because of the variety of chemicals, the PID will not indicate exposure to a specific PEL. Table C-8.

TABLE C-10. AIR MONITORING ACTION LEVELS

Contaminant	Activity	Monitoring Device	Frequency of Monitoring Breathing Zone	Action Level	Action
Organic Vapors	Drilling and sampling	PID	Start of shift; every 60 minutes and in event of odors	Background to 5 ppm in breathing zone	Use Level D or Modified Level D PPE

Contaminant	Activity	Monitoring Device	Frequency of Monitoring Breathing Zone	Action Level	Action
Organic Vapors	Drilling and sampling	PID	Start of shift; every 60 minutes and in event of odors	5 to 50 ppm in breathing zone	Upgrade to Level C PPE
Organic Vapors	Drilling and sampling	PID	Start of shift; every 60 minutes and in event of odors	> 50 ppm in breathing zone	Stop work and evacuate the area. Contact Health and Safety Program Manager for guidance.
Combustible Atmosphere	Drilling and sampling	PID	Start of shift; every 60 minutes and in event of odors	>1,000 ppm	Stop work and evacuate the site. Contact Health and Safety Program Manager for guidance.

SITE CONTROL PLAN

Work zones will be considered to be within 50 feet of the drill rig, backhoe, or other equipment. Employees should work upwind of the machinery if possible. To the extent practicable, use the buddy system. Do not approach heavy equipment unless you are sure the operator sees you and has indicated it is safe to approach. All personnel from GeoEngineers and subcontractor(s) should be made aware of safety features during each morning's safety tailgate meeting (drill rig shutoff switch, location of fire extinguishers, cell phone numbers, etc.). For medical assistance, see the Emergency Information section above.

Traffic or Vehicle Access Control Plans

Survey tape and traffic cones will be used to cordon off any areas on site where borings will be conducted or monitoring wells will be developed and sampled in order to restrict public vehicular and pedestrian access. When working in city right-of-way on arterial roads, a traffic control plan is provided, and traffic control equipment shall be deployed in accordance with the plan.

Site Work Zones

An exclusion zone, contamination reduction zone, and support zone should be established around working areas. Personnel leaving the facility or on break should exit the exclusion zone through the contamination reduction zone. The contamination reduction zone, at a minimum, should consist of garbage bags into which used PPE should be disposed. Personnel should wash hands at the Facility before eating or leaving the facility.

Hot zone/exclusion zone: *Within 10 feet of borings or excavations*

Method of Delineation / Excluding Non-Site Personnel	
	Fence
X	Traffic Cones
X	Other Road Work Signs

Buddy System

Personnel on site should use the buddy system (pairs), particularly whenever communication is restricted. If only one GeoEngineers employee is on site, a buddy system can be arranged with subcontractor/ contractor personnel.

Site Communication Plan

Positive communications (within sight and hearing distance or via radio) should be maintained between pairs on site, with the pair remaining in proximity to assist each other in case of emergencies. The team should prearrange hand signals or other emergency signals for communication when voice communication becomes impaired (including cases of lack of radios or radio breakdown) and an agreed upon location for an emergency assembly area.

In instances where communication cannot be maintained, you should consider suspending work until it can be restored. If this is not an option, the following are some examples for communication:

- Hand gripping throat: Out of air, can't breathe.
- Gripping partner's wrist or placing both hands around waist: Leave area immediately, no debate.
- Hands on top of head: Need assistance.
- Thumbs up: Okay, I'm all right; or I understand.
- Thumbs down: No, negative.

Emergency Action

In the event of an emergency, employees with convene in a designated area Identified on the Job Hazard Analyses Form (JHA) Form 3. Employees should communicate with others working on site and the PM to determine the Emergency Action Plan for each site. All personnel from GeoEngineers and subcontractor(s) should be made aware of the Emergency Action for the site at each morning's safety tailgate meeting (drill rig shutoff switch, location of fire extinguishers, cell phone numbers, etc.). For medical assistance, see the Emergency Information section above.

Decontamination Procedures

Decontamination, at a minimum, should include removing and disposing of PPE when exiting the exclusion zone; and washing your hands. Decontamination may also consist of removing outer protective gloves and washing soiled boots and gloves using bucket and brush provided on site in the contamination reduction zone. If needed, inner gloves will then be removed, and respirator, hands and face will be washed in either a portable wash station or a bathroom facility at the site. Employees will perform decontamination procedures and wash before eating, drinking or leaving the site.

Waste Disposal or Storage

Used PPE is to be placed in a plastic bag and disposed of as municipal waste.

Drill Cutting/Excavated Sediment Disposal or Storage:

☒ On site in DOT approved steel drums, pending analysis and further action

☐ Secured (list method):

☐ Other (describe destination, responsible parties):

PERSONAL PROTECTIVE EQUIPMENT

After the initial and/or daily hazard assessment has been completed the appropriate personal protective equipment (PPE) will be selected to ensure worker safety. Task-specific levels of PPE shall be reviewed with field personnel during the pre-work briefing conducted before the start of site operations. Task-specific levels of PPE shall be reviewed with field personnel during the pre-work briefing conducted before the start of site operations.

Site activities include handling and sampling solid subsurface material (material may potentially be saturated with contaminated materials and groundwater). Depth-to-groundwater measurements will be performed as well. Site hazards include potential exposure to hazardous materials, and physical hazards such as trips/falls, heavy equipment, and contaminant exposure.

Air monitoring will be conducted to determine the level of respiratory protection.

- Level D PPE, unless a higher level of protection is required, will be worn at all times on the site. Potentially exposed personnel will wash gloves, hands, face and other pertinent items to prevent hand-to-mouth contact. This will be done prior to hand-to-mouth activities including eating, smoking, etc.
- Adequate personnel and equipment decontamination will be used to decrease potential ingestion and inhalation.

Check Applicable Personal Protection Equipment to be Used	
X	Hardhat
X	Steel-toed boots
X	Safety glasses
X	Hearing protection
X	Rubber boots (if wet conditions)
Gloves (specify)	
X	Nitrile
	Latex
	Liners
	Leather
	Other (specify) _____
Protective clothing	
	Tyvek (if dry conditions are encountered, Tyvek is sufficient)
	Saranex (personnel will use Saranex if liquids are handled or splash may be an issue)

Check Applicable Personal Protection Equipment to be Used	
X	Cotton
X	Rain gear (as needed)
X	Layered warm clothing (as needed)
Inhalation hazard protection	
X	Level D
	Level C (respirators with organic vapor filters / P100 filters)

Personal Protective Clothing Inspections

PPE clothing ensembles designated for use during site activities shall be selected to provide protection against known or anticipated hazards. However, no protective garment, glove or boot is entirely chemical-resistant, nor does any PPE provide protection against all types of hazards. To obtain optimum performance from PPE, site personnel shall be trained in the proper use and inspection of PPE. This training shall include the following:

- Inspect PPE before and during use for imperfect seams, non-uniform coatings, tears, poorly functioning closures or other defects. If the integrity of the PPE is compromised in any manner, proceed to the contamination reduction zone and replace the PPE.
- Inspect PPE during use for visible signs of chemical permeation such as swelling, discoloration, stiffness, brittleness, cracks, tears or other signs of punctures. If the integrity of the PPE is compromised in any manner, proceed to the contamination reduction zone and replace the PPE.
- Disposable PPE should not be reused after breaks unless it has been properly decontaminated.

Respirator Selection, Use and Maintenance

If respirators are required, site personnel shall be trained before use on the proper use, maintenance and limitations of respirators. Additionally, they must be medically qualified to wear respiratory protection in accordance with 29 CFR 1910.134. Site personnel who will use a tight-fitting respirator must have passed a qualitative or quantitative fit test conducted in accordance with an OSHA-accepted fit test protocol. Fit testing must be repeated annually or whenever a new type of respirator is used. Respirators will be stored in a protective container.

Respirator Cartridges

If the action levels identified in the Air Monitoring Action Levels Table in Table C-10, are exceeded, site personnel should don respiratory protection appropriate for the known or suspected chemical of concern. For the identified field activities, use of a respirator is not anticipated. If PID readings trigger the action levels in Table C-10, stop work and a respirator must be obtained from a GeoEngineers office if air concentration remains above the action levels. For most sites, a half-face or full-face air purifying respirator with a NIOSH-approved organic vapor/HEPA P100 combination cartridge (Level C), will be appropriate for the known or suspected chemicals of concern. Monitoring frequency should be continuous while using Level C respiratory protection. The SSO closely monitor personnel using respiratory protection, including observing for signs of fatigue or respiratory distress, the potential for cartridge breakthrough or increased resistance to inhalation, and the need for changes in the level of respiratory protection based on air

monitoring. The frequency and duration of breaks should be increased for personnel working in respiratory protection. If at any time on-site air monitoring indicates Level B respiratory protection is warranted, personnel should leave the exclusion zone and consult with the HSM.

If site personnel are required to wear air-purifying respirators, the appropriate cartridges shall be selected to protect personnel from known or anticipated site contaminants. The respirator/cartridge combination shall be approved and NIOSH-certified. A cartridge change-out schedule shall be developed based on known site contaminants, anticipated contaminant concentrations and data supplied by the cartridge manufacturer related to the absorption capacity of the cartridge for specific contaminants. Site personnel shall be made aware of the cartridge change-out schedule prior to the initiation of site activities. Site personnel shall also be instructed to change respirator cartridges if they detect increased resistance during inhalation or detect vapor breakthrough by smell, taste or feel, although breakthrough is not an acceptable method of determining the change-out schedule.

Respirator Inspection and Cleaning

The Site Safety Officer shall periodically (weekly) inspect respirators at the project site. Site personnel shall inspect respirators prior to each use in accordance with the manufacturer's instructions. In addition, site personnel wearing a tight-fitting respirator shall perform a positive and negative pressure user seal check each time the respirator is donned, to ensure proper fit and function. User seal checks shall be performed in accordance with the GeoEngineers respiratory protection program or the respirator manufacturer's instructions.

ADDITIONAL ELEMENTS

Cold Stress Prevention

Working in cold environments presents many hazards to site personnel and can result in frost nip (superficial freezing of the skin), frost bite (deep tissue freezing), or hypothermia (lowering of the core body temperature).

The combination of wind and cold temperatures increases the degree of cold stress experienced by site personnel. Site personnel shall be trained on the signs and symptoms of cold-related illnesses, how the human body adapts to cold environments, and how to prevent the onset of cold-related illnesses. Heated break areas and warm beverages shall be provided during periods of cold weather.

Heat Stress Prevention

Keep workers hydrated in a hot outdoor environment requires more water be provided than at other times of the year. When employee exposure is at or above an applicable temperature listed in the Heat Stress table below, Project Managers will ensure that:

- A sufficient quantity of drinking water is readily accessible to employees at all times.
- All employees have the opportunity to drink at least 1 quart of drinking water per hour.

HEAT STRESS

Type of Clothing	Outdoor Temperature Action Levels
Nonbreathing clothes including vapor barrier clothing or PPE such as chemical resistant suits	52°
Double-layer woven clothes including coveralls, jackets and sweatshirts	77°
All other clothing	89°

Emergency Response

Indicate what site-specific procedures you will implement.

- Personnel on site should use the "buddy system" (pairs).
- Visual contact should be maintained between "pairs" on site, with the team remaining in proximity to assist each other in case of emergencies.
- If any member of the field crew experiences any adverse exposure symptoms while on site, the entire field crew should immediately halt work and act according to the instructions provided by the SSO.
- Wind indicators visible to all on-site personnel should be provided by the SSO to indicate possible routes for upwind escape. Alternatively, the SSO may ask on-site personnel to observe the wind direction periodically during site activities.
- The discovery of any condition that would suggest the existence of a situation more hazardous than anticipated should result in the evacuation of the field team, contact of the PM, and reevaluation of the hazard and the level of protection required.
- If an accident occurs, the Site Safety Officer and the injured person are to complete, within 24 hours, an Accident Report (Form 4) for submittal to the PM, the HSPM, and HR. The PM should ensure that follow-up action is taken to correct the situation that caused the accident or exposure.

MISCELLANEOUS

Personnel Medical Surveillance

GeoEngineers employees are not in a medical surveillance program because they do not fall into the category of "Employees Covered" in OSHA 1910.120(f)(2), which states that a medical surveillance program is required for the following employees:

1. All employees who are or may be exposed to hazardous substances or health hazards at or above the permissible exposure limits or, if there is no permissible exposure limit, above the published exposure levels for these substances, without regard to the use of respirators, for 30 days or more a year.
2. All employees who wear a respirator for 30 days or more a year or as required by state and federal regulations.
3. All employees who are injured, become ill or develop signs or symptoms due to possible overexposure involving hazardous substances or health hazards from an emergency response or hazardous waste operation.
4. Members of HAZMAT teams.

Spill Containment Plans (Drum and Container Handling)

Based upon the most recent aerial imagery, the site appears to be generally flat to gently sloping down to the southwest where asphalt pavement meets the creek embankment. In the occurrence of a spill, materials would likely drain as surface runoff to the southwest and eventually into the vegetative creek drainage. No engineered site drains were observed.

Sampling, Managing and Handling Drums and Containers

Drums and containers used during the investigation shall meet the appropriate Department of Transportation (DOT), OSHA and U.S. Environmental Protection Agency (EPA) regulations for the waste that they contain. Site operations shall be organized to minimize the amount of drum or container movement. When practicable, drums and containers shall be inspected and their integrity shall be ensured before they are moved. Unlabeled drums and containers shall be considered to contain hazardous substances and handled accordingly until the contents are positively identified and labeled. Before drums or containers are moved, all employees involved in the transfer operation shall be warned of the potential hazards associated with the contents.

Drums or containers and suitable quantities of proper absorbent shall be kept available and used where spills, leaks or rupturing may occur. Where major spills may occur, a spill containment program shall be implemented to contain and isolate the entire volume of the hazardous substance being transferred. Fire extinguishing equipment shall be on hand and ready for use to control incipient fires.

Entry Procedures for Tanks or Vaults (Confined Spaces)

GeoEngineers employees shall not enter confined spaces to perform work unless they have been properly trained and with hands-on experience in the use of retrieval equipment. If a project requires confined space entry, please include a copy of the confined space permit and include the training documentation in this HASP.

Trenches greater than 4 feet in depth with the potential for buildup of a hazardous atmosphere are considered confined spaces.

Sanitation

Sanitary facilities are not available on site. The Ward Rugh facility is the closest bathroom. Soap and water will be available in GeoEngineers vehicle.

Lighting

Work is anticipated to be performed during daylight hours. Work may extend slightly into the evening provided adequate lighting is used (e.g., portable flood lights).

DOCUMENTATION TO BE COMPLETED FOR HAZWOPER PROJECTS

- Daily Field Log
- FORM 1—Health and Safety Pre-Entry Briefing and Acknowledgment of Site Health and Safety Plan for use by employees, subcontractors and visitors
- FORM 2—Safety Meeting Record
- FORM 3—Job Hazard Analyses (JHA) Form
- FORM 4—Accident/Exposure Report Form

NOTE: The Field Log is to contain the following information:

- Updates on hazard assessments, field decisions, conversations with subcontractors, client or other parties, etc.;
- Air monitoring/calibration results, including: personnel, locations monitored, activity at the time of monitoring, etc.;
- Actions taken;
- Action level for upgrading PPE and rationale; and
- Meteorological conditions (temperature, wind direction, wind speed, humidity, rain, snow, etc.).

APPROVALS

1.	Plan Preparation	Bryce K. Hanson	4/22/2021 Date
2.	Plan Approval	Jedidiah R. Sugalski PM Signature	4/22/2021 Date
3.	Health & Safety Officer	Mary Lou Sullivan Health & Safety Program Manager	4/22/2021 Date

FORM 1
HEALTH AND SAFETY PRE-ENTRY BRIEFING AND ACKNOWLEDGEMENT OF THE SITE HEALTH AND SAFETY PLAN FOR GEOENGINEERS' EMPLOYEES, SUBCONTRACTORS AND VISITORS
ELLENSBURG CITY WEST 8TH STREET ROW SITE ASSESSMENT
FILE NO. 0504-169-00

Inform employees, contractors and subcontractors or their representatives about:

- The nature, level and degree of exposure to hazardous substances they're likely to encounter;
- All site-related emergency response procedures; and
- Any identified potential fire, explosion, health, safety or other hazards.

Conduct briefings for employees, contractors and subcontractors, or their representatives as follows:

- A pre-entry briefing before any site activity is started.
- Additional briefings, as needed, to make sure that the Site-specific HASP is followed.
- Make sure all employees working on the Site are informed of any risks identified and trained on how to protect themselves and other workers against the Site hazards and risks.
- Update all information to reflect current sight activities and hazards.
- All personnel participating in this project must receive initial health and safety orientation. Thereafter, brief tailgate safety meetings will be held as deemed necessary by the Site Safety Officer.
- The orientation and the tailgate safety meetings shall include a discussion of emergency response, site communications and site hazards.

(All of GeoEngineers' Site workers shall complete this form, which should remain attached to the HASP and be filed with other project documentation). Please be advised that this site-specific HASP is intended for use by GeoEngineers employees only. Nothing herein shall be construed as granting rights to GeoEngineers' subcontractors or any other contractors working on this site to use or legally rely on this HASP. GeoEngineers specifically disclaims any responsibility for the health and safety of any person not employed by the company.

I hereby verify that a copy of the current HASP has been provided by GeoEngineers, Inc., for my review and personal use. I have read the document completely and acknowledge an understanding of the safety procedures and protocol for my responsibilities on site. I agree to comply with all required, specified safety regulations and procedures.

Print Name **Signature** **Date**

_____

_____

_____

FORM 2
SAFETY MEETING RECORD
ELLENSBURG CITY WEST 8TH STREET ROW SITE ASSESSMENT
FILE NO. 0504-169-00

Safety meetings should include a discussion of emergency response, site communications and site hazards.

- Use in conjunction with the HASP and Job Hazard Analyses (JHA) Form 3 to help identify hazards.

Date: _____ **Site Safety Officer (SSO):**_____

Topics: _____

Attendees:

Print Name	**Signature:**

FORM 3
JOB HAZARD ANALYSES (JHA) FORM
ELLENSBURG CITY WEST 8TH STREET ROW SITE ASSESSMENT
FILE NO. 0504-169-00

This form can be used for analyses of daily hazards where there are multiple tasks and ongoing projects and for record keeping purposes. Make copies as needed.

Project: Site Investigation **File No:** 0504-169-00	**Date:** 4/20/2021	**Site Location:** 710 West 8th Street Ellensburg, WA 98926

Development Team:	**Position/Title:**	**Reviewed by:**	**Position/Title:**
JR Sugalski	Senior Environmental Engineer	Name	Position
Name	Position	Name	Position

Minimum Required Protective Equipment: (see critical actions for task-specific requirements)

PPE	**Equipment**	**Tools**	**Actions**
☒ Hard Hat	☐ Safety Beacons	☒ Cell/Satellite Phone	☒ Stay Visible
☒ High Visibility Vest	☒ Safety Cones	☐ Digital Camera	☒ Equipment Inspection
☒ Safety Shoes/Waders	☒ First Aid Kit	☐ iPad	☒ Work in Pairs
☒ Gloves	☒ Fire Extinguisher	☐	☒ Safety Control/Traffic Plan
☒ Safety Glasses	☒ Eye Wash/ Drinking Water	☐	☐

Job Steps	**Potential Hazards**	**Critical Actions to Mitigate Hazards**
Pre-Job Activities	Example: Unfamiliar locations, congestion, unpaved roads, Mechanical Failure, Flat Tires Vehicle Fire, Exhaust Leaks, Vehicle Collision, Internal Projectiles	■ Inspect the vehicle before departure: ▪ Check for tire cuts, fluid leaks, flat tires, body damage, windshield cracks, and other damage. ▪ Check lights, wipers, fluid levels, and seat belts. ■ Study the area maps, photos and use GPS and compass skills. ■ Identify the safest spot to park field vehicles.
Familiarize crew with the task and location of site	Crew does not notify site owner / manager. Unaware of the job site hazards and steps to prevent injury. Appropriate personnel protective equipment not worn. Other Hazards	■ Example: Conduct a tailgate safety meeting discussing the jobs, the hazards and actions that will be taken to prevent injury. ■ Discuss "Stop Work Authority" as it applies to each site member. ■ Discuss appropriate PPE including high visibility clothing such as reflective vest. ■ Notify attendant and/or site owner/manager of work activities and location. ■ Discuss appropriate PPE including high visibility clothing such as reflective vest. ■ Set up exclusion zone surrounding work area.

Driving to work site location (Highway Driving)	Unfamiliar road, Mechanical Failure, Flat Tires, Vehicle Fire, Vehicle Collision. Other Hazards	■ Inspect the vehicle before departure: ○ Check for tire cuts, fluid leaks, flat tires, body damage, windshield cracks, and other damage. ○ Check lights, wipers, fluid levels, and seat belts. ■ Study the area maps, photos and use GPS and compass skills. ■ Use only vehicles appropriate for the work needs and the driving conditions expected. ■ Ensure the vehicle has a complete and current first aid kit and fire extinguisher. ■ Place heavy objects behind a secure safety cage if they must be carried in a passenger compartment. ■ Use parking brake, and don't leave vehicle unattended while it is running. ■ Ensure vehicle has fuel to get to and from your destinations. ■ Inform your Project Manager of your destination and estimated time of return. ■ Carry extra food, water, and clothing. ■ Drive defensively.
Driving on Unimproved Roads **(Off-Highway Driving)**	Encountering Other Vehicles on Narrow Unfamiliar Road, Narrow, Rough Roads, Animal / Object Collision, Running / Skidding Off Road, Icy / Muddy Roads Flying Debris (Rocks, etc.), Poor Visibility Backing, Run-Away Vehicle, Roadway Obstacles Project Manager unaware of location.	■ Stay on the main roadway. Pull over on firm ground and avoid soft shoulders, if a stop is necessary. ■ Drive on maintained trails when possible. ■ Drive with care in tall brush and grass. Watch for wildlife, fallen trees, rocks, and other obstacles. ■ Slow down, especially on corners. Maintain a safe speed at all times. ■ Follow from a safe distance. ■ Know when and how to use 4WD. ■ Use only vehicles appropriate to the road conditions. Learn these conditions before you go. ■ Pull over to allow larger vehicles (i.e.: trucks and trailers) to pass from either direction. ■ Don't travel the road at all if there is high potential for vehicle damage. ■ Park so that backing up will not be necessary. ■ Use a spotter or get out to check behind vehicle.

		■ Use ground guide to walk the path on questionable roadways. ■ When removing debris from the roadway, use care, lift properly, and use proper equipment and PPE. ■ When descending a long grade, use lower gears to control speed rather than brakes. ■ Keep vehicle well ventilated by opening a window at least 6 inches, when idling or heating for a period. ■ Keep all windows clear of snow, ice, mud, and anything else obstructing the driver's view. ■ Keep vehicle windows clean, inside and out, and washer fluid full. Replace damaged or worn wipers.
Traveling on Foot	Falls, Foot Injuries, and Stress and Impact Injuries Forest Fires Lightning Personal Safety	■ Identify and use safe travel routes. Do not exceed physical abilities or equipment design. ■ Use pack equipment properly. Carry weight on hips, not back. ■ Warm up and stretch the appropriate muscle groups before and after hitting the trail. ■ Test and use secure footing. Move cautiously and deliberately. Never run. ■ In heavy undergrowth, particularly off-trail, slow down and watch carefully. ■ Carry tools on the downhill side. ■ Wear safety-toed boots with good, non-skid soles that are tall enough to support ankles. ■ Know basic first aid. Completion of a basic first aid course is required. ■ Use footwear appropriate to the terrain and load being carried. ■ Know how to fall. Roll, protect the head and neck, and do not extend arms to break the fall. ■ Wear fire retardant clothing ■ Refer to GeoEngineers Personal Safety Program - Never you're your personal safety. Leave the area and contact your Project Manager. ■ Travel on maintained trails when possible.
	Biological Hazards	■ Discuss applicable hazard mitigation measures - Insects, Snakes, Wildlife, Vegetation

Slope Evaluation	Slips, Trips and Falls	■ Travel on maintained trails when possible. ■ Take extra precautions when encountering steep, loose, wet trail conditions. ■ Always carry tools on your downhill side. ■ Use a rope for stability if needed / tie off to trees / have throw rope with on-shore buddy. ■ Take slow deliberate steps as conditions dictate. ■ Use a flashlight after dark. ■ Travel after dark only in an emergency. ■ Wear appropriate footwear for conditions.
Communication	Additional Hazards, i.e., No communication in case of emergency	■ Verify cell phone is working. ■ Maintain communication with Project Manager throughout job task. ■ Verify location and contact numbers for emergency medical assistance or 911.
	Additional Hazards, i.e., Emergency	■ **Dial 911** ■ Hospital Route (Attached Fall Protection Plan)
Required Control Measures: (check the box when complete)		
☐ Perform a pre-work vehicle inspection (First Aid kit, fire extinguisher).		
☐ Drive defensively looking out for the other guy.		
☐ Conduct a pre-work safety meeting.		
☐ Use a Safety Watch to monitor equipment Minimum Approach Distance (MAD) and to keep personnel clear if needed.		
☐ Wear Personal Protective Equipment (PPE).		
☐ Ensure training is current (First Aid, defensive driving, etc.).		
☐ Conduct Task Safety Assessments throughout the job.		
Additional Comments:		

DAILY HAZARD ASSESSMENT RECORD OF SAFETY MEETINGS

Signature **Date** **Signature** **Date**

_____

_____

_____

_____

FORM 4
ACCIDENT/EXPOSURE REPORT FORM
ELLENSBURG CITY WEST 8TH STREET ROW SITE ASSESSMENT
FILE NO. 0504-169-00

To (Supervisor): _____ From (Employee): _____

Telephone (with area code): _____

Name of injured or ill employee: _____

Date of accident: Time of accident: Exact location of accident:

_____

Narrative description of: **accident**/**exposure** (circle one):

_____

_____

_____

_____

_____

Medical attention given on site:

_____

_____

_____

_____

Nature of illness or injury and part of body involved: Lost Time? Yes ☐ No ☐

_____

_____

Probably Disability (check one):

Fatal	Lost work day with days away from work	Lost work day with days of restricted activity	No lost work day	First Aid only
☐	☐	☐	☐	☐

Corrective action taken by reporting unit and corrective action that remains to be taken (by whom and when):

_____

_____

Employee Signature: Date:

Name of Supervisor:

ATTACHMENT A
COVID-19 SUPPLEMENTARY JHA

GeoEngineers

Project Name: **File No:**	**Date:**	**Site Location:**

Application:

This COVID-19 supplementary JHA is designed to meet the requirements of GeoEngineers' Field Safety During COVID-19 protocols and the COVID-19 Response Plan as well as the recommendations provided by the Centers for Disease Control and Prevention (CDC) and other applicable state or federal agencies.

PPE/Supplies/Actions Equipment: (select those applicable to this jobsite)

PPE	**Supplies**	**Tools**	**Actions**
☐ Eye Protection	☐ Hand Washing Soap	☐ Cell Phone/Satellite	☐ Maximize Social Distance (≥6ft)
☐ Gloves	☐ Hand Washing Water Supply	☐ Scanning Thermometer	☐ Meeting Location Planning
☐ Cloth Face Covering	☐ Hand Sanitizer	☐ Water Basin	☐ Hand Washing
☐ N95 Mask	☐ Sanitizing Wipes		☐ High Touch Surface Sanitation
☐ Disposable Coveralls			

Job Steps	**Potential Hazard**	**Critical Actions to Mitigate Hazard**
Mobilization to worksite	Transmission of COVID-19 Virus	■ Pack hand sanitizer and wipes for use during all modes of business travel. ■ Assign hand sanitizer to vehicle when able. ■ Sanitize "high touch" areas: keys, steering wheels, dash controls, door handles, mirror adjustments, shifter, blinkers, head rests, etc. ■ Re-Fueling: Use sampling gloves or wash hands after using the pump at a gas station. When possible, do this before you get back into the vehicle. ■ Intra-Site Transportation: Maintain social distancing on transport skiffs or multi- passenger ATVs. Request multiple trips if overcrowded. Keep your field PPE on during travel.

Pre-work Safety Meetings	Transmission of COVID-19 Virus	■ Review site maps, photos and routes prior to site arrival to anticipate present staffing or public density areas. ■ Conduct a tailgate safety meeting in location that can accommodate greater than 6 feet social distancing. ■ Keep group sizes as small as possible (≤ 10 people or smaller depending on individual state guidance). ■ Meeting attendance should be verbally announced and recorded by a single representative to avoid contact with shared supplies/ equipment/computers/work surfaces. ■ Use verbal greetings. Do not shake hands, hug, fist bump, or high five. ■ Wear face coverings if social distances cannot be maintained. ■ Use own supply of pens, notebooks and similar field supplies.
Site Operations	Transmission of COVID-19 Virus	■ Maximize social distances to the greatest extent feasible. ■ If tasks or locations require sharing workspaces in proximity to others with less than 6 feet separation, wear a face covering. ■ Sanitize shared tools or equipment. ■ Use own vehicle as site office rather than shared spaces. ■ Wash ungloved hands after contacting shared surfaces. ■ Sanitize personal items regularly (cell phone, water bottle, clipboards, notebooks). ■ Set up exclusion zones surrounding public interface areas if less than 6 feet separation. ■ Wear face covering if traveling off site for lunch/coffee/supplies and recommended social distances cannot be maintained. ■ Leave job site if experiencing onset of COVID-19 symptoms.
Positive or Assumed Positive COVID-19 Result at Job Site	Transmission of COVID-19 Virus	■ Contact your manager as soon as information is received of a positive or assumed positive result on the jobsite. ■ Determine if you have had close and prolonged personal proximity to the individual. ■ Based on proximity, you may be asked to remove yourself from the worksite. ■ Your manager will provide guidance for how to proceed safely following worksite withdrawal.
Additional Comments:		

Daily JHA Record of Safety Meetings

Name of Attendees Date

Signature of Individual Verifying the Above Date

GeoEngineers

APPENDIX C
Chemical Analytical Laboratory Reports

GeoEngineers

523 East Second Avenue, Spokane, Washington 99202, Telephone: 509.363.3125 www.geoengineers.com

Data Validation Report

Project: Ellensburg City, West 8th Street Right-of-Way (ROW)– Site Assessment
May 2021 Soil and Groundwater Samples

GEI File No: 0504-169-00

Date: June 15, 2021

This report documents the results of a United States Environmental Protection Agency (USEPA)-defined Stage 2A data validation (USEPA Document 540-R-08-005; USEPA, 2009) of analytical data from the analyses of soil and groundwater samples collected as part of the May 2021 sampling events, and the associated laboratory and field quality control (QC) samples. The samples were obtained from the Ellensburg City West 8th Street ROW site located on the 700 block of West University Way (formerly West 8th Street) in Ellensburg, Washington.

Objective and Quality Control Elements

GeoEngineers, Inc. (GeoEngineers) completed the data validation consistent with the USEPA Contract Laboratory Program National Functional Guidelines for Organic Superfund Methods Data Review (USEPA, 2020) (National Functional Guidelines) to determine if the laboratory analytical results meet the project objectives and are usable for their intended purpose. Data usability was assessed by determining if:

- The samples were analyzed using well-defined and acceptable methods that provide reporting limits below applicable regulatory criteria;
- The precision and accuracy of the data are well-defined and sufficient to provide defensible data; and
- The quality assurance/quality control (QA/QC) procedures utilized by the laboratory meet acceptable industry practices and standards.

In accordance with the Quality Assurance Project Plan (QAPP), Appendix B of the Work Plan (GeoEngineers, 2021), the data validation included review of the following QC elements:

- Data Package Completeness
- Chain-of-Custody Documentation
- Holding Times and Sample Preservation
- Surrogate Recoveries
- Method and Trip Blanks
- Matrix Spikes/Matrix Spike Duplicates
- Laboratory Control Samples/Laboratory Control Sample Duplicates
- Field Duplicates
- Miscellaneous

Validated Sample Delivery Groups

This data validation included review of the sample delivery group (SDG) listed below in Table 1.

TABLE 1. SUMMARY OF VALIDATED SAMPLE DELIVERY GROUPS

Laboratory SDG	Samples Validated
590-15226-1	GEI029-B1 (5.5-6), GEI029-B1-052521, GEI029-DUP-052521, GEI029-B2 (5.5-6), GEI029-B2-052521, GEI029-B3 (6.5-7), GEI029-B3-052521, GEI029-B4 (6-6.5), GEI029-B4-052521, GEI029-B5 (6-6.5), GEI029-B5-052521, Trip Blank (soil), Trip Blank (water)

Chemical Analysis Performed

Eurofins TestAmerica Laboratories, Inc. (TestAmerica), located in Spokane, Washington, performed laboratory analyses on the samples using one or more of the following methods:

- Gasoline-Range Hydrocarbons (NWTPH-Gx) by Method NWTPH-Gx;
- Petroleum Hydrocarbons (NWTPH-Dx) by Method NWTPH-Dx; and
- Volatile Organic Compounds (VOCs) by Method EPA8260D

Data Validation Summary

The results for each of the QC elements are summarized below.

Data Package Completeness

TestAmerica provided the required deliverables for the data validation according to the National Functional Guidelines. The laboratory followed adequate corrective action processes and the identified anomalies were discussed in the relevant laboratory case narrative.

Chain-of-Custody Documentation

Chain-of-custody (COC) forms were provided with the laboratory analytical reports. The COCs were accurate and complete when submitted to the laboratory.

Holding Times and Sample Preservation

The sample holding time is defined as the time that elapses between sample collection and sample analysis. Maximum holding time criteria exist for each analysis to help ensure that the analyte concentrations found at the time of analysis reflect the concentration present at the time of sample collection. Established holding times were met for each analysis. The sample cooler arrived at the laboratory outside the appropriate temperatures of between 2 and 6 degrees Celsius at 1.3 degrees Celsius. It was determined through professional judgment, that since the samples were not frozen when received by the laboratory, this temperature should not affect the sample analytical results.

Surrogate Recoveries

A surrogate compound is a compound that is chemically similar to the organic analytes of interest, but unlikely to be found in an environmental sample. Surrogates are used for organic analyses and are added to the samples, standards, and blanks to serve as an accuracy and specificity check of each analysis. The surrogates are added to the samples at a known concentration and percent recoveries are calculated following analysis. The surrogate percent recoveries for field samples were within the laboratory control limits.

Method and Trip Blanks

Method Blanks

Method blanks are analyzed to ensure that laboratory procedures and reagents do not introduce measurable concentrations of the analytes of interest. A method blank was analyzed with each batch of samples, at a frequency of 1 per 20 samples. For each sample batch, method blanks for the applicable methods were analyzed at the required frequency. None of the analytes of interest were detected in the method blanks.

Trip Blanks

Trip blanks are analyzed to provide an indication as to whether volatile compounds have cross-contaminated other like samples within the transportation process to the laboratory. None of the analytes of interest were detected in the trip blanks.

Matrix Spikes/Matrix Spike Duplicates

Since the actual analyte concentration in an environmental sample is not known, the accuracy of a particular analysis is usually inferred by performing a matrix spike (MS) analysis on one sample from the associated batch, known as the parent sample. One aliquot of the sample is analyzed in the normal manner and then a second aliquot of the sample is spiked with a known amount of analyte concentration and analyzed. From these analyses, a percent recovery is calculated. Matrix spike duplicate (MSD) analyses are generally performed for organic analyses as a precision check and analyzed in the same sequence as a matrix spike. Using the result values from the MS and MSD, the relative percent difference (RPD) is calculated.

A laboratory control sample/laboratory control sample duplicate (LCS/LCSD) sample set was performed in lieu of a MS/MSD analysis.

Laboratory Control Samples/Laboratory Control Sample Duplicates

A laboratory control sample (LCS) is a blank sample that is spiked with a known amount of analyte and then analyzed. An LCS is similar to an MS, but without the possibility of matrix interference. Given that matrix interference is not an issue, the LCS/LCSD control limits for accuracy and precision are usually more rigorous than for MS/MSD analyses. Additionally, data qualification based on LCS/LCSD analyses would apply to each sample in the associated batch, instead of just the parent sample. The percent recovery control limits for LCS and LCSD analyses are specified in the laboratory documents, as are the RPD control limits for LCS/LCSD sample sets.

One LCS/LCSD analysis should be performed for every analytical batch or every 20 field samples, whichever is more frequent. The frequency requirements were met for each analysis and the percent recovery and RPD values were within the proper control limits, with the following exception:

SDG 590-15226-1: (VOCs) The percent recovery for ethylbenzene was greater than the control limits in the LCS extracted on 6/1/2021. There were no positive results for this target analyte in the associated field samples; therefore, no qualifications were required.

Field Duplicates

In order to assess precision, field duplicate samples were collected and analyzed along with the reviewed sample batches. The duplicate samples were analyzed for the same parameters as the associated parent samples. Precision is determined by calculating the RPD between each pair of samples. If one or more of

the sample analytes has a concentration less than 5 times the reporting limit for that sample, then the absolute difference is used instead of the RPD. The RPD control limits are specified in the QAPP.

SDG 590-15226-1: One field duplicate sample pair, GEI029-B1-052521 and GEI029-DUP-052521, was submitted with this SDG. The precision criteria for the target analytes were met for this sample pair.

Miscellaneous

SDG 590-15226-1: (NWTPH-Dx) The laboratory noted that positive results for diesel-range hydrocarbons in samples GEI029-B1 (5.5-6), GEI029-B3 (6.5-7) and GEI029-B5 (6-6.5) appear to be due to lube oil overlap, which may bias the reported sample concentration. For this reason, the positive results for diesel-range hydrocarbons were qualified as estimated (J) in these samples.

Overall Assessment

As was determined by this data validation, the laboratory followed the specified analytical methods. Accuracy was acceptable, as demonstrated by the surrogate and LCS/LCSD percent recovery values, with the exception noted above. Precision was acceptable, as demonstrated by the LCS/LCSD and field duplicate RPD values.

The data are acceptable for the intended use, with the following qualifications listed below in Table 2.

TABLE 2. SUMMARY OF QUALIFIED SAMPLES

Sample ID	Analyte	Qualifier	Reason
GEI029-B1 (5.5-6)	Diesel-range hydrocarbons	J	See Miscellaneous
GEI029-B3 (6.5-7)	Diesel-range hydrocarbons	J	See Miscellaneous
GEI029-B5 (6-6.5)	Diesel-range hydrocarbons	J	See Miscellaneous

References

U.S. Environmental Protection Agency (USEPA). "Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use," EPA-540-R-08-005. January 2009.

U.S. Environmental Protection Agency (USEPA). "Contract Laboratory Program National Functional Guidelines for Organic Superfund Methods Data Review," EPA-540-R-20-005. November 2020.

GeoEngineers, Inc. (GeoEngineers). "Work Plan, Ellensburg City West 8th Street ROW," prepared for Washington State Department of Ecology. April 22, 2021.

eurofins | Environment Testing America

ANALYTICAL REPORT

Eurofins TestAmerica, Spokane
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Tel: (509)924-9200

Laboratory Job ID: 590-15226-1
Client Project/Site: Ellensburg City West 8th/0504-169-00

For:
GeoEngineers Inc
523 East Second Ave
Spokane, Washington 99202

Attn: JR Sugalski

Randee Arrington

Authorized for release by:
6/9/2021 3:33:16 PM

Randee Arrington, Lab Director
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Case Narrative

Client: GeoEngineers Inc
Job ID: 590-15226-1
Project/Site: Ellensburg City West 8th/0504-169-00

Job ID: 590-15226-1

Laboratory: Eurofins TestAmerica, Spokane

Narrative

Receipt
The samples were received on 5/28/2021 8:05 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 1.3º C.

GC/MS VOA
Method 8260D: The laboratory control sample (LCS) for preparation batch 590-31793 and analytical batch 590-31801 recovered outside control limits for the following analytes: Ethylbenzene. These analytes were biased high in the LCS and were not detected in the associated samples; therefore, the data have been reported.

Method 8260D: The following sample was provided to the laboratory with a significantly different initial weight than that required by the reference method: GEI029-B2 (5.5-6) (590-15226-2). Deviations in the weight by more than 20% may affect reporting limits and potentially method performance. The method specifies 10 grams. The amount provided was 6.432 grams.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC Semi VOA
Method NWTPH-Dx: Detected hydrocarbons in the diesel range appear to be due to oil overlap in the following samples: GEI029-B1 (5.5-6) (590-15226-1), GEI029-B3 (6.5-7) (590-15226-3) and GEI029-B5 (6-6.5) (590-15226-5).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Organic Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

VOA Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Sample Summary

Client: GeoEngineers Inc
Job ID: 590-15226-1
Project/Site: Ellensburg City West 8th/0504-169-00

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
590-15226-1	GEI029-B1 (5.5-6)	Solid	05/25/21 13:05	05/28/21 08:05	
590-15226-2	GEI029-B2 (5.5-6)	Solid	05/25/21 13:15	05/28/21 08:05	
590-15226-3	GEI029-B3 (6.5-7)	Solid	05/25/21 13:30	05/28/21 08:05	
590-15226-4	GEI029-B4 (6-6.5)	Solid	05/25/21 13:50	05/28/21 08:05	
590-15226-5	GEI029-B5 (6-6.5)	Solid	05/25/21 14:05	05/28/21 08:05	
590-15226-6	Trip Blank	Solid	05/25/21 12:30	05/28/21 08:05	
590-15226-7	GEI029-B1-052521	Water	05/25/21 14:44	05/28/21 08:05	
590-15226-8	GEI029-B2-052521	Water	05/25/21 15:42	05/28/21 08:05	
590-15226-9	GEI029-B3-052521	Water	05/25/21 16:34	05/28/21 08:05	
590-15226-10	GEI029-B4-052521	Water	05/25/21 15:16	05/28/21 08:05	
590-15226-11	GEI029-B5-052521	Water	05/25/21 16:08	05/28/21 08:05	
590-15226-12	GEI029-DUP-052521	Water	05/25/21 12:30	05/28/21 08:05	
590-15226-13	Trip Blank	Water	05/25/21 12:30	05/28/21 08:05	

Definitions/Glossary

Client: GeoEngineers Inc
Job ID: 590-15226-1
Project/Site: Ellensburg City West 8th/0504-169-00

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
*+	LCS and/or LCSD is outside acceptance limits, high biased.

GC Semi VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Client Sample ID: GEI029-B1 (5.5-6)

Lab Sample ID: 590-15226-1
Date Collected: 05/25/21 13:05
Matrix: Solid
Date Received: 05/28/21 08:05
Percent Solids: 93.6

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		0.027	0.013	mg/Kg	☼	06/01/21 10:50	06/01/21 19:46	1
Ethylbenzene	ND	*+	0.13	0.022	mg/Kg	☼	06/01/21 10:50	06/01/21 19:46	1
m,p-Xylene	ND		0.54	0.038	mg/Kg	☼	06/01/21 10:50	06/01/21 19:46	1
o-Xylene	ND		0.27	0.031	mg/Kg	☼	06/01/21 10:50	06/01/21 19:46	1
Toluene	ND		0.13	0.018	mg/Kg	☼	06/01/21 10:50	06/01/21 19:46	1
Xylenes, Total	ND		0.80	0.069	mg/Kg	☼	06/01/21 10:50	06/01/21 19:46	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*83*		*75 - 129*	*06/01/21 10:50*	*06/01/21 19:46*	*1*
4-Bromofluorobenzene (Surr)	*97*		*76 - 122*	*06/01/21 10:50*	*06/01/21 19:46*	*1*
Dibromofluoromethane (Surr)	*93*		*80 - 120*	*06/01/21 10:50*	*06/01/21 19:46*	*1*
Toluene-d8 (Surr)	*103*		*80 - 120*	*06/01/21 10:50*	*06/01/21 19:46*	*1*

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		6.7	2.4	mg/Kg	☼	06/01/21 10:50	06/01/21 19:46	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*97*		*41.5 - 162*	*06/01/21 10:50*	*06/01/21 19:46*	*1*

Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics (DRO) (C10-C25)	**14**		10	4.3	mg/Kg	☼	06/04/21 13:21	06/04/21 22:37	1
Residual Range Organics (RRO) (C25-C36)	**140**		26	5.2	mg/Kg	☼	06/04/21 13:21	06/04/21 22:37	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*82*		*50 - 150*	*06/04/21 13:21*	*06/04/21 22:37*	*1*
n-Triacontane-d62	*73*		*50 - 150*	*06/04/21 13:21*	*06/04/21 22:37*	*1*

Client Sample ID: GEI029-B2 (5.5-6)

Lab Sample ID: 590-15226-2
Date Collected: 05/25/21 13:15
Matrix: Solid
Date Received: 05/28/21 08:05
Percent Solids: 89.1

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		0.037	0.019	mg/Kg	☼	06/01/21 10:50	06/01/21 20:07	1
Ethylbenzene	ND	*+	0.19	0.030	mg/Kg	☼	06/01/21 10:50	06/01/21 20:07	1
m,p-Xylene	ND		0.75	0.054	mg/Kg	☼	06/01/21 10:50	06/01/21 20:07	1
o-Xylene	ND		0.37	0.043	mg/Kg	☼	06/01/21 10:50	06/01/21 20:07	1
Toluene	ND		0.19	0.025	mg/Kg	☼	06/01/21 10:50	06/01/21 20:07	1
Xylenes, Total	ND		1.1	0.096	mg/Kg	☼	06/01/21 10:50	06/01/21 20:07	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*85*		*75 - 129*	*06/01/21 10:50*	*06/01/21 20:07*	*1*
4-Bromofluorobenzene (Surr)	*104*		*76 - 122*	*06/01/21 10:50*	*06/01/21 20:07*	*1*
Dibromofluoromethane (Surr)	*91*		*80 - 120*	*06/01/21 10:50*	*06/01/21 20:07*	*1*
Toluene-d8 (Surr)	*101*		*80 - 120*	*06/01/21 10:50*	*06/01/21 20:07*	*1*

Client Sample ID: GEI029-B2 (5.5-6)
Lab Sample ID: 590-15226-2
Date Collected: 05/25/21 13:15
Matrix: Solid
Date Received: 05/28/21 08:05
Percent Solids: 89.1

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		9.3	3.4	mg/Kg	☼	06/01/21 10:50	06/01/21 20:07	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*104*		*41.5 - 162*	*06/01/21 10:50*	*06/01/21 20:07*	*1*

Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics (DRO) (C10-C25)	**140**	**J**	220	92	mg/Kg	☼	06/04/21 13:21	06/04/21 23:19	20
Residual Range Organics (RRO) (C25-C36)	**1700**		550	110	mg/Kg	☼	06/04/21 13:21	06/04/21 23:19	20

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*63*		*50 - 150*	*06/04/21 13:21*	*06/04/21 23:19*	*20*
n-Triacontane-d62	*55*		*50 - 150*	*06/04/21 13:21*	*06/04/21 23:19*	*20*

Client Sample ID: GEI029-B3 (6.5-7)
Lab Sample ID: 590-15226-3
Date Collected: 05/25/21 13:30
Matrix: Solid
Date Received: 05/28/21 08:05
Percent Solids: 93.8

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		0.025	0.013	mg/Kg	☼	06/01/21 10:50	06/01/21 20:29	1
Ethylbenzene	ND	*+	0.13	0.021	mg/Kg	☼	06/01/21 10:50	06/01/21 20:29	1
m,p-Xylene	ND		0.51	0.036	mg/Kg	☼	06/01/21 10:50	06/01/21 20:29	1
o-Xylene	ND		0.25	0.029	mg/Kg	☼	06/01/21 10:50	06/01/21 20:29	1
Toluene	ND		0.13	0.017	mg/Kg	☼	06/01/21 10:50	06/01/21 20:29	1
Xylenes, Total	ND		0.76	0.066	mg/Kg	☼	06/01/21 10:50	06/01/21 20:29	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*83*		*75 - 129*	*06/01/21 10:50*	*06/01/21 20:29*	*1*
4-Bromofluorobenzene (Surr)	*100*		*76 - 122*	*06/01/21 10:50*	*06/01/21 20:29*	*1*
Dibromofluoromethane (Surr)	*92*		*80 - 120*	*06/01/21 10:50*	*06/01/21 20:29*	*1*
Toluene-d8 (Surr)	*105*		*80 - 120*	*06/01/21 10:50*	*06/01/21 20:29*	*1*

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		6.3	2.3	mg/Kg	☼	06/01/21 10:50	06/01/21 20:29	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*100*		*41.5 - 162*	*06/01/21 10:50*	*06/01/21 20:29*	*1*

Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics (DRO) (C10-C25)	**55**		53	22	mg/Kg	☼	06/04/21 13:21	06/04/21 23:40	5
Residual Range Organics (RRO) (C25-C36)	**700**		130	27	mg/Kg	☼	06/04/21 13:21	06/04/21 23:40	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*71*		*50 - 150*	*06/04/21 13:21*	*06/04/21 23:40*	*5*
n-Triacontane-d62	*64*		*50 - 150*	*06/04/21 13:21*	*06/04/21 23:40*	*5*

Client Sample ID: GEI029-B4 (6-6.5)
Lab Sample ID: 590-15226-4
Date Collected: 05/25/21 13:50
Matrix: Solid
Date Received: 05/28/21 08:05
Percent Solids: 79.4

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		0.025	0.013	mg/Kg	☼	06/01/21 10:50	06/01/21 20:50	1
Ethylbenzene	ND	*+	0.13	0.020	mg/Kg	☼	06/01/21 10:50	06/01/21 20:50	1
m,p-Xylene	ND		0.50	0.036	mg/Kg	☼	06/01/21 10:50	06/01/21 20:50	1
o-Xylene	ND		0.25	0.029	mg/Kg	☼	06/01/21 10:50	06/01/21 20:50	1
Toluene	ND		0.13	0.017	mg/Kg	☼	06/01/21 10:50	06/01/21 20:50	1
Xylenes, Total	ND		0.75	0.065	mg/Kg	☼	06/01/21 10:50	06/01/21 20:50	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*82*		*75 - 129*	*06/01/21 10:50*	*06/01/21 20:50*	*1*
4-Bromofluorobenzene (Surr)	*101*		*76 - 122*	*06/01/21 10:50*	*06/01/21 20:50*	*1*
Dibromofluoromethane (Surr)	*91*		*80 - 120*	*06/01/21 10:50*	*06/01/21 20:50*	*1*
Toluene-d8 (Surr)	*106*		*80 - 120*	*06/01/21 10:50*	*06/01/21 20:50*	*1*

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		6.3	2.3	mg/Kg	☼	06/01/21 10:50	06/01/21 20:50	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*101*		*41.5 - 162*	*06/01/21 10:50*	*06/01/21 20:50*	*1*

Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics (DRO) (C10-C25)	ND		12	5.2	mg/Kg	☼	06/04/21 13:21	06/05/21 00:01	1
Residual Range Organics (RRO) (C25-C36)	ND		31	6.2	mg/Kg	☼	06/04/21 13:21	06/05/21 00:01	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*79*		*50 - 150*	*06/04/21 13:21*	*06/05/21 00:01*	*1*
n-Triacontane-d62	*75*		*50 - 150*	*06/04/21 13:21*	*06/05/21 00:01*	*1*

Client Sample ID: GEI029-B5 (6-6.5)
Lab Sample ID: 590-15226-5
Date Collected: 05/25/21 14:05
Matrix: Solid
Date Received: 05/28/21 08:05
Percent Solids: 89.3

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		0.024	0.012	mg/Kg	☼	06/01/21 10:50	06/01/21 21:11	1
Ethylbenzene	ND	*+	0.12	0.019	mg/Kg	☼	06/01/21 10:50	06/01/21 21:11	1
m,p-Xylene	ND		0.47	0.034	mg/Kg	☼	06/01/21 10:50	06/01/21 21:11	1
o-Xylene	ND		0.24	0.027	mg/Kg	☼	06/01/21 10:50	06/01/21 21:11	1
Toluene	ND		0.12	0.016	mg/Kg	☼	06/01/21 10:50	06/01/21 21:11	1
Xylenes, Total	ND		0.71	0.061	mg/Kg	☼	06/01/21 10:50	06/01/21 21:11	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*85*		*75 - 129*	*06/01/21 10:50*	*06/01/21 21:11*	*1*
4-Bromofluorobenzene (Surr)	*97*		*76 - 122*	*06/01/21 10:50*	*06/01/21 21:11*	*1*
Dibromofluoromethane (Surr)	*96*		*80 - 120*	*06/01/21 10:50*	*06/01/21 21:11*	*1*
Toluene-d8 (Surr)	*103*		*80 - 120*	*06/01/21 10:50*	*06/01/21 21:11*	*1*

Client Sample ID: GEI029-B5 (6-6.5)
Lab Sample ID: 590-15226-5
Date Collected: 05/25/21 14:05
Matrix: Solid
Date Received: 05/28/21 08:05
Percent Solids: 89.3

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		5.9	2.1	mg/Kg	☼	06/01/21 10:50	06/01/21 21:11	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*97*		*41.5 - 162*	*06/01/21 10:50*	*06/01/21 21:11*	*1*

Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics (DRO) (C10-C25)	**98**		56	23	mg/Kg	☼	06/04/21 13:21	06/05/21 00:22	5
Residual Range Organics (RRO) (C25-C36)	**760**		140	28	mg/Kg	☼	06/04/21 13:21	06/05/21 00:22	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*74*		*50 - 150*	*06/04/21 13:21*	*06/05/21 00:22*	*5*
n-Triacontane-d62	*63*		*50 - 150*	*06/04/21 13:21*	*06/05/21 00:22*	*5*

Client Sample ID: Trip Blank
Lab Sample ID: 590-15226-6
Date Collected: 05/25/21 12:30
Matrix: Solid
Date Received: 05/28/21 08:05

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		0.020	0.010	mg/Kg		06/01/21 10:50	06/01/21 21:32	1
Ethylbenzene	ND	*+	0.10	0.016	mg/Kg		06/01/21 10:50	06/01/21 21:32	1
m,p-Xylene	ND		0.40	0.029	mg/Kg		06/01/21 10:50	06/01/21 21:32	1
o-Xylene	ND		0.20	0.023	mg/Kg		06/01/21 10:50	06/01/21 21:32	1
Toluene	ND		0.10	0.013	mg/Kg		06/01/21 10:50	06/01/21 21:32	1
Xylenes, Total	ND		0.60	0.052	mg/Kg		06/01/21 10:50	06/01/21 21:32	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*83*		*75 - 129*	*06/01/21 10:50*	*06/01/21 21:32*	*1*
4-Bromofluorobenzene (Surr)	*99*		*76 - 122*	*06/01/21 10:50*	*06/01/21 21:32*	*1*
Dibromofluoromethane (Surr)	*93*		*80 - 120*	*06/01/21 10:50*	*06/01/21 21:32*	*1*
Toluene-d8 (Surr)	*106*		*80 - 120*	*06/01/21 10:50*	*06/01/21 21:32*	*1*

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		5.0	1.8	mg/Kg		06/01/21 10:50	06/01/21 21:32	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*99*		*41.5 - 162*	*06/01/21 10:50*	*06/01/21 21:32*	*1*

Client Sample ID: GEI029-B1-052521
Lab Sample ID: 590-15226-7
Date Collected: 05/25/21 14:44
Matrix: Water
Date Received: 05/28/21 08:05

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		0.40	0.093	ug/L			06/03/21 17:03	1
Ethylbenzene	ND		1.0	0.20	ug/L			06/03/21 17:03	1
m,p-Xylene	ND		2.0	0.28	ug/L			06/03/21 17:03	1
o-Xylene	ND		1.0	0.16	ug/L			06/03/21 17:03	1

Client Sample ID: GEI029-B1-052521
Lab Sample ID: 590-15226-7
Date Collected: 05/25/21 14:44
Matrix: Water
Date Received: 05/28/21 08:05

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Toluene	ND		1.0	0.31	ug/L			06/03/21 17:03	1
Xylenes, Total	ND		3.0	0.44	ug/L			06/03/21 17:03	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*97*		*80 - 120*		*06/03/21 17:03*	*1*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*		*06/03/21 17:03*	*1*
Dibromofluoromethane (Surr)	*97*		*80 - 120*		*06/03/21 17:03*	*1*
Toluene-d8 (Surr)	*96*		*80 - 120*		*06/03/21 17:03*	*1*

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	**170**		150	70	ug/L			06/03/21 17:03	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*101*		*68.7 - 141*		*06/03/21 17:03*	*1*

Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics (DRO) (C10-C25)	ND		0.23	0.10	mg/L		06/07/21 10:53	06/07/21 22:28	1
Residual Range Organics (RRO) (C25-C36)	**0.14**	**J**	0.38	0.11	mg/L		06/07/21 10:53	06/07/21 22:28	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*84*		*50 - 150*	*06/07/21 10:53*	*06/07/21 22:28*	*1*
n-Triacontane-d62	*81*		*50 - 150*	*06/07/21 10:53*	*06/07/21 22:28*	*1*

Client Sample ID: GEI029-B2-052521
Lab Sample ID: 590-15226-8
Date Collected: 05/25/21 15:42
Matrix: Water
Date Received: 05/28/21 08:05

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		0.40	0.093	ug/L			06/03/21 17:25	1
Ethylbenzene	ND		1.0	0.20	ug/L			06/03/21 17:25	1
m,p-Xylene	ND		2.0	0.28	ug/L			06/03/21 17:25	1
o-Xylene	ND		1.0	0.16	ug/L			06/03/21 17:25	1
Toluene	ND		1.0	0.31	ug/L			06/03/21 17:25	1
Xylenes, Total	ND		3.0	0.44	ug/L			06/03/21 17:25	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*95*		*80 - 120*		*06/03/21 17:25*	*1*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*		*06/03/21 17:25*	*1*
Dibromofluoromethane (Surr)	*95*		*80 - 120*		*06/03/21 17:25*	*1*
Toluene-d8 (Surr)	*94*		*80 - 120*		*06/03/21 17:25*	*1*

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		150	70	ug/L			06/03/21 17:25	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*100*		*68.7 - 141*		*06/03/21 17:25*	*1*

Client Sample ID: GEI029-B2-052521
Lab Sample ID: 590-15226-8
Date Collected: 05/25/21 15:42
Matrix: Water
Date Received: 05/28/21 08:05

Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics (DRO) (C10-C25)	**0.11**	**J**	0.23	0.11	mg/L		06/07/21 10:53	06/07/21 22:49	1
Residual Range Organics (RRO) (C25-C36)	**0.37**	**J**	0.38	0.12	mg/L		06/07/21 10:53	06/07/21 22:49	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*92*		*50 - 150*	*06/07/21 10:53*	*06/07/21 22:49*	*1*
n-Triacontane-d62	*93*		*50 - 150*	*06/07/21 10:53*	*06/07/21 22:49*	*1*

Client Sample ID: GEI029-B3-052521
Lab Sample ID: 590-15226-9
Date Collected: 05/25/21 16:34
Matrix: Water
Date Received: 05/28/21 08:05

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		0.40	0.093	ug/L			06/03/21 17:47	1
Ethylbenzene	ND		1.0	0.20	ug/L			06/03/21 17:47	1
m,p-Xylene	ND		2.0	0.28	ug/L			06/03/21 17:47	1
o-Xylene	ND		1.0	0.16	ug/L			06/03/21 17:47	1
Toluene	ND		1.0	0.31	ug/L			06/03/21 17:47	1
Xylenes, Total	ND		3.0	0.44	ug/L			06/03/21 17:47	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*96*		*80 - 120*		*06/03/21 17:47*	*1*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*		*06/03/21 17:47*	*1*
Dibromofluoromethane (Surr)	*98*		*80 - 120*		*06/03/21 17:47*	*1*
Toluene-d8 (Surr)	*98*		*80 - 120*		*06/03/21 17:47*	*1*

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		150	70	ug/L			06/03/21 17:47	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*101*		*68.7 - 141*		*06/03/21 17:47*	*1*

Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics (DRO) (C10-C25)	ND		0.24	0.11	mg/L		06/07/21 10:53	06/07/21 23:10	1
Residual Range Organics (RRO) (C25-C36)	**0.19**	**J**	0.40	0.12	mg/L		06/07/21 10:53	06/07/21 23:10	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*91*		*50 - 150*	*06/07/21 10:53*	*06/07/21 23:10*	*1*
n-Triacontane-d62	*90*		*50 - 150*	*06/07/21 10:53*	*06/07/21 23:10*	*1*

Client Sample ID: GEI029-B4-052521
Lab Sample ID: 590-15226-10
Date Collected: 05/25/21 15:16
Matrix: Water
Date Received: 05/28/21 08:05

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		0.40	0.093	ug/L			06/03/21 18:09	1

Client Sample ID: GEI029-B4-052521
Lab Sample ID: 590-15226-10
Date Collected: 05/25/21 15:16
Matrix: Water
Date Received: 05/28/21 08:05

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	ND		1.0	0.20	ug/L			06/03/21 18:09	1
m,p-Xylene	ND		2.0	0.28	ug/L			06/03/21 18:09	1
o-Xylene	ND		1.0	0.16	ug/L			06/03/21 18:09	1
Toluene	ND		1.0	0.31	ug/L			06/03/21 18:09	1
Xylenes, Total	ND		3.0	0.44	ug/L			06/03/21 18:09	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*95*		*80 - 120*		*06/03/21 18:09*	*1*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*		*06/03/21 18:09*	*1*
Dibromofluoromethane (Surr)	*97*		*80 - 120*		*06/03/21 18:09*	*1*
Toluene-d8 (Surr)	*96*		*80 - 120*		*06/03/21 18:09*	*1*

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		150	70	ug/L			06/03/21 18:09	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*100*		*68.7 - 141*		*06/03/21 18:09*	*1*

Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics (DRO) (C10-C25)	ND		0.23	0.11	mg/L		06/07/21 10:53	06/07/21 23:30	1
Residual Range Organics (RRO) (C25-C36)	**0.14**	**J**	0.38	0.12	mg/L		06/07/21 10:53	06/07/21 23:30	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*87*		*50 - 150*	*06/07/21 10:53*	*06/07/21 23:30*	*1*
n-Triacontane-d62	*83*		*50 - 150*	*06/07/21 10:53*	*06/07/21 23:30*	*1*

Client Sample ID: GEI029-B5-052521
Lab Sample ID: 590-15226-11
Date Collected: 05/25/21 16:08
Matrix: Water
Date Received: 05/28/21 08:05

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		0.40	0.093	ug/L			06/03/21 18:31	1
Ethylbenzene	ND		1.0	0.20	ug/L			06/03/21 18:31	1
m,p-Xylene	ND		2.0	0.28	ug/L			06/03/21 18:31	1
o-Xylene	ND		1.0	0.16	ug/L			06/03/21 18:31	1
Toluene	ND		1.0	0.31	ug/L			06/03/21 18:31	1
Xylenes, Total	ND		3.0	0.44	ug/L			06/03/21 18:31	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*94*		*80 - 120*		*06/03/21 18:31*	*1*
4-Bromofluorobenzene (Surr)	*105*		*80 - 120*		*06/03/21 18:31*	*1*
Dibromofluoromethane (Surr)	*98*		*80 - 120*		*06/03/21 18:31*	*1*
Toluene-d8 (Surr)	*99*		*80 - 120*		*06/03/21 18:31*	*1*

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		150	70	ug/L			06/03/21 18:31	1

Client Sample ID: GEI029-B5-052521
Lab Sample ID: 590-15226-11
Date Collected: 05/25/21 16:08
Matrix: Water
Date Received: 05/28/21 08:05

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*105*		*68.7 - 141*		*06/03/21 18:31*	*1*

Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics (DRO) (C10-C25)	ND		0.23	0.11	mg/L		06/07/21 10:53	06/08/21 00:12	1
Residual Range Organics (RRO) (C25-C36)	ND		0.38	0.12	mg/L		06/07/21 10:53	06/08/21 00:12	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*86*		*50 - 150*	*06/07/21 10:53*	*06/08/21 00:12*	*1*
n-Triacontane-d62	*79*		*50 - 150*	*06/07/21 10:53*	*06/08/21 00:12*	*1*

Client Sample ID: GEI029-DUP-052521
Lab Sample ID: 590-15226-12
Date Collected: 05/25/21 12:30
Matrix: Water
Date Received: 05/28/21 08:05

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		0.40	0.093	ug/L			06/03/21 18:53	1
Ethylbenzene	ND		1.0	0.20	ug/L			06/03/21 18:53	1
m,p-Xylene	ND		2.0	0.28	ug/L			06/03/21 18:53	1
o-Xylene	ND		1.0	0.16	ug/L			06/03/21 18:53	1
Toluene	ND		1.0	0.31	ug/L			06/03/21 18:53	1
Xylenes, Total	ND		3.0	0.44	ug/L			06/03/21 18:53	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*95*		*80 - 120*		*06/03/21 18:53*	*1*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*		*06/03/21 18:53*	*1*
Dibromofluoromethane (Surr)	*97*		*80 - 120*		*06/03/21 18:53*	*1*
Toluene-d8 (Surr)	*98*		*80 - 120*		*06/03/21 18:53*	*1*

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		150	70	ug/L			06/03/21 18:53	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*102*		*68.7 - 141*		*06/03/21 18:53*	*1*

Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics (DRO) (C10-C25)	ND		0.23	0.11	mg/L		06/07/21 10:53	06/08/21 00:33	1
Residual Range Organics (RRO) (C25-C36)	**0.12**	**J**	0.38	0.11	mg/L		06/07/21 10:53	06/08/21 00:33	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*90*		*50 - 150*	*06/07/21 10:53*	*06/08/21 00:33*	*1*
n-Triacontane-d62	*86*		*50 - 150*	*06/07/21 10:53*	*06/08/21 00:33*	*1*

Client: GeoEngineers Inc
Job ID: 590-15226-1
Project/Site: Ellensburg City West 8th/0504-169-00

Client Sample ID: Trip Blank
Lab Sample ID: 590-15226-13
Date Collected: 05/25/21 12:30
Matrix: Water
Date Received: 05/28/21 08:05

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		0.40	0.093	ug/L			06/03/21 19:15	1
Ethylbenzene	ND		1.0	0.20	ug/L			06/03/21 19:15	1
m,p-Xylene	ND		2.0	0.28	ug/L			06/03/21 19:15	1
o-Xylene	ND		1.0	0.16	ug/L			06/03/21 19:15	1
Toluene	ND		1.0	0.31	ug/L			06/03/21 19:15	1
Xylenes, Total	ND		3.0	0.44	ug/L			06/03/21 19:15	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*92*		*80 - 120*		*06/03/21 19:15*	*1*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*		*06/03/21 19:15*	*1*
Dibromofluoromethane (Surr)	*94*		*80 - 120*		*06/03/21 19:15*	*1*
Toluene-d8 (Surr)	*102*		*80 - 120*		*06/03/21 19:15*	*1*

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		150	70	ug/L			06/03/21 19:15	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*101*		*68.7 - 141*		*06/03/21 19:15*	*1*

Method: 8260D - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 590-31793/1-A
Matrix: Solid
Analysis Batch: 31801

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 31793

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		0.020	0.010	mg/Kg		06/01/21 10:49	06/01/21 11:20	1
Ethylbenzene	ND		0.10	0.016	mg/Kg		06/01/21 10:49	06/01/21 11:20	1
m,p-Xylene	ND		0.40	0.029	mg/Kg		06/01/21 10:49	06/01/21 11:20	1
o-Xylene	ND		0.20	0.023	mg/Kg		06/01/21 10:49	06/01/21 11:20	1
Toluene	ND		0.10	0.013	mg/Kg		06/01/21 10:49	06/01/21 11:20	1
Xylenes, Total	ND		0.60	0.052	mg/Kg		06/01/21 10:49	06/01/21 11:20	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*93*		*75 - 129*	*06/01/21 10:49*	*06/01/21 11:20*	*1*
4-Bromofluorobenzene (Surr)	*95*		*76 - 122*	*06/01/21 10:49*	*06/01/21 11:20*	*1*
Dibromofluoromethane (Surr)	*102*		*80 - 120*	*06/01/21 10:49*	*06/01/21 11:20*	*1*
Toluene-d8 (Surr)	*104*		*80 - 120*	*06/01/21 10:49*	*06/01/21 11:20*	*1*

Lab Sample ID: LCS 590-31793/2-A
Matrix: Solid
Analysis Batch: 31801

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 31793

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	0.500	0.627		mg/Kg		125	76 - 129
Ethylbenzene	0.500	0.648	*+	mg/Kg		130	77 - 126
m,p-Xylene	0.500	0.651		mg/Kg		130	78 - 130
o-Xylene	0.500	0.600		mg/Kg		120	77 - 129
Toluene	0.500	0.649		mg/Kg		130	77 - 131

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*87*		*75 - 129*
4-Bromofluorobenzene (Surr)	*93*		*76 - 122*
Dibromofluoromethane (Surr)	*99*		*80 - 120*
Toluene-d8 (Surr)	*102*		*80 - 120*

Lab Sample ID: MB 590-31830/6
Matrix: Water
Analysis Batch: 31830

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		0.40	0.093	ug/L			06/03/21 11:52	1
Ethylbenzene	ND		1.0	0.20	ug/L			06/03/21 11:52	1
m,p-Xylene	ND		2.0	0.28	ug/L			06/03/21 11:52	1
o-Xylene	ND		1.0	0.16	ug/L			06/03/21 11:52	1
Toluene	ND		1.0	0.31	ug/L			06/03/21 11:52	1
Xylenes, Total	ND		3.0	0.44	ug/L			06/03/21 11:52	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*98*		*80 - 120*		*06/03/21 11:52*	*1*
4-Bromofluorobenzene (Surr)	*99*		*80 - 120*		*06/03/21 11:52*	*1*
Dibromofluoromethane (Surr)	*102*		*80 - 120*		*06/03/21 11:52*	*1*
Toluene-d8 (Surr)	*98*		*80 - 120*		*06/03/21 11:52*	*1*

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 590-31830/1003
Matrix: Water
Analysis Batch: 31830

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Benzene			10.0	8.90		ug/L		89	80 - 126		
Ethylbenzene			10.0	9.00		ug/L		90	80 - 128		
m,p-Xylene			10.0	8.92		ug/L		89	80 - 127		
o-Xylene			10.0	8.72		ug/L		87	80 - 126		
Toluene			10.0	8.94		ug/L		89	80 - 129		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*100*		*80 - 120*
4-Bromofluorobenzene (Surr)	*98*		*80 - 120*
Dibromofluoromethane (Surr)	*101*		*80 - 120*
Toluene-d8 (Surr)	*102*		*80 - 120*

Lab Sample ID: LCSD 590-31830/4
Matrix: Water
Analysis Batch: 31830

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene			10.0	9.95		ug/L		99	80 - 126	11	18
Ethylbenzene			10.0	10.0		ug/L		100	80 - 128	11	18
m,p-Xylene			10.0	10.0		ug/L		100	80 - 127	12	18
o-Xylene			10.0	9.92		ug/L		99	80 - 126	13	17
Toluene			10.0	10.2		ug/L		102	80 - 129	14	18

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*95*		*80 - 120*
4-Bromofluorobenzene (Surr)	*97*		*80 - 120*
Dibromofluoromethane (Surr)	*100*		*80 - 120*
Toluene-d8 (Surr)	*102*		*80 - 120*

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS)

Lab Sample ID: MB 590-31793/1-A
Matrix: Solid
Analysis Batch: 31800

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 31793

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		5.0	1.8	mg/Kg		06/01/21 10:49	06/01/21 11:20	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*95*		*41.5 - 162*	*06/01/21 10:49*	*06/01/21 11:20*	*1*

Lab Sample ID: LCS 590-31793/3-A
Matrix: Solid
Analysis Batch: 31800

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 31793

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Gasoline			50.0	57.8		mg/Kg		115	74.4 - 124		

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC/MS) (Continued)

Lab Sample ID: LCS 590-31793/3-A
Matrix: Solid
Analysis Batch: 31800

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 31793

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*99*		*41.5 - 162*

Lab Sample ID: MB 590-31831/6
Matrix: Water
Analysis Batch: 31831

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		150	70	ug/L			06/03/21 11:52	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*99*		*68.7 - 141*		*06/03/21 11:52*	*1*

Lab Sample ID: LCS 590-31831/1005
Matrix: Water
Analysis Batch: 31831

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Gasoline			1000	981		ug/L		98	80 - 120		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*103*		*68.7 - 141*

Lab Sample ID: LCSD 590-31831/1027
Matrix: Water
Analysis Batch: 31831

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Gasoline			1000	1030		ug/L		103	80 - 120	5	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*104*		*68.7 - 141*

Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Lab Sample ID: MB 590-31851/1-A
Matrix: Solid
Analysis Batch: 31847

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 31851

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics (DRO) (C10-C25)	ND		10	4.2	mg/Kg		06/04/21 13:21	06/04/21 15:40	1
Residual Range Organics (RRO) (C25-C36)	ND		25	5.0	mg/Kg		06/04/21 13:21	06/04/21 15:40	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*74*		*50 - 150*	*06/04/21 13:21*	*06/04/21 15:40*	*1*
n-Triacontane-d62	*69*		*50 - 150*	*06/04/21 13:21*	*06/04/21 15:40*	*1*

Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC) (Continued)

Lab Sample ID: LCS 590-31851/2-A
Matrix: Solid
Analysis Batch: 31847

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 31851

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Diesel Range Organics (DRO) (C10-C25)	66.7	62.8		mg/Kg		94	50 - 150
Residual Range Organics (RRO) (C25-C36)	66.7	66.9		mg/Kg		100	50 - 150

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
o-Terphenyl	*90*		*50 - 150*
n-Triacontane-d62	*77*		*50 - 150*

Lab Sample ID: MB 590-31865/1-A
Matrix: Water
Analysis Batch: 31866

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 31865

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics (DRO) (C10-C25)	ND		0.24	0.11	mg/L		06/07/21 10:53	06/07/21 20:23	1
Residual Range Organics (RRO) (C25-C36)	ND		0.40	0.12	mg/L		06/07/21 10:53	06/07/21 20:23	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*82*		*50 - 150*	*06/07/21 10:53*	*06/07/21 20:23*	*1*
n-Triacontane-d62	*71*		*50 - 150*	*06/07/21 10:53*	*06/07/21 20:23*	*1*

Lab Sample ID: LCS 590-31865/2-A
Matrix: Water
Analysis Batch: 31866

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 31865

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Diesel Range Organics (DRO) (C10-C25)	1.60	1.25		mg/L		78	50 - 150
Residual Range Organics (RRO) (C25-C36)	1.60	1.43		mg/L		89	50 - 150

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
o-Terphenyl	*85*		*50 - 150*
n-Triacontane-d62	*80*		*50 - 150*

Lab Sample ID: LCSD 590-31865/3-A
Matrix: Water
Analysis Batch: 31866

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 31865

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Diesel Range Organics (DRO) (C10-C25)	1.60	1.12		mg/L		70	50 - 150	10	25
Residual Range Organics (RRO) (C25-C36)	1.60	1.39		mg/L		87	50 - 150	3	25

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
o-Terphenyl	*85*		*50 - 150*

Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC) (Continued)

Lab Sample ID: LCSD 590-31865/3-A
Matrix: Water
Analysis Batch: 31866

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 31865

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
n-Triacontane-d62	79		50 - 150

Lab Chronicle

Client: GeoEngineers Inc
Job ID: 590-15226-1
Project/Site: Ellensburg City West 8th/0504-169-00

Client Sample ID: GEI029-B1 (5.5-6)
Lab Sample ID: 590-15226-1
Date Collected: 05/25/21 13:05
Matrix: Solid
Date Received: 05/28/21 08:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			31824	06/03/21 09:23	AMB	TAL SPK

Client Sample ID: GEI029-B1 (5.5-6)
Lab Sample ID: 590-15226-1
Date Collected: 05/25/21 13:05
Matrix: Solid
Date Received: 05/28/21 08:05
Percent Solids: 93.6

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			8.407 g	10 mL	31793	06/01/21 10:50	JSP	TAL SPK
Total/NA	Analysis	8260D		1	0.86 mL	43 mL	31801	06/01/21 19:46	JSP	TAL SPK
Total/NA	Prep	5035			8.407 g	10 mL	31793	06/01/21 10:50	JSP	TAL SPK
Total/NA	Analysis	NWTPH-Gx		1	0.86 mL	43 mL	31800	06/01/21 19:46	JSP	TAL SPK
Total/NA	Prep	3550C			15.46 g	5 mL	31851	06/04/21 13:21	NMI	TAL SPK
Total/NA	Analysis	NWTPH-Dx		1			31847	06/04/21 22:37	NMI	TAL SPK

Client Sample ID: GEI029-B2 (5.5-6)
Lab Sample ID: 590-15226-2
Date Collected: 05/25/21 13:15
Matrix: Solid
Date Received: 05/28/21 08:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			31824	06/03/21 09:23	AMB	TAL SPK

Client Sample ID: GEI029-B2 (5.5-6)
Lab Sample ID: 590-15226-2
Date Collected: 05/25/21 13:15
Matrix: Solid
Date Received: 05/28/21 08:05
Percent Solids: 89.1

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			6.432 g	10 mL	31793	06/01/21 10:50	JSP	TAL SPK
Total/NA	Analysis	8260D		1	0.86 mL	43 mL	31801	06/01/21 20:07	JSP	TAL SPK
Total/NA	Prep	5035			6.432 g	10 mL	31793	06/01/21 10:50	JSP	TAL SPK
Total/NA	Analysis	NWTPH-Gx		1	0.86 mL	43 mL	31800	06/01/21 20:07	JSP	TAL SPK
Total/NA	Prep	3550C			15.32 g	5 mL	31851	06/04/21 13:21	NMI	TAL SPK
Total/NA	Analysis	NWTPH-Dx		20			31847	06/04/21 23:19	NMI	TAL SPK

Client Sample ID: GEI029-B3 (6.5-7)
Lab Sample ID: 590-15226-3
Date Collected: 05/25/21 13:30
Matrix: Solid
Date Received: 05/28/21 08:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			31824	06/03/21 09:23	AMB	TAL SPK

Lab Chronicle

Client: GeoEngineers Inc
Job ID: 590-15226-1
Project/Site: Ellensburg City West 8th/0504-169-00

Client Sample ID: GEI029-B3 (6.5-7)
Lab Sample ID: 590-15226-3
Date Collected: 05/25/21 13:30
Matrix: Solid
Date Received: 05/28/21 08:05
Percent Solids: 93.8

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			8.88 g	10 mL	31793	06/01/21 10:50	JSP	TAL SPK
Total/NA	Analysis	8260D		1	0.86 mL	43 mL	31801	06/01/21 20:29	JSP	TAL SPK
Total/NA	Prep	5035			8.88 g	10 mL	31793	06/01/21 10:50	JSP	TAL SPK
Total/NA	Analysis	NWTPH-Gx		1	0.86 mL	43 mL	31800	06/01/21 20:29	JSP	TAL SPK
Total/NA	Prep	3550C			15.05 g	5 mL	31851	06/04/21 13:21	NMI	TAL SPK
Total/NA	Analysis	NWTPH-Dx		5			31847	06/04/21 23:40	NMI	TAL SPK

Client Sample ID: GEI029-B4 (6-6.5)
Lab Sample ID: 590-15226-4
Date Collected: 05/25/21 13:50
Matrix: Solid
Date Received: 05/28/21 08:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			31824	06/03/21 09:23	AMB	TAL SPK

Client Sample ID: GEI029-B4 (6-6.5)
Lab Sample ID: 590-15226-4
Date Collected: 05/25/21 13:50
Matrix: Solid
Date Received: 05/28/21 08:05
Percent Solids: 79.4

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			12.635 g	10 mL	31793	06/01/21 10:50	JSP	TAL SPK
Total/NA	Analysis	8260D		1	0.86 mL	43 mL	31801	06/01/21 20:50	JSP	TAL SPK
Total/NA	Prep	5035			12.635 g	10 mL	31793	06/01/21 10:50	JSP	TAL SPK
Total/NA	Analysis	NWTPH-Gx		1	0.86 mL	43 mL	31800	06/01/21 20:50	JSP	TAL SPK
Total/NA	Prep	3550C			15.21 g	5 mL	31851	06/04/21 13:21	NMI	TAL SPK
Total/NA	Analysis	NWTPH-Dx		1			31847	06/05/21 00:01	NMI	TAL SPK

Client Sample ID: GEI029-B5 (6-6.5)
Lab Sample ID: 590-15226-5
Date Collected: 05/25/21 14:05
Matrix: Solid
Date Received: 05/28/21 08:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			31824	06/03/21 09:23	AMB	TAL SPK

Client Sample ID: GEI029-B5 (6-6.5)
Lab Sample ID: 590-15226-5
Date Collected: 05/25/21 14:05
Matrix: Solid
Date Received: 05/28/21 08:05
Percent Solids: 89.3

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			10.549 g	10 mL	31793	06/01/21 10:50	JSP	TAL SPK
Total/NA	Analysis	8260D		1	0.86 mL	43 mL	31801	06/01/21 21:11	JSP	TAL SPK
Total/NA	Prep	5035			10.549 g	10 mL	31793	06/01/21 10:50	JSP	TAL SPK
Total/NA	Analysis	NWTPH-Gx		1	0.86 mL	43 mL	31800	06/01/21 21:11	JSP	TAL SPK
Total/NA	Prep	3550C			15.07 g	5 mL	31851	06/04/21 13:21	NMI	TAL SPK
Total/NA	Analysis	NWTPH-Dx		5			31847	06/05/21 00:22	NMI	TAL SPK

Lab Chronicle

Client: GeoEngineers Inc
Job ID: 590-15226-1
Project/Site: Ellensburg City West 8th/0504-169-00

Client Sample ID: Trip Blank
Lab Sample ID: 590-15226-6
Date Collected: 05/25/21 12:30
Matrix: Solid
Date Received: 05/28/21 08:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			10 g	10 mL	31793	06/01/21 10:50	JSP	TAL SPK
Total/NA	Analysis	8260D		1	0.86 mL	43 mL	31801	06/01/21 21:32	JSP	TAL SPK
Total/NA	Prep	5035			10 g	10 mL	31793	06/01/21 10:50	JSP	TAL SPK
Total/NA	Analysis	NWTPH-Gx		1	0.86 mL	43 mL	31800	06/01/21 21:32	JSP	TAL SPK

Client Sample ID: GEI029-B1-052521
Lab Sample ID: 590-15226-7
Date Collected: 05/25/21 14:44
Matrix: Water
Date Received: 05/28/21 08:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	43 mL	43 mL	31830	06/03/21 17:03	JSP	TAL SPK
Total/NA	Analysis	NWTPH-Gx		1	43 mL	43 mL	31831	06/03/21 17:03	JSP	TAL SPK
Total/NA	Prep	3510C			265.9 mL	2 mL	31865	06/07/21 10:53	NMI	TAL SPK
Total/NA	Analysis	NWTPH-Dx		1			31866	06/07/21 22:28	NMI	TAL SPK

Client Sample ID: GEI029-B2-052521
Lab Sample ID: 590-15226-8
Date Collected: 05/25/21 15:42
Matrix: Water
Date Received: 05/28/21 08:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	43 mL	43 mL	31830	06/03/21 17:25	JSP	TAL SPK
Total/NA	Analysis	NWTPH-Gx		1	43 mL	43 mL	31831	06/03/21 17:25	JSP	TAL SPK
Total/NA	Prep	3510C			260.5 mL	2 mL	31865	06/07/21 10:53	NMI	TAL SPK
Total/NA	Analysis	NWTPH-Dx		1			31866	06/07/21 22:49	NMI	TAL SPK

Client Sample ID: GEI029-B3-052521
Lab Sample ID: 590-15226-9
Date Collected: 05/25/21 16:34
Matrix: Water
Date Received: 05/28/21 08:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	43 mL	43 mL	31830	06/03/21 17:47	JSP	TAL SPK
Total/NA	Analysis	NWTPH-Gx		1	43 mL	43 mL	31831	06/03/21 17:47	JSP	TAL SPK
Total/NA	Prep	3510C			247 mL	2 mL	31865	06/07/21 10:53	NMI	TAL SPK
Total/NA	Analysis	NWTPH-Dx		1			31866	06/07/21 23:10	NMI	TAL SPK

Client Sample ID: GEI029-B4-052521
Lab Sample ID: 590-15226-10
Date Collected: 05/25/21 15:16
Matrix: Water
Date Received: 05/28/21 08:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	43 mL	43 mL	31830	06/03/21 18:09	JSP	TAL SPK
Total/NA	Analysis	NWTPH-Gx		1	43 mL	43 mL	31831	06/03/21 18:09	JSP	TAL SPK
Total/NA	Prep	3510C			260.3 mL	2 mL	31865	06/07/21 10:53	NMI	TAL SPK
Total/NA	Analysis	NWTPH-Dx		1			31866	06/07/21 23:30	NMI	TAL SPK

Lab Chronicle

Client: GeoEngineers Inc
Job ID: 590-15226-1
Project/Site: Ellensburg City West 8th/0504-169-00

Client Sample ID: GEI029-B5-052521
Lab Sample ID: 590-15226-11
Date Collected: 05/25/21 16:08
Matrix: Water
Date Received: 05/28/21 08:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	43 mL	43 mL	31830	06/03/21 18:31	JSP	TAL SPK
Total/NA	Analysis	NWTPH-Gx		1	43 mL	43 mL	31831	06/03/21 18:31	JSP	TAL SPK
Total/NA	Prep	3510C			260.4 mL	2 mL	31865	06/07/21 10:53	NMI	TAL SPK
Total/NA	Analysis	NWTPH-Dx		1			31866	06/08/21 00:12	NMI	TAL SPK

Client Sample ID: GEI029-DUP-052521
Lab Sample ID: 590-15226-12
Date Collected: 05/25/21 12:30
Matrix: Water
Date Received: 05/28/21 08:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	43 mL	43 mL	31830	06/03/21 18:53	JSP	TAL SPK
Total/NA	Analysis	NWTPH-Gx		1	43 mL	43 mL	31831	06/03/21 18:53	JSP	TAL SPK
Total/NA	Prep	3510C			261.5 mL	2 mL	31865	06/07/21 10:53	NMI	TAL SPK
Total/NA	Analysis	NWTPH-Dx		1			31866	06/08/21 00:33	NMI	TAL SPK

Client Sample ID: Trip Blank
Lab Sample ID: 590-15226-13
Date Collected: 05/25/21 12:30
Matrix: Water
Date Received: 05/28/21 08:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	43 mL	43 mL	31830	06/03/21 19:15	JSP	TAL SPK
Total/NA	Analysis	NWTPH-Gx		1	43 mL	43 mL	31831	06/03/21 19:15	JSP	TAL SPK

Laboratory References:

TAL SPK = Eurofins TestAmerica, Spokane, 11922 East 1st Ave, Spokane, WA 99206, TEL (509)924-9200

Accreditation/Certification Summary

Client: GeoEngineers Inc
Job ID: 590-15226-1
Project/Site: Ellensburg City West 8th/0504-169-00

Laboratory: Eurofins TestAmerica, Spokane

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Washington	State	C569	01-06-22

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
Moisture		Solid	Percent Moisture
Moisture		Solid	Percent Solids
NWTPH-Dx	3510C	Water	Residual Range Organics (RRO) (C25-C36)
NWTPH-Dx	3550C	Solid	Residual Range Organics (RRO) (C25-C36)

Method Summary

Client: GeoEngineers Inc
Job ID: 590-15226-1
Project/Site: Ellensburg City West 8th/0504-169-00

Method	Method Description	Protocol	Laboratory
8260D	Volatile Organic Compounds by GC/MS	SW846	TAL SPK
NWTPH-Gx	Northwest - Volatile Petroleum Products (GC/MS)	NWTPH	TAL SPK
NWTPH-Dx	Northwest - Semi-Volatile Petroleum Products (GC)	NWTPH	TAL SPK
Moisture	Percent Moisture	EPA	TAL SPK
3510C	Liquid-Liquid Extraction (Separatory Funnel)	SW846	TAL SPK
3550C	Ultrasonic Extraction	SW846	TAL SPK
5030C	Purge and Trap	SW846	TAL SPK
5035	Closed System Purge and Trap	SW846	TAL SPK

Protocol References:

EPA = US Environmental Protection Agency

NWTPH = Northwest Total Petroleum Hydrocarbon

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SPK = Eurofins TestAmerica, Spokane, 11922 East 1st Ave, Spokane, WA 99206, TEL (509)924-9200

Eurofins TestAmerica, Spokane
11922 East 1st Ave
Spokane, WA 99206
Phone: 509-924-9200 Fax: 509-924-9290

Chain of Custody Record

eurofins | Environment Testing America

Client Information	Sampler: Justin Orr	Lab PM: Arrington, Randee E	Carrier Tracking No(s):	COC No: 590-6505-1930.1
Client Contact: JR Sugalski	Phone: (406) 890-1310	E-Mail: Randee.Arrington@Eurofinset.com	State of Origin:	Page: Page 1 of 2
Company: GeoEngineers Inc	PWSID:			Job #:
Address: 523 East Second Ave	Due Date Requested: STD			
City: Spokane	TAT Requested (days): STD			
State, Zip: WA, 99202	Compliance Project: Δ Yes Δ No			
Phone: 509-209-2830(Tel)	PO #: Purchase Order not required			
Email: jsugalski@geoengineers.com	WO #:			
Project Name: Ellensburg City West 8th/0504-169-00	Project #: 59002150			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	NWTPH_Dx - DRO and RRO (N)	8260D, NWTPH_Gx_MS (F)	NWTPH_Dx - DRO and RRO (A)	8260D, NWTPH_Gx_MS (A)	8260D - BTEX (F)	8260D - BTEX (A)	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	F	A	A	F	A		
GE1029-B1 (5.5-6)	5/25/21	1305	G	Solid			X	X			X			
GE1029-B2(5.5-6)		1315		Solid			X	X			X			
GE1029-B3(6.5-7)		1330		Solid			X	X			X			
GE1029-B4(6-6.5)		1350		Solid			X	X			X			
GE1029-B5(6-6.5)		1405		Solid			X	X			X			
Trip Blank		1230		Solid				X			X			
GE1029-B1-052521		1444		~~Solid~~ W			X	X			X			
GE1029-B2-052521		1542		Water			X	X			X			
GE1029-B3-052521		1634		Water			X	X			X			
GE1029-B4-052521		1516		Water			X	X			X			
GE1029-B5-052521		1609		Water			X	X			X			

590-15226 Chain of Custody

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify)	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		5-28-21 / 0805	GEI		5/28/21 0805	ETA SP
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 1.3° C IR#0

Ver: 11/01/2020

6/9/2021

Eurofins TestAmerica, Spokane
11922 East 1st Ave
Spokane, WA 99206
Phone: 509-924-9200 Fax: 509-924-9290

Chain of Custody Record

eurofins | Environment Testing America

Client Information	Sampler: Justin Orr	Lab PM: Arrington, Randee E	Carrier Tracking No(s):	COC No: 590-6505-1930.2
Client Contact: JR Sugalski	Phone: (406) 890-1310	E-Mail: Randee.Arrington@Eurofinset.com	State of Origin:	Page: Page 2 of 2
Company: GeoEngineers Inc	PWSID:			Job #:
Address: 523 East Second Ave	Due Date Requested:			
City: Spokane	TAT Requested (days):			
State, Zip: WA, 99202	Compliance Project: Δ Yes Δ No			
Phone: 509-209-2830(Tel)	PO #: Purchase Order not required			
Email: jsugalski@geoengineers.com	WO #:			
Project Name: Ellensburg City West 8th/0504-169-00	Project #: 59002150			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (Wewater, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	NWTPH_Dx - DRO and RRO	8260D, NWTPH_Gx_MS	NWTPH_Dx - DRO and RRO	8260D, NWTPH_Gx_MS	8260D - BTEX	8260D - BTEX	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	F	A	A	F	A		
GE1029-DUP-052521	5/25/21	1230	G	Water			X	X			X			
Trip Blank	5/25/21	1230	G	Water				X			X			
				Water										
				Solid										
				Water										

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		5-28-21 / 0805	GGI		5/28/21 0805	ETNSP
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks: 1.3° C

Ver: 11/01/2020

6/9/2021

Login Sample Receipt Checklist

Client: GeoEngineers Inc

Job Number: 590-15226-1

Login Number: 15226
List Number: 1
Creator: O'Toole, Maria C

List Source: Eurofins TestAmerica, Spokane

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	Lab does not accept radioactive samples.
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	No analysis requiring residual chlorine check assigned.

APPENDIX D
Report Limitations and Guidelines for Use

APPENDIX D
REPORT LIMITATIONS AND GUIDELINES FOR USE[1]

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

Environmental Services Are Performed for Specific Purposes, Persons and Projects

This report has been prepared for the exclusive use of the Washington State Department of Ecology (Ecology). 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 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 Ecology should rely on this environmental report 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 has been prepared for the Ellensburg City West 8th Street ROW site located on the 700 block of West University Way (formerly West 8th Street) in Ellensburg, 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.

If important changes are made after the date of this report, 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

Our report was prepared for the exclusive use of Ecology. No other party may rely on the product of our services unless we agree in advance to such reliance in writing. This is to provide our firm and Ecology with reasonable protection against open-ended liability claims by third parties with whom there would otherwise be no contractual limits to their actions. Within the limitations of scope, schedule and budget, our services have been executed in accordance with our Agreement with Ecology and generally accepted environmental practices in this area at the time this report was prepared.

[1] Developed based on material provided by ASFE, Professional Firms Practicing in the Geosciences; www.asfe.org.

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.

Uncertainty May Remain Even After This Phase II ESA is Completed

No ESA can wholly eliminate uncertainty regarding the potential for contamination in connection with a property. Our interpretation of subsurface conditions in this study is based on field observations and chemical analytical data from widely spaced sampling locations. It is always possible that contamination exists in areas that were not explored, sampled or analyzed.

Subsurface Conditions Can Change

This environmental report is based on conditions that existed at the time the study was 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.

Most Environmental Findings are Professional Opinions.

Our interpretations of subsurface conditions are based on field observations and chemical analytical data from widely spaced sampling locations at the site. 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. Our report, conclusions and interpretations should not be construed as a warranty of the subsurface conditions.

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 reproductions are acceptable but recognize that separating logs from the report can elevate risk.

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.

Geotechnical, Geologic and Geoenvironmental 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.

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

GeoEngineers