Groundwater Monitoring Report (Year 5)

Cap Sante Marine Site
Anacortes, Washington
Ecology Consent Decree No. 13-2-02181-4

for
Washington State Department of Ecology
***on Behalf of* Port of Anacortes**

May 18, 2018

GeoEngineers
Earth Science + Technology

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Cap Sante Marine Site
Anacortes, Washington
Ecology Consent Decree
No. 13-2-02181-4

File No. 5147-005-12

May 18, 2018

Prepared for:

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INTRODUCTION

This report presents the results of confirmation groundwater monitoring completed for the Cap Sante Marine Site (Site; Facility/Site Identification No. 67532227) located between 11th and 13th Streets east of Q Avenue in Anacortes, Washington (Figure 1). Pursuant to Washington State Department of Ecology (Ecology) Consent Decree No. 13-2-02181-4 (Consent Decree) filed with the Skagit County Superior Court on January 17, 2014, long-term confirmation groundwater monitoring activities were completed by the Port of Anacortes (Port) to confirm:

- Compliance with the site-specific groundwater cleanup levels;
- Natural attenuation performance; and
- Stability of the residual soil contamination that remains in place as part of the final Cleanup Action for the Site.

Historically, the Site was used for small boat storage, boat launch, boat maintenance, and vessel fueling. In 2007, an interim cleanup action was completed under Ecology approvals to remove two leaky underground storage tanks (USTs) and surrounding petroleum contaminated soil resulting from the fuel releases. Supplemental soil investigation activities in 2012 identified residual gasoline-, diesel- and heavy oil-range petroleum hydrocarbons and polycyclic aromatic hydrocarbons (PAHs) in soil south and southwest of the interim action area. In accordance with the Cleanup Action Plan (CAP; Ecology, 2013), residual soil contamination in these areas are being protected in-place utilizing a combination of engineering (paved surfaces) and institutional (environmental covenant) controls.

To confirm continued compliance with the cleanup action objectives, monitoring wells GEI-MW-6 and GEI-MW-7 (installed during previous environmental studies) were sampled over a 5-year period between August 2014 and February 2018 in accordance with the Ecology-approved Groundwater Monitoring Sampling and Analysis Plan (SAP; GeoEngineers, 2014) and SAP Addendum (SAPA; GeoEngineers, 2016). Sampling activities and chemical analytical data for these monitoring events are summarized in the following sections.

The location of the Site relative to surrounding physical features is shown on Figure 1. The general layout of the Site is shown on Figure 2.

GROUNDWATER MONITORING

Existing groundwater monitoring wells GEI-MW-6 and GEI-MW-7 were used to monitor groundwater conditions within and/or downgradient of the areas in which residual soil contamination remains in-place. Monitoring well GEI-MW-6 is positioned downgradient of residual petroleum hydrocarbon and PAH-contaminated soil located in the southwest corner of the Former Cap Sante Marine Lease Area. Monitoring well GEI-MW-7 is positioned at the shoreline within the area of residual petroleum hydrocarbon and PAH-contaminated soil located in the eastern portion of the Fisherman's Work and Parking Area. In accordance with the SAP and SAPA, groundwater samples were collected from the monitoring wells over a 5-year period to confirm compliance that with the cleanup action objectives.

The location of monitoring wells GEI-MW-6 and GEI-MW-7 are shown relative to the Site on Figure 2. Well construction details for GEI-MW-6 and GEI-MW-7 are presented in Appendix A. Groundwater performance criteria and monitoring activities are summarized in the following sections.

Groundwater Performance Criteria

Groundwater cleanup criteria were developed to be protective of aquatic organisms and of humans that may ingest these marine organisms. Except for petroleum hydrocarbons (gasoline, diesel and heavy oil), Model Toxics Control Act (MTCA) Method B marine surface water preliminary cleanup levels were developed in accordance with Washington Administrative Code (WAC) 173-340-730(3). Because groundwater cleanup levels are based on protection of marine surface water and not protection of groundwater as drinking water, a conditional point of compliance for the groundwater was established by Ecology as the point of at which groundwater discharges to Fidalgo Bay—within the Cap Sante Marina. This conditional point of compliance corresponds to the groundwater/surface water interface east of the Site.

Completed Groundwater Monitoring Events

Groundwater samples were obtained during the following monitoring events:

- Year 1 Groundwater Monitoring – Completed on August 7 and November 5, 2014
- Year 2 Groundwater Monitoring – Completed on February 6 and May 5, 2015
- Year 4 Groundwater Monitoring – Complete February 14 and August 18, 2017
- Year 5 Groundwater Monitoring – Completed February 21, 2018

During each monitoring event, monitoring wells located within 200 feet of the shoreline (i.e., GEI-MW-7) were sampled at or around the low tide to best capture groundwater at the Site and minimize tidal inundation effects. Predicted tide elevations were based on U.S. National Oceanic and Atmospheric Administration (NOAA) Tide Station No. 9448794 located within Guemes Channel.

Groundwater Sampling and Analysis

Prior to sampling groundwater levels were measured from the top of each surveyed well casing rim to the nearest 0.01 foot using a decontaminated electric water level indicator (e-tape). Decontamination procedures are described in the SAP. Measured water levels for each monitoring event are summarized in Table 1.

Groundwater samples were obtained using low-flow/low-turbidity sampling techniques during each monitoring event to minimize the suspension of sediment in groundwater samples. Using a peristaltic pump, groundwater was pumped from the well at a rate not exceeding 0.5 liter per minute through dedicated polyethylene tubing with the end positioned at the approximate midpoint of the saturated screened interval. A Horiba U-50 series water quality meter with flow-through-cell was used to monitor the following parameters during purging:

- Acidity (pH);
- Electrical conductivity (EC);
- Turbidity;

- Dissolved oxygen (DO);
- Temperature;
- Total dissolved solids (TDS);
- Oxygen reduction potential (ORP); and
- Salinity.

Collection of water samples began once these parameters were observed to vary by less than 10 percent on three consecutive measurements. The stabilized field measurements for each monitoring event are summarized in Table 2. Purge water generated during these activities were stored at the Port's Pier 2 Terminal Facility for temporary storage pending permitted disposal. Incidental waste generated during sampling activities such as gloves, plastic sheeting, paper towels and similar expended and discarded field supplies were disposed of in the local trash receptacle.

Groundwater conditions observed at the time of sampling and chemical analytical results are summarized in the following sections.

Groundwater Conditions

Near the shoreline, groundwater ranged in elevation between +5.51 and +6.79 feet mean lower low water (MLLW) at GEI-MW-7. At GEI-MW-6 located further inland, groundwater ranged in elevation between +7.53 and +9.60 feet MLLW. Based on the measured groundwater elevations and previous groundwater investigations (GeoEngineers, 2013), the inferred predominant groundwater flow direction is to the east toward the shoreline of Fidalgo Bay.

Groundwater elevations measured during each sampling event (Years 1 through 5) are summarized in Table 1. Stabilized groundwater water quality parameters measured during each sampling event are summarized in Table 2.

Chemical Analytical Results

Groundwater samples obtained during each monitoring event were submitted to OnSite Environmental, Inc. in Redmond, Washington, for chemical analysis of Site contaminants in soil remaining in-place exceeding cleanup levels, including:

- Gasoline-range hydrocarbons using Ecology Method NWTPH-Gx,
- Diesel- and heavy oil-range hydrocarbons using Ecology Method NWTPH-Dx, and
- PAHs using U.S. Environmental Protection Agency (EPA) Method 8270 SIM.

Based on a review of the chemical analytical results, Site contaminants either were not detected or were detected at concentrations less than the site-specific groundwater cleanup levels in each of the monitoring wells during each quarterly monitoring event with no exceptions. Groundwater analytical results for monitoring wells GEI-MW-6 and GEI-MW-7 are summarized in Table 3 and shown on Figures 3 through 5. Trend plots for contaminants of concern (COCs) including gasoline- and diesel-range petroleum hydrocarbons and cPAHs detected in groundwater during one or more monitoring events are shown on Figures 6 through 8.

Laboratory data presented in Appendix B were subjected to an EPA-defined Stage 2B validation (EPA Document 540-R-08-005; EPA, 2009) and were determined to be acceptable for their intended use as qualified. The data validation review is presented in Appendix C.

CONCLUSIONS

Groundwater monitoring activities were completed by the Port of Anacortes for the Cap Sante Marine Site over of 5-year basis as required by Ecology to demonstrate compliance with the performance criteria established by the CAP. The groundwater monitoring results demonstrate compliance with the groundwater performance criteria for the Site at each monitoring well location including the conditional point of compliance established by Ecology as the point of at which groundwater discharges to Fidalgo Bay. These results provide supporting evidence of the stability of the residual soil contamination remaining in-place at the Site. Future long-term monitoring activities will be determined by Ecology following review of the data contained in this report.

LIMITATIONS

We have prepared this report for the exclusive use by the Port of Anacortes (Port), their authorized agents and regulatory agencies for the Cap Sante Marine Site. This report is not intended for use by others and the information contained herein is not applicable to other sites. No other party may rely on the product of our services unless we agree in advance, and in writing, to such reliance. This is to provide our firm with reasonable protection against open-ended liability claims by third parties with whom there would otherwise be no contractual limits to their actions.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with our general agreement with Port and generally accepted environmental science practices in this area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood.

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

REFERENCES

GeoEngineers, Inc. (GeoEngineers, 2016), "Groundwater Monitoring Sampling and Analysis Plan Addendum, Cap Sante Marine Site, Anacortes, Washington, Ecology Consent Decree No. 9917," GEI File No. 5147-005-10, prepared for the Washington State Department of Ecology on behalf of Port of Anacortes, January 7, 2016.

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GeoEngineers, Inc. (GeoEngineers, 2013), "Remedial Investigation/Feasibility Study, Cap Sante Marine, Anacortes, Washington, Ecology Agreed Order No. DE-07TCPHQ-4197," GEI File No. 5147-005-09, prepared for the Washington State Department of Ecology on behalf of Port of Anacortes, December 10, 2013.

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

TABLES

GeoEngineers

Table 1

Groundwater Elevation Data

Cap Sante Marine Site

Anacortes, Washington

Groundwater Monitoring Well[1]	Quarterly Groundwater Monitoring Event	Date Measured	Top of Casing Elevation[2] (feet)	Depth to Water from Top of Casing (feet)	Groundwater Elevation[2] (feet)
GEI-MW-6	Round 1	08/07/14	12.50	3.62	8.88
	Round 2	11/05/14		4.3	8.20
	Round 3	02/06/15		2.9	9.60
	Round 4	05/05/15		3.98	8.52
	Round 5	02/14/17		3.68	8.82
	Round 6	08/18/17		3.42	9.08
	Round 7	02/21/18		4.97	7.53
GEI-MW-7	Round 1	08/07/14	11.70	5.54	6.16
	Round 2	11/05/14		5.01	6.69
	Round 3	02/06/15		4.91	6.79
	Round 4	05/05/15		5.12	6.58
	Round 5	02/14/17		5.03	6.67
	Round 6	08/18/17		5.22	6.48
	Round 7	02/21/18		6.19	5.51

Notes:

[1]Monitoiring well locations are shown on Figure 2.

[2]Elevation is referenced to Mean Lower Low Water (MLLW).

Table 2

Groundwater Field Parameters

Cap Sante Marine Site

Anacortes, Washington

Groundwater Monitoring Well[1]	Quarterly Groundwater Monitoring Event	Date Measured	pH	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C)	Total Dissolved Solids (g/L)	Oxidation Reduction Potential (m/V)	Salinity (ppt)
GEI-MW-6	Round 1	08/07/14	7.5	0.56	12.1	0.87	17.5	0.36	-185	0.3
	Round 2	11/05/14	7.3	0.63	3.8	0.43	15.3	0.41	-621	0.3
	Round 3	02/06/15	7.7	0.58	11.2	1.57	11.3	0.37	-129	0.3
	Round 4	05/05/15	6.7	0.59	10.8	12.10	12.5	0.38	-87	0.3
	Round 5	02/14/17	7.4	0.51	4.8	0.31	9.4	0.49	-329	0.4
	Round 6	08/18/17	7.4	0.64	8.0	0.27	18.4	0.44	-259.1	0.3
	Round 7	02/21/18	6.8	0.37	1.4	0.75	8.4	0.35	-121.9	0.26
GEI-MW-7	Round 1	08/07/14	7.1	32.78	2.9	0.80	15.3	21.33	-216	20.8
	Round 2	11/05/14	7.1	25.33	3.5	0.29	15.0	16.36	-242	20.6
	Round 3	02/06/15	7.3	18.50	0	6.32	11.3	11.70	-191	11.0
	Round 4	05/05/15	7.1	20.10	6.5	10.89	13.6	12.50	-178	12.3
	Round 5	02/14/17	7.4	22.70	2.0	0.10	11.1	20.08	-250	19.4
	Round 6	08/18/17	7.3	34.56	6.1	0.18	15.7	21.49	-337.4	19.7
	Round 7	02/21/18	7.2	22.70	0.8	0.68	10.2	0.5	-250	19.5

Notes:

[1]Monitoiring well locations are shown on Figure 2.

°C = degrees Celsius

g/L = grams per liter

m/V = millivolts

mS/cm = microsemens per centimeter

NTU = Nephelometric Turbidity Units

ppt = parts per thousand

Table 3

Groundwater Chemical Analytical Data

Cap Sante Marine Site
Anacortes, Washington

Monitoring Well[1]	Groundwater Monitoring Event	Sample Date	Petroleum Hydrocarbons (µg/L)			Non-Carcinogenic Polycyclic Aromatic Hydrocarbons (PAHs) by EPA Method 8270-SIM (µg/L)											Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) by EPA Method 8270-SIM (µg/L)							
			Gasoline-Range by NWTPH-G	Diesel-Range by NWTPH-Dx	Heavy Oil-Range by NWTPH-Dx	1-Methylnaphthalene	2-Methylnaphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benzo(ghi)perylene	Fluoranthene	Fluorene	Naphthalene	Phenanthrene	Pyrene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(j,k)fluoranthene	Chrysene	Dibenzo(a,h) anthracene	Indeno(1,2,3-cd)pyrene	Total cPAH TEQ (ND=0.5RL)
GEI-MW-6	Round 1	08/07/14	100 U	260 U	410 U	0.094 U	0.094 U	0.094 U	0.094 U	0.094 U	0.0094 U	0.094 U	0.094 U	0.095	0.094 U	0.094 U	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.007 UT
	Round 2	11/05/14	100 U	260 U	410 U	0.094 U	0.094 U	0.094 U	0.094 U	0.094 U	0.0094 U	0.094 U	0.094 U	0.094 U	0.094 U	0.094 U	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.007 UT
	Round 3	02/06/15	100 U	260 U	410 U	0.095 U	0.095 U	0.095 U	0.095 U	0.095 U	0.0095 U	0.095 U	0.095 U	0.095 U	0.095 U	0.095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.007 UT
	Round 4	05/05/15	100 U	250 U	410 U	0.094 U	0.094 U	0.094 U	0.094 U	0.094 U	0.0094 U	0.094 U	0.094 U	0.094 U	0.094 U	0.094 U	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0094 U	**0.013**	**0.0095**	**0.008 T**
	Round 4 (Duplicate)	05/05/15	100 U	260 U	410 U	0.095 U	0.095 U	0.095 U	0.095 U	0.095 U	0.0095 U	0.095 U	0.095 U	0.095 U	0.095 U	0.095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.007 UT
	Round 5	02/14/17	100 U	260 U	410 U	0.095 U	0.095 U	0.095 U	0.095 U	0.095 U	0.0095 U	0.095 U	0.095 U	0.095 U	0.095 U	0.095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U	0.007 UT
	Round 6	08/18/17	500 U	260 U	420 U	0.094 U	0.094 U	0.094 U	0.094 U	0.094 U	0.0094 U	0.094 U	0.094 U	0.094 U	0.094 U	0.094 U	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.007 UT
	Round 6 (Duplicate)	08/18/17	500 U	260 U	420 U	0.093 U	0.093 U	0.093 U	0.093 U	0.093 U	0.0093 U	0.093 U	0.093 U	0.093 U	0.093 U	0.093 U	0.0093 U	0.0093 U	0.0093 U	0.0093 U	0.0093 U	0.0093 U	0.0093 U	0.007 UT
	Round 7	02/21/18	100 U	260 U	410 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.008 UT
	Round 7 (Duplicate)	02/21/18	100 U	260 U	410 U	0.099 U	0.099 U	0.099 U	0.099 U	0.099 U	0.099 U	0.099 U	0.099 U	0.099 U	0.099 U	0.099 U	0.0099 U	0.0099 U	0.0099 U	0.0099 U	0.0099 U	0.0099 U	0.0099 U	0.007 UT
GEI-MW-7	Round 1	08/07/14	100 U	250 U	400 U	0.093 U	0.093 U	0.093 U	0.093 U	0.093 U	0.0093 U	0.093 U	0.093 U	0.093 U	0.093 U	0.093 U	0.0093 U	0.0093 U	0.0093 U	0.0093 U	0.0093 U	0.0093 U	0.0093 U	0.007 UT
	Round 1 (Duplicate)	08/07/14	100 U	250 U	400 U	0.093 U	0.093 U	0.093 U	0.093 U	0.093 U	0.0093 U	0.093 U	0.093 U	0.093 U	0.093 U	0.093 U	0.0093 U	0.0093 U	0.0093 U	0.0093 U	0.0093 U	0.0093 U	0.0093 U	0.007 UT
	Round 2	11/05/14	100 U	250 U	400 U	0.093 U	0.093 U	0.093 U	0.093 U	0.093 U	0.0093 U	0.093 U	0.093 U	0.093 U	0.093 U	0.093 U	0.0093 U	0.0093 U	0.0093 U	0.0093 U	0.0093 U	0.0093 U	0.0093 U	0.007 UT
	Round 2 (Duplicate)	11/05/14	100 U	250 U	400 U	0.093 U	0.093 U	0.093 U	0.093 U	0.093 U	0.0093 U	0.093 U	0.093 U	0.093 U	0.093 U	0.093 U	0.0093 U	0.0093 U	0.0093 U	0.0093 U	0.0093 U	0.0093 U	0.0093 U	0.007 UT
	Round 3	02/06/15	100 U	250 U	410 U	**1.4**	**0.11**	**1.9**	0.093 U	0.093 U	0.0093 U	0.093 U	**0.51**	**17**	**0.19**	0.093 U	**0.0096**	0.0093 U	0.0093 U	0.0093 U	0.0093 U	0.0093 U	0.0093 U	**0.0075 T**
	Round 3 (Duplicate)	02/06/15	100 U	**280**	400 U	**1.3**	**0.11**	**1.8**	0.093 U	0.093 U	0.0093 U	0.093 U	**0.51**	**17**	**0.18**	0.093 U	**0.01**	0.0093 U	0.0093 U	0.0093 U	0.0093 U	0.0093 U	0.0093 U	**0.01 T**
	Round 4	05/05/15	100 U	**320**	410 U	**0.39**	0.094 U	**0.63**	0.094 U	**0.13**	0.0094 U	0.094 U	**0.19**	**1.7**	0.094 U	0.094 U	**0.011**	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0094 U	**0.008 T**
	Round 5	02/14/17	100 U	**500**	400 U	**5.9**	0.093 UJ	**8.5 J**	0.093 U	**0.11 J**	0.0093 U	0.093 UJ	**2.4 J**	**19**	**1.2 J**	0.093 U	0.0093 U	0.0093 U	0.0093 U	0.0093 U	0.0093 U	0.0093 U	0.0093 U	0.007 UT
	Round 5 (Duplicate)	02/14/17	**110**	**390**	400 U	**8.1**	0.092 UJ	**14 J**	0.092 U	**0.26 J**	0.0092 U	**0.19 J**	**5.7 J**	**26**	**2.8 J**	0.092 U	0.0092 U	0.0092 U	0.0092 U	0.0092 U	0.0092 U	0.0092 U	0.0092 U	0.007 UT
	Round 6	08/18/17	500 U	**270**	430 U	0.094 U	0.094 U	**0.61**	0.094 U	0.094 U	0.0094 UJ	0.094 U	0.094 U	0.094 U	0.094 U	0.094 U	0.0094 UJ	0.0094 U	0.0094 U	0.0094 U	0.0094 U	0.0094 UJ	0.0094 U	0.007 UT
	Round 7	02/21/18	100 U	250 U	400 U	**0.9**	0.1 U	**2.2**	0.1 U	0.1 U	0.1 U	0.1 U	**0.47**	**2**	**0.16**	0.1 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.008 UT
Site-Specific Cleanup Level[2]			1,000	500	500	NE	NE	643	NE	25,900	NE	90	3,460	4,940	NE	2,590	see TEQ							0.1

Notes:

[1]Groundwater montitoring well locations are shown on Figure 2.

[2]Site-specific groundwater cleanup levels are referenced from Table 1 of the Groundwater Sampling and Analysis Plan for the Cap Sante Marine Site (GeoEngineers, 2014).

NE = not established

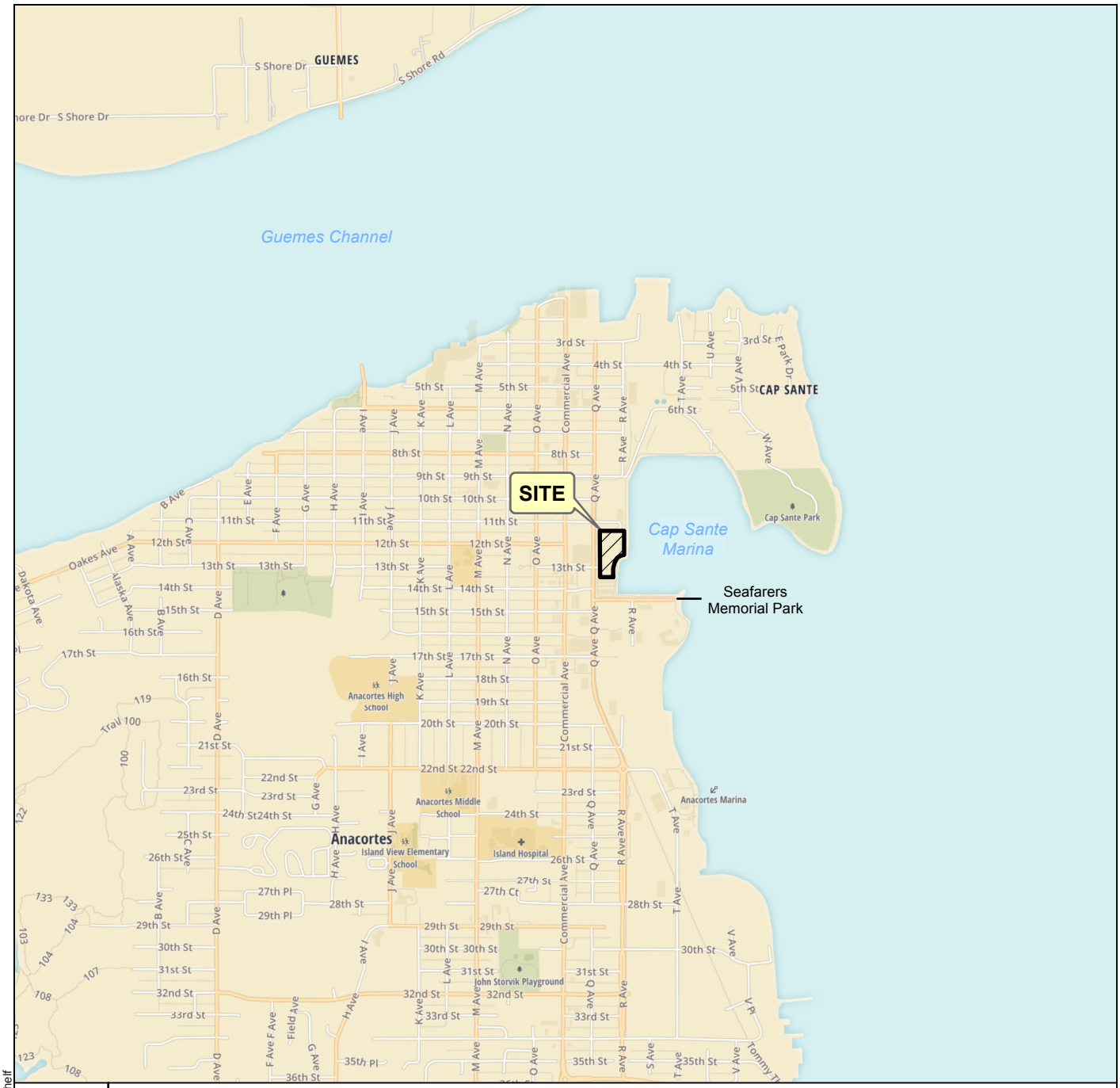
T = qualifier indicating total concentration

U = qualifier indicating analyte not detected at level above listed practical quantitation limit

Chemical analyses performed by OnSite Environmental Inc. of Redmond, Washington.

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: Mapbox Open Street Map, 2016

Projection: NAD 1983 UTM Zone 10N

Vicinity Map

Cap Sante Marine Site
Anacortes, Washington

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Figure 1

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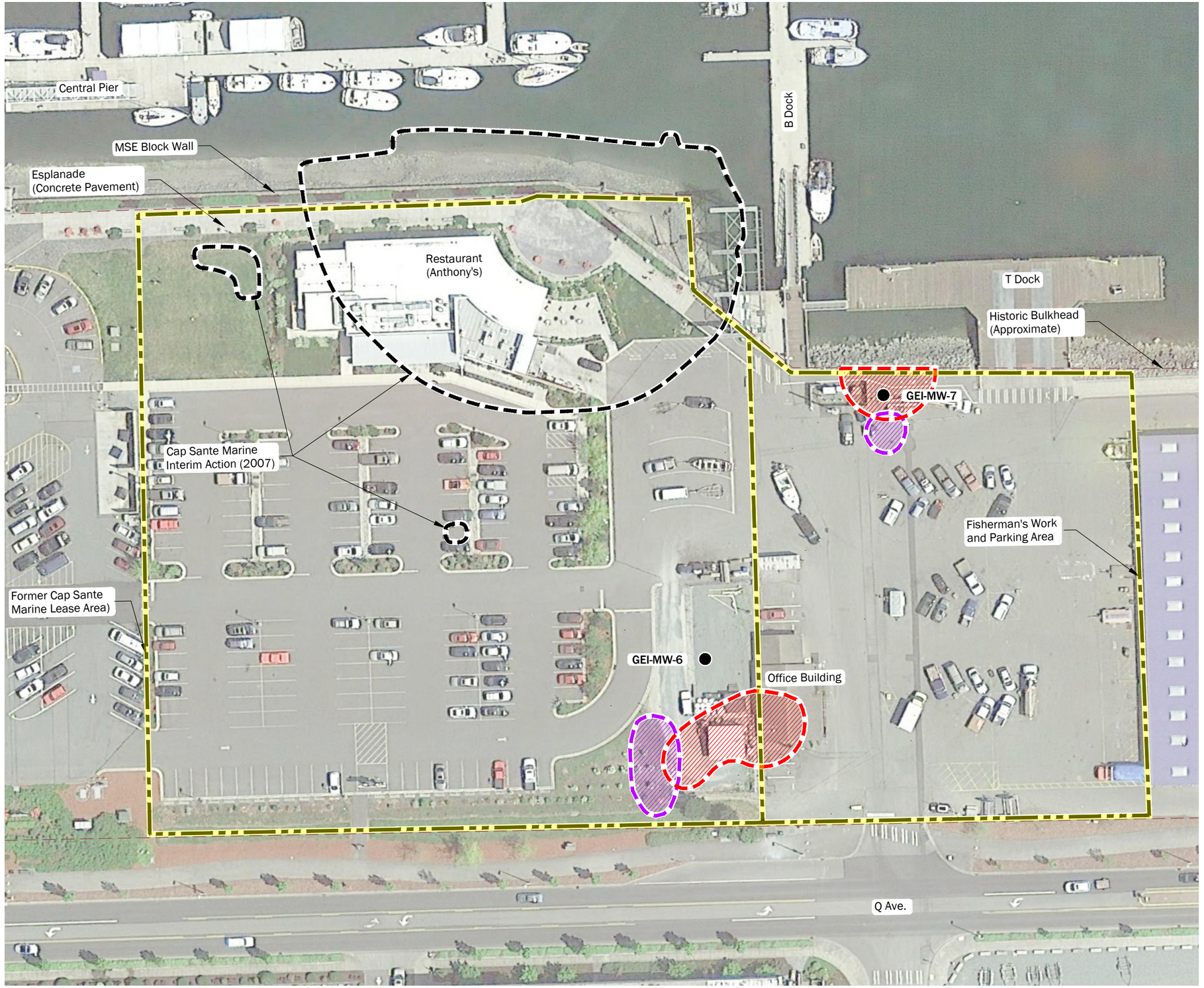


Legend

Site Boundary

GEI-MW-6 Monitoring Well

Areas with Contaminants of Concern (COCs) Exceeding Soil Cleanup Level

Approximate Area of TPH Exceedance in Soil

Approximate Area of PAH Exceedance in Soil

PAH - Polycyclic Aromatic Hydrocarbons

TPH - Petroleum Hydrocarbons (Gasoline, Diesel and/or Heavy Oil)

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: Aerial was taken from Google Earth Pro., Imagery Dated: 5/2/2015

Projection: WA State Plane, North Zone, NAD83, US Foot

60 0 60

Feet

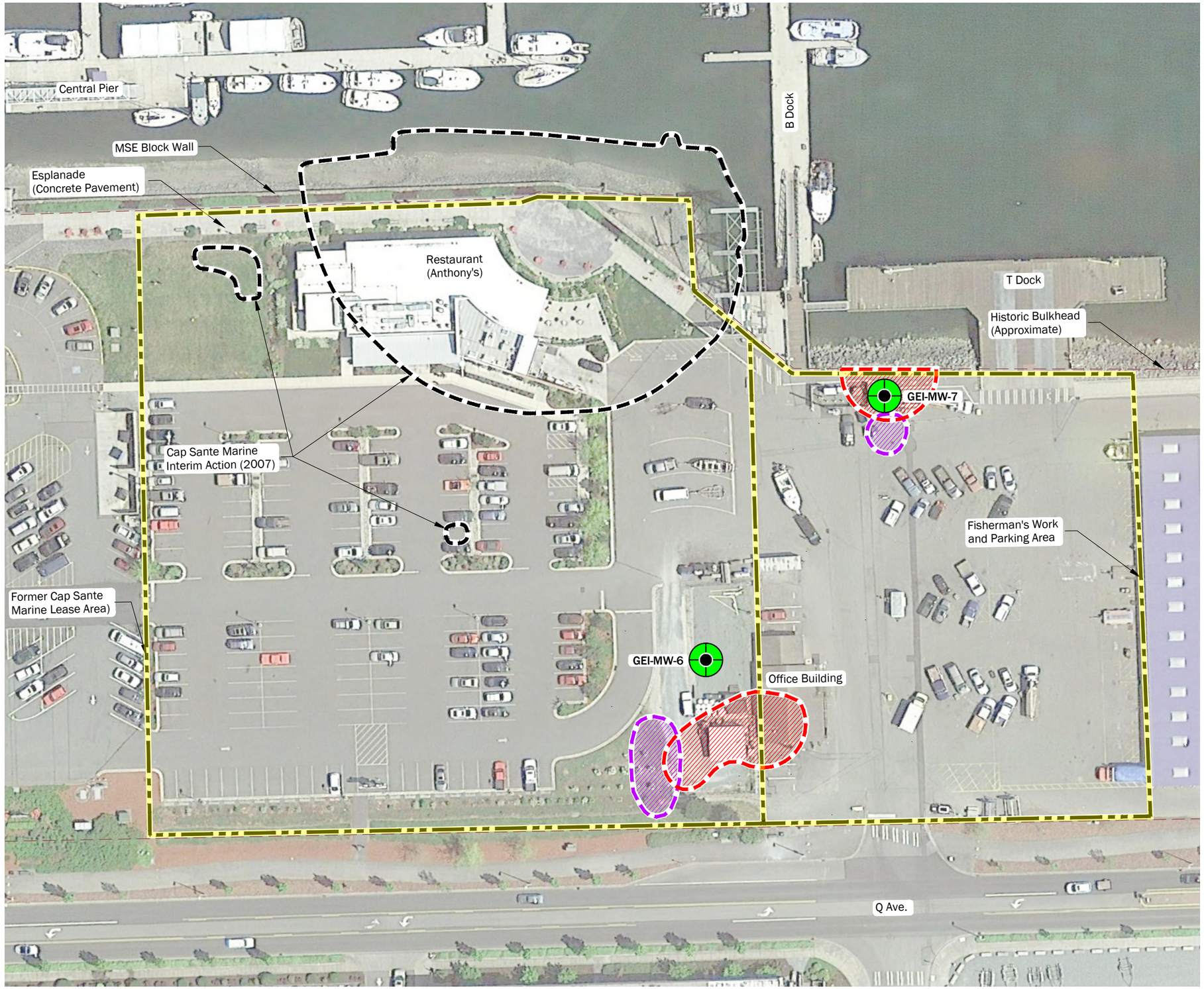
Site Plan

Cap Sante Marine Site
Anacortes, Washington

GeoEngineers

Figure 2

P:\5\5147012\CAD\12\GW Monitoring\0514700512_F02_Groundwater Monitoring Event.dwg TAB:Groundwater Monitoring Date Exported: 03/24/17 - 8:14 by kcook



Legend

Site Boundary

GEI-MW-6 Monitoring Well

Groundwater Chemical Analytical Results

Gas — Diesel

PAHs — Heavy Oil

Detected at a concentration greater than the cleanup level

Not detected or detected at a concentration less than the cleanup level

Areas with Contaminants of Concern (COCs) Exceeding Soil Cleanup Level

Approximate Area of TPH Exceedance in Soil

Approximate Area of PAH Exceedance in Soil

PAH - Polycyclic Aromatic Hydrocarbons

TPH - Petroleum Hydrocarbons (Gasoline, Diesel and/or Heavy Oil)

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: Aerial was taken from Google Earth Pro., Imagery Dated: 5/2/2015

Projection: WA State Plane, North Zone, NAD83, US Foot

N E S W

60 0 60

Feet

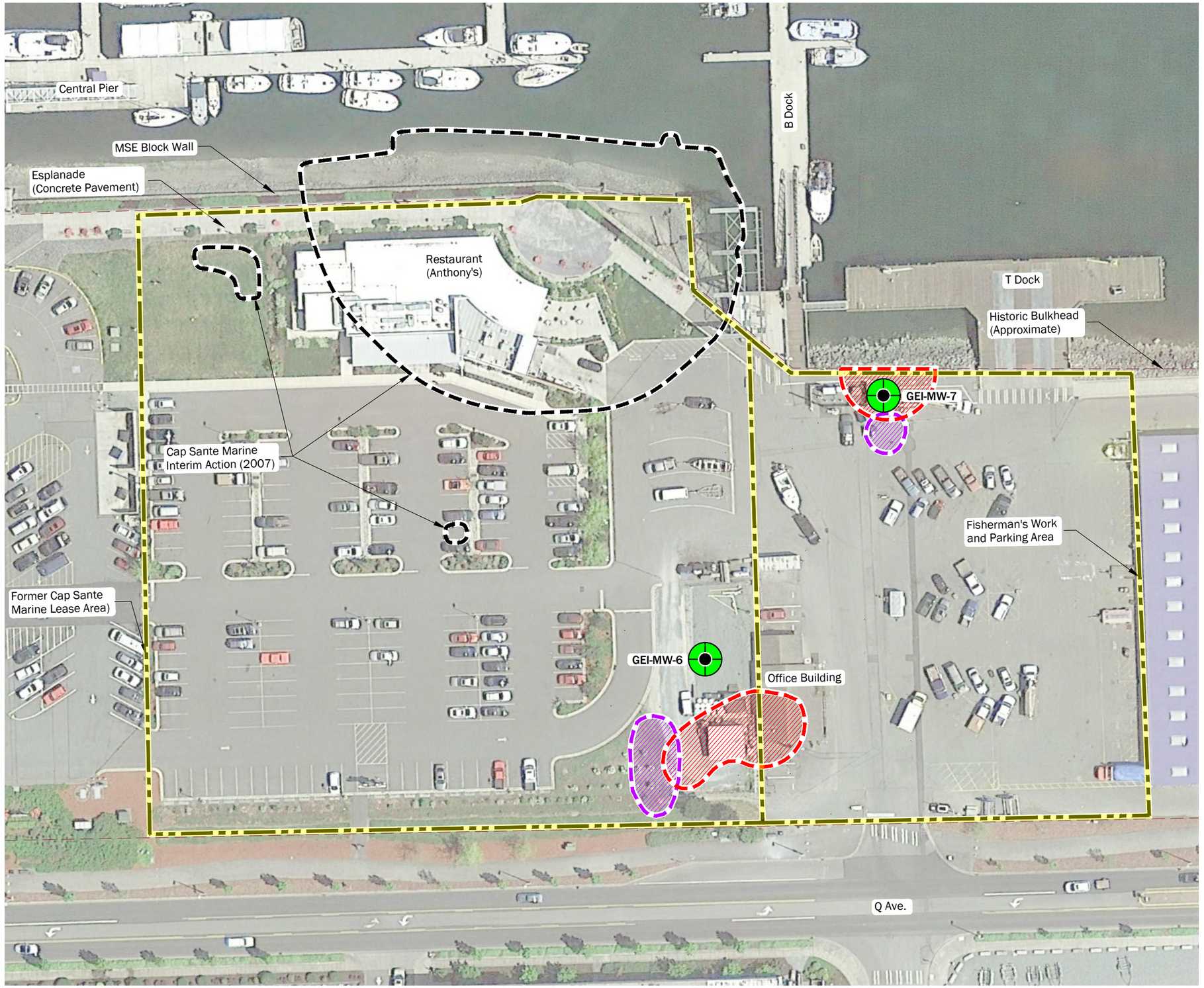
February 2017
Groundwater Monitoring Event

Cap Sante Marine Site
Anacortes, Washington

GeoEngineers

Figure 3

P:\5\5147012\CAD\12\GW Monitoring\0514700512_F02_Groundwater Monitoring Event.dwg TAB:Groundwater Monitoring_Date Exported: 03/24/17 - 8:14 by kcook



Legend

Site Boundary

GEI-MW-6 Monitoring Well

Groundwater Chemical Analytical Results

Gas — Diesel

PAHs — Heavy Oil

Detected at a concentration greater than the cleanup level

Not detected or detected at a concentration less than the cleanup level

Areas with Contaminants of Concern (COCs) Exceeding Soil Cleanup Level

Approximate Area of TPH Exceedance in Soil

Approximate Area of PAH Exceedance in Soil

PAH - Polycyclic Aromatic Hydrocarbons

TPH - Petroleum Hydrocarbons (Gasoline, Diesel and/or Heavy Oil)

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: Aerial was taken from Google Earth Pro., Imagery Dated: 5/2/2015

Projection: WA State Plane, North Zone, NAD83, US Foot

N E S W

60 0 60

Feet

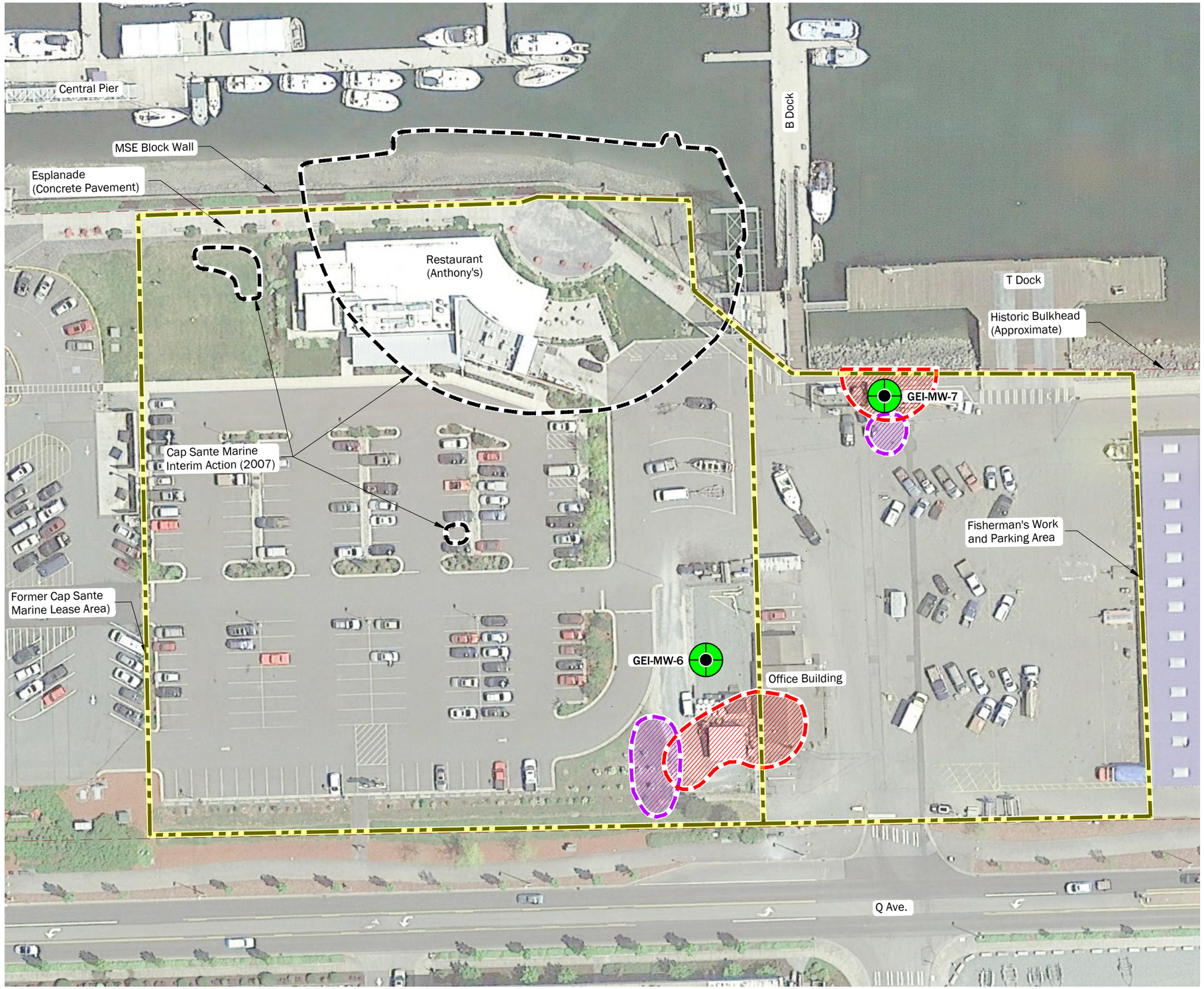
August 2017
Groundwater Monitoring Event

Cap Sante Marine Site
Anacortes, Washington

GeoEngineers

Figure 4

P:\5\5147012\CAD\12\GW Monitoring\05147005\12_F02_Groundwater Monitoring Event.dwg TAB:Groundwater Monitoring_Date Exported: 03/24/17 - 8:14 by kcook



Legend

Site Boundary

GEI-MW-6 Monitoring Well

Groundwater Chemical Analytical Results

Gas — Diesel

PAHs — Heavy Oil

Detected at a concentration greater than the cleanup level

Not detected or detected at a concentration less than the cleanup level

Areas with Contaminants of Concern (COCs) Exceeding Soil Cleanup Level

Approximate Area of TPH Exceedance in Soil

Approximate Area of PAH Exceedance in Soil

PAH - Polycyclic Aromatic Hydrocarbons

TPH - Petroleum Hydrocarbons (Gasoline, Diesel and/or Heavy Oil)

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: Aerial was taken from Google Earth Pro., Imagery Dated: 5/2/2015

Projection: WA State Plane, North Zone, NAD83, US Foot

N E S W

60 0 60

Feet

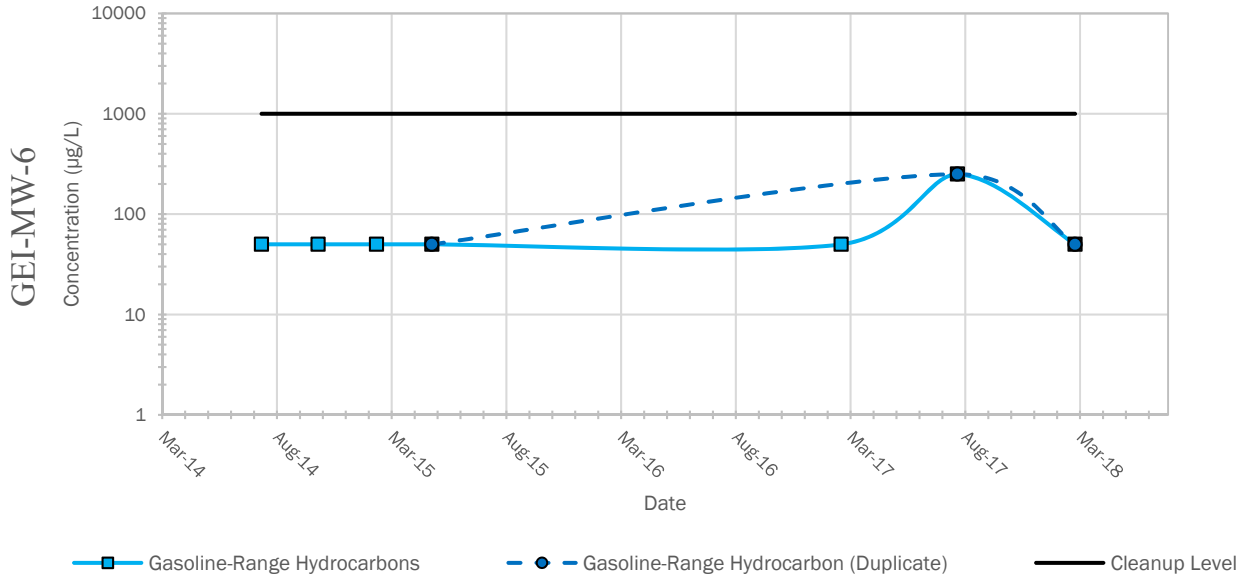
February 2018
Groundwater Monitoring Event

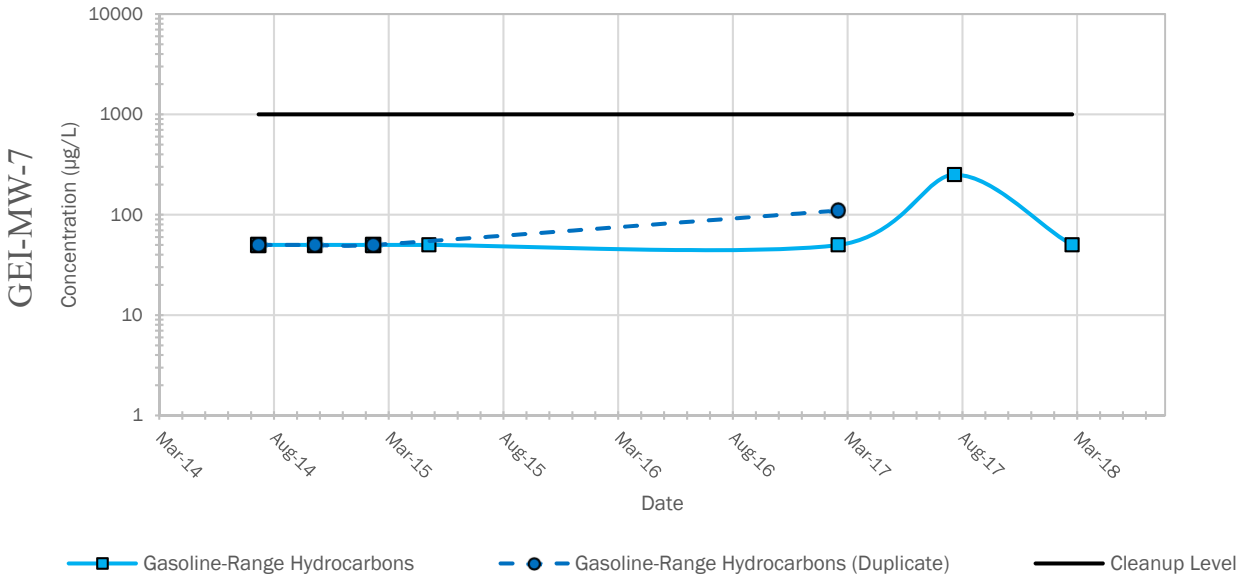
Cap Sante Marine Site
Anacortes, Washington

GeoEngineers

Figure 5

P:\5\5147012\CAD\12\GW Monitoring\05147005l2_F02_Groundwater Monitoring Event.dwg TAB:Groundwater Monitoring Date Exported: 03/24/17 - 8:14 by kcook





Notes:

1. Non-detect result reported as ½ the reporting limit.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not 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.

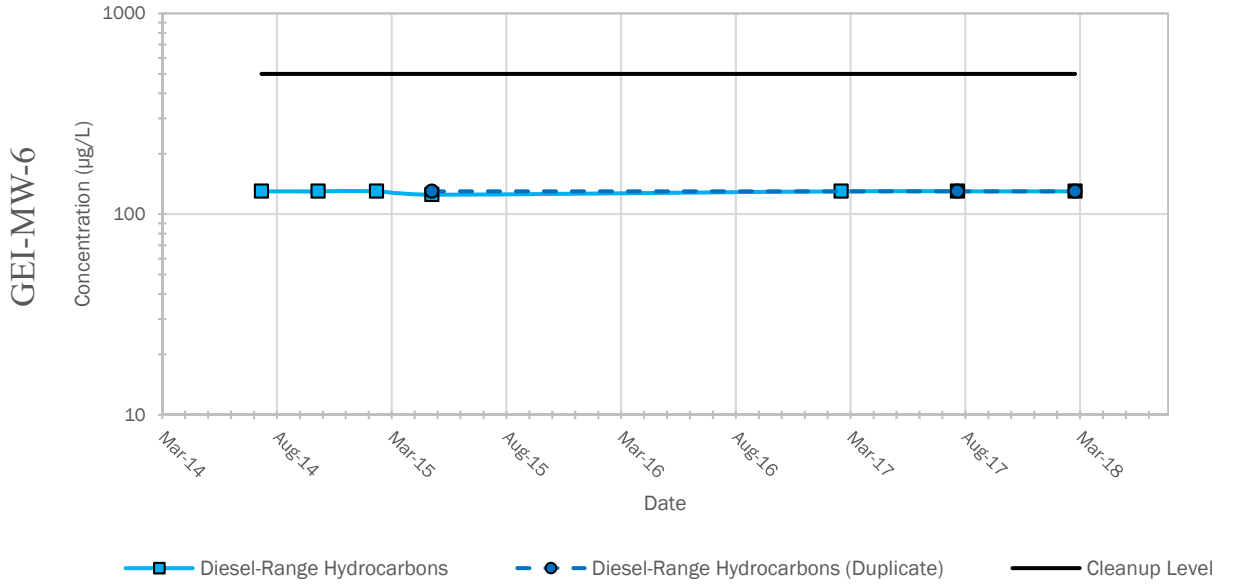
Data Source: Cap Sante Marine groundwater chemical analytical data (see Table 3).

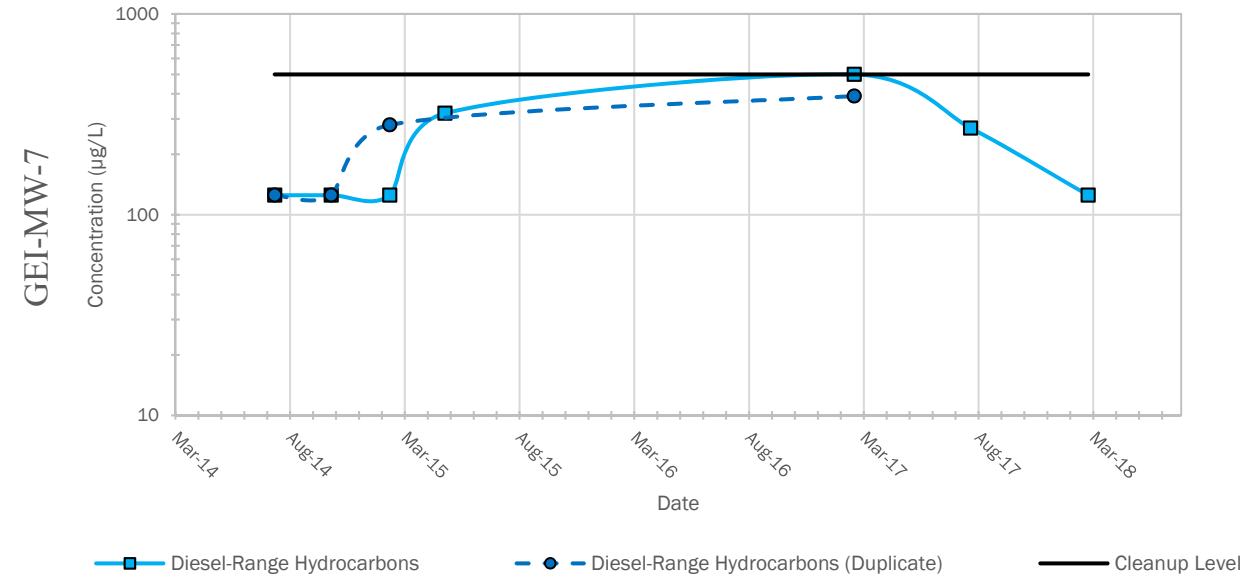
Groundwater Monitoring Results
Gasoline-Range Hydrocarbons

Cap Sante Marine
Anacortes, Washington

GeoEngineers

Figure 6





Notes:

1. Non-detect result reported as ½ the reporting limit.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not 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.

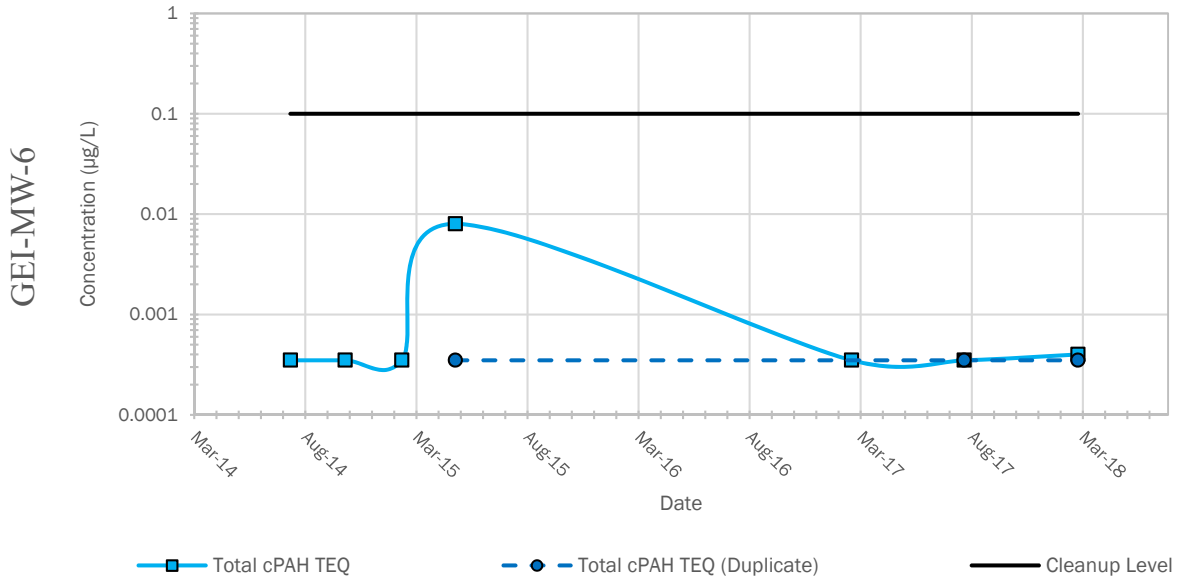
Data Source: Cap Sante Marine groundwater chemical analytical data (see Table 3).

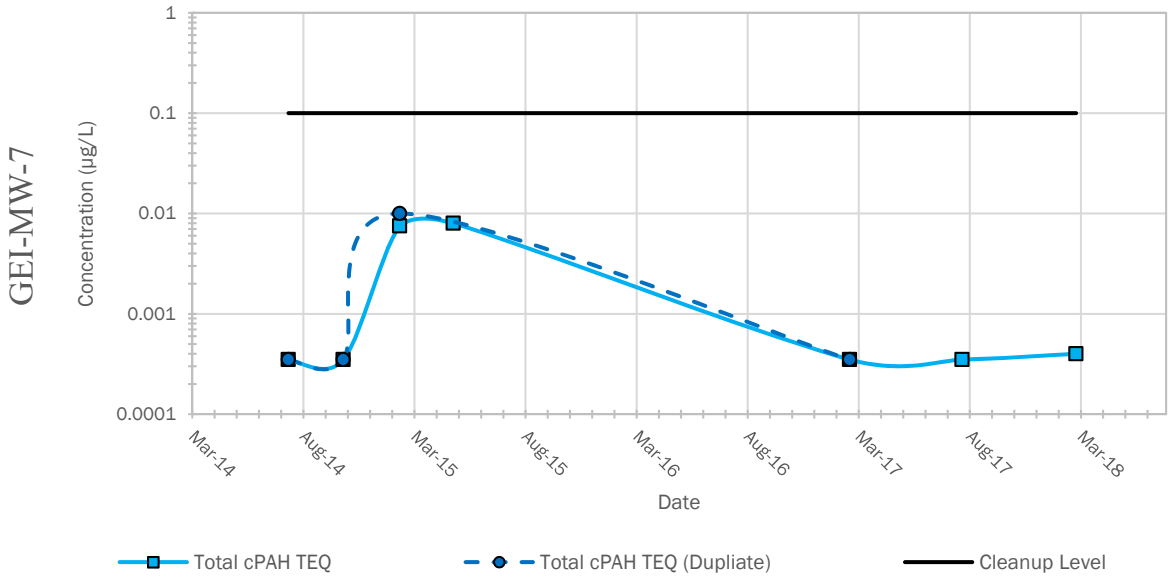
Groundwater Monitoring Results
Diesel-Range Hydrocarbons

Cap Sante Marine
Anacortes, Washington

GeoEngineers

Figure 7





Notes:

1. Non-detect result reported as ½ the reporting limit.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not 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: Cap Sante Marine groundwater chemical analytical data (see Table 3).

Groundwater Monitoring Results
Total cPAH TEQ

Cap Sante Marine
Anacortes, Washington

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Figure 8

APPENDICES

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APPENDIX A
Well Completion 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 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
	CC	Cement Concrete
	AC	Asphalt Concrete
	CR	Crushed Rock/ Quarry Spalls
	TS	Topsoil/ Forest Duff/Sod

Measured groundwater level in exploration, well, or piezometer

Groundwater observed at time of exploration

Perched water observed at time of exploration

Measured free product in well or piezometer

Graphic Log Contact

Distinct contact between soil strata or geologic units

Approximate location of soil strata change within a geologic soil unit

Material Description Contact

Distinct contact between soil strata or geologic units

Approximate location of soil strata change within a geologic soil unit

Sampler Symbol Descriptions

2.4-inch I.D. split barrel

Standard Penetration Test (SPT)

Shelby tube

Piston

Direct-Push

Bulk or grab

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

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

Laboratory / Field Tests

%F	Percent fines
AL	Atterberg limits
CA	Chemical analysis
CP	Laboratory compaction test
CS	Consolidation test
DS	Direct shear
HA	Hydrometer analysis
MC	Moisture content
MD	Moisture content and dry density
OC	Organic content
PM	Permeability or hydraulic conductivity
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
NT	Not Tested

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

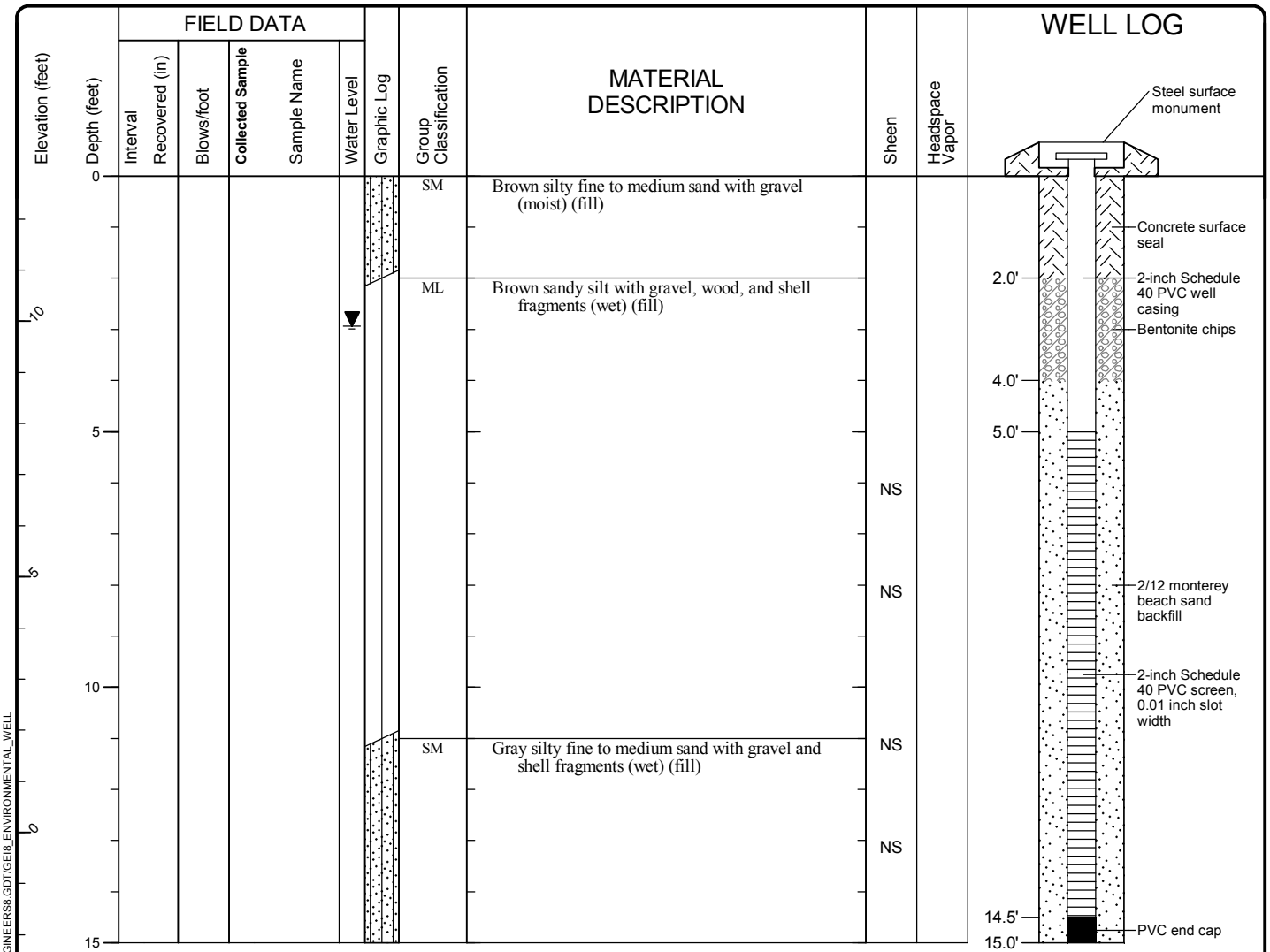
Drilled	Start	End	Total Depth (ft)	Logged By	Checked By	Driller	Drilling Method
	2/9/2012	2/9/2012	15	AJ	RST	Cascade Drilling, LP	Hollow Stem Auger

Hammer Data	N/A	Drilling Equipment	CME 75
Surface Elevation (ft) Vertical Datum	12.8 MLLW	Top of Casing Elevation (ft)	12.5
Easting (X) Northing (Y)	1209694.387 556552.4204	Horizontal Datum	NAD83

Licensing agency well number: **BHM145**
A 2 (in) well was installed on 2/9/2012 to a depth of 15 (ft).

Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)
2/9/2012	2.9	9.58

Notes: Air knife from 0 to 5 feet. No samples obtained, soil descriptions based on drill cuttings. PID malfunction - No head space vapor readings.



Note: See Figure B-1 for explanation of symbols.

Log of Monitoring Well GEI-MW-6

GeoEngineers

Project: Former Shell Oil Tank Farm
Project Location: Anacortes, Washington
Project Number: 5147-012-02

Figure A-2
Sheet 1 of 1

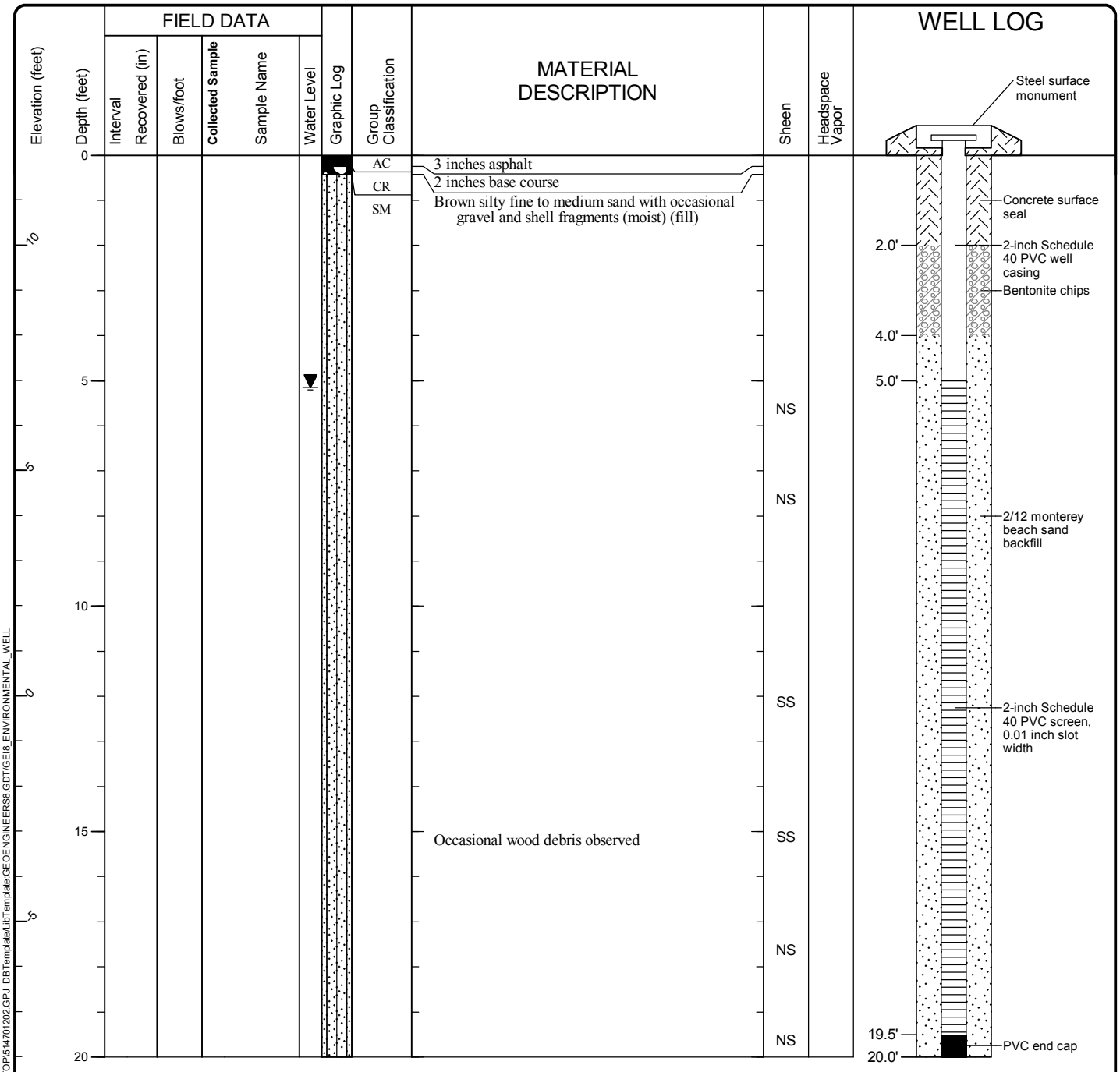
Drilled Start	End	Total Depth (ft)	Logged By / Checked By	Driller	Drilling Method
2/10/2012	2/10/2012	20	AJ / RST	Cascade Drilling, LP	Hollow Stem Auger

Hammer Data	N/A	Drilling Equipment	CME 75
Surface Elevation (ft) Vertical Datum	12.0 MLLW	Top of Casing Elevation (ft)	11.7
Easting (X) Northing (Y)	1209845.159 556436.0145	Horizontal Datum	NAD83

Licensing agency well number: **BHM147**
A 2 (in) well was installed on 2/10/2012 to a depth of 20 (ft).

Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)
3/6/2012	5.2	6.50

Notes: Air knife from 0 to 5 feet. No samples obtained, soil descriptions based on drill cuttings. PID malfunction - No head space vapor readings.



Note: See Figure B-1 for explanation of symbols.

Log of Monitoring Well GEI-MW-7

GeoEngineers

Project: Former Shell Oil Tank Farm
Project Location: Anacortes, Washington
Project Number: 5147-012-02

Figure A-3
Sheet 1 of 1

Seattle: Date:4/5/12 Path:C:\USERS\TNASH\DESKTOP\5147012202.GPJ DBTemplate/LibTemplate:GEOENGINEERS8.GDT/GEI8_ENVIRONMENTAL_WELL

APPENDIX B
Laboratory Data Reports

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

February 27, 2017

Robert Trahan
GeoEngineers, Inc.
600 Stewart, Suite 1700
Seattle, WA 98101-1233

Re: Analytical Data for Project 5147-005-10
Laboratory Reference No. 1702-161

Dear Robert:

Enclosed are the analytical results and associated quality control data for samples submitted on February 17, 2017.

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

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

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: February 27, 2017
Samples Submitted: February 17, 2017
Laboratory Reference: 1702-161
Project: 5147-005-10

Case Narrative

Samples were collected on February 14, 2017 and received by the laboratory on February 17, 2017. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

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

Date of Report: February 27, 2017
Samples Submitted: February 17, 2017
Laboratory Reference: 1702-161
Project: 5147-005-10

ANALYTICAL REPORT FOR SAMPLES

Client ID	Laboratory ID	Matrix	Date Sampled	Date Received	Notes
GEI-MW-6-021417	02-161-01	Water	2-14-17	2-17-17	
GEI-MW-7-021417	02-161-02	Water	2-14-17	2-17-17	
GEI-DUP-1-021417	02-161-03	Water	2-14-17	2-17-17	
TRIP BLANK-021417	02-161-04	Water	2-14-17	2-17-17	

Date of Report: February 27, 2017
Samples Submitted: February 17, 2017
Laboratory Reference: 1702-161
Project: 5147-005-10

NWTPH-Gx

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GEI-MW-6-021417**					
Laboratory ID:	02-161-01					
Gasoline	**ND**	100	NWTPH-Gx	2-23-17	2-23-17	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*93*	*61-118*				
Client ID:	**GEI-MW-7-021417**					
Laboratory ID:	02-161-02					
Gasoline	**ND**	100	NWTPH-Gx	2-23-17	2-23-17	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*93*	*61-118*				
Client ID:	**GEI-DUP-1-021417**					
Laboratory ID:	02-161-03					
Gasoline	**110**	100	NWTPH-Gx	2-23-17	2-23-17	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*98*	*61-118*				
Client ID:	**TRIP BLANK-021417**					
Laboratory ID:	02-161-04					
Gasoline	**ND**	100	NWTPH-Gx	2-23-17	2-23-17	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*96*	*61-118*				

Date of Report: February 27, 2017
Samples Submitted: February 17, 2017
Laboratory Reference: 1702-161
Project: 5147-005-10

NWTPH-Dx

Matrix: Water
Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GEI-MW-6-021417**					
Laboratory ID:	02-161-01					
Diesel Range Organics	**ND**	0.26	NWTPH-Dx	2-27-17	2-27-17	
Lube Oil Range Organics	**ND**	0.41	NWTPH-Dx	2-27-17	2-27-17	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*80*	*50-150*				
Client ID:	**GEI-MW-7-021417**					
Laboratory ID:	02-161-02					
Diesel Range Organics	**0.50**	0.25	NWTPH-Dx	2-27-17	2-27-17	
Lube Oil Range Organics	**ND**	0.40	NWTPH-Dx	2-27-17	2-27-17	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*84*	*50-150*				
Client ID:	**GEI-DUP-1-021417**					
Laboratory ID:	02-161-03					
Diesel Range Organics	**0.39**	0.25	NWTPH-Dx	2-27-17	2-27-17	
Lube Oil Range Organics	**ND**	0.40	NWTPH-Dx	2-27-17	2-27-17	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*74*	*50-150*				

Date of Report: February 27, 2017
Samples Submitted: February 17, 2017
Laboratory Reference: 1702-161
Project: 5147-005-10

PAHs EPA 8270D/SIM

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GEI-MW-6-021417**					
Laboratory ID:	02-161-01					
Naphthalene	**ND**	0.095	EPA 8270D/SIM	2-17-17	2-19-17	
2-Methylnaphthalene	**ND**	0.095	EPA 8270D/SIM	2-17-17	2-19-17	
1-Methylnaphthalene	**ND**	0.095	EPA 8270D/SIM	2-17-17	2-19-17	
Acenaphthylene	**ND**	0.095	EPA 8270D/SIM	2-17-17	2-19-17	
Acenaphthene	**ND**	0.095	EPA 8270D/SIM	2-17-17	2-19-17	
Fluorene	**ND**	0.095	EPA 8270D/SIM	2-17-17	2-19-17	
Phenanthrene	**ND**	0.095	EPA 8270D/SIM	2-17-17	2-19-17	
Anthracene	**ND**	0.095	EPA 8270D/SIM	2-17-17	2-19-17	
Fluoranthene	**ND**	0.095	EPA 8270D/SIM	2-17-17	2-19-17	
Pyrene	**ND**	0.095	EPA 8270D/SIM	2-17-17	2-19-17	
Benzo[a]anthracene	**ND**	0.0095	EPA 8270D/SIM	2-17-17	2-19-17	
Chrysene	**ND**	0.0095	EPA 8270D/SIM	2-17-17	2-19-17	
Benzo[b]fluoranthene	**ND**	0.0095	EPA 8270D/SIM	2-17-17	2-19-17	
Benzo(j,k)fluoranthene	**ND**	0.0095	EPA 8270D/SIM	2-17-17	2-19-17	
Benzo[a]pyrene	**ND**	0.0095	EPA 8270D/SIM	2-17-17	2-19-17	
Indeno(1,2,3-c,d)pyrene	**ND**	0.0095	EPA 8270D/SIM	2-17-17	2-19-17	
Dibenz[a,h]anthracene	**ND**	0.0095	EPA 8270D/SIM	2-17-17	2-19-17	
Benzo[g,h,i]perylene	**ND**	0.0095	EPA 8270D/SIM	2-17-17	2-19-17	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*57*	*30 - 124*				
Pyrene-d10	*60*	*40 - 143*				
Terphenyl-d14	*65*	*27 - 127*				

Date of Report: February 27, 2017
Samples Submitted: February 17, 2017
Laboratory Reference: 1702-161
Project: 5147-005-10

PAHs EPA 8270D/SIM

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GEI-MW-7-021417**					
Laboratory ID:	02-161-02					
Naphthalene	**19**	0.93	EPA 8270D/SIM	2-17-17	2-21-17	
2-Methylnaphthalene	**ND**	0.093	EPA 8270D/SIM	2-17-17	2-19-17	
1-Methylnaphthalene	**5.9**	0.93	EPA 8270D/SIM	2-17-17	2-21-17	
Acenaphthylene	**ND**	0.093	EPA 8270D/SIM	2-17-17	2-19-17	
Acenaphthene	**8.5**	0.93	EPA 8270D/SIM	2-17-17	2-21-17	
Fluorene	**2.4**	0.093	EPA 8270D/SIM	2-17-17	2-19-17	
Phenanthrene	**1.2**	0.093	EPA 8270D/SIM	2-17-17	2-19-17	
Anthracene	**0.11**	0.093	EPA 8270D/SIM	2-17-17	2-19-17	
Fluoranthene	**ND**	0.093	EPA 8270D/SIM	2-17-17	2-19-17	
Pyrene	**ND**	0.093	EPA 8270D/SIM	2-17-17	2-19-17	
Benzo[a]anthracene	**ND**	0.0093	EPA 8270D/SIM	2-17-17	2-19-17	
Chrysene	**ND**	0.0093	EPA 8270D/SIM	2-17-17	2-19-17	
Benzo[b]fluoranthene	**ND**	0.0093	EPA 8270D/SIM	2-17-17	2-19-17	
Benzo(j,k)fluoranthene	**ND**	0.0093	EPA 8270D/SIM	2-17-17	2-19-17	
Benzo[a]pyrene	**ND**	0.0093	EPA 8270D/SIM	2-17-17	2-19-17	
Indeno(1,2,3-c,d)pyrene	**ND**	0.0093	EPA 8270D/SIM	2-17-17	2-19-17	
Dibenz[a,h]anthracene	**ND**	0.0093	EPA 8270D/SIM	2-17-17	2-19-17	
Benzo[g,h,i]perylene	**ND**	0.0093	EPA 8270D/SIM	2-17-17	2-19-17	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*52*	*30 - 124*				
Pyrene-d10	*57*	*40 - 143*				
Terphenyl-d14	*58*	*27 - 127*				

Date of Report: February 27, 2017
Samples Submitted: February 17, 2017
Laboratory Reference: 1702-161
Project: 5147-005-10

PAHs EPA 8270D/SIM

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GEI-DUP-1-021417**					
Laboratory ID:	02-161-03					
Naphthalene	**26**	0.92	EPA 8270D/SIM	2-17-17	2-22-17	
2-Methylnaphthalene	**ND**	0.46	EPA 8270D/SIM	2-17-17	2-22-17	
1-Methylnaphthalene	**8.1**	0.46	EPA 8270D/SIM	2-17-17	2-22-17	
Acenaphthylene	**ND**	0.092	EPA 8270D/SIM	2-17-17	2-22-17	
Acenaphthene	**14**	0.46	EPA 8270D/SIM	2-17-17	2-22-17	
Fluorene	**5.7**	0.46	EPA 8270D/SIM	2-17-17	2-22-17	
Phenanthrene	**2.8**	0.092	EPA 8270D/SIM	2-17-17	2-22-17	
Anthracene	**0.26**	0.092	EPA 8270D/SIM	2-17-17	2-22-17	
Fluoranthene	**0.19**	0.092	EPA 8270D/SIM	2-17-17	2-22-17	
Pyrene	**ND**	0.092	EPA 8270D/SIM	2-17-17	2-22-17	
Benzo[a]anthracene	**ND**	0.0092	EPA 8270D/SIM	2-17-17	2-22-17	
Chrysene	**ND**	0.0092	EPA 8270D/SIM	2-17-17	2-22-17	
Benzo[b]fluoranthene	**ND**	0.0092	EPA 8270D/SIM	2-17-17	2-22-17	
Benzo(j,k)fluoranthene	**ND**	0.0092	EPA 8270D/SIM	2-17-17	2-22-17	
Benzo[a]pyrene	**ND**	0.0092	EPA 8270D/SIM	2-17-17	2-22-17	
Indeno(1,2,3-c,d)pyrene	**ND**	0.0092	EPA 8270D/SIM	2-17-17	2-22-17	
Dibenz[a,h]anthracene	**ND**	0.0092	EPA 8270D/SIM	2-17-17	2-22-17	
Benzo[g,h,i]perylene	**ND**	0.0092	EPA 8270D/SIM	2-17-17	2-22-17	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*66*	*30 - 124*				
Pyrene-d10	*86*	*40 - 143*				
Terphenyl-d14	*72*	*27 - 127*				

Date of Report: February 27, 2017
Samples Submitted: February 17, 2017
Laboratory Reference: 1702-161
Project: 5147-005-10

NWTPH-Gx
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0223W1					
Gasoline	**ND**	100	NWTPH-Gx	2-23-17	2-23-17	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*101*	*61-118*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	02-161-01										
	ORIG	DUP									
Gasoline	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Surrogate:											
Fluorobenzene						*93*	*95*	*61-118*			

Date of Report: February 27, 2017
Samples Submitted: February 17, 2017
Laboratory Reference: 1702-161
Project: 5147-005-10

NWTPH-Gx
CONTINUING CALIBRATION SUMMARY

Lab ID	True Value (ppm)	Calc. Value	Percent Difference	Control Limits
CCVD0223G-1	5.00	5.20	-4	+/- 20%
CCVD0223G-2	5.00	4.67	7	+/- 20%

Date of Report: February 27, 2017
Samples Submitted: February 17, 2017
Laboratory Reference: 1702-161
Project: 5147-005-10

NWTPH-Dx
QUALITY CONTROL

Matrix: Water
Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0227W1					
Diesel Range Organics	**ND**	0.25	NWTPH-Dx	2-27-17	2-27-17	
Lube Oil Range Organics	**ND**	0.40	NWTPH-Dx	2-27-17	2-27-17	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*63*	*50-150*				

Analyte	Result		Spike Level		Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE										
Laboratory ID:	02-161-01									
	ORIG	DUP								
Diesel Range	**ND**	**ND**	NA	NA		NA	NA	NA	NA	
Lube Oil Range	**ND**	**ND**	NA	NA		NA	NA	NA	NA	
Surrogate:										
o-Terphenyl						*80* *76*	*50-150*			

Date of Report: February 27, 2017
Samples Submitted: February 17, 2017
Laboratory Reference: 1702-161
Project: 5147-005-10

NWTPH-Dx
CONTINUING CALIBRATION SUMMARY

Lab ID	True Value (ppm)	Calc. Value	Percent Difference	Control Limits
CCV0227F-V1	100	87.2	13	+/-15%
CCV0227F-V2	100	94.4	5.6	+/-15%
CCV0227R-T1	100	100.0	0.01	+/-15%
CCV0227F-T1	100	87.8	12	+/-15%
CCV0227R-T2	100	101	-1.5	+/-15%
CCV0227F-T2	100	89.7	10	+/-15%

Date of Report: February 27, 2017
Samples Submitted: February 17, 2017
Laboratory Reference: 1702-161
Project: 5147-005-10

PAHs EPA 8270D/SIM
METHOD BLANK QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB0217W1					
Naphthalene	**ND**	0.10	EPA 8270D/SIM	2-17-17	2-19-17	
2-Methylnaphthalene	**ND**	0.10	EPA 8270D/SIM	2-17-17	2-19-17	
1-Methylnaphthalene	**ND**	0.10	EPA 8270D/SIM	2-17-17	2-19-17	
Acenaphthylene	**ND**	0.10	EPA 8270D/SIM	2-17-17	2-19-17	
Acenaphthene	**ND**	0.10	EPA 8270D/SIM	2-17-17	2-19-17	
Fluorene	**ND**	0.10	EPA 8270D/SIM	2-17-17	2-19-17	
Phenanthrene	**ND**	0.10	EPA 8270D/SIM	2-17-17	2-19-17	
Anthracene	**ND**	0.10	EPA 8270D/SIM	2-17-17	2-19-17	
Fluoranthene	**ND**	0.10	EPA 8270D/SIM	2-17-17	2-19-17	
Pyrene	**ND**	0.10	EPA 8270D/SIM	2-17-17	2-19-17	
Benzo[a]anthracene	**ND**	0.010	EPA 8270D/SIM	2-17-17	2-19-17	
Chrysene	**ND**	0.010	EPA 8270D/SIM	2-17-17	2-19-17	
Benzo[b]fluoranthene	**ND**	0.010	EPA 8270D/SIM	2-17-17	2-19-17	
Benzo(j,k)fluoranthene	**ND**	0.010	EPA 8270D/SIM	2-17-17	2-19-17	
Benzo[a]pyrene	**ND**	0.010	EPA 8270D/SIM	2-17-17	2-19-17	
Indeno(1,2,3-c,d)pyrene	**ND**	0.010	EPA 8270D/SIM	2-17-17	2-19-17	
Dibenz[a,h]anthracene	**ND**	0.010	EPA 8270D/SIM	2-17-17	2-19-17	
Benzo[g,h,i]perylene	**ND**	0.010	EPA 8270D/SIM	2-17-17	2-19-17	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*55*	*30 - 124*				
Pyrene-d10	*59*	*40 - 143*				
Terphenyl-d14	*66*	*27 - 127*				

Date of Report: February 27, 2017
Samples Submitted: February 17, 2017
Laboratory Reference: 1702-161
Project: 5147-005-10

PAHs EPA 8270D/SIM
SB/SBD QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB0217W1									
	SB	SBD	SB	SBD	SB	SBD				
Naphthalene	**0.294**	**0.332**	0.500	0.500	59	66	29 - 101	12	47	
Acenaphthylene	**0.302**	**0.302**	0.500	0.500	60	60	20 - 117	0	50	
Acenaphthene	**0.308**	**0.324**	0.500	0.500	62	65	37 - 109	5	43	
Fluorene	**0.337**	**0.348**	0.500	0.500	67	70	47 - 108	3	34	
Phenanthrene	**0.344**	**0.349**	0.500	0.500	69	70	49 - 109	1	28	
Anthracene	**0.322**	**0.328**	0.500	0.500	64	66	34 - 140	2	32	
Fluoranthene	**0.345**	**0.351**	0.500	0.500	69	70	45 - 120	2	39	
Pyrene	**0.346**	**0.351**	0.500	0.500	69	70	42 - 133	1	39	
Benzo[a]anthracene	**0.381**	**0.381**	0.500	0.500	76	76	71 - 117	0	28	
Chrysene	**0.329**	**0.336**	0.500	0.500	66	67	53 - 110	2	25	
Benzo[b]fluoranthene	**0.356**	**0.357**	0.500	0.500	71	71	53 - 123	0	37	
Benzo(j,k)fluoranthene	**0.333**	**0.342**	0.500	0.500	67	68	52 - 119	3	41	
Benzo[a]pyrene	**0.330**	**0.322**	0.500	0.500	66	64	37 - 129	2	33	
Indeno(1,2,3-c,d)pyrene	**0.372**	**0.372**	0.500	0.500	74	74	45 - 128	0	31	
Dibenz[a,h]anthracene	**0.348**	**0.349**	0.500	0.500	70	70	54 - 120	0	30	
Benzo[g,h,i]perylene	**0.363**	**0.363**	0.500	0.500	73	73	49 - 117	0	29	
Surrogate:										
2-Fluorobiphenyl					*54*	*59*	*30 - 124*			
Pyrene-d10					*65*	*66*	*40 - 143*			
Terphenyl-d14					*72*	*77*	*27 - 127*			

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

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

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

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

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

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

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

I - Compound recovery is outside of the control limits.

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

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

L - The RPD is outside of the control limits.

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

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

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

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

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

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

Q - Surrogate recovery is outside of the control limits.

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

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

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

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

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

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

X - Sample extract treated with a mercury cleanup procedure.

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

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

Z -

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

Chain of Custody

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

Company: GEOENGINEERS INC.
Project Number: 5147-005-10
Project Name: CAP SANTE MARINE
Project Manager: ROBERT TRAHAN
Sampled by: NATHAN SOLOMON

Turnaround Request (in working days)

(Check One)

- ☐ Same Day
- ☐ 1 Day
- ☐ 2 Days
- ☐ 3 Days
- ☒ Standard (7 Days) (TPH analysis 5 Days)
- ☐ _____ (other)

Laboratory Number: 02-161

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx (☐ Acid / SG Clean-up)	Volatiles 8260C	Halogenated Volatiles 8260C	EDB EPA 8011 (Waters Only)	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A	MS/MSD				% Moisture
1	GEI-MW-6-021417	2.14.17	1145	WATER	9			X	X					X									X				
2	GEI-MW-7-021417		1220		7			X	X					X													
3	GEI-DUP-1-021417		1200		7			X	X					X													
4	TRIP BLANK-021417		--		3			X																			

	Signature	Company	Date	Time
Relinquished		GEI	2.17.17	10:00
Received			2/17/17	1000
Relinquished				
Received				
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions

MS/MSD ON PAHs

Data Package: Standard ☐ Level III ☐ Level IV ☐

Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☐

Sample/Cooler Receipt and Acceptance Checklist

Client: GES

Client Project Name/Number: 5147-005-10

OnSite Project Number: 02-161

Initiated by: AMY

Date Initiated: 2/17/17

1.0 Cooler Verification

1.1 Were there custody seals on the outside of the cooler?	Yes	No	N/A	1 2 3 4
1.2 Were the custody seals intact?	Yes	No	N/A	1 2 3 4
1.3 Were the custody seals signed and dated by last custodian?	Yes	No	N/A	1 2 3 4
1.4 Were the samples delivered on ice or blue ice?	Yes	No		1 2 3 4
1.5 Were samples received between 0-6 degrees Celsius?	Yes	No	Temperature: 6	
1.6 Have shipping bills (if any) been attached to the back of this form?	Yes	N/A		
1.7 How were the samples delivered?	Client	Courier	UPS/FedEx	OSE Pickup / Other

2.0 Chain of Custody Verification

2.1 Was a Chain of Custody submitted with the samples?	Yes	No	1 2 3 4
2.2 Was the COC legible and written in permanent ink?	Yes	No	1 2 3 4
2.3 Have samples been relinquished and accepted by each custodian?	Yes	No	1 2 3 4
2.4 Did the sample labels (ID, date, time, preservative) agree with COC?	Yes	No	1 2 3 4
2.5 Were all of the samples listed on the COC submitted?	Yes	No	1 2 3 4
2.6 Were any of the samples submitted omitted from the COC?	Yes	No	1 2 3 4

3.0 Sample Verification

3.1 Were any sample containers broken or compromised?	Yes	No		1 2 3 4
3.2 Were any sample labels missing or illegible?	Yes	No		1 2 3 4
3.3 Have the correct containers been used for each analysis requested?	Yes	No		1 2 3 4
3.4 Have the samples been correctly preserved?	Yes	No	N/A	1 2 3 4
3.5 Are volatiles samples free from headspace and bubbles greater than 6mm?	Yes	No	N/A	1 2 3 4
3.6 Is there sufficient sample submitted to perform requested analyses?	Yes	No		1 2 3 4
3.7 Have any holding times already expired or will expire in 24 hours?	Yes	No		1 2 3 4
3.8 Was method 5035A used?	Yes	No	N/A	1 2 3 4
3.9 If 5035A was used, which sampling option was used (#1, 2, or 3).	#		N/A	1 2 3 4

Explain any discrepancies:

1 - Discuss issue in Case Narrative

2 - Process Sample As-is

3 - Client contacted to discuss problem

4 - Sample cannot be analyzed or client does not wish to proceed

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

August 30, 2017

Robert Trahan
GeoEngineers, Inc.
600 Stewart, Suite 1700
Seattle, WA 98101-1233

Re: Analytical Data for Project 5147-005-12
Laboratory Reference No. 1708-246

Dear Robert:

Enclosed are the analytical results and associated quality control data for samples submitted on August 18, 2017.

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

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

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: August 30, 2017
Samples Submitted: August 18, 2017
Laboratory Reference: 1708-246
Project: 5147-005-12

Case Narrative

Samples were collected on August 18, 2017 and received by the laboratory on August 18, 2017. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

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

PAHs EPA 8270D/SIM Analysis

Sample MS/MSD pair had several recoveries fall outside of control limits believed to be caused by sample matrix. The SB/SBD pair extracted with this batch had all parameters in control, no further action was deemed necessary.

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

Date of Report: August 30, 2017
Samples Submitted: August 18, 2017
Laboratory Reference: 1708-246
Project: 5147-005-12

ANALYTICAL REPORT FOR SAMPLES

Client ID	Laboratory ID	Matrix	Date Sampled	Date Received	Notes
GEI-MW-6_081817	08-246-01	Water	8-18-17	8-18-17	
GEI-MW-7_081817	08-246-02	Water	8-18-17	8-18-17	
Dup_081817	08-246-03	Water	8-18-17	8-18-17	
Trip Blank	08-246-04	Water	8-18-17	8-18-17	

Date of Report: August 30, 2017
Samples Submitted: August 18, 2017
Laboratory Reference: 1708-246
Project: 5147-005-12

NWTPH-Gx

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GEI-MW-6_081817**					
Laboratory ID:	08-246-01					
Gasoline	**ND**	500	NWTPH-Gx	8-28-17	8-28-17	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*91*	*61-118*				
Client ID:	**GEI-MW-7_081817**					
Laboratory ID:	08-246-02					
Gasoline	**ND**	500	NWTPH-Gx	8-28-17	8-28-17	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*80*	*61-118*				
Client ID:	**Dup_081817**					
Laboratory ID:	08-246-03					
Gasoline	**ND**	500	NWTPH-Gx	8-28-17	8-28-17	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*78*	*61-118*				
Client ID:	**Trip Blank**					
Laboratory ID:	08-246-04					
Gasoline	**ND**	100	NWTPH-Gx	8-28-17	8-28-17	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*109*	*61-118*				

Date of Report: August 30, 2017
Samples Submitted: August 18, 2017
Laboratory Reference: 1708-246
Project: 5147-005-12

NWTPH-Dx

Matrix: Water
Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GEI-MW-6_081817**					
Laboratory ID:	08-246-01					
Diesel Range Organics	**ND**	0.26	NWTPH-Dx	8-28-17	8-28-17	
Lube Oil Range Organics	**ND**	0.42	NWTPH-Dx	8-28-17	8-28-17	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*105*	*50-150*				
Client ID:	**GEI-MW-7_081817**					
Laboratory ID:	08-246-02					
Diesel Range Organics	**0.27**	0.27	NWTPH-Dx	8-28-17	8-28-17	
Lube Oil Range Organics	**ND**	0.43	NWTPH-Dx	8-28-17	8-28-17	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*93*	*50-150*				
Client ID:	**Dup_081817**					
Laboratory ID:	08-246-03					
Diesel Range Organics	**ND**	0.26	NWTPH-Dx	8-28-17	8-28-17	
Lube Oil Range Organics	**ND**	0.42	NWTPH-Dx	8-28-17	8-28-17	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*84*	*50-150*				

Date of Report: August 30, 2017
Samples Submitted: August 18, 2017
Laboratory Reference: 1708-246
Project: 5147-005-12

PAHs EPA 8270D/SIM

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GEI-MW-6_081817**					
Laboratory ID:	08-246-01					
Naphthalene	**ND**	0.094	EPA 8270D/SIM	8-22-17	8-25-17	
2-Methylnaphthalene	**ND**	0.094	EPA 8270D/SIM	8-22-17	8-25-17	
1-Methylnaphthalene	**ND**	0.094	EPA 8270D/SIM	8-22-17	8-25-17	
Acenaphthylene	**ND**	0.094	EPA 8270D/SIM	8-22-17	8-25-17	
Acenaphthene	**ND**	0.094	EPA 8270D/SIM	8-22-17	8-25-17	
Fluorene	**ND**	0.094	EPA 8270D/SIM	8-22-17	8-25-17	
Phenanthrene	**ND**	0.094	EPA 8270D/SIM	8-22-17	8-25-17	
Anthracene	**ND**	0.094	EPA 8270D/SIM	8-22-17	8-25-17	
Fluoranthene	**ND**	0.094	EPA 8270D/SIM	8-22-17	8-25-17	
Pyrene	**ND**	0.094	EPA 8270D/SIM	8-22-17	8-25-17	
Benzo[a]anthracene	**ND**	0.0094	EPA 8270D/SIM	8-22-17	8-25-17	
Chrysene	**ND**	0.0094	EPA 8270D/SIM	8-22-17	8-25-17	
Benzo[b]fluoranthene	**ND**	0.0094	EPA 8270D/SIM	8-22-17	8-25-17	
Benzo(j,k)fluoranthene	**ND**	0.0094	EPA 8270D/SIM	8-22-17	8-25-17	
Benzo[a]pyrene	**ND**	0.0094	EPA 8270D/SIM	8-22-17	8-25-17	
Indeno(1,2,3-c,d)pyrene	**ND**	0.0094	EPA 8270D/SIM	8-22-17	8-25-17	
Dibenz[a,h]anthracene	**ND**	0.0094	EPA 8270D/SIM	8-22-17	8-25-17	
Benzo[g,h,i]perylene	**ND**	0.0094	EPA 8270D/SIM	8-22-17	8-25-17	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*77*	*30 - 124*				
Pyrene-d10	*66*	*40 - 143*				
Terphenyl-d14	*109*	*27 - 127*				

Date of Report: August 30, 2017
Samples Submitted: August 18, 2017
Laboratory Reference: 1708-246
Project: 5147-005-12

PAHs EPA 8270D/SIM

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GEI-MW-7_081817**					
Laboratory ID:	08-246-02					
Naphthalene	**ND**	0.094	EPA 8270D/SIM	8-22-17	8-25-17	
2-Methylnaphthalene	**ND**	0.094	EPA 8270D/SIM	8-22-17	8-25-17	
1-Methylnaphthalene	**ND**	0.094	EPA 8270D/SIM	8-22-17	8-25-17	
Acenaphthylene	**ND**	0.094	EPA 8270D/SIM	8-22-17	8-25-17	
Acenaphthene	**0.61**	0.094	EPA 8270D/SIM	8-22-17	8-25-17	
Fluorene	**ND**	0.094	EPA 8270D/SIM	8-22-17	8-25-17	
Phenanthrene	**ND**	0.094	EPA 8270D/SIM	8-22-17	8-25-17	
Anthracene	**ND**	0.094	EPA 8270D/SIM	8-22-17	8-25-17	
Fluoranthene	**ND**	0.094	EPA 8270D/SIM	8-22-17	8-25-17	
Pyrene	**ND**	0.094	EPA 8270D/SIM	8-22-17	8-25-17	
Benzo[a]anthracene	**ND**	0.0094	EPA 8270D/SIM	8-22-17	8-25-17	
Chrysene	**ND**	0.0094	EPA 8270D/SIM	8-22-17	8-25-17	
Benzo[b]fluoranthene	**ND**	0.0094	EPA 8270D/SIM	8-22-17	8-25-17	
Benzo(j,k)fluoranthene	**ND**	0.0094	EPA 8270D/SIM	8-22-17	8-25-17	
Benzo[a]pyrene	**ND**	0.0094	EPA 8270D/SIM	8-22-17	8-25-17	
Indeno(1,2,3-c,d)pyrene	**ND**	0.0094	EPA 8270D/SIM	8-22-17	8-25-17	
Dibenz[a,h]anthracene	**ND**	0.0094	EPA 8270D/SIM	8-22-17	8-25-17	
Benzo[g,h,i]perylene	**ND**	0.0094	EPA 8270D/SIM	8-22-17	8-25-17	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*44*	*30 - 124*				
Pyrene-d10	*40*	*40 - 143*				
Terphenyl-d14	*61*	*27 - 127*				

Date of Report: August 30, 2017
Samples Submitted: August 18, 2017
Laboratory Reference: 1708-246
Project: 5147-005-12

PAHs EPA 8270D/SIM

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**Dup_081817**					
Laboratory ID:	08-246-03					
Naphthalene	**ND**	0.093	EPA 8270D/SIM	8-22-17	8-25-17	
2-Methylnaphthalene	**ND**	0.093	EPA 8270D/SIM	8-22-17	8-25-17	
1-Methylnaphthalene	**ND**	0.093	EPA 8270D/SIM	8-22-17	8-25-17	
Acenaphthylene	**ND**	0.093	EPA 8270D/SIM	8-22-17	8-25-17	
Acenaphthene	**ND**	0.093	EPA 8270D/SIM	8-22-17	8-25-17	
Fluorene	**ND**	0.093	EPA 8270D/SIM	8-22-17	8-25-17	
Phenanthrene	**ND**	0.093	EPA 8270D/SIM	8-22-17	8-25-17	
Anthracene	**ND**	0.093	EPA 8270D/SIM	8-22-17	8-25-17	
Fluoranthene	**ND**	0.093	EPA 8270D/SIM	8-22-17	8-25-17	
Pyrene	**ND**	0.093	EPA 8270D/SIM	8-22-17	8-25-17	
Benzo[a]anthracene	**ND**	0.0093	EPA 8270D/SIM	8-22-17	8-25-17	
Chrysene	**ND**	0.0093	EPA 8270D/SIM	8-22-17	8-25-17	
Benzo[b]fluoranthene	**ND**	0.0093	EPA 8270D/SIM	8-22-17	8-25-17	
Benzo(j,k)fluoranthene	**ND**	0.0093	EPA 8270D/SIM	8-22-17	8-25-17	
Benzo[a]pyrene	**ND**	0.0093	EPA 8270D/SIM	8-22-17	8-25-17	
Indeno(1,2,3-c,d)pyrene	**ND**	0.0093	EPA 8270D/SIM	8-22-17	8-25-17	
Dibenz[a,h]anthracene	**ND**	0.0093	EPA 8270D/SIM	8-22-17	8-25-17	
Benzo[g,h,i]perylene	**ND**	0.0093	EPA 8270D/SIM	8-22-17	8-25-17	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*81*	*30 - 124*				
Pyrene-d10	*66*	*40 - 143*				
Terphenyl-d14	*110*	*27 - 127*				

Date of Report: August 30, 2017
Samples Submitted: August 18, 2017
Laboratory Reference: 1708-246
Project: 5147-005-12

NWTPH-Gx
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0828W2					
Gasoline	**ND**	100	NWTPH-Gx	8-28-17	8-28-17	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*85*	*61-118*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	08-246-03										
	ORIG	DUP									
Gasoline	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Surrogate:											
Fluorobenzene						*78*	*87*	*61-118*			

Date of Report: August 30, 2017
Samples Submitted: August 18, 2017
Laboratory Reference: 1708-246
Project: 5147-005-12

NWTPH-Gx
CONTINUING CALIBRATION SUMMARY

Lab ID	True Value (ppm)	Calc. Value	Percent Difference	Control Limits
CCVD0828G1	5.00	4.83	3	+/- 20%
CCVD0828G-2	5.00	4.80	4	+/- 20%
CCVH0828G-1	5.00	5.11	-2	+/- 20%
CCVH0828G-2	5.00	4.66	7	+/- 20%

Date of Report: August 30, 2017
Samples Submitted: August 18, 2017
Laboratory Reference: 1708-246
Project: 5147-005-12

NWTPH-Dx
QUALITY CONTROL

Matrix: Water
Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0828W1					
Diesel Range Organics	**ND**	0.25	NWTPH-Dx	8-28-17	8-29-17	
Lube Oil Range Organics	**ND**	0.40	NWTPH-Dx	8-28-17	8-29-17	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*77*	*50-150*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	08-246-02										
	ORIG	DUP									
Diesel Range Organics	**0.274**	**ND**	NA	NA		NA		NA	NA	NA	
Lube Oil Range	**ND**	**ND**	NA	NA		NA		NA	NA	NA	
Surrogate:											
o-Terphenyl						*93*	*84*	*50-150*			

Date of Report: August 30, 2017
Samples Submitted: August 18, 2017
Laboratory Reference: 1708-246
Project: 5147-005-12

NWTPH-Dx
CONTINUING CALIBRATION SUMMARY

Lab ID	True Value (ppm)	Calc. Value	Percent Difference	Control Limits
CCV0828F-T1	100	88.2	11.8	+/-15%
CCV0828F-T2	100	104	-4.3	+/-15%
CCV0828R-T1	100	86.6	13.4	+/-15%
CCV0828R-T2	100	90.5	9.5	+/-15%
CCV0828F-V2	100	106	-5.6	+/-15%
CCV0828F-V3	100	95.4	4.6	+/-15%
CCV0828R-V1	100	98.3	1.7	+/-15%
CCV0828R-V2	100	94.3	5.7	+/-15%
CCV0829R-T1	100	90.8	9.2	+/-15%
CCV0829R-T2	100	94.1	5.9	+/-15%

Date of Report: August 30, 2017
Samples Submitted: August 18, 2017
Laboratory Reference: 1708-246
Project: 5147-005-12

PAHs EPA 8270D/SIM
METHOD BLANK QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB0822W1					
Naphthalene	**ND**	0.10	EPA 8270D/SIM	8-22-17	8-24-17	
2-Methylnaphthalene	**ND**	0.10	EPA 8270D/SIM	8-22-17	8-24-17	
1-Methylnaphthalene	**ND**	0.10	EPA 8270D/SIM	8-22-17	8-24-17	
Acenaphthylene	**ND**	0.10	EPA 8270D/SIM	8-22-17	8-24-17	
Acenaphthene	**ND**	0.10	EPA 8270D/SIM	8-22-17	8-24-17	
Fluorene	**ND**	0.10	EPA 8270D/SIM	8-22-17	8-24-17	
Phenanthrene	**ND**	0.10	EPA 8270D/SIM	8-22-17	8-24-17	
Anthracene	**ND**	0.10	EPA 8270D/SIM	8-22-17	8-24-17	
Fluoranthene	**ND**	0.10	EPA 8270D/SIM	8-22-17	8-24-17	
Pyrene	**ND**	0.10	EPA 8270D/SIM	8-22-17	8-24-17	
Benzo[a]anthracene	**ND**	0.010	EPA 8270D/SIM	8-22-17	8-24-17	
Chrysene	**ND**	0.010	EPA 8270D/SIM	8-22-17	8-24-17	
Benzo[b]fluoranthene	**ND**	0.010	EPA 8270D/SIM	8-22-17	8-24-17	
Benzo(j,k)fluoranthene	**ND**	0.010	EPA 8270D/SIM	8-22-17	8-24-17	
Benzo[a]pyrene	**ND**	0.010	EPA 8270D/SIM	8-22-17	8-24-17	
Indeno(1,2,3-c,d)pyrene	**ND**	0.010	EPA 8270D/SIM	8-22-17	8-24-17	
Dibenz[a,h]anthracene	**ND**	0.010	EPA 8270D/SIM	8-22-17	8-24-17	
Benzo[g,h,i]perylene	**ND**	0.010	EPA 8270D/SIM	8-22-17	8-24-17	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*83*	*30 - 124*				
Pyrene-d10	*79*	*40 - 143*				
Terphenyl-d14	*106*	*27 - 127*				

Date of Report: August 30, 2017
Samples Submitted: August 18, 2017
Laboratory Reference: 1708-246
Project: 5147-005-12

PAHs EPA 8270D/SIM
MS/MSD QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
MATRIX SPIKES											
Laboratory ID:	08-246-02										
	MS	MSD	MS	MSD		MS	MSD				
Naphthalene	**0.207**	**0.225**	0.473	0.469	ND	44	48	29 - 101	8	47	
Acenaphthylene	**0.228**	**0.270**	0.473	0.469	ND	48	58	20 - 117	17	50	
Acenaphthene	**0.914**	**0.962**	0.473	0.469	0.610	64	75	37 - 109	5	43	
Fluorene	**0.273**	**0.322**	0.473	0.469	ND	58	69	47 - 108	16	34	
Phenanthrene	**0.237**	**0.284**	0.473	0.469	ND	50	61	49 - 109	18	28	
Anthracene	**0.291**	**0.350**	0.473	0.469	ND	62	75	34 - 140	18	32	
Fluoranthene	**0.274**	**0.332**	0.473	0.469	ND	58	71	45 - 120	19	39	
Pyrene	**0.251**	**0.302**	0.473	0.469	ND	53	64	42 - 133	18	39	
Benzo[a]anthracene	**0.253**	**0.310**	0.473	0.469	ND	53	66	71 - 117	20	28	II
Chrysene	**0.225**	**0.276**	0.473	0.469	ND	48	59	53 - 110	20	25	I
Benzo[b]fluoranthene	**0.212**	**0.258**	0.473	0.469	ND	45	55	53 - 123	20	37	I
Benzo(j,k)fluoranthene	**0.252**	**0.306**	0.473	0.469	ND	53	65	52 - 119	19	41	
Benzo[a]pyrene	**0.229**	**0.282**	0.473	0.469	ND	48	60	37 - 129	21	33	
Indeno(1,2,3-c,d)pyrene	**0.248**	**0.308**	0.473	0.469	ND	52	66	45 - 128	22	31	
Dibenz[a,h]anthracene	**0.197**	**0.247**	0.473	0.469	ND	42	53	54 - 120	23	30	II
Benzo[g,h,i]perylene	**0.175**	**0.220**	0.473	0.469	ND	37	47	49 - 117	23	29	II
Surrogate:											
2-Fluorobiphenyl						*43*	*49*	*30 - 124*			
Pyrene-d10						*47*	*56*	*40 - 143*			
Terphenyl-d14						*59*	*70*	*27 - 127*			

Date of Report: August 30, 2017
Samples Submitted: August 18, 2017
Laboratory Reference: 1708-246
Project: 5147-005-12

PAHs EPA 8270D/SIM
SB/SBD QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB0822W1									
	SB	SBD	SB	SBD	SB	SBD				
Naphthalene	**0.360**	**0.331**	0.500	0.500	72	66	29 - 101	8	47	
Acenaphthylene	**0.374**	**0.365**	0.500	0.500	75	73	20 - 117	2	50	
Acenaphthene	**0.468**	**0.377**	0.500	0.500	94	75	37 - 109	22	43	
Fluorene	**0.404**	**0.382**	0.500	0.500	81	76	47 - 108	6	34	
Phenanthrene	**0.414**	**0.394**	0.500	0.500	83	79	49 - 109	5	28	
Anthracene	**0.437**	**0.414**	0.500	0.500	87	83	34 - 140	5	32	
Fluoranthene	**0.425**	**0.405**	0.500	0.500	85	81	45 - 120	5	39	
Pyrene	**0.547**	**0.414**	0.500	0.500	109	83	42 - 133	28	39	
Benzo[a]anthracene	**0.491**	**0.477**	0.500	0.500	98	95	71 - 117	3	28	
Chrysene	**0.428**	**0.410**	0.500	0.500	86	82	53 - 110	4	25	
Benzo[b]fluoranthene	**0.440**	**0.424**	0.500	0.500	88	85	53 - 123	4	37	
Benzo(j,k)fluoranthene	**0.463**	**0.446**	0.500	0.500	93	89	52 - 119	4	41	
Benzo[a]pyrene	**0.433**	**0.413**	0.500	0.500	87	83	37 - 129	5	33	
Indeno(1,2,3-c,d)pyrene	**0.450**	**0.425**	0.500	0.500	90	85	45 - 128	6	31	
Dibenz[a,h]anthracene	**0.459**	**0.441**	0.500	0.500	92	88	54 - 120	4	30	
Benzo[g,h,i]perylene	**0.444**	**0.434**	0.500	0.500	89	87	49 - 117	2	29	
Surrogate:										
2-Fluorobiphenyl					*82*	*67*	*30 - 124*			
Pyrene-d10					*77*	*75*	*40 - 143*			
Terphenyl-d14					*103*	*94*	*27 - 127*			

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

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

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

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

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

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

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

I - Compound recovery is outside of the control limits.

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

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

L - The RPD is outside of the control limits.

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

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

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

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

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

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

Q - Surrogate recovery is outside of the control limits.

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

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

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

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

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

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

X - Sample extract treated with a mercury cleanup procedure.

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

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

Z -

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

Chain of Custody

Page 1 of 1

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

Company: GeoEngineers
Project Number: 5147-005-12
Project Name: POA - Lap Santa Marina
Project Manager: Robert Trahan
Sampled by: Robert Trahan

Turnaround Request (in working days)

(Check One)

- ☐ Same Day
- ☐ 1 Day
- ☐ 2 Days
- ☐ 3 Days
- ☒ Standard (7 Days) (TPH analysis 5 Days)
- ☐ _____ (other)

Laboratory Number: 08-246

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx (☐ Acid / SG Clean-up)	Volatiles 8260C	Halogenated Volatiles 8260C	EDB EPA 8011 (Waters Only)	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A	MS/MSD				% Moisture
1	GEI-MW-6-081817	8/18/17	12:50	L	7			X	X					X													
2	GEI-MW-7-081817	↓	10:55		14			X	X					X									X				
3	Dup-081817	↓	—		7			X	X					X													
4	Trip Blank	↓		↓	3			X	X	NO DO																	

	Signature	Company	Date	Time
Relinquished		GEI	8/18/17	4:45
Received		OnSite	8/18/17	16:45
Relinquished				
Received				
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions

Data Package: Standard ☐ Level III ☒ Level IV ☐

Chromatograms with final report ☒ Electronic Data Deliverables (EDDs) ☒

Sample/Cooler Receipt and Acceptance Checklist

Client: GES

Client Project Name/Number: 5147 005-12

OnSite Project Number: 08-246

Initiated by: BL

Date Initiated: 8-19-17

1.0 Cooler Verification

1.1 Were there custody seals on the outside of the cooler?	Yes	(No)	N/A	1 2 3 4
1.2 Were the custody seals intact?	Yes	No	(N/A)	1 2 3 4
1.3 Were the custody seals signed and dated by last custodian?	Yes	No	(N/A)	1 2 3 4
1.4 Were the samples delivered on ice or blue ice?	(Yes)	No		1 2 3 4
1.5 Were samples received between 0-6 degrees Celsius?	Yes	(No)	Temperature: 8°C	
1.6 Have shipping bills (if any) been attached to the back of this form?	Yes	(N/A)		

1.7 How were the samples delivered?	Client	Courier	UPS/FedEx	OSE Pickup	Other
	(Client)				

2.0 Chain of Custody Verification

2.1 Was a Chain of Custody submitted with the samples?	(Yes)	No	1 2 3 4
2.2 Was the COC legible and written in permanent ink?	(Yes)	No	1 2 3 4
2.3 Have samples been relinquished and accepted by each custodian?	(Yes)	No	1 2 3 4
2.4 Did the sample labels (ID, date, time, preservative) agree with COC?	(Yes)	No	1 2 3 4
2.5 Were all of the samples listed on the COC submitted?	(Yes)	No	1 2 3 4
2.6 Were any of the samples submitted omitted from the COC?	Yes	(No)	1 2 3 4

3.0 Sample Verification

3.1 Were any sample containers broken or compromised?	Yes	(No)		1 2 3 4
3.2 Were any sample labels missing or illegible?	Yes	(No)		1 2 3 4
3.3 Have the correct containers been used for each analysis requested?	(Yes)	No		1 2 3 4
3.4 Have the samples been correctly preserved?	(Yes)	No	N/A	1 2 3 4
3.5 Are volatiles samples free from headspace and bubbles greater than 6mm?	Yes	(No)	N/A	1 2 3 4
3.6 Is there sufficient sample submitted to perform requested analyses?	(Yes)	No		1 2 3 4
3.7 Have any holding times already expired or will expire in 24 hours?	Yes	(No)		1 2 3 4
3.8 Was method 5035A used?	Yes	No	(N/A)	1 2 3 4
3.9 If 5035A was used, which sampling option was used (#1, 2, or 3).	#		(N/A)	1 2 3 4

Explain any discrepancies:

1 - Discuss issue in Case Narrative

2 - Process Sample As-is

3 - Client contacted to discuss problem

4 - Sample cannot be analyzed or client does not wish to proceed

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

February 28, 2018

Robert Trahan
GeoEngineers, Inc.
600 Stewart, Suite 1700
Seattle, WA 98101-1233

Re: Analytical Data for Project 05147-005-12
Laboratory Reference No. 1802-224

Dear Robert:

Enclosed are the analytical results and associated quality control data for samples submitted on February 22, 2018.

Please note that this is a *revised* report. The full list of PAH compounds is now included.

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

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

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: February 28, 2018
Samples Submitted: February 22, 2018
Laboratory Reference: 1802-224
Project: 05147-005-12

Case Narrative

Samples were collected on February 21, 2018 and received by the laboratory on February 22, 2018. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

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

PAHs EPA 8270D/SIM Analysis

The RPD's for the MS/MSD were outside of control limits. The SB/SBD pair extracted with this batch had all parameters in control, indicating potential matrix interference on the MS/MSD. Due to limited sample, re-extraction was not possible.

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

Date of Report: February 28, 2018
Samples Submitted: February 22, 2018
Laboratory Reference: 1802-224
Project: 05147-005-12

ANALYTICAL REPORT FOR SAMPLES

Client ID	Laboratory ID	Matrix	Date Sampled	Date Received	Notes
GEI-MW-6_022118	02-224-01	Water	2-21-18	2-22-18	
GEI-MW-7_022118	02-224-02	Water	2-21-18	2-22-18	
GEI-DUP_022118	02-224-03	Water	2-21-18	2-22-18	
Trip Blank_022118	02-224-04	Water	2-21-18	2-22-18	

Date of Report: February 28, 2018
Samples Submitted: February 22, 2018
Laboratory Reference: 1802-224
Project: 05147-005-12

NWTPH-Gx

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GEI-MW-6_022118**					
Laboratory ID:	02-224-01					
Gasoline	**ND**	100	NWTPH-Gx	2-22-18	2-22-18	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*86*	*66-114*				
Client ID:	**GEI-MW-7_022118**					
Laboratory ID:	02-224-02					
Gasoline	**ND**	100	NWTPH-Gx	2-22-18	2-22-18	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*79*	*66-114*				
Client ID:	**GEI-DUP_022118**					
Laboratory ID:	02-224-03					
Gasoline	**ND**	100	NWTPH-Gx	2-22-18	2-22-18	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*84*	*66-114*				
Client ID:	**Trip Blank_022118**					
Laboratory ID:	02-224-04					
Gasoline	**ND**	100	NWTPH-Gx	2-23-18	2-23-18	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*89*	*66-114*				

Date of Report: February 28, 2018
Samples Submitted: February 22, 2018
Laboratory Reference: 1802-224
Project: 05147-005-12

NWTPH-Dx

Matrix: Water
Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GEI-MW-6_022118**					
Laboratory ID:	02-224-01					
Diesel Range Organics	**ND**	0.26	NWTPH-Dx	2-23-18	2-26-18	
Lube Oil Range Organics	**ND**	0.41	NWTPH-Dx	2-23-18	2-26-18	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*90*	*50-150*				
Client ID:	**GEI-MW-7_022118**					
Laboratory ID:	02-224-02					
Diesel Range Organics	**ND**	0.25	NWTPH-Dx	2-23-18	2-26-18	
Lube Oil Range Organics	**ND**	0.40	NWTPH-Dx	2-23-18	2-26-18	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*99*	*50-150*				
Client ID:	**GEI-DUP_022118**					
Laboratory ID:	02-224-03					
Diesel Range Organics	**ND**	0.26	NWTPH-Dx	2-23-18	2-26-18	
Lube Oil Range Organics	**ND**	0.41	NWTPH-Dx	2-23-18	2-26-18	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*97*	*50-150*				

Date of Report: February 28, 2018
Samples Submitted: February 22, 2018
Laboratory Reference: 1802-224
Project: 05147-005-12

PAHs EPA 8270D/SIM

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GEI-MW-6_022118**					
Laboratory ID:	02-224-01					
Naphthalene	**ND**	0.10	EPA 8270D/SIM	2-26-18	2-27-18	
2-Methylnaphthalene	**ND**	0.10	EPA 8270D/SIM	2-26-18	2-27-18	
1-Methylnaphthalene	**ND**	0.10	EPA 8270D/SIM	2-26-18	2-27-18	
Acenaphthylene	**ND**	0.10	EPA 8270D/SIM	2-26-18	2-27-18	
Acenaphthene	**ND**	0.10	EPA 8270D/SIM	2-26-18	2-27-18	
Fluorene	**ND**	0.10	EPA 8270D/SIM	2-26-18	2-27-18	
Phenanthrene	**ND**	0.10	EPA 8270D/SIM	2-26-18	2-27-18	
Anthracene	**ND**	0.10	EPA 8270D/SIM	2-26-18	2-27-18	
Fluoranthene	**ND**	0.10	EPA 8270D/SIM	2-26-18	2-27-18	
Pyrene	**ND**	0.10	EPA 8270D/SIM	2-26-18	2-27-18	
Benzo[a]anthracene	**ND**	0.010	EPA 8270D/SIM	2-26-18	2-27-18	
Chrysene	**ND**	0.010	EPA 8270D/SIM	2-26-18	2-27-18	
Benzo[b]fluoranthene	**ND**	0.010	EPA 8270D/SIM	2-26-18	2-27-18	
Benzo(j,k)fluoranthene	**ND**	0.010	EPA 8270D/SIM	2-26-18	2-27-18	
Benzo[a]pyrene	**ND**	0.010	EPA 8270D/SIM	2-26-18	2-27-18	
Indeno(1,2,3-c,d)pyrene	**ND**	0.010	EPA 8270D/SIM	2-26-18	2-27-18	
Dibenz[a,h]anthracene	**ND**	0.010	EPA 8270D/SIM	2-26-18	2-27-18	
Benzo[g,h,i]perylene	**ND**	0.010	EPA 8270D/SIM	2-26-18	2-27-18	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*61*	*25 - 107*				
Pyrene-d10	*80*	*28 - 103*				
Terphenyl-d14	*78*	*36 - 129*				

Date of Report: February 28, 2018
Samples Submitted: February 22, 2018
Laboratory Reference: 1802-224
Project: 05147-005-12

PAHs EPA 8270D/SIM

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GEI-MW-7_022118**					
Laboratory ID:	02-224-02					
Naphthalene	**2.0**	0.10	EPA 8270D/SIM	2-26-18	2-27-18	
2-Methylnaphthalene	**ND**	0.10	EPA 8270D/SIM	2-26-18	2-27-18	
1-Methylnaphthalene	**0.90**	0.10	EPA 8270D/SIM	2-26-18	2-27-18	
Acenaphthylene	**ND**	0.10	EPA 8270D/SIM	2-26-18	2-27-18	
Acenaphthene	**2.2**	0.10	EPA 8270D/SIM	2-26-18	2-27-18	
Fluorene	**0.47**	0.10	EPA 8270D/SIM	2-26-18	2-27-18	
Phenanthrene	**0.16**	0.10	EPA 8270D/SIM	2-26-18	2-27-18	
Anthracene	**ND**	0.10	EPA 8270D/SIM	2-26-18	2-27-18	
Fluoranthene	**ND**	0.10	EPA 8270D/SIM	2-26-18	2-27-18	
Pyrene	**ND**	0.10	EPA 8270D/SIM	2-26-18	2-27-18	
Benzo[a]anthracene	**ND**	0.010	EPA 8270D/SIM	2-26-18	2-27-18	
Chrysene	**ND**	0.010	EPA 8270D/SIM	2-26-18	2-27-18	
Benzo[b]fluoranthene	**ND**	0.010	EPA 8270D/SIM	2-26-18	2-27-18	
Benzo(j,k)fluoranthene	**ND**	0.010	EPA 8270D/SIM	2-26-18	2-27-18	
Benzo[a]pyrene	**ND**	0.010	EPA 8270D/SIM	2-26-18	2-27-18	
Indeno(1,2,3-c,d)pyrene	**ND**	0.010	EPA 8270D/SIM	2-26-18	2-27-18	
Dibenz[a,h]anthracene	**ND**	0.010	EPA 8270D/SIM	2-26-18	2-27-18	
Benzo[g,h,i]perylene	**ND**	0.010	EPA 8270D/SIM	2-26-18	2-27-18	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*59*	*25 - 107*				
Pyrene-d10	*76*	*28 - 103*				
Terphenyl-d14	*75*	*36 - 129*				

Date of Report: February 28, 2018
Samples Submitted: February 22, 2018
Laboratory Reference: 1802-224
Project: 05147-005-12

PAHs EPA 8270D/SIM

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GEI-DUP_022118**					
Laboratory ID:	02-224-03					
Naphthalene	**ND**	0.099	EPA 8270D/SIM	2-26-18	2-27-18	
2-Methylnaphthalene	**ND**	0.099	EPA 8270D/SIM	2-26-18	2-27-18	
1-Methylnaphthalene	**ND**	0.099	EPA 8270D/SIM	2-26-18	2-27-18	
Acenaphthylene	**ND**	0.099	EPA 8270D/SIM	2-26-18	2-27-18	
Acenaphthene	**ND**	0.099	EPA 8270D/SIM	2-26-18	2-27-18	
Fluorene	**ND**	0.099	EPA 8270D/SIM	2-26-18	2-27-18	
Phenanthrene	**ND**	0.099	EPA 8270D/SIM	2-26-18	2-27-18	
Anthracene	**ND**	0.099	EPA 8270D/SIM	2-26-18	2-27-18	
Fluoranthene	**ND**	0.099	EPA 8270D/SIM	2-26-18	2-27-18	
Pyrene	**ND**	0.099	EPA 8270D/SIM	2-26-18	2-27-18	
Benzo[a]anthracene	**ND**	0.0099	EPA 8270D/SIM	2-26-18	2-27-18	
Chrysene	**ND**	0.0099	EPA 8270D/SIM	2-26-18	2-27-18	
Benzo[b]fluoranthene	**ND**	0.0099	EPA 8270D/SIM	2-26-18	2-27-18	
Benzo(j,k)fluoranthene	**ND**	0.0099	EPA 8270D/SIM	2-26-18	2-27-18	
Benzo[a]pyrene	**ND**	0.0099	EPA 8270D/SIM	2-26-18	2-27-18	
Indeno(1,2,3-c,d)pyrene	**ND**	0.0099	EPA 8270D/SIM	2-26-18	2-27-18	
Dibenz[a,h]anthracene	**ND**	0.0099	EPA 8270D/SIM	2-26-18	2-27-18	
Benzo[g,h,i]perylene	**ND**	0.0099	EPA 8270D/SIM	2-26-18	2-27-18	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*59*	*25 - 107*				
Pyrene-d10	*77*	*28 - 103*				
Terphenyl-d14	*77*	*36 - 129*				

Date of Report: February 28, 2018
Samples Submitted: February 22, 2018
Laboratory Reference: 1802-224
Project: 05147-005-12

NWTPH-Gx
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0222W1					
Gasoline	**ND**	100	NWTPH-Gx	2-22-18	2-22-18	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*98*	*66-114*				
Laboratory ID:	MB0223W1					
Gasoline	**ND**	100	NWTPH-Gx	2-23-18	2-23-18	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*96*	*66-114*				

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	02-224-01								
	ORIG	DUP							
Gasoline	**ND**	**ND**	NA	NA	NA	NA	NA	30	
Surrogate:									
Fluorobenzene					*86* *85*	*66-114*			
Laboratory ID:	02-224-04								
	ORIG	DUP							
Gasoline	**ND**	**ND**	NA	NA	NA	NA	NA	30	
Surrogate:									
Fluorobenzene					*89* *92*	*66-114*			

Date of Report: February 28, 2018
Samples Submitted: February 22, 2018
Laboratory Reference: 1802-224
Project: 05147-005-12

NWTPH-Gx
CONTINUING CALIBRATION SUMMARY

Lab ID	True Value (ppm)	Calc. Value	Percent Difference	Control Limits
CCVD0222G-1	5.00	5.80	-16	+/- 20%
CCVD0222G-3	5.00	5.96	-19	+/- 20%
CCVH0222G-1	2.50	2.72	-9	+/- 20%
CCVH0222G-3	2.50	2.81	-12	+/- 20%
CCVH0223G-1	2.50	2.75	-10	+/- 20%
CCVH0223G-2	2.50	2.58	-3	+/- 20%

Date of Report: February 28, 2018
Samples Submitted: February 22, 2018
Laboratory Reference: 1802-224
Project: 05147-005-12

NWTPH-Dx
QUALITY CONTROL

Matrix: Water
Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0223W1					
Diesel Range Organics	**ND**	0.25	NWTPH-Dx	2-23-18	2-26-18	
Lube Oil Range Organics	**ND**	0.40	NWTPH-Dx	2-23-18	2-26-18	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*91*	*50-150*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	02-224-01										
	ORIG	DUP									
Diesel Range	**ND**	**ND**	NA	NA		NA		NA	NA	NA	
Lube Oil Range	**ND**	**ND**	NA	NA		NA		NA	NA	NA	
Surrogate:											
o-Terphenyl						*90*	*97*	*50-150*			

Date of Report: February 28, 2018
Samples Submitted: February 22, 2018
Laboratory Reference: 1802-224
Project: 05147-005-12

NWTPH-Dx
CONTINUING CALIBRATION SUMMARY

Lab ID	True Value (ppm)	Calc. Value	Percent Difference	Control Limits
CCV0226R-V2	100	106	-6.4	+/-15%
CCV0226R-V3	100	103	-3.5	+/-15%

Date of Report: February 28, 2018
Samples Submitted: February 22, 2018
Laboratory Reference: 1802-224
Project: 05147-005-12

PAHs EPA 8270D/SIM
METHOD BLANK QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB0226W1					
Naphthalene	**ND**	0.10	EPA 8270D/SIM	2-26-18	2-26-18	
2-Methylnaphthalene	**ND**	0.10	EPA 8270D/SIM	2-26-18	2-26-18	
1-Methylnaphthalene	**ND**	0.10	EPA 8270D/SIM	2-26-18	2-26-18	
Acenaphthylene	**ND**	0.10	EPA 8270D/SIM	2-26-18	2-26-18	
Acenaphthene	**ND**	0.10	EPA 8270D/SIM	2-26-18	2-26-18	
Fluorene	**ND**	0.10	EPA 8270D/SIM	2-26-18	2-26-18	
Phenanthrene	**ND**	0.10	EPA 8270D/SIM	2-26-18	2-26-18	
Anthracene	**ND**	0.10	EPA 8270D/SIM	2-26-18	2-26-18	
Fluoranthene	**ND**	0.10	EPA 8270D/SIM	2-26-18	2-26-18	
Pyrene	**ND**	0.10	EPA 8270D/SIM	2-26-18	2-26-18	
Benzo[a]anthracene	**ND**	0.010	EPA 8270D/SIM	2-26-18	2-26-18	
Chrysene	**ND**	0.010	EPA 8270D/SIM	2-26-18	2-26-18	
Benzo[b]fluoranthene	**ND**	0.010	EPA 8270D/SIM	2-26-18	2-26-18	
Benzo(j,k)fluoranthene	**ND**	0.010	EPA 8270D/SIM	2-26-18	2-26-18	
Benzo[a]pyrene	**ND**	0.010	EPA 8270D/SIM	2-26-18	2-26-18	
Indeno(1,2,3-c,d)pyrene	**ND**	0.010	EPA 8270D/SIM	2-26-18	2-26-18	
Dibenz[a,h]anthracene	**ND**	0.010	EPA 8270D/SIM	2-26-18	2-26-18	
Benzo[g,h,i]perylene	**ND**	0.010	EPA 8270D/SIM	2-26-18	2-26-18	
Surrogate:	*Percent Recovery*	*Control Limits*				
2-Fluorobiphenyl	*69*	*25 - 107*				
Pyrene-d10	*83*	*28 - 103*				
Terphenyl-d14	*89*	*36 - 129*				

Date of Report: February 28, 2018
Samples Submitted: February 22, 2018
Laboratory Reference: 1802-224
Project: 05147-005-12

PAHs EPA 8270D/SIM
SB/SBD QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB0226W1									
	SB	SBD	SB	SBD	SB	SBD				
Naphthalene	**0.354**	**0.336**	0.500	0.500	71	67	27 - 106	5	35	
Acenaphthylene	**0.399**	**0.378**	0.500	0.500	80	76	20 - 117	5	34	
Acenaphthene	**0.427**	**0.393**	0.500	0.500	85	79	30 - 114	8	32	
Fluorene	**0.422**	**0.395**	0.500	0.500	84	79	36 - 116	7	28	
Phenanthrene	**0.409**	**0.384**	0.500	0.500	82	77	31 - 122	6	26	
Anthracene	**0.411**	**0.393**	0.500	0.500	82	79	33 - 144	4	26	
Fluoranthene	**0.449**	**0.432**	0.500	0.500	90	86	44 - 120	4	25	
Pyrene	**0.491**	**0.455**	0.500	0.500	98	91	40 - 130	8	29	
Benzo[a]anthracene	**0.458**	**0.459**	0.500	0.500	92	92	47 - 131	0	27	
Chrysene	**0.451**	**0.449**	0.500	0.500	90	90	48 - 120	0	29	
Benzo[b]fluoranthene	**0.432**	**0.420**	0.500	0.500	86	84	42 - 128	3	29	
Benzo(j,k)fluoranthene	**0.469**	**0.476**	0.500	0.500	94	95	46 - 121	1	27	
Benzo[a]pyrene	**0.399**	**0.410**	0.500	0.500	80	82	34 - 121	3	29	
Indeno(1,2,3-c,d)pyrene	**0.390**	**0.402**	0.500	0.500	78	80	39 - 128	3	28	
Dibenz[a,h]anthracene	**0.425**	**0.423**	0.500	0.500	85	85	39 - 125	0	30	
Benzo[g,h,i]perylene	**0.396**	**0.399**	0.500	0.500	79	80	41 - 122	1	29	
Surrogate:										
2-Fluorobiphenyl					*71*	*64*	*25 - 107*			
Pyrene-d10					*81*	*77*	*28 - 103*			
Terphenyl-d14					*86*	*81*	*36 - 129*			

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

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

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

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

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

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

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

I - Compound recovery is outside of the control limits.

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

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

L - The RPD is outside of the control limits.

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

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

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

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

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

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

Q - Surrogate recovery is outside of the control limits.

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

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

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

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

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

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

X - Sample extract treated with a mercury cleanup procedure.

X1- Sample extract treated with a sulfuric acid/silica gel cleanup procedure.

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

Z -

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

Chain of Custody

Page 1 of 1

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

Laboratory Number: 02-224

Company: GeoEngineers Inc.
Project Number: 05147-005-12
Project Name: Port of Anacortes - CSM
Project Manager: Robert Trahan
Sampled by: Nate Solomon

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

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx (☐ Acid / SG Clean-up)	Volatiles 8260C	Halogenated Volatiles 8260C	EDB EPA 8011 (Waters Only)	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A	MS/MSD (PAHs)				% Moisture
1	GEI-MW-6_022118	2.21.18	1355	W	7			X	X					X									X				
2	GEI-MW-7_022118	2.21.18	1435	W	7			X	X					X													
3	GEI-DUP_022118	2.21.18	1400	W	7			X	X					X													
4	TRIP BLANK_022118	2.21.18		W	3			X																			

	Signature	Company	Date	Time
Relinquished		GeoEngineers Inc	2.22.18	0948
Received		QSC	2/22/18	0948
Relinquished				
Received				
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions

Data Package: Standard ☐ Level III ☐ Level IV ☐

Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☐

Sample/Cooler Receipt and Acceptance Checklist

Client: GES

Client Project Name/Number: 05147-005-12

OnSite Project Number: 02-224

Initiated by: MN

Date Initiated: 2/22/18

1.0 Cooler Verification

1.1 Were there custody seals on the outside of the cooler?	Yes	No	N/A	1 2 3 4
1.2 Were the custody seals intact?	Yes	No	N/A	1 2 3 4
1.3 Were the custody seals signed and dated by last custodian?	Yes	No	N/A	1 2 3 4
1.4 Were the samples delivered on ice or blue ice?	Yes	No		1 2 3 4
1.5 Were samples received between 0-6 degrees Celsius?	Yes	No	Temperature: 0	
1.6 Have shipping bills (if any) been attached to the back of this form?	Yes	N/A		
1.7 How were the samples delivered?	Client	Courier	UPS/FedEx	OSE Pickup / Other

2.0 Chain of Custody Verification

2.1 Was a Chain of Custody submitted with the samples?	Yes	No	1 2 3 4
2.2 Was the COC legible and written in permanent ink?	Yes	No	1 2 3 4
2.3 Have samples been relinquished and accepted by each custodian?	Yes	No	1 2 3 4
2.4 Did the sample labels (ID, date, time, preservative) agree with COC?	Yes	No	1 2 3 4
2.5 Were all of the samples listed on the COC submitted?	Yes	No	1 2 3 4
2.6 Were any of the samples submitted omitted from the COC?	Yes	No	1 2 3 4

3.0 Sample Verification

3.1 Were any sample containers broken or compromised?	Yes	No		1 2 3 4
3.2 Were any sample labels missing or illegible?	Yes	No		1 2 3 4
3.3 Have the correct containers been used for each analysis requested?	Yes	No		1 2 3 4
3.4 Have the samples been correctly preserved?	Yes	No	N/A	1 2 3 4
3.5 Are volatiles samples free from headspace and bubbles greater than 6mm?	Yes	No	N/A	1 2 3 4
3.6 Is there sufficient sample submitted to perform requested analyses?	Yes	No		1 2 3 4
3.7 Have any holding times already expired or will expire in 24 hours?	Yes	No		1 2 3 4
3.8 Was method 5035A used?	Yes	No	N/A	1 2 3 4
3.9 If 5035A was used, which sampling option was used (#1, 2, or 3).	#		N/A	1 2 3 4

Explain any discrepancies:

1 - Discuss issue in Case Narrative

2 - Process Sample As-is

3 - Client contacted to discuss problem

4 - Sample cannot be analyzed or client does not wish to proceed

APPENDIX C
Data Validation Report

GeoEngineers

Data Validation Report

Plaza 600 Building, 600 Stewart Street, Suite 1700, Seattle, WA 98101, Telephone: 206.728.2674, Fax: 206.728.2732 www.geoengineers.com

Project: Cap Sante Marine Site – Groundwater Monitoring
February 2017, August 2017, and February 2018 Groundwater Monitoring Events

GEI File No: 05147-005-12

Date: May 11, 2018

This report documents the results of a United States Environmental Protection Agency (USEPA)-defined Stage 2B data validation (USEPA Document 540-R-08-005; USEPA, 2009) of analytical data from the analyses of groundwater samples collected as part of the February 2017, August 2017, and February 2018 groundwater sampling events, and the associated laboratory and field quality control (QC) samples. The samples were obtained from the Cap Sante Marine Cleanup Project Site located in Anacortes, Washington.

OBJECTIVE AND QUALITY CONTROL ELEMENTS

GeoEngineers, Inc. (GeoEngineers) completed the data validation consistent with USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (USEPA, 2016) (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, Appendix A of the Cap Sante Marine Groundwater Monitoring Sampling and Analysis Plan (GeoEngineers, 2014), 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
- Laboratory and Field Duplicates
- Initial Calibrations (ICALs)

- Continuing Calibrations (CCALs)
- Internal Standards
- Reporting Limits

VALIDATED SAMPLE DELIVERY GROUPS

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

TABLE 1: SUMMARY OF VALIDATED SAMPLE DELIVERY GROUPS

Laboratory SDG	Samples Validated
1702-161	GEI-MW-6-021417, GEI-MW-7-021417, GEI-DUP-1-021417, TRIP BLANK-021417
1708-246	GEI-MW-6_081817, Dup_081817, GEI-MW-7_081817, Trip Blank
1802-224	GEI-MW-6_022118, GEI-DUP_022118, GEI-MW-7_022118, Trip Blank_022118

Notes:
SDG = Sample Delivery Group

CHEMICAL ANALYSIS PERFORMED

OnSite Environmental, Inc. (OnSite), located in Redmond, Washington, performed laboratory analysis on the groundwater samples using the following methods:

- Gas-Range Hydrocarbons (NWTPH-Gx) by Method NWTPH-Gx;
- Petroleum Hydrocarbons (NWTPH-Dx) by Method NWTPH-Dx; and
- Polycyclic Aromatic Hydrocarbons (PAHs) by Method SW8270D-SIM

DATA VALIDATION SUMMARY

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

Data Package Completeness

OnSite 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 lab.

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 coolers arrived at the laboratory within the appropriate temperatures of between two and six degrees Celsius, with the exceptions noted below.

- **SDG 1708-246:** The sample cooler temperature recorded at the laboratory was 8.0 degrees Celsius. It was determined through professional judgment that, since the samples were collected the same day they were received by the laboratory, this temperature should not affect the sample analytical results.
- **SDG 1802-224:** The sample cooler temperature recorded at the laboratory was 1.0 degree Celsius. It was determined through professional judgment that, since the samples were not frozen, 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 recoveries for field samples were within the laboratory control limits.

Method and Trip 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 were analyzed at the required frequency. None of the analytes of interest were detected above the reporting limits in the method 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 above the reporting limits 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. The percent recovery control limits for MS and MSD analyses are specified in the laboratory documents, as are the RPD control limits for MS/MSD sample sets.

One MS/MSD 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 exceptions:

- **SDG 1708-246 (PAHs):** The laboratory performed an MS/MSD sample set on Sample GEI-MW-7_081817. The percent recoveries for benzo(a)anthracene, benzo(g,h,i)perylene, and dibenzo(a,h)anthracene were less than the control limits in the MS/MSD sample set extracted on 8/22/2017. The reporting limits for these target analytes were qualified as estimated (UJ) in Sample GEI-MW-7_081817.

  Additionally, in the same MS/MSD sample set, the percent recoveries for benzo(b)fluoranthene and chrysene were less than the control limits in the MS; however, the percent recoveries for these target analytes were within the control limits in the corresponding MSD. No action was required for these outliers.

- **SDG 1802-224 (PAHs):** The laboratory performed an MS/MSD sample set on Sample GEI-MW-6_022118. The RPDs for the PAHs target analytes were greater than the control limits in the MS/MSD sample set extracted on 2/26/2018. There were no positive results for the PAHs target analytes in Sample GEI-MW-6_022118; therefore, no qualifications were required.

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.

Laboratory Duplicates

Internal laboratory duplicate analyses are performed to monitor the precision of the analyses. Two separate aliquots of a sample are analyzed as distinct samples in the laboratory and the RPD between the two results is calculated. Duplicate analyses should be performed once per analytical batch. If one or more of the samples used has a concentration less than five times the reporting limit for that sample, the absolute difference is used instead of the RPD. The RPD control limits are specified in the laboratory documents. Laboratory duplicates were analyzed at the proper frequency and the specified acceptance criteria were met.

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 five times the reporting limit for that sample, then the absolute difference is used instead of the RPD. The RPD control limit for water samples is 35 percent.

- **SDG 1702-261:** One field duplicate sample pair, GEI-MW-7-021417 and GEI-DUP-1-021417, was submitted with this SDG. The precision criteria for the target analytes were met for this sample pair, with the exception of 2-Methylnaphthalene, acenaphthene, anthracene, fluoranthene, fluorene, and

phenanthrene. The reporting limits for 2-Methylnaphthalene, the positive results for acenaphthene, anthracene, fluorene, and phenanthrene, and the positive result and reporting limit for fluoranthene were qualified as estimated (J and UJ), accordingly, in this sample pair.

- **SDG 1708-246:** One field duplicate sample pair, GEI-MW-6_081817 and Dup_081817, was submitted with this SDG. The precision criteria for the target analytes were met for this sample pair.
- **SDG 1802-224:** One field duplicate sample pair, GEI-MW-6_022118 and GEI-DUP_022118, was submitted with this SDG. The precision criteria for the target analytes were met for this sample pair.

Initial Calibrations (ICALs)

All initial calibrations were conducted according to the laboratory methods and consisted of the appropriate number of standards. For inorganic analyses, all percent recoveries were within the control limits of 90% and 110%. For organic analyses, all percent relative standard deviation (%RSD) and relative response factors (RRF) values were within the control limits stated in either the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (USEPA, 2016).

Continuing Calibrations (CCALs)

All continuing calibrations were conducted according to the laboratory methods and consisted of the appropriate number of standards. For inorganic analyses, all percent recoveries were within the control limits of 90% and 110%. For organic analyses, all percent difference (%D) and relative response factors (RRF) values were within the control limits in either the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (USEPA, 2016).

Internal Standards

Like the surrogate, an internal standard is a compound that is chemically similar to the analytes of interest, but unlikely to be found in any environmental sample. Internal standards are used only for the mass spectrometry instrumentation and are usually added to the sample aliquot after extraction has taken place. The internal standard should be analyzed at the beginning of a 12-hour sample run. For organic analyses, the control limits for internal standard recoveries are 50 percent to 200 percent of the calibration standard. For inorganic analyses, the control limits for internal standard recoveries are 60 percent to 125 percent of the calibration standard. All internal standard recoveries were within the control limits.

OVERALL ASSESSMENT

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

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
GEI-MW-7-021417	2-Methylnaphthalene	UJ	Field Duplicate Precision
	Acenaphthene	J	Field Duplicate Precision
	Anthracene	J	Field Duplicate Precision
	Fluoranthene	UJ	Field Duplicate Precision
	Fluorene	J	Field Duplicate Precision
	Phenanthrene	J	Field Duplicate Precision
GEI-DUP-1-021417	2-Methylnaphthalene	UJ	Field Duplicate Precision
	Acenaphthene	J	Field Duplicate Precision
	Anthracene	J	Field Duplicate Precision
	Fluoranthene	J	Field Duplicate Precision
	Fluorene	J	Field Duplicate Precision
	Phenanthrene	J	Field Duplicate Precision
GEI-MW-7_081817	Benzo(a)anthracene	UJ	MS/MSD Recovery
	Benzo(g,h,i)perylene	UJ	MS/MSD Recovery
	Dibenzo(a,h)anthracene	UJ	MS/MSD Recovery

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 Superfund Organic Methods Data Review," EPA-540-R-016-002. September 2016.

GeoEngineers, Inc., "Cap Sante Marine Site – Groundwater Monitoring Sampling and Analysis Plan," prepared for Washington State Department of Ecology. May 30, 2014.

GeoEngineers