

Phase II Environmental Site Assessment

Rufus 2.0 Development
Block 18
Seattle, Washington 98101

for

Acorn Development, LLC

November 13, 2017



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Phase II Environmental Site Assessment

Rufus 2.0 Development Block 18 Seattle, Washington

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November 13, 2017

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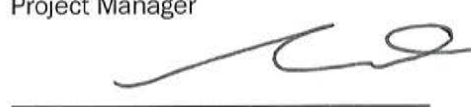
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EXECUTIVE SUMMARY

The objective of the Phase II Environmental Site Assessment (ESA) services completed on Block 18 was to assess soil and groundwater prior to planned construction mass excavation activities at the Site.

Four hollow-stem auger (HSA) borings, and six direct-push borings were completed at the Site, and a monitoring well was installed in one of the HSA borings (MW18-1). Soil and groundwater samples were obtained from the borings/monitoring wells for chemical analysis. A summary of the findings is presented below.

- **Fill Soil** – The average fill thickness observed across the Site was approximately 5 feet, while the thickest fill (10 feet) was observed in boring B18-6 in the western third of the Site.

Isolated cPAH contamination (above MTCA cleanup level [CUL]) was identified in boring B18-2 in shallow fill soil at 2.5 feet bgs near the southeast corner of the Site. However, cPAHs were not detected in soil from the underlying native material at 10 feet bgs. Other potential contaminants of concern (TPH, PAHs, VOCs, and metals) were either not detected, or were detected at concentrations below MTCA CULs.

The isolated cPAH contamination requires remedial action likely including remedial excavation and confirmation soil sampling and reporting. The remaining fill soil with contaminants of concern detected at concentrations less than MTCA CULs may require special handling/end-use.

- **Native Soil** – Potential contaminants of concern (TPH, PAHs, VOCs, and metals) were not detected above MTCA CULs in the soil samples tested from native soil, and detected metals concentrations were similar to published values for natural background metals concentrations in Puget Sound soils.
- **Groundwater** – Potential contaminants of concern including TPH, PAHs, VOCs, and metals (excluding arsenic) were not detected in the groundwater samples analyzed. Total arsenic was detected at a concentration greater than the MTCA Method A CUL from the deep monitoring well MW18-1. Follow-up groundwater sampling from the same well indicated total and dissolved arsenic at concentrations less than the MTCA Method A CUL.

Although arsenic was detected above the MTCA Method A CUL during the initial sampling event due to the presence of silt and sand in the sample, the follow-up groundwater sample is representative of actual groundwater conditions and meets the specifications for discharge to the King County combined storm-sanitary sewer without pre-treatment for hazardous chemicals. Discharge into the combined storm-sanitary sewer will need to meet King County discharge requirements for physical parameters. In our opinion, this detection does not represent a threat to human health and the environment.

This Executive Summary should be used only in the context of the full report for which it is intended.

1.0 INTRODUCTION

This report presents the results of our Phase II Environmental Site Assessment (ESA) completed in May 2017 for Block 18 in the Denny Triangle Neighborhood in downtown Seattle, Washington. Block 18 is comprised of two adjoining tax parcels (066000-0130 and -0150) and is bounded by 7th Avenue to the north, Blanchard Street to the east, an alley to the south and Bell Street to the west. Block 18 (Site or subject property) comprises approximately 0.9 acres, and is currently developed with a four-story building formerly used as a college dormitory for Cornish College, and a one-story retail building. The remainder of the property outside the building footprints are asphalt parking areas. The Site location is shown relative to surrounding physical features on the Vicinity Map, Figure 1; the layout of the buildings and the approximate locations of the Phase II ESA explorations are shown in Figure 2.

Our Phase II ESA services at the Site were completed in conjunction with our geotechnical engineering services. The results of our geotechnical investigation are summarized in a separate report.

2.0 BACKGROUND AND SUMMARY OF PREVIOUS STUDIES

GeoEngineers completed a Phase I ESA for the Site in 2012; the findings are presented in our report titled “Phase I Environmental Site Assessment, Rufus 2.0, Denny Triangle, Blocks 14, 19, 20, 18, and 21, Seattle, Washington,” dated June 7, 2012. A second Phase I ESA was completed in December 2016 by Aspect Consulting of Seattle Washington, which was reviewed for consistency with our Phase I ESA findings. A brief summary of key environmental findings is provided below.

Historical site use includes residential from the 1900s to 1930s, and retail/commercial from the 1940s to the present including Schuck’s Auto Supply (1940 to 2007), Fastenal Company (2000s to 2011), and the Towne Motel/Day’s Inn (1958 to 2000s). No recognized environmental conditions (RECs) were identified as part of the Phase I ESA. However, based on historical research, it is likely that imported soil from an unknown source was placed on portions of the Site during the early 1900s Denny Hill Cut and Regrade activities.

The potential contaminants of concern for the Site based on the presence of unknown fill include the following:

- Gasoline-, diesel-, and heavy oil-range total petroleum hydrocarbons (TPH);
- Polycyclic aromatic hydrocarbons (PAHs), including carcinogenic PAHs (cPAHs);
- Volatile organic compounds (VOCs); and,
- Metals.

3.0 SCOPE OF SERVICES

The general objective of the Phase II ESA was to characterize soil and groundwater at the Site prior to planned construction mass excavation activities. Our specific scope of services, as presented in our proposal dated March 3, 2017, was as follows:

1. Coordinated Site access with representatives of Seneca.
2. Prepared a site-specific health and safety plan for use by GeoEngineers' employees working at the Site.
3. Prepared an Exploration Plan which included the drilling program and objectives, and the proposed exploration schedule.
4. Marked proposed exploration locations and contacted public utilities to mark underground utilities in the vicinity of the proposed exploration locations. Subcontracted a private utility locate service to identify underground utilities and unknown objects, including the use of both magnetic and ground penetrating radar (GPR) survey methods.
5. Monitored the completion of ten soil borings: six shallow borings using direct-push drilling equipment to a depth of 15 feet below ground surface (bgs), and four deep borings using hollow-stem auger equipment to a maximum depth of 96.5 feet bgs. One of the deep borings was completed as a monitoring well. The explorations were completed by a licensed drilling company under subcontract to GeoEngineers; the drillers submitted notifications to Ecology as required by State law.
6. Obtained discrete-depth soil samples from the borings and field screened the samples for evidence of contamination using visual, water sheen, and headspace vapor screening methods. Visually classified soil from the borings in general accordance with ASTM D 2488 and maintained a detailed log of each exploration.
7. Submitted up to three soil samples from each boring for chemical analysis based on sample locations and depth relative to potential sources of contamination and field screening results. Analyzed soil samples for one or more of the following: gasoline-, diesel-, and heavy oil-range petroleum hydrocarbons by Northwest Methods NWTPH-Gx and NWTPH-Dx; volatile organic compounds (VOCs) by EPA Method 8260C; polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270D/SIM; and Resource Conservation and Recovery Act (RCRA) metals by EPA Method 6000/7000 series.
8. Obtained two groundwater samples from monitoring well MW18-1 using low-flow purging and sampling methods. Analyzed groundwater samples for one or more of the following: gasoline-, diesel-, and heavy oil-range petroleum hydrocarbons by Northwest Methods NWTPH-Gx and NWTPH-Dx; VOCs by EPA Method 8260C; PAHs by EPA Method 8270D/SIM; and total and dissolved RCRA metals by EPA Methods 200.8/245.1.
9. Evaluated the data relative to Model Toxics Control Act (MTCA) Method A and B cleanup levels.
10. Prepared this report presenting the Phase II ESA findings.

4.0 PHASE II ESA FINDINGS

4.1. General

The Phase II ESA investigation was completed in two phases:

1. Soil samples were obtained from four deep borings (B18-1, B18-2, B18-3, and MW18-1) using hollow-stem auger drilling equipment owned and operated by Geologic Drill of Spokane, Washington. These borings were completed to depths of 80.5 to 96.5 feet bgs between May 8 and 10, 2017 to provide information for geotechnical purposes as well as supplement the shallow environmental borings completed in the second phase. One boring, MW18-1 was completed as a monitoring well; two groundwater samples were collected from MW18-1 (on May 23, 2017 and one on June 28, 2017) to evaluate groundwater conditions in the deep regional aquifer below the site.
2. Soil samples were obtained from six shallow borings (B18-4 to B18-9) using direct-push drilling equipment owned and operated by Cascade Drilling of Woodinville, Washington. These borings were completed to a depth of up to 15 feet bgs on May 16, 2017.

Prior to drilling activities, a private utility locating service conducted a utility clearance at the site, including the use of magnetic and GPR survey methods, to identify any subsurface utilities and/or potential underground physical hazards such as unknown underground storage tanks (USTs); no underground anomalies, USTs, or conflicting utilities were identified. Discrete soil samples were obtained from the borings at approximately 2.5- to 5-foot intervals for field screening and potential chemical analysis for one or more of the potential contaminants of concern discussed in Section 2.0. Soil samples were collected for chemical analysis based on field screening indications of contamination and the depth and location of the soil sample relative to the presence of fill soil from an unknown source. Field screening consisted of visual, headspace, and water sheen screening methods as described in Appendix B. The approximate exploration locations are shown in Figures 2 and 3.

4.2. Subsurface Conditions

The subsurface conditions at the Site are summarized in Sections 4.2.1 and 4.2.2 below, and discussed in detail in our geotechnical report titled, "Geotechnical Master Use Permit Report, Rufus 2.0 Development – Block 18, Seattle, Washington," dated June 2, 2017.

4.2.1. Subsurface Soil Conditions

Soil encountered at the Site consists of relatively shallow fill (up to approximately 10 feet bgs) overlying competent glacially consolidated soils.

- **Fill** generally consists of loose to medium dense/medium stiff to very stiff silty sand and silt with variable gravel and cobble content. Based on historical research, the block is located just west of the eastern edge of the 1928–1930 Denny Regrade; i.e. the site was cut as part of the regrade. The thickness of fill encountered in the explorations completed for this study ranged up to approximately 10 feet, although the average fill thickness was approximately 5 feet. Fill is expected to be locally thicker in areas adjacent to the existing buildings and existing buried utilities.
- **Glacially consolidated soils** were encountered below the fill. Three glacially consolidated soil units were encountered in the explorations: cohesive silt and clay, cohesionless sand and gravel, and till-like deposits.

- The cohesive silt and clay unit consists of stiff to very stiff silt and clay with traces of sand and gravel and occasional sand lenses and interbeds. The cohesive silt and clay layer was observed to range between 5 and 15 feet deep, increasing in thickness to the east.
- The cohesionless sand and gravel soils consist of very dense sand and gravel with silt and occasional cobbles with isolated layers of silty sand with gravel, and the till-like deposits consist of very dense silty sand with gravel and variable cobble and boulder content with isolated layers of hard clay. These two units were interlayered and encountered to the depths in the deep geotechnical borings (B18-1 through B18-3, and MW18-1) from approximately 15 feet bgs to the depths explored (approximately 96 feet bgs). Additionally, while not encountered during our drilling activities, occasional boulders have been observed in glacially consolidated soils in nearby excavations and may be present at the site.

Interpreted subsurface conditions are presented in our geotechnical report (referenced above). A geologic cross-section showing the fill/native contact and the chemical analytical results is presented with this report in Figure 4.

4.2.2. Subsurface Groundwater Conditions

The depth to groundwater was measured in the monitoring well installed in boring MW18-1. An automatic data-logger was installed in the monitoring well to observe the variability in groundwater levels seasonally and after significant rainfall events. Based on the monitoring well data, conditions observed during drilling, and data from monitoring wells in the vicinity, we anticipate that the regional groundwater table is between approximate Elevations 15 to 22 feet (approximately 84 to 89 feet bgs). Additionally, based on our explorations including the deep hollow-stem auger borings and shallow direct-push borings, perched groundwater was not observed beneath the site. Boring logs for explorations B18-4 through B18-9 are presented in Appendix B, while logs for the deep geotechnical borings (B18-1 through B18-3, and MW18-1) are presented in our geotechnical report.

4.3. Hollow-Stem Auger and Direct-Push Borings

4.3.1. Purpose and Boring Locations

As explained in Section 4.0, the Phase II ESA investigation was completed in two phases. The first phase included the four hollow-stem auger (HSA) borings which were completed to depths ranging from 80.5 to 96.5 feet bgs. The purpose of these borings was to obtain information for geotechnical purposes, to supplement the shallow environmental boring data, and to explore deeper, regional groundwater conditions. One boring (MW18-1) was completed as a groundwater monitoring well screened from 85 to 95 feet bgs (approximate Elevation 12 to 22 feet) to evaluate the potential for contaminants in the regional groundwater aquifer beneath the Site.

The second phase of the investigation included six direct-push borings which were completed to a depth of 15 feet bgs. The purpose of these borings was to evaluate the relative fill thickness across the Site, and collect chemical analytical data for contaminants of concern in fill and native soil prior to planned construction excavation activities at the Site. Boring locations for both phases of drilling are shown in the Site Plan, Figure 2, and soil chemical analytical data is shown in Figure 3.

4.4. Soil Chemical Analytical Results

Total carcinogenic polycyclic aromatic hydrocarbons (cPAHs) were detected at a concentration greater than the MTCA Method A cleanup level (CUL) of 100 micrograms per kilogram ($\mu\text{g}/\text{kg}$) in fill soil from boring B18-2 at 2.5 feet bgs (189.9 $\mu\text{g}/\text{kg}$).

Heavy oil-range petroleum hydrocarbons, non-carcinogenic PAHs, and/or select petroleum related VOCs including xylenes and 1,3,5- and 1,2,4-trimethylbenzene were detected at concentrations less than the MTCA CULs in fill soil from borings B18-2, B18-6 and MW18-1 at 2.5 feet bgs, boring B18-3 at 5.0 feet bgs, and boring B18-6 at 10.0 feet bgs. Metals including arsenic, barium, chromium, lead, and selenium were detected at concentrations below MTCA CULs in all soil samples analyzed; detected concentrations were similar to published values for natural background metals concentrations in Puget Sound soils.

Contaminants of concern were either not detected, or were detected below MTCA CULs in all soil samples from the underlying native material.

4.5. Groundwater Chemical Analytical Results

Total arsenic was detected in groundwater at a concentration greater than the MTCA Method A CUL of 5 micrograms per liter ($\mu\text{g}/\text{L}$) in sample MW18-1-170523. Sample MW18-1-170523 was collected on May 23, 2017 from monitoring well MW18-1 (22.5 $\mu\text{g}/\text{L}$) which is screened in the deep regional aquifer below the Site at estimated depths ranging from 85 to 95 feet bgs. Suspended solids including brown silt and sand were noted in the sample, however dissolved arsenic was not tested in this sample.

To confirm the analytical results from sample MW18-1-170523, a second sample (MW18-1-06272017) was obtained from monitoring well MW18-1 on June 27, 2017. Total and dissolved arsenic were detected at 1.27 $\mu\text{g}/\text{L}$ (total), and 1.05 $\mu\text{g}/\text{L}$ (dissolved), below the MTCA Method A CUL of 5 $\mu\text{g}/\text{L}$. Based on the low-level total and dissolved arsenic concentrations detected in sample MW18-1-062717, the elevated suspended solids in the first groundwater sample collected (MW18-1-170523) likely biased the total arsenic concentration artificially high and was not representative of the arsenic concentrations in the regional aquifer at this location.

Metals, including barium, cadmium, chromium, lead, and selenium were detected at concentrations below MTCA CULs, and other potential contaminants of concern (TPH, PAHs, and VOCs) were not detected in the groundwater samples analyzed.

5.0 SUMMARY OF FINDINGS

The Phase II ESA characterized soil and groundwater at Block 18 to evaluate the potential for contamination from fill-soil from an unknown source, and to prepare soil handling recommendations (if needed) prior to planned mass excavation construction activities at the Site.

Based on the geologic information and chemical analytical results obtained during this investigation, a summary of the findings is as follows:

- **Fill Soil** – The average fill thickness observed across the Site was approximately 5 feet, while the thickest fill (10 feet) was observed in boring B18-6 in the western third of the Site. Isolated cPAH contamination (above MTCA CUL) was identified in boring B18-2 in shallow fill soil at 2.5 feet bgs

(sample B18-2-2.5) near the southwest corner of the Site. However, cPAHs were not detected in soil from the underlying native material at 5 feet bgs (sample B18-2-5.0). Other potential contaminants of concern (TPH, PAHs, VOCs, and metals) were either not detected, or were detected at concentrations below MTCA CULs.

The isolated cPAH contamination requires remedial action likely including excavation and confirmation soil sampling and reporting. The remaining fill soil with contaminants of concern detected less than MTCA CULs may require special handling/end-use.

- **Native Soil** – No potential contaminants of concern (TPH, PAHs, VOCs, and metals) exceeded MTCA CULs in the soil samples tested from native soil, and detected metals concentrations were similar to published values for natural background metals concentrations in Puget Sound soils. Native soil will not require special soil handling/end-use during construction excavation activities.

Groundwater – Contaminants of concern including TPH, PAHs, VOCs, and metals (excluding arsenic) were not detected above MTCA CULs. Total arsenic was detected at a concentration greater than the MTCA Method A CUL from the deep monitoring well MW18-1 on May 23, 2017. Follow-up groundwater sampling from the same well on June 27, 2017 indicated total and dissolved arsenic concentrations were below the MTCA Method A CUL. Elevated total arsenic in sample MW18-1-170523 was likely due to the presence of suspended solids (silt and sand) in the collected sample. In our opinion, groundwater conditions do not represent a threat to human health and the environment and further action is not warranted.

Based on the results of the follow-up groundwater sampling, groundwater will meet the specifications for discharge to the King County combined storm-sanitary sewer without pre-treatment for hazardous chemicals. Discharge into the combined storm-sanitary sewer will need to meet King County discharge requirements for physical parameters.

Table 1
Soil Field Screening and Chemical Analytical Data (Petroleum Hydrocarbons and Metals)
Project Rufus 2.0
Block 18, Denny Triangle, Seattle, Washington

Sample Date	Exploration Location ¹	Sample ID	Depth (feet bgs)	Location of Sample Relative to Fill/Native Soil	Field Screening		Petroleum Hydrocarbons (mg/kg)			RCRA 8 Metals ⁴ (mg/kg)							
					Sheen	Headspace (ppm)	Gasoline Range ²	Diesel Range ³	Heavy Oil Range ³	Arsenic	Barium	Cadmium	Chromium	Lead	Selenium	Silver	Mercury
Hollow-Stem Auger Borings Completed May 9 to May 10, 2017																	
05/09/17	B18-1	B18-1-2.5	2.5	Fill	NS	<1	<4.98	<22.9	<57.3	6.5	99.6	<0.182	53.9	3.68	1.95	<0.0909	<0.293
05/09/17	B18-1	B18-1-7.5	7.5	Native	NS	<1	<5.63	<21.0	<52.4	2.79	25.7	<0.171	21.3	1.23	0.713	<0.0856	<0.26
05/09/17	B18-2	B18-2-2.5	2.5	Fill	NS	<1	<7.66	<23.6	125	5.3	135	<0.204	70.8	6.29	2.06	<0.102	<0.286
05/09/17	B18-2	B18-2-5.0	5	Native	NS	<1	<5.70	<22.6	<56.4	5.42	141	<0.188	68.7	5.30	1.86	<0.0942	<0.325
05/09/17	B18-2	B18-2-10.0	10	Native	NS	<1	<5.84	<23.6	<58.9	5.48	124	<0.2	67.3	4.68	2.25	<0.0999	<0.312
05/08/17	B18-3	B18-3-5.0	5	Fill	NS	<1	<5.0	<22.9	104	4.57	103	<0.183	55.2	5.03	1.77	<0.0921	<0.278
05/08/17	B18-3	B18-3-15.0	15	Native	NS	<1	<11.1	<20.5	<51.3	1.48	48.2	<0.164	32.3	1.66	0.966	<0.0818	<0.241
05/10/17	MW18-1	MW18-1-2.5	2.5	Fill	NS	<1	<6.28	<19.9	138	1.94	39.9	<0.168	32.7	1.86	0.98	<0.084	<0.226
05/10/17	MW18-1	MW18-1-7.5	7.5	Native	NS	<1	<5.99	<20.9	<52.2	3.19	45.1	<0.155	30.4	1.93	1.12	<0.0777	<0.259
Direct-Push Borings Completed May 16, 2017																	
05/16/17	B18-4	B18-4-5.0	5	Fill	NS	<1	<7.95	<24.0	<60.1	4.98	93.1	<0.195	61	4.19	1.67	<0.0973	<0.302
05/16/17	B18-4	B18-4-15.0	15	Native	NS	<1	<4.51	<20.5	<51.3	2.58	51.5	<0.169	38.1	1.94	1.05	<0.0847	<0.253
05/16/17	B18-5	B18-5-2.5	2.5	Native	NS	<1	<4.91	<19	<47.6	2.69	38.6	<0.173	34.6	2.07	1.08	<0.0863	<0.264
05/16/17	B18-5	B18-5-10.0	10	Native	NS	<1	<6.22	<20.7	<51.8	1.82	31.5	<0.161	35.9	1.54	1	<0.0806	<0.260
05/16/17	B18-6	B18-6-5.0	5	Fill	NS	<1	<4.23	<19.5	<48.8	2.18	30.2	<0.170	28.8	1.61	1.06	<0.0851	<0.267
05/16/17	B18-6	B18-6-10.0	10	Fill	NS	<1	<4.91	<19.5	127	3.3	52.6	<0.174	88.3 ⁷	2.43	1.37	<0.0870	<0.251
05/16/17	B18-7	B18-7-2.5	2.5	Fill	NS	<1	<4.65	<19.5	<48.8	1.75	26.4	<0.155	26.9	1.49	0.827	<0.0775	<0.256
05/16/17	B18-8	B18-8-2.5	2.5	Fill	NS	<1	<7.96	<19.4	<48.4	2.39	31.2	<0.172	28	1.55	1.02	<0.0858	<0.268
05/16/17	B18-8	B18-8-10.0	10	Native	SS	<1	<5.26	<19.9	<49.8	2.73	49.4	<0.182	59.9	2.13	1.2	<0.0908	<0.261
05/16/17	B18-8	B18-8-15.0	15	Native	NS	<1	<6.21	<20.1	<50.4	2.36	34.4	<0.154	33.4	1.7	1.01	<0.0772	<0.263
05/16/17	B18-9	B18-9-5.0	5	Native	NS	<1	<7.93	<23.8	<59.5	5.03	136	<0.203	88.5 ⁸	5.91	2.21	0.102	0.0324
05/16/17	B18-9	B18-9-10.0	10	Native	NS	<1	<5.43	<25.0	<62.5	5.02	121	<0.189	85.6 ⁹	5.6	2.11	<0.0943	<0.0315
MTCA Method A or B Cleanup Level for Unrestricted Land Use							30/100 ⁵	2,000		20	16,000	2	2,000 ⁶	250	400	400	2
Puget Sound Natural Background Concentration										7	0.6	1	48	24	ne	ne	0.07

Notes:

¹Approximate exploration locations shown on the attached figures. Chemical analytical testing by Fremont Analytical in Seattle, Washington.

²Gasoline-range hydrocarbons analyzed by petroleum hydrocarbon identification using Northwest Method NWTPH-Gx.

³Diesel- and heavy oil-range hydrocarbons analyzed by Northwest Method NWTPH-Dx.

⁴Total metals analyzed by EPA Method 6020/7471.

⁵When benzene is present, the gasoline range cleanup level is 30 mg/kg. When benzene is not present the gasoline range cleanup level is 100 mg/kg.

⁶MTCA Method A cleanup level for Chromium III (Trivalent Chromium).

⁷The chromium detected in this sample was also submitted for Chromium Speciation using EPA Method 7196. Hexavalent Chromium (Chromium VI) was not detected above laboratory reporting limits (0.542 mg/kg).

⁸The chromium detected in this sample was also submitted for Chromium Speciation using EPA Method 7196. Hexavalent Chromium (Chromium VI) was not detected above laboratory reporting limits (0.651 mg/kg).

⁹The chromium detected in this sample was also submitted for Chromium Speciation using EPA Method 7196. Hexavalent Chromium (Chromium VI) was not detected above laboratory reporting limits (0.614 mg/kg).

mg/kg = milligrams per kilogram
ns = no sheen, ss = slight sheen
bgs = below ground surface
-- = not tested
ne = not established
Bolding indicates analyte was detected. Shading indicates analyte was detected at a concentration greater than the MTCA cleanup level.



Table 2
Soil Chemical Analytical Data (VOCs and PAHs)
Project Rufus 2.0
Block 18, Denny Triangle, Seattle, Washington

Sample Date	Exploration Location ¹	Sample ID	Depth (feet bgs)	Location of Sample Relative to Fill/Native Soil	Non-Carcinogenic PAHs ² (µg/kg)						Total cPAHs ³ (µg/kg)	VOCs ⁴ (mg/kg)				
					Acenaphthene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo (g,h,i) perylene	TEQ	Methylene Chloride	Total Xylenes	1,3,5-Trimethylbenzene	1,2,4-Trimethylbenzene	Other VOCs
Hollow-Stem Auger Borings Completed May 9 to May 10, 2017																
05/09/17	B18-1	B18-1-2.5	2.5	Fill	<46.9	<46.9	<46.9	<46.9	<46.9	<46.9	ND	<0.0199	<0.0199	<0.0199	<0.0199	ND
05/09/17	B18-1	B18-1-7.5	7.5	Native	<43.9	<43.9	<43.9	<43.9	<43.9	<43.9	ND	<0.0225	<0.0225	<0.0225	<0.0225	ND
05/09/17	B18-2	B18-2-2.5	2.5	Fill	218	343	273	139	137	71.7	189.92	<0.0306	0.1548	0.0784	0.118	ND
05/09/17	B18-2	B18-2-5.0	5	Native	<49.3	<49.3	<49.3	<49.3	<49.3	<49.3	ND	<0.0228	<0.0228	<0.0228	<0.0228	ND
05/09/17	B18-2	B18-2-10.0	10	Native	<49.6	<49.6	<49.6	<49.6	<49.6	<49.6	ND	<0.0234	<0.0234	<0.0234	<0.0234	ND
05/08/17	B18-3	B18-3-5.0	5	Fill	<43.9	<43.9	<43.9	<43.9	<43.9	<43.9	ND	<0.02	<0.02	<0.02	<0.02	ND
05/08/17	B18-3	B18-3-15.0	15	Native	<41.8	<41.8	<41.8	<41.8	<41.8	<41.8	ND	<0.0446	<0.0446	<0.0446	<0.0446	ND
05/10/17	MW18-1	MW18-1-2.5	2.5	Fill	<41.8	<41.8	<421	<41.8	<41.8	<41.8	ND	0.0419⁶	<0.0251	<0.0251	<0.0251	ND
05/10/17	MW18-1	MW18-1-7.5	7.5	Native	<41.8	<41.8	<41.8	<41.8	<41.8	<41.8	ND	<0.0239	<0.0239	<0.0239	<0.0239	ND
Direct-Push Borings Completed May 16, 2017																
05/16/17	B18-4	B18-4-5.0	5	Fill	<43.9	<43.9	<43.9	<43.9	<43.9	<43.9	ND	<0.0318	<0.0318	<0.0318	<0.0318	ND
05/16/17	B18-4	B18-4-15.0	15	Native	<43.6	<43.6	<43.6	<43.6	<43.6	<43.6	ND	<0.0180	<0.0180	<0.0180	<0.0180	ND
05/16/17	B18-5	B18-5-2.5	2.5	Native	<42.6	<42.6	<42.6	<42.6	<42.6	<42.6	ND	<0.0197	<0.0197	<0.0197	<0.0197	ND
05/16/17	B18-5	B18-5-10.0	10	Native	<42.6	<42.6	<42.6	<42.6	<42.6	<42.6	ND	<0.0249	<0.0249	<0.0249	<0.0249	ND
05/16/17	B18-6	B18-6-5.0	5	Fill	<38.9	<38.9	<38.9	<38.9	<38.9	<38.9	ND	<.0169	<.0169	<.0169	<.0169	ND
05/16/17	B18-6	B18-6-10.0	10	Fill	<39.1	<39.1	<39.1	<39.1	<39.1	<39.1	ND	<.0196	<.0196	<.0196	<.0196	ND
05/16/17	B18-7	B18-7-2.5	2.5	Fill	<35.0	<35.0	<35.0	<35.0	<35.0	<35.0	ND	<0.0186	<0.0186	<0.0186	<0.0186	ND
05/16/17	B18-8	B18-8-2.5	2.5	Fill	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3	ND	<0.0318	<0.0318	<0.0318	<0.0318	ND
05/16/17	B18-8	B18-8-10.0	10	Native	<42.7	<42.7	<42.7	<42.7	<42.7	<42.7	ND	<0.0210	<0.0210	<0.0210	<0.0210	ND
05/16/17	B18-8	B18-8-15.0	15	Native	<40.5	<40.5	<40.5	<40.5	<40.5	<40.5	ND	<0.0250	<0.0250	<0.0250	<0.0250	ND
05/16/17	B18-9	B18-9-5.0	5	Native	<48.3	<48.3	<48.3	<48.3	<48.3	<48.3	ND	<0.0317	<0.0317	<0.0317	<0.0317	ND
05/16/17	B18-9	B18-9-10.0	10	Native	<48.8	<48.8	<48.8	<48.8	<48.8	<48.8	ND	<0.0217	<0.0217	<0.0217	<0.0217	ND
MTCA Method A or B Cleanup Level for Unrestricted Land Use					ne	3,200,000	2,400,000	ne	2,400,000	ne	100	0.02	9 ⁵	800	ne	Varies

Notes:

- ¹Approximate exploration locations shown on the attached figures. Chemical analytical testing by Fremont Analytical in Seattle, Washington.
- ²Polycyclic aromatic hydrocarbons (PAHs) analyzed by EPA Method 8270D/SIM. See the laboratory report for the full list of compounds analyzed.
- ³Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) analyzed by EPA Method 8270D/SIM. Total cPAHs calculated using the toxicity equivalency (TEQ) methodology specified in WAC 173-340-780(8). cPAHs that were not detected were assigned half the value of the detection limit for these calculations except when none were detected.
- ⁴Volatile organic compounds (VOCs) were analyzed by EPA Method 8260C. For VOCs, only detected compounds are presented in the table. See the laboratory report for the full list of compounds analyzed and detection limits.
- ⁵MTCA method A cleanup level for the sum of m,p- and o-xylenes (Total Xylenes).
- ⁶Methylene chloride is a common laboratory solvent and was likely introduced during sample preparation.

µg/kg = micrograms per kilogram
bgs = below ground surface
mg/kg = milligrams per kilogram

-- = Not Tested
ne = not established
ND = not detected above laboratory reporting limits

Bolding indicates analyte was detected. Shading indicates analyte was detected at a concentration greater than the MTCA cleanup level.

Table 3
Groundwater Chemical Analytical Data
Project Rufus 2.0
Block 18, Denny Triangle, Seattle, Washington

Sample Date	Exploration Location ¹	Screened Interval (feet bgs)	Sample ID	Depth to Water (feet bgs)	Petroleum Hydrocarbons (mg/L)			Total RCRA 8 Metals ⁴ (mg/L)								Dissolved Metals ⁴ (µg/L)	VOCs ⁵ (µg/L)	PAHs ⁶ (µg/L)
					Gasoline Range ²	Diesel Range ³	Heavy Oil Range ³	Arsenic	Barium	Cadmium	Chromium	Lead	Selenium	Silver	Mercury	Arsenic		
05/23/17	MW18-1	85-95	MW18-1-170523	88.9	<50.0	<49.9	<99.8	22.5	2210	1.46	33.3	8.08	19.5	<0.2	<0.1	--	ND	ND
06/27/17			MW18-1-06272017	--	--	--	1.27	--	--	--	--	--	--	--	1.05	--	--	
MTCA Method A or B Cleanup Level					800/1,000 ⁷	500	500	5	3,200	5	50	15	80	80	2	5	varies	varies

Notes:

¹Approximate exploration locations shown on the attached figures. Chemical analytical testing by Fremont Analytical in Seattle, Washington.

²Gasoline-range hydrocarbons analyzed by petroleum hydrocarbon identification using Northwest Method NWTPH-Gx.

³Diesel- and heavy oil-range hydrocarbons analyzed by Northwest Method NWTPH-Dx.

⁴Total and dissolved metals analyzed by EPA 200.8/245.1.

⁵Volatile organic compounds (VOCs) were analyzed by EPA Method 8260C. For VOCs, only detected compounds are presented in the table. See the laboratory report for the full list of compounds analyzed and detection limits.

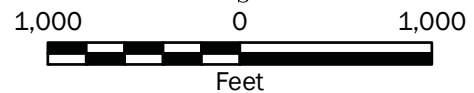
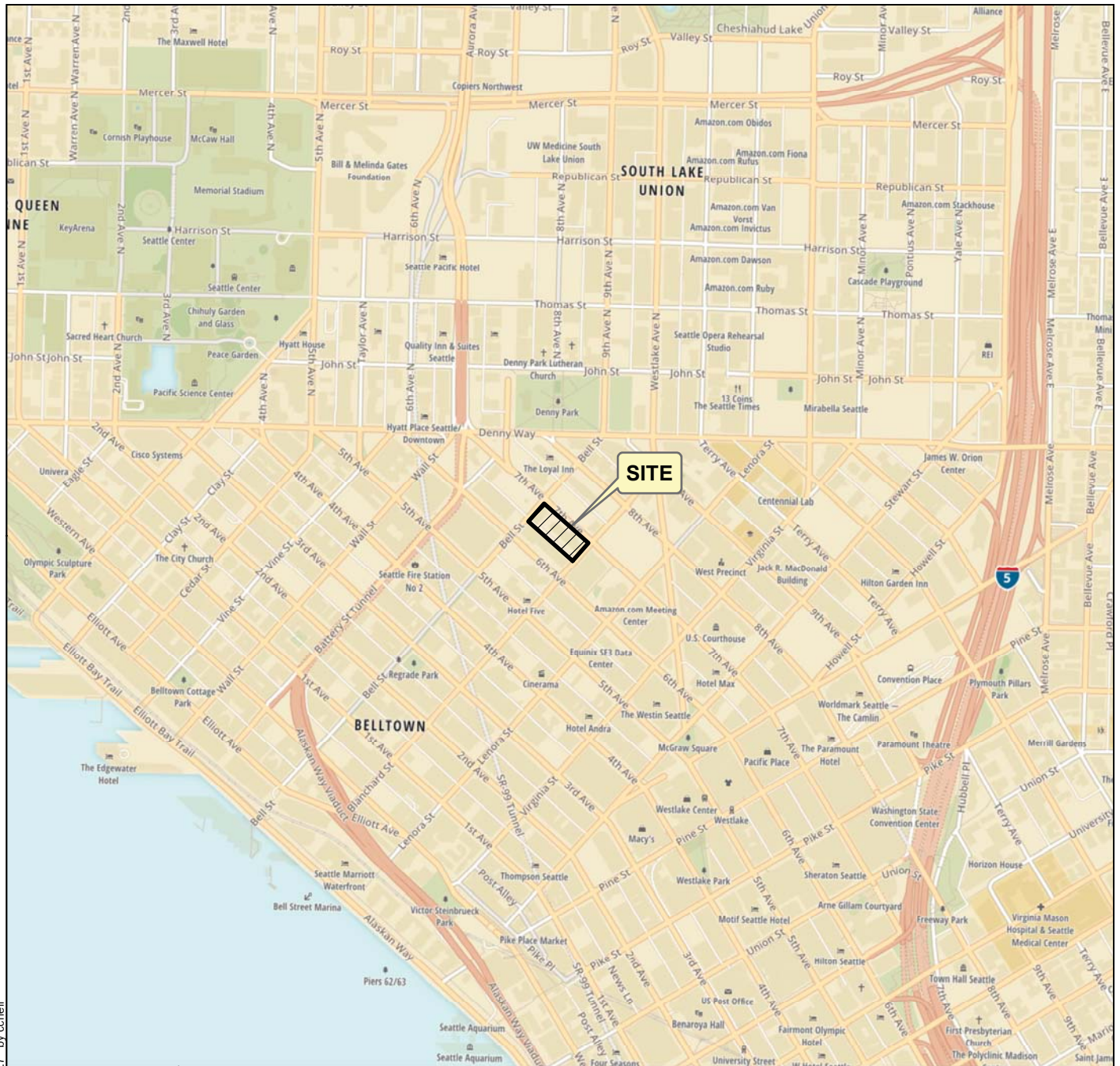
⁶Polycyclic aromatic hydrocarbons (PAHs) analyzed by EPA Method 8270D/SIM. For PAHs, only detected compounds are presented in the table. See the laboratory report for the full list of compounds analyzed and detection limits.

⁷When benzene is present, the gasoline range cleanup level is 800 µg/L. When benzene is not present the gasoline range cleanup level is 1000 µg/L.

bgs = below ground surface

µg/L = micrograms per liter

Bolding indicates analyte was detected. Shading indicates analyte was detected at a concentraion greater than the MTCA cleanup level.



Vicinity Map

Rufus 2.0 Development - Block 18
Seattle, Washington



Figure 1

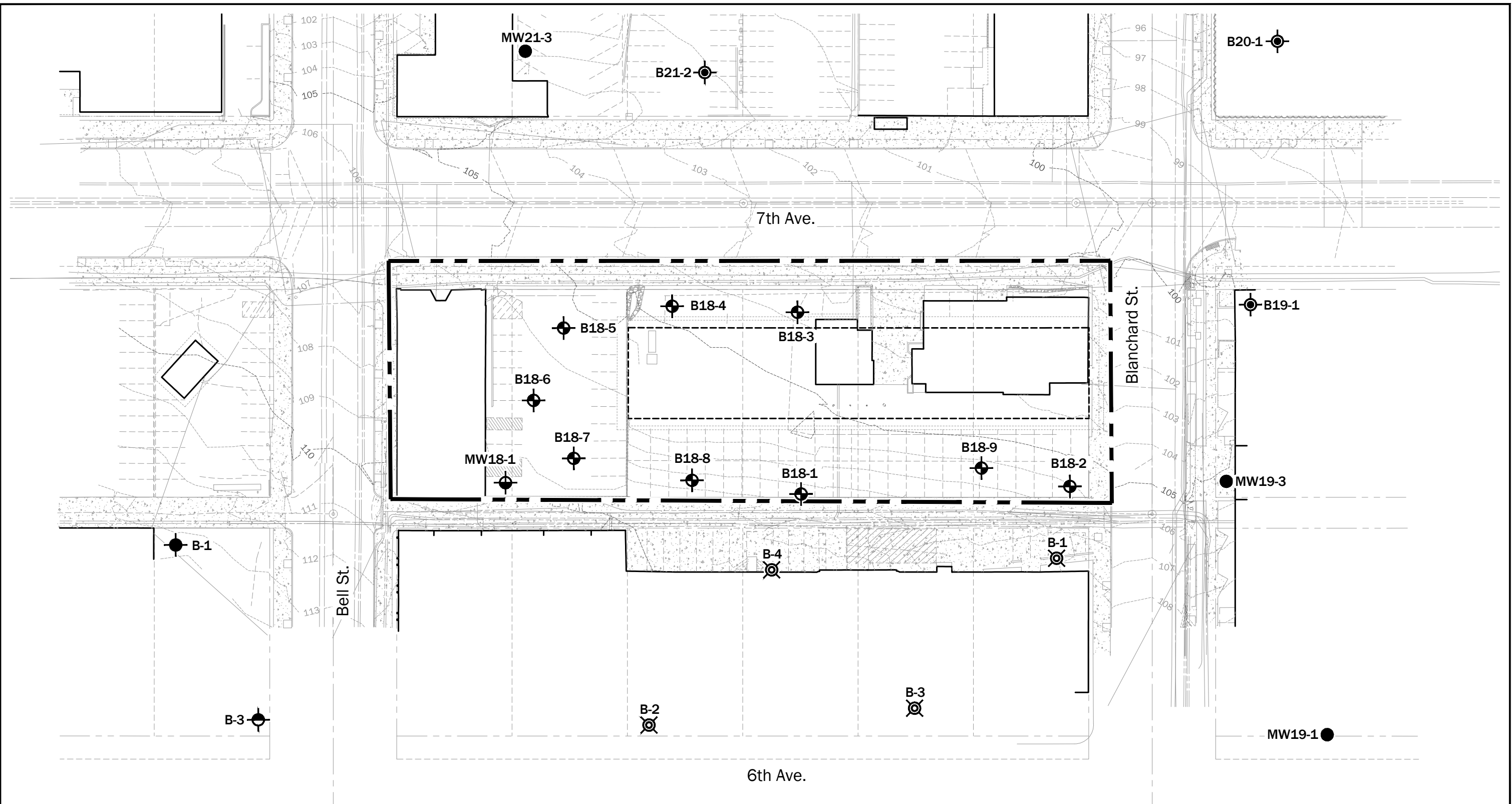
Notes:

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

Data Source: Mapbox Open Street Map, 2016

Projection: NAD 1983 StatePlane Washington North FIPS 4601 Feet

P:\20\20434001\CAD\32\Environmental\2043400132_F02-F03_Site Plan and Cross-Section.dwg TAB:Site Plan Date Exported: 09/05/17 - 14:44 by kcook



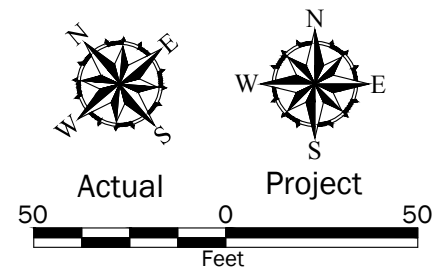
Notes:

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: Base map was taken from BRH, Dated 12/21/2016

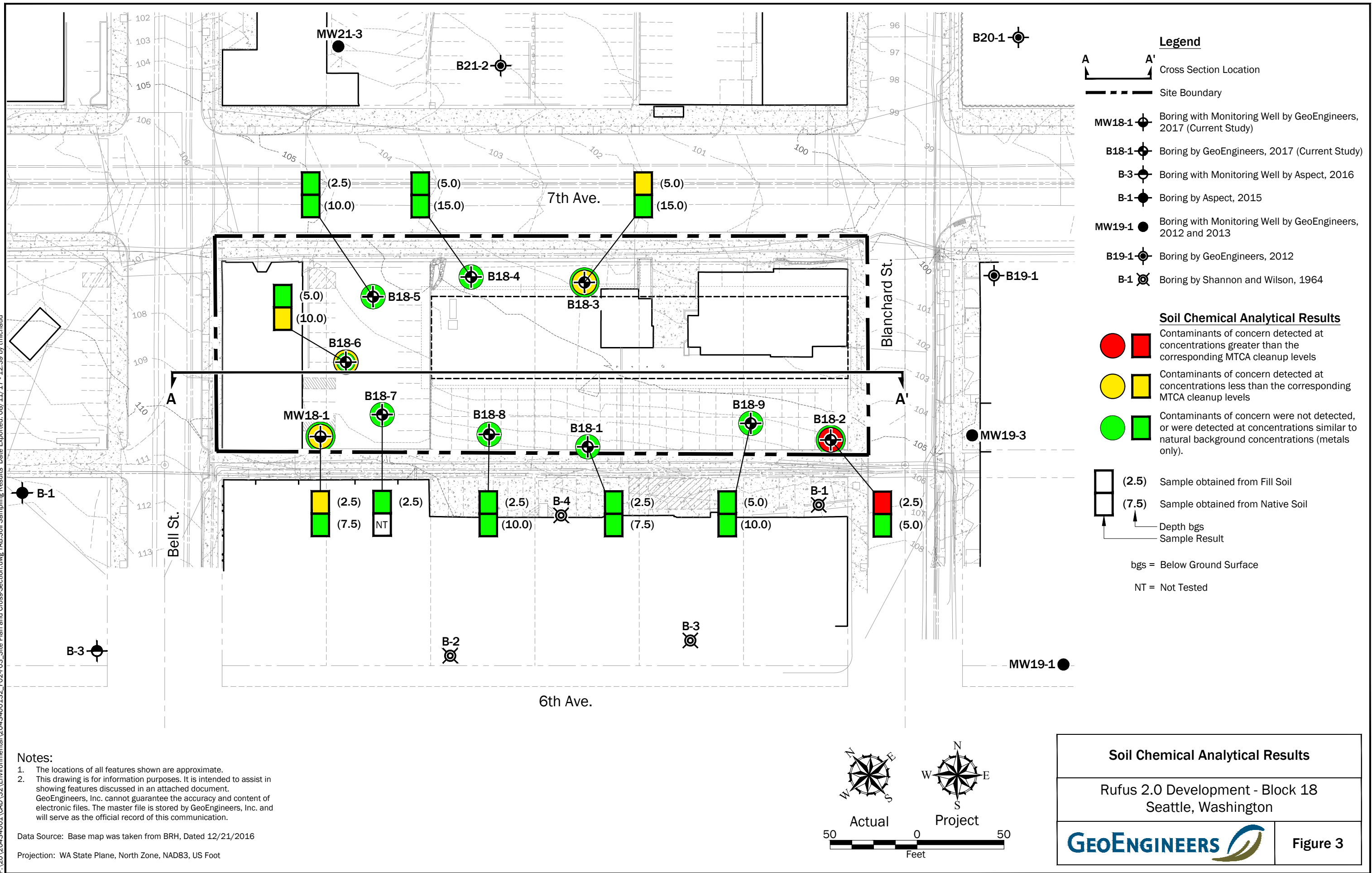
Projection: WA State Plane, North Zone, NAD83, US Foot

- Legend**
- | | | | |
|--|--|--|---|
| | Site Boundary | | B-3 Boring with Monitoring Well by Aspect, 2016 |
| | MW18-1 Boring with Monitoring Well by GeoEngineers, 2017 (Current Study) | | B-1 Boring by Aspect, 2015 |
| | B18-1 Boring by GeoEngineers, 2017 (Current Study) | | MW19-1 Boring with Monitoring Well by GeoEngineers, 2012 and 2013 |
| | | | B19-1 Boring by GeoEngineers, 2012 |
| | | | B-1 Boring by Shannon and Wilson, 1964 |

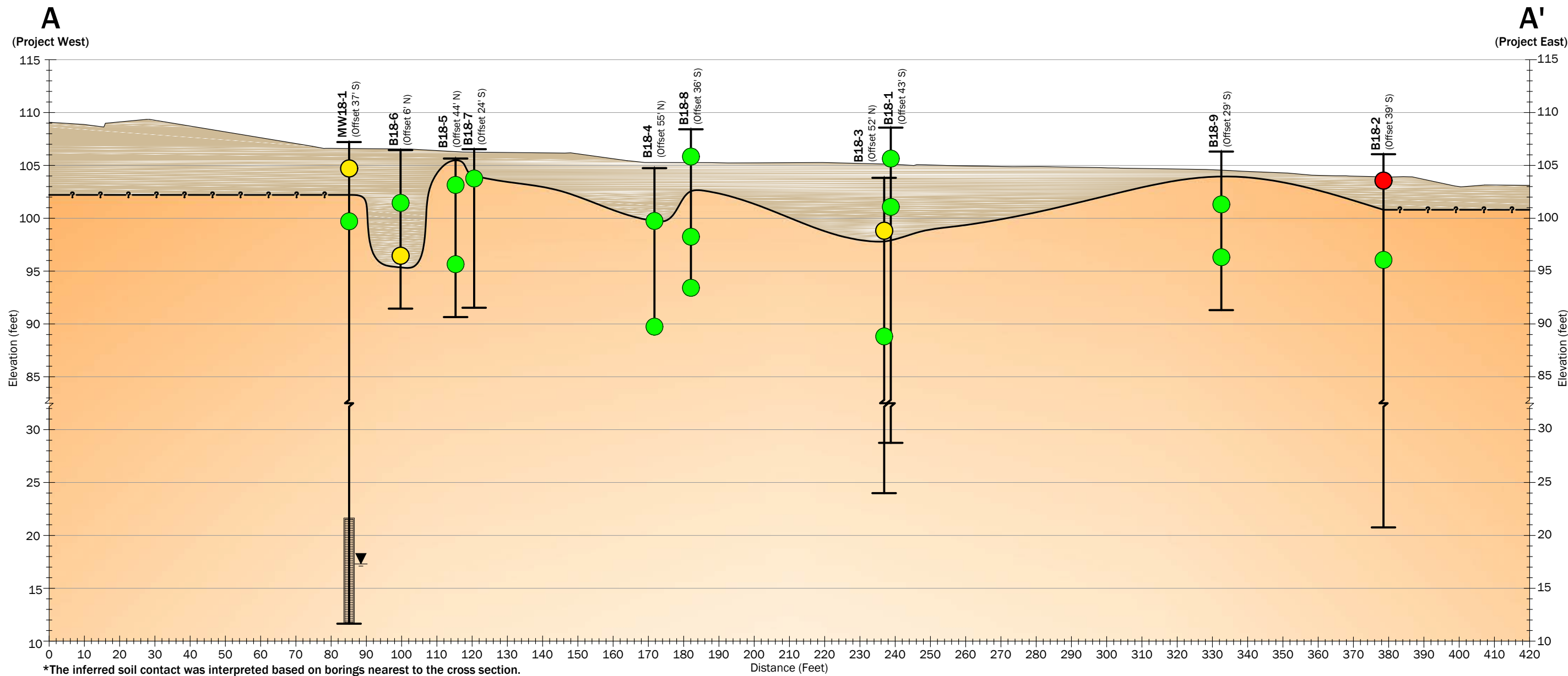


Site Plan	
Rufus 2.0 Development - Block 18 Seattle, Washington	
	Figure 2

P:\20\20434001\CAD\32\Environmental\2043400132_F02-F03_Site Plan and Cross-Section.dwg TAB:Soil Sampling Results Date Exported: 08/11/17 - 12:39 by ttnchaud



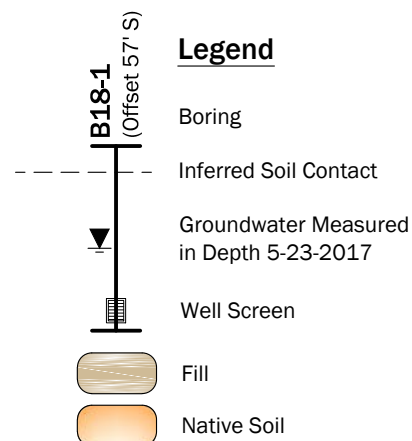
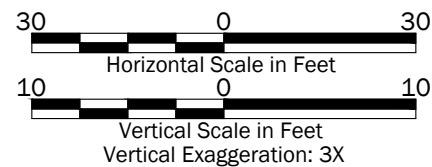
P:\20\20434001\CAD\32\Environmental\2043400132_F02-F03_Site Plan and Cross-Section.dwg TAB:Section A-A' Date Exported: 08/15/17 - 16:02 by tmichaud



Notes:

1. The subsurface conditions shown are based on interpolation between widely spaced explorations and should be considered approximate; actual subsurface conditions may vary from those shown.
2. This figure is for informational purposes only. It is intended to assist in the identification of features discussed in a related document. Data were compiled from sources as listed in this figure. The data sources do not guarantee these data are accurate or complete. There may have been updates to the data since the publication of this figure. This figure is a copy of a master document. The hard copy is stored by GeoEngineers, Inc. and will serve as the official document of record.

Datum: NAVD 88, unless otherwise noted.



Soil Chemical Analytical Results

- Contaminants of concern detected at concentrations greater than the corresponding MTCA cleanup levels
- Contaminants of concern detected at concentrations less than the corresponding MTCA cleanup levels
- Contaminants of concern were not detected, or were detected at concentrations similar to natural background concentrations (metals only).

Cross Section A - A'

Rufus 2.0 Development - Block 18
Seattle, Washington



Figure 4

APPENDIX A

Limitations and Guidelines for Use

APPENDIX A

REPORT LIMITATIONS AND GUIDELINES FOR USE¹

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

Read These Provisions Closely

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

Environmental Services Are Performed for Specific Purposes, Persons and Projects

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

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

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

This report applies to Block 18 in the Denny Triangle neighborhood of Seattle, Washington. GeoEngineers considered a number of unique, project-specific factors when establishing the scope of services for this project and report. Unless GeoEngineers specifically indicates otherwise, do not rely on this report if it was:

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

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

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

Reliance Conditions for Third Parties

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

Environmental Regulations Are Always Evolving

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

Uncertainty May Remain after Completion of Remedial Activities

Remediation activity completed in a portion of a site cannot wholly eliminate uncertainty regarding the potential for contamination in connection with a property. Our interpretation of subsurface conditions in this study is based on field observations and chemical analytical data from widely spaced sampling locations. It is always possible that contamination exists in areas that were not explored, sampled or analyzed.

Subsurface Conditions Can Change

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

Soil and Groundwater End Use

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

Most Environmental Findings Are Professional Opinions

Our interpretations of subsurface conditions are based on field observations and chemical analytical data from widely spaced sampling locations at the site. Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. GeoEngineers reviewed field and laboratory data and then applied our professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ – sometimes significantly – from those indicated in this report. Our report, conclusions and interpretations should not be construed as a warranty of the subsurface conditions.

Geotechnical, Geologic and Geoenvironmental Reports Should Not Be Interchanged

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

Biological Pollutants

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

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

APPENDIX B

Field Procedures and Boring Logs

APPENDIX B

FIELD PROCEDURES AND BORING LOGS

Soil Sample Collection and Handling

Subsurface conditions at the Site were evaluated by completing direct push explorations using equipment owned and operated by Cascade Drilling of Woodinville, Washington; hollow-stem auger explorations were completed using equipment owned and operated by Geologic Drill of Spokane, Washington. Cascade Drilling and Geologic Drill are both Washington state-licensed drilling companies.

Direct-push drilling was conducted using track-mounted direct-push drilling equipment. Continuous soil cores were obtained from the direct-push borings using 2¼-inch diameter, 4-foot long stainless-steel sampler rods driven with a pneumatic hammer. Soil samples were collected in clean, plastic 1½-inch diameter disposable liners. The liners were placed inside the sampling rod and then hydraulically driven or pushed into the soil at the selected sampling depth. Soil samples obtained from the direct push borings were collected from the sampler with a stainless-steel knife or new gloves. The direct push sampler was driven a maximum of 48 inches using a pneumatic hammer. A portion of each sample was placed in laboratory-prepared sample jars for possible chemical analysis. The remaining portion of each sample was used for field screening. The sampling equipment was decontaminated prior to each use with an Alconox® wash and a clean water rinse. The direct-push borings extended to a maximum depth of approximately 15 feet below the ground surface (bgs). The sampling equipment was decontaminated before each sampling attempt with an Alconox® wash and a clean water rinse. Soil samples were obtained from continuous cores for field screening and possible chemical analysis.

Hollow-stem auger drilling was conducted in general accordance with Washington Administrative Code (WAC) 173-760. Soil samples were obtained from the borings at 2.5-foot depth intervals through shallow fill, then at 5-foot depth intervals through native soil for field screening and possible chemical analysis. Soil samples from the borings were obtained using a 2.5-inch diameter, split barrel sampler. The sampler was driven a maximum of 18 inches by a 140-pound weight falling a vertical distance of approximately 30 inches. The number of blows needed to advance the sampler the final 12 inches or other specified distance is indicated to the left of the corresponding sample notation on the boring logs. Using new disposable gloves, soil from the spit-barrel sampler was placed in laboratory-prepared sample jars for possible chemical analysis. The remaining portion of the sample was placed in a plastic bag for field screening. The hollow-stem auger borings extended to a maximum depth of approximately 96.5 feet bgs. The drilling equipment was decontaminated by steam cleaning prior to drilling each boring. One hollow-stem auger boring (MW18-1) was completed as a monitoring well.

A representative from our staff classified the soil encountered in each of the borings. Soil in the explorations was visually classified in general accordance with ASTM International (ASTM) D 2488-94. The boring logs are presented in Figures B-2 through B-7.

Samples from each boring were selected for chemical analysis based on the sample location relative to potential sources of contamination, or field screening results. Samples submitted for chemical analysis are shown on the logs. The soil samples were placed in a cooler with ice for transport to the laboratory. Standard chain-of-custody procedures were followed in transporting the soil samples to the laboratory.

Field Screening of Soil Samples

A representative from our staff performed field screening of soil samples obtained from the borings. Field screening results are used as a general guideline to identify areas with possible petroleum hydrocarbons. In addition, screening results are used to aid in the selection of soil samples for chemical analysis. The screening methods used included visual screening water sheen screening, and photoionization detector (PID).

Visual screening consists of inspecting the soil for stains indicative of petroleum hydrocarbons. Visual screening is generally more effective when hydrocarbons are heavier, such as motor oil, or when hydrocarbon concentrations are high. Water sheen screening is a more sensitive method that can be effective in detecting contamination at concentrations less than regulatory cleanup levels. However, field screening results are site-specific. The effectiveness of field screening varies with temperature, moisture content, organic content, soil type and age of contaminant. The presence or absence of a sheen does not necessarily indicate the presence or absence of petroleum hydrocarbons.

Water sheen screening involves placing soil in water and observing the water surface for signs of sheen. Sheen screening may detect both volatile and nonvolatile petroleum hydrocarbons. Sheen classifications are as follows:

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

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

Start Drilled	5/10/2017	End 5/11/2017	Total Depth (ft)	96.5	Logged By Checked By	CJK JDB	Driller	Geologic Drill Exploration, Inc.	Drilling Method	Hollow-stem Auger
Surface Elevation (ft) Vertical Datum	107.2 NAVD88			Hammer Data	Automatic 140 (lbs) / 30 (in) Drop			Drilling Equipment	Diedrich D50 Turbo	
Easting (X) Northing (Y)	1268481 228671			System Datum	WA State Plane North NAD83 (feet)			Groundwater not observed at time of exploration		
Notes: Field screening consisting of sheen and headspace vapor testing was completed on soil samples. No sheen or headspace vapor was observed unless otherwise noted.										

Elevation (feet)	FIELD DATA				Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing						
0						AC	4 inches asphalt concrete pavement			
105						SM	Gray silty fine to medium sand with gravel (very dense, moist) (till-like deposits)			
	11	50/5"		1						
5	18	84		2						
100										
	12	50/6"		3						
				4						
10	18	74		5		SPSM	Gray fine to medium sand with silt and gravel (very dense, moist) (cohesionless sand and gravel)	4	7	Driller noted sandier at 9 feet
95				5						
				6		SM	Gray silty fine to medium sand with occasional gravel (dense, moist)			
15	18	41		6						
90						ML	Gray sandy silt (hard, moist) (till-like deposits)			
20	18	56		7A						
85				7B		SPSM	Brown fine to medium sand with silt (very dense, moist) (cohesionless sand and gravel)			
				8		SM	Brown silty fine to medium sand (very dense, moist) (till-like deposits)			
25	18	66		8						
80										
30	6	50/6"		9			Becomes wet			
15										
						SM	Brown silty fine to medium sand with gravel (very dense, moist)			Water added at 32 feet
35										

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

Coordinates Data Source: Horizontal approximated based on BRH Survey, Vertical approximated based on Topographic Survey

Log of Boring with Monitoring Well MW18-1



Project: Rufus 2.0 Development - Block 18
Project Location: Seattle, Washington
Project Number: 20434-001-32

Figure B-2
Sheet 1 of 3

Date: 9/8/17 Path: \\GEOENGINEERS\COM\W\PROJECTS\20_20434001\GINT\2043400132.GPJ DBLibrary\Library\GEOENGINEERS_DF_STD_US_JUNE_2017.GLB\GEB_GEO TECH_STANDARD_SF_NO_GW

Date: 9/8/17 Path: \\GEOENGINEERS.COM\WAN\PROJECTS\20_20434001\GINT\2043400132.GPJ DBLibrary\Library\GEOENGINEERS_DF_STD_US_JUNE_2017.GLB\GERB_GEOTECH_STANDARD_SF_NO_GW

Elevation (feet)	FIELD DATA				Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing					
35		4	50/4"		10 %F			15	18	Water added at 35 feet
40		2	50/2"		11					Water added at 38 feet
										Bouncing on rock
45		5	50/5"		12	SM	Brown silty fine to coarse sand with gravel (very dense, moist)			
50		2	50/2"		13					Bouncing on rock
55		11	50/5"		14	SM	Brown silty fine to medium sand (very dense, moist) (cohesionless sand and gravel)			
60		16	94/10"		15					
65		11	50/5"		16 SA			10	18	
70		12	50/6"		17					
75		2	50/2"		18	SM	Gray silty fine to medium sand with gravel (very dense, moist)			

Log of Boring with Monitoring Well MW18-1 (continued)



Project: Rufus 2.0 Development - Block 18
 Project Location: Seattle, Washington
 Project Number: 20434-001-32

Figure B-2
 Sheet 2 of 3

Date: 9/8/17 Path: \\GEOENGINEERS.COM\WAN\PROJECTS\20_20434001\GINT\2043400132.GPJ DBLibrary\Library\GEOENGINEERS_DF_STD_US_JUNE_2017.GLB\GERB_GEOTECH_STANDARD_SF_NO_0W

Elevation (feet)	FIELD DATA					MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing				
80		2	50/2"		19				
85		5	50/5"		20				
90		6	50/6"		21A 21B	Grades to increased gravel content Dark brown sandy silt with gravel (hard, moist) (till-like deposits)			
95		16	82/10"		22	SM Gray silty fine to coarse sand with gravel (very dense, moist to wet) (cohesionless sand and gravel)			

Log of Boring with Monitoring Well MW18-1 (continued)



Project: Rufus 2.0 Development - Block 18
Project Location: Seattle, Washington
Project Number: 20434-001-32

Figure B-2
Sheet 3 of 3

Drilled	Start 5/9/2017	End 5/9/2017	Total Depth (ft)	80.5	Logged By Checked By	CJK JDB	Driller	Geologic Drill Exploration, Inc.	Drilling Method	Hollow-stem Auger
Surface Elevation (ft) Vertical Datum	109 NAVD88			Hammer Data	Automatic 140 (lbs) / 30 (in) Drop			Drilling Equipment	Diedrich D50 Turbo	
Easting (X) Northing (Y)	1268591 228564			System Datum	WA State Plane North NAD83 (feet)			Groundwater not observed at time of exploration		
Notes: Field screening consisting of sheen and headspace vapor testing was completed on soil samples. No sheen or headspace vapor was observed unless otherwise noted.										

Elevation (feet)	FIELD DATA				Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample Sample Name Testing						
0				1		AC	6 inches asphalt concrete pavement			
						ML	Gray sandy silt with occasional gravel (fill)			
						ML	Gray silt with occasional sand lenses, massive (very stiff, moist) (cohesive silt and clay)			
105		18	17	2		ML	Gray silt with sand and gravel (hard, moist)			Headspace vapor = 3 ppm
5		18	36	3		ML	Gray silt (hard, moist)			
		18	75	4		ML	Gray silty fine to medium sand with gravel (very dense, moist) (till-like deposits)			
100		12	50/6"	5A 5B		SM SP-SM	Gray fine to medium sand with silt and gravel (very dense, moist) (cohesionless sand and gravel)			Driller noted smooth drilling at 12 feet
95		18	55	6 %F			Occasional gravel and silt lenses	5	7	
90		18	73	7		SM	Gray silty fine to medium sand with occasional gravel (very dense, moist) (till-like deposits)			Driller noted gravel at 18 feet
85		15	83	8		SM	Gray silty fine to coarse sand with gravel (very dense, moist) (cohesionless sand and gravel)			
80		12	50/6"	9 SA				6	21	
75										
70										
65										
60										
55										
50										
45										
40										
35										

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

Coordinates Data Source: Horizontal approximated based on Other, Vertical approximated based on Topographic Survey

Log of Boring B18-1



Project: Rufus 2.0 Development - Block 18
Project Location: Seattle, Washington
Project Number: 20434-001-32

Figure B-3
Sheet 1 of 3

Date: 9/8/17 Path: \\GEOENGINEERS.COM\W\PROJECTS\20_20434001\GINT\2043400132.GPJ DBLibrary\Library\GEOENGINEERS_DF_STD_US_JUNE_2017.GLB\GEB_GEO TECH_STANDARD_SF_NO_GW

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Elevation (feet)	FIELD DATA				Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample						
35										
40										
45										
50										
55										
60										
65										
70										
75										

Log of Boring B18-1 (continued)



Project: Rufus 2.0 Development - Block 18
 Project Location: Seattle, Washington
 Project Number: 20434-001-32

Figure B-3
 Sheet 2 of 3

Date: 9/8/17 Path: \\GEOENGINEERS.COM\WAN\PROJECTS\20_20434001\GINT\2043400132.GPJ DBLibrary\Library\GEOENGINEERS_DF_STD_US_JUNE_2017.GLB\GEB8_GEOTECH_STANDARD_SF_NO_GW

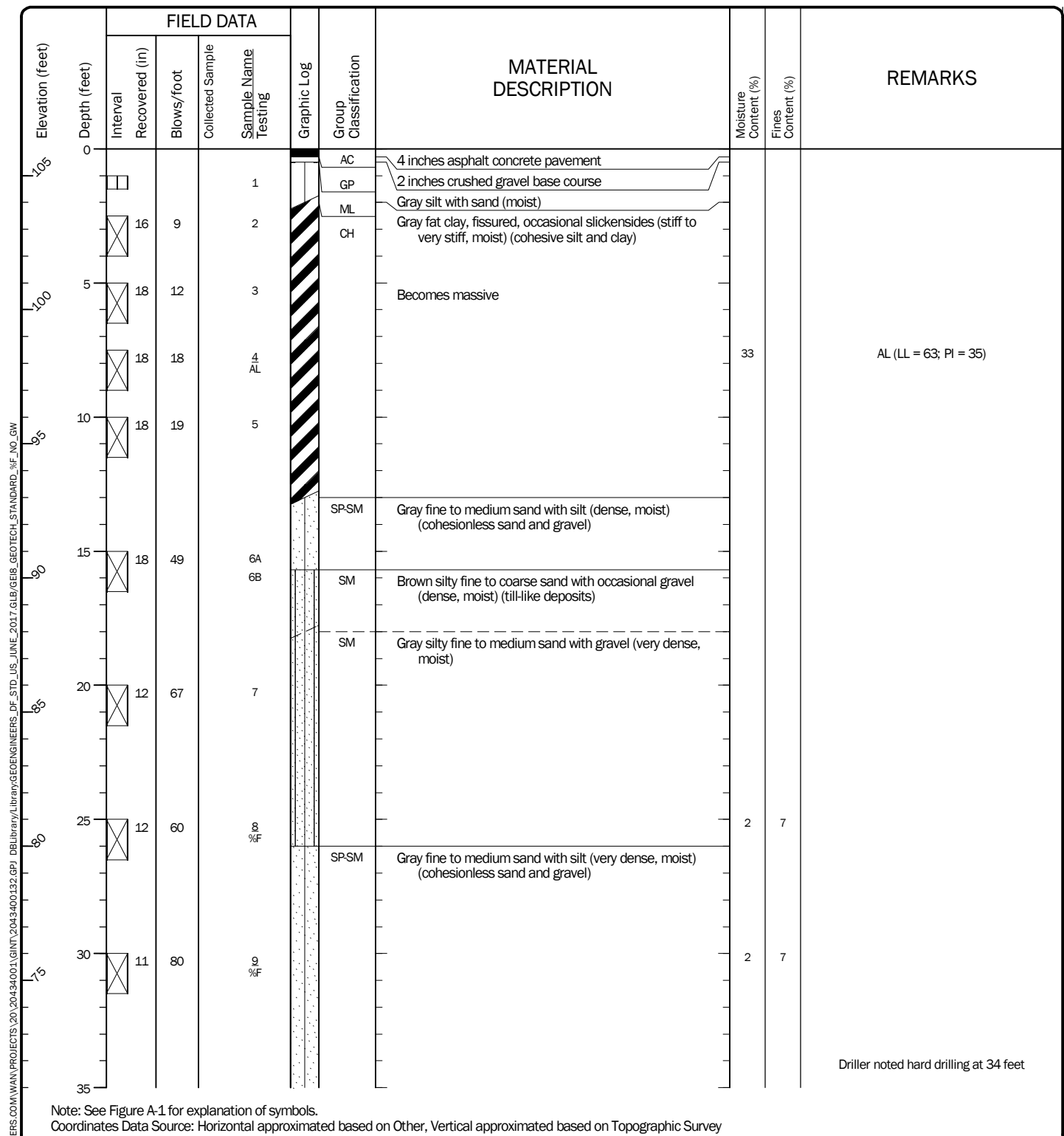
Elevation (feet)	FIELD DATA					MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Interval	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log				
80	5	50/5"		19					

Log of Boring B18-1 (continued)



Project: Rufus 2.0 Development - Block 18
Project Location: Seattle, Washington
Project Number: 20434-001-32

Drilled	Start 5/9/2017	End 5/10/2017	Total Depth (ft)	85.25	Logged By Checked By	CJK JDB	Driller	Geologic Drill Exploration, Inc.	Drilling Method	Hollow-stem Auger
Surface Elevation (ft) Vertical Datum			106 NAVD88		Hammer Data		Automatic 140 (lbs) / 30 (in) Drop		Drilling Equipment Diedrich D50 Turbo	
Easting (X) Northing (Y)			1268697 228472		System Datum		WA State Plane North NAD83 (feet)		Groundwater not observed at time of exploration	
Notes: Field screening consisting of sheen and headspace vapor testing was completed on soil samples. No sheen or headspace vapor was observed unless otherwise noted.										



Date: 9/8/17 Path: \\GEOENGINEERS.COM\WAN\PROJECTS\20_20434001\GINT\2043400132.GPJ DBLibrary\Library\GEOENGINEERS_DF STD_US_JUNE_2017.GLB\GER_GEOTECH_STANDARD_SF_NO_GW

Elevation (feet)	FIELD DATA				Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample						
35										
35	35	10	82	10			Grades to with gravel			
40	40	6	50/6"	11						Driller noted hard drilling at 39 feet
45	45	11	50/5"	12						
50	50	18	82	13	SM	Gray silty fine to coarse sand with gravel (very dense, moist) (till-like deposits)				
55	55	6	50/6"	14 %F	SM	Gray silty fine to medium sand with gravel (very dense, moist) (cohesionless sand and gravel)				
60	60	11	50/5"	15			Iron oxide staining	7	14	
65	65	16	94/10"	16			Becomes brown			
70	70	12	50/6"	17			Grades to with occasional gravel			Driller added water 1-foot wet silt in sampler
75	75	11	50/5"	18			Grades to without gravel			

Log of Boring B18-2 (continued)



Project: Rufus 2.0 Development - Block 18
 Project Location: Seattle, Washington
 Project Number: 20434-001-32

Figure B-4
 Sheet 2 of 3

Date: 9/8/17 Path: \\GEOENGINEERS.COM\WAN\PROJECTS\20_20434001\GINT\2043400132.GPJ DBLibrary\Library\GEOENGINEERS_DF STD_US_JUNE_2017.GLB\GEB8 GEOTECH_STANDARD_SF_NO_GW

Elevation (feet)	FIELD DATA					MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing				
80	10	50/4"	19			Grades to with occasional gravel			
85	0	50/0.5"	20						Driller noted bouncing on a rock

Log of Boring B18-2 (continued)



Project: Rufus 2.0 Development - Block 18
Project Location: Seattle, Washington
Project Number: 20434-001-32

Figure B-4
Sheet 3 of 3

Drilled	Start 5/8/2017	End 5/8/2017	Total Depth (ft)	80.25	Logged By Checked By	CJK JDB	Driller	Geologic Drill Exploration, Inc.	Drilling Method	Hollow-stem Auger
Surface Elevation (ft)	104			Hammer	Automatic			Diedrich D50 Turbo		
Vertical Datum	NAVD88			Data	140 (lbs) / 30 (in) Drop			Drilling Equipment		
Easting (X)	1268653			System	WA State Plane North			Groundwater not observed at time of exploration		
Northing (Y)	228635			Datum	NAD83 (feet)					
Notes: Field screening consisting of sheen and headspace vapor testing was completed on soil samples. No sheen or headspace vapor was observed unless otherwise noted.										

Elevation (feet)	FIELD DATA				Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample Sample Name Testing						
0				1		AC	3½ inches asphalt concrete pavement			
						ML	Gray silt with sand (stiff, moist) (cohesive silt and clay)			
100		18	17	2						
5		18	42	3A 3B		SM	Gray silty fine to medium sand with gravel (dense to very dense, moist) (till-like deposits)			Headspace vapor = 1.1 ppm Driller noted gravels at 6 feet bgs; harder drilling
95		18	74	4						Headspace vapor = 12.5 ppm Driller noted sandier at 9½ feet
10		18	43	5						
90						SPSM	Gray fine to medium sand with silt (dense to very dense, moist) (cohesionless sand and gravel)			
15		12	48	6 %F				5	7	
85										
20		12	50/6"	7			Grades to with gravel			
80										
25		12	94/10"	8						Headspace vapor = 5.6 ppm
15						SM	Gray silty fine to medium sand with occasional gravel (very dense, moist)			
30		10	50/4"	9 %F				5	14	Driller noted gravels at 30 feet Headspace vapor = 6.9 ppm
10										
35										

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

Coordinates Data Source: Horizontal approximated based on Other, Vertical approximated based on Topographic Survey

Log of Boring B18-3



Project: Rufus 2.0 Development - Block 18
Project Location: Seattle, Washington
Project Number: 20434-001-32

Figure B-5
Sheet 1 of 3

Date: 9/8/17 Path: \\GEOENGINEERS.COM\WAN\PROJECTS\20_20434001\GINT\2043400132.GPJ DBLibrary\Library\GEOENGINEERS_DF_STD_US_JUNE_2017.GLB\GEB_GEO TECH_STANDARD_SF_NO_GW

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Elevation (feet)	FIELD DATA				Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample						
35										
		10	50/4"							Driller noted cobbles and rough drilling from 37 to 45 feet
40		3	50/3"				Grades to with gravel			
45		16	85		SM		Gray silty fine to coarse sand with gravel (very dense, moist)			Driller noted easier drilling starting at 45 feet Iron oxide staining
50		11	50/5"							
55		11	50/5"		SM		Gray silty fine sand (very dense, moist)			Driller noted sand layer at 54 feet
60		4	50/4"				Grades to with gravel	8	14	Headspace vapor = 2 ppm
65		11.5	50/5.5"				Grades to with occasional gravel			Added water at 65 feet
70		12	50/6"				Becomes brown			Added more water at 70 feet
75		17	90/11"							

Log of Boring B18-3 (continued)



Project: Rufus 2.0 Development - Block 18
 Project Location: Seattle, Washington
 Project Number: 20434-001-32

Figure B-5
 Sheet 2 of 3

Date: 9/8/17 Path: \\GEOENGINEERS.COM\WAN\PROJECTS\20_20434001\GINT\2043400132.GPJ DBLibrary\Library\GEOENGINEERS_DF_STD_US_JUNE_2017.GLB\GEB8_GEOTECH_STANDARD_%F_NO_GW

Elevation (feet)	FIELD DATA					MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Interval	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log				
80	3	100/3"		19		Becomes gray			

Log of Boring B18-3 (continued)



Project: Rufus 2.0 Development - Block 18
Project Location: Seattle, Washington
Project Number: 20434-001-32

Drilled	Start 5/16/2017	End 5/16/2017	Total Depth (ft)	15	Logged By Checked By	LJK SJB	Driller	Cascade Drilling, LP	Drilling Method	Direct Push	
Surface Elevation (ft) Vertical Datum			105 NAVD88		Hammer Data			Drilling Equipment			Truck-mounted GeoProbe
Easting (X) Northing (Y)			1268607 228681		System Datum			WA State Plane North NAD83 (feet)		Groundwater not observed at time of exploration	
Notes:											

Elevation (feet)	FIELD DATA					MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing				
0	42					AC			Asphalt concrete pavement
						ML			Gray silt with sand (stiff, moist) (fill)
						SM			Grades to black Gray silty fine to medium sand (dense, moist)
5	60				B18-4-5.0 CA				
						ML			Grades to black Gray sandy silt (stiff, moist) (native)
						SPSM			Gray fine to medium sand with silt (dense, moist)
						SPSM			Brown fine to medium sand with silt and gravel (very dense, moist)
10	60								
									Grades to gray with no gravel
						SM			Gray to brown silty fine to coarse sand with gravel
15					B18-4-15.0 CA				

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on Other, Vertical approximated based on Topographic Survey

Log of Boring B18-4



Project: Rufus 2.0 Development - Block 18
Project Location: Seattle, Washington
Project Number: 20434-001-32

Figure B-6
Sheet 1 of 1

Drilled	Start 5/16/2017	End 5/16/2017	Total Depth (ft)	15	Logged By Checked By	LJK SJB	Driller	Cascade Drilling, LP	Drilling Method	Direct Push	
Surface Elevation (ft) Vertical Datum				106 NAVD88	Hammer Data			Drilling Equipment			Truck-mounted GeoProbe
Easting (X) Northing (Y)			1268557 228710		System Datum		WA State Plane North NAD83 (feet)		Groundwater not observed at time of exploration		
Notes:											

Elevation (feet)	FIELD DATA					MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample Sample Name Testing				
0		42				AC	Asphalt concrete pavement		
10					B18-5-2.5 CA	SM	Brown to gray silty fine to medium sand with gravel (very dense, moist) (native)		
5		60							
10					B18-5-10.0 CA	SP-SM	Gray fine to medium sand with silt (very dense, moist)		
9.5		60				SM	Gray silty fine to medium sand with occasional gravel (very dense, moist)		

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

Coordinates Data Source: Horizontal approximated based on Other, Vertical approximated based on Topographic Survey

Log of Boring B18-5



Project: Rufus 2.0 Development - Block 18

Project Location: Seattle, Washington

Project Number: 20434-001-32

Figure B-7
Sheet 1 of 1

Date: 9/8/17 Path: \\GEOENGINEERS.COM\WAN\PROJECTS\20\20434001\GINT\2043400132.GPJ DBLibrary\Library\GEOENGINEERS_DF STD_US_JUNE_2017.GLB\GEI8 GEOTECH_STANDARD_%F_NO_GW

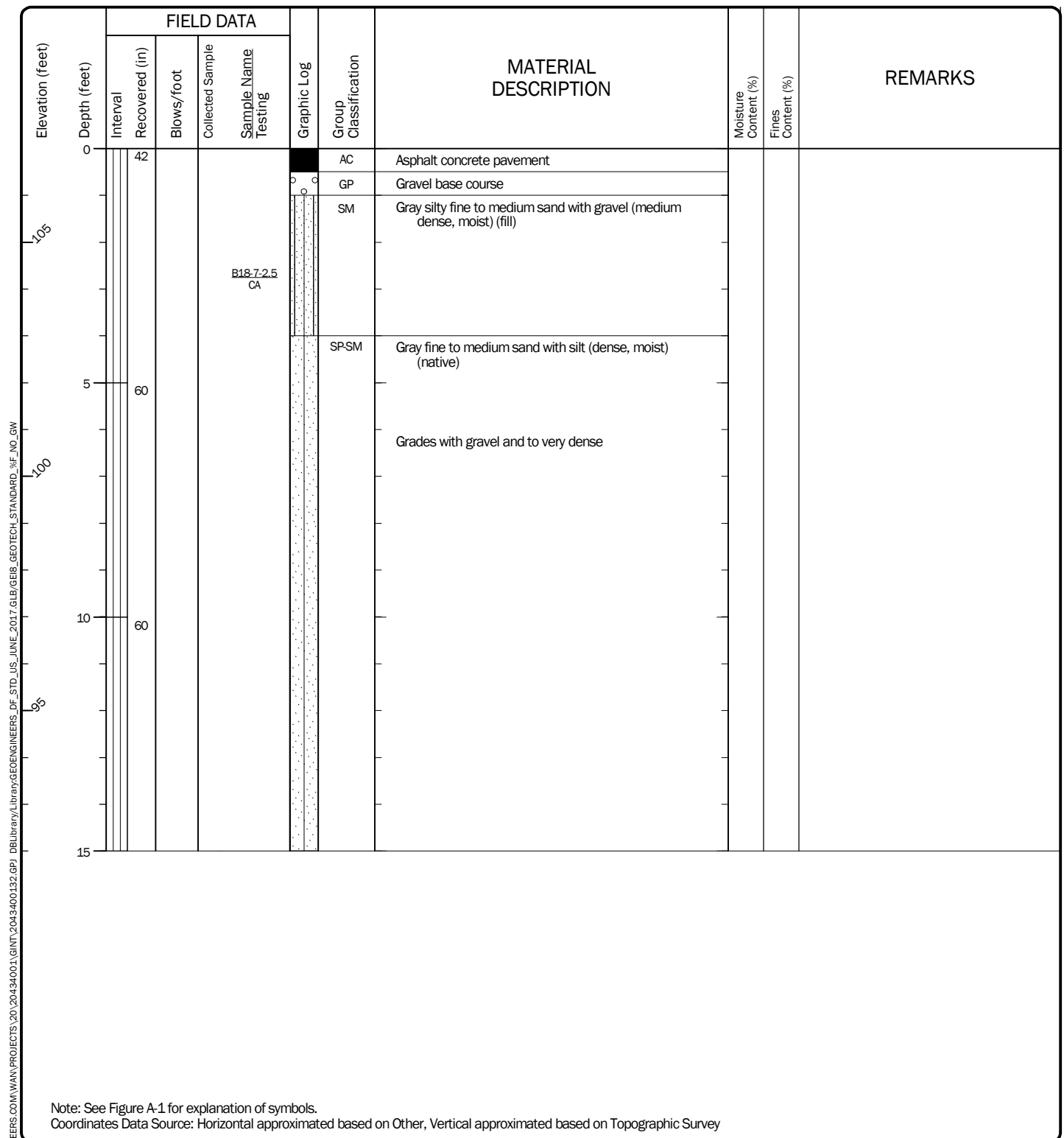
Drilled	Start 5/16/2017	End 5/16/2017	Total Depth (ft)	15	Logged By Checked By	LJK SJB	Driller	Cascade Drilling, LP	Drilling Method	Direct Push	
Surface Elevation (ft) Vertical Datum				106 NAVD88	Hammer Data			Drilling Equipment			Truck-mounted GeoProbe
Easting (X) Northing (Y)			1268520 228693		System Datum		WA State Plane North NAD83 (feet)		Groundwater not observed at time of exploration		
Notes:											

Elevation (feet)	FIELD DATA					MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample Sample Name Testing				
0			42				AC	Asphalt concrete pavement	
10							SPSM	Brown to gray fine to medium sand with silt and gravel (very dense, moist) (fill)	
5			60		B18-6-5.0 CA				
10			60		B18-6-10.0 CA				
15							SM	Gray silty fine to medium sand with occasional gravel (very dense, moist) (native)	

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on Other, Vertical approximated based on Topographic Survey

Figure B-8
Sheet 1 of 1

Drilled	Start 5/16/2017	End 5/16/2017	Total Depth (ft)	15	Logged By Checked By	LJK SJB	Driller	Cascade Drilling, LP	Drilling Method	Direct Push	
Surface Elevation (ft) Vertical Datum				107 NAVD88	Hammer Data			Drilling Equipment			Truck-mounted GeoProbe
Easting (X) Northing (Y)			1268516 228657		System Datum		WA State Plane North NAD83 (feet)		Groundwater not observed at time of exploration		
Notes:											



Log of Boring B18-7



Project: Rufus 2.0 Development - Block 18
Project Location: Seattle, Washington
Project Number: 20434-001-32

Figure B-9
Sheet 1 of 1

Drilled	Start 5/16/2017	End 5/16/2017	Total Depth (ft)	15	Logged By Checked By	LJK SJB	Driller	Cascade Drilling, LP	Drilling Method	Direct Push	
Surface Elevation (ft) Vertical Datum				108 NAVD88	Hammer Data			Drilling Equipment			Truck-mounted GeoProbe
Easting (X) Northing (Y)			1268553 228607		System Datum		WA State Plane North NAD83 (feet)		Groundwater not observed at time of exploration		
Notes:											

Elevation (feet)	Depth (feet)	FIELD DATA					Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
		Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing						
0		42						AC	Asphalt concrete pavement			
								SM	Gray silty fine to medium sand with gravel (medium dense, moist) (fill)			
105						B18-8-2.5 CA		SP-SM	Gray fine to medium sand with silt (dense, moist) (native)			
5		60										
100								ML	Gray sandy silt (hard, moist)			
								SP-SM	Gray fine to medium sand with silt and occasional gravel (very dense, moist) (till-like deposits)			
10		60				B18-8-10.0 CA						
95												
15						B18-8-15.0 CA						

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on Other, Vertical approximated based on Topographic Survey

Log of Boring B18-8



Project: Rufus 2.0 Development - Block 18
Project Location: Seattle, Washington
Project Number: 20434-001-32

Figure B-10
Sheet 1 of 1

Drilled	Start 5/16/2017	End 5/16/2017	Total Depth (ft)	15	Logged By Checked By	LJK SJB	Driller	Cascade Drilling, LP	Drilling Method	Direct Push	
Surface Elevation (ft) Vertical Datum			106 NAVD88		Hammer Data			Drilling Equipment			Truck-mounted GeoProbe
Easting (X) Northing (Y)			1268669 228510		System Datum			WA State Plane North NAD83 (feet)			Groundwater not observed at time of exploration
Notes:											

Elevation (feet)	Depth (feet)	FIELD DATA					MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
		Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log				
105	0	42					AC	Asphalt concrete pavement		
							CR	Crushed gravel base course		
							ML	Gray silt with sand (stiff, moist) (native)		
100	5	60			B18-9-5.0 CA					
	10	60			B18-9-10.0 CA					
95										Grades to very stiff
	15									

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on Other, Vertical approximated based on Topographic Survey

Log of Boring B18-9



Project: Rufus 2.0 Development - Block 18
Project Location: Seattle, Washington
Project Number: 20434-001-32

Figure B-11
Sheet 1 of 1

APPENDIX C

Chemical Analytical Program

APPENDIX C

CHEMICAL ANALYTICAL PROGRAM

Analytical Methods

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

Analytical Data Review

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

Analytical Data Review Summary

Laboratory quality control exceptions were noted by Fremont Analytical for select soil samples in the attached laboratory reports. It is our opinion that the analytical data are of acceptable quality for their intended use in this report.



Fremont
Analytical

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

GeoEngineers

Chris Brown
600 Stewart Street, Suite 1700
Seattle, WA 98101

RE: Rufus 2.0 Block 18
Work Order Number: 1705202

June 06, 2017

Attention Chris Brown:

Fremont Analytical, Inc. received 30 sample(s) on 5/17/2017 for the analyses presented in the following report.

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.
Gasoline by NWTPH-Gx
Hexavalent Chromium by EPA Method 7196
Mercury by EPA Method 7471
Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)
Sample Moisture (Percent Moisture)
Total Metals by EPA Method 6020
Volatile Organic Compounds by EPA Method 8260C

This report consists of the following:

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

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

Thank you for using Fremont Analytical.

Sincerely,

Mike Ridgeway
Laboratory Director

DoD/ELAP Certification #L2371, ISO/IEC 17025:2005
ORELAP Certification: WA 100009-007 (NELAP Recognized)

CLIENT: GeoEngineers
Project: Rufus 2.0 Block 18
Work Order: 1705202

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
1705202-001	B18-8-2.5	05/16/2017 8:40 AM	05/17/2017 9:15 AM
1705202-002	B18-8-5.0	05/16/2017 8:45 AM	05/17/2017 9:15 AM
1705202-003	B18-8-7.5	05/16/2017 8:50 AM	05/17/2017 9:15 AM
1705202-004	B18-8-10.0	05/16/2017 8:55 AM	05/17/2017 9:15 AM
1705202-005	B18-8-15.0	05/16/2017 9:00 AM	05/17/2017 9:15 AM
1705202-006	B18-9-2.5	05/16/2017 9:30 AM	05/17/2017 9:15 AM
1705202-007	B18-9-5.0	05/16/2017 9:35 AM	05/17/2017 9:15 AM
1705202-008	B18-9-7.5	05/16/2017 9:40 AM	05/17/2017 9:15 AM
1705202-009	B18-9-10.0	05/16/2017 9:45 AM	05/17/2017 9:15 AM
1705202-010	B18-7-2.5	05/16/2017 11:00 AM	05/17/2017 9:15 AM
1705202-011	B18-7-5.0	05/16/2017 11:05 AM	05/17/2017 9:15 AM
1705202-012	B18-7-7.5	05/16/2017 11:10 AM	05/17/2017 9:15 AM
1705202-013	B18-7-10.0	05/16/2017 11:15 AM	05/17/2017 9:15 AM
1705202-014	B18-7-15.0	05/16/2017 11:20 AM	05/17/2017 9:15 AM
1705202-015	B18-6-2.5	05/16/2017 12:00 PM	05/17/2017 9:15 AM
1705202-016	B18-6-5.0	05/16/2017 12:05 PM	05/17/2017 9:15 AM
1705202-017	B18-6-7.5	05/16/2017 12:10 PM	05/17/2017 9:15 AM
1705202-018	B18-6-10.0	05/16/2017 12:15 PM	05/17/2017 9:15 AM
1705202-019	B18-6-15.0	05/16/2017 12:20 PM	05/17/2017 9:15 AM
1705202-020	B18-5-2.5	05/16/2017 1:15 PM	05/17/2017 9:15 AM
1705202-021	B18-5-5.0	05/16/2017 1:20 PM	05/17/2017 9:15 AM
1705202-022	B18-5-7.5	05/16/2017 1:25 PM	05/17/2017 9:15 AM
1705202-023	B18-5-10.0	05/16/2017 1:30 PM	05/17/2017 9:15 AM
1705202-024	B18-5-15.0	05/16/2017 1:40 PM	05/17/2017 9:15 AM
1705202-025	B18-4-2.5	05/16/2017 2:00 PM	05/17/2017 9:15 AM
1705202-026	B18-4-5.0	05/16/2017 2:05 PM	05/17/2017 9:15 AM
1705202-027	B18-4-7.5	05/16/2017 2:10 PM	05/17/2017 9:15 AM
1705202-028	B18-4-10.0	05/16/2017 2:15 PM	05/17/2017 9:15 AM
1705202-029	B18-4-15.0	05/16/2017 2:20 PM	05/17/2017 9:15 AM
1705202-030	Trip Blank	05/15/2017 11:51 AM	05/17/2017 9:15 AM

CLIENT: GeoEngineers
Project: Rufus 2.0 Block 18

I. SAMPLE RECEIPT:

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

II. GENERAL REPORTING COMMENTS:

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

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

III. ANALYSES AND EXCEPTIONS:

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

Qualifiers:

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

Acronyms:

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



Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 8:40:00 AM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-001

Matrix: Soil

Client Sample ID: B18-8-2.5

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

Batch ID: 17078

Analyst: SB

Diesel (Fuel Oil)	ND	19.4		mg/Kg-dry	1	5/20/2017 4:00:42 AM
Heavy Oil	ND	48.4		mg/Kg-dry	1	5/20/2017 4:00:42 AM
Surr: 2-Fluorobiphenyl	91.2	50-150		%Rec	1	5/20/2017 4:00:42 AM
Surr: o-Terphenyl	94.5	50-150		%Rec	1	5/20/2017 4:00:42 AM

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Batch ID: 17077

Analyst: BT

Naphthalene	ND	41.3		µg/Kg-dry	1	5/18/2017 1:59:27 AM
2-Methylnaphthalene	ND	41.3		µg/Kg-dry	1	5/18/2017 1:59:27 AM
1-Methylnaphthalene	ND	41.3		µg/Kg-dry	1	5/18/2017 1:59:27 AM
Acenaphthylene	ND	41.3		µg/Kg-dry	1	5/18/2017 1:59:27 AM
Acenaphthene	ND	41.3		µg/Kg-dry	1	5/18/2017 1:59:27 AM
Fluorene	ND	41.3		µg/Kg-dry	1	5/18/2017 1:59:27 AM
Phenanthrene	ND	41.3		µg/Kg-dry	1	5/18/2017 1:59:27 AM
Anthracene	ND	41.3		µg/Kg-dry	1	5/18/2017 1:59:27 AM
Fluoranthene	ND	41.3		µg/Kg-dry	1	5/18/2017 1:59:27 AM
Pyrene	ND	41.3		µg/Kg-dry	1	5/18/2017 1:59:27 AM
Benz(a)anthracene	ND	41.3		µg/Kg-dry	1	5/18/2017 1:59:27 AM
Chrysene	ND	41.3		µg/Kg-dry	1	5/18/2017 1:59:27 AM
Benzo(b)fluoranthene	ND	41.3		µg/Kg-dry	1	5/18/2017 1:59:27 AM
Benzo(k)fluoranthene	ND	41.3		µg/Kg-dry	1	5/18/2017 1:59:27 AM
Benzo(a)pyrene	ND	41.3		µg/Kg-dry	1	5/18/2017 1:59:27 AM
Indeno(1,2,3-cd)pyrene	ND	41.3		µg/Kg-dry	1	5/18/2017 1:59:27 AM
Dibenz(a,h)anthracene	ND	41.3		µg/Kg-dry	1	5/18/2017 1:59:27 AM
Benzo(g,h,i)perylene	ND	41.3		µg/Kg-dry	1	5/18/2017 1:59:27 AM
Surr: 2-Fluorobiphenyl	50.4	24.5-139		%Rec	1	5/18/2017 1:59:27 AM
Surr: Terphenyl-d14 (surr)	62.6	44.3-176		%Rec	1	5/18/2017 1:59:27 AM

Gasoline by NWTPH-Gx

Batch ID: 17149

Analyst: NG

Gasoline	ND	7.96		mg/Kg-dry	1	5/24/2017 4:06:06 AM
Surr: Toluene-d8	100	65-135		%Rec	1	5/24/2017 4:06:06 AM
Surr: 4-Bromofluorobenzene	95.2	65-135		%Rec	1	5/24/2017 4:06:06 AM

Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17149

Analyst: NG

Dichlorodifluoromethane (CFC-12)	ND	0.0955	Q	mg/Kg-dry	1	5/24/2017 4:06:06 AM
Chloromethane	ND	0.0955		mg/Kg-dry	1	5/24/2017 4:06:06 AM
Vinyl chloride	ND	0.00318		mg/Kg-dry	1	5/24/2017 4:06:06 AM



Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 8:40:00 AM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-001

Matrix: Soil

Client Sample ID: B18-8-2.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17149

Analyst: NG

Bromomethane	ND	0.143		mg/Kg-dry	1	5/24/2017 4:06:06 AM
Trichlorofluoromethane (CFC-11)	ND	0.0796		mg/Kg-dry	1	5/24/2017 4:06:06 AM
Chloroethane	ND	0.0955		mg/Kg-dry	1	5/24/2017 4:06:06 AM
1,1-Dichloroethene	ND	0.0796		mg/Kg-dry	1	5/24/2017 4:06:06 AM
Methylene chloride	ND	0.0318		mg/Kg-dry	1	5/24/2017 4:06:06 AM
trans-1,2-Dichloroethene	ND	0.0318		mg/Kg-dry	1	5/24/2017 4:06:06 AM
Methyl tert-butyl ether (MTBE)	ND	0.0796	Q	mg/Kg-dry	1	5/24/2017 4:06:06 AM
1,1-Dichloroethane	ND	0.0318		mg/Kg-dry	1	5/24/2017 4:06:06 AM
2,2-Dichloropropane	ND	0.0796	Q	mg/Kg-dry	1	5/24/2017 4:06:06 AM
cis-1,2-Dichloroethene	ND	0.0318		mg/Kg-dry	1	5/24/2017 4:06:06 AM
Chloroform	ND	0.0318		mg/Kg-dry	1	5/24/2017 4:06:06 AM
1,1,1-Trichloroethane (TCA)	ND	0.0318		mg/Kg-dry	1	5/24/2017 4:06:06 AM
1,1-Dichloropropene	ND	0.0318		mg/Kg-dry	1	5/24/2017 4:06:06 AM
Carbon tetrachloride	ND	0.0318		mg/Kg-dry	1	5/24/2017 4:06:06 AM
1,2-Dichloroethane (EDC)	ND	0.0477		mg/Kg-dry	1	5/24/2017 4:06:06 AM
Benzene	ND	0.0318		mg/Kg-dry	1	5/24/2017 4:06:06 AM
Trichloroethene (TCE)	ND	0.0318		mg/Kg-dry	1	5/24/2017 4:06:06 AM
1,2-Dichloropropane	ND	0.0318		mg/Kg-dry	1	5/24/2017 4:06:06 AM
Bromodichloromethane	ND	0.0318		mg/Kg-dry	1	5/24/2017 4:06:06 AM
Dibromomethane	ND	0.0637		mg/Kg-dry	1	5/24/2017 4:06:06 AM
cis-1,3-Dichloropropene	ND	0.0318		mg/Kg-dry	1	5/24/2017 4:06:06 AM
Toluene	ND	0.0318		mg/Kg-dry	1	5/24/2017 4:06:06 AM
trans-1,3-Dichloropropylene	ND	0.0477	Q	mg/Kg-dry	1	5/24/2017 4:06:06 AM
1,1,2-Trichloroethane	ND	0.0477		mg/Kg-dry	1	5/24/2017 4:06:06 AM
1,3-Dichloropropane	ND	0.0796		mg/Kg-dry	1	5/24/2017 4:06:06 AM
Tetrachloroethene (PCE)	ND	0.0318		mg/Kg-dry	1	5/24/2017 4:06:06 AM
Dibromochloromethane	ND	0.0477		mg/Kg-dry	1	5/24/2017 4:06:06 AM
1,2-Dibromoethane (EDB)	ND	0.00796		mg/Kg-dry	1	5/24/2017 4:06:06 AM
Chlorobenzene	ND	0.0318		mg/Kg-dry	1	5/24/2017 4:06:06 AM
1,1,1,2-Tetrachloroethane	ND	0.0477		mg/Kg-dry	1	5/24/2017 4:06:06 AM
Ethylbenzene	ND	0.0477		mg/Kg-dry	1	5/24/2017 4:06:06 AM
m,p-Xylene	ND	0.0318		mg/Kg-dry	1	5/24/2017 4:06:06 AM
o-Xylene	ND	0.0318		mg/Kg-dry	1	5/24/2017 4:06:06 AM
Styrene	ND	0.0318		mg/Kg-dry	1	5/24/2017 4:06:06 AM
Isopropylbenzene	ND	0.127		mg/Kg-dry	1	5/24/2017 4:06:06 AM
Bromoform	ND	0.0318		mg/Kg-dry	1	5/24/2017 4:06:06 AM
1,1,2,2-Tetrachloroethane	ND	0.0318	Q	mg/Kg-dry	1	5/24/2017 4:06:06 AM
n-Propylbenzene	ND	0.0318		mg/Kg-dry	1	5/24/2017 4:06:06 AM
Bromobenzene	ND	0.0477		mg/Kg-dry	1	5/24/2017 4:06:06 AM



Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 8:40:00 AM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-001

Matrix: Soil

Client Sample ID: B18-8-2.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17149

Analyst: NG

1,3,5-Trimethylbenzene	ND	0.0318		mg/Kg-dry	1	5/24/2017 4:06:06 AM
2-Chlorotoluene	ND	0.0318		mg/Kg-dry	1	5/24/2017 4:06:06 AM
4-Chlorotoluene	ND	0.0318		mg/Kg-dry	1	5/24/2017 4:06:06 AM
tert-Butylbenzene	ND	0.0318		mg/Kg-dry	1	5/24/2017 4:06:06 AM
1,2,3-Trichloropropane	ND	0.0318	Q	mg/Kg-dry	1	5/24/2017 4:06:06 AM
1,2,4-Trichlorobenzene	ND	0.0796		mg/Kg-dry	1	5/24/2017 4:06:06 AM
sec-Butylbenzene	ND	0.0318		mg/Kg-dry	1	5/24/2017 4:06:06 AM
4-Isopropyltoluene	ND	0.0318		mg/Kg-dry	1	5/24/2017 4:06:06 AM
1,3-Dichlorobenzene	ND	0.0318		mg/Kg-dry	1	5/24/2017 4:06:06 AM
1,4-Dichlorobenzene	ND	0.0318		mg/Kg-dry	1	5/24/2017 4:06:06 AM
n-Butylbenzene	ND	0.0318		mg/Kg-dry	1	5/24/2017 4:06:06 AM
1,2-Dichlorobenzene	ND	0.0318		mg/Kg-dry	1	5/24/2017 4:06:06 AM
1,2-Dibromo-3-chloropropane	ND	0.796	Q	mg/Kg-dry	1	5/24/2017 4:06:06 AM
1,2,4-Trimethylbenzene	ND	0.0318		mg/Kg-dry	1	5/24/2017 4:06:06 AM
Hexachlorobutadiene	ND	0.159		mg/Kg-dry	1	5/24/2017 4:06:06 AM
Naphthalene	ND	0.0477	Q	mg/Kg-dry	1	5/24/2017 4:06:06 AM
1,2,3-Trichlorobenzene	ND	0.0318		mg/Kg-dry	1	5/24/2017 4:06:06 AM
Surr: Dibromofluoromethane	96.9	56.5-129		%Rec	1	5/24/2017 4:06:06 AM
Surr: Toluene-d8	102	64.5-151		%Rec	1	5/24/2017 4:06:06 AM
Surr: 1-Bromo-4-fluorobenzene	89.4	63.1-141		%Rec	1	5/24/2017 4:06:06 AM

NOTES:

Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Mercury by EPA Method 7471

Batch ID: 17157

Analyst: WF

Mercury	ND	0.268		mg/Kg-dry	1	5/24/2017 4:44:24 PM
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Total Metals by EPA Method 6020

Batch ID: 17124

Analyst: TN

Arsenic	2.39	0.0858		mg/Kg-dry	1	5/22/2017 4:54:54 PM
Barium	31.2	0.429		mg/Kg-dry	1	5/22/2017 4:54:54 PM
Cadmium	ND	0.172		mg/Kg-dry	1	5/22/2017 4:54:54 PM
Chromium	28.0	0.0858		mg/Kg-dry	1	5/22/2017 4:54:54 PM
Lead	1.55	0.172		mg/Kg-dry	1	5/22/2017 4:54:54 PM
Selenium	1.02	0.429		mg/Kg-dry	1	5/22/2017 4:54:54 PM
Silver	ND	0.0858		mg/Kg-dry	1	5/22/2017 4:54:54 PM



Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 8:40:00 AM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-001

Matrix: Soil

Client Sample ID: B18-8-2.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Sample Moisture (Percent Moisture)

Batch ID: R36200 Analyst: CG

Percent Moisture	6.77			wt%	1	5/17/2017 2:01:24 PM
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Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 8:55:00 AM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-004

Matrix: Soil

Client Sample ID: B18-8-10.0

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

Batch ID: 17078

Analyst: SB

Diesel (Fuel Oil)	ND	19.9		mg/Kg-dry	1	5/20/2017 7:10:59 AM
Heavy Oil	ND	49.8		mg/Kg-dry	1	5/20/2017 7:10:59 AM
Surr: 2-Fluorobiphenyl	85.6	50-150		%Rec	1	5/20/2017 7:10:59 AM
Surr: o-Terphenyl	86.5	50-150		%Rec	1	5/20/2017 7:10:59 AM

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Batch ID: 17077

Analyst: BT

Naphthalene	ND	42.7		µg/Kg-dry	1	5/23/2017 1:26:31 AM
2-Methylnaphthalene	ND	42.7		µg/Kg-dry	1	5/23/2017 1:26:31 AM
1-Methylnaphthalene	ND	42.7		µg/Kg-dry	1	5/23/2017 1:26:31 AM
Acenaphthylene	ND	42.7		µg/Kg-dry	1	5/23/2017 1:26:31 AM
Acenaphthene	ND	42.7		µg/Kg-dry	1	5/23/2017 1:26:31 AM
Fluorene	ND	42.7		µg/Kg-dry	1	5/23/2017 1:26:31 AM
Phenanthrene	ND	42.7		µg/Kg-dry	1	5/23/2017 1:26:31 AM
Anthracene	ND	42.7		µg/Kg-dry	1	5/23/2017 1:26:31 AM
Fluoranthene	ND	42.7		µg/Kg-dry	1	5/23/2017 1:26:31 AM
Pyrene	ND	42.7		µg/Kg-dry	1	5/23/2017 1:26:31 AM
Benz(a)anthracene	ND	42.7		µg/Kg-dry	1	5/23/2017 1:26:31 AM
Chrysene	ND	42.7		µg/Kg-dry	1	5/23/2017 1:26:31 AM
Benzo(b)fluoranthene	ND	42.7		µg/Kg-dry	1	5/23/2017 1:26:31 AM
Benzo(k)fluoranthene	ND	42.7		µg/Kg-dry	1	5/23/2017 1:26:31 AM
Benzo(a)pyrene	ND	42.7		µg/Kg-dry	1	5/23/2017 1:26:31 AM
Indeno(1,2,3-cd)pyrene	ND	42.7		µg/Kg-dry	1	5/23/2017 1:26:31 AM
Dibenz(a,h)anthracene	ND	42.7		µg/Kg-dry	1	5/23/2017 1:26:31 AM
Benzo(g,h,i)perylene	ND	42.7		µg/Kg-dry	1	5/23/2017 1:26:31 AM
Surr: 2-Fluorobiphenyl	60.6	24.5-139		%Rec	1	5/23/2017 1:26:31 AM
Surr: Terphenyl-d14 (surr)	72.5	44.3-176		%Rec	1	5/23/2017 1:26:31 AM

Gasoline by NWTPH-Gx

Batch ID: 17149

Analyst: NG

Gasoline	ND	5.26		mg/Kg-dry	1	5/24/2017 5:05:27 AM
Surr: Toluene-d8	97.4	65-135		%Rec	1	5/24/2017 5:05:27 AM
Surr: 4-Bromofluorobenzene	91.0	65-135		%Rec	1	5/24/2017 5:05:27 AM

Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17149

Analyst: NG

Dichlorodifluoromethane (CFC-12)	ND	0.0631	Q	mg/Kg-dry	1	5/24/2017 5:05:27 AM
Chloromethane	ND	0.0631		mg/Kg-dry	1	5/24/2017 5:05:27 AM
Vinyl chloride	ND	0.00210		mg/Kg-dry	1	5/24/2017 5:05:27 AM



Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 8:55:00 AM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-004

Matrix: Soil

Client Sample ID: B18-8-10.0

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17149

Analyst: NG

Bromomethane	ND	0.0946		mg/Kg-dry	1	5/24/2017 5:05:27 AM
Trichlorofluoromethane (CFC-11)	ND	0.0526		mg/Kg-dry	1	5/24/2017 5:05:27 AM
Chloroethane	ND	0.0631		mg/Kg-dry	1	5/24/2017 5:05:27 AM
1,1-Dichloroethene	ND	0.0526		mg/Kg-dry	1	5/24/2017 5:05:27 AM
Methylene chloride	ND	0.0210		mg/Kg-dry	1	5/24/2017 5:05:27 AM
trans-1,2-Dichloroethene	ND	0.0210		mg/Kg-dry	1	5/24/2017 5:05:27 AM
Methyl tert-butyl ether (MTBE)	ND	0.0526	Q	mg/Kg-dry	1	5/24/2017 5:05:27 AM
1,1-Dichloroethane	ND	0.0210		mg/Kg-dry	1	5/24/2017 5:05:27 AM
2,2-Dichloropropane	ND	0.0526	Q	mg/Kg-dry	1	5/24/2017 5:05:27 AM
cis-1,2-Dichloroethene	ND	0.0210		mg/Kg-dry	1	5/24/2017 5:05:27 AM
Chloroform	ND	0.0210		mg/Kg-dry	1	5/24/2017 5:05:27 AM
1,1,1-Trichloroethane (TCA)	ND	0.0210		mg/Kg-dry	1	5/24/2017 5:05:27 AM
1,1-Dichloropropene	ND	0.0210		mg/Kg-dry	1	5/24/2017 5:05:27 AM
Carbon tetrachloride	ND	0.0210		mg/Kg-dry	1	5/24/2017 5:05:27 AM
1,2-Dichloroethane (EDC)	ND	0.0315		mg/Kg-dry	1	5/24/2017 5:05:27 AM
Benzene	ND	0.0210		mg/Kg-dry	1	5/24/2017 5:05:27 AM
Trichloroethene (TCE)	ND	0.0210		mg/Kg-dry	1	5/24/2017 5:05:27 AM
1,2-Dichloropropane	ND	0.0210		mg/Kg-dry	1	5/24/2017 5:05:27 AM
Bromodichloromethane	ND	0.0210		mg/Kg-dry	1	5/24/2017 5:05:27 AM
Dibromomethane	ND	0.0421		mg/Kg-dry	1	5/24/2017 5:05:27 AM
cis-1,3-Dichloropropene	ND	0.0210		mg/Kg-dry	1	5/24/2017 5:05:27 AM
Toluene	ND	0.0210		mg/Kg-dry	1	5/24/2017 5:05:27 AM
trans-1,3-Dichloropropylene	ND	0.0315	Q	mg/Kg-dry	1	5/24/2017 5:05:27 AM
1,1,2-Trichloroethane	ND	0.0315		mg/Kg-dry	1	5/24/2017 5:05:27 AM
1,3-Dichloropropane	ND	0.0526		mg/Kg-dry	1	5/24/2017 5:05:27 AM
Tetrachloroethene (PCE)	ND	0.0210		mg/Kg-dry	1	5/24/2017 5:05:27 AM
Dibromochloromethane	ND	0.0315		mg/Kg-dry	1	5/24/2017 5:05:27 AM
1,2-Dibromoethane (EDB)	ND	0.00526		mg/Kg-dry	1	5/24/2017 5:05:27 AM
Chlorobenzene	ND	0.0210		mg/Kg-dry	1	5/24/2017 5:05:27 AM
1,1,1,2-Tetrachloroethane	ND	0.0315		mg/Kg-dry	1	5/24/2017 5:05:27 AM
Ethylbenzene	ND	0.0315		mg/Kg-dry	1	5/24/2017 5:05:27 AM
m,p-Xylene	ND	0.0210		mg/Kg-dry	1	5/24/2017 5:05:27 AM
o-Xylene	ND	0.0210		mg/Kg-dry	1	5/24/2017 5:05:27 AM
Styrene	ND	0.0210		mg/Kg-dry	1	5/24/2017 5:05:27 AM
Isopropylbenzene	ND	0.0841		mg/Kg-dry	1	5/24/2017 5:05:27 AM
Bromoform	ND	0.0210		mg/Kg-dry	1	5/24/2017 5:05:27 AM
1,1,2,2-Tetrachloroethane	ND	0.0210	Q	mg/Kg-dry	1	5/24/2017 5:05:27 AM
n-Propylbenzene	ND	0.0210		mg/Kg-dry	1	5/24/2017 5:05:27 AM
Bromobenzene	ND	0.0315		mg/Kg-dry	1	5/24/2017 5:05:27 AM



Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 8:55:00 AM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-004

Matrix: Soil

Client Sample ID: B18-8-10.0

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17149

Analyst: NG

1,3,5-Trimethylbenzene	ND	0.0210		mg/Kg-dry	1	5/24/2017 5:05:27 AM
2-Chlorotoluene	ND	0.0210		mg/Kg-dry	1	5/24/2017 5:05:27 AM
4-Chlorotoluene	ND	0.0210		mg/Kg-dry	1	5/24/2017 5:05:27 AM
tert-Butylbenzene	ND	0.0210		mg/Kg-dry	1	5/24/2017 5:05:27 AM
1,2,3-Trichloropropane	ND	0.0210	Q	mg/Kg-dry	1	5/24/2017 5:05:27 AM
1,2,4-Trichlorobenzene	ND	0.0526		mg/Kg-dry	1	5/24/2017 5:05:27 AM
sec-Butylbenzene	ND	0.0210		mg/Kg-dry	1	5/24/2017 5:05:27 AM
4-Isopropyltoluene	ND	0.0210		mg/Kg-dry	1	5/24/2017 5:05:27 AM
1,3-Dichlorobenzene	ND	0.0210		mg/Kg-dry	1	5/24/2017 5:05:27 AM
1,4-Dichlorobenzene	ND	0.0210		mg/Kg-dry	1	5/24/2017 5:05:27 AM
n-Butylbenzene	ND	0.0210		mg/Kg-dry	1	5/24/2017 5:05:27 AM
1,2-Dichlorobenzene	ND	0.0210		mg/Kg-dry	1	5/24/2017 5:05:27 AM
1,2-Dibromo-3-chloropropane	ND	0.526	Q	mg/Kg-dry	1	5/24/2017 5:05:27 AM
1,2,4-Trimethylbenzene	ND	0.0210		mg/Kg-dry	1	5/24/2017 5:05:27 AM
Hexachlorobutadiene	ND	0.105		mg/Kg-dry	1	5/24/2017 5:05:27 AM
Naphthalene	ND	0.0315	Q	mg/Kg-dry	1	5/24/2017 5:05:27 AM
1,2,3-Trichlorobenzene	ND	0.0210		mg/Kg-dry	1	5/24/2017 5:05:27 AM
Surr: Dibromofluoromethane	99.5	56.5-129		%Rec	1	5/24/2017 5:05:27 AM
Surr: Toluene-d8	103	64.5-151		%Rec	1	5/24/2017 5:05:27 AM
Surr: 1-Bromo-4-fluorobenzene	85.4	63.1-141		%Rec	1	5/24/2017 5:05:27 AM

NOTES:

Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Mercury by EPA Method 7471

Batch ID: 17157

Analyst: WF

Mercury	ND	0.261		mg/Kg-dry	1	5/24/2017 4:50:54 PM
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Total Metals by EPA Method 6020

Batch ID: 17124

Analyst: TN

Arsenic	2.73	0.0908		mg/Kg-dry	1	5/22/2017 4:58:55 PM
Barium	49.4	0.454		mg/Kg-dry	1	5/22/2017 4:58:55 PM
Cadmium	ND	0.182		mg/Kg-dry	1	5/22/2017 4:58:55 PM
Chromium	59.9	0.0908		mg/Kg-dry	1	5/22/2017 4:58:55 PM
Lead	2.13	0.182		mg/Kg-dry	1	5/22/2017 4:58:55 PM
Selenium	1.20	0.454		mg/Kg-dry	1	5/24/2017 12:38:36 PM
Silver	ND	0.0908		mg/Kg-dry	1	5/22/2017 4:58:55 PM



Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 8:55:00 AM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-004

Matrix: Soil

Client Sample ID: B18-8-10.0

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Sample Moisture (Percent Moisture)

Batch ID: R36200 Analyst: CG

Percent Moisture	9.71			wt%	1	5/17/2017 2:01:24 PM
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Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 9:00:00 AM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-005

Matrix: Soil

Client Sample ID: B18-8-15.0

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<u>Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.</u>				Batch ID: 17078		Analyst: SB
Diesel (Fuel Oil)	ND	20.1		mg/Kg-dry	1	5/20/2017 7:42:41 AM
Heavy Oil	ND	50.4		mg/Kg-dry	1	5/20/2017 7:42:41 AM
Surr: 2-Fluorobiphenyl	91.7	50-150		%Rec	1	5/20/2017 7:42:41 AM
Surr: o-Terphenyl	90.6	50-150		%Rec	1	5/20/2017 7:42:41 AM

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Batch ID: 17093 Analyst: BT

Naphthalene	ND	40.5		µg/Kg-dry	1	5/18/2017 3:09:18 PM
2-Methylnaphthalene	ND	40.5		µg/Kg-dry	1	5/18/2017 3:09:18 PM
1-Methylnaphthalene	ND	40.5		µg/Kg-dry	1	5/18/2017 3:09:18 PM
Acenaphthylene	ND	40.5		µg/Kg-dry	1	5/18/2017 3:09:18 PM
Acenaphthene	ND	40.5		µg/Kg-dry	1	5/18/2017 3:09:18 PM
Fluorene	ND	40.5		µg/Kg-dry	1	5/18/2017 3:09:18 PM
Phenanthrene	ND	40.5		µg/Kg-dry	1	5/18/2017 3:09:18 PM
Anthracene	ND	40.5		µg/Kg-dry	1	5/18/2017 3:09:18 PM
Fluoranthene	ND	40.5		µg/Kg-dry	1	5/18/2017 3:09:18 PM
Pyrene	ND	40.5		µg/Kg-dry	1	5/18/2017 3:09:18 PM
Benz(a)anthracene	ND	40.5		µg/Kg-dry	1	5/18/2017 3:09:18 PM
Chrysene	ND	40.5		µg/Kg-dry	1	5/18/2017 3:09:18 PM
Benzo(b)fluoranthene	ND	40.5		µg/Kg-dry	1	5/18/2017 3:09:18 PM
Benzo(k)fluoranthene	ND	40.5		µg/Kg-dry	1	5/18/2017 3:09:18 PM
Benzo(a)pyrene	ND	40.5		µg/Kg-dry	1	5/18/2017 3:09:18 PM
Indeno(1,2,3-cd)pyrene	ND	40.5		µg/Kg-dry	1	5/18/2017 3:09:18 PM
Dibenz(a,h)anthracene	ND	40.5		µg/Kg-dry	1	5/18/2017 3:09:18 PM
Benzo(g,h,i)perylene	ND	40.5		µg/Kg-dry	1	5/18/2017 3:09:18 PM
Surr: 2-Fluorobiphenyl	67.0	24.5-139		%Rec	1	5/18/2017 3:09:18 PM
Surr: Terphenyl-d14 (surr)	61.3	44.3-176		%Rec	1	5/18/2017 3:09:18 PM

Gasoline by NWTPH-Gx

Batch ID: 17149 Analyst: NG

Gasoline	ND	6.25		mg/Kg-dry	1	5/24/2017 5:35:09 AM
Surr: Toluene-d8	96.2	65-135		%Rec	1	5/24/2017 5:35:09 AM
Surr: 4-Bromofluorobenzene	89.2	65-135		%Rec	1	5/24/2017 5:35:09 AM

Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17149 Analyst: NG

Dichlorodifluoromethane (CFC-12)	ND	0.0750	Q	mg/Kg-dry	1	5/24/2017 5:35:09 AM
Chloromethane	ND	0.0750		mg/Kg-dry	1	5/24/2017 5:35:09 AM
Vinyl chloride	ND	0.00250		mg/Kg-dry	1	5/24/2017 5:35:09 AM



Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 9:00:00 AM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-005

Matrix: Soil

Client Sample ID: B18-8-15.0

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17149

Analyst: NG

Bromomethane	ND	0.112		mg/Kg-dry	1	5/24/2017 5:35:09 AM
Trichlorofluoromethane (CFC-11)	ND	0.0625		mg/Kg-dry	1	5/24/2017 5:35:09 AM
Chloroethane	ND	0.0750		mg/Kg-dry	1	5/24/2017 5:35:09 AM
1,1-Dichloroethene	ND	0.0625		mg/Kg-dry	1	5/24/2017 5:35:09 AM
Methylene chloride	ND	0.0250		mg/Kg-dry	1	5/24/2017 5:35:09 AM
trans-1,2-Dichloroethene	ND	0.0250		mg/Kg-dry	1	5/24/2017 5:35:09 AM
Methyl tert-butyl ether (MTBE)	ND	0.0625	Q	mg/Kg-dry	1	5/24/2017 5:35:09 AM
1,1-Dichloroethane	ND	0.0250		mg/Kg-dry	1	5/24/2017 5:35:09 AM
2,2-Dichloropropane	ND	0.0625	Q	mg/Kg-dry	1	5/24/2017 5:35:09 AM
cis-1,2-Dichloroethene	ND	0.0250		mg/Kg-dry	1	5/24/2017 5:35:09 AM
Chloroform	ND	0.0250		mg/Kg-dry	1	5/24/2017 5:35:09 AM
1,1,1-Trichloroethane (TCA)	ND	0.0250		mg/Kg-dry	1	5/24/2017 5:35:09 AM
1,1-Dichloropropene	ND	0.0250		mg/Kg-dry	1	5/24/2017 5:35:09 AM
Carbon tetrachloride	ND	0.0250		mg/Kg-dry	1	5/24/2017 5:35:09 AM
1,2-Dichloroethane (EDC)	ND	0.0375		mg/Kg-dry	1	5/24/2017 5:35:09 AM
Benzene	ND	0.0250		mg/Kg-dry	1	5/24/2017 5:35:09 AM
Trichloroethene (TCE)	ND	0.0250		mg/Kg-dry	1	5/24/2017 5:35:09 AM
1,2-Dichloropropane	ND	0.0250		mg/Kg-dry	1	5/24/2017 5:35:09 AM
Bromodichloromethane	ND	0.0250		mg/Kg-dry	1	5/24/2017 5:35:09 AM
Dibromomethane	ND	0.0500		mg/Kg-dry	1	5/24/2017 5:35:09 AM
cis-1,3-Dichloropropene	ND	0.0250		mg/Kg-dry	1	5/24/2017 5:35:09 AM
Toluene	ND	0.0250		mg/Kg-dry	1	5/24/2017 5:35:09 AM
trans-1,3-Dichloropropylene	ND	0.0375	Q	mg/Kg-dry	1	5/24/2017 5:35:09 AM
1,1,2-Trichloroethane	ND	0.0375		mg/Kg-dry	1	5/24/2017 5:35:09 AM
1,3-Dichloropropane	ND	0.0625		mg/Kg-dry	1	5/24/2017 5:35:09 AM
Tetrachloroethene (PCE)	ND	0.0250		mg/Kg-dry	1	5/24/2017 5:35:09 AM
Dibromochloromethane	ND	0.0375		mg/Kg-dry	1	5/24/2017 5:35:09 AM
1,2-Dibromoethane (EDB)	ND	0.00625		mg/Kg-dry	1	5/24/2017 5:35:09 AM
Chlorobenzene	ND	0.0250		mg/Kg-dry	1	5/24/2017 5:35:09 AM
1,1,1,2-Tetrachloroethane	ND	0.0375		mg/Kg-dry	1	5/24/2017 5:35:09 AM
Ethylbenzene	ND	0.0375		mg/Kg-dry	1	5/24/2017 5:35:09 AM
m,p-Xylene	ND	0.0250		mg/Kg-dry	1	5/24/2017 5:35:09 AM
o-Xylene	ND	0.0250		mg/Kg-dry	1	5/24/2017 5:35:09 AM
Styrene	ND	0.0250		mg/Kg-dry	1	5/24/2017 5:35:09 AM
Isopropylbenzene	ND	0.0999		mg/Kg-dry	1	5/24/2017 5:35:09 AM
Bromoform	ND	0.0250		mg/Kg-dry	1	5/24/2017 5:35:09 AM
1,1,2,2-Tetrachloroethane	ND	0.0250	Q	mg/Kg-dry	1	5/24/2017 5:35:09 AM
n-Propylbenzene	ND	0.0250		mg/Kg-dry	1	5/24/2017 5:35:09 AM
Bromobenzene	ND	0.0375		mg/Kg-dry	1	5/24/2017 5:35:09 AM



Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 9:00:00 AM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-005

Matrix: Soil

Client Sample ID: B18-8-15.0

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17149

Analyst: NG

1,3,5-Trimethylbenzene	ND	0.0250		mg/Kg-dry	1	5/24/2017 5:35:09 AM
2-Chlorotoluene	ND	0.0250		mg/Kg-dry	1	5/24/2017 5:35:09 AM
4-Chlorotoluene	ND	0.0250		mg/Kg-dry	1	5/24/2017 5:35:09 AM
tert-Butylbenzene	ND	0.0250		mg/Kg-dry	1	5/24/2017 5:35:09 AM
1,2,3-Trichloropropane	ND	0.0250	Q	mg/Kg-dry	1	5/24/2017 5:35:09 AM
1,2,4-Trichlorobenzene	ND	0.0625		mg/Kg-dry	1	5/24/2017 5:35:09 AM
sec-Butylbenzene	ND	0.0250		mg/Kg-dry	1	5/24/2017 5:35:09 AM
4-Isopropyltoluene	ND	0.0250		mg/Kg-dry	1	5/24/2017 5:35:09 AM
1,3-Dichlorobenzene	ND	0.0250		mg/Kg-dry	1	5/24/2017 5:35:09 AM
1,4-Dichlorobenzene	ND	0.0250		mg/Kg-dry	1	5/24/2017 5:35:09 AM
n-Butylbenzene	ND	0.0250		mg/Kg-dry	1	5/24/2017 5:35:09 AM
1,2-Dichlorobenzene	ND	0.0250		mg/Kg-dry	1	5/24/2017 5:35:09 AM
1,2-Dibromo-3-chloropropane	ND	0.625	Q	mg/Kg-dry	1	5/24/2017 5:35:09 AM
1,2,4-Trimethylbenzene	ND	0.0250		mg/Kg-dry	1	5/24/2017 5:35:09 AM
Hexachlorobutadiene	ND	0.125		mg/Kg-dry	1	5/24/2017 5:35:09 AM
Naphthalene	ND	0.0375	Q	mg/Kg-dry	1	5/24/2017 5:35:09 AM
1,2,3-Trichlorobenzene	ND	0.0250		mg/Kg-dry	1	5/24/2017 5:35:09 AM
Surr: Dibromofluoromethane	99.1	56.5-129		%Rec	1	5/24/2017 5:35:09 AM
Surr: Toluene-d8	101	64.5-151		%Rec	1	5/24/2017 5:35:09 AM
Surr: 1-Bromo-4-fluorobenzene	83.8	63.1-141		%Rec	1	5/24/2017 5:35:09 AM

NOTES:

Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Mercury by EPA Method 7471

Batch ID: 17157

Analyst: WF

Mercury	ND	0.263		mg/Kg-dry	1	5/24/2017 4:52:29 PM
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Total Metals by EPA Method 6020

Batch ID: 17124

Analyst: TN

Arsenic	2.36	0.0772		mg/Kg-dry	1	5/22/2017 5:02:56 PM
Barium	34.4	0.386		mg/Kg-dry	1	5/22/2017 5:02:56 PM
Cadmium	ND	0.154		mg/Kg-dry	1	5/22/2017 5:02:56 PM
Chromium	33.4	0.0772		mg/Kg-dry	1	5/22/2017 5:02:56 PM
Lead	1.70	0.154		mg/Kg-dry	1	5/22/2017 5:02:56 PM
Selenium	1.01	0.386		mg/Kg-dry	1	5/22/2017 5:02:56 PM
Silver	ND	0.0772		mg/Kg-dry	1	5/22/2017 5:02:56 PM



Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 9:00:00 AM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-005

Matrix: Soil

Client Sample ID: B18-8-15.0

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Sample Moisture (Percent Moisture)

Batch ID: R36200 Analyst: CG

Percent Moisture	6.77			wt%	1	5/17/2017 2:01:24 PM
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Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 9:35:00 AM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-007

Matrix: Soil

Client Sample ID: B18-9-5.0

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

Batch ID: 17078

Analyst: SB

Diesel (Fuel Oil)	ND	23.8		mg/Kg-dry	1	5/20/2017 8:46:02 AM
Heavy Oil	ND	59.5		mg/Kg-dry	1	5/20/2017 8:46:02 AM
Surr: 2-Fluorobiphenyl	71.6	50-150		%Rec	1	5/20/2017 8:46:02 AM
Surr: o-Terphenyl	71.4	50-150		%Rec	1	5/20/2017 8:46:02 AM

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Batch ID: 17093

Analyst: BT

Naphthalene	ND	48.3		µg/Kg-dry	1	5/18/2017 6:08:15 PM
2-Methylnaphthalene	ND	48.3		µg/Kg-dry	1	5/18/2017 6:08:15 PM
1-Methylnaphthalene	ND	48.3		µg/Kg-dry	1	5/18/2017 6:08:15 PM
Acenaphthylene	ND	48.3		µg/Kg-dry	1	5/18/2017 6:08:15 PM
Acenaphthene	ND	48.3		µg/Kg-dry	1	5/18/2017 6:08:15 PM
Fluorene	ND	48.3		µg/Kg-dry	1	5/18/2017 6:08:15 PM
Phenanthrene	ND	48.3		µg/Kg-dry	1	5/18/2017 6:08:15 PM
Anthracene	ND	48.3		µg/Kg-dry	1	5/18/2017 6:08:15 PM
Fluoranthene	ND	48.3		µg/Kg-dry	1	5/18/2017 6:08:15 PM
Pyrene	ND	48.3		µg/Kg-dry	1	5/18/2017 6:08:15 PM
Benz(a)anthracene	ND	48.3		µg/Kg-dry	1	5/18/2017 6:08:15 PM
Chrysene	ND	48.3		µg/Kg-dry	1	5/18/2017 6:08:15 PM
Benzo(b)fluoranthene	ND	48.3		µg/Kg-dry	1	5/18/2017 6:08:15 PM
Benzo(k)fluoranthene	ND	48.3		µg/Kg-dry	1	5/18/2017 6:08:15 PM
Benzo(a)pyrene	ND	48.3		µg/Kg-dry	1	5/18/2017 6:08:15 PM
Indeno(1,2,3-cd)pyrene	ND	48.3		µg/Kg-dry	1	5/18/2017 6:08:15 PM
Dibenz(a,h)anthracene	ND	48.3		µg/Kg-dry	1	5/18/2017 6:08:15 PM
Benzo(g,h,i)perylene	ND	48.3		µg/Kg-dry	1	5/18/2017 6:08:15 PM
Surr: 2-Fluorobiphenyl	56.7	24.5-139		%Rec	1	5/18/2017 6:08:15 PM
Surr: Terphenyl-d14 (surr)	54.5	44.3-176		%Rec	1	5/18/2017 6:08:15 PM

Gasoline by NWTPH-Gx

Batch ID: 17149

Analyst: NG

Gasoline	ND	7.93		mg/Kg-dry	1	5/24/2017 6:04:50 AM
Surr: Toluene-d8	97.2	65-135		%Rec	1	5/24/2017 6:04:50 AM
Surr: 4-Bromofluorobenzene	93.5	65-135		%Rec	1	5/24/2017 6:04:50 AM

Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17149

Analyst: NG

Dichlorodifluoromethane (CFC-12)	ND	0.0951	Q	mg/Kg-dry	1	5/24/2017 6:04:50 AM
Chloromethane	ND	0.0951		mg/Kg-dry	1	5/24/2017 6:04:50 AM
Vinyl chloride	ND	0.00317		mg/Kg-dry	1	5/24/2017 6:04:50 AM



Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 9:35:00 AM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-007

Matrix: Soil

Client Sample ID: B18-9-5.0

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17149

Analyst: NG

Bromomethane	ND	0.143		mg/Kg-dry	1	5/24/2017 6:04:50 AM
Trichlorofluoromethane (CFC-11)	ND	0.0793		mg/Kg-dry	1	5/24/2017 6:04:50 AM
Chloroethane	ND	0.0951		mg/Kg-dry	1	5/24/2017 6:04:50 AM
1,1-Dichloroethene	ND	0.0793		mg/Kg-dry	1	5/24/2017 6:04:50 AM
Methylene chloride	ND	0.0317		mg/Kg-dry	1	5/24/2017 6:04:50 AM
trans-1,2-Dichloroethene	ND	0.0317		mg/Kg-dry	1	5/24/2017 6:04:50 AM
Methyl tert-butyl ether (MTBE)	ND	0.0793	Q	mg/Kg-dry	1	5/24/2017 6:04:50 AM
1,1-Dichloroethane	ND	0.0317		mg/Kg-dry	1	5/24/2017 6:04:50 AM
2,2-Dichloropropane	ND	0.0793	Q	mg/Kg-dry	1	5/24/2017 6:04:50 AM
cis-1,2-Dichloroethene	ND	0.0317		mg/Kg-dry	1	5/24/2017 6:04:50 AM
Chloroform	ND	0.0317		mg/Kg-dry	1	5/24/2017 6:04:50 AM
1,1,1-Trichloroethane (TCA)	ND	0.0317		mg/Kg-dry	1	5/24/2017 6:04:50 AM
1,1-Dichloropropene	ND	0.0317		mg/Kg-dry	1	5/24/2017 6:04:50 AM
Carbon tetrachloride	ND	0.0317		mg/Kg-dry	1	5/24/2017 6:04:50 AM
1,2-Dichloroethane (EDC)	ND	0.0476		mg/Kg-dry	1	5/24/2017 6:04:50 AM
Benzene	ND	0.0317		mg/Kg-dry	1	5/24/2017 6:04:50 AM
Trichloroethene (TCE)	ND	0.0317		mg/Kg-dry	1	5/24/2017 6:04:50 AM
1,2-Dichloropropane	ND	0.0317		mg/Kg-dry	1	5/24/2017 6:04:50 AM
Bromodichloromethane	ND	0.0317		mg/Kg-dry	1	5/24/2017 6:04:50 AM
Dibromomethane	ND	0.0634		mg/Kg-dry	1	5/24/2017 6:04:50 AM
cis-1,3-Dichloropropene	ND	0.0317		mg/Kg-dry	1	5/24/2017 6:04:50 AM
Toluene	ND	0.0317		mg/Kg-dry	1	5/24/2017 6:04:50 AM
trans-1,3-Dichloropropylene	ND	0.0476	Q	mg/Kg-dry	1	5/24/2017 6:04:50 AM
1,1,2-Trichloroethane	ND	0.0476		mg/Kg-dry	1	5/24/2017 6:04:50 AM
1,3-Dichloropropane	ND	0.0793		mg/Kg-dry	1	5/24/2017 6:04:50 AM
Tetrachloroethene (PCE)	ND	0.0317		mg/Kg-dry	1	5/24/2017 6:04:50 AM
Dibromochloromethane	ND	0.0476		mg/Kg-dry	1	5/24/2017 6:04:50 AM
1,2-Dibromoethane (EDB)	ND	0.00793		mg/Kg-dry	1	5/24/2017 6:04:50 AM
Chlorobenzene	ND	0.0317		mg/Kg-dry	1	5/24/2017 6:04:50 AM
1,1,1,2-Tetrachloroethane	ND	0.0476		mg/Kg-dry	1	5/24/2017 6:04:50 AM
Ethylbenzene	ND	0.0476		mg/Kg-dry	1	5/24/2017 6:04:50 AM
m,p-Xylene	ND	0.0317		mg/Kg-dry	1	5/24/2017 6:04:50 AM
o-Xylene	ND	0.0317		mg/Kg-dry	1	5/24/2017 6:04:50 AM
Styrene	ND	0.0317		mg/Kg-dry	1	5/24/2017 6:04:50 AM
Isopropylbenzene	ND	0.127		mg/Kg-dry	1	5/24/2017 6:04:50 AM
Bromoform	ND	0.0317		mg/Kg-dry	1	5/24/2017 6:04:50 AM
1,1,2,2-Tetrachloroethane	ND	0.0317	Q	mg/Kg-dry	1	5/24/2017 6:04:50 AM
n-Propylbenzene	ND	0.0317		mg/Kg-dry	1	5/24/2017 6:04:50 AM
Bromobenzene	ND	0.0476		mg/Kg-dry	1	5/24/2017 6:04:50 AM



Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 9:35:00 AM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-007

Matrix: Soil

Client Sample ID: B18-9-5.0

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17149

Analyst: NG

1,3,5-Trimethylbenzene	ND	0.0317		mg/Kg-dry	1	5/24/2017 6:04:50 AM
2-Chlorotoluene	ND	0.0317		mg/Kg-dry	1	5/24/2017 6:04:50 AM
4-Chlorotoluene	ND	0.0317		mg/Kg-dry	1	5/24/2017 6:04:50 AM
tert-Butylbenzene	ND	0.0317		mg/Kg-dry	1	5/24/2017 6:04:50 AM
1,2,3-Trichloropropane	ND	0.0317	Q	mg/Kg-dry	1	5/24/2017 6:04:50 AM
1,2,4-Trichlorobenzene	ND	0.0793		mg/Kg-dry	1	5/24/2017 6:04:50 AM
sec-Butylbenzene	ND	0.0317		mg/Kg-dry	1	5/24/2017 6:04:50 AM
4-Isopropyltoluene	ND	0.0317		mg/Kg-dry	1	5/24/2017 6:04:50 AM
1,3-Dichlorobenzene	ND	0.0317		mg/Kg-dry	1	5/24/2017 6:04:50 AM
1,4-Dichlorobenzene	ND	0.0317		mg/Kg-dry	1	5/24/2017 6:04:50 AM
n-Butylbenzene	ND	0.0317		mg/Kg-dry	1	5/24/2017 6:04:50 AM
1,2-Dichlorobenzene	ND	0.0317		mg/Kg-dry	1	5/24/2017 6:04:50 AM
1,2-Dibromo-3-chloropropane	ND	0.793	Q	mg/Kg-dry	1	5/24/2017 6:04:50 AM
1,2,4-Trimethylbenzene	ND	0.0317		mg/Kg-dry	1	5/24/2017 6:04:50 AM
Hexachlorobutadiene	ND	0.159		mg/Kg-dry	1	5/24/2017 6:04:50 AM
Naphthalene	ND	0.0476	Q	mg/Kg-dry	1	5/24/2017 6:04:50 AM
1,2,3-Trichlorobenzene	ND	0.0317		mg/Kg-dry	1	5/24/2017 6:04:50 AM
Surr: Dibromofluoromethane	98.1	56.5-129		%Rec	1	5/24/2017 6:04:50 AM
Surr: Toluene-d8	100	64.5-151		%Rec	1	5/24/2017 6:04:50 AM
Surr: 1-Bromo-4-fluorobenzene	87.8	63.1-141		%Rec	1	5/24/2017 6:04:50 AM

NOTES:

Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Mercury by EPA Method 7471

Batch ID: 17157

Analyst: WF

Mercury	ND	0.324		mg/Kg-dry	1	5/24/2017 4:54:05 PM
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Total Metals by EPA Method 6020

Batch ID: 17124

Analyst: TN

Arsenic	5.03	0.102		mg/Kg-dry	1	5/22/2017 5:06:57 PM
Barium	136	0.509		mg/Kg-dry	1	5/22/2017 5:06:57 PM
Cadmium	ND	0.203		mg/Kg-dry	1	5/22/2017 5:06:57 PM
Chromium	88.5	0.102		mg/Kg-dry	1	5/22/2017 5:06:57 PM
Lead	5.91	0.203		mg/Kg-dry	1	5/22/2017 5:06:57 PM
Selenium	2.21	0.509		mg/Kg-dry	1	5/22/2017 5:06:57 PM
Silver	ND	0.102		mg/Kg-dry	1	5/22/2017 5:06:57 PM



Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 9:35:00 AM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-007

Matrix: Soil

Client Sample ID: B18-9-5.0

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Sample Moisture (Percent Moisture)

Batch ID: R36200 Analyst: CG

Percent Moisture	24.4			wt%	1	5/17/2017 2:01:24 PM
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Hexavalent Chromium by EPA Method 7196

Batch ID: 17266 Analyst: KT

Chromium, Hexavalent	ND	0.651		mg/Kg-dry	1	6/6/2017 10:25:00 AM
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Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 9:45:00 AM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-009

Matrix: Soil

Client Sample ID: B18-9-10.0

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<u>Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.</u>				Batch ID: 17078		Analyst: SB
Diesel (Fuel Oil)	ND	25.0		mg/Kg-dry	1	5/20/2017 10:45:14 PM
Heavy Oil	ND	62.5		mg/Kg-dry	1	5/20/2017 10:45:14 PM
Surr: 2-Fluorobiphenyl	81.7	50-150		%Rec	1	5/20/2017 10:45:14 PM
Surr: o-Terphenyl	81.7	50-150		%Rec	1	5/20/2017 10:45:14 PM

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Batch ID: 17093 Analyst: BT

Naphthalene	ND	48.8		µg/Kg-dry	1	5/18/2017 6:30:39 PM
2-Methylnaphthalene	ND	48.8		µg/Kg-dry	1	5/18/2017 6:30:39 PM
1-Methylnaphthalene	ND	48.8		µg/Kg-dry	1	5/18/2017 6:30:39 PM
Acenaphthylene	ND	48.8		µg/Kg-dry	1	5/18/2017 6:30:39 PM
Acenaphthene	ND	48.8		µg/Kg-dry	1	5/18/2017 6:30:39 PM
Fluorene	ND	48.8		µg/Kg-dry	1	5/18/2017 6:30:39 PM
Phenanthrene	ND	48.8		µg/Kg-dry	1	5/18/2017 6:30:39 PM
Anthracene	ND	48.8		µg/Kg-dry	1	5/18/2017 6:30:39 PM
Fluoranthene	ND	48.8		µg/Kg-dry	1	5/18/2017 6:30:39 PM
Pyrene	ND	48.8		µg/Kg-dry	1	5/18/2017 6:30:39 PM
Benz(a)anthracene	ND	48.8		µg/Kg-dry	1	5/18/2017 6:30:39 PM
Chrysene	ND	48.8		µg/Kg-dry	1	5/18/2017 6:30:39 PM
Benzo(b)fluoranthene	ND	48.8		µg/Kg-dry	1	5/18/2017 6:30:39 PM
Benzo(k)fluoranthene	ND	48.8		µg/Kg-dry	1	5/18/2017 6:30:39 PM
Benzo(a)pyrene	ND	48.8		µg/Kg-dry	1	5/18/2017 6:30:39 PM
Indeno(1,2,3-cd)pyrene	ND	48.8		µg/Kg-dry	1	5/18/2017 6:30:39 PM
Dibenz(a,h)anthracene	ND	48.8		µg/Kg-dry	1	5/18/2017 6:30:39 PM
Benzo(g,h,i)perylene	ND	48.8		µg/Kg-dry	1	5/18/2017 6:30:39 PM
Surr: 2-Fluorobiphenyl	58.6	24.5-139		%Rec	1	5/18/2017 6:30:39 PM
Surr: Terphenyl-d14 (surr)	59.5	44.3-176		%Rec	1	5/18/2017 6:30:39 PM

Gasoline by NWTPH-Gx

Batch ID: 17149 Analyst: NG

Gasoline	ND	5.43		mg/Kg-dry	1	5/24/2017 6:34:32 AM
Surr: Toluene-d8	98.0	65-135		%Rec	1	5/24/2017 6:34:32 AM
Surr: 4-Bromofluorobenzene	93.6	65-135		%Rec	1	5/24/2017 6:34:32 AM

Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17149 Analyst: NG

Dichlorodifluoromethane (CFC-12)	ND	0.0652	Q	mg/Kg-dry	1	5/24/2017 6:34:32 AM
Chloromethane	ND	0.0652		mg/Kg-dry	1	5/24/2017 6:34:32 AM
Vinyl chloride	ND	0.00217		mg/Kg-dry	1	5/24/2017 6:34:32 AM



Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 9:45:00 AM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-009

Matrix: Soil

Client Sample ID: B18-9-10.0

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17149

Analyst: NG

Bromomethane	ND	0.0978		mg/Kg-dry	1	5/24/2017 6:34:32 AM
Trichlorofluoromethane (CFC-11)	ND	0.0543		mg/Kg-dry	1	5/24/2017 6:34:32 AM
Chloroethane	ND	0.0652		mg/Kg-dry	1	5/24/2017 6:34:32 AM
1,1-Dichloroethene	ND	0.0543		mg/Kg-dry	1	5/24/2017 6:34:32 AM
Methylene chloride	ND	0.0217		mg/Kg-dry	1	5/24/2017 6:34:32 AM
trans-1,2-Dichloroethene	ND	0.0217		mg/Kg-dry	1	5/24/2017 6:34:32 AM
Methyl tert-butyl ether (MTBE)	ND	0.0543	Q	mg/Kg-dry	1	5/24/2017 6:34:32 AM
1,1-Dichloroethane	ND	0.0217		mg/Kg-dry	1	5/24/2017 6:34:32 AM
2,2-Dichloropropane	ND	0.0543	Q	mg/Kg-dry	1	5/24/2017 6:34:32 AM
cis-1,2-Dichloroethene	ND	0.0217		mg/Kg-dry	1	5/24/2017 6:34:32 AM
Chloroform	ND	0.0217		mg/Kg-dry	1	5/24/2017 6:34:32 AM
1,1,1-Trichloroethane (TCA)	ND	0.0217		mg/Kg-dry	1	5/24/2017 6:34:32 AM
1,1-Dichloropropene	ND	0.0217		mg/Kg-dry	1	5/24/2017 6:34:32 AM
Carbon tetrachloride	ND	0.0217		mg/Kg-dry	1	5/24/2017 6:34:32 AM
1,2-Dichloroethane (EDC)	ND	0.0326		mg/Kg-dry	1	5/24/2017 6:34:32 AM
Benzene	ND	0.0217		mg/Kg-dry	1	5/24/2017 6:34:32 AM
Trichloroethene (TCE)	ND	0.0217		mg/Kg-dry	1	5/24/2017 6:34:32 AM
1,2-Dichloropropane	ND	0.0217		mg/Kg-dry	1	5/24/2017 6:34:32 AM
Bromodichloromethane	ND	0.0217		mg/Kg-dry	1	5/24/2017 6:34:32 AM
Dibromomethane	ND	0.0434		mg/Kg-dry	1	5/24/2017 6:34:32 AM
cis-1,3-Dichloropropene	ND	0.0217		mg/Kg-dry	1	5/24/2017 6:34:32 AM
Toluene	ND	0.0217		mg/Kg-dry	1	5/24/2017 6:34:32 AM
trans-1,3-Dichloropropylene	ND	0.0326	Q	mg/Kg-dry	1	5/24/2017 6:34:32 AM
1,1,2-Trichloroethane	ND	0.0326		mg/Kg-dry	1	5/24/2017 6:34:32 AM
1,3-Dichloropropane	ND	0.0543		mg/Kg-dry	1	5/24/2017 6:34:32 AM
Tetrachloroethene (PCE)	ND	0.0217		mg/Kg-dry	1	5/24/2017 6:34:32 AM
Dibromochloromethane	ND	0.0326		mg/Kg-dry	1	5/24/2017 6:34:32 AM
1,2-Dibromoethane (EDB)	ND	0.00543		mg/Kg-dry	1	5/24/2017 6:34:32 AM
Chlorobenzene	ND	0.0217		mg/Kg-dry	1	5/24/2017 6:34:32 AM
1,1,1,2-Tetrachloroethane	ND	0.0326		mg/Kg-dry	1	5/24/2017 6:34:32 AM
Ethylbenzene	ND	0.0326		mg/Kg-dry	1	5/24/2017 6:34:32 AM
m,p-Xylene	ND	0.0217		mg/Kg-dry	1	5/24/2017 6:34:32 AM
o-Xylene	ND	0.0217		mg/Kg-dry	1	5/24/2017 6:34:32 AM
Styrene	ND	0.0217		mg/Kg-dry	1	5/24/2017 6:34:32 AM
Isopropylbenzene	ND	0.0869		mg/Kg-dry	1	5/24/2017 6:34:32 AM
Bromoform	ND	0.0217		mg/Kg-dry	1	5/24/2017 6:34:32 AM
1,1,2,2-Tetrachloroethane	ND	0.0217	Q	mg/Kg-dry	1	5/24/2017 6:34:32 AM
n-Propylbenzene	ND	0.0217		mg/Kg-dry	1	5/24/2017 6:34:32 AM
Bromobenzene	ND	0.0326		mg/Kg-dry	1	5/24/2017 6:34:32 AM



Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 9:45:00 AM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-009

Matrix: Soil

Client Sample ID: B18-9-10.0

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17149

Analyst: NG

1,3,5-Trimethylbenzene	ND	0.0217		mg/Kg-dry	1	5/24/2017 6:34:32 AM
2-Chlorotoluene	ND	0.0217		mg/Kg-dry	1	5/24/2017 6:34:32 AM
4-Chlorotoluene	ND	0.0217		mg/Kg-dry	1	5/24/2017 6:34:32 AM
tert-Butylbenzene	ND	0.0217		mg/Kg-dry	1	5/24/2017 6:34:32 AM
1,2,3-Trichloropropane	ND	0.0217	Q	mg/Kg-dry	1	5/24/2017 6:34:32 AM
1,2,4-Trichlorobenzene	ND	0.0543		mg/Kg-dry	1	5/24/2017 6:34:32 AM
sec-Butylbenzene	ND	0.0217		mg/Kg-dry	1	5/24/2017 6:34:32 AM
4-Isopropyltoluene	ND	0.0217		mg/Kg-dry	1	5/24/2017 6:34:32 AM
1,3-Dichlorobenzene	ND	0.0217		mg/Kg-dry	1	5/24/2017 6:34:32 AM
1,4-Dichlorobenzene	ND	0.0217		mg/Kg-dry	1	5/24/2017 6:34:32 AM
n-Butylbenzene	ND	0.0217		mg/Kg-dry	1	5/24/2017 6:34:32 AM
1,2-Dichlorobenzene	ND	0.0217		mg/Kg-dry	1	5/24/2017 6:34:32 AM
1,2-Dibromo-3-chloropropane	ND	0.543	Q	mg/Kg-dry	1	5/24/2017 6:34:32 AM
1,2,4-Trimethylbenzene	ND	0.0217		mg/Kg-dry	1	5/24/2017 6:34:32 AM
Hexachlorobutadiene	ND	0.109		mg/Kg-dry	1	5/24/2017 6:34:32 AM
Naphthalene	ND	0.0326	Q	mg/Kg-dry	1	5/24/2017 6:34:32 AM
1,2,3-Trichlorobenzene	ND	0.0217		mg/Kg-dry	1	5/24/2017 6:34:32 AM
Surr: Dibromofluoromethane	97.8	56.5-129		%Rec	1	5/24/2017 6:34:32 AM
Surr: Toluene-d8	101	64.5-151		%Rec	1	5/24/2017 6:34:32 AM
Surr: 1-Bromo-4-fluorobenzene	87.7	63.1-141		%Rec	1	5/24/2017 6:34:32 AM

NOTES:

Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Mercury by EPA Method 7471

Batch ID: 17157

Analyst: WF

Mercury	ND	0.315		mg/Kg-dry	1	5/24/2017 4:55:41 PM
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Total Metals by EPA Method 6020

Batch ID: 17124

Analyst: TN

Arsenic	5.02	0.0943		mg/Kg-dry	1	5/24/2017 12:42:38 PM
Barium	121	0.472		mg/Kg-dry	1	5/22/2017 5:23:27 PM
Cadmium	ND	0.189		mg/Kg-dry	1	5/22/2017 5:23:27 PM
Chromium	85.6	0.0943		mg/Kg-dry	1	5/24/2017 12:42:38 PM
Lead	5.60	0.189		mg/Kg-dry	1	5/22/2017 5:23:27 PM
Selenium	2.11	0.472		mg/Kg-dry	1	5/22/2017 5:23:27 PM
Silver	ND	0.0943		mg/Kg-dry	1	5/24/2017 12:42:38 PM



Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 9:45:00 AM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-009

Matrix: Soil

Client Sample ID: B18-9-10.0

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Sample Moisture (Percent Moisture)

Batch ID: R36200 Analyst: CG

Percent Moisture	23.7			wt%	1	5/17/2017 2:01:24 PM
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Hexavalent Chromium by EPA Method 7196

Batch ID: 17266 Analyst: KT

Chromium, Hexavalent	ND	0.614		mg/Kg-dry	1	6/6/2017 10:29:00 AM
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Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 11:00:00 AM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-010

Matrix: Soil

Client Sample ID: B18-7-2.5

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

Batch ID: 17078

Analyst: SB

Diesel (Fuel Oil)	ND	19.5		mg/Kg-dry	1	5/20/2017 11:17:18 PM
Heavy Oil	ND	48.8		mg/Kg-dry	1	5/20/2017 11:17:18 PM
Surr: 2-Fluorobiphenyl	85.2	50-150		%Rec	1	5/20/2017 11:17:18 PM
Surr: o-Terphenyl	89.0	50-150		%Rec	1	5/20/2017 11:17:18 PM

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Batch ID: 17093

Analyst: BT

Naphthalene	ND	35.0		µg/Kg-dry	1	5/19/2017 3:03:37 AM
2-Methylnaphthalene	ND	35.0		µg/Kg-dry	1	5/19/2017 3:03:37 AM
1-Methylnaphthalene	ND	35.0		µg/Kg-dry	1	5/19/2017 3:03:37 AM
Acenaphthylene	ND	35.0		µg/Kg-dry	1	5/19/2017 3:03:37 AM
Acenaphthene	ND	35.0		µg/Kg-dry	1	5/19/2017 3:03:37 AM
Fluorene	ND	35.0		µg/Kg-dry	1	5/19/2017 3:03:37 AM
Phenanthrene	ND	35.0		µg/Kg-dry	1	5/19/2017 3:03:37 AM
Anthracene	ND	35.0		µg/Kg-dry	1	5/19/2017 3:03:37 AM
Fluoranthene	ND	35.0		µg/Kg-dry	1	5/19/2017 3:03:37 AM
Pyrene	ND	35.0		µg/Kg-dry	1	5/19/2017 3:03:37 AM
Benz(a)anthracene	ND	35.0		µg/Kg-dry	1	5/19/2017 3:03:37 AM
Chrysene	ND	35.0		µg/Kg-dry	1	5/19/2017 3:03:37 AM
Benzo(b)fluoranthene	ND	35.0		µg/Kg-dry	1	5/19/2017 3:03:37 AM
Benzo(k)fluoranthene	ND	35.0		µg/Kg-dry	1	5/19/2017 3:03:37 AM
Benzo(a)pyrene	ND	35.0		µg/Kg-dry	1	5/19/2017 3:03:37 AM
Indeno(1,2,3-cd)pyrene	ND	35.0		µg/Kg-dry	1	5/19/2017 3:03:37 AM
Dibenz(a,h)anthracene	ND	35.0		µg/Kg-dry	1	5/19/2017 3:03:37 AM
Benzo(g,h,i)perylene	ND	35.0		µg/Kg-dry	1	5/19/2017 3:03:37 AM
Surr: 2-Fluorobiphenyl	78.8	24.5-139		%Rec	1	5/19/2017 3:03:37 AM
Surr: Terphenyl-d14 (surr)	66.5	44.3-176		%Rec	1	5/19/2017 3:03:37 AM

Gasoline by NWTPH-Gx

Batch ID: 17149

Analyst: NG

Gasoline	ND	4.65		mg/Kg-dry	1	5/24/2017 7:04:13 AM
Surr: Toluene-d8	97.6	65-135		%Rec	1	5/24/2017 7:04:13 AM
Surr: 4-Bromofluorobenzene	90.7	65-135		%Rec	1	5/24/2017 7:04:13 AM

Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17149

Analyst: NG

Dichlorodifluoromethane (CFC-12)	ND	0.0558	Q	mg/Kg-dry	1	5/24/2017 7:04:13 AM
Chloromethane	ND	0.0558		mg/Kg-dry	1	5/24/2017 7:04:13 AM
Vinyl chloride	ND	0.00186		mg/Kg-dry	1	5/24/2017 7:04:13 AM



Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 11:00:00 AM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-010

Matrix: Soil

Client Sample ID: B18-7-2.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17149

Analyst: NG

Bromomethane	ND	0.0836		mg/Kg-dry	1	5/24/2017 7:04:13 AM
Trichlorofluoromethane (CFC-11)	ND	0.0465		mg/Kg-dry	1	5/24/2017 7:04:13 AM
Chloroethane	ND	0.0558		mg/Kg-dry	1	5/24/2017 7:04:13 AM
1,1-Dichloroethene	ND	0.0465		mg/Kg-dry	1	5/24/2017 7:04:13 AM
Methylene chloride	ND	0.0186		mg/Kg-dry	1	5/24/2017 7:04:13 AM
trans-1,2-Dichloroethene	ND	0.0186		mg/Kg-dry	1	5/24/2017 7:04:13 AM
Methyl tert-butyl ether (MTBE)	ND	0.0465	Q	mg/Kg-dry	1	5/24/2017 7:04:13 AM
1,1-Dichloroethane	ND	0.0186		mg/Kg-dry	1	5/24/2017 7:04:13 AM
2,2-Dichloropropane	ND	0.0465	Q	mg/Kg-dry	1	5/24/2017 7:04:13 AM
cis-1,2-Dichloroethene	ND	0.0186		mg/Kg-dry	1	5/24/2017 7:04:13 AM
Chloroform	ND	0.0186		mg/Kg-dry	1	5/24/2017 7:04:13 AM
1,1,1-Trichloroethane (TCA)	ND	0.0186		mg/Kg-dry	1	5/24/2017 7:04:13 AM
1,1-Dichloropropene	ND	0.0186		mg/Kg-dry	1	5/24/2017 7:04:13 AM
Carbon tetrachloride	ND	0.0186		mg/Kg-dry	1	5/24/2017 7:04:13 AM
1,2-Dichloroethane (EDC)	ND	0.0279		mg/Kg-dry	1	5/24/2017 7:04:13 AM
Benzene	ND	0.0186		mg/Kg-dry	1	5/24/2017 7:04:13 AM
Trichloroethene (TCE)	ND	0.0186		mg/Kg-dry	1	5/24/2017 7:04:13 AM
1,2-Dichloropropane	ND	0.0186		mg/Kg-dry	1	5/24/2017 7:04:13 AM
Bromodichloromethane	ND	0.0186		mg/Kg-dry	1	5/24/2017 7:04:13 AM
Dibromomethane	ND	0.0372		mg/Kg-dry	1	5/24/2017 7:04:13 AM
cis-1,3-Dichloropropene	ND	0.0186		mg/Kg-dry	1	5/24/2017 7:04:13 AM
Toluene	ND	0.0186		mg/Kg-dry	1	5/24/2017 7:04:13 AM
trans-1,3-Dichloropropylene	ND	0.0279	Q	mg/Kg-dry	1	5/24/2017 7:04:13 AM
1,1,2-Trichloroethane	ND	0.0279		mg/Kg-dry	1	5/24/2017 7:04:13 AM
1,3-Dichloropropane	ND	0.0465		mg/Kg-dry	1	5/24/2017 7:04:13 AM
Tetrachloroethene (PCE)	ND	0.0186		mg/Kg-dry	1	5/24/2017 7:04:13 AM
Dibromochloromethane	ND	0.0279		mg/Kg-dry	1	5/24/2017 7:04:13 AM
1,2-Dibromoethane (EDB)	ND	0.00465		mg/Kg-dry	1	5/24/2017 7:04:13 AM
Chlorobenzene	ND	0.0186		mg/Kg-dry	1	5/24/2017 7:04:13 AM
1,1,1,2-Tetrachloroethane	ND	0.0279		mg/Kg-dry	1	5/24/2017 7:04:13 AM
Ethylbenzene	ND	0.0279		mg/Kg-dry	1	5/24/2017 7:04:13 AM
m,p-Xylene	ND	0.0186		mg/Kg-dry	1	5/24/2017 7:04:13 AM
o-Xylene	ND	0.0186		mg/Kg-dry	1	5/24/2017 7:04:13 AM
Styrene	ND	0.0186		mg/Kg-dry	1	5/24/2017 7:04:13 AM
Isopropylbenzene	ND	0.0743		mg/Kg-dry	1	5/24/2017 7:04:13 AM
Bromoform	ND	0.0186		mg/Kg-dry	1	5/24/2017 7:04:13 AM
1,1,2,2-Tetrachloroethane	ND	0.0186	Q	mg/Kg-dry	1	5/24/2017 7:04:13 AM
n-Propylbenzene	ND	0.0186		mg/Kg-dry	1	5/24/2017 7:04:13 AM
Bromobenzene	ND	0.0279		mg/Kg-dry	1	5/24/2017 7:04:13 AM



Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 11:00:00 AM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-010

Matrix: Soil

Client Sample ID: B18-7-2.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17149

Analyst: NG

1,3,5-Trimethylbenzene	ND	0.0186		mg/Kg-dry	1	5/24/2017 7:04:13 AM
2-Chlorotoluene	ND	0.0186		mg/Kg-dry	1	5/24/2017 7:04:13 AM
4-Chlorotoluene	ND	0.0186		mg/Kg-dry	1	5/24/2017 7:04:13 AM
tert-Butylbenzene	ND	0.0186		mg/Kg-dry	1	5/24/2017 7:04:13 AM
1,2,3-Trichloropropane	ND	0.0186	Q	mg/Kg-dry	1	5/24/2017 7:04:13 AM
1,2,4-Trichlorobenzene	ND	0.0465		mg/Kg-dry	1	5/24/2017 7:04:13 AM
sec-Butylbenzene	ND	0.0186		mg/Kg-dry	1	5/24/2017 7:04:13 AM
4-Isopropyltoluene	ND	0.0186		mg/Kg-dry	1	5/24/2017 7:04:13 AM
1,3-Dichlorobenzene	ND	0.0186		mg/Kg-dry	1	5/24/2017 7:04:13 AM
1,4-Dichlorobenzene	ND	0.0186		mg/Kg-dry	1	5/24/2017 7:04:13 AM
n-Butylbenzene	ND	0.0186		mg/Kg-dry	1	5/24/2017 7:04:13 AM
1,2-Dichlorobenzene	ND	0.0186		mg/Kg-dry	1	5/24/2017 7:04:13 AM
1,2-Dibromo-3-chloropropane	ND	0.465	Q	mg/Kg-dry	1	5/24/2017 7:04:13 AM
1,2,4-Trimethylbenzene	ND	0.0186		mg/Kg-dry	1	5/24/2017 7:04:13 AM
Hexachlorobutadiene	ND	0.0929		mg/Kg-dry	1	5/24/2017 7:04:13 AM
Naphthalene	ND	0.0279	Q	mg/Kg-dry	1	5/24/2017 7:04:13 AM
1,2,3-Trichlorobenzene	ND	0.0186		mg/Kg-dry	1	5/24/2017 7:04:13 AM
Surr: Dibromofluoromethane	98.6	56.5-129		%Rec	1	5/24/2017 7:04:13 AM
Surr: Toluene-d8	101	64.5-151		%Rec	1	5/24/2017 7:04:13 AM
Surr: 1-Bromo-4-fluorobenzene	85.2	63.1-141		%Rec	1	5/24/2017 7:04:13 AM

NOTES:

Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Mercury by EPA Method 7471

Batch ID: 17157

Analyst: WF

Mercury	ND	0.256		mg/Kg-dry	1	5/24/2017 5:01:07 PM
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Total Metals by EPA Method 6020

Batch ID: 17124

Analyst: TN

Arsenic	1.75	0.0775		mg/Kg-dry	1	5/22/2017 5:27:28 PM
Barium	26.4	0.387		mg/Kg-dry	1	5/22/2017 5:27:28 PM
Cadmium	ND	0.155		mg/Kg-dry	1	5/22/2017 5:27:28 PM
Chromium	26.9	0.0775		mg/Kg-dry	1	5/22/2017 5:27:28 PM
Lead	1.49	0.155		mg/Kg-dry	1	5/22/2017 5:27:28 PM
Selenium	0.827	0.387		mg/Kg-dry	1	5/22/2017 5:27:28 PM
Silver	ND	0.0775		mg/Kg-dry	1	5/24/2017 12:46:39 PM



Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 11:00:00 AM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-010

Matrix: Soil

Client Sample ID: B18-7-2.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Sample Moisture (Percent Moisture)

Batch ID: R36200 Analyst: CG

Percent Moisture	4.36			wt%	1	5/17/2017 2:01:24 PM
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Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 12:05:00 PM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-016

Matrix: Soil

Client Sample ID: B18-6-5.0

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

Batch ID: 17072

Analyst: SB

Diesel (Fuel Oil)	ND	19.5		mg/Kg-dry	1	5/18/2017 5:59:59 PM
Heavy Oil	ND	48.8		mg/Kg-dry	1	5/18/2017 5:59:59 PM
Surr: 2-Fluorobiphenyl	88.5	50-150		%Rec	1	5/18/2017 5:59:59 PM
Surr: o-Terphenyl	89.0	50-150		%Rec	1	5/18/2017 5:59:59 PM

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Batch ID: 17093

Analyst: BT

Naphthalene	ND	38.9		µg/Kg-dry	1	5/19/2017 3:25:39 AM
2-Methylnaphthalene	ND	38.9		µg/Kg-dry	1	5/19/2017 3:25:39 AM
1-Methylnaphthalene	ND	38.9		µg/Kg-dry	1	5/19/2017 3:25:39 AM
Acenaphthylene	ND	38.9		µg/Kg-dry	1	5/19/2017 3:25:39 AM
Acenaphthene	ND	38.9		µg/Kg-dry	1	5/19/2017 3:25:39 AM
Fluorene	ND	38.9		µg/Kg-dry	1	5/19/2017 3:25:39 AM
Phenanthrene	ND	38.9		µg/Kg-dry	1	5/19/2017 3:25:39 AM
Anthracene	ND	38.9		µg/Kg-dry	1	5/19/2017 3:25:39 AM
Fluoranthene	ND	38.9		µg/Kg-dry	1	5/19/2017 3:25:39 AM
Pyrene	ND	38.9		µg/Kg-dry	1	5/19/2017 3:25:39 AM
Benz(a)anthracene	ND	38.9		µg/Kg-dry	1	5/19/2017 3:25:39 AM
Chrysene	ND	38.9		µg/Kg-dry	1	5/19/2017 3:25:39 AM
Benzo(b)fluoranthene	ND	38.9		µg/Kg-dry	1	5/19/2017 3:25:39 AM
Benzo(k)fluoranthene	ND	38.9		µg/Kg-dry	1	5/19/2017 3:25:39 AM
Benzo(a)pyrene	ND	38.9		µg/Kg-dry	1	5/19/2017 3:25:39 AM
Indeno(1,2,3-cd)pyrene	ND	38.9		µg/Kg-dry	1	5/19/2017 3:25:39 AM
Dibenz(a,h)anthracene	ND	38.9		µg/Kg-dry	1	5/19/2017 3:25:39 AM
Benzo(g,h,i)perylene	ND	38.9		µg/Kg-dry	1	5/19/2017 3:25:39 AM
Surr: 2-Fluorobiphenyl	71.9	24.5-139		%Rec	1	5/19/2017 3:25:39 AM
Surr: Terphenyl-d14 (surr)	59.5	44.3-176		%Rec	1	5/19/2017 3:25:39 AM

Gasoline by NWTPH-Gx

Batch ID: 17149

Analyst: NG

Gasoline	ND	4.23		mg/Kg-dry	1	5/24/2017 7:33:54 AM
Surr: Toluene-d8	96.0	65-135		%Rec	1	5/24/2017 7:33:54 AM
Surr: 4-Bromofluorobenzene	90.5	65-135		%Rec	1	5/24/2017 7:33:54 AM

Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17149

Analyst: NG

Dichlorodifluoromethane (CFC-12)	ND	0.0507	Q	mg/Kg-dry	1	5/24/2017 7:33:54 AM
Chloromethane	ND	0.0507		mg/Kg-dry	1	5/24/2017 7:33:54 AM
Vinyl chloride	ND	0.00169		mg/Kg-dry	1	5/24/2017 7:33:54 AM



Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 12:05:00 PM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-016

Matrix: Soil

Client Sample ID: B18-6-5.0

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17149

Analyst: NG

Bromomethane	ND	0.0761		mg/Kg-dry	1	5/24/2017 7:33:54 AM
Trichlorofluoromethane (CFC-11)	ND	0.0423		mg/Kg-dry	1	5/24/2017 7:33:54 AM
Chloroethane	ND	0.0507		mg/Kg-dry	1	5/24/2017 7:33:54 AM
1,1-Dichloroethene	ND	0.0423		mg/Kg-dry	1	5/24/2017 7:33:54 AM
Methylene chloride	ND	0.0169		mg/Kg-dry	1	5/24/2017 7:33:54 AM
trans-1,2-Dichloroethene	ND	0.0169		mg/Kg-dry	1	5/24/2017 7:33:54 AM
Methyl tert-butyl ether (MTBE)	ND	0.0423	Q	mg/Kg-dry	1	5/24/2017 7:33:54 AM
1,1-Dichloroethane	ND	0.0169		mg/Kg-dry	1	5/24/2017 7:33:54 AM
2,2-Dichloropropane	ND	0.0423	Q	mg/Kg-dry	1	5/24/2017 7:33:54 AM
cis-1,2-Dichloroethene	ND	0.0169		mg/Kg-dry	1	5/24/2017 7:33:54 AM
Chloroform	ND	0.0169		mg/Kg-dry	1	5/24/2017 7:33:54 AM
1,1,1-Trichloroethane (TCA)	ND	0.0169		mg/Kg-dry	1	5/24/2017 7:33:54 AM
1,1-Dichloropropene	ND	0.0169		mg/Kg-dry	1	5/24/2017 7:33:54 AM
Carbon tetrachloride	ND	0.0169		mg/Kg-dry	1	5/24/2017 7:33:54 AM
1,2-Dichloroethane (EDC)	ND	0.0254		mg/Kg-dry	1	5/24/2017 7:33:54 AM
Benzene	ND	0.0169		mg/Kg-dry	1	5/24/2017 7:33:54 AM
Trichloroethene (TCE)	ND	0.0169		mg/Kg-dry	1	5/24/2017 7:33:54 AM
1,2-Dichloropropane	ND	0.0169		mg/Kg-dry	1	5/24/2017 7:33:54 AM
Bromodichloromethane	ND	0.0169		mg/Kg-dry	1	5/24/2017 7:33:54 AM
Dibromomethane	ND	0.0338		mg/Kg-dry	1	5/24/2017 7:33:54 AM
cis-1,3-Dichloropropene	ND	0.0169		mg/Kg-dry	1	5/24/2017 7:33:54 AM
Toluene	ND	0.0169		mg/Kg-dry	1	5/24/2017 7:33:54 AM
trans-1,3-Dichloropropylene	ND	0.0254	Q	mg/Kg-dry	1	5/24/2017 7:33:54 AM
1,1,2-Trichloroethane	ND	0.0254		mg/Kg-dry	1	5/24/2017 7:33:54 AM
1,3-Dichloropropane	ND	0.0423		mg/Kg-dry	1	5/24/2017 7:33:54 AM
Tetrachloroethene (PCE)	ND	0.0169		mg/Kg-dry	1	5/24/2017 7:33:54 AM
Dibromochloromethane	ND	0.0254		mg/Kg-dry	1	5/24/2017 7:33:54 AM
1,2-Dibromoethane (EDB)	ND	0.00423		mg/Kg-dry	1	5/24/2017 7:33:54 AM
Chlorobenzene	ND	0.0169		mg/Kg-dry	1	5/24/2017 7:33:54 AM
1,1,1,2-Tetrachloroethane	ND	0.0254		mg/Kg-dry	1	5/24/2017 7:33:54 AM
Ethylbenzene	ND	0.0254		mg/Kg-dry	1	5/24/2017 7:33:54 AM
m,p-Xylene	ND	0.0169		mg/Kg-dry	1	5/24/2017 7:33:54 AM
o-Xylene	ND	0.0169		mg/Kg-dry	1	5/24/2017 7:33:54 AM
Styrene	ND	0.0169		mg/Kg-dry	1	5/24/2017 7:33:54 AM
Isopropylbenzene	ND	0.0676		mg/Kg-dry	1	5/24/2017 7:33:54 AM
Bromoform	ND	0.0169		mg/Kg-dry	1	5/24/2017 7:33:54 AM
1,1,2,2-Tetrachloroethane	ND	0.0169	Q	mg/Kg-dry	1	5/24/2017 7:33:54 AM
n-Propylbenzene	ND	0.0169		mg/Kg-dry	1	5/24/2017 7:33:54 AM
Bromobenzene	ND	0.0254		mg/Kg-dry	1	5/24/2017 7:33:54 AM



Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 12:05:00 PM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-016

Matrix: Soil

Client Sample ID: B18-6-5.0

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17149

Analyst: NG

1,3,5-Trimethylbenzene	ND	0.0169		mg/Kg-dry	1	5/24/2017 7:33:54 AM
2-Chlorotoluene	ND	0.0169		mg/Kg-dry	1	5/24/2017 7:33:54 AM
4-Chlorotoluene	ND	0.0169		mg/Kg-dry	1	5/24/2017 7:33:54 AM
tert-Butylbenzene	ND	0.0169		mg/Kg-dry	1	5/24/2017 7:33:54 AM
1,2,3-Trichloropropane	ND	0.0169	Q	mg/Kg-dry	1	5/24/2017 7:33:54 AM
1,2,4-Trichlorobenzene	ND	0.0423		mg/Kg-dry	1	5/24/2017 7:33:54 AM
sec-Butylbenzene	ND	0.0169		mg/Kg-dry	1	5/24/2017 7:33:54 AM
4-Isopropyltoluene	ND	0.0169		mg/Kg-dry	1	5/24/2017 7:33:54 AM
1,3-Dichlorobenzene	ND	0.0169		mg/Kg-dry	1	5/24/2017 7:33:54 AM
1,4-Dichlorobenzene	ND	0.0169		mg/Kg-dry	1	5/24/2017 7:33:54 AM
n-Butylbenzene	ND	0.0169		mg/Kg-dry	1	5/24/2017 7:33:54 AM
1,2-Dichlorobenzene	ND	0.0169		mg/Kg-dry	1	5/24/2017 7:33:54 AM
1,2-Dibromo-3-chloropropane	ND	0.423	Q	mg/Kg-dry	1	5/24/2017 7:33:54 AM
1,2,4-Trimethylbenzene	ND	0.0169		mg/Kg-dry	1	5/24/2017 7:33:54 AM
Hexachlorobutadiene	ND	0.0845		mg/Kg-dry	1	5/24/2017 7:33:54 AM
Naphthalene	ND	0.0254	Q	mg/Kg-dry	1	5/24/2017 7:33:54 AM
1,2,3-Trichlorobenzene	ND	0.0169		mg/Kg-dry	1	5/24/2017 7:33:54 AM
Surr: Dibromofluoromethane	96.2	56.5-129		%Rec	1	5/24/2017 7:33:54 AM
Surr: Toluene-d8	98.9	64.5-151		%Rec	1	5/24/2017 7:33:54 AM
Surr: 1-Bromo-4-fluorobenzene	84.9	63.1-141		%Rec	1	5/24/2017 7:33:54 AM

NOTES:

Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Mercury by EPA Method 7471

Batch ID: 17157

Analyst: WF

Mercury	ND	0.267		mg/Kg-dry	1	5/24/2017 5:02:44 PM
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Total Metals by EPA Method 6020

Batch ID: 17124

Analyst: TN

Arsenic	2.18	0.0851		mg/Kg-dry	1	5/22/2017 5:31:29 PM
Barium	30.2	0.426		mg/Kg-dry	1	5/22/2017 5:31:29 PM
Cadmium	ND	0.170		mg/Kg-dry	1	5/22/2017 5:31:29 PM
Chromium	28.8	0.0851		mg/Kg-dry	1	5/22/2017 5:31:29 PM
Lead	1.61	0.170		mg/Kg-dry	1	5/22/2017 5:31:29 PM
Selenium	1.06	0.426		mg/Kg-dry	1	5/22/2017 5:31:29 PM
Silver	ND	0.0851		mg/Kg-dry	1	5/24/2017 12:50:40 PM



Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 12:05:00 PM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-016

Matrix: Soil

Client Sample ID: B18-6-5.0

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Sample Moisture (Percent Moisture)

Batch ID: R36211 Analyst: CG

Percent Moisture	8.20			wt%	1	5/18/2017 8:29:46 AM
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Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 12:15:00 PM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-018

Matrix: Soil

Client Sample ID: B18-6-10.0

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

Batch ID: 17094

Analyst: SB

Diesel (Fuel Oil)	ND	19.5		mg/Kg-dry	1	5/19/2017 12:22:57 AM
Heavy Oil	127	48.7		mg/Kg-dry	1	5/19/2017 12:22:57 AM
Surr: 2-Fluorobiphenyl	86.0	50-150		%Rec	1	5/19/2017 12:22:57 AM
Surr: o-Terphenyl	83.8	50-150		%Rec	1	5/19/2017 12:22:57 AM

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Batch ID: 17093

Analyst: BT

Naphthalene	ND	39.1		µg/Kg-dry	1	5/19/2017 3:47:40 AM
2-Methylnaphthalene	ND	39.1		µg/Kg-dry	1	5/19/2017 3:47:40 AM
1-Methylnaphthalene	ND	39.1		µg/Kg-dry	1	5/19/2017 3:47:40 AM
Acenaphthylene	ND	39.1		µg/Kg-dry	1	5/19/2017 3:47:40 AM
Acenaphthene	ND	39.1		µg/Kg-dry	1	5/19/2017 3:47:40 AM
Fluorene	ND	39.1		µg/Kg-dry	1	5/19/2017 3:47:40 AM
Phenanthrene	ND	39.1		µg/Kg-dry	1	5/19/2017 3:47:40 AM
Anthracene	ND	39.1		µg/Kg-dry	1	5/19/2017 3:47:40 AM
Fluoranthene	ND	39.1		µg/Kg-dry	1	5/19/2017 3:47:40 AM
Pyrene	ND	39.1		µg/Kg-dry	1	5/19/2017 3:47:40 AM
Benz(a)anthracene	ND	39.1		µg/Kg-dry	1	5/19/2017 3:47:40 AM
Chrysene	ND	39.1		µg/Kg-dry	1	5/19/2017 3:47:40 AM
Benzo(b)fluoranthene	ND	39.1		µg/Kg-dry	1	5/19/2017 3:47:40 AM
Benzo(k)fluoranthene	ND	39.1		µg/Kg-dry	1	5/19/2017 3:47:40 AM
Benzo(a)pyrene	ND	39.1		µg/Kg-dry	1	5/19/2017 3:47:40 AM
Indeno(1,2,3-cd)pyrene	ND	39.1		µg/Kg-dry	1	5/19/2017 3:47:40 AM
Dibenz(a,h)anthracene	ND	39.1		µg/Kg-dry	1	5/19/2017 3:47:40 AM
Benzo(g,h,i)perylene	ND	39.1		µg/Kg-dry	1	5/19/2017 3:47:40 AM
Surr: 2-Fluorobiphenyl	75.3	24.5-139		%Rec	1	5/19/2017 3:47:40 AM
Surr: Terphenyl-d14 (surr)	62.3	44.3-176		%Rec	1	5/19/2017 3:47:40 AM

Gasoline by NWTPH-Gx

Batch ID: 17149

Analyst: NG

Gasoline	ND	4.91		mg/Kg-dry	1	5/24/2017 8:03:41 AM
Surr: Toluene-d8	99.1	65-135		%Rec	1	5/24/2017 8:03:41 AM
Surr: 4-Bromofluorobenzene	92.1	65-135		%Rec	1	5/24/2017 8:03:41 AM

Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17149

Analyst: NG

Dichlorodifluoromethane (CFC-12)	ND	0.0589	Q	mg/Kg-dry	1	5/24/2017 8:03:41 AM
Chloromethane	ND	0.0589		mg/Kg-dry	1	5/24/2017 8:03:41 AM
Vinyl chloride	ND	0.00196		mg/Kg-dry	1	5/24/2017 8:03:41 AM



Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 12:15:00 PM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-018

Matrix: Soil

Client Sample ID: B18-6-10.0

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17149

Analyst: NG

Bromomethane	ND	0.0883		mg/Kg-dry	1	5/24/2017 8:03:41 AM
Trichlorofluoromethane (CFC-11)	ND	0.0491		mg/Kg-dry	1	5/24/2017 8:03:41 AM
Chloroethane	ND	0.0589		mg/Kg-dry	1	5/24/2017 8:03:41 AM
1,1-Dichloroethene	ND	0.0491		mg/Kg-dry	1	5/24/2017 8:03:41 AM
Methylene chloride	ND	0.0196		mg/Kg-dry	1	5/24/2017 8:03:41 AM
trans-1,2-Dichloroethene	ND	0.0196		mg/Kg-dry	1	5/24/2017 8:03:41 AM
Methyl tert-butyl ether (MTBE)	ND	0.0491	Q	mg/Kg-dry	1	5/24/2017 8:03:41 AM
1,1-Dichloroethane	ND	0.0196		mg/Kg-dry	1	5/24/2017 8:03:41 AM
2,2-Dichloropropane	ND	0.0491	Q	mg/Kg-dry	1	5/24/2017 8:03:41 AM
cis-1,2-Dichloroethene	ND	0.0196		mg/Kg-dry	1	5/24/2017 8:03:41 AM
Chloroform	ND	0.0196		mg/Kg-dry	1	5/24/2017 8:03:41 AM
1,1,1-Trichloroethane (TCA)	ND	0.0196		mg/Kg-dry	1	5/24/2017 8:03:41 AM
1,1-Dichloropropene	ND	0.0196		mg/Kg-dry	1	5/24/2017 8:03:41 AM
Carbon tetrachloride	ND	0.0196		mg/Kg-dry	1	5/24/2017 8:03:41 AM
1,2-Dichloroethane (EDC)	ND	0.0294		mg/Kg-dry	1	5/24/2017 8:03:41 AM
Benzene	ND	0.0196		mg/Kg-dry	1	5/24/2017 8:03:41 AM
Trichloroethene (TCE)	ND	0.0196		mg/Kg-dry	1	5/24/2017 8:03:41 AM
1,2-Dichloropropane	ND	0.0196		mg/Kg-dry	1	5/24/2017 8:03:41 AM
Bromodichloromethane	ND	0.0196		mg/Kg-dry	1	5/24/2017 8:03:41 AM
Dibromomethane	ND	0.0393		mg/Kg-dry	1	5/24/2017 8:03:41 AM
cis-1,3-Dichloropropene	ND	0.0196		mg/Kg-dry	1	5/24/2017 8:03:41 AM
Toluene	ND	0.0196		mg/Kg-dry	1	5/24/2017 8:03:41 AM
trans-1,3-Dichloropropylene	ND	0.0294	Q	mg/Kg-dry	1	5/24/2017 8:03:41 AM
1,1,2-Trichloroethane	ND	0.0294		mg/Kg-dry	1	5/24/2017 8:03:41 AM
1,3-Dichloropropane	ND	0.0491		mg/Kg-dry	1	5/24/2017 8:03:41 AM
Tetrachloroethene (PCE)	ND	0.0196		mg/Kg-dry	1	5/24/2017 8:03:41 AM
Dibromochloromethane	ND	0.0294		mg/Kg-dry	1	5/24/2017 8:03:41 AM
1,2-Dibromoethane (EDB)	ND	0.00491		mg/Kg-dry	1	5/24/2017 8:03:41 AM
Chlorobenzene	ND	0.0196		mg/Kg-dry	1	5/24/2017 8:03:41 AM
1,1,1,2-Tetrachloroethane	ND	0.0294		mg/Kg-dry	1	5/24/2017 8:03:41 AM
Ethylbenzene	ND	0.0294		mg/Kg-dry	1	5/24/2017 8:03:41 AM
m,p-Xylene	ND	0.0196		mg/Kg-dry	1	5/24/2017 8:03:41 AM
o-Xylene	ND	0.0196		mg/Kg-dry	1	5/24/2017 8:03:41 AM
Styrene	ND	0.0196		mg/Kg-dry	1	5/24/2017 8:03:41 AM
Isopropylbenzene	ND	0.0785		mg/Kg-dry	1	5/24/2017 8:03:41 AM
Bromoform	ND	0.0196		mg/Kg-dry	1	5/24/2017 8:03:41 AM
1,1,2,2-Tetrachloroethane	ND	0.0196	Q	mg/Kg-dry	1	5/24/2017 8:03:41 AM
n-Propylbenzene	ND	0.0196		mg/Kg-dry	1	5/24/2017 8:03:41 AM
Bromobenzene	ND	0.0294		mg/Kg-dry	1	5/24/2017 8:03:41 AM



Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 12:15:00 PM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-018

Matrix: Soil

Client Sample ID: B18-6-10.0

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17149

Analyst: NG

1,3,5-Trimethylbenzene	ND	0.0196		mg/Kg-dry	1	5/24/2017 8:03:41 AM
2-Chlorotoluene	ND	0.0196		mg/Kg-dry	1	5/24/2017 8:03:41 AM
4-Chlorotoluene	ND	0.0196		mg/Kg-dry	1	5/24/2017 8:03:41 AM
tert-Butylbenzene	ND	0.0196		mg/Kg-dry	1	5/24/2017 8:03:41 AM
1,2,3-Trichloropropane	ND	0.0196	Q	mg/Kg-dry	1	5/24/2017 8:03:41 AM
1,2,4-Trichlorobenzene	ND	0.0491		mg/Kg-dry	1	5/24/2017 8:03:41 AM
sec-Butylbenzene	ND	0.0196		mg/Kg-dry	1	5/24/2017 8:03:41 AM
4-Isopropyltoluene	ND	0.0196		mg/Kg-dry	1	5/24/2017 8:03:41 AM
1,3-Dichlorobenzene	ND	0.0196		mg/Kg-dry	1	5/24/2017 8:03:41 AM
1,4-Dichlorobenzene	ND	0.0196		mg/Kg-dry	1	5/24/2017 8:03:41 AM
n-Butylbenzene	ND	0.0196		mg/Kg-dry	1	5/24/2017 8:03:41 AM
1,2-Dichlorobenzene	ND	0.0196		mg/Kg-dry	1	5/24/2017 8:03:41 AM
1,2-Dibromo-3-chloropropane	ND	0.491	Q	mg/Kg-dry	1	5/24/2017 8:03:41 AM
1,2,4-Trimethylbenzene	ND	0.0196		mg/Kg-dry	1	5/24/2017 8:03:41 AM
Hexachlorobutadiene	ND	0.0982		mg/Kg-dry	1	5/24/2017 8:03:41 AM
Naphthalene	ND	0.0294	Q	mg/Kg-dry	1	5/24/2017 8:03:41 AM
1,2,3-Trichlorobenzene	ND	0.0196		mg/Kg-dry	1	5/24/2017 8:03:41 AM
Surr: Dibromofluoromethane	99.0	56.5-129		%Rec	1	5/24/2017 8:03:41 AM
Surr: Toluene-d8	101	64.5-151		%Rec	1	5/24/2017 8:03:41 AM
Surr: 1-Bromo-4-fluorobenzene	86.2	63.1-141		%Rec	1	5/24/2017 8:03:41 AM

NOTES:

Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Mercury by EPA Method 7471

Batch ID: 17157

Analyst: WF

Mercury	ND	0.251		mg/Kg-dry	1	5/24/2017 5:04:22 PM
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Total Metals by EPA Method 6020

Batch ID: 17124

Analyst: TN

Arsenic	3.30	0.0870		mg/Kg-dry	1	5/22/2017 5:35:30 PM
Barium	52.6	0.435		mg/Kg-dry	1	5/22/2017 5:35:30 PM
Cadmium	ND	0.174		mg/Kg-dry	1	5/22/2017 5:35:30 PM
Chromium	88.3	0.0870		mg/Kg-dry	1	5/22/2017 5:35:30 PM
Lead	2.43	0.174		mg/Kg-dry	1	5/22/2017 5:35:30 PM
Selenium	1.37	0.435		mg/Kg-dry	1	5/22/2017 5:35:30 PM
Silver	ND	0.0870		mg/Kg-dry	1	5/24/2017 12:54:41 PM



Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 12:15:00 PM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-018

Matrix: Soil

Client Sample ID: B18-6-10.0

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Sample Moisture (Percent Moisture)

Batch ID: R36211 Analyst: CG

Percent Moisture	9.49			wt%	1	5/18/2017 8:29:46 AM
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Hexavalent Chromium by EPA Method 7196

Batch ID: 17266 Analyst: KT

Chromium, Hexavalent	ND	0.542		mg/Kg-dry	1	6/6/2017 10:33:00 AM
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Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 1:15:00 PM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-020

Matrix: Soil

Client Sample ID: B18-5-2.5

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

Batch ID: 17094

Analyst: SB

Diesel (Fuel Oil)	ND	19.0		mg/Kg-dry	1	5/23/2017 5:31:30 PM
Heavy Oil	ND	47.6		mg/Kg-dry	1	5/23/2017 5:31:30 PM
Surr: 2-Fluorobiphenyl	101	50-150		%Rec	1	5/23/2017 5:31:30 PM
Surr: o-Terphenyl	98.9	50-150		%Rec	1	5/23/2017 5:31:30 PM

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Batch ID: 17093

Analyst: BT

Naphthalene	ND	42.6		µg/Kg-dry	1	5/19/2017 4:09:41 AM
2-Methylnaphthalene	ND	42.6		µg/Kg-dry	1	5/19/2017 4:09:41 AM
1-Methylnaphthalene	ND	42.6		µg/Kg-dry	1	5/19/2017 4:09:41 AM
Acenaphthylene	ND	42.6		µg/Kg-dry	1	5/19/2017 4:09:41 AM
Acenaphthene	ND	42.6		µg/Kg-dry	1	5/19/2017 4:09:41 AM
Fluorene	ND	42.6		µg/Kg-dry	1	5/19/2017 4:09:41 AM
Phenanthrene	ND	42.6		µg/Kg-dry	1	5/19/2017 4:09:41 AM
Anthracene	ND	42.6		µg/Kg-dry	1	5/19/2017 4:09:41 AM
Fluoranthene	ND	42.6		µg/Kg-dry	1	5/19/2017 4:09:41 AM
Pyrene	ND	42.6		µg/Kg-dry	1	5/19/2017 4:09:41 AM
Benz(a)anthracene	ND	42.6		µg/Kg-dry	1	5/19/2017 4:09:41 AM
Chrysene	ND	42.6		µg/Kg-dry	1	5/19/2017 4:09:41 AM
Benzo(b)fluoranthene	ND	42.6		µg/Kg-dry	1	5/19/2017 4:09:41 AM
Benzo(k)fluoranthene	ND	42.6		µg/Kg-dry	1	5/19/2017 4:09:41 AM
Benzo(a)pyrene	ND	42.6		µg/Kg-dry	1	5/19/2017 4:09:41 AM
Indeno(1,2,3-cd)pyrene	ND	42.6		µg/Kg-dry	1	5/19/2017 4:09:41 AM
Dibenz(a,h)anthracene	ND	42.6		µg/Kg-dry	1	5/19/2017 4:09:41 AM
Benzo(g,h,i)perylene	ND	42.6		µg/Kg-dry	1	5/19/2017 4:09:41 AM
Surr: 2-Fluorobiphenyl	66.6	24.5-139		%Rec	1	5/19/2017 4:09:41 AM
Surr: Terphenyl-d14 (surr)	55.5	44.3-176		%Rec	1	5/19/2017 4:09:41 AM

Gasoline by NWTPH-Gx

Batch ID: 17149

Analyst: NG

Gasoline	ND	4.91		mg/Kg-dry	1	5/24/2017 8:33:28 AM
Surr: Toluene-d8	97.3	65-135		%Rec	1	5/24/2017 8:33:28 AM
Surr: 4-Bromofluorobenzene	90.6	65-135		%Rec	1	5/24/2017 8:33:28 AM

Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17149

Analyst: NG

Dichlorodifluoromethane (CFC-12)	ND	0.0590	Q	mg/Kg-dry	1	5/24/2017 8:33:28 AM
Chloromethane	ND	0.0590		mg/Kg-dry	1	5/24/2017 8:33:28 AM
Vinyl chloride	ND	0.00197		mg/Kg-dry	1	5/24/2017 8:33:28 AM



Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 1:15:00 PM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-020

Matrix: Soil

Client Sample ID: B18-5-2.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17149

Analyst: NG

Bromomethane	ND	0.0884		mg/Kg-dry	1	5/24/2017 8:33:28 AM
Trichlorofluoromethane (CFC-11)	ND	0.0491		mg/Kg-dry	1	5/24/2017 8:33:28 AM
Chloroethane	ND	0.0590		mg/Kg-dry	1	5/24/2017 8:33:28 AM
1,1-Dichloroethene	ND	0.0491		mg/Kg-dry	1	5/24/2017 8:33:28 AM
Methylene chloride	ND	0.0197		mg/Kg-dry	1	5/24/2017 8:33:28 AM
trans-1,2-Dichloroethene	ND	0.0197		mg/Kg-dry	1	5/24/2017 8:33:28 AM
Methyl tert-butyl ether (MTBE)	ND	0.0491	Q	mg/Kg-dry	1	5/24/2017 8:33:28 AM
1,1-Dichloroethane	ND	0.0197		mg/Kg-dry	1	5/24/2017 8:33:28 AM
2,2-Dichloropropane	ND	0.0491	Q	mg/Kg-dry	1	5/24/2017 8:33:28 AM
cis-1,2-Dichloroethene	ND	0.0197		mg/Kg-dry	1	5/24/2017 8:33:28 AM
Chloroform	ND	0.0197		mg/Kg-dry	1	5/24/2017 8:33:28 AM
1,1,1-Trichloroethane (TCA)	ND	0.0197		mg/Kg-dry	1	5/24/2017 8:33:28 AM
1,1-Dichloropropene	ND	0.0197		mg/Kg-dry	1	5/24/2017 8:33:28 AM
Carbon tetrachloride	ND	0.0197		mg/Kg-dry	1	5/24/2017 8:33:28 AM
1,2-Dichloroethane (EDC)	ND	0.0295		mg/Kg-dry	1	5/24/2017 8:33:28 AM
Benzene	ND	0.0197		mg/Kg-dry	1	5/24/2017 8:33:28 AM
Trichloroethene (TCE)	ND	0.0197		mg/Kg-dry	1	5/24/2017 8:33:28 AM
1,2-Dichloropropane	ND	0.0197		mg/Kg-dry	1	5/24/2017 8:33:28 AM
Bromodichloromethane	ND	0.0197		mg/Kg-dry	1	5/24/2017 8:33:28 AM
Dibromomethane	ND	0.0393		mg/Kg-dry	1	5/24/2017 8:33:28 AM
cis-1,3-Dichloropropene	ND	0.0197		mg/Kg-dry	1	5/24/2017 8:33:28 AM
Toluene	ND	0.0197		mg/Kg-dry	1	5/24/2017 8:33:28 AM
trans-1,3-Dichloropropylene	ND	0.0295	Q	mg/Kg-dry	1	5/24/2017 8:33:28 AM
1,1,2-Trichloroethane	ND	0.0295		mg/Kg-dry	1	5/24/2017 8:33:28 AM
1,3-Dichloropropane	ND	0.0491		mg/Kg-dry	1	5/24/2017 8:33:28 AM
Tetrachloroethene (PCE)	ND	0.0197		mg/Kg-dry	1	5/24/2017 8:33:28 AM
Dibromochloromethane	ND	0.0295		mg/Kg-dry	1	5/24/2017 8:33:28 AM
1,2-Dibromoethane (EDB)	ND	0.00491		mg/Kg-dry	1	5/24/2017 8:33:28 AM
Chlorobenzene	ND	0.0197		mg/Kg-dry	1	5/24/2017 8:33:28 AM
1,1,1,2-Tetrachloroethane	ND	0.0295		mg/Kg-dry	1	5/24/2017 8:33:28 AM
Ethylbenzene	ND	0.0295		mg/Kg-dry	1	5/24/2017 8:33:28 AM
m,p-Xylene	ND	0.0197		mg/Kg-dry	1	5/24/2017 8:33:28 AM
o-Xylene	ND	0.0197		mg/Kg-dry	1	5/24/2017 8:33:28 AM
Styrene	ND	0.0197		mg/Kg-dry	1	5/24/2017 8:33:28 AM
Isopropylbenzene	ND	0.0786		mg/Kg-dry	1	5/24/2017 8:33:28 AM
Bromoform	ND	0.0197		mg/Kg-dry	1	5/24/2017 8:33:28 AM
1,1,2,2-Tetrachloroethane	ND	0.0197	Q	mg/Kg-dry	1	5/24/2017 8:33:28 AM
n-Propylbenzene	ND	0.0197		mg/Kg-dry	1	5/24/2017 8:33:28 AM
Bromobenzene	ND	0.0295		mg/Kg-dry	1	5/24/2017 8:33:28 AM



Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 1:15:00 PM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-020

Matrix: Soil

Client Sample ID: B18-5-2.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17149

Analyst: NG

1,3,5-Trimethylbenzene	ND	0.0197		mg/Kg-dry	1	5/24/2017 8:33:28 AM
2-Chlorotoluene	ND	0.0197		mg/Kg-dry	1	5/24/2017 8:33:28 AM
4-Chlorotoluene	ND	0.0197		mg/Kg-dry	1	5/24/2017 8:33:28 AM
tert-Butylbenzene	ND	0.0197		mg/Kg-dry	1	5/24/2017 8:33:28 AM
1,2,3-Trichloropropane	ND	0.0197	Q	mg/Kg-dry	1	5/24/2017 8:33:28 AM
1,2,4-Trichlorobenzene	ND	0.0491		mg/Kg-dry	1	5/24/2017 8:33:28 AM
sec-Butylbenzene	ND	0.0197		mg/Kg-dry	1	5/24/2017 8:33:28 AM
4-Isopropyltoluene	ND	0.0197		mg/Kg-dry	1	5/24/2017 8:33:28 AM
1,3-Dichlorobenzene	ND	0.0197		mg/Kg-dry	1	5/24/2017 8:33:28 AM
1,4-Dichlorobenzene	ND	0.0197		mg/Kg-dry	1	5/24/2017 8:33:28 AM
n-Butylbenzene	ND	0.0197		mg/Kg-dry	1	5/24/2017 8:33:28 AM
1,2-Dichlorobenzene	ND	0.0197		mg/Kg-dry	1	5/24/2017 8:33:28 AM
1,2-Dibromo-3-chloropropane	ND	0.491	Q	mg/Kg-dry	1	5/24/2017 8:33:28 AM
1,2,4-Trimethylbenzene	ND	0.0197		mg/Kg-dry	1	5/24/2017 8:33:28 AM
Hexachlorobutadiene	ND	0.0983		mg/Kg-dry	1	5/24/2017 8:33:28 AM
Naphthalene	ND	0.0295	Q	mg/Kg-dry	1	5/24/2017 8:33:28 AM
1,2,3-Trichlorobenzene	ND	0.0197		mg/Kg-dry	1	5/24/2017 8:33:28 AM
Surr: Dibromofluoromethane	98.7	56.5-129		%Rec	1	5/24/2017 8:33:28 AM
Surr: Toluene-d8	98.9	64.5-151		%Rec	1	5/24/2017 8:33:28 AM
Surr: 1-Bromo-4-fluorobenzene	84.9	63.1-141		%Rec	1	5/24/2017 8:33:28 AM

NOTES:

Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Mercury by EPA Method 7471

Batch ID: 17157

Analyst: WF

Mercury	ND	0.264		mg/Kg-dry	1	5/24/2017 5:06:00 PM
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Total Metals by EPA Method 6020

Batch ID: 17124

Analyst: TN

Arsenic	2.69	0.0863		mg/Kg-dry	1	5/22/2017 6:03:56 PM
Barium	38.6	0.432		mg/Kg-dry	1	5/22/2017 6:03:56 PM
Cadmium	ND	0.173		mg/Kg-dry	1	5/22/2017 6:03:56 PM
Chromium	34.6	0.0863		mg/Kg-dry	1	5/22/2017 6:03:56 PM
Lead	2.07	0.173		mg/Kg-dry	1	5/22/2017 6:03:56 PM
Selenium	1.08	0.432		mg/Kg-dry	1	5/22/2017 6:03:56 PM
Silver	ND	0.0863		mg/Kg-dry	1	5/24/2017 12:58:42 PM



Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 1:15:00 PM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-020

Matrix: Soil

Client Sample ID: B18-5-2.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Sample Moisture (Percent Moisture)

Batch ID: R36211 Analyst: CG

Percent Moisture	8.81			wt%	1	5/18/2017 8:29:46 AM
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Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 1:30:00 PM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-023

Matrix: Soil

Client Sample ID: B18-5-10.0

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

Batch ID: 17094

Analyst: SB

Diesel (Fuel Oil)	ND	20.7		mg/Kg-dry	1	5/23/2017 9:53:40 PM
Heavy Oil	ND	51.8		mg/Kg-dry	1	5/23/2017 9:53:40 PM
Surr: 2-Fluorobiphenyl	93.1	50-150		%Rec	1	5/23/2017 9:53:40 PM
Surr: o-Terphenyl	93.4	50-150		%Rec	1	5/23/2017 9:53:40 PM

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Batch ID: 17093

Analyst: BT

Naphthalene	ND	42.6		µg/Kg-dry	1	5/19/2017 4:31:44 AM
2-Methylnaphthalene	ND	42.6		µg/Kg-dry	1	5/19/2017 4:31:44 AM
1-Methylnaphthalene	ND	42.6		µg/Kg-dry	1	5/19/2017 4:31:44 AM
Acenaphthylene	ND	42.6		µg/Kg-dry	1	5/19/2017 4:31:44 AM
Acenaphthene	ND	42.6		µg/Kg-dry	1	5/19/2017 4:31:44 AM
Fluorene	ND	42.6		µg/Kg-dry	1	5/19/2017 4:31:44 AM
Phenanthrene	ND	42.6		µg/Kg-dry	1	5/19/2017 4:31:44 AM
Anthracene	ND	42.6		µg/Kg-dry	1	5/19/2017 4:31:44 AM
Fluoranthene	ND	42.6		µg/Kg-dry	1	5/19/2017 4:31:44 AM
Pyrene	ND	42.6		µg/Kg-dry	1	5/19/2017 4:31:44 AM
Benz(a)anthracene	ND	42.6		µg/Kg-dry	1	5/19/2017 4:31:44 AM
Chrysene	ND	42.6		µg/Kg-dry	1	5/19/2017 4:31:44 AM
Benzo(b)fluoranthene	ND	42.6		µg/Kg-dry	1	5/19/2017 4:31:44 AM
Benzo(k)fluoranthene	ND	42.6		µg/Kg-dry	1	5/19/2017 4:31:44 AM
Benzo(a)pyrene	ND	42.6		µg/Kg-dry	1	5/19/2017 4:31:44 AM
Indeno(1,2,3-cd)pyrene	ND	42.6		µg/Kg-dry	1	5/19/2017 4:31:44 AM
Dibenz(a,h)anthracene	ND	42.6		µg/Kg-dry	1	5/19/2017 4:31:44 AM
Benzo(g,h,i)perylene	ND	42.6		µg/Kg-dry	1	5/19/2017 4:31:44 AM
Surr: 2-Fluorobiphenyl	64.8	24.5-139		%Rec	1	5/19/2017 4:31:44 AM
Surr: Terphenyl-d14 (surr)	61.2	44.3-176		%Rec	1	5/19/2017 4:31:44 AM

Gasoline by NWTPH-Gx

Batch ID: 17149

Analyst: NG

Gasoline	ND	6.22		mg/Kg-dry	1	5/24/2017 1:02:01 PM
Surr: Toluene-d8	95.5	65-135		%Rec	1	5/24/2017 1:02:01 PM
Surr: 4-Bromofluorobenzene	94.3	65-135		%Rec	1	5/24/2017 1:02:01 PM

Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17149

Analyst: NG

Dichlorodifluoromethane (CFC-12)	ND	0.0746		mg/Kg-dry	1	5/24/2017 1:02:01 PM
Chloromethane	ND	0.0746		mg/Kg-dry	1	5/24/2017 1:02:01 PM
Vinyl chloride	ND	0.00249		mg/Kg-dry	1	5/24/2017 1:02:01 PM



Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 1:30:00 PM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-023

Matrix: Soil

Client Sample ID: B18-5-10.0

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17149

Analyst: NG

Bromomethane	ND	0.112		mg/Kg-dry	1	5/24/2017 1:02:01 PM
Trichlorofluoromethane (CFC-11)	ND	0.0622		mg/Kg-dry	1	5/24/2017 1:02:01 PM
Chloroethane	ND	0.0746		mg/Kg-dry	1	5/24/2017 1:02:01 PM
1,1-Dichloroethene	ND	0.0622		mg/Kg-dry	1	5/24/2017 1:02:01 PM
Methylene chloride	ND	0.0249		mg/Kg-dry	1	5/24/2017 1:02:01 PM
trans-1,2-Dichloroethene	ND	0.0249		mg/Kg-dry	1	5/24/2017 1:02:01 PM
Methyl tert-butyl ether (MTBE)	ND	0.0622		mg/Kg-dry	1	5/24/2017 1:02:01 PM
1,1-Dichloroethane	ND	0.0249		mg/Kg-dry	1	5/24/2017 1:02:01 PM
2,2-Dichloropropane	ND	0.0622		mg/Kg-dry	1	5/24/2017 1:02:01 PM
cis-1,2-Dichloroethene	ND	0.0249		mg/Kg-dry	1	5/24/2017 1:02:01 PM
Chloroform	ND	0.0249		mg/Kg-dry	1	5/24/2017 1:02:01 PM
1,1,1-Trichloroethane (TCA)	ND	0.0249		mg/Kg-dry	1	5/24/2017 1:02:01 PM
1,1-Dichloropropene	ND	0.0249		mg/Kg-dry	1	5/24/2017 1:02:01 PM
Carbon tetrachloride	ND	0.0249		mg/Kg-dry	1	5/24/2017 1:02:01 PM
1,2-Dichloroethane (EDC)	ND	0.0373		mg/Kg-dry	1	5/24/2017 1:02:01 PM
Benzene	ND	0.0249		mg/Kg-dry	1	5/24/2017 1:02:01 PM
Trichloroethene (TCE)	ND	0.0249		mg/Kg-dry	1	5/24/2017 1:02:01 PM
1,2-Dichloropropane	ND	0.0249		mg/Kg-dry	1	5/24/2017 1:02:01 PM
Bromodichloromethane	ND	0.0249		mg/Kg-dry	1	5/24/2017 1:02:01 PM
Dibromomethane	ND	0.0497		mg/Kg-dry	1	5/24/2017 1:02:01 PM
cis-1,3-Dichloropropene	ND	0.0249		mg/Kg-dry	1	5/24/2017 1:02:01 PM
Toluene	ND	0.0249		mg/Kg-dry	1	5/24/2017 1:02:01 PM
trans-1,3-Dichloropropylene	ND	0.0373		mg/Kg-dry	1	5/24/2017 1:02:01 PM
1,1,2-Trichloroethane	ND	0.0373		mg/Kg-dry	1	5/24/2017 1:02:01 PM
1,3-Dichloropropane	ND	0.0622		mg/Kg-dry	1	5/24/2017 1:02:01 PM
Tetrachloroethene (PCE)	ND	0.0249		mg/Kg-dry	1	5/24/2017 1:02:01 PM
Dibromochloromethane	ND	0.0373		mg/Kg-dry	1	5/24/2017 1:02:01 PM
1,2-Dibromoethane (EDB)	ND	0.00622		mg/Kg-dry	1	5/24/2017 1:02:01 PM
Chlorobenzene	ND	0.0249		mg/Kg-dry	1	5/24/2017 1:02:01 PM
1,1,1,2-Tetrachloroethane	ND	0.0373		mg/Kg-dry	1	5/24/2017 1:02:01 PM
Ethylbenzene	ND	0.0373		mg/Kg-dry	1	5/24/2017 1:02:01 PM
m,p-Xylene	ND	0.0249		mg/Kg-dry	1	5/24/2017 1:02:01 PM
o-Xylene	ND	0.0249		mg/Kg-dry	1	5/24/2017 1:02:01 PM
Styrene	ND	0.0249		mg/Kg-dry	1	5/24/2017 1:02:01 PM
Isopropylbenzene	ND	0.0995		mg/Kg-dry	1	5/24/2017 1:02:01 PM
Bromoform	ND	0.0249		mg/Kg-dry	1	5/24/2017 1:02:01 PM
1,1,2,2-Tetrachloroethane	ND	0.0249		mg/Kg-dry	1	5/24/2017 1:02:01 PM
n-Propylbenzene	ND	0.0249		mg/Kg-dry	1	5/24/2017 1:02:01 PM
Bromobenzene	ND	0.0373		mg/Kg-dry	1	5/24/2017 1:02:01 PM



Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 1:30:00 PM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-023

Matrix: Soil

Client Sample ID: B18-5-10.0

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17149

Analyst: NG

1,3,5-Trimethylbenzene	ND	0.0249		mg/Kg-dry	1	5/24/2017 1:02:01 PM
2-Chlorotoluene	ND	0.0249		mg/Kg-dry	1	5/24/2017 1:02:01 PM
4-Chlorotoluene	ND	0.0249		mg/Kg-dry	1	5/24/2017 1:02:01 PM
tert-Butylbenzene	ND	0.0249		mg/Kg-dry	1	5/24/2017 1:02:01 PM
1,2,3-Trichloropropane	ND	0.0249		mg/Kg-dry	1	5/24/2017 1:02:01 PM
1,2,4-Trichlorobenzene	ND	0.0622		mg/Kg-dry	1	5/24/2017 1:02:01 PM
sec-Butylbenzene	ND	0.0249		mg/Kg-dry	1	5/24/2017 1:02:01 PM
4-Isopropyltoluene	ND	0.0249		mg/Kg-dry	1	5/24/2017 1:02:01 PM
1,3-Dichlorobenzene	ND	0.0249		mg/Kg-dry	1	5/24/2017 1:02:01 PM
1,4-Dichlorobenzene	ND	0.0249		mg/Kg-dry	1	5/24/2017 1:02:01 PM
n-Butylbenzene	ND	0.0249		mg/Kg-dry	1	5/24/2017 1:02:01 PM
1,2-Dichlorobenzene	ND	0.0249		mg/Kg-dry	1	5/24/2017 1:02:01 PM
1,2-Dibromo-3-chloropropane	ND	0.622	Q	mg/Kg-dry	1	5/24/2017 1:02:01 PM
1,2,4-Trimethylbenzene	ND	0.0249		mg/Kg-dry	1	5/24/2017 1:02:01 PM
Hexachlorobutadiene	ND	0.124		mg/Kg-dry	1	5/24/2017 1:02:01 PM
Naphthalene	ND	0.0373	Q	mg/Kg-dry	1	5/24/2017 1:02:01 PM
1,2,3-Trichlorobenzene	ND	0.0249		mg/Kg-dry	1	5/24/2017 1:02:01 PM
Surr: Dibromofluoromethane	98.4	56.5-129		%Rec	1	5/24/2017 1:02:01 PM
Surr: Toluene-d8	99.8	64.5-151		%Rec	1	5/24/2017 1:02:01 PM
Surr: 1-Bromo-4-fluorobenzene	88.4	63.1-141		%Rec	1	5/24/2017 1:02:01 PM

NOTES:

Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Mercury by EPA Method 7471

Batch ID: 17157

Analyst: WF

Mercury	ND	0.260		mg/Kg-dry	1	5/24/2017 5:07:36 PM
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Total Metals by EPA Method 6020

Batch ID: 17124

Analyst: TN

Arsenic	1.82	0.0806		mg/Kg-dry	1	5/22/2017 6:07:57 PM
Barium	31.5	0.403		mg/Kg-dry	1	5/22/2017 6:07:57 PM
Cadmium	ND	0.161		mg/Kg-dry	1	5/22/2017 6:07:57 PM
Chromium	35.9	0.0806		mg/Kg-dry	1	5/22/2017 6:07:57 PM
Lead	1.54	0.161		mg/Kg-dry	1	5/22/2017 6:07:57 PM
Selenium	1.00	0.403		mg/Kg-dry	1	5/22/2017 6:07:57 PM
Silver	ND	0.0806		mg/Kg-dry	1	5/24/2017 1:10:47 PM



Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 1:30:00 PM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-023

Matrix: Soil

Client Sample ID: B18-5-10.0

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Sample Moisture (Percent Moisture)

Batch ID: R36211 Analyst: CG

Percent Moisture	9.43			wt%	1	5/18/2017 8:29:46 AM
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Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 2:05:00 PM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-026

Matrix: Soil

Client Sample ID: B18-4-5.0

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<u>Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.</u>				Batch ID: 17094		Analyst: SB
Diesel (Fuel Oil)	ND	24.0		mg/Kg-dry	1	5/23/2017 10:25:53 PM
Heavy Oil	ND	60.1		mg/Kg-dry	1	5/23/2017 10:25:53 PM
Surr: 2-Fluorobiphenyl	92.3	50-150		%Rec	1	5/23/2017 10:25:53 PM
Surr: o-Terphenyl	90.7	50-150		%Rec	1	5/23/2017 10:25:53 PM

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Batch ID: 17093 Analyst: BT

Naphthalene	ND	43.9		µg/Kg-dry	1	5/19/2017 4:53:42 AM
2-Methylnaphthalene	ND	43.9		µg/Kg-dry	1	5/19/2017 4:53:42 AM
1-Methylnaphthalene	ND	43.9		µg/Kg-dry	1	5/19/2017 4:53:42 AM
Acenaphthylene	ND	43.9		µg/Kg-dry	1	5/19/2017 4:53:42 AM
Acenaphthene	ND	43.9		µg/Kg-dry	1	5/19/2017 4:53:42 AM
Fluorene	ND	43.9		µg/Kg-dry	1	5/19/2017 4:53:42 AM
Phenanthrene	ND	43.9		µg/Kg-dry	1	5/19/2017 4:53:42 AM
Anthracene	ND	43.9		µg/Kg-dry	1	5/19/2017 4:53:42 AM
Fluoranthene	ND	43.9		µg/Kg-dry	1	5/19/2017 4:53:42 AM
Pyrene	ND	43.9		µg/Kg-dry	1	5/19/2017 4:53:42 AM
Benz(a)anthracene	ND	43.9		µg/Kg-dry	1	5/19/2017 4:53:42 AM
Chrysene	ND	43.9		µg/Kg-dry	1	5/19/2017 4:53:42 AM
Benzo(b)fluoranthene	ND	43.9		µg/Kg-dry	1	5/19/2017 4:53:42 AM
Benzo(k)fluoranthene	ND	43.9		µg/Kg-dry	1	5/19/2017 4:53:42 AM
Benzo(a)pyrene	ND	43.9		µg/Kg-dry	1	5/19/2017 4:53:42 AM
Indeno(1,2,3-cd)pyrene	ND	43.9		µg/Kg-dry	1	5/19/2017 4:53:42 AM
Dibenz(a,h)anthracene	ND	43.9		µg/Kg-dry	1	5/19/2017 4:53:42 AM
Benzo(g,h,i)perylene	ND	43.9		µg/Kg-dry	1	5/19/2017 4:53:42 AM
Surr: 2-Fluorobiphenyl	65.6	24.5-139		%Rec	1	5/19/2017 4:53:42 AM
Surr: Terphenyl-d14 (surr)	57.2	44.3-176		%Rec	1	5/19/2017 4:53:42 AM

Gasoline by NWTPH-Gx

Batch ID: 17149 Analyst: NG

Gasoline	ND	7.95		mg/Kg-dry	1	5/24/2017 1:31:58 PM
Surr: Toluene-d8	96.2	65-135		%Rec	1	5/24/2017 1:31:58 PM
Surr: 4-Bromofluorobenzene	92.8	65-135		%Rec	1	5/24/2017 1:31:58 PM

Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17149 Analyst: NG

Dichlorodifluoromethane (CFC-12)	ND	0.0954		mg/Kg-dry	1	5/24/2017 1:31:58 PM
Chloromethane	ND	0.0954		mg/Kg-dry	1	5/24/2017 1:31:58 PM
Vinyl chloride	ND	0.00318		mg/Kg-dry	1	5/24/2017 1:31:58 PM



Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 2:05:00 PM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-026

Matrix: Soil

Client Sample ID: B18-4-5.0

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17149

Analyst: NG

Bromomethane	ND	0.143		mg/Kg-dry	1	5/24/2017 1:31:58 PM
Trichlorofluoromethane (CFC-11)	ND	0.0795		mg/Kg-dry	1	5/24/2017 1:31:58 PM
Chloroethane	ND	0.0954		mg/Kg-dry	1	5/24/2017 1:31:58 PM
1,1-Dichloroethene	ND	0.0795		mg/Kg-dry	1	5/24/2017 1:31:58 PM
Methylene chloride	ND	0.0318		mg/Kg-dry	1	5/24/2017 1:31:58 PM
trans-1,2-Dichloroethene	ND	0.0318		mg/Kg-dry	1	5/24/2017 1:31:58 PM
Methyl tert-butyl ether (MTBE)	ND	0.0795		mg/Kg-dry	1	5/24/2017 1:31:58 PM
1,1-Dichloroethane	ND	0.0318		mg/Kg-dry	1	5/24/2017 1:31:58 PM
2,2-Dichloropropane	ND	0.0795		mg/Kg-dry	1	5/24/2017 1:31:58 PM
cis-1,2-Dichloroethene	ND	0.0318		mg/Kg-dry	1	5/24/2017 1:31:58 PM
Chloroform	ND	0.0318		mg/Kg-dry	1	5/24/2017 1:31:58 PM
1,1,1-Trichloroethane (TCA)	ND	0.0318		mg/Kg-dry	1	5/24/2017 1:31:58 PM
1,1-Dichloropropene	ND	0.0318		mg/Kg-dry	1	5/24/2017 1:31:58 PM
Carbon tetrachloride	ND	0.0318		mg/Kg-dry	1	5/24/2017 1:31:58 PM
1,2-Dichloroethane (EDC)	ND	0.0477		mg/Kg-dry	1	5/24/2017 1:31:58 PM
Benzene	ND	0.0318		mg/Kg-dry	1	5/24/2017 1:31:58 PM
Trichloroethene (TCE)	ND	0.0318		mg/Kg-dry	1	5/24/2017 1:31:58 PM
1,2-Dichloropropane	ND	0.0318		mg/Kg-dry	1	5/24/2017 1:31:58 PM
Bromodichloromethane	ND	0.0318		mg/Kg-dry	1	5/24/2017 1:31:58 PM
Dibromomethane	ND	0.0636		mg/Kg-dry	1	5/24/2017 1:31:58 PM
cis-1,3-Dichloropropene	ND	0.0318		mg/Kg-dry	1	5/24/2017 1:31:58 PM
Toluene	ND	0.0318		mg/Kg-dry	1	5/24/2017 1:31:58 PM
trans-1,3-Dichloropropylene	ND	0.0477		mg/Kg-dry	1	5/24/2017 1:31:58 PM
1,1,2-Trichloroethane	ND	0.0477		mg/Kg-dry	1	5/24/2017 1:31:58 PM
1,3-Dichloropropane	ND	0.0795		mg/Kg-dry	1	5/24/2017 1:31:58 PM
Tetrachloroethene (PCE)	ND	0.0318		mg/Kg-dry	1	5/24/2017 1:31:58 PM
Dibromochloromethane	ND	0.0477		mg/Kg-dry	1	5/24/2017 1:31:58 PM
1,2-Dibromoethane (EDB)	ND	0.00795		mg/Kg-dry	1	5/24/2017 1:31:58 PM
Chlorobenzene	ND	0.0318		mg/Kg-dry	1	5/24/2017 1:31:58 PM
1,1,1,2-Tetrachloroethane	ND	0.0477		mg/Kg-dry	1	5/24/2017 1:31:58 PM
Ethylbenzene	ND	0.0477		mg/Kg-dry	1	5/24/2017 1:31:58 PM
m,p-Xylene	ND	0.0318		mg/Kg-dry	1	5/24/2017 1:31:58 PM
o-Xylene	ND	0.0318		mg/Kg-dry	1	5/24/2017 1:31:58 PM
Styrene	ND	0.0318		mg/Kg-dry	1	5/24/2017 1:31:58 PM
Isopropylbenzene	ND	0.127		mg/Kg-dry	1	5/24/2017 1:31:58 PM
Bromoform	ND	0.0318		mg/Kg-dry	1	5/24/2017 1:31:58 PM
1,1,2,2-Tetrachloroethane	ND	0.0318		mg/Kg-dry	1	5/24/2017 1:31:58 PM
n-Propylbenzene	ND	0.0318		mg/Kg-dry	1	5/24/2017 1:31:58 PM
Bromobenzene	ND	0.0477		mg/Kg-dry	1	5/24/2017 1:31:58 PM



Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 2:05:00 PM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-026

Matrix: Soil

Client Sample ID: B18-4-5.0

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17149

Analyst: NG

1,3,5-Trimethylbenzene	ND	0.0318		mg/Kg-dry	1	5/24/2017 1:31:58 PM
2-Chlorotoluene	ND	0.0318		mg/Kg-dry	1	5/24/2017 1:31:58 PM
4-Chlorotoluene	ND	0.0318		mg/Kg-dry	1	5/24/2017 1:31:58 PM
tert-Butylbenzene	ND	0.0318		mg/Kg-dry	1	5/24/2017 1:31:58 PM
1,2,3-Trichloropropane	ND	0.0318		mg/Kg-dry	1	5/24/2017 1:31:58 PM
1,2,4-Trichlorobenzene	ND	0.0795		mg/Kg-dry	1	5/24/2017 1:31:58 PM
sec-Butylbenzene	ND	0.0318		mg/Kg-dry	1	5/24/2017 1:31:58 PM
4-Isopropyltoluene	ND	0.0318		mg/Kg-dry	1	5/24/2017 1:31:58 PM
1,3-Dichlorobenzene	ND	0.0318		mg/Kg-dry	1	5/24/2017 1:31:58 PM
1,4-Dichlorobenzene	ND	0.0318		mg/Kg-dry	1	5/24/2017 1:31:58 PM
n-Butylbenzene	ND	0.0318		mg/Kg-dry	1	5/24/2017 1:31:58 PM
1,2-Dichlorobenzene	ND	0.0318		mg/Kg-dry	1	5/24/2017 1:31:58 PM
1,2-Dibromo-3-chloropropane	ND	0.795	Q	mg/Kg-dry	1	5/24/2017 1:31:58 PM
1,2,4-Trimethylbenzene	ND	0.0318		mg/Kg-dry	1	5/24/2017 1:31:58 PM
Hexachlorobutadiene	ND	0.159		mg/Kg-dry	1	5/24/2017 1:31:58 PM
Naphthalene	ND	0.0477	Q	mg/Kg-dry	1	5/24/2017 1:31:58 PM
1,2,3-Trichlorobenzene	ND	0.0318		mg/Kg-dry	1	5/24/2017 1:31:58 PM
Surr: Dibromofluoromethane	97.9	56.5-129		%Rec	1	5/24/2017 1:31:58 PM
Surr: Toluene-d8	97.3	64.5-151		%Rec	1	5/24/2017 1:31:58 PM
Surr: 1-Bromo-4-fluorobenzene	87.1	63.1-141		%Rec	1	5/24/2017 1:31:58 PM

NOTES:

Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Mercury by EPA Method 7471

Batch ID: 17157

Analyst: WF

Mercury	ND	0.302		mg/Kg-dry	1	5/24/2017 5:09:12 PM
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Total Metals by EPA Method 6020

Batch ID: 17124

Analyst: TN

Arsenic	4.98	0.0973		mg/Kg-dry	1	5/22/2017 6:11:58 PM
Barium	93.1	0.486		mg/Kg-dry	1	5/22/2017 6:11:58 PM
Cadmium	ND	0.195		mg/Kg-dry	1	5/22/2017 6:11:58 PM
Chromium	61.0	0.0973		mg/Kg-dry	1	5/22/2017 6:11:58 PM
Lead	4.19	0.195		mg/Kg-dry	1	5/22/2017 6:11:58 PM
Selenium	1.67	0.486		mg/Kg-dry	1	5/22/2017 6:11:58 PM
Silver	ND	0.0973		mg/Kg-dry	1	5/24/2017 1:14:49 PM



Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 2:05:00 PM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-026

Matrix: Soil

Client Sample ID: B18-4-5.0

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Sample Moisture (Percent Moisture)

Batch ID: R36211 Analyst: CG

Percent Moisture	17.1			wt%	1	5/18/2017 8:29:46 AM
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Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 2:20:00 PM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-029

Matrix: Soil

Client Sample ID: B18-4-15.0

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<u>Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.</u>				Batch ID: 17094		Analyst: SB
Diesel (Fuel Oil)	ND	20.5		mg/Kg-dry	1	5/23/2017 10:58:03 PM
Heavy Oil	ND	51.3		mg/Kg-dry	1	5/23/2017 10:58:03 PM
Surr: 2-Fluorobiphenyl	102	50-150		%Rec	1	5/23/2017 10:58:03 PM
Surr: o-Terphenyl	97.4	50-150		%Rec	1	5/23/2017 10:58:03 PM

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Batch ID: 17093 Analyst: BT

Naphthalene	ND	43.6		µg/Kg-dry	1	5/19/2017 5:15:40 AM
2-Methylnaphthalene	ND	43.6		µg/Kg-dry	1	5/19/2017 5:15:40 AM
1-Methylnaphthalene	ND	43.6		µg/Kg-dry	1	5/19/2017 5:15:40 AM
Acenaphthylene	ND	43.6		µg/Kg-dry	1	5/19/2017 5:15:40 AM
Acenaphthene	ND	43.6		µg/Kg-dry	1	5/19/2017 5:15:40 AM
Fluorene	ND	43.6		µg/Kg-dry	1	5/19/2017 5:15:40 AM
Phenanthrene	ND	43.6		µg/Kg-dry	1	5/19/2017 5:15:40 AM
Anthracene	ND	43.6		µg/Kg-dry	1	5/19/2017 5:15:40 AM
Fluoranthene	ND	43.6		µg/Kg-dry	1	5/19/2017 5:15:40 AM
Pyrene	ND	43.6		µg/Kg-dry	1	5/19/2017 5:15:40 AM
Benz(a)anthracene	ND	43.6		µg/Kg-dry	1	5/19/2017 5:15:40 AM
Chrysene	ND	43.6		µg/Kg-dry	1	5/19/2017 5:15:40 AM
Benzo(b)fluoranthene	ND	43.6		µg/Kg-dry	1	5/19/2017 5:15:40 AM
Benzo(k)fluoranthene	ND	43.6		µg/Kg-dry	1	5/19/2017 5:15:40 AM
Benzo(a)pyrene	ND	43.6		µg/Kg-dry	1	5/19/2017 5:15:40 AM
Indeno(1,2,3-cd)pyrene	ND	43.6		µg/Kg-dry	1	5/19/2017 5:15:40 AM
Dibenz(a,h)anthracene	ND	43.6		µg/Kg-dry	1	5/19/2017 5:15:40 AM
Benzo(g,h,i)perylene	ND	43.6		µg/Kg-dry	1	5/19/2017 5:15:40 AM
Surr: 2-Fluorobiphenyl	72.0	24.5-139		%Rec	1	5/19/2017 5:15:40 AM
Surr: Terphenyl-d14 (surr)	61.6	44.3-176		%Rec	1	5/19/2017 5:15:40 AM

Gasoline by NWTPH-Gx

Batch ID: 17149 Analyst: NG

Gasoline	ND	4.51		mg/Kg-dry	1	5/24/2017 2:31:51 PM
Surr: Toluene-d8	96.8	65-135		%Rec	1	5/24/2017 2:31:51 PM
Surr: 4-Bromofluorobenzene	95.1	65-135		%Rec	1	5/24/2017 2:31:51 PM

Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17149 Analyst: NG

Dichlorodifluoromethane (CFC-12)	ND	0.0541		mg/Kg-dry	1	5/24/2017 2:31:51 PM
Chloromethane	ND	0.0541		mg/Kg-dry	1	5/24/2017 2:31:51 PM
Vinyl chloride	ND	0.00180		mg/Kg-dry	1	5/24/2017 2:31:51 PM



Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 2:20:00 PM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-029

Matrix: Soil

Client Sample ID: B18-4-15.0

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17149

Analyst: NG

Bromomethane	ND	0.0812		mg/Kg-dry	1	5/24/2017 2:31:51 PM
Trichlorofluoromethane (CFC-11)	ND	0.0451		mg/Kg-dry	1	5/24/2017 2:31:51 PM
Chloroethane	ND	0.0541		mg/Kg-dry	1	5/24/2017 2:31:51 PM
1,1-Dichloroethene	ND	0.0451		mg/Kg-dry	1	5/24/2017 2:31:51 PM
Methylene chloride	ND	0.0180		mg/Kg-dry	1	5/24/2017 2:31:51 PM
trans-1,2-Dichloroethene	ND	0.0180		mg/Kg-dry	1	5/24/2017 2:31:51 PM
Methyl tert-butyl ether (MTBE)	ND	0.0451		mg/Kg-dry	1	5/24/2017 2:31:51 PM
1,1-Dichloroethane	ND	0.0180		mg/Kg-dry	1	5/24/2017 2:31:51 PM
2,2-Dichloropropane	ND	0.0451		mg/Kg-dry	1	5/24/2017 2:31:51 PM
cis-1,2-Dichloroethene	ND	0.0180		mg/Kg-dry	1	5/24/2017 2:31:51 PM
Chloroform	ND	0.0180		mg/Kg-dry	1	5/24/2017 2:31:51 PM
1,1,1-Trichloroethane (TCA)	ND	0.0180		mg/Kg-dry	1	5/24/2017 2:31:51 PM
1,1-Dichloropropene	ND	0.0180		mg/Kg-dry	1	5/24/2017 2:31:51 PM
Carbon tetrachloride	ND	0.0180		mg/Kg-dry	1	5/24/2017 2:31:51 PM
1,2-Dichloroethane (EDC)	ND	0.0271		mg/Kg-dry	1	5/24/2017 2:31:51 PM
Benzene	ND	0.0180		mg/Kg-dry	1	5/24/2017 2:31:51 PM
Trichloroethene (TCE)	ND	0.0180		mg/Kg-dry	1	5/24/2017 2:31:51 PM
1,2-Dichloropropane	ND	0.0180		mg/Kg-dry	1	5/24/2017 2:31:51 PM
Bromodichloromethane	ND	0.0180		mg/Kg-dry	1	5/24/2017 2:31:51 PM
Dibromomethane	ND	0.0361		mg/Kg-dry	1	5/24/2017 2:31:51 PM
cis-1,3-Dichloropropene	ND	0.0180		mg/Kg-dry	1	5/24/2017 2:31:51 PM
Toluene	ND	0.0180		mg/Kg-dry	1	5/24/2017 2:31:51 PM
trans-1,3-Dichloropropylene	ND	0.0271		mg/Kg-dry	1	5/24/2017 2:31:51 PM
1,1,2-Trichloroethane	ND	0.0271		mg/Kg-dry	1	5/24/2017 2:31:51 PM
1,3-Dichloropropane	ND	0.0451		mg/Kg-dry	1	5/24/2017 2:31:51 PM
Tetrachloroethene (PCE)	ND	0.0180		mg/Kg-dry	1	5/24/2017 2:31:51 PM
Dibromochloromethane	ND	0.0271		mg/Kg-dry	1	5/24/2017 2:31:51 PM
1,2-Dibromoethane (EDB)	ND	0.00451		mg/Kg-dry	1	5/24/2017 2:31:51 PM
Chlorobenzene	ND	0.0180		mg/Kg-dry	1	5/24/2017 2:31:51 PM
1,1,1,2-Tetrachloroethane	ND	0.0271		mg/Kg-dry	1	5/24/2017 2:31:51 PM
Ethylbenzene	ND	0.0271		mg/Kg-dry	1	5/24/2017 2:31:51 PM
m,p-Xylene	ND	0.0180		mg/Kg-dry	1	5/24/2017 2:31:51 PM
o-Xylene	ND	0.0180		mg/Kg-dry	1	5/24/2017 2:31:51 PM
Styrene	ND	0.0180		mg/Kg-dry	1	5/24/2017 2:31:51 PM
Isopropylbenzene	ND	0.0722		mg/Kg-dry	1	5/24/2017 2:31:51 PM
Bromoform	ND	0.0180		mg/Kg-dry	1	5/24/2017 2:31:51 PM
1,1,2,2-Tetrachloroethane	ND	0.0180		mg/Kg-dry	1	5/24/2017 2:31:51 PM
n-Propylbenzene	ND	0.0180		mg/Kg-dry	1	5/24/2017 2:31:51 PM
Bromobenzene	ND	0.0271		mg/Kg-dry	1	5/24/2017 2:31:51 PM



Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 2:20:00 PM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-029

Matrix: Soil

Client Sample ID: B18-4-15.0

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17149

Analyst: NG

1,3,5-Trimethylbenzene	ND	0.0180		mg/Kg-dry	1	5/24/2017 2:31:51 PM
2-Chlorotoluene	ND	0.0180		mg/Kg-dry	1	5/24/2017 2:31:51 PM
4-Chlorotoluene	ND	0.0180		mg/Kg-dry	1	5/24/2017 2:31:51 PM
tert-Butylbenzene	ND	0.0180		mg/Kg-dry	1	5/24/2017 2:31:51 PM
1,2,3-Trichloropropane	ND	0.0180		mg/Kg-dry	1	5/24/2017 2:31:51 PM
1,2,4-Trichlorobenzene	ND	0.0451		mg/Kg-dry	1	5/24/2017 2:31:51 PM
sec-Butylbenzene	ND	0.0180		mg/Kg-dry	1	5/24/2017 2:31:51 PM
4-Isopropyltoluene	ND	0.0180		mg/Kg-dry	1	5/24/2017 2:31:51 PM
1,3-Dichlorobenzene	ND	0.0180		mg/Kg-dry	1	5/24/2017 2:31:51 PM
1,4-Dichlorobenzene	ND	0.0180		mg/Kg-dry	1	5/24/2017 2:31:51 PM
n-Butylbenzene	ND	0.0180		mg/Kg-dry	1	5/24/2017 2:31:51 PM
1,2-Dichlorobenzene	ND	0.0180		mg/Kg-dry	1	5/24/2017 2:31:51 PM
1,2-Dibromo-3-chloropropane	ND	0.451	Q	mg/Kg-dry	1	5/24/2017 2:31:51 PM
1,2,4-Trimethylbenzene	ND	0.0180		mg/Kg-dry	1	5/24/2017 2:31:51 PM
Hexachlorobutadiene	ND	0.0902		mg/Kg-dry	1	5/24/2017 2:31:51 PM
Naphthalene	ND	0.0271	Q	mg/Kg-dry	1	5/24/2017 2:31:51 PM
1,2,3-Trichlorobenzene	ND	0.0180		mg/Kg-dry	1	5/24/2017 2:31:51 PM
Surr: Dibromofluoromethane	95.1	56.5-129		%Rec	1	5/24/2017 2:31:51 PM
Surr: Toluene-d8	98.1	64.5-151		%Rec	1	5/24/2017 2:31:51 PM
Surr: 1-Bromo-4-fluorobenzene	89.2	63.1-141		%Rec	1	5/24/2017 2:31:51 PM

NOTES:

Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Mercury by EPA Method 7471

Batch ID: 17157

Analyst: WF

Mercury	ND	0.253		mg/Kg-dry	1	5/24/2017 5:10:48 PM
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Total Metals by EPA Method 6020

Batch ID: 17124

Analyst: TN

Arsenic	2.58	0.0847		mg/Kg-dry	1	5/24/2017 1:18:50 PM
Barium	51.5	0.423		mg/Kg-dry	1	5/24/2017 1:18:50 PM
Cadmium	ND	0.169		mg/Kg-dry	1	5/24/2017 1:18:50 PM
Chromium	38.1	0.0847		mg/Kg-dry	1	5/24/2017 1:18:50 PM
Lead	1.94	0.169		mg/Kg-dry	1	5/24/2017 1:18:50 PM
Selenium	1.05	0.423		mg/Kg-dry	1	5/24/2017 1:18:50 PM
Silver	ND	0.0847		mg/Kg-dry	1	5/24/2017 1:18:50 PM



Analytical Report

Work Order: 1705202
Date Reported: 6/6/2017

Client: GeoEngineers

Collection Date: 5/16/2017 2:20:00 PM

Project: Rufus 2.0 Block 18

Lab ID: 1705202-029

Matrix: Soil

Client Sample ID: B18-4-15.0

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Sample Moisture (Percent Moisture)

Batch ID: R36211 Analyst: CG

Percent Moisture	8.43			wt%	1	5/18/2017 8:29:46 AM
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Work Order: 1705202
CLIENT: GeoEngineers
Project: Rufus 2.0 Block 18

QC SUMMARY REPORT

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

Sample ID	MB-17094	SampType:	MBLK			Units:	mg/Kg			Prep Date:	5/18/2017			RunNo:	36365		
Client ID:	MBLKS	Batch ID:	17094			Analysis Date:					5/18/2017			SeqNo:	697212		
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val		%RPD	RPDLimit	Qual				

Diesel (Fuel Oil)	ND	20.0									
Heavy Oil	ND	50.0									
Surr: 2-Fluorobiphenyl	18.8		20.00		94.1	50	150				
Surr: o-Terphenyl	18.4		20.00		91.8	50	150				

Sample ID	LCS-17094	SampType:	LCS	Units:	mg/Kg	Prep Date:	5/18/2017	RunNo:	36365		
Client ID:	LCSS	Batch ID:	17094			Analysis Date:	5/18/2017	SeqNo:	697211		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Diesel (Fuel Oil)	487	20.0	500.0	0	97.4	65	135				
Surr: 2-Fluorobiphenyl	19.7		20.00		98.4	50	150				
Surr: o-Terphenyl	21.8		20.00		109	50	150				

Sample ID	1705202-018ADUP	SampType:	DUP	Units:	mg/Kg-dry	Prep Date:	5/18/2017	RunNo:	36365		
Client ID:	B18-6-10.0	Batch ID:	17094			Analysis Date:	5/19/2017	SeqNo:	697187		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Diesel (Fuel Oil)	ND	21.2						0		30	
Heavy Oil	147	53.0						126.5	15.1	30	
Surr: 2-Fluorobiphenyl	19.6		21.19		92.5	50	150		0		
Surr: o-Terphenyl	19.2		21.19		90.6	50	150		0		

Sample ID	1705202-018AMS	SampType: MS			Units: mg/Kg-dry		Prep Date: 5/18/2017			RunNo: 36365		
Client ID:	B18-6-10.0	Batch ID: 17094			Analysis Date: 5/19/2017					SeqNo: 697188		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Diesel (Fuel Oil)	454	21.4	534.3	0	85.0	65	135				
Surr: 2-Fluorobiphenyl	20.8		21.37		97.2	50	150				
Surr: o-Terphenyl	22.8		21.37		107	50	150				

Work Order: 1705202
CLIENT: GeoEngineers
Project: Rufus 2.0 Block 18

QC SUMMARY REPORT

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

Sample ID	1705202-018AMS	SampType:	MS	Units:	mg/Kg-dry	Prep Date:	5/18/2017	RunNo:	36365		
Client ID:	B18-6-10.0	Batch ID:	17094			Analysis Date:	5/19/2017	SeqNo:	697188		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Sample ID	1705202-018AMSD	SampType:	MSD	Units:	mg/Kg-dry	Prep Date:	5/18/2017	RunNo:	36365		
Client ID:	B18-6-10.0	Batch ID:	17094			Analysis Date:	5/19/2017	SeqNo:	697189		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	465	21.6	540.0	0	86.1	65	135	454.0	2.42	30	
Surr: 2-Fluorobiphenyl	19.8		21.60		91.8	50	150		0		
Surr: o-Terphenyl	21.3		21.60		98.7	50	150		0		

Sample ID	1705215-003ADUP	SampType:	DUP		Units:	mg/Kg-dry		Prep Date:	5/18/2017		RunNo:	36365	
Client ID:	BATCH	Batch ID:	17094					Analysis Date:	5/24/2017		SeqNo:	697196	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val		%RPD	RPDLimit	Qual	
Diesel (Fuel Oil)	ND	24.6						0			30		
Heavy Oil	80.0	61.5						55.44		36.2	30		
Surr: 2-Fluorobiphenyl	22.6		24.58		92.1	50	150			0			
Surr: o-Terphenyl	22.3		24.58		90.8	50	150			0			

Work Order: 1705202
CLIENT: GeoEngineers
Project: Rufus 2.0 Block 18

QC SUMMARY REPORT

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

Sample ID	MB-17078	SampType:	MBLK			Units:	mg/Kg			Prep Date:	5/17/2017			RunNo:	36338		
Client ID:	MBLKS	Batch ID:	17078			Analysis Date:					5/20/2017			SeqNo:	696621		
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val		%RPD	RPDLimit	Qual				

Diesel (Fuel Oil)	ND	20.0									
Heavy Oil	ND	50.0									
Surr: 2-Fluorobiphenyl	19.2		20.00		95.9	50	150				
Surr: o-Terphenyl	19.3		20.00		96.7	50	150				

Sample ID	LCS-17078	SampType:	LCS	Units:	mg/Kg	Prep Date:	5/17/2017	RunNo:	36338		
Client ID:	LCSS	Batch ID:	17078	Analysis Date:	5/20/2017	SeqNo:	696620				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Diesel (Fuel Oil)	514	20.0	500.0	0	103	65	135				
Surr: 2-Fluorobiphenyl	20.4		20.00		102	50	150				
Surr: o-Terphenyl	22.3		20.00		111	50	150				

Sample ID	1705202-001ADUP	SampType:	DUP	Units:	mg/Kg-dry	Prep Date:	5/17/2017	RunNo:	36338		
Client ID:	B18-8-2.5	Batch ID:	17078			Analysis Date:	5/20/2017	SeqNo:	696588		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Diesel (Fuel Oil)	ND	21.1						0		30	
Heavy Oil	ND	52.6						0		30	
Surr: 2-Fluorobiphenyl	19.4		21.05		92.0	50	150		0		
Surr: o-Terphenyl	19.6		21.05		93.1	50	150		0		

Sample ID	1705202-001AMS	SampType:	MS	Units:	mg/Kg-dry	Prep Date:	5/17/2017	RunNo:	36338		
Client ID:	B18-8-2.5	Batch ID:	17078	Analysis Date:	5/20/2017	SeqNo:	696589				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Diesel (Fuel Oil)	505	19.6	491.1	0	103	65	135				
Surr: 2-Fluorobiphenyl	18.7		19.65		95.1	50	150				
Surr: o-Terphenyl	20.8		19.65		106	50	150				

Work Order: 1705202
CLIENT: GeoEngineers
Project: Rufus 2.0 Block 18

QC SUMMARY REPORT

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

Sample ID 1705202-001AMS	SampType: MS	Units: mg/Kg-dry		Prep Date: 5/17/2017	RunNo: 36338
Client ID: B18-8-2.5	Batch ID: 17078	Analysis Date: 5/20/2017		SeqNo: 696589	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual

Sample ID 1705202-001AMSD	SampType: MSD	Units: mg/Kg-dry		Prep Date: 5/17/2017	RunNo: 36338
Client ID: B18-8-2.5	Batch ID: 17078	Analysis Date: 5/20/2017		SeqNo: 696590	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual
Diesel (Fuel Oil)	504	20.5	512.7	0	98.4 65 135 504.5 0.0354 30
Surr: 2-Fluorobiphenyl	19.6		20.51		95.5 50 150 0
Surr: o-Terphenyl	21.8		20.51		106 50 150 0

Sample ID 1705202-011ADUP	SampType: DUP	Units: mg/Kg-dry		Prep Date: 5/17/2017	RunNo: 36338
Client ID: B18-7-5.0	Batch ID: 17078	Analysis Date: 5/21/2017		SeqNo: 696601	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC LowLimit HighLimit RPD Ref Val %RPD RPDLimit Qual
Diesel (Fuel Oil)	ND	21.2			0 30
Heavy Oil	ND	53.0			0 30
Surr: 2-Fluorobiphenyl	18.4		21.20		86.8 50 150 0
Surr: o-Terphenyl	19.2		21.20		90.7 50 150 0

Work Order: 1705202
CLIENT: GeoEngineers
Project: Rufus 2.0 Block 18

QC SUMMARY REPORT

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

Sample ID	MB-17072	SampType:	MBLK			Units:	mg/Kg			Prep Date:	5/17/2017			RunNo:	36202			
Client ID:	MBLKS	Batch ID:	17072			Analysis Date:						5/17/2017			SeqNo:	693346		
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val		%RPD	RPDLimit	Qual					

Diesel (Fuel Oil)	ND	20.0									
Heavy Oil	ND	50.0									
Surr: 2-Fluorobiphenyl	18.0		20.00		89.8	50	150				
Surr: o-Terphenyl	18.0		20.00		89.8	50	150				

Sample ID	LCS-17072	SampType:	LCS	Units:	mg/Kg	Prep Date:	5/17/2017	RunNo:	36202		
Client ID:	LCSS	Batch ID:	17072	Analysis Date:	5/17/2017	SeqNo:	693345				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Diesel (Fuel Oil)	509	20.0	500.0	0	102	65	135				
Surr: 2-Fluorobiphenyl	18.9		20.00		94.6	50	150				
Surr: o-Terphenyl	20.8		20.00		104	50	150				

Sample ID	1705199-005ADUP	SampType:	DUP	Units:	mg/Kg-dry	Prep Date:	5/17/2017	RunNo:	36202		
Client ID:	BATCH	Batch ID:	17072			Analysis Date:	5/18/2017	SeqNo:	696074		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Diesel (Fuel Oil)	ND	40.0						0		30	
Heavy Oil	ND	100						0		30	
Heavy Oil Range Organics (C24-37)	319	100						367.2	14.0	30	
Surr: 2-Fluorobiphenyl	13.8		40.03		34.5	50	150		0		S
Surr: o-Terphenyl	16.9		40.03		42.3	50	150		0		S

NOTES:

S - Outlying surrogate recovery(ies) observed. A duplicate analysis was performed with similar results indicating a possible matrix effect.
 Heavy Oil Range Organics - Indicates the presence of unresolved compounds in the Lube+ Oil ranges.

Work Order: 1705202
CLIENT: GeoEngineers
Project: Rufus 2.0 Block 18

QC SUMMARY REPORT

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

Sample ID	1705173-013ADUP	SampType:	DUP	Units:	mg/Kg-dry	Prep Date:	5/17/2017	RunNo:	36202		
Client ID:	BATCH	Batch ID:	17072			Analysis Date:	5/18/2017	SeqNo:	695118		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Diesel (Fuel Oil)	ND	21.3						0		30	
Heavy Oil	80.5	53.3						63.39	23.7	30	
Surr: 2-Fluorobiphenyl	21.4		21.34		100	50	150		0		
Surr: o-Terphenyl	22.2		21.34		104	50	150		0		

Sample ID	1705173-013AMS	SampType:	MS	Units:	mg/Kg-dry	Prep Date:	5/17/2017	RunNo:	36202		
Client ID:	BATCH	Batch ID:	17072	Analysis Date:				5/18/2017	SeqNo:	695119	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Diesel (Fuel Oil)	549	21.2	529.5	13.17	101	65	135				
Surr: 2-Fluorobiphenyl	20.2		21.18		95.5	50	150				
Surr: o-Terphenyl	23.3		21.18		110	50	150				

Sample ID	1705173-013AMSD	SampType:	MSD	Units:	mg/Kg-dry	Prep Date:	5/17/2017	RunNo:	36202		
Client ID:	BATCH	Batch ID:	17072	Analysis Date:	5/18/2017	SeqNo:	695132				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Diesel (Fuel Oil)	548	21.4	534.5	13.17	100	65	135	548.9	0.222	30	
Surr: 2-Fluorobiphenyl	26.6		21.38		124	50	150		0		
Surr: o-Terphenyl	28.4		21.38		133	50	150		0		

Work Order: 1705202
CLIENT: GeoEngineers
Project: Rufus 2.0 Block 18

QC SUMMARY REPORT

Gasoline by NWTPH-Gx

Sample ID	LCS-17149	SampType:	LCS	Units:	mg/Kg	Prep Date:	5/23/2017	RunNo:	36371		
Client ID:	LCSS	Batch ID:	17149			Analysis Date:	5/24/2017	SeqNo:	697397		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Gasoline	25.8	5.00	25.00	0	103	65	135				
Surr: Toluene-d8	1.15		1.250		91.7	65	135				
Surr: 4-Bromofluorobenzene	1.23		1.250		98.6	65	135				

Sample ID	MB-17149	SampType:	MBLK			Units:	mg/Kg			Prep Date:	5/23/2017		RunNo:	36371	
Client ID:	MBLKS	Batch ID:	17149						Analysis Date:	5/24/2017			SeqNo:	697398	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val		%RPD	RPDLimit	Qual		

Gasoline	ND	5.00									
Surr: Toluene-d8	1.17		1.250		93.6	65	135				
Surr: 4-Bromofluorobenzene	1.09		1.250		87.2	65	135				

Sample ID	1705202-001BDUP	SampType:	DUP	Units:	mg/Kg-dry	Prep Date:	5/23/2017	RunNo:	36371		
Client ID:	B18-8-2.5	Batch ID:	17149			Analysis Date:	5/24/2017	SeqNo:	697381		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Gasoline	ND	7.96						0		30	
Surr: Toluene-d8	1.91		1.989		96.2	65	135		0		
Surr: 4-Bromofluorobenzene	1.82		1.989		91.4	65	135		0		

Sample ID	1705202-023BMS	SampType:	MSD	Units:	mg/Kg-dry	Prep Date:	5/23/2017	RunNo:	36371		
Client ID:	B18-5-10.0	Batch ID:	17149			Analysis Date:	5/24/2017	SeqNo:	697391		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Gasoline	20.2	6.22	31.08	0	65.1	65	135				
Surr: Toluene-d8	1.50		1.554		96.7	65	135				
Surr: 4-Bromofluorobenzene	1.56		1.554		101	65	135				



Work Order: 1705202
CLIENT: GeoEngineers
Project: Rufus 2.0 Block 18

QC SUMMARY REPORT

Gasoline by NWTPH-Gx

Sample ID	1705202-023BMSD	SampType:	MSD	Units:	mg/Kg-dry	Prep Date:	5/23/2017	RunNo:	36371		
Client ID:	B18-5-10.0	Batch ID:	17149			Analysis Date:	5/24/2017	SeqNo:	697392		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Gasoline	9.80	6.22	31.08	0	31.5	65	135				SI
Surr: Toluene-d8	1.52		1.554		97.5	65	135				I
Surr: 4-Bromofluorobenzene	1.65		1.554		106	65	135				I

NOTES:

S - Outlying spike recovery(ies) observed. A duplicate analysis was performed and recovered within range.

I - Indicates an analyte with an internal standard that does not meet established acceptance criteria. A duplicate analysis was performed and recovered within range.

Sample ID	1705202-026BDUP	SampType:	DUP	Units:	mg/Kg-dry	Prep Date:	5/23/2017	RunNo:	36371		
Client ID:	B18-4-5.0	Batch ID:	17149			Analysis Date:	5/24/2017	SeqNo:	697394		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Gasoline	ND	7.95						0		30	
Surr: Toluene-d8	1.92		1.988		96.6	65	135		0		
Surr: 4-Bromofluorobenzene	1.86		1.988		93.8	65	135		0		

Work Order: 1705202
CLIENT: GeoEngineers
Project: Rufus 2.0 Block 18

QC SUMMARY REPORT

Hexavalent Chromium by EPA Method 7196

Sample ID	MB-17266	SampType:	MBLK			Units:	mg/Kg			Prep Date:	6/6/2017			RunNo:	36628		
Client ID:	MBLKS	Batch ID:	17266			Analysis Date:					6/6/2017			SeqNo:	703001		
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val		%RPD	RPDLimit	Qual				

Chromium, Hexavalent	ND	0.500									
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Sample ID	LCS-17266	SampType: LCS			Units: mg/Kg		Prep Date: 6/6/2017			RunNo: 36628		
Client ID:	LCSS	Batch ID: 17266			Analysis Date: 6/6/2017					SeqNo: 703002		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Chromium, Hexavalent	2.12	0.500	2.500	0	84.6	65	135				
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Sample ID	1705202-018ADUP	SampType:	DUP	Units:	mg/Kg-dry	Prep Date:	6/6/2017	RunNo:	36628		
Client ID:	B18-6-10.0	Batch ID:	17266	Analysis Date:	6/6/2017	SeqNo:	703006				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Chromium, Hexavalent	ND	0.534						0		30	
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Sample ID	1705202-018AMS	SampType:	MS	Units:	mg/Kg-dry	Prep Date:	6/6/2017	RunNo:	36628		
Client ID:	B18-6-10.0	Batch ID:	17266			Analysis Date:	6/6/2017	SeqNo:	703007		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Chromium, Hexavalent	2.26	0.541	2.705	0	83.4	65	135				
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Sample ID	1705202-018AMSD	SampType:	MSD	Units:	mg/Kg-dry	Prep Date:	6/6/2017	RunNo:	36628		
Client ID:	B18-6-10.0	Batch ID:	17266	Analysis Date:				6/6/2017	SeqNo:	703008	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Chromium, Hexavalent	2.75	0.514	2.572	0	107	65	135	2.257	19.6	30	
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Work Order: 1705202
CLIENT: GeoEngineers
Project: Rufus 2.0 Block 18

QC SUMMARY REPORT

Hexavalent Chromium by EPA Method 7196

Sample ID	1705202-018APDS		SampType:	PDS		Units:	mg/Kg-dry		Prep Date:	6/6/2017		RunNo:	36628	
Client ID:	B18-6-10.0		Batch ID:	17266					Analysis Date:	6/6/2017		SeqNo:	703009	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual			
Chromium, Hexavalent	0.250	0.542	2.50	-0.00680	99.8	85	115							

Work Order: 1705202
CLIENT: GeoEngineers
Project: Rufus 2.0 Block 18

QC SUMMARY REPORT

Mercury by EPA Method 7471

Sample ID	MB-17157	SampType:	MBLK			Units:	mg/Kg			Prep Date:	5/24/2017		RunNo:	36378		
Client ID:	MBLKS	Batch ID:	17157			Analysis Date:						5/24/2017		SeqNo:	697566	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val		%RPD	RPDLimit	Qual			

Mercury ND 0.250

Sample ID	LCS-17157	SampType: LCS			Units: mg/Kg		Prep Date: 5/24/2017			RunNo: 36378		
Client ID:	LCSS	Batch ID: 17157			Analysis Date: 5/24/2017			SeqNo: 697567				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Mercury 0.499 0.250 0.5000 0 99.8 80 120

Sample ID	1705202-001ADUP	SampType:	DUP	Units:	mg/Kg-dry	Prep Date:	5/24/2017	RunNo:	36378		
Client ID:	B18-8-2.5	Batch ID:	17157			Analysis Date:	5/24/2017	SeqNo:	697569		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Mercury ND 0.268 0 20

Sample ID	1705202-001AMS	SampType:	MS	Units:	mg/Kg-dry	Prep Date:	5/24/2017	RunNo:	36378		
Client ID:	B18-8-2.5	Batch ID:	17157			Analysis Date:	5/24/2017	SeqNo:	697570		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Mercury 0.575 0.268 0.5363 0 107 70 130

Sample ID	1705202-001AMSD	SampType:	MSD	Units:	mg/Kg-dry	Prep Date:	5/24/2017	RunNo:	36378		
Client ID:	B18-8-2.5	Batch ID:	17157			Analysis Date:	5/24/2017	SeqNo:	697571		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Mercury 0.558 0.268 0.5363 0 104 70 130 0.5749 3.03 20

Work Order: 1705202
CLIENT: GeoEngineers
Project: Rufus 2.0 Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID	MB-17093	SampType:	MBLK		Units:	µg/Kg		Prep Date:	5/18/2017		RunNo:	36253	
Client ID:	MBLKS	Batch ID:	17093					Analysis Date:	5/18/2017		SeqNo:	694778	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val		%RPD	RPDLimit	Qual
Naphthalene		ND	40.0										
2-Methylnaphthalene		ND	40.0										
1-Methylnaphthalene		ND	40.0										
Acenaphthylene		ND	40.0										
Acenaphthene		ND	40.0										
Fluorene		ND	40.0										
Phenanthrene		ND	40.0										
Anthracene		ND	40.0										
Fluoranthene		ND	40.0										
Pyrene		ND	40.0										
Benz(a)anthracene		ND	40.0										
Chrysene		ND	40.0										
Benzo(b)fluoranthene		ND	40.0										
Benzo(k)fluoranthene		ND	40.0										
Benzo(a)pyrene		ND	40.0										
Indeno(1,2,3-cd)pyrene		ND	40.0										
Dibenz(a,h)anthracene		ND	40.0										
Benzo(g,h,i)perylene		ND	40.0										
Surr: 2-Fluorobiphenyl		445		500.0		88.9	24.5	139					
Surr: Terphenyl-d14 (surr)		419		500.0		83.9	44.3	176					

Sample ID	LCS-17093	SampType:	LCS	Units:	µg/Kg	Prep Date:	5/18/2017	RunNo:	36253		
Client ID:	LCSS	Batch ID:	17093			Analysis Date:	5/18/2017	SeqNo:	694779		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	889	40.0	1,000	0	88.9	46.4	125				
2-Methylnaphthalene	903	40.0	1,000	0	90.3	45.1	135				
1-Methylnaphthalene	905	40.0	1,000	0	90.5	46.2	133				
Acenaphthylene	930	40.0	1,000	0	93.0	32.8	136				
Acenaphthene	887	40.0	1,000	0	88.7	38.7	129				

Work Order: 1705202
CLIENT: GeoEngineers
Project: Rufus 2.0 Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID	LCS-17093	SampType:	LCS	Units:	µg/Kg	Prep Date:	5/18/2017	RunNo:	36253		
Client ID:	LCSS	Batch ID:	17093			Analysis Date:	5/18/2017	SeqNo:	694779		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluorene	924	40.0	1,000	0	92.4	41.4	144				
Phenanthrene	940	40.0	1,000	0	94.0	43.9	133				
Anthracene	959	40.0	1,000	0	95.9	44.2	136				
Fluoranthene	955	40.0	1,000	0	95.5	45.9	137				
Pyrene	945	40.0	1,000	0	94.5	46.2	137				
Benz(a)anthracene	970	40.0	1,000	0	97.0	41.9	136				
Chrysene	967	40.0	1,000	0	96.7	46.9	138				
Benzo(b)fluoranthene	996	40.0	1,000	0	99.6	41	155				
Benzo(k)fluoranthene	975	40.0	1,000	0	97.5	41.8	153				
Benzo(a)pyrene	1,040	40.0	1,000	0	104	34.3	157				
Indeno(1,2,3-cd)pyrene	961	40.0	1,000	0	96.1	31.3	159				
Dibenz(a,h)anthracene	937	40.0	1,000	0	93.7	28	158				
Benzo(g,h,i)perylene	939	40.0	1,000	0	93.9	32.4	144				
Surr: 2-Fluorobiphenyl	431		500.0		86.2	24.5	139				
Surr: Terphenyl-d14 (surr)	413		500.0		82.6	44.3	176				

Sample ID	1705202-005ADUP	SampType:	DUP	Units:	µg/Kg-dry	Prep Date:	5/18/2017	RunNo:	36253		
Client ID:	B18-8-15.0	Batch ID:	17093			Analysis Date:	5/18/2017	SeqNo:	694781		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	39.0						0		30	
2-Methylnaphthalene	ND	39.0						0		30	
1-Methylnaphthalene	ND	39.0						0		30	
Acenaphthylene	ND	39.0						0		30	
Acenaphthene	ND	39.0						0		30	
Fluorene	ND	39.0						0		30	
Phenanthrene	ND	39.0						0		30	
Anthracene	ND	39.0						0		30	
Fluoranthene	ND	39.0						0		30	
Pyrene	ND	39.0						0		30	

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QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID	1705202-005ADUP	SampType:	DUP	Units:	µg/Kg-dry	Prep Date:	5/18/2017	RunNo:	36253		
Client ID:	B18-8-15.0	Batch ID:	17093			Analysis Date:	5/18/2017	SeqNo:	694781		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benz(a)anthracene	ND	39.0						0		30	
Chrysene	ND	39.0						0		30	
Benzo(b)fluoranthene	ND	39.0						0		30	
Benzo(k)fluoranthene	ND	39.0						0		30	
Benzo(a)pyrene	ND	39.0						0		30	
Indeno(1,2,3-cd)pyrene	ND	39.0						0		30	
Dibenz(a,h)anthracene	ND	39.0						0		30	
Benzo(g,h,i)perylene	ND	39.0						0		30	
Surr: 2-Fluorobiphenyl	292		487.6		59.8	24.5	139		0		
Surr: Terphenyl-d14 (surr)	251		487.6		51.4	44.3	176		0		

Sample ID	1705202-005AMS	SampType:	MS		Units:	µg/Kg-dry		Prep Date:	5/18/2017		RunNo:	36253	
Client ID:	B18-8-15.0	Batch ID:	17093					Analysis Date:	5/18/2017		SeqNo:	694782	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual		
Naphthalene	750	38.0	949.2	0	79.0	42.9	138						
2-Methylnaphthalene	762	38.0	949.2	0	80.3	42.8	151						
1-Methylnaphthalene	761	38.0	949.2	0	80.2	41.6	148						
Acenaphthylene	782	38.0	949.2	3.627	82.0	32.6	160						
Acenaphthene	753	38.0	949.2	0	79.4	46.3	142						
Fluorene	780	38.0	949.2	0	82.1	43.4	153						
Phenanthrene	791	38.0	949.2	0	83.4	45.5	140						
Anthracene	798	38.0	949.2	3.487	83.7	32.6	160						
Fluoranthene	793	38.0	949.2	2.625	83.3	44.6	161						
Pyrene	790	38.0	949.2	2.708	82.9	48.3	158						
Benz(a)anthracene	807	38.0	949.2	5.124	84.5	34.9	139						
Chrysene	820	38.0	949.2	0	86.3	45.2	146						
Benzo(b)fluoranthene	850	38.0	949.2	0	89.5	42.2	168						
Benzo(k)fluoranthene	813	38.0	949.2	0	85.7	34.8	147						
Benzo(a)pyrene	879	38.0	949.2	0	92.6	34.4	179						

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QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID	1705202-005AMS	SampType:	MS	Units:	µg/Kg-dry	Prep Date:	5/18/2017	RunNo:	36253		
Client ID:	B18-8-15.0	Batch ID:	17093			Analysis Date:	5/18/2017	SeqNo:	694782		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Indeno(1,2,3-cd)pyrene	801	38.0	949.2	0	84.4	5	113				
Dibenz(a,h)anthracene	783	38.0	949.2	0	82.5	17.3	156				
Benzo(g,h,i)perylene	784	38.0	949.2	0	82.6	24.9	119				
Surr: 2-Fluorobiphenyl	349		474.6		73.5	24.5	139				
Surr: Terphenyl-d14 (surr)	318		474.6		67.1	44.3	176				

Sample ID	1705202-005AMSD	SampType:	MSD	Units:	µg/Kg-dry	Prep Date:	5/18/2017	RunNo:	36253		
Client ID:	B18-8-15.0	Batch ID:	17093			Analysis Date:	5/18/2017	SeqNo:	694783		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	787	42.7	1,067	0	73.8	42.9	138	749.6	4.92	30	
2-Methylnaphthalene	805	42.7	1,067	0	75.4	42.8	151	761.9	5.45	30	
1-Methylnaphthalene	803	42.7	1,067	0	75.3	41.6	148	761.1	5.40	30	
Acenaphthylene	835	42.7	1,067	3.627	77.9	32.6	160	782.3	6.57	30	
Acenaphthene	797	42.7	1,067	0	74.7	46.3	142	753.4	5.61	30	
Fluorene	830	42.7	1,067	0	77.8	43.4	153	779.8	6.26	30	
Phenanthrene	837	42.7	1,067	0	78.5	45.5	140	791.5	5.63	30	
Anthracene	850	42.7	1,067	3.487	79.3	32.6	160	797.7	6.30	30	
Fluoranthene	850	42.7	1,067	2.625	79.4	44.6	161	793.1	6.89	30	
Pyrene	846	42.7	1,067	2.708	79.0	48.3	158	790.0	6.87	30	
Benz(a)anthracene	869	42.7	1,067	5.124	80.9	34.9	139	807.5	7.28	30	
Chrysene	864	42.7	1,067	0	80.9	45.2	146	819.5	5.28	30	
Benzo(b)fluoranthene	898	42.7	1,067	0	84.1	42.2	168	849.8	5.51	30	
Benzo(k)fluoranthene	834	42.7	1,067	0	78.1	34.8	147	813.0	2.50	30	
Benzo(a)pyrene	908	42.7	1,067	0	85.0	34.4	179	878.6	3.26	30	
Indeno(1,2,3-cd)pyrene	828	42.7	1,067	0	77.6	5	113	800.7	3.32	30	
Dibenz(a,h)anthracene	805	42.7	1,067	0	75.4	17.3	156	782.9	2.79	30	
Benzo(g,h,i)perylene	809	42.7	1,067	0	75.8	24.9	119	784.4	3.08	30	
Surr: 2-Fluorobiphenyl	358		533.6		67.2	24.5	139		0		
Surr: Terphenyl-d14 (surr)	341		533.6		63.9	44.3	176		0		



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QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID	1705202-005AMSD	SampType:	MSD	Units:	µg/Kg-dry	Prep Date:	5/18/2017	RunNo:	36253		
Client ID:	B18-8-15.0	Batch ID:	17093			Analysis Date:	5/18/2017	SeqNo:	694783		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

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QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID	MB-17077	SampType:	MBLK		Units:	µg/Kg		Prep Date:	5/17/2017		RunNo:	36242	
Client ID:	MBLKS	Batch ID:	17077					Analysis Date:	5/17/2017		SeqNo:	694208	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual		
Naphthalene	ND	40.0											
2-Methylnaphthalene	ND	40.0											
1-Methylnaphthalene	ND	40.0											
Acenaphthylene	ND	40.0											
Acenaphthene	ND	40.0											
Fluorene	ND	40.0											
Phenanthrene	ND	40.0											
Anthracene	ND	40.0											
Fluoranthene	ND	40.0											
Pyrene	ND	40.0											
Benz(a)anthracene	ND	40.0											
Chrysene	ND	40.0											
Benzo(b)fluoranthene	ND	40.0											
Benzo(k)fluoranthene	ND	40.0											
Benzo(a)pyrene	ND	40.0											
Indeno(1,2,3-cd)pyrene	ND	40.0											
Dibenz(a,h)anthracene	ND	40.0											
Benzo(g,h,i)perylene	ND	40.0											
Surr: 2-Fluorobiphenyl	277		500.0		55.4	24.5	139						
Surr: Terphenyl-d14 (surr)	420		500.0		84.0	44.3	176						

Sample ID	LCS-17077	SampType:	LCS	Units:	µg/Kg	Prep Date:	5/17/2017	RunNo:	36242		
Client ID:	LCSS	Batch ID:	17077			Analysis Date:	5/17/2017	SeqNo:	694209		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	876	40.0	1,000	0	87.6	46.4	125				
2-Methylnaphthalene	914	40.0	1,000	0	91.4	45.1	135				
1-Methylnaphthalene	996	40.0	1,000	0	99.6	46.2	133				
Acenaphthylene	890	40.0	1,000	0	89.0	32.8	136				
Acenaphthene	861	40.0	1,000	0	86.1	38.7	129				



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QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID	LCS-17077	SampType:	LCS	Units:	µg/Kg	Prep Date:	5/17/2017	RunNo:	36242		
Client ID:	LCSS	Batch ID:	17077	Analysis Date:				5/17/2017	SeqNo:	694209	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluorene	879	40.0	1,000	0	87.9	41.4	144				
Phenanthrene	857	40.0	1,000	0	85.7	43.9	133				
Anthracene	934	40.0	1,000	0	93.4	44.2	136				
Fluoranthene	927	40.0	1,000	0	92.7	45.9	137				
Pyrene	927	40.0	1,000	0	92.7	46.2	137				
Benz(a)anthracene	957	40.0	1,000	0	95.7	41.9	136				
Chrysene	895	40.0	1,000	0	89.5	46.9	138				
Benzo(b)fluoranthene	948	40.0	1,000	0	94.8	41	155				
Benzo(k)fluoranthene	889	40.0	1,000	0	88.9	41.8	153				
Benzo(a)pyrene	920	40.0	1,000	0	92.0	34.3	157				
Indeno(1,2,3-cd)pyrene	849	40.0	1,000	0	84.9	31.3	159				
Dibenz(a,h)anthracene	874	40.0	1,000	0	87.4	28	158				
Benzo(g,h,i)perylene	811	40.0	1,000	0	81.1	32.4	144				
Surr: 2-Fluorobiphenyl	367		500.0		73.3	24.5	139				
Surr: Terphenyl-d14 (surr)	402		500.0		80.4	44.3	176				

Sample ID	1705173-005ADUP	SampType:	DUP			Units:	µg/Kg-dry			Prep Date:	5/17/2017			RunNo:	36242		
Client ID:	BATCH	Batch ID:	17077							Analysis Date:	5/17/2017			SeqNo:	694218		
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val		%RPD	RPDLimit	Qual				
Naphthalene		ND	37.9						0			30					
2-Methylnaphthalene		ND	37.9						0			30					
1-Methylnaphthalene		ND	37.9						0			30					
Acenaphthylene		ND	37.9						0			30					
Acenaphthene		ND	37.9						0			30					
Fluorene		ND	37.9						0			30					
Phenanthrene		58.3	37.9						30.56		62.5	30					
Anthracene		ND	37.9						0			30					
Fluoranthene		ND	37.9						0			30					
Pyrene		60.8	37.9						53.76		12.3	30					

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QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID	1705173-005ADUP	SampType:	DUP	Units:	µg/Kg-dry	Prep Date:	5/17/2017	RunNo:	36242		
Client ID:	BATCH	Batch ID:	17077			Analysis Date:	5/17/2017	SeqNo:	694218		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benz(a)anthracene	ND	37.9						0		30	
Chrysene	ND	37.9						0		30	
Benzo(b)fluoranthene	88.1	37.9						57.65	41.8	30	
Benzo(k)fluoranthene	ND	37.9						0		30	
Benzo(a)pyrene	ND	37.9						0		30	
Indeno(1,2,3-cd)pyrene	ND	37.9						0		30	
Dibenz(a,h)anthracene	ND	37.9						0		30	
Benzo(g,h,i)perylene	47.0	37.9						32.77	35.7	30	
Surr: 2-Fluorobiphenyl	314		473.7		66.3	24.5	139		0		
Surr: Terphenyl-d14 (surr)	303		473.7		63.9	44.3	176		0		

Sample ID	1705173-005AMS	SampType:	MS	Units:	µg/Kg-dry	Prep Date:	5/17/2017	RunNo:	36242		
Client ID:	BATCH	Batch ID:	17077			Analysis Date:	5/17/2017	SeqNo:	694219		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	609	39.5	988.7	3.978	61.2	42.9	138				
2-Methylnaphthalene	691	39.5	988.7	17.16	68.1	42.8	151				
1-Methylnaphthalene	621	39.5	988.7	5.582	62.2	41.6	148				
Acenaphthylene	642	39.5	988.7	0	65.0	32.6	160				
Acenaphthene	656	39.5	988.7	0	66.4	46.3	142				
Fluorene	637	39.5	988.7	6.262	63.8	43.4	153				
Phenanthrene	628	39.5	988.7	30.56	60.4	45.5	140				
Anthracene	660	39.5	988.7	0	66.8	32.6	160				
Fluoranthene	651	39.5	988.7	0	65.9	44.6	161				
Pyrene	675	39.5	988.7	53.76	62.8	48.3	158				
Benz(a)anthracene	625	39.5	988.7	0	63.2	34.9	139				
Chrysene	649	39.5	988.7	0	65.6	45.2	146				
Benzo(b)fluoranthene	552	39.5	988.7	57.65	50.0	42.2	168				
Benzo(k)fluoranthene	503	39.5	988.7	0	50.9	34.8	147				
Benzo(a)pyrene	484	39.5	988.7	25.40	46.4	34.4	179				

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QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID	1705173-005AMS	SampType: MS	Units: µg/Kg-dry			Prep Date: 5/17/2017			RunNo: 36242		
Client ID:	BATCH	Batch ID:	17077			Analysis Date: 5/17/2017			SeqNo: 694219		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Indeno(1,2,3-cd)pyrene	399	39.5	988.7	10.06	39.4	5	113				
Dibenz(a,h)anthracene	416	39.5	988.7	8.993	41.1	17.3	156				
Benzo(g,h,i)perylene	390	39.5	988.7	32.77	36.1	24.9	119				
Surr: 2-Fluorobiphenyl	303		494.4		61.3	24.5	139				
Surr: Terphenyl-d14 (surr)	275		494.4		55.7	44.3	176				

Sample ID	1705173-005AMSD	SampType:	MSD	Units:	µg/Kg-dry	Prep Date:	5/17/2017	RunNo:	36242		
Client ID:	BATCH	Batch ID:	17077			Analysis Date:	5/17/2017	SeqNo:	694220		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	597	39.1	977.2	3.978	60.6	42.9	138	608.7	1.99	30	
2-Methylnaphthalene	661	39.1	977.2	17.16	65.9	42.8	151	690.9	4.35	30	
1-Methylnaphthalene	704	39.1	977.2	5.582	71.4	41.6	148	621.0	12.5	30	
Acenaphthylene	633	39.1	977.2	0	64.8	32.6	160	642.3	1.39	30	
Acenaphthene	621	39.1	977.2	0	63.6	46.3	142	656.1	5.45	30	
Fluorene	610	39.1	977.2	6.262	61.8	43.4	153	637.3	4.30	30	
Phenanthrene	588	39.1	977.2	30.56	57.0	45.5	140	627.5	6.51	30	
Anthracene	626	39.1	977.2	0	64.0	32.6	160	660.0	5.34	30	
Fluoranthene	593	39.1	977.2	0	60.7	44.6	161	651.1	9.34	30	
Pyrene	616	39.1	977.2	53.76	57.5	48.3	158	674.6	9.08	30	
Benz(a)anthracene	549	39.1	977.2	0	56.2	34.9	139	625.3	13.0	30	
Chrysene	612	39.1	977.2	0	62.6	45.2	146	648.8	5.86	30	
Benzo(b)fluoranthene	510	39.1	977.2	57.65	46.3	42.2	168	552.5	8.03	30	
Benzo(k)fluoranthene	481	39.1	977.2	0	49.2	34.8	147	502.9	4.53	30	
Benzo(a)pyrene	458	39.1	977.2	25.40	44.3	34.4	179	483.8	5.45	30	
Indeno(1,2,3-cd)pyrene	391	39.1	977.2	10.06	39.0	5	113	399.4	2.01	30	
Dibenz(a,h)anthracene	393	39.1	977.2	8.993	39.3	17.3	156	415.7	5.64	30	
Benzo(g,h,i)perylene	382	39.1	977.2	32.77	35.7	24.9	119	390.0	2.09	30	
Surr: 2-Fluorobiphenyl	287		488.6		58.7	24.5	139		0		
Surr: Terphenyl-d14 (surr)	262		488.6		53.6	44.3	176		0		



Work Order: 1705202
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QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID	1705173-005AMSD	SampType:	MSD	Units:	µg/Kg-dry	Prep Date:	5/17/2017	RunNo:	36242		
Client ID:	BATCH	Batch ID:	17077			Analysis Date:	5/17/2017	SeqNo:	694220		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual



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QC SUMMARY REPORT

Sample Moisture (Percent Moisture)

Sample ID 1705208-001ADUP		SampType: DUP			Units: wt%		Prep Date: 5/18/2017			RunNo: 36211		
Client ID: BATCH		Batch ID: R36211			Analysis Date: 5/18/2017				SeqNo: 693642			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Percent Moisture	7.94	0.500						7.905	0.504	20		

Sample ID	1705215-012ADUP	SampType: DUP			Units: wt%		Prep Date: 5/18/2017			RunNo: 36211		
Client ID:	BATCH	Batch ID: R36211			Analysis Date: 5/18/2017				SeqNo: 693764			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Percent Moisture	6.79	0.500						6.981	2.75	20		



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QC SUMMARY REPORT

Sample Moisture (Percent Moisture)

Sample ID	1705190-001ADUP			SampType:	DUP		Units:	wt%		Prep Date:	5/17/2017		RunNo:	36200	
Client ID:	BATCH			Batch ID:	R36200					Analysis Date:	5/17/2017		SeqNo:	693275	
Analyte		Result	RL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val		%RPD	RPDLimit	Qual	
Percent Moisture		4.00	0.500							4.004		0.0889	20		

Sample ID	1705202-013ADUP			SampType:	DUP		Units:	wt%		Prep Date:	5/17/2017		RunNo:	36200	
Client ID:	B18-7-10.0			Batch ID:	R36200					Analysis Date:	5/17/2017		SeqNo:	693307	
Analyte		Result	RL	SPK value	SPK Ref Val		%REC	LowLimit	HighLimit	RPD Ref Val		%RPD	RPDLimit	Qual	
Percent Moisture		7.71	0.500							8.021		4.01	20		



Date: 6/6/2017

Work Order: 1705202
CLIENT: GeoEngineers
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QC SUMMARY REPORT
Total Metals by EPA Method 6020

Sample ID	MB-17124	SampType:	MBLK			Units:	mg/Kg		Prep Date:	5/22/2017		RunNo:	36316	
Client ID:	MBLKS	Batch ID:	17124						Analysis Date:	5/22/2017		SeqNo:	696051	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val			%RPD	RPDLimit	Qual

Arsenic	ND	0.0758
Barium	ND	0.379
Cadmium	ND	0.152
Chromium	ND	0.0758
Lead	ND	0.152
Selenium	ND	0.379
Silver	ND	0.0758

Sample ID	LCS-17124	SampType: LCS			Units: mg/Kg		Prep Date: 5/22/2017			RunNo: 36316		
Client ID:	LCSS	Batch ID: 17124			Analysis Date: 5/22/2017					SeqNo: 696052		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Arsenic	38.2	0.0735	36.76	0	104	80	120
Barium	37.9	0.368	36.76	0	103	80	120
Cadmium	1.92	0.147	1.838	0	105	80	120
Chromium	38.7	0.0735	36.76	0	105	80	120
Lead	20.2	0.147	18.38	0	110	80	120
Selenium	3.52	0.368	3.676	0	95.6	80	120
Silver	8.10	0.0735	9.191	0	88.1	80	120

Sample ID	1705251-007ADUP	SampType:	DUP	Units:	mg/Kg-dry	Prep Date:	5/22/2017	RunNo:	36316		
Client ID:	BATCH	Batch ID:	17124			Analysis Date:	5/22/2017	SeqNo:	696054		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Arsenic	8.46	0.105						7.496	12.0	20
Barium	86.0	0.526						82.17	4.57	20
Cadmium	ND	0.210						0		20
Chromium	43.9	0.105						38.54	13.1	20
Lead	15.2	0.210						14.23	6.83	20
Selenium	1.01	0.526						1.020	1.18	20

Work Order: 1705202
CLIENT: GeoEngineers
Project: Rufus 2.0 Block 18

QC SUMMARY REPORT

Total Metals by EPA Method 6020

Sample ID	1705251-007ADUP	SampType:	DUP	Units:	mg/Kg-dry	Prep Date:	5/22/2017	RunNo:	36316		
Client ID:	BATCH	Batch ID:	17124			Analysis Date:	5/22/2017	SeqNo:	696054		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Silver	ND	0.105						0		20	

Sample ID	1705251-007AMS	SampType: MS		Units: mg/Kg-dry		Prep Date: 5/22/2017		RunNo: 36316			
Client ID:	BATCH	Batch ID: 17124				Analysis Date: 5/22/2017		SeqNo: 696058			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	56.6	0.105	52.61	7.496	93.4	75	125				
Barium	121	0.526	52.61	82.17	73.9	75	125				S
Cadmium	2.62	0.210	2.631	0.2004	91.8	75	125				
Chromium	87.0	0.105	52.61	38.54	92.2	75	125				
Lead	36.3	0.210	26.31	14.23	83.9	75	125				
Selenium	5.62	0.526	5.261	1.020	87.5	75	125				
Silver	8.39	0.105	13.15	0.06603	63.3	75	125				S

NOTES:

S - Outlying spike recovery observed (Ag). A duplicate analysis was performed with similar results indicating a possible matrix effect.

S - Outlying spike recovery observed (Ba). A duplicate analysis was performed and recovered within range.

Sample ID	1705251-007AMSD	SampType: MSD		Units: mg/Kg-dry		Prep Date: 5/22/2017			RunNo: 36316		
Client ID:	BATCH	Batch ID: 17124		Analysis Date: 5/22/2017					SeqNo: 696059		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	62.7	0.105	52.61	7.496	105	75	125	56.62	10.2	20	RS
Barium	128	0.526	52.61	82.17	86.5	75	125	121.1	5.29	20	
Cadmium	2.99	0.210	2.631	0.2004	106	75	125	2.617	13.4	20	
Chromium	107	0.105	52.61	38.54	131	75	125	87.03	21.0	20	
Lead	41.7	0.210	26.31	14.23	104	75	125	36.29	13.9	20	
Selenium	6.23	0.526	5.261	1.020	99.0	75	125	5.622	10.3	20	
Silver	9.77	0.105	13.15	0.06603	73.7	75	125	8.388	15.2	20	

Work Order: 1705202
CLIENT: GeoEngineers
Project: Rufus 2.0 Block 18

QC SUMMARY REPORT

Total Metals by EPA Method 6020

Sample ID	1705251-007AMSD	SampType:	MSD	Units:	mg/Kg-dry	Prep Date:	5/22/2017	RunNo:	36316		
Client ID:	BATCH	Batch ID:	17124	Analysis Date:	5/22/2017	SeqNo:	696059				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

NOTES:

S - Outlying spike recovery observed (Ag). A duplicate analysis was performed with similar results indicating a possible matrix effect.

S - Outlying spike recovery observed (Cr). A duplicate analysis was performed and recovered within range.

R - High RPD observed. The method is in control as indicated by the LCS.

Sample ID	1705251-007APDS	SampType:	PDS			Units:	mg/Kg-dry			Prep Date:	5/22/2017			RunNo:	36316			
Client ID:	BATCH	Batch ID:	17124			Analysis Date:						5/22/2017			SeqNo:	696060		
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val		%RPD	RPDLimit	Qual					
Arsenic		64.2	0.105	52.6	7.50	108	80	120										
Barium		129	0.526	52.6	82.2	88.7	80	120										
Cadmium		2.95	0.210	2.63	0.200	104	80	120										
Chromium		94.3	0.105	52.6	38.5	106	80	120										
Lead		41.3	0.210	26.3	14.2	103	80	120										
Selenium		6.25	0.526	5.26	1.02	99.5	80	120										
Silver		1.93	0.105	2.63	0.0660	70.9	80	120					S					

NOTES:

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

Work Order: 1705202
CLIENT: GeoEngineers
Project: Rufus 2.0 Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID	LCS-17149	SampType:	LCS	Units:	mg/Kg	Prep Date:	5/23/2017	RunNo:	36370		
Client ID:	LCSS	Batch ID:	17149			Analysis Date:	5/24/2017	SeqNo:	697320		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	0.762	0.0600	1.000	0	76.2	14.3	167				
Chloromethane	0.872	0.0600	1.000	0	87.2	46	144				
Vinyl chloride	0.953	0.00200	1.000	0	95.3	44	142				
Bromomethane	1.42	0.0900	1.000	0	142	40.9	157				
Trichlorofluoromethane (CFC-11)	1.09	0.0500	1.000	0	109	36.9	156				
Chloroethane	0.984	0.0600	1.000	0	98.4	33.4	155				
1,1-Dichloroethene	1.04	0.0500	1.000	0	104	49.7	142				
Methylene chloride	0.993	0.0200	1.000	0	99.3	46.3	140				
trans-1,2-Dichloroethene	1.03	0.0200	1.000	0	103	68	130				
Methyl tert-butyl ether (MTBE)	0.704	0.0500	1.000	0	70.4	66.3	145				
1,1-Dichloroethane	1.01	0.0200	1.000	0	101	61.9	137				
2,2-Dichloropropane	0.921	0.0500	1.000	0	92.1	35.5	186				
cis-1,2-Dichloroethene	1.03	0.0200	1.000	0	103	71.3	135				
Chloroform	1.07	0.0200	1.000	0	107	69	145				
1,1,1-Trichloroethane (TCA)	1.13	0.0200	1.000	0	113	69	132				
1,1-Dichloropropene	1.07	0.0200	1.000	0	107	72.7	131				
Carbon tetrachloride	1.21	0.0200	1.000	0	121	63.4	137				
1,2-Dichloroethane (EDC)	0.946	0.0300	1.000	0	94.6	50.9	162				
Benzene	1.02	0.0200	1.000	0	102	64.3	133				
Trichloroethene (TCE)	1.09	0.0200	1.000	0	109	65.5	137				
1,2-Dichloropropane	1.06	0.0200	1.000	0	106	63.2	142				
Bromodichloromethane	1.13	0.0200	1.000	0	113	73.2	131				
Dibromomethane	0.914	0.0400	1.000	0	91.4	60.1	146				
cis-1,3-Dichloropropene	0.920	0.0200	1.000	0	92.0	59.1	143				
Toluene	1.10	0.0200	1.000	0	110	67.3	138				
trans-1,3-Dichloropropylene	0.841	0.0300	1.000	0	84.1	49.2	149				
1,1,2-Trichloroethane	0.911	0.0300	1.000	0	91.1	56.9	147				
1,3-Dichloropropane	0.851	0.0500	1.000	0	85.1	56.1	153				
Tetrachloroethene (PCE)	1.11	0.0200	1.000	0	111	52.7	150				
Dibromochloromethane	0.991	0.0300	1.000	0	99.1	70.6	144				
1,2-Dibromoethane (EDB)	0.832	0.00500	1.000	0	83.2	50.5	154				

Work Order: 1705202
CLIENT: GeoEngineers
Project: Rufus 2.0 Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID	LCS-17149	SampType:	LCS	Units:	mg/Kg	Prep Date:	5/23/2017	RunNo:	36370		
Client ID:	LCSS	Batch ID:	17149			Analysis Date:	5/24/2017	SeqNo:	697320		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorobenzene	1.06	0.0200	1.000	0	106	76.1	123				
1,1,1,2-Tetrachloroethane	1.04	0.0300	1.000	0	104	65.9	141				
Ethylbenzene	1.06	0.0300	1.000	0	106	74	129				
m,p-Xylene	2.24	0.0200	2.000	0	112	70	124				
o-Xylene	1.14	0.0200	1.000	0	114	68.1	139				
Styrene	0.985	0.0200	1.000	0	98.5	73.3	146				
Isopropylbenzene	1.22	0.0800	1.000	0	122	70	130				
Bromoform	0.942	0.0200	1.000	0	94.2	67	154				
1,1,2,2-Tetrachloroethane	0.802	0.0200	1.000	0	80.2	44.8	165				
n-Propylbenzene	1.05	0.0200	1.000	0	105	74.8	125				
Bromobenzene	0.996	0.0300	1.000	0	99.6	49.2	144				
1,3,5-Trimethylbenzene	1.05	0.0200	1.000	0	105	74.6	123				
2-Chlorotoluene	1.09	0.0200	1.000	0	109	76.7	129				
4-Chlorotoluene	1.00	0.0200	1.000	0	100	77.5	125				
tert-Butylbenzene	1.13	0.0200	1.000	0	113	66.2	130				
1,2,3-Trichloropropane	0.785	0.0200	1.000	0	78.5	67.9	136				
1,2,4-Trichlorobenzene	0.893	0.0500	1.000	0	89.3	62.6	143				
sec-Butylbenzene	1.05	0.0200	1.000	0	105	75.6	133				
4-Isopropyltoluene	0.970	0.0200	1.000	0	97.0	76.8	131				
1,3-Dichlorobenzene	1.07	0.0200	1.000	0	107	72.8	128				
1,4-Dichlorobenzene	1.06	0.0200	1.000	0	106	72.6	126				
n-Butylbenzene	1.06	0.0200	1.000	0	106	65.3	136				
1,2-Dichlorobenzene	1.00	0.0200	1.000	0	100	72.8	126				
1,2-Dibromo-3-chloropropane	0.647	0.500	1.000	0	64.7	40.2	155				
1,2,4-Trimethylbenzene	1.03	0.0200	1.000	0	103	77.5	129				
Hexachlorobutadiene	1.03	0.100	1.000	0	103	42	151				
Naphthalene	0.644	0.0300	1.000	0	64.4	58.4	160				
1,2,3-Trichlorobenzene	0.893	0.0200	1.000	0	89.3	54.8	143				
Surr: Dibromofluoromethane	1.27		1.250		102	56.5	129				
Surr: Toluene-d8	1.25		1.250		100	64.5	151				
Surr: 1-Bromo-4-fluorobenzene	1.35		1.250		108	63.1	141				

Work Order: 1705202
CLIENT: GeoEngineers
Project: Rufus 2.0 Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID	LCS-17149	SampType:	LCS	Units:	mg/Kg	Prep Date:	5/23/2017			RunNo:	36370	
Client ID:	LCSS	Batch ID:	17149	Analysis Date:			5/24/2017			SeqNo:	697320	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Sample ID	MB-17149	SampType:	MBLK	Units:	mg/Kg	Prep Date:	5/23/2017	RunNo:	36370		
Client ID:	MBLKS	Batch ID:	17149	Analysis Date:				5/24/2017	SeqNo:	697321	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Dichlorodifluoromethane (CFC-12)	ND	0.0600									Q
Chloromethane	ND	0.0600									
Vinyl chloride	ND	0.00200									
Bromomethane	ND	0.0900									
Trichlorofluoromethane (CFC-11)	ND	0.0500									
Chloroethane	ND	0.0600									
1,1-Dichloroethene	ND	0.0500									
Methylene chloride	ND	0.0200									
trans-1,2-Dichloroethene	ND	0.0200									
Methyl tert-butyl ether (MTBE)	ND	0.0500									Q
1,1-Dichloroethane	ND	0.0200									
2,2-Dichloropropane	ND	0.0500									Q
cis-1,2-Dichloroethene	ND	0.0200									
Chloroform	ND	0.0200									
1,1,1-Trichloroethane (TCA)	ND	0.0200									
1,1-Dichloropropene	ND	0.0200									
Carbon tetrachloride	ND	0.0200									
1,2-Dichloroethane (EDC)	ND	0.0300									
Benzene	ND	0.0200									
Trichloroethene (TCE)	ND	0.0200									
1,2-Dichloropropane	ND	0.0200									
Bromodichloromethane	ND	0.0200									
Dibromomethane	ND	0.0400									
cis-1,3-Dichloropropene	ND	0.0200									
Toluene	ND	0.0200									

Work Order: 1705202
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QC SUMMARY REPORT
Volatile Organic Compounds by EPA Method 8260C

Sample ID	MB-17149	SampType:	MBLK		Units:	mg/Kg			Prep Date:	5/23/2017		RunNo:	36370	
Client ID:	MBLKS	Batch ID:	17149						Analysis Date:	5/24/2017		SeqNo:	697321	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val		%RPD	RPDLimit	Qual	
trans-1,3-Dichloropropylene		ND	0.0300										Q	
1,1,2-Trichloroethane		ND	0.0300											
1,3-Dichloropropane		ND	0.0500											
Tetrachloroethene (PCE)		ND	0.0200											
Dibromochloromethane		ND	0.0300											
1,2-Dibromoethane (EDB)		ND	0.00500											
Chlorobenzene		ND	0.0200											
1,1,1,2-Tetrachloroethane		ND	0.0300											
Ethylbenzene		ND	0.0300											
m,p-Xylene		ND	0.0200											
o-Xylene		ND	0.0200											
Styrene		ND	0.0200											
Isopropylbenzene		ND	0.0800											
Bromoform		ND	0.0200											
1,1,2,2-Tetrachloroethane		ND	0.0200										Q	
n-Propylbenzene		ND	0.0200											
Bromobenzene		ND	0.0300											
1,3,5-Trimethylbenzene		ND	0.0200											
2-Chlorotoluene		ND	0.0200											
4-Chlorotoluene		ND	0.0200											
tert-Butylbenzene		ND	0.0200											
1,2,3-Trichloropropane		ND	0.0200										Q	
1,2,4-Trichlorobenzene		ND	0.0500											
sec-Butylbenzene		ND	0.0200											
4-Isopropyltoluene		ND	0.0200											
1,3-Dichlorobenzene		ND	0.0200											
1,4-Dichlorobenzene		ND	0.0200											
n-Butylbenzene		ND	0.0200											
1,2-Dichlorobenzene		ND	0.0200											
1,2-Dibromo-3-chloropropane		ND	0.500										Q	
1,2,4-Trimethylbenzene		ND	0.0200											

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CLIENT: GeoEngineers
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QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID	MB-17149	SampType:	MBLK	Units:	mg/Kg	Prep Date:	5/23/2017			RunNo:	36370	
Client ID:	MBLKS	Batch ID:	17149				Analysis Date:	5/24/2017			SeqNo:	697321
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Hexachlorobutadiene	ND	0.100										
Naphthalene	ND	0.0300									Q	
1,2,3-Trichlorobenzene	ND	0.0200										
Surr: Dibromofluoromethane	1.26		1.250		101	56.5	129					
Surr: Toluene-d8	1.16		1.250		93.2	64.5	151					
Surr: 1-Bromo-4-fluorobenzene	1.03		1.250		82.2	63.1	141					

NOTES:

Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Sample ID	1705202-001BDUP	SampType:	DUP	Units:	mg/Kg-dry	Prep Date:	5/23/2017	RunNo:	36370		
Client ID:	B18-8-2.5	Batch ID:	17149			Analysis Date:	5/24/2017	SeqNo:	697303		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	ND	0.0955						0		30	Q
Chloromethane	ND	0.0955						0		30	
Vinyl chloride	ND	0.00318						0		30	
Bromomethane	ND	0.143						0		30	
Trichlorofluoromethane (CFC-11)	ND	0.0796						0		30	
Chloroethane	ND	0.0955						0		30	
1,1-Dichloroethene	ND	0.0796						0		30	
Methylene chloride	ND	0.0318						0		30	
trans-1,2-Dichloroethene	ND	0.0318						0		30	
Methyl tert-butyl ether (MTBE)	ND	0.0796						0		30	Q
1,1-Dichloroethane	ND	0.0318						0		30	
2,2-Dichloropropane	ND	0.0796						0		30	Q
cis-1,2-Dichloroethene	ND	0.0318						0		30	
Chloroform	ND	0.0318						0		30	
1,1,1-Trichloroethane (TCA)	ND	0.0318						0		30	
1,1-Dichloropropene	ND	0.0318						0		30	
Carbon tetrachloride	ND	0.0318						0		30	
1,2-Dichloroethane (EDC)	ND	0.0477						0		30	

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QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID	1705202-001BDUP	SampType:	DUP	Units:	mg/Kg-dry	Prep Date:	5/23/2017	RunNo:	36370			
Client ID:	B18-8-2.5	Batch ID:	17149	Analysis Date:				5/24/2017	SeqNo:	697303		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Benzene	ND	0.0318						0		30		
Trichloroethene (TCE)	ND	0.0318						0		30		
1,2-Dichloropropane	ND	0.0318						0		30		
Bromodichloromethane	ND	0.0318						0		30		
Dibromomethane	ND	0.0637						0		30		
cis-1,3-Dichloropropene	ND	0.0318						0		30		
Toluene	ND	0.0318						0		30		
trans-1,3-Dichloropropylene	ND	0.0477						0		30	Q	
1,1,2-Trichloroethane	ND	0.0477						0		30		
1,3-Dichloropropane	ND	0.0796						0		30		
Tetrachloroethene (PCE)	ND	0.0318						0		30		
Dibromochloromethane	ND	0.0477						0		30		
1,2-Dibromoethane (EDB)	ND	0.00796						0		30		
Chlorobenzene	ND	0.0318						0		30		
1,1,1,2-Tetrachloroethane	ND	0.0477						0		30		
Ethylbenzene	ND	0.0477						0		30		
m,p-Xylene	ND	0.0318						0		30		
o-Xylene	ND	0.0318						0		30		
Styrene	ND	0.0318						0		30		
Isopropylbenzene	ND	0.127						0		30		
Bromoform	ND	0.0318						0		30		
1,1,2,2-Tetrachloroethane	ND	0.0318						0		30	Q	
n-Propylbenzene	ND	0.0318						0		30		
Bromobenzene	ND	0.0477						0		30		
1,3,5-Trimethylbenzene	ND	0.0318						0		30		
2-Chlorotoluene	ND	0.0318						0		30		
4-Chlorotoluene	ND	0.0318						0		30		
tert-Butylbenzene	ND	0.0318						0		30		
1,2,3-Trichloropropane	ND	0.0318						0		30	Q	
1,2,4-Trichlorobenzene	ND	0.0796						0		30		
sec-Butylbenzene	ND	0.0318						0		30		

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CLIENT: GeoEngineers
Project: Rufus 2.0 Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID	1705202-001BDUP	SampType:	DUP	Units:	mg/Kg-dry	Prep Date:	5/23/2017	RunNo:	36370		
Client ID:	B18-8-2.5	Batch ID:	17149			Analysis Date:	5/24/2017	SeqNo:	697303		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4-Isopropyltoluene	ND	0.0318						0		30	
1,3-Dichlorobenzene	ND	0.0318						0		30	
1,4-Dichlorobenzene	ND	0.0318						0		30	
n-Butylbenzene	ND	0.0318						0		30	
1,2-Dichlorobenzene	ND	0.0318						0		30	
1,2-Dibromo-3-chloropropane	ND	0.796						0		30	Q
1,2,4-Trimethylbenzene	ND	0.0318						0		30	
Hexachlorobutadiene	ND	0.159						0		30	
Naphthalene	ND	0.0477						0		30	Q
1,2,3-Trichlorobenzene	ND	0.0318						0		30	
Surr: Dibromofluoromethane	1.95		1.989		98.0	56.5	129		0		
Surr: Toluene-d8	2.04		1.989		103	64.5	151		0		
Surr: 1-Bromo-4-fluorobenzene	1.71		1.989		85.8	63.1	141		0		

NOTES:

Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Sample ID	1705202-020BMS	SampType:	MS		Units:	mg/Kg-dry		Prep Date:	5/23/2017		RunNo:	36370	
Client ID:	B18-5-2.5	Batch ID:	17149					Analysis Date:	5/24/2017		SeqNo:	697312	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual		
Dichlorodifluoromethane (CFC-12)	0.653	0.0590	0.9827	0	66.5	43.5	121						
Chloromethane	0.816	0.0590	0.9827	0	83.0	45	130						
Vinyl chloride	0.784	0.00197	0.9827	0	79.8	51.2	146						
Bromomethane	1.34	0.0884	0.9827	0	136	21.3	120				S		
Trichlorofluoromethane (CFC-11)	1.08	0.0491	0.9827	0	109	35	131						
Chloroethane	0.977	0.0590	0.9827	0	99.4	31.9	123						
1,1-Dichloroethene	0.828	0.0491	0.9827	0	84.2	61.9	141						
Methylene chloride	0.888	0.0197	0.9827	0	90.3	54.7	142						
trans-1,2-Dichloroethene	0.901	0.0197	0.9827	0	91.7	52	136						
Methyl tert-butyl ether (MTBE)	0.845	0.0491	0.9827	0	86.0	54.4	132						
1,1-Dichloroethane	0.969	0.0197	0.9827	0	98.6	51.8	141						

Work Order: 1705202
CLIENT: GeoEngineers
Project: Rufus 2.0 Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID	1705202-020BMS	SampType:	MS	Units:	mg/Kg-dry	Prep Date:	5/23/2017	RunNo:	36370		
Client ID:	B18-5-2.5	Batch ID:	17149			Analysis Date:	5/24/2017	SeqNo:	697312		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
2,2-Dichloropropane	1.26	0.0491	0.9827	0	128	36	123				S
cis-1,2-Dichloroethene	0.911	0.0197	0.9827	0	92.7	58.6	136				
Chloroform	0.920	0.0197	0.9827	0	93.6	53.2	129				
1,1,1-Trichloroethane (TCA)	1.18	0.0197	0.9827	0	120	58.3	145				
1,1-Dichloropropene	0.938	0.0197	0.9827	0	95.4	55.1	138				
Carbon tetrachloride	1.17	0.0197	0.9827	0	119	53.3	144				
1,2-Dichloroethane (EDC)	0.829	0.0295	0.9827	0	84.4	51.3	139				
Benzene	0.912	0.0197	0.9827	0	92.8	63.5	133				
Trichloroethene (TCE)	0.926	0.0197	0.9827	0	94.2	68.6	132				
1,2-Dichloropropane	0.967	0.0197	0.9827	0	98.4	59	136				
Bromodichloromethane	1.03	0.0197	0.9827	0	105	50.7	141				
Dibromomethane	0.834	0.0393	0.9827	0	84.8	50.6	137				
cis-1,3-Dichloropropene	1.13	0.0197	0.9827	0	115	50.4	138				
Toluene	0.958	0.0197	0.9827	0	97.5	63.4	132				
trans-1,3-Dichloropropylene	0.960	0.0295	0.9827	0	97.7	44.1	147				
1,1,2-Trichloroethane	0.799	0.0295	0.9827	0	81.3	51.6	137				
1,3-Dichloropropane	0.868	0.0491	0.9827	0	88.3	53.1	134				
Tetrachloroethene (PCE)	0.934	0.0197	0.9827	0	95.1	35.6	158				
Dibromochloromethane	1.01	0.0295	0.9827	0	102	55.3	140				
1,2-Dibromoethane (EDB)	0.809	0.00491	0.9827	0	82.3	50.4	136				
Chlorobenzene	0.918	0.0197	0.9827	0	93.4	60	133				
1,1,1,2-Tetrachloroethane	1.06	0.0295	0.9827	0	108	53.1	142				
Ethylbenzene	0.944	0.0295	0.9827	0	96.1	54.5	134				
m,p-Xylene	1.90	0.0197	1.965	0	96.8	53.1	132				
o-Xylene	0.895	0.0197	0.9827	0	91.1	53.3	139				
Styrene	0.960	0.0197	0.9827	0	97.7	51.1	132				
Isopropylbenzene	0.981	0.0786	0.9827	0	99.8	58.9	138				
Bromoform	0.892	0.0197	0.9827	0	90.8	57.9	130				
1,1,2,2-Tetrachloroethane	0.717	0.0197	0.9827	0	72.9	51.9	131				
n-Propylbenzene	0.994	0.0197	0.9827	0	101	53.6	140				
Bromobenzene	0.864	0.0295	0.9827	0	87.9	54.2	140				

Work Order: 1705202
CLIENT: GeoEngineers
Project: Rufus 2.0 Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID	1705202-020BMS	SampType:	MS	Units:	mg/Kg-dry	Prep Date:	5/23/2017	RunNo:	36370		
Client ID:	B18-5-2.5	Batch ID:	17149			Analysis Date:	5/24/2017	SeqNo:	697312		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,3,5-Trimethylbenzene	0.954	0.0197	0.9827	0	97.1	51.8	136				
2-Chlorotoluene	0.909	0.0197	0.9827	0	92.5	51.6	136				
4-Chlorotoluene	0.900	0.0197	0.9827	0	91.6	50.1	139				
tert-Butylbenzene	0.809	0.0197	0.9827	0	82.4	50.5	135				
1,2,3-Trichloropropane	0.729	0.0197	0.9827	0	74.1	50.5	131				
1,2,4-Trichlorobenzene	0.823	0.0491	0.9827	0	83.8	50.8	130				
sec-Butylbenzene	0.974	0.0197	0.9827	0	99.1	52.6	141				
4-Isopropyltoluene	0.909	0.0197	0.9827	0	92.6	52.9	134				
1,3-Dichlorobenzene	0.934	0.0197	0.9827	0	95.0	52.6	131				
1,4-Dichlorobenzene	0.926	0.0197	0.9827	0	94.3	52.9	129				
n-Butylbenzene	0.991	0.0197	0.9827	0	101	52.6	130				
1,2-Dichlorobenzene	0.886	0.0197	0.9827	0	90.2	55.8	129				
1,2-Dibromo-3-chloropropane	0.662	0.491	0.9827	0	67.3	40.5	131				
1,2,4-Trimethylbenzene	0.950	0.0197	0.9827	0	96.7	50.6	137				
Hexachlorobutadiene	0.930	0.0983	0.9827	0	94.6	40.6	158				
Naphthalene	0.582	0.0295	0.9827	0	59.2	52.3	124				
1,2,3-Trichlorobenzene	0.823	0.0197	0.9827	0	83.8	54.4	124				
Surr: Dibromofluoromethane	1.23		1.228		100	56.5	129				
Surr: Toluene-d8	1.34		1.228		109	64.5	151				
Surr: 1-Bromo-4-fluorobenzene	1.31		1.228		107	63.1	141				

NOTES:

S - Outlying spike recoveries observed. The method is in control as indicated by the Laboratory Control Sample (LCS).

Sample ID	1705202-020BMSD	SampType: MSD	Units: mg/Kg-dry			Prep Date: 5/23/2017			RunNo: 36370		
Client ID:	B18-5-2.5	Batch ID:	17149				Analysis Date: 5/24/2017			SeqNo: 697313	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	0.580	0.0590	0.9827	0	59.0	43.5	121	0.6530	11.9	30	
Chloromethane	0.767	0.0590	0.9827	0	78.1	45	130	0.8159	6.18	30	
Vinyl chloride	0.705	0.00197	0.9827	0	71.7	51.2	146	0.7839	10.6	30	
Bromomethane	1.22	0.0884	0.9827	0	124	21.3	120	1.338	9.59	30	S

Work Order: 1705202
CLIENT: GeoEngineers
Project: Rufus 2.0 Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID	1705202-020BMSD	SampType:	MSD	Units:	mg/Kg-dry	Prep Date:	5/23/2017	RunNo:	36370		
Client ID:	B18-5-2.5	Batch ID:	17149			Analysis Date:	5/24/2017	SeqNo:	697313		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Trichlorofluoromethane (CFC-11)	0.946	0.0491	0.9827	0	96.3	35	131	1.075	12.8	30	
Chloroethane	0.876	0.0590	0.9827	0	89.2	31.9	123	0.9766	10.8	30	
1,1-Dichloroethene	0.714	0.0491	0.9827	0	72.6	61.9	141	0.8275	14.8	30	
Methylene chloride	0.832	0.0197	0.9827	0	84.7	54.7	142	0.8876	6.48	30	
trans-1,2-Dichloroethene	0.815	0.0197	0.9827	0	83.0	52	136	0.9011	10.0	30	
Methyl tert-butyl ether (MTBE)	0.887	0.0491	0.9827	0	90.3	54.4	132	0.8448	4.86	30	
1,1-Dichloroethane	0.867	0.0197	0.9827	0	88.2	51.8	141	0.9689	11.2	30	
2,2-Dichloropropane	1.25	0.0491	0.9827	0	127	36	123	1.257	0.932	30	S
cis-1,2-Dichloroethene	0.838	0.0197	0.9827	0	85.3	58.6	136	0.9110	8.35	30	
Chloroform	0.794	0.0197	0.9827	0	80.8	53.2	129	0.9199	14.7	30	
1,1,1-Trichloroethane (TCA)	1.08	0.0197	0.9827	0	110	58.3	145	1.184	8.79	30	
1,1-Dichloropropene	0.863	0.0197	0.9827	0	87.9	55.1	138	0.9379	8.27	30	
Carbon tetrachloride	1.11	0.0197	0.9827	0	113	53.3	144	1.171	5.69	30	
1,2-Dichloroethane (EDC)	0.828	0.0295	0.9827	0	84.3	51.3	139	0.8290	0.0590	30	
Benzene	0.859	0.0197	0.9827	0	87.4	63.5	133	0.9122	6.06	30	
Trichloroethene (TCE)	0.839	0.0197	0.9827	0	85.4	68.6	132	0.9259	9.88	30	
1,2-Dichloropropane	0.901	0.0197	0.9827	0	91.7	59	136	0.9671	7.12	30	
Bromodichloromethane	1.02	0.0197	0.9827	0	104	50.7	141	1.034	1.14	30	
Dibromomethane	0.829	0.0393	0.9827	0	84.3	50.6	137	0.8336	0.583	30	
cis-1,3-Dichloropropene	1.11	0.0197	0.9827	0	112	50.4	138	1.132	2.42	30	
Toluene	0.869	0.0197	0.9827	0	88.5	63.4	132	0.9577	9.65	30	
trans-1,3-Dichloropropylene	0.976	0.0295	0.9827	0	99.3	44.1	147	0.9604	1.63	30	
1,1,2-Trichloroethane	0.789	0.0295	0.9827	0	80.3	51.6	137	0.7988	1.23	30	
1,3-Dichloropropane	0.853	0.0491	0.9827	0	86.8	53.1	134	0.8677	1.71	30	
Tetrachloroethene (PCE)	0.838	0.0197	0.9827	0	85.2	35.6	158	0.9343	10.9	30	
Dibromochloromethane	0.992	0.0295	0.9827	0	101	55.3	140	1.005	1.38	30	
1,2-Dibromoethane (EDB)	0.805	0.00491	0.9827	0	82.0	50.4	136	0.8092	0.485	30	
Chlorobenzene	0.856	0.0197	0.9827	0	87.2	60	133	0.9175	6.89	30	
1,1,1,2-Tetrachloroethane	1.01	0.0295	0.9827	0	103	53.1	142	1.058	4.92	30	
Ethylbenzene	0.857	0.0295	0.9827	0	87.3	54.5	134	0.9443	9.65	30	
m,p-Xylene	1.73	0.0197	1.965	0	87.8	53.1	132	1.903	9.75	30	

Work Order: 1705202
CLIENT: GeoEngineers
Project: Rufus 2.0 Block 18

QC SUMMARY REPORT
Volatile Organic Compounds by EPA Method 8260C

Sample ID	1705202-020BMSD	SampType: MSD	Units: mg/Kg-dry			Prep Date: 5/23/2017			RunNo: 36370		
Client ID:	B18-5-2.5	Batch ID:	17149				Analysis Date: 5/24/2017			SeqNo: 697313	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
o-Xylene	0.838	0.0197	0.9827	0	85.3	53.3	139	0.8953	6.58	30	
Styrene	0.922	0.0197	0.9827	0	93.8	51.1	132	0.9600	4.06	30	
Isopropylbenzene	0.892	0.0786	0.9827	0	90.8	58.9	138	0.9811	9.52	30	
Bromoform	0.907	0.0197	0.9827	0	92.3	57.9	130	0.8922	1.68	30	
1,1,2,2-Tetrachloroethane	0.723	0.0197	0.9827	0	73.6	51.9	131	0.7167	0.916	30	
n-Propylbenzene	0.928	0.0197	0.9827	0	94.4	53.6	140	0.9943	6.92	30	
Bromobenzene	0.826	0.0295	0.9827	0	84.0	54.2	140	0.8636	4.50	30	
1,3,5-Trimethylbenzene	0.898	0.0197	0.9827	0	91.3	51.8	136	0.9538	6.08	30	
2-Chlorotoluene	0.844	0.0197	0.9827	0	85.9	51.6	136	0.9087	7.37	30	
4-Chlorotoluene	0.844	0.0197	0.9827	0	85.9	50.1	139	0.8997	6.37	30	
tert-Butylbenzene	0.723	0.0197	0.9827	0	73.5	50.5	135	0.8093	11.3	30	
1,2,3-Trichloropropane	0.753	0.0197	0.9827	0	76.7	50.5	131	0.7286	3.34	30	
1,2,4-Trichlorobenzene	0.922	0.0491	0.9827	0	93.9	50.8	130	0.8231	11.4	30	
sec-Butylbenzene	0.911	0.0197	0.9827	0	92.7	52.6	141	0.9736	6.66	30	
4-Isopropyltoluene	0.864	0.0197	0.9827	0	88.0	52.9	134	0.9095	5.09	30	
1,3-Dichlorobenzene	0.912	0.0197	0.9827	0	92.8	52.6	131	0.9338	2.35	30	
1,4-Dichlorobenzene	0.915	0.0197	0.9827	0	93.1	52.9	129	0.9264	1.22	30	
n-Butylbenzene	1.01	0.0197	0.9827	0	103	52.6	130	0.9908	1.68	30	
1,2-Dichlorobenzene	0.885	0.0197	0.9827	0	90.0	55.8	129	0.8860	0.149	30	
1,2-Dibromo-3-chloropropane	0.699	0.491	0.9827	0	71.1	40.5	131	0.6618	5.46	30	
1,2,4-Trimethylbenzene	0.919	0.0197	0.9827	0	93.5	50.6	137	0.9498	3.26	30	
Hexachlorobutadiene	0.922	0.0983	0.9827	0	93.9	40.6	158	0.9297	0.786	30	
Naphthalene	1.06	0.0295	0.9827	0	108	52.3	124	0.5816	58.2	30	R
1,2,3-Trichlorobenzene	0.922	0.0197	0.9827	0	93.9	54.4	124	0.8231	11.4	30	
Surr: Dibromofluoromethane	1.21		1.228		98.6	56.5	129		0		
Surr: Toluene-d8	1.33		1.228		108	64.5	151		0		
Surr: 1-Bromo-4-fluorobenzene	1.31		1.228		106	63.1	141		0		

NOTES:

S - Outlying spike recoveries observed. The method is in control as indicated by the Laboratory Control Sample (LCS).

Work Order: 1705202
CLIENT: GeoEngineers
Project: Rufus 2.0 Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID	1705202-026BDUP	SampType:	DUP	Units:	mg/Kg-dry	Prep Date:	5/23/2017	RunNo:	36370		
Client ID:	B18-4-5.0	Batch ID:	17149			Analysis Date:	5/24/2017	SeqNo:	697316		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	ND	0.0954						0		30	
Chloromethane	ND	0.0954						0		30	
Vinyl chloride	ND	0.00318						0		30	
Bromomethane	ND	0.143						0		30	
Trichlorofluoromethane (CFC-11)	ND	0.0795						0		30	
Chloroethane	ND	0.0954						0		30	
1,1-Dichloroethene	ND	0.0795						0		30	
Methylene chloride	ND	0.0318						0		30	
trans-1,2-Dichloroethene	ND	0.0318						0		30	
Methyl tert-butyl ether (MTBE)	ND	0.0795						0		30	
1,1-Dichloroethane	ND	0.0318						0		30	
2,2-Dichloropropane	ND	0.0795						0		30	
cis-1,2-Dichloroethene	ND	0.0318						0		30	
Chloroform	ND	0.0318						0		30	
1,1,1-Trichloroethane (TCA)	ND	0.0318						0		30	
1,1-Dichloropropene	ND	0.0318						0		30	
Carbon tetrachloride	ND	0.0318						0		30	
1,2-Dichloroethane (EDC)	ND	0.0477						0		30	
Benzene	ND	0.0318						0		30	
Trichloroethene (TCE)	ND	0.0318						0		30	
1,2-Dichloropropane	ND	0.0318						0		30	
Bromodichloromethane	ND	0.0318						0		30	
Dibromomethane	ND	0.0636						0		30	
cis-1,3-Dichloropropene	ND	0.0318						0		30	
Toluene	ND	0.0318						0		30	
trans-1,3-Dichloropropylene	ND	0.0477						0		30	
1,1,2-Trichloroethane	ND	0.0477						0		30	
1,3-Dichloropropane	ND	0.0795						0		30	
Tetrachloroethene (PCE)	ND	0.0318						0		30	
Dibromochloromethane	ND	0.0477						0		30	
1,2-Dibromoethane (EDB)	ND	0.00795						0		30	

Work Order: 1705202
CLIENT: GeoEngineers
Project: Rufus 2.0 Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID	1705202-026BDUP	SampType:	DUP	Units:	mg/Kg-dry	Prep Date:	5/23/2017	RunNo:	36370		
Client ID:	B18-4-5.0	Batch ID:	17149			Analysis Date:	5/24/2017	SeqNo:	697316		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorobenzene	ND	0.0318						0		30	
1,1,1,2-Tetrachloroethane	ND	0.0477						0		30	
Ethylbenzene	ND	0.0477						0		30	
m,p-Xylene	ND	0.0318						0		30	
o-Xylene	ND	0.0318						0		30	
Styrene	ND	0.0318						0		30	
Isopropylbenzene	ND	0.127						0		30	
Bromoform	ND	0.0318						0		30	
1,1,2,2-Tetrachloroethane	ND	0.0318						0		30	
n-Propylbenzene	ND	0.0318						0		30	
Bromobenzene	ND	0.0477						0		30	
1,3,5-Trimethylbenzene	ND	0.0318						0		30	
2-Chlorotoluene	ND	0.0318						0		30	
4-Chlorotoluene	ND	0.0318						0		30	
tert-Butylbenzene	ND	0.0318						0		30	
1,2,3-Trichloropropane	ND	0.0318						0		30	
1,2,4-Trichlorobenzene	ND	0.0795						0		30	
sec-Butylbenzene	ND	0.0318						0		30	
4-Isopropyltoluene	ND	0.0318						0		30	
1,3-Dichlorobenzene	ND	0.0318						0		30	
1,4-Dichlorobenzene	ND	0.0318						0		30	
n-Butylbenzene	ND	0.0318						0		30	
1,2-Dichlorobenzene	ND	0.0318						0		30	
1,2-Dibromo-3-chloropropane	ND	0.795						0		30	Q
1,2,4-Trimethylbenzene	ND	0.0318						0		30	
Hexachlorobutadiene	ND	0.159						0		30	
Naphthalene	ND	0.0477						0		30	Q
1,2,3-Trichlorobenzene	ND	0.0318						0		30	
Surr: Dibromofluoromethane	1.96		1.988		98.4	56.5	129		0		
Surr: Toluene-d8	2.01		1.988		101	64.5	151		0		
Surr: 1-Bromo-4-fluorobenzene	1.75		1.988		88.0	63.1	141		0		

Work Order: 1705202
CLIENT: GeoEngineers
Project: Rufus 2.0 Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID	1705202-026BDUP	SampType:	DUP	Units:	mg/Kg-dry	Prep Date:	5/23/2017	RunNo:	36370		
Client ID:	B18-4-5.0	Batch ID:	17149			Analysis Date:	5/24/2017	SeqNo:	697316		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

NOTES:

Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

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

Work Order Number: **1705202**
 Date Received: **5/17/2017 9:15:00 AM**

Chain of Custody

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

Log In

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

Please refer to Item Information

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

Special Handling (if applicable)

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

Person Notified: Date
 By Whom: Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person
 Regarding:
 Client Instructions:

19. Additional remarks:

PM contacted lab via email to put selected samples on hold 5/17/17.

Item Information

Item #	Temp °C
Cooler	14.0
Sample	14.5
Temp Blank	16.8

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C



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Chain of Custody Record & Laboratory Services Agreement

Date: 5/17 Page: 1 of 3

Project Name: Rufus 2.0 Block 18

Project No: 20434-001-31

Collected by: CSK

Location: Block 18

Report To (PM): Chris Brown

PM Email: cbrown@freemontanalytical.com

Laboratory Project No (Internal): 1705202

Special Remarks:

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

Client: Geoengineers
Address: 600 Stewart St Suite 1700
City, State, zip: Seattle, WA
Telephone:
Fax:

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	VOCs (EPA 8260 / 624)	GV/BTEX	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T) Dissolved (D)	Anions (C)***	EDB (8011)	Comments
1 B18-8-2.5	5/16	0840	Soil	X		X	X	X	X							RCRA - Total Metals
2 B18-8-5.0		0845														
3 B18-8-7.5		0850														
4 B18-8-10.0		0855														
5 B18-8-15.0		0900														
6 B18-9-2.5		0930														
7 B18-9-5.0		0935														
8 B18-9-7.5		0940														
9 B18-9-10.0		0945														
10 B18-7-2.5		1100														

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

**Metals (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL Individual: Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Tl Ti U V Zn

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate-Nitrite

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Relinquished Date/Time

Received

Date/Time

Date/Time

3 Day

2 Day

Next Day

Standard

Turn-around Time:

Same Day (specify)

Relinquished

Date/Time

Received

Date/Time

Date/Time

3 Day

2 Day

Next Day

Standard

Turn-around Time:

Same Day (specify)



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Chain of Custody Record & Laboratory Services Agreement

Date: 5/17 Page: 2 of 3

Laboratory Project No (Internal): 1705202

Client: Greenminters

Project Name: Block 18

Special Remarks:

Address:

Collected by: GSK

City, State, Zip:

Location: Block 18

Telephone:

Report To (PM): Chris Brown

Fax:

PM Email: chbrown@greenminters.com

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*															Comments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
				VOCs (EPA 8260 / 624)	GX/BTEX	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T) / Dissolved (D)	Anions (IC)***	EDB (8011)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			

1	B18-7-5.0	5/16	1105	Soil	X													
2	B18-7-7.5		1110			X												
3	B18-7-10.0		1115				X											
4	B18-7-15.0		1120					X										
5	B18-b-2.5		1200						X									
6	B18-b-5.0		1205							X								
7	B18-6-7.5		1210								X							
8	B18-b-10.0		1215									X						
9	B18-b-15.0		1220										X					
10																		

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

**Metals (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL Individual: Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti Tl U V Zn

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate-Nitrite

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Relinquished Date/Time

Received

Date/Time

2 Day

Relinquished Date/Time

Received

Date/Time

Next Day

Relinquished

Date/Time

Received

Date/Time

Same Day



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Chain of Custody Record & Laboratory Services Agreement

Date: 5/1/16 Page: 3 of 3

Project Name: Block 18

Project No: 20434-061-31

Collected by: GTR

Location: Block 18

Report to (PM): Chris Brown

PM Email: chbrown@geoengineers.com

Laboratory Project No (Internal): 1705202

Special Remarks:

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

Client: Geoengineers

Address:

City, State, Zip:

Telephone:

Fax:

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	YOCs (EPA 8260 / 624)	GX/BTEX	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T) Dissolved (D)	Anions (IC)***	EDB (8011)	Comments
-------------	-------------	-------------	-----------------------	-----------------------	---------	------	------------------------------	-----------------------------------	--------------------------------------	------------------------	-----------------------	-----------------------	-----------------------------	---------------------------	----------------	------------	----------

1	B18-5-2.5	5/1/16	1315	Soil	X	X	X	X	X	X	X	X	X	X	X	X	
2	B18-6-5.0		1320														
3	B18-5-7.5		1325														
4	B18-5-10.0		1330														
5	B18-5-15.0		1340														
6	B18-4-2.5		1406														
7	B18-4-5.0		1405														
8	B18-4-7.5		1410														
9	B18-4-10.0		1415														
10	B18-4-15.0		1420														

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

**Metals (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL Individual: Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti U V Zn

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Relinquished Date/Time 5/17/17 9:15 Received Date/Time 5/17/17 0915

Relinquished Date/Time 5/17/17 9:15 Received Date/Time 5/17/17 0915

Same Day ☐ 3 Day ☐ 2 Day ☐ Next Day ☐ Turn-around Time: (specify)



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Chain of Custody Record & Laboratory Services Agreement

Date: 5/17 Page: 1 of 3

Project Name: Rufus 2.0 Block 18

Project No: 20434-001-31

Collected by: CSK

Location: Block 18

Report To (PM): Chris Brown

PM Email: cbrown@geoengineers.com

Laboratory Project No (Internal): 1705202

Special Remarks:
Hold indicated samples per C. Brown 5/17/17 JSS

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

Client: Geoengineers

Address: 600 Stewart St Suite 1700

City, State, Zip: Seattle, WA

Telephone:

Fax:

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	VOCs (EPA 8260 / 624)	GY/BTEX	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	SVOCS (EPA 8270 / 625)	PAHs (EPA 8270 / 625)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T) / Dissolved (D)	Anions (IC)***	EDB (8011)	Comments
1 B18-8-2.5	5/16	0840	Soil	X		X	X	X	X	X	X					RCA - Total Metals
2 B18-8-5.0		0845														HOLD
3 B18-8-7.5		0850														HOLD
4 B18-8-10.0		0855														HOLD
5 B18-8-15.0		0900														
6 B18-9-2.5		0930														HOLD
7 B18-9-5.0		0935														
8 B18-9-7.5		0940														
9 B18-9-10.0		0945														HOLD
10 B18-9-2.5		1100														

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

**Metals (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL Individual: Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti U V Zn

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate-Nitrite

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Reinquired: 5/17/17 9:15 Date/Time

Reinquired: 5/17/17 Date/Time

Received: 5/17/17 Date/Time

Received: 0915 Date/Time

Turn-around Time: ☒ Standard ☐ 3 Day ☐ 2 Day ☐ Next Day ☐ Same Day (specify)



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Chain of Custody Record & Laboratory Services Agreement

Date: 5/17 Page: 2 of 3

Laboratory Project No (Internal): 1705202

Client: Greenpeace

Address:

City, State, Zip:

Telephone:

Fax:

Project Name: Block 18
Project No: 20734-001-31
Collected by: CSK

Location: Block 18

Report To (PM): Chris Brown

PM Email: cbrown@greenpeace.org

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

Special Remarks:

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	VOG (EPA 8260 / 624)	GX/BTEX	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T) / Dissolved (D)	Anions (C)***	EDB (8011)	Comments
1 B18-7-5.0	5/16	1105	Soil	X	X	X	X	X	X	X	X	X	X	X	X	HOLD
2 B18-7-7.5		1110														HOLD
3 B18-7-10.0		1115														HOLD
4 B18-7-15.0		1120														HOLD
5 B18-b-2.5		1200														HOLD
6 B18-b-5.0		1205														HOLD
7 B18-6-7.5		1210														HOLD
8 B18-b-10.0		1215														HOLD
9 B18-b-15.0		1220														HOLD
10																

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

**Metals (Circle): MTC-A-5 RGA-8 Priority Pollutants TAL Individual: Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti U V Zn

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate+Nitrite

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Relinquished Date/Time 5/17/17 9:15

Received Date/Time 5/10/17 0915

Relinquished Date/Time

Received Date/Time

Turn-around Time: ☒ Standard ☐ 3 Day ☐ 2 Day ☐ Next Day ☐ Same Day (specify)



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Chain of Custody Record & Laboratory Services Agreement

Date: 5/16 Page: 3 of 3

Project Name: Block 18

Project No: 20434-061-31

Collected by: GTR

Location: Block 18

Report To (PM): Chris Brown

PM Email: cbrown@geoengineers.com

Laboratory Project No (Internal): 1705202

Special Remarks:

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

Client: Geoengineers

Address:

City, State, Zip:

Telephone:

Fax:

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	VOCs (EPA 8260 / 624)	GY/BTEX	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DW)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 / 625)	PCBs (EPA 8270 / 625)	Metals (EPA 8082 / 608)	Total (T) / Dissolved (D)	Anions (IC)***	EDB (8011)	Comments
1 B18-5-2.5	5/16	1315	56.1	X	X	X	X	X	X	X	X	X	X	X	X	X	HOLD
2 B18-6-6.0		1320															HOLD
3 B18-5-7.5		1325															HOLD
4 B18-5-10.0		1330															HOLD
5 B18-5-15.0		1340															HOLD
6 B18-4-2.5		1406															HOLD
7 B18-4-5.0		1405															HOLD
8 B18-4-7.5		1410															HOLD
9 B18-4-10.0		1415															HOLD
10 B18-4-15.0		1420															HOLD

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

**Metals (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL Individual: Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti Tl U V Zn

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate+Nitrite

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Relinquished

Date/Time: 5/17/17 9:15

Received

Date/Time: 5/17/17

0915

Relinquished

Date/Time

Received

Date/Time

0915

X

X

X

X

Turn-around Time: ☒ Standard ☐ 3 Day ☐ 2 Day ☐ Next Day ☐ Same Day (specify)



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Chain of Custody Record & Laboratory Services Agreement

Date: 5/17 Page: 1 of 3

Project Name: Rufus 2.0 Block 18

Project No: 20434-001-31

Collected by: CSK

Location: Block 18

Report To (PM): Chris Brown

PM Email: cbrown@beoengineers.com

Special Remarks:

Laboratory Project No (Internal): 1705202

Hold indicated samples per C. Brown 5/17/17 CSK

Run per CSK 5/30/17 - CSK
Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

Client: beoengineers
Address: 600 Stewart St Suite 1700
City, State, zip: Seattle, WA
Telephone:
Fax:

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	VOCs (EPA 8260 / 624)	GW/BTEX	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 / 625)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T) Dissolved (D)	Anions (A)***	EDB (8011)	Hex (Chromat)	Comments
1 B18-8-2.5	5/16	0840	Soil	X	X	X	X	X	X	X	X	X	X	X	X	X	RCA - Total Metals
2 B18-8-5.0		0845															HOLD
3 B18-8-7.5		0850															HOLD
4 B18-8-10.0		0855															HOLD
5 B18-8-15.0		0900															
6 B18-9-2.5		0930															HOLD
7 B18-9-5.0		0935															HOLD
8 B18-9-7.5		0940															
9 B18-9-10.0		0945															HOLD
10 B18-9-2.5		1100															

* Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water
** Metals (Circle): MTCA5 RCRA-8 Priority Pollutants TAL Individual: Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti Tl U V Zn
*** Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate-Nitrite
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Relinquished Date/Time: 5/17/17 9:15 Received Date/Time: 5/17/17 0915

Relinquished Date/Time: 5/17/17 9:15 Received Date/Time: 5/17/17 0915

Relinquished Date/Time: 5/17/17 9:15 Received Date/Time: 5/17/17 0915



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Chain of Custody Record & Laboratory Services Agreement

Date: 5/17 Page: 2 of 3

Project Name: Block 18

Project No: 20734-001-31

Collected by: GSK

Location: Block 18

Report To (PM): Chris Brown

PM Email: cbrown@geoengineers.com

Laboratory Project No (Internal): 1705202

Special Remarks:

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

Client: Geoengineers
Address:
City, State, Zip:
Telephone:
Fax:

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	VOCs (EPA 8260 / 624)	GX/BTEX	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HID)	Diesel/Heavy Oil range Organics (DO)	SVOCS (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 808)	Metals** (EPA 6020 / 200.8)	Total (T) Dissolved (D)	Anions (IC)***	EDB (8011)	Hex Cr	Comments
1 B18-7-5.0	5/16	1105	Soil	X	X	X	X	X	X	X	X	X	X	X	X	X	X	HOLD
2 B18-7-7.5		1110		X	X	X	X	X	X	X	X	X	X	X	X	X	X	HOLD
3 B18-7-10.0		1115		X	X	X	X	X	X	X	X	X	X	X	X	X	X	HOLD
4 B18-7-15.0		1120		X	X	X	X	X	X	X	X	X	X	X	X	X	X	HOLD
5 B18-6-2.5		1200		X	X	X	X	X	X	X	X	X	X	X	X	X	X	HOLD
6 B18-6-4.0		1205		X	X	X	X	X	X	X	X	X	X	X	X	X	X	HOLD
7 B18-6-7.5		1210		X	X	X	X	X	X	X	X	X	X	X	X	X	X	HOLD
8 B18-6-10.0		1215		X	X	X	X	X	X	X	X	X	X	X	X	X	X	HOLD
9 B18-6-15.0		1220		X	X	X	X	X	X	X	X	X	X	X	X	X	X	HOLD
10																		

*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water
**Metals (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL Individual: Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti Tl U V Zn
***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate+Nitrite

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above and that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

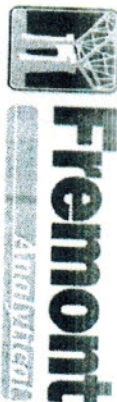
Relinquished x Date/Time 5/17/17 9:15

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Relinquished x Date/Time 5/17/17 9:15

www.fremontanalytical.com



3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: 5/16 Page: 3 of 3

Project Name: Block 18

Project No: 20434-061-31

Collected by: CTK

Location: Block 18

Report to (PM): Chris Brown

PM Email: Chron@geosynners.com

Laboratory Project No (Internal): 1705202

Special Remarks:

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

Client: Geosynners

Address:

City, State, Zip:

Telephone:

Fax:

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	VOCs (EPA 8260 / 624)	GV/BTEX	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T) Dissolved (D)	Metals (IC)**	EDS (8011)	Comments
1 B18-5-2.5	5/16	1315	Soil	X	X	X	X	X	X	X	X	X	X	X	X	HOLD
2 B18-6-6.0		1320														HOLD
3 B18-5-7.5		1325														HOLD
4 B18-5-10.0		1330														HOLD
5 B18-5-15.0		1340														HOLD
6 B18-4-2.5		1400														HOLD
7 B18-4-5.0		1405														HOLD
8 B18-4-7.5		1410														HOLD
9 B18-4-10.0		1415														HOLD
10 B18-4-15.0		1420														HOLD

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

**Metals (Circle): MTCA-5 RCA-8 Priority Pollutants TAL Individual: Ag Al As Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti U V Zn

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate-Nitrite

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above and that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Retinquished Date/Time 5/17/17

Reinquished Date/Time 5/17/17

Received Date/Time 5/17/17

Turn-around Time: ☒ Standard ☐ 3 Day ☐ 2 Day ☐ Next Day

Same Day (Specify)



GeoEngineers

Chris Brown
600 Stewart Street, Suite 1700
Seattle, WA 98101

RE: Rufus 2.0 - Block 18
Work Order Number: 1705281

May 31, 2017

Attention Chris Brown:

Fremont Analytical, Inc. received 2 sample(s) on 5/23/2017 for the analyses presented in the following report.

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.
Gasoline by NWTPH-Gx
Mercury by EPA Method 245.1
Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)
Total Metals by EPA Method 200.8
Volatile Organic Compounds by EPA Method 8260C

This report consists of the following:

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

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

Thank you for using Fremont Analytical.

Sincerely,

Mike Ridgeway
Laboratory Director

CLIENT: GeoEngineers
Project: Rufus 2.0 - Block 18
Work Order: 1705281

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
1705281-001	MW-18-1-170523	05/23/2017 1:30 PM	05/23/2017 2:45 PM
1705281-002	Trip Blank	05/22/2017 10:37 AM	05/23/2017 2:45 PM

CLIENT: GeoEngineers
Project: Rufus 2.0 - Block 18

I. SAMPLE RECEIPT:

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

II. GENERAL REPORTING COMMENTS:

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

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

III. ANALYSES AND EXCEPTIONS:

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

Qualifiers:

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

Acronyms:

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



Analytical Report

Work Order: 1705281

Date Reported: 5/31/2017

Client: GeoEngineers

Collection Date: 5/23/2017 1:30:00 PM

Project: Rufus 2.0 - Block 18

Lab ID: 1705281-001

Matrix: Groundwater

Client Sample ID: MW-18-1-170523

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<u>Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.</u>				Batch ID: 17184	Analyst: SB	
Diesel (Fuel Oil)	ND	49.9		µg/L	1	5/31/2017 2:05:24 PM
Heavy Oil	ND	99.8		µg/L	1	5/31/2017 2:05:24 PM
Surr: 2-Fluorobiphenyl	91.6	50-150		%Rec	1	5/31/2017 2:05:24 PM
Surr: o-Terphenyl	75.3	50-150		%Rec	1	5/31/2017 2:05:24 PM

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Batch ID: 17185 Analyst: BT

Naphthalene	ND	0.0994		µg/L	1	5/30/2017 4:40:06 PM
2-Methylnaphthalene	ND	0.0994		µg/L	1	5/30/2017 4:40:06 PM
1-Methylnaphthalene	ND	0.0994		µg/L	1	5/30/2017 4:40:06 PM
Acenaphthylene	ND	0.0994		µg/L	1	5/30/2017 4:40:06 PM
Acenaphthene	ND	0.0994		µg/L	1	5/30/2017 4:40:06 PM
Fluorene	ND	0.0994		µg/L	1	5/30/2017 4:40:06 PM
Phenanthrene	ND	0.0994		µg/L	1	5/30/2017 4:40:06 PM
Anthracene	ND	0.0994		µg/L	1	5/30/2017 4:40:06 PM
Fluoranthene	ND	0.0994		µg/L	1	5/30/2017 4:40:06 PM
Pyrene	ND	0.0994		µg/L	1	5/30/2017 4:40:06 PM
Benz(a)anthracene	ND	0.0994		µg/L	1	5/30/2017 4:40:06 PM
Chrysene	ND	0.0994		µg/L	1	5/30/2017 4:40:06 PM
Benzo(b)fluoranthene	ND	0.0994		µg/L	1	5/30/2017 4:40:06 PM
Benzo(k)fluoranthene	ND	0.0994		µg/L	1	5/30/2017 4:40:06 PM
Benzo(a)pyrene	ND	0.0994		µg/L	1	5/30/2017 4:40:06 PM
Indeno(1,2,3-cd)pyrene	ND	0.0994		µg/L	1	5/30/2017 4:40:06 PM
Dibenz(a,h)anthracene	ND	0.0994		µg/L	1	5/30/2017 4:40:06 PM
Benzo(g,h,i)perylene	ND	0.0994		µg/L	1	5/30/2017 4:40:06 PM
Surr: 2-Fluorobiphenyl	106	31.2-159		%Rec	1	5/30/2017 4:40:06 PM
Surr: Terphenyl-d14	19.9	32.4-141	S	%Rec	1	5/30/2017 4:40:06 PM

NOTES:

S - Outlying surrogate recovery(ies) observed.

Gasoline by NWTPH-Gx

Batch ID: 17202 Analyst: EM

Gasoline	ND	50.0		µg/L	1	5/31/2017 4:51:47 PM
Surr: Toluene-d8	101	65-135		%Rec	1	5/31/2017 4:51:47 PM
Surr: 4-Bromofluorobenzene	106	65-135		%Rec	1	5/31/2017 4:51:47 PM

Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17202 Analyst: EM

Dichlorodifluoromethane (CFC-12)	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
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Analytical Report

Work Order: 1705281

Date Reported: 5/31/2017

Client: GeoEngineers

Collection Date: 5/23/2017 1:30:00 PM

Project: Rufus 2.0 - Block 18

Lab ID: 1705281-001

Matrix: Groundwater

Client Sample ID: MW-18-1-170523

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17202

Analyst: EM

Chloromethane	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
Vinyl chloride	ND	0.200		µg/L	1	5/31/2017 4:51:47 PM
Bromomethane	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
Trichlorofluoromethane (CFC-11)	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
Chloroethane	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
1,1-Dichloroethene	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
Methylene chloride	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
trans-1,2-Dichloroethene	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
Methyl tert-butyl ether (MTBE)	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
1,1-Dichloroethane	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
2,2-Dichloropropane	ND	2.00		µg/L	1	5/31/2017 4:51:47 PM
cis-1,2-Dichloroethene	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
Chloroform	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
1,1,1-Trichloroethane (TCA)	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
1,1-Dichloropropene	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
Carbon tetrachloride	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
1,2-Dichloroethane (EDC)	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
Benzene	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
Trichloroethene (TCE)	ND	0.500		µg/L	1	5/31/2017 4:51:47 PM
1,2-Dichloropropane	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
Bromodichloromethane	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
Dibromomethane	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
cis-1,3-Dichloropropene	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
Toluene	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
trans-1,3-Dichloropropylene	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
1,1,2-Trichloroethane	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
1,3-Dichloropropane	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
Tetrachloroethene (PCE)	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
Dibromochloromethane	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
1,2-Dibromoethane (EDB)	ND	0.0600		µg/L	1	5/31/2017 4:51:47 PM
Chlorobenzene	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
1,1,1,2-Tetrachloroethane	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
Ethylbenzene	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
m,p-Xylene	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
o-Xylene	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
Styrene	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
Isopropylbenzene	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
Bromoform	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
1,1,2,2-Tetrachloroethane	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM

Original



Analytical Report

Work Order: 1705281

Date Reported: 5/31/2017

Client: GeoEngineers

Collection Date: 5/23/2017 1:30:00 PM

Project: Rufus 2.0 - Block 18

Lab ID: 1705281-001

Matrix: Groundwater

Client Sample ID: MW-18-1-170523

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17202

Analyst: EM

n-Propylbenzene	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
Bromobenzene	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
1,3,5-Trimethylbenzene	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
2-Chlorotoluene	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
4-Chlorotoluene	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
tert-Butylbenzene	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
1,2,3-Trichloropropane	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
1,2,4-Trichlorobenzene	ND	2.00		µg/L	1	5/31/2017 4:51:47 PM
sec-Butylbenzene	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
4-Isopropyltoluene	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
1,3-Dichlorobenzene	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
1,4-Dichlorobenzene	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
n-Butylbenzene	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
1,2-Dichlorobenzene	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
1,2-Dibromo-3-chloropropane	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
1,2,4-Trimethylbenzene	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
Hexachloro-1,3-butadiene	ND	4.00		µg/L	1	5/31/2017 4:51:47 PM
Naphthalene	ND	1.00		µg/L	1	5/31/2017 4:51:47 PM
1,2,3-Trichlorobenzene	ND	4.00		µg/L	1	5/31/2017 4:51:47 PM
Surr: Dibromofluoromethane	101	45.4-152		%Rec	1	5/31/2017 4:51:47 PM
Surr: Toluene-d8	95.5	40.1-139		%Rec	1	5/31/2017 4:51:47 PM
Surr: 1-Bromo-4-fluorobenzene	101	64.2-128		%Rec	1	5/31/2017 4:51:47 PM

Mercury by EPA Method 245.1

Batch ID: 17177

Analyst: WF

Mercury	ND	0.100		µg/L	1	5/25/2017 4:54:32 PM
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Total Metals by EPA Method 200.8

Batch ID: 17172

Analyst: TN

Arsenic	22.5	1.00		µg/L	1	5/26/2017 2:43:26 PM
Barium	2,210	0.500		µg/L	1	5/26/2017 2:43:26 PM
Cadmium	1.46	0.200		µg/L	1	5/26/2017 2:43:26 PM
Chromium	33.3	0.500		µg/L	1	5/26/2017 2:43:26 PM
Lead	8.08	0.500		µg/L	1	5/26/2017 2:43:26 PM
Selenium	19.5	1.00		µg/L	1	5/26/2017 2:43:26 PM
Silver	ND	0.200		µg/L	1	5/26/2017 2:43:26 PM

Work Order: 1705281
CLIENT: GeoEngineers
Project: Rufus 2.0 - Block 18

QC SUMMARY REPORT

Total Metals by EPA Method 200.8

Sample ID	LCS-17172	SampType:	LCS	Units:	µg/L	Prep Date:	5/25/2017	RunNo:	36433		
Client ID:	LCSW	Batch ID:	17172			Analysis Date:	5/26/2017	SeqNo:	698955		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	103	1.00	100.0	0	103	85	115				
Barium	98.2	0.500	100.0	0	98.2	85	115				
Cadmium	4.88	0.200	5.000	0	97.6	85	115				
Chromium	103	0.500	100.0	0	103	85	115				
Lead	50.6	0.500	50.00	0	101	85	115				
Selenium	10.4	1.00	10.00	0	104	85	115				
Silver	4.79	0.200	5.000	0	95.9	85	115				

Sample ID	1705276-001CDUP	SampType:	DUP	Units:	µg/L	Prep Date:	5/25/2017	RunNo:	36433		
Client ID:	BATCH	Batch ID:	17172			Analysis Date:	5/26/2017	SeqNo:	698957		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	3.66	1.00						3.427	6.63	30	
Barium	43.4	0.500						41.76	3.77	30	
Cadmium	ND	0.200						0		30	
Chromium	3.25	0.500						1.416	78.6	30	R
Lead	2.77	0.500						3.285	17.1	30	
Selenium	ND	1.00						0		30	
Silver	ND	0.200						0		30	

NOTES:

R - High RPD observed. The method is in control as indicated by the LCS.

Sample ID	1705276-001CMS	SampType:	MS	Units:	µg/L	Prep Date:	5/25/2017	RunNo:	36433		
Client ID:	BATCH	Batch ID:	17172			Analysis Date:	5/26/2017	SeqNo:	698958		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	573	1.00	500.0	3.427	114	70	130				
Barium	540	0.500	500.0	41.76	99.7	70	130				
Cadmium	29.2	0.200	25.00	0.06500	116	70	130				
Chromium	586	0.500	500.0	1.416	117	70	130				
Lead	245	0.500	250.0	3.285	96.8	70	130				

Work Order: 1705281
CLIENT: GeoEngineers
Project: Rufus 2.0 - Block 18

QC SUMMARY REPORT

Total Metals by EPA Method 200.8

Sample ID	1705276-001CMS	SampType:	MS	Units:	µg/L	Prep Date:	5/25/2017	RunNo:	36433		
Client ID:	BATCH	Batch ID:	17172	Analysis Date:				5/26/2017	SeqNo:	698958	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Selenium	56.0	1.00	50.00	0	112	70	130				
Silver	16.0	0.200	25.00	0.05700	63.7	70	130				S

NOTES:

S - Outlying spike recovery observed (Ag). A duplicate analysis was performed with similar results indicating a possible matrix effect.

Sample ID	1705276-001CMSD	SampType:	MSD	Units:	µg/L	Prep Date:	5/25/2017	RunNo:	36433		
Client ID:	BATCH	Batch ID:	17172			Analysis Date:	5/26/2017	SeqNo:	698959		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	604	1.00	500.0	3.427	120	70	130	573.3	5.19	30	
Barium	522	0.500	500.0	41.76	96.1	70	130	540.2	3.35	30	
Cadmium	31.1	0.200	25.00	0.06500	124	70	130	29.15	6.44	30	
Chromium	663	0.500	500.0	1.416	132	70	130	586.3	12.3	30	S
Lead	240	0.500	250.0	3.285	94.8	70	130	245.3	2.12	30	
Selenium	58.4	1.00	50.00	0	117	70	130	56.01	4.11	30	
Silver	15.1	0.200	25.00	0.05700	60.2	70	130	15.97	5.66	30	S

NOTES:

S - Outlying spike recovery observed (Ag). A duplicate analysis was performed with similar results indicating a possible matrix effect.

S - Outlying spike recovery(ies) observed (Cr). A duplicate analysis was performed and recovered within range.

Sample ID	MB-17172	SampType:	MBLK	Units:	µg/L	Prep Date:	5/25/2017	RunNo:	36433		
Client ID:	MBLKW	Batch ID:	17172	Analysis Date:				5/26/2017	SeqNo:	699038	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	1.00									
Barium	ND	0.500									
Cadmium	ND	0.200									
Chromium	ND	0.500									
Lead	ND	0.500									
Selenium	ND	1.00									
Silver	ND	0.200									

Work Order: 1705281
CLIENT: GeoEngineers
Project: Rufus 2.0 - Block 18

QC SUMMARY REPORT

Mercury by EPA Method 245.1

Sample ID	MB-17177	SampType:	MBLK	Units:	µg/L	Prep Date:	5/25/2017	RunNo:	36399			
Client ID:	MBLKW	Batch ID:	17177			Analysis Date:	5/25/2017	SeqNo:	698490			
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Mercury ND 0.100

Sample ID	LCS-17177	SampType:	LCS	Units:	µg/L	Prep Date:	5/25/2017	RunNo:	36399		
Client ID:	LCSW	Batch ID:	17177			Analysis Date:	5/25/2017	SeqNo:	698491		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Mercury 2.64 0.100 2.500 0 106 85 115

Sample ID	1705277-003BDUP	SampType:	DUP	Units:	µg/L	Prep Date:	5/25/2017	RunNo:	36399			
Client ID:	BATCH	Batch ID:	17177			Analysis Date:	5/25/2017	SeqNo:	698493			
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Mercury ND 0.100 0 20

Sample ID	1705277-003BMS	SampType:	MS	Units:	µg/L	Prep Date:	5/25/2017	RunNo:	36399			
Client ID:	BATCH	Batch ID:	17177			Analysis Date:	5/25/2017	SeqNo:	698494			
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Mercury 2.47 0.100 2.500 0 98.8 70 130

Sample ID	1705277-003BMSD	SampType:	MSD	Units:	µg/L	Prep Date:	5/25/2017	RunNo:	36399		
Client ID:	BATCH	Batch ID:	17177			Analysis Date:	5/25/2017	SeqNo:	698495		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Mercury 2.63 0.100 2.500 0 105 70 130 2.470 6.27 20

Work Order: 1705281
CLIENT: GeoEngineers
Project: Rufus 2.0 - Block 18

QC SUMMARY REPORT

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

Sample ID	MB-17184	SampType: MBLK			Units: µg/L		Prep Date: 5/26/2017			RunNo: 36491		
Client ID:	MBLKW	Batch ID: 17184			Analysis Date: 5/31/2017					SeqNo: 700109		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Diesel (Fuel Oil)	ND	49.8									
Heavy Oil	ND	99.6									
Surr: 2-Fluorobiphenyl	66.9		79.69		83.9	50	150				
Surr: o-Terphenyl	72.6		79.69		91.1	50	150				

Sample ID	LCS-17184	SampType: LCS			Units: µg/L		Prep Date: 5/26/2017			RunNo: 36491		
Client ID:	LCSW	Batch ID: 17184			Analysis Date: 5/31/2017					SeqNo: 700108		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Diesel (Fuel Oil)	735	49.7	993.6	0	74.0	65	135				
Surr: 2-Fluorobiphenyl	64.9		79.49		81.7	50	150				
Surr: o-Terphenyl	68.1		79.49		85.7	50	150				

Work Order: 1705281
CLIENT: GeoEngineers
Project: Rufus 2.0 - Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID	MB-17185	SampType:	MBLK		Units:	µg/L		Prep Date:	5/26/2017		RunNo:	36468	
Client ID:	MBLKW	Batch ID:	17185					Analysis Date:	5/30/2017		SeqNo:	699654	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual		
Naphthalene	ND	0.0998											
2-Methylnaphthalene	ND	0.0998											
1-Methylnaphthalene	ND	0.0998											
Acenaphthylene	ND	0.0998											
Acenaphthene	ND	0.0998											
Fluorene	ND	0.0998											
Phenanthrene	ND	0.0998											
Anthracene	ND	0.0998											
Fluoranthene	ND	0.0998											
Pyrene	ND	0.0998											
Benz(a)anthracene	ND	0.0998											
Chrysene	ND	0.0998											
Benzo(b)fluoranthene	ND	0.0998											
Benzo(k)fluoranthene	ND	0.0998											
Benzo(a)pyrene	ND	0.0998											
Indeno(1,2,3-cd)pyrene	ND	0.0998											
Dibenz(a,h)anthracene	ND	0.0998											
Benzo(g,h,i)perylene	ND	0.0998											
Surr: 2-Fluorobiphenyl	1.96		1.996		98.3	31.2	159						
Surr: Terphenyl-d14	1.77		1.996		88.8	32.4	141						

Sample ID	LCS-17185	SampType:	LCS	Units:	µg/L	Prep Date:	5/26/2017	RunNo:	36468		
Client ID:	LCSW	Batch ID:	17185			Analysis Date:	5/30/2017	SeqNo:	699655		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	3.64	0.0998	3.992	0	91.2	30.4	113				
2-Methylnaphthalene	3.95	0.0998	3.992	0	98.9	33.2	126				
1-Methylnaphthalene	3.80	0.0998	3.992	0	95.3	30.2	119				
Acenaphthylene	4.36	0.0998	3.992	0	109	34	133				
Acenaphthene	4.00	0.0998	3.992	0	100	31.8	127				

Work Order: 1705281
CLIENT: GeoEngineers
Project: Rufus 2.0 - Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID	LCS-17185	SampType:	LCS	Units:	µg/L	Prep Date:	5/26/2017	RunNo:	36468		
Client ID:	LCSW	Batch ID:	17185			Analysis Date:	5/30/2017	SeqNo:	699655		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluorene	4.54	0.0998	3.992	0	114	27.7	138				
Phenanthrene	4.51	0.0998	3.992	0	113	26.3	139				
Anthracene	4.29	0.0998	3.992	0	108	27	125				
Fluoranthene	4.68	0.0998	3.992	0	117	23.5	142				
Pyrene	4.59	0.0998	3.992	0	115	25.1	136				
Benz(a)anthracene	4.43	0.0998	3.992	0	111	42.8	125				
Chrysene	4.41	0.0998	3.992	0	110	32.3	120				
Benzo(b)fluoranthene	4.67	0.0998	3.992	0	117	25.9	132				
Benzo(k)fluoranthene	4.52	0.0998	3.992	0	113	25.1	118				
Benzo(a)pyrene	4.45	0.0998	3.992	0	111	18.7	120				
Indeno(1,2,3-cd)pyrene	3.87	0.0998	3.992	0	97.0	21.3	131				
Dibenz(a,h)anthracene	3.68	0.0998	3.992	0	92.2	21.3	137				
Benzo(g,h,i)perylene	3.79	0.0998	3.992	0	95.0	21.2	127				
Surr: 2-Fluorobiphenyl	2.20		1.996		110	31.2	159				
Surr: Terphenyl-d14	2.05		1.996		103	32.4	141				

Sample ID	1705276-005BDUP	SampType:	DUP	Units:	µg/L	Prep Date:	5/26/2017	RunNo:	36468		
Client ID:	BATCH	Batch ID:	17185			Analysis Date:	5/30/2017	SeqNo:	699657		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	0.100						0		30	
2-Methylnaphthalene	ND	0.100						0		30	
1-Methylnaphthalene	ND	0.100						0		30	
Acenaphthylene	ND	0.100						0		30	
Acenaphthene	ND	0.100						0		30	
Fluorene	ND	0.100						0		30	
Phenanthrene	ND	0.100						0		30	
Anthracene	ND	0.100						0		30	
Fluoranthene	ND	0.100						0		30	
Pyrene	ND	0.100						0		30	

Work Order: 1705281
CLIENT: GeoEngineers
Project: Rufus 2.0 - Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID	1705276-005BDUP	SampType:	DUP	Units:	µg/L	Prep Date:	5/26/2017	RunNo:	36468		
Client ID:	BATCH	Batch ID:	17185			Analysis Date:	5/30/2017	SeqNo:	699657		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benz(a)anthracene	ND	0.100						0		30	
Chrysene	ND	0.100						0		30	
Benzo(b)fluoranthene	ND	0.100						0		30	
Benzo(k)fluoranthene	ND	0.100						0		30	
Benzo(a)pyrene	ND	0.100						0		30	
Indeno(1,2,3-cd)pyrene	ND	0.100						0		30	
Dibenz(a,h)anthracene	ND	0.100						0		30	
Benzo(g,h,i)perylene	ND	0.100						0		30	
Surr: 2-Fluorobiphenyl	2.07		2.002		103	31.2	159		0		
Surr: Terphenyl-d14	1.90		2.002		95.1	32.4	141		0		

Sample ID	1705276-005BMS	SampType:	MS		Units:	µg/L		Prep Date:	5/26/2017		RunNo:	36468	
Client ID:	BATCH	Batch ID:	17185					Analysis Date:	5/30/2017		SeqNo:	699658	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual		
Naphthalene	3.54	0.100	4.011	0	88.2	26	108						
2-Methylnaphthalene	3.86	0.100	4.011	0	96.1	33.9	109						
1-Methylnaphthalene	3.72	0.100	4.011	0	92.8	33.2	110						
Acenaphthylene	4.26	0.100	4.011	0.007538	106	40.5	98.7					S	
Acenaphthene	3.95	0.100	4.011	0	98.6	30.6	117						
Fluorene	4.53	0.100	4.011	0	113	35.2	99.1					S	
Phenanthrene	4.55	0.100	4.011	0	113	42.7	111					S	
Anthracene	4.20	0.100	4.011	0	105	43.9	103					S	
Fluoranthene	4.73	0.100	4.011	0	118	40.7	122						
Pyrene	4.67	0.100	4.011	0	117	44.2	134						
Benz(a)anthracene	4.48	0.100	4.011	0	112	30.8	126						
Chrysene	4.25	0.100	4.011	0	106	22	113						
Benzo(b)fluoranthene	4.67	0.100	4.011	0	116	26.8	130						
Benzo(k)fluoranthene	4.22	0.100	4.011	0	105	37	122						
Benzo(a)pyrene	4.32	0.100	4.011	0.01016	108	22.1	120						

Work Order: 1705281
CLIENT: GeoEngineers
Project: Rufus 2.0 - Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID	1705276-005BMS		SampType: MS		Units: µg/L		Prep Date: 5/26/2017		RunNo: 36468		
Client ID:	BATCH		Batch ID: 17185				Analysis Date: 5/30/2017		SeqNo: 699658		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Indeno(1,2,3-cd)pyrene	3.69	0.100	4.011	0.007205	91.7	21.1	136				
Dibenz(a,h)anthracene	3.49	0.100	4.011	0.007356	86.9	31.4	120				
Benzo(g,h,i)perylene	3.61	0.100	4.011	0	90.1	30	116				
Surr: 2-Fluorobiphenyl	2.10		2.005		105	31.2	159				
Surr: Terphenyl-d14	1.95		2.005		97.1	32.4	141				

NOTES:

S - Outlying spike recovery(ies) observed. A duplicate analysis was performed and recovered within range.

Sample ID	1705276-005BMSD	SampType:	MSD	Units:	µg/L	Prep Date:	5/26/2017	RunNo:	36468		
Client ID:	BATCH	Batch ID:	17185			Analysis Date:	5/30/2017	SeqNo:	699659		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	2.57	0.100	3.999	0	64.3	26	108	3.536	31.6	30	R
2-Methylnaphthalene	2.88	0.100	3.999	0	72.0	33.9	109	3.855	28.9	30	
1-Methylnaphthalene	2.79	0.100	3.999	0	69.7	33.2	110	3.721	28.7	30	
Acenaphthylene	3.39	0.100	3.999	0.007538	84.6	40.5	98.7	4.260	22.7	30	
Acenaphthene	3.16	0.100	3.999	0	79.1	30.6	117	3.953	22.2	30	
Fluorene	3.84	0.100	3.999	0	96.1	35.2	99.1	4.528	16.4	30	
Phenanthrene	4.05	0.100	3.999	0	101	42.7	111	4.552	11.6	30	
Anthracene	3.68	0.100	3.999	0	92.0	43.9	103	4.202	13.2	30	
Fluoranthene	4.29	0.100	3.999	0	107	40.7	122	4.735	9.81	30	
Pyrene	4.20	0.100	3.999	0	105	44.2	134	4.674	10.7	30	
Benz(a)anthracene	3.96	0.100	3.999	0	99.1	30.8	126	4.478	12.2	30	
Chrysene	3.92	0.100	3.999	0	98.0	22	113	4.252	8.11	30	
Benzo(b)fluoranthene	4.25	0.100	3.999	0	106	26.8	130	4.668	9.48	30	
Benzo(k)fluoranthene	3.71	0.100	3.999	0	92.7	37	122	4.218	12.8	30	
Benzo(a)pyrene	3.84	0.100	3.999	0.01016	95.8	22.1	120	4.323	11.8	30	
Indeno(1,2,3-cd)pyrene	3.30	0.100	3.999	0.007205	82.3	21.1	136	3.685	11.1	30	
Dibenz(a,h)anthracene	3.12	0.100	3.999	0.007356	77.7	31.4	120	3.492	11.4	30	
Benzo(g,h,i)perylene	3.23	0.100	3.999	0	80.8	30	116	3.614	11.2	30	
Surr: 2-Fluorobiphenyl	1.44		2.000		72.0	31.2	159		0	0	

Work Order: 1705281
CLIENT: GeoEngineers
Project: Rufus 2.0 - Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID	1705276-005BMSD	SampType:	MSD	Units:	µg/L	Prep Date:	5/26/2017	RunNo:	36468		
Client ID:	BATCH	Batch ID:	17185			Analysis Date:	5/30/2017	SeqNo:	699659		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Surr: Terphenyl-d14	1.55		2.000		77.4	32.4	141		0	0	
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NOTES:

R - High RPD observed, spike recoveries are within range.



Work Order: 1705281
CLIENT: GeoEngineers
Project: Rufus 2.0 - Block 18

QC SUMMARY REPORT

Gasoline by NWTPH-Gx

Sample ID	LCS-17202	SampType:	LCS	Units:	µg/L	Prep Date:	5/30/2017	RunNo:	36500		
Client ID:	LCSW	Batch ID:	17202			Analysis Date:	5/31/2017	SeqNo:	700293		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Gasoline	483	50.0	500.0	0	96.6	65	135				
Surr: Toluene-d8	25.2		25.00		101	65	135				
Surr: 4-Bromofluorobenzene	25.9		25.00		103	65	135				

Sample ID	LCS-17202	SampType:	LCS	Units:	µg/L	Prep Date:	5/30/2017	RunNo:	36500		
Client ID:	LCSW	Batch ID:	17202			Analysis Date:	5/31/2017	SeqNo:	700294		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Gasoline	507	50.0	500.0	0	101	65	135				
Surr: Toluene-d8	25.0		25.00		100	65	135				
Surr: 4-Bromofluorobenzene	25.7		25.00		103	65	135				

Sample ID	MB-17202	SampType:	MBLK			Units:	µg/L		Prep Date:	5/30/2017		RunNo:	36500	
Client ID:	MBLKW	Batch ID:	17202			Analysis Date:				5/31/2017		SeqNo:	700295	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual			

Gasoline	ND	50.0									
Surr: Toluene-d8	25.2		25.00		101	65	135				
Surr: 4-Bromofluorobenzene	24.5		25.00		97.9	65	135				

Sample ID	1705260-001ADUP	SampType:	DUP	Units:	µg/L	Prep Date:	5/30/2017	RunNo:	36500		
Client ID:	BATCH	Batch ID:	17202			Analysis Date:	5/31/2017	SeqNo:	700281		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Gasoline	ND	50.0						0		30	
Surr: Toluene-d8	24.9		25.00		99.6	65	135		0		
Surr: 4-Bromofluorobenzene	36.6		25.00		146	65	135		0		S

NOTES:

S - Outlying surrogate recovery(ies) observed (high bias). Sample is non-detect; no further action required.



Date: 5/31/2017

Work Order: 1705281
CLIENT: GeoEngineers
Project: Rufus 2.0 - Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID	LCS-17202	SampType:	LCS	Units:	µg/L	Prep Date:	5/30/2017	RunNo:	36499		
Client ID:	LCSW	Batch ID:	17202			Analysis Date:	5/31/2017	SeqNo:	700278		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	27.9	1.00	20.00	0	139	18.7	171				
Chloromethane	21.2	1.00	20.00	0	106	38.5	171				
Vinyl chloride	21.0	0.200	20.00	0	105	48	145				
Bromomethane	19.3	1.00	20.00	0	96.3	32.5	184				
Trichlorofluoromethane (CFC-11)	20.1	1.00	20.00	0	100	43.5	149				
Chloroethane	20.0	1.00	20.00	0	99.9	43.8	168				
1,1-Dichloroethene	19.3	1.00	20.00	0	96.5	57.5	150				
Methylene chloride	18.9	1.00	20.00	0	94.6	67.1	131				
trans-1,2-Dichloroethene	18.8	1.00	20.00	0	94.0	71.7	129				
Methyl tert-butyl ether (MTBE)	19.6	1.00	20.00	0	98.2	58	138				
1,1-Dichloroethane	18.9	1.00	20.00	0	94.6	67.9	134				
2,2-Dichloropropane	25.9	2.00	20.00	0	130	26.5	185				
cis-1,2-Dichloroethene	19.4	1.00	20.00	0	97.2	70.2	139				
Chloroform	20.3	1.00	20.00	0	101	66.3	131				
1,1,1-Trichloroethane (TCA)	19.8	1.00	20.00	0	98.8	71	131				
1,1-Dichloropropene	18.4	1.00	20.00	0	92.2	69.9	124				
Carbon tetrachloride	17.2	1.00	20.00	0	86.1	66.2	134				
1,2-Dichloroethane (EDC)	21.1	1.00	20.00	0	105	67	126				
Benzene	25.1	1.00	20.00	0	125	69.3	132				
Trichloroethene (TCE)	18.3	0.500	20.00	0	91.6	65.2	136				
1,2-Dichloropropane	18.5	1.00	20.00	0	92.4	70.5	130				
Bromodichloromethane	17.4	1.00	20.00	0	87.1	67.2	137				
Dibromomethane	17.9	1.00	20.00	0	89.7	69.3	143				
cis-1,3-Dichloropropene	19.6	1.00	20.00	0	97.9	62.6	137				
Toluene	22.8	1.00	20.00	0	114	61.3	145				
trans-1,3-Dichloropropylene	19.4	1.00	20.00	0	97.2	56.5	163				
1,1,2-Trichloroethane	17.8	1.00	20.00	0	88.8	71.7	131				
1,3-Dichloropropane	17.7	1.00	20.00	0	88.3	73.5	127				
Tetrachloroethene (PCE)	19.0	1.00	20.00	0	95.0	47.5	147				
Dibromochloromethane	17.9	1.00	20.00	0	89.6	67.2	134				
1,2-Dibromoethane (EDB)	17.6	0.0600	20.00	0	88.2	73.6	125				

Work Order: 1705281
CLIENT: GeoEngineers
Project: Rufus 2.0 - Block 18

QC SUMMARY REPORT
Volatile Organic Compounds by EPA Method 8260C

Sample ID	LCS-17202	SampType: LCS		Units: µg/L		Prep Date: 5/30/2017			RunNo: 36499		
Client ID:	LCSW	Batch ID: 17202					Analysis Date: 5/31/2017			SeqNo: 700278	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorobenzene	19.0	1.00	20.00	0	94.9	73.9	126				
1,1,1,2-Tetrachloroethane	18.6	1.00	20.00	0	92.8	76.8	124				
Ethylbenzene	23.2	1.00	20.00	0	116	72	130				
m,p-Xylene	47.1	1.00	40.00	0	118	70.3	134				
o-Xylene	23.9	1.00	20.00	0	119	72.1	131				
Styrene	19.3	1.00	20.00	0	96.5	64.3	140				
Isopropylbenzene	19.1	1.00	20.00	0	95.5	73.9	128				
Bromoform	15.2	1.00	20.00	0	76.1	55.3	141				
1,1,2,2-Tetrachloroethane	18.4	1.00	20.00	0	92.2	62.9	132				
n-Propylbenzene	18.9	1.00	20.00	0	94.3	74.5	127				
Bromobenzene	18.6	1.00	20.00	0	93.2	71	131				
1,3,5-Trimethylbenzene	18.6	1.00	20.00	0	92.9	73.1	128				
2-Chlorotoluene	19.5	1.00	20.00	0	97.3	70.8	130				
4-Chlorotoluene	19.0	1.00	20.00	0	95.0	70.1	131				
tert-Butylbenzene	19.2	1.00	20.00	0	95.8	68.2	131				
1,2,3-Trichloropropane	17.7	1.00	20.00	0	88.6	67.7	131				
1,2,4-Trichlorobenzene	19.8	2.00	20.00	0	98.8	51.8	152				
sec-Butylbenzene	19.7	1.00	20.00	0	98.4	72	129				
4-Isopropyltoluene	19.8	1.00	20.00	0	98.8	69.2	130				
1,3-Dichlorobenzene	20.2	1.00	20.00	0	101	80.4	124				
1,4-Dichlorobenzene	19.8	1.00	20.00	0	98.8	66.8	119				
n-Butylbenzene	19.6	1.00	20.00	0	97.9	73.8	127				
1,2-Dichlorobenzene	19.4	1.00	20.00	0	97.2	69.7	119				
1,2-Dibromo-3-chloropropane	15.2	1.00	20.00	0	76.0	63.1	136				
1,2,4-Trimethylbenzene	18.6	1.00	20.00	0	93.2	73.4	127				
Hexachloro-1,3-butadiene	19.9	4.00	20.00	0	99.6	58.6	138				
Naphthalene	21.7	1.00	20.00	0	109	41.8	165				
1,2,3-Trichlorobenzene	20.2	4.00	20.00	0	101	48.7	156				
Surr: Dibromofluoromethane	27.0		25.00		108	45.4	152				
Surr: Toluene-d8	25.4		25.00		101	40.1	139				
Surr: 1-Bromo-4-fluorobenzene	26.3		25.00		105	64.2	128				



Date: 5/31/2017

Work Order: 1705281
CLIENT: GeoEngineers
Project: Rufus 2.0 - Block 18

QC SUMMARY REPORT
Volatile Organic Compounds by EPA Method 8260C

Sample ID	LCS-17202	SampType:	LCS	Units:	µg/L	Prep Date:	5/30/2017	RunNo:	36499		
Client ID:	LCSW	Batch ID:	17202			Analysis Date:	5/31/2017	SeqNo:	700278		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Sample ID	MB-17202	SampType:	MBLK	Units:	µg/L	Prep Date:	5/30/2017	RunNo:	36499		
Client ID:	MBLKW	Batch ID:	17202			Analysis Date:	5/31/2017	SeqNo:	700279		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

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

Work Order: 1705281
CLIENT: GeoEngineers
Project: Rufus 2.0 - Block 18

QC SUMMARY REPORT
Volatile Organic Compounds by EPA Method 8260C

Sample ID	MB-17202	SampType:	MBLK		Units:	µg/L		Prep Date:	5/30/2017		RunNo:	36499	
Client ID:	MBLKW	Batch ID:	17202					Analysis Date:	5/31/2017		SeqNo:	700279	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual		
trans-1,3-Dichloropropylene	ND	1.00											
1,1,2-Trichloroethane	ND	1.00											
1,3-Dichloropropane	ND	1.00											
Tetrachloroethene (PCE)	ND	1.00											
Dibromochloromethane	ND	1.00											
1,2-Dibromoethane (EDB)	ND	0.0600											
Chlorobenzene	ND	1.00											
1,1,1,2-Tetrachloroethane	ND	1.00											
Ethylbenzene	ND	1.00											
m,p-Xylene	ND	1.00											
o-Xylene	ND	1.00											
Styrene	ND	1.00											
Isopropylbenzene	ND	1.00											
Bromoform	ND	1.00											Q
1,1,2,2-Tetrachloroethane	ND	1.00											
n-Propylbenzene	ND	1.00											
Bromobenzene	ND	1.00											
1,3,5-Trimethylbenzene	ND	1.00											
2-Chlorotoluene	ND	1.00											
4-Chlorotoluene	ND	1.00											
tert-Butylbenzene	ND	1.00											
1,2,3-Trichloropropane	ND	1.00											
1,2,4-Trichlorobenzene	ND	2.00											
sec-Butylbenzene	ND	1.00											
4-Isopropyltoluene	ND	1.00											
1,3-Dichlorobenzene	ND	1.00											
1,4-Dichlorobenzene	ND	1.00											
n-Butylbenzene	ND	1.00											
1,2-Dichlorobenzene	ND	1.00											
1,2-Dibromo-3-chloropropane	ND	1.00											Q
1,2,4-Trimethylbenzene	ND	1.00											

Work Order: 1705281
CLIENT: GeoEngineers
Project: Rufus 2.0 - Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID	MB-17202	SampType:	MBLK	Units:	µg/L	Prep Date:	5/30/2017			RunNo:	36499	
Client ID:	MBLKW	Batch ID:	17202				Analysis Date:	5/31/2017			SeqNo:	700279
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Hexachloro-1,3-butadiene	ND	4.00										
Naphthalene	ND	1.00										
1,2,3-Trichlorobenzene	ND	4.00										
Surr: Dibromofluoromethane	23.7		25.00		95.0	45.4	152					
Surr: Toluene-d8	20.8		25.00		83.3	40.1	139					
Surr: 1-Bromo-4-fluorobenzene	23.4		25.00		93.5	64.2	128					

NOTES:

Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Sample ID	1705260-001ADUP	SampType:	DUP		Units:	µg/L		Prep Date:	5/30/2017		RunNo:	36499	
Client ID:	BATCH	Batch ID:	17202					Analysis Date:	5/31/2017		SeqNo:	700265	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val		%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)		ND	1.00						0			30	
Chloromethane		ND	1.00						0			30	
Vinyl chloride		ND	0.200						0			30	
Bromomethane		ND	1.00						0			30	
Trichlorofluoromethane (CFC-11)		ND	1.00						0			30	
Chloroethane		ND	1.00						0			30	
1,1-Dichloroethene		ND	1.00						0			30	
Methylene chloride		ND	1.00						0			30	
trans-1,2-Dichloroethene		ND	1.00						0			30	
Methyl tert-butyl ether (MTBE)		ND	1.00						0			30	
1,1-Dichloroethane		ND	1.00						0			30	
2,2-Dichloropropane		ND	2.00						0			30	
cis-1,2-Dichloroethene		ND	1.00						0			30	
Chloroform		ND	1.00						0			30	
1,1,1-Trichloroethane (TCA)		ND	1.00						0			30	
1,1-Dichloropropene		ND	1.00						0			30	
Carbon tetrachloride		ND	1.00						0			30	
1,2-Dichloroethane (EDC)		ND	1.00						0			30	



Date: 5/31/2017

Work Order: 1705281
CLIENT: GeoEngineers
Project: Rufus 2.0 - Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID	1705260-001ADUP	SampType:	DUP	Units:	µg/L	Prep Date:	5/30/2017	RunNo:	36499		
Client ID:	BATCH	Batch ID:	17202			Analysis Date:	5/31/2017	SeqNo:	700265		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	ND	1.00						0		30	
Trichloroethene (TCE)	ND	0.500						0		30	
1,2-Dichloropropane	ND	1.00						0		30	
Bromodichloromethane	ND	1.00						0		30	
Dibromomethane	ND	1.00						0		30	
cis-1,3-Dichloropropene	ND	1.00						0		30	
Toluene	ND	1.00						0		30	
trans-1,3-Dichloropropylene	ND	1.00						0		30	
1,1,2-Trichloroethane	ND	1.00						0		30	
1,3-Dichloropropane	ND	1.00						0		30	
Tetrachloroethene (PCE)	ND	1.00						0		30	
Dibromochloromethane	ND	1.00						0		30	
1,2-Dibromoethane (EDB)	ND	0.0600						0		30	
Chlorobenzene	ND	1.00						0		30	
1,1,1,2-Tetrachloroethane	ND	1.00						0		30	
Ethylbenzene	ND	1.00						0		30	
m,p-Xylene	ND	1.00						0		30	
o-Xylene	ND	1.00						0		30	
Styrene	ND	1.00						0		30	
Isopropylbenzene	ND	1.00						0		30	
Bromoform	ND	1.00						0		30	Q
1,1,2,2-Tetrachloroethane	ND	1.00						0		30	
n-Propylbenzene	ND	1.00						0		30	
Bromobenzene	ND	1.00						0		30	
1,3,5-Trimethylbenzene	ND	1.00						0		30	
2-Chlorotoluene	ND	1.00						0		30	
4-Chlorotoluene	ND	1.00						0		30	
tert-Butylbenzene	ND	1.00						0		30	
1,2,3-Trichloropropane	ND	1.00						0		30	
1,2,4-Trichlorobenzene	ND	2.00						0		30	
sec-Butylbenzene	ND	1.00						0		30	

Work Order: 1705281
CLIENT: GeoEngineers
Project: Rufus 2.0 - Block 18

QC SUMMARY REPORT
Volatile Organic Compounds by EPA Method 8260C

Sample ID	1705260-001ADUP	SampType:	DUP	Units:	µg/L	Prep Date:	5/30/2017	RunNo:	36499		
Client ID:	BATCH	Batch ID:	17202			Analysis Date:	5/31/2017	SeqNo:	700265		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4-Isopropyltoluene	ND	1.00						0		30	
1,3-Dichlorobenzene	ND	1.00						0		30	
1,4-Dichlorobenzene	ND	1.00						0		30	
n-Butylbenzene	ND	1.00						0		30	
1,2-Dichlorobenzene	ND	1.00						0		30	
1,2-Dibromo-3-chloropropane	ND	1.00						0		30	Q
1,2,4-Trimethylbenzene	ND	1.00						0		30	
Hexachloro-1,3-butadiene	ND	4.00						0		30	
Naphthalene	ND	1.00						0		30	
1,2,3-Trichlorobenzene	ND	4.00						0		30	
Surr: Dibromofluoromethane	24.3		25.00		97.1	45.4	152		0		
Surr: Toluene-d8	19.8		25.00		79.1	40.1	139		0		
Surr: 1-Bromo-4-fluorobenzene	34.9		25.00		140	64.2	128		0		S

NOTES:

S - Outlying surrogate recovery(ies) observed (high bias). Sample is non-detect; no further action required.

Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

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

Work Order Number: **1705281**
 Date Received: **5/23/2017 2:45:00 PM**

Chain of Custody

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

Log In

3. Coolers are present? Yes ☒ No ☐ NA ☐
 4. Shipping container/cooler in good condition? Yes ☒ No ☐
 5. Custody Seals present on shipping container/cooler?
 (Refer to comments for Custody Seals not intact) Yes ☐ No ☐ Not Required ☒
 6. Was an attempt made to cool the samples? Yes ☒ No ☐ NA ☐
 7. Were all items received at a temperature of >0°C to 10.0°C* Yes ☒ No ☐ NA ☐
 8. Sample(s) in proper container(s)? Yes ☒ No ☐
 9. Sufficient sample volume for indicated test(s)? Yes ☒ No ☐
 10. Are samples properly preserved? Yes ☒ No ☐
 11. Was preservative added to bottles? Yes ☐ No ☒ NA ☐
 12. Is there headspace in the VOA vials? Yes ☐ No ☒ NA ☐
 13. Did all samples containers arrive in good condition(unbroken)? Yes ☒ No ☐
 14. Does paperwork match bottle labels? Yes ☒ No ☐
 15. Are matrices correctly identified on Chain of Custody? Yes ☒ No ☐
 16. Is it clear what analyses were requested? Yes ☒ No ☐
 17. Were all holding times able to be met? Yes ☒ No ☐

Special Handling (if applicable)

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

Person Notified: Date
 By Whom: Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person
 Regarding:
 Client Instructions:

19. Additional remarks:

Item Information

Item #	Temp °C
Cooler	1.1
Sample	1.3
Temp Blank	0.1

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C



Fremont

ANALYTICAL

3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: 5-23-17 Page: 1 of: 1

Project Name: RUFUS 2.0-BLOCK 18

Project No: 20434-001-32

Collected by: BLAIR AUGERSON

Location: SEATTLE, WA

Report To (PM): CHRIS T. BROWN

PM Email: CBROWN@GEOSCIENCE.SCI

Laboratory Project No (Internal): 1705281

Special Remarks:

Sample Disposal: ☐ Return to client ☒ Disposal by lab (after 30 days)

Client: GEOSCIENCE

Address: 600 STEWART ST. STE 1700

City, State, Zip: SEATTLE WA 98101

Telephone: 206-239-3251

Fax:

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	VOCs (EPA 8260 / 624)	GX/BTEX	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCD)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T) Dissolved (D)	Anions (IC)***	EDB (8011)	Comments
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1 MW18-1-170523 5-23-17 1330 GW Y Y Y Y Y Y Y Y Y Y Y Y

2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

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

**Metals (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL Individual: Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Tl Ti U V Zn

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate-Nitrite

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above and that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Relinquished

5-23-17 1445

Date/Time

Received

5/23/2017 1445

Date/Time

Same Day

(specify)

Turn-around Time: ☒ Standard ☐ 3 Day ☐ 2 Day ☐ Next Day



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

GeoEngineers

Chris Brown
600 Stewart Street, Suite 1700
Seattle, WA 98101

RE: Block 18

Work Order Number: 1705316

June 19, 2017

Attention Chris Brown:

Fremont Analytical, Inc. received 16 sample(s) on 5/10/2017 for the analyses presented in the following report.

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.
Gasoline by NWTPH-Gx
Mercury by EPA Method 7471
Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)
Sample Moisture (Percent Moisture)
Total Metals by EPA Method 6020
Volatile Organic Compounds by EPA Method 8260C

This report consists of the following:

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

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

Thank you for using Fremont Analytical.

Sincerely,

A handwritten signature in black ink, appearing to read "Mike C. Ridgeway". The signature is fluid and cursive.

Mike Ridgeway
Laboratory Director

DoD/ELAP Certification #L2371, ISO/IEC 17025:2005
ORELAP Certification: WA 100009-007 (NELAP Recognized)

CLIENT: GeoEngineers
Project: Block 18
Work Order: 1705316

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
1705316-001	B18-1-2.5	05/09/2017 8:10 AM	05/10/2017 4:10 PM
1705316-002	B18-1-5.0	05/09/2017 8:15 AM	05/10/2017 4:10 PM
1705316-003	B18-1-7.5	05/09/2017 8:20 AM	05/10/2017 4:10 PM
1705316-004	B18-1-10.0	05/09/2017 8:25 AM	05/10/2017 4:10 PM
1705316-005	B18-1-15.0	05/09/2017 8:30 AM	05/10/2017 4:10 PM
1705316-006	B18-2-2.5	05/09/2017 12:30 PM	05/10/2017 4:10 PM
1705316-007	B18-2-5.0	05/09/2017 12:35 PM	05/10/2017 4:10 PM
1705316-008	B18-2-7.5	05/09/2017 12:40 PM	05/10/2017 4:10 PM
1705316-009	B18-2-10.0	05/09/2017 12:45 PM	05/10/2017 4:10 PM
1705316-010	B18-2-15.0	05/09/2017 12:50 PM	05/10/2017 4:10 PM
1705316-011	MW18-1-2.5	05/10/2017 12:00 PM	05/10/2017 4:10 PM
1705316-012	MW18-1-5.0	05/10/2017 12:05 PM	05/10/2017 4:10 PM
1705316-013	MW18-1-7.5	05/10/2017 12:10 PM	05/10/2017 4:10 PM
1705316-014	MW18-1-10.0	05/10/2017 12:15 PM	05/10/2017 4:10 PM
1705316-015	MW18-1-15.0	05/10/2017 12:20 PM	05/10/2017 4:10 PM
1705316-016	Trip Blank	05/04/2017 4:27 PM	05/10/2017 4:10 PM

CLIENT: GeoEngineers**Project:** Block 18

I. SAMPLE RECEIPT:

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

II. GENERAL REPORTING COMMENTS:

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

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

III. ANALYSES AND EXCEPTIONS:

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

Qualifiers:

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

Acronyms:

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



Analytical Report

Work Order: 1705316
Date Reported: 6/19/2017

Client: GeoEngineers

Collection Date: 5/9/2017 8:10:00 AM

Project: Block 18

Lab ID: 1705316-001

Matrix: Soil

Client Sample ID: B18-1-2.5

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

Batch ID: 17188

Analyst: SB

Diesel (Fuel Oil)	ND	22.9	H	mg/Kg-dry	1	5/27/2017 5:19:10 AM
Heavy Oil	ND	57.3	H	mg/Kg-dry	1	5/27/2017 5:19:10 AM
Surr: 2-Fluorobiphenyl	92.8	50-150	H	%Rec	1	5/27/2017 5:19:10 AM
Surr: o-Terphenyl	92.2	50-150	H	%Rec	1	5/27/2017 5:19:10 AM

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Batch ID: 17196

Analyst: BT

Naphthalene	ND	46.9	H	µg/Kg-dry	1	5/30/2017 11:21:57 PM
2-Methylnaphthalene	ND	46.9	H	µg/Kg-dry	1	5/30/2017 11:21:57 PM
1-Methylnaphthalene	ND	46.9	H	µg/Kg-dry	1	5/30/2017 11:21:57 PM
Acenaphthylene	ND	46.9	H	µg/Kg-dry	1	5/30/2017 11:21:57 PM
Acenaphthene	ND	46.9	H	µg/Kg-dry	1	5/30/2017 11:21:57 PM
Fluorene	ND	46.9	H	µg/Kg-dry	1	5/30/2017 11:21:57 PM
Phenanthrene	ND	46.9	H	µg/Kg-dry	1	5/30/2017 11:21:57 PM
Anthracene	ND	46.9	H	µg/Kg-dry	1	5/30/2017 11:21:57 PM
Fluoranthene	ND	46.9	H	µg/Kg-dry	1	5/30/2017 11:21:57 PM
Pyrene	ND	46.9	H	µg/Kg-dry	1	5/30/2017 11:21:57 PM
Benz(a)anthracene	ND	46.9	H	µg/Kg-dry	1	5/30/2017 11:21:57 PM
Chrysene	ND	46.9	H	µg/Kg-dry	1	5/30/2017 11:21:57 PM
Benzo(b)fluoranthene	ND	46.9	H	µg/Kg-dry	1	5/30/2017 11:21:57 PM
Benzo(k)fluoranthene	ND	46.9	H	µg/Kg-dry	1	5/30/2017 11:21:57 PM
Benzo(a)pyrene	ND	46.9	H	µg/Kg-dry	1	5/30/2017 11:21:57 PM
Indeno(1,2,3-cd)pyrene	ND	46.9	H	µg/Kg-dry	1	5/30/2017 11:21:57 PM
Dibenz(a,h)anthracene	ND	46.9	H	µg/Kg-dry	1	5/30/2017 11:21:57 PM
Benzo(g,h,i)perylene	ND	46.9	H	µg/Kg-dry	1	5/30/2017 11:21:57 PM
Surr: 2-Fluorobiphenyl	60.5	24.5-139	H	%Rec	1	5/30/2017 11:21:57 PM
Surr: Terphenyl-d14 (surr)	78.8	44.3-176	H	%Rec	1	5/30/2017 11:21:57 PM

Gasoline by NWTPH-Gx

Batch ID: 17217

Analyst: EM

Gasoline	ND	4.98	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
Surr: Toluene-d8	102	65-135	H	%Rec	1	6/1/2017 5:52:46 PM
Surr: 4-Bromofluorobenzene	98.8	65-135	H	%Rec	1	6/1/2017 5:52:46 PM

Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17217

Analyst: EM

Dichlorodifluoromethane (CFC-12)	ND	0.0597	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
Chloromethane	ND	0.0597	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
Vinyl chloride	ND	0.00199	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM



Analytical Report

Work Order: 1705316
Date Reported: 6/19/2017

Client: GeoEngineers

Collection Date: 5/9/2017 8:10:00 AM

Project: Block 18

Lab ID: 1705316-001

Matrix: Soil

Client Sample ID: B18-1-2.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17217

Analyst: EM

Bromomethane	ND	0.0896	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
Trichlorofluoromethane (CFC-11)	ND	0.0498	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
Chloroethane	ND	0.0597	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
1,1-Dichloroethene	ND	0.0498	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
Methylene chloride	ND	0.0199	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
trans-1,2-Dichloroethene	ND	0.0199	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
Methyl tert-butyl ether (MTBE)	ND	0.0498	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
1,1-Dichloroethane	ND	0.0199	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
2,2-Dichloropropane	ND	0.0498	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
cis-1,2-Dichloroethene	ND	0.0199	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
Chloroform	ND	0.0199	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
1,1,1-Trichloroethane (TCA)	ND	0.0199	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
1,1-Dichloropropene	ND	0.0199	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
Carbon tetrachloride	ND	0.0199	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
1,2-Dichloroethane (EDC)	ND	0.0299	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
Benzene	ND	0.0199	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
Trichloroethene (TCE)	ND	0.0199	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
1,2-Dichloropropane	ND	0.0199	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
Bromodichloromethane	ND	0.0199	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
Dibromomethane	ND	0.0398	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
cis-1,3-Dichloropropene	ND	0.0199	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
Toluene	ND	0.0199	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
trans-1,3-Dichloropropylene	ND	0.0299	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
1,1,2-Trichloroethane	ND	0.0299	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
1,3-Dichloropropane	ND	0.0498	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
Tetrachloroethene (PCE)	ND	0.0199	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
Dibromochloromethane	ND	0.0299	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
1,2-Dibromoethane (EDB)	ND	0.00498	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
Chlorobenzene	ND	0.0199	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
1,1,1,2-Tetrachloroethane	ND	0.0299	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
Ethylbenzene	ND	0.0299	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
m,p-Xylene	ND	0.0199	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
o-Xylene	ND	0.0199	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
Styrene	ND	0.0199	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
Isopropylbenzene	ND	0.0796	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
Bromoform	ND	0.0199	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
1,1,2,2-Tetrachloroethane	ND	0.0199	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
n-Propylbenzene	ND	0.0199	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
Bromobenzene	ND	0.0299	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM



Analytical Report

Work Order: 1705316
Date Reported: 6/19/2017

Client: GeoEngineers

Collection Date: 5/9/2017 8:10:00 AM

Project: Block 18

Lab ID: 1705316-001

Matrix: Soil

Client Sample ID: B18-1-2.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17217

Analyst: EM

1,3,5-Trimethylbenzene	ND	0.0199	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
2-Chlorotoluene	ND	0.0199	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
4-Chlorotoluene	ND	0.0199	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
tert-Butylbenzene	ND	0.0199	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
1,2,3-Trichloropropane	ND	0.0199	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
1,2,4-Trichlorobenzene	ND	0.0498	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
sec-Butylbenzene	ND	0.0199	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
4-Isopropyltoluene	ND	0.0199	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
1,3-Dichlorobenzene	ND	0.0199	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
1,4-Dichlorobenzene	ND	0.0199	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
n-Butylbenzene	ND	0.0199	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
1,2-Dichlorobenzene	ND	0.0199	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
1,2-Dibromo-3-chloropropane	ND	0.498	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
1,2,4-Trimethylbenzene	ND	0.0199	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
Hexachlorobutadiene	ND	0.0995	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
Naphthalene	ND	0.0299	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
1,2,3-Trichlorobenzene	ND	0.0199	H	mg/Kg-dry	1	6/1/2017 5:52:46 PM
Surr: Dibromofluoromethane	90.5	56.5-129	H	%Rec	1	6/1/2017 5:52:46 PM
Surr: Toluene-d8	98.3	64.5-151	H	%Rec	1	6/1/2017 5:52:46 PM
Surr: 1-Bromo-4-fluorobenzene	94.0	63.1-141	H	%Rec	1	6/1/2017 5:52:46 PM

Mercury by EPA Method 7471

Batch ID: 17208

Analyst: WF

Mercury	ND	0.293		mg/Kg-dry	1	5/31/2017 12:27:28 PM
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Total Metals by EPA Method 6020

Batch ID: 17190

Analyst: TN

Arsenic	6.50	0.0909		mg/Kg-dry	1	5/30/2017 4:30:15 PM
Barium	99.6	0.455		mg/Kg-dry	1	5/30/2017 4:30:15 PM
Cadmium	ND	0.182		mg/Kg-dry	1	5/30/2017 4:30:15 PM
Chromium	53.9	0.0909		mg/Kg-dry	1	5/30/2017 4:30:15 PM
Lead	3.68	0.182		mg/Kg-dry	1	5/30/2017 4:30:15 PM
Selenium	1.95	0.455		mg/Kg-dry	1	5/30/2017 4:30:15 PM
Silver	ND	0.0909		mg/Kg-dry	1	5/30/2017 4:30:15 PM

Sample Moisture (Percent Moisture)

Batch ID: R36474

Analyst: BB

Percent Moisture	20.9			wt%	1	5/31/2017 8:39:07 AM
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Analytical Report

Work Order: 1705316
Date Reported: 6/19/2017

Client: GeoEngineers

Collection Date: 5/9/2017 8:20:00 AM

Project: Block 18

Lab ID: 1705316-003

Matrix: Soil

Client Sample ID: B18-1-7.5

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

Batch ID: 17188

Analyst: SB

Diesel (Fuel Oil)	ND	21.0	H	mg/Kg-dry	1	5/27/2017 5:50:52 AM
Heavy Oil	ND	52.4	H	mg/Kg-dry	1	5/27/2017 5:50:52 AM
Surr: 2-Fluorobiphenyl	98.0	50-150	H	%Rec	1	5/27/2017 5:50:52 AM
Surr: o-Terphenyl	101	50-150	H	%Rec	1	5/27/2017 5:50:52 AM

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Batch ID: 17196

Analyst: BT

Naphthalene	ND	43.9	H	µg/Kg-dry	1	5/30/2017 11:43:47 PM
2-Methylnaphthalene	ND	43.9	H	µg/Kg-dry	1	5/30/2017 11:43:47 PM
1-Methylnaphthalene	ND	43.9	H	µg/Kg-dry	1	5/30/2017 11:43:47 PM
Acenaphthylene	ND	43.9	H	µg/Kg-dry	1	5/30/2017 11:43:47 PM
Acenaphthene	ND	43.9	H	µg/Kg-dry	1	5/30/2017 11:43:47 PM
Fluorene	ND	43.9	H	µg/Kg-dry	1	5/30/2017 11:43:47 PM
Phenanthrene	ND	43.9	H	µg/Kg-dry	1	5/30/2017 11:43:47 PM
Anthracene	ND	43.9	H	µg/Kg-dry	1	5/30/2017 11:43:47 PM
Fluoranthene	ND	43.9	H	µg/Kg-dry	1	5/30/2017 11:43:47 PM
Pyrene	ND	43.9	H	µg/Kg-dry	1	5/30/2017 11:43:47 PM
Benz(a)anthracene	ND	43.9	H	µg/Kg-dry	1	5/30/2017 11:43:47 PM
Chrysene	ND	43.9	H	µg/Kg-dry	1	5/30/2017 11:43:47 PM
Benzo(b)fluoranthene	ND	43.9	H	µg/Kg-dry	1	5/30/2017 11:43:47 PM
Benzo(k)fluoranthene	ND	43.9	H	µg/Kg-dry	1	5/30/2017 11:43:47 PM
Benzo(a)pyrene	ND	43.9	H	µg/Kg-dry	1	5/30/2017 11:43:47 PM
Indeno(1,2,3-cd)pyrene	ND	43.9	H	µg/Kg-dry	1	5/30/2017 11:43:47 PM
Dibenz(a,h)anthracene	ND	43.9	H	µg/Kg-dry	1	5/30/2017 11:43:47 PM
Benzo(g,h,i)perylene	ND	43.9	H	µg/Kg-dry	1	5/30/2017 11:43:47 PM
Surr: 2-Fluorobiphenyl	69.6	24.5-139	H	%Rec	1	5/30/2017 11:43:47 PM
Surr: Terphenyl-d14 (surr)	98.4	44.3-176	H	%Rec	1	5/30/2017 11:43:47 PM

Gasoline by NWTPH-Gx

Batch ID: 17217

Analyst: EM

Gasoline	ND	5.63	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
Surr: Toluene-d8	102	65-135	H	%Rec	1	6/1/2017 6:21:36 PM
Surr: 4-Bromofluorobenzene	97.2	65-135	H	%Rec	1	6/1/2017 6:21:36 PM

Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17217

Analyst: EM

Dichlorodifluoromethane (CFC-12)	ND	0.0676	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
Chloromethane	ND	0.0676	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
Vinyl chloride	ND	0.00225	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM



Analytical Report

Work Order: 1705316

Date Reported: 6/19/2017

Client: GeoEngineers

Collection Date: 5/9/2017 8:20:00 AM

Project: Block 18

Lab ID: 1705316-003

Matrix: Soil

Client Sample ID: B18-1-7.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17217

Analyst: EM

Bromomethane	ND	0.101	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
Trichlorofluoromethane (CFC-11)	ND	0.0563	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
Chloroethane	ND	0.0676	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
1,1-Dichloroethene	ND	0.0563	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
Methylene chloride	ND	0.0225	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
trans-1,2-Dichloroethene	ND	0.0225	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
Methyl tert-butyl ether (MTBE)	ND	0.0563	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
1,1-Dichloroethane	ND	0.0225	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
2,2-Dichloropropane	ND	0.0563	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
cis-1,2-Dichloroethene	ND	0.0225	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
Chloroform	ND	0.0225	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
1,1,1-Trichloroethane (TCA)	ND	0.0225	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
1,1-Dichloropropene	ND	0.0225	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
Carbon tetrachloride	ND	0.0225	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
1,2-Dichloroethane (EDC)	ND	0.0338	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
Benzene	ND	0.0225	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
Trichloroethene (TCE)	ND	0.0225	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
1,2-Dichloropropane	ND	0.0225	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
Bromodichloromethane	ND	0.0225	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
Dibromomethane	ND	0.0451	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
cis-1,3-Dichloropropene	ND	0.0225	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
Toluene	ND	0.0225	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
trans-1,3-Dichloropropylene	ND	0.0338	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
1,1,2-Trichloroethane	ND	0.0338	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
1,3-Dichloropropane	ND	0.0563	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
Tetrachloroethene (PCE)	ND	0.0225	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
Dibromochloromethane	ND	0.0338	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
1,2-Dibromoethane (EDB)	ND	0.00563	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
Chlorobenzene	ND	0.0225	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
1,1,1,2-Tetrachloroethane	ND	0.0338	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
Ethylbenzene	ND	0.0338	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
m,p-Xylene	ND	0.0225	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
o-Xylene	ND	0.0225	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
Styrene	ND	0.0225	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
Isopropylbenzene	ND	0.0901	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
Bromoform	ND	0.0225	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
1,1,2,2-Tetrachloroethane	ND	0.0225	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
n-Propylbenzene	ND	0.0225	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
Bromobenzene	ND	0.0338	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM



Analytical Report

Work Order: 1705316
Date Reported: 6/19/2017

Client: GeoEngineers

Collection Date: 5/9/2017 8:20:00 AM

Project: Block 18

Lab ID: 1705316-003

Matrix: Soil

Client Sample ID: B18-1-7.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17217

Analyst: EM

1,3,5-Trimethylbenzene	ND	0.0225	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
2-Chlorotoluene	ND	0.0225	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
4-Chlorotoluene	ND	0.0225	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
tert-Butylbenzene	ND	0.0225	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
1,2,3-Trichloropropane	ND	0.0225	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
1,2,4-Trichlorobenzene	ND	0.0563	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
sec-Butylbenzene	ND	0.0225	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
4-Isopropyltoluene	ND	0.0225	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
1,3-Dichlorobenzene	ND	0.0225	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
1,4-Dichlorobenzene	ND	0.0225	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
n-Butylbenzene	ND	0.0225	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
1,2-Dichlorobenzene	ND	0.0225	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
1,2-Dibromo-3-chloropropane	ND	0.563	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
1,2,4-Trimethylbenzene	ND	0.0225	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
Hexachlorobutadiene	ND	0.113	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
Naphthalene	ND	0.0338	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
1,2,3-Trichlorobenzene	ND	0.0225	H	mg/Kg-dry	1	6/1/2017 6:21:36 PM
Surr: Dibromofluoromethane	89.2	56.5-129	H	%Rec	1	6/1/2017 6:21:36 PM
Surr: Toluene-d8	97.4	64.5-151	H	%Rec	1	6/1/2017 6:21:36 PM
Surr: 1-Bromo-4-fluorobenzene	92.7	63.1-141	H	%Rec	1	6/1/2017 6:21:36 PM

Mercury by EPA Method 7471

Batch ID: 17208

Analyst: WF

Mercury	ND	0.260		mg/Kg-dry	1	5/31/2017 12:29:10 PM
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Total Metals by EPA Method 6020

Batch ID: 17190

Analyst: TN

Arsenic	2.79	0.0856		mg/Kg-dry	1	5/30/2017 4:42:21 PM
Barium	25.7	0.428		mg/Kg-dry	1	5/30/2017 4:42:21 PM
Cadmium	ND	0.171		mg/Kg-dry	1	5/30/2017 4:42:21 PM
Chromium	21.3	0.0856		mg/Kg-dry	1	5/30/2017 4:42:21 PM
Lead	1.23	0.171		mg/Kg-dry	1	5/30/2017 4:42:21 PM
Selenium	0.713	0.428		mg/Kg-dry	1	5/30/2017 4:42:21 PM
Silver	ND	0.0856		mg/Kg-dry	1	5/30/2017 4:42:21 PM

Sample Moisture (Percent Moisture)

Batch ID: R36474

Analyst: BB

Percent Moisture	9.42			wt%	1	5/31/2017 8:39:07 AM
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Analytical Report

Work Order: 1705316
Date Reported: 6/19/2017

Client: GeoEngineers

Collection Date: 5/9/2017 12:30:00 PM

Project: Block 18

Lab ID: 1705316-006

Matrix: Soil

Client Sample ID: B18-2-2.5

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

Batch ID: 17188

Analyst: SB

Diesel (Fuel Oil)	ND	23.6	H	mg/Kg-dry	1	5/27/2017 6:22:33 AM
Heavy Oil	125	59.0	H	mg/Kg-dry	1	5/27/2017 6:22:33 AM
Surr: 2-Fluorobiphenyl	94.2	50-150	H	%Rec	1	5/27/2017 6:22:33 AM
Surr: o-Terphenyl	101	50-150	H	%Rec	1	5/27/2017 6:22:33 AM

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Batch ID: 17196

Analyst: BT

Naphthalene	ND	44.8	H	µg/Kg-dry	1	5/31/2017 12:05:32 AM
2-Methylnaphthalene	ND	44.8	H	µg/Kg-dry	1	5/31/2017 12:05:32 AM
1-Methylnaphthalene	ND	44.8	H	µg/Kg-dry	1	5/31/2017 12:05:32 AM
Acenaphthylene	ND	44.8	H	µg/Kg-dry	1	5/31/2017 12:05:32 AM
Acenaphthene	ND	44.8	H	µg/Kg-dry	1	5/31/2017 12:05:32 AM
Fluorene	ND	44.8	H	µg/Kg-dry	1	5/31/2017 12:05:32 AM
Phenanthrene	218	44.8	H	µg/Kg-dry	1	5/31/2017 12:05:32 AM
Anthracene	ND	44.8	H	µg/Kg-dry	1	5/31/2017 12:05:32 AM
Fluoranthene	343	44.8	H	µg/Kg-dry	1	5/31/2017 12:05:32 AM
Pyrene	273	44.8	H	µg/Kg-dry	1	5/31/2017 12:05:32 AM
Benz(a)anthracene	139	44.8	H	µg/Kg-dry	1	5/31/2017 12:05:32 AM
Chrysene	137	44.8	H	µg/Kg-dry	1	5/31/2017 12:05:32 AM
Benzo(b)fluoranthene	182	44.8	H	µg/Kg-dry	1	5/31/2017 12:05:32 AM
Benzo(k)fluoranthene	63.5	44.8	H	µg/Kg-dry	1	5/31/2017 12:05:32 AM
Benzo(a)pyrene	141	44.8	H	µg/Kg-dry	1	5/31/2017 12:05:32 AM
Indeno(1,2,3-cd)pyrene	68.6	44.8	H	µg/Kg-dry	1	5/31/2017 12:05:32 AM
Dibenz(a,h)anthracene	ND	44.8	H	µg/Kg-dry	1	5/31/2017 12:05:32 AM
Benzo(g,h,i)perylene	71.7	44.8	H	µg/Kg-dry	1	5/31/2017 12:05:32 AM
Surr: 2-Fluorobiphenyl	72.3	24.5-139	H	%Rec	1	5/31/2017 12:05:32 AM
Surr: Terphenyl-d14 (surr)	85.5	44.3-176	H	%Rec	1	5/31/2017 12:05:32 AM

Gasoline by NWTPH-Gx

Batch ID: 17217

Analyst: EM

Gasoline	ND	7.66	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
Surr: Toluene-d8	100	65-135	H	%Rec	1	6/1/2017 6:50:13 PM
Surr: 4-Bromofluorobenzene	101	65-135	H	%Rec	1	6/1/2017 6:50:13 PM

Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17217

Analyst: EM

Dichlorodifluoromethane (CFC-12)	ND	0.0919	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
Chloromethane	ND	0.0919	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
Vinyl chloride	ND	0.00306	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM



Analytical Report

Work Order: 1705316
Date Reported: 6/19/2017

Client: GeoEngineers

Collection Date: 5/9/2017 12:30:00 PM

Project: Block 18

Lab ID: 1705316-006

Matrix: Soil

Client Sample ID: B18-2-2.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17217

Analyst: EM

Bromomethane	ND	0.138	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
Trichlorofluoromethane (CFC-11)	ND	0.0766	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
Chloroethane	ND	0.0919	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
1,1-Dichloroethene	ND	0.0766	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
Methylene chloride	ND	0.0306	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
trans-1,2-Dichloroethene	ND	0.0306	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
Methyl tert-butyl ether (MTBE)	ND	0.0766	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
1,1-Dichloroethane	ND	0.0306	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
2,2-Dichloropropane	ND	0.0766	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
cis-1,2-Dichloroethene	ND	0.0306	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
Chloroform	ND	0.0306	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
1,1,1-Trichloroethane (TCA)	ND	0.0306	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
1,1-Dichloropropene	ND	0.0306	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
Carbon tetrachloride	ND	0.0306	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
1,2-Dichloroethane (EDC)	ND	0.0460	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
Benzene	ND	0.0306	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
Trichloroethene (TCE)	ND	0.0306	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
1,2-Dichloropropane	ND	0.0306	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
Bromodichloromethane	ND	0.0306	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
Dibromomethane	ND	0.0613	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
cis-1,3-Dichloropropene	ND	0.0306	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
Toluene	ND	0.0306	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
trans-1,3-Dichloropropylene	ND	0.0460	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
1,1,2-Trichloroethane	ND	0.0460	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
1,3-Dichloropropane	ND	0.0766	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
Tetrachloroethene (PCE)	ND	0.0306	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
Dibromochloromethane	ND	0.0460	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
1,2-Dibromoethane (EDB)	ND	0.00766	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
Chlorobenzene	ND	0.0306	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
1,1,1,2-Tetrachloroethane	ND	0.0460	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
Ethylbenzene	ND	0.0460	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
m,p-Xylene	0.0971	0.0306	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
o-Xylene	0.0577	0.0306	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
Styrene	ND	0.0306	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
Isopropylbenzene	ND	0.123	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
Bromoform	ND	0.0306	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
1,1,2,2-Tetrachloroethane	ND	0.0306	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
n-Propylbenzene	ND	0.0306	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
Bromobenzene	ND	0.0460	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM



Analytical Report

Work Order: 1705316
Date Reported: 6/19/2017

Client: GeoEngineers

Collection Date: 5/9/2017 12:30:00 PM

Project: Block 18

Lab ID: 1705316-006

Matrix: Soil

Client Sample ID: B18-2-2.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17217

Analyst: EM

1,3,5-Trimethylbenzene	0.0784	0.0306	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
2-Chlorotoluene	ND	0.0306	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
4-Chlorotoluene	ND	0.0306	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
tert-Butylbenzene	ND	0.0306	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
1,2,3-Trichloropropane	ND	0.0306	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
1,2,4-Trichlorobenzene	ND	0.0766	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
sec-Butylbenzene	ND	0.0306	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
4-Isopropyltoluene	ND	0.0306	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
1,3-Dichlorobenzene	ND	0.0306	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
1,4-Dichlorobenzene	ND	0.0306	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
n-Butylbenzene	ND	0.0306	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
1,2-Dichlorobenzene	ND	0.0306	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
1,2-Dibromo-3-chloropropane	ND	0.766	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
1,2,4-Trimethylbenzene	0.118	0.0306	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
Hexachlorobutadiene	ND	0.153	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
Naphthalene	ND	0.0460	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
1,2,3-Trichlorobenzene	ND	0.0306	H	mg/Kg-dry	1	6/1/2017 6:50:13 PM
Surr: Dibromofluoromethane	90.8	56.5-129	H	%Rec	1	6/1/2017 6:50:13 PM
Surr: Toluene-d8	99.3	64.5-151	H	%Rec	1	6/1/2017 6:50:13 PM
Surr: 1-Bromo-4-fluorobenzene	95.9	63.1-141	H	%Rec	1	6/1/2017 6:50:13 PM

Mercury by EPA Method 7471

Batch ID: 17208

Analyst: WF

Mercury	ND	0.286		mg/Kg-dry	1	5/31/2017 12:30:47 PM
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Total Metals by EPA Method 6020

Batch ID: 17190

Analyst: TN

Arsenic	5.30	0.102		mg/Kg-dry	1	5/30/2017 4:46:22 PM
Barium	135	0.510		mg/Kg-dry	1	5/30/2017 4:46:22 PM
Cadmium	ND	0.204		mg/Kg-dry	1	5/30/2017 4:46:22 PM
Chromium	70.8	0.102		mg/Kg-dry	1	5/30/2017 4:46:22 PM
Lead	6.29	0.204		mg/Kg-dry	1	5/30/2017 4:46:22 PM
Selenium	2.06	0.510		mg/Kg-dry	1	5/30/2017 4:46:22 PM
Silver	ND	0.102		mg/Kg-dry	1	5/30/2017 4:46:22 PM

Sample Moisture (Percent Moisture)

Batch ID: R36474

Analyst: BB

Percent Moisture	23.3			wt%	1	5/31/2017 8:39:07 AM
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Analytical Report

Work Order: 1705316
Date Reported: 6/19/2017

Client: GeoEngineers

Collection Date: 5/9/2017 12:35:00 PM

Project: Block 18

Lab ID: 1705316-007

Matrix: Soil

Client Sample ID: B18-2-5.0

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

Batch ID: 17394

Analyst: SG

Diesel (Fuel Oil)	ND	22.6	H	mg/Kg-dry	1	6/16/2017 3:56:00 PM
Heavy Oil	ND	56.4	H	mg/Kg-dry	1	6/16/2017 3:56:00 PM
Surr: 2-Fluorobiphenyl	92.7	50-150	H	%Rec	1	6/16/2017 3:56:00 PM
Surr: o-Terphenyl	94.3	50-150	H	%Rec	1	6/16/2017 3:56:00 PM

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Batch ID: 17400

Analyst: BT

Naphthalene	ND	49.3	H	µg/Kg-dry	1	6/16/2017 11:54:28 PM
2-Methylnaphthalene	ND	49.3	H	µg/Kg-dry	1	6/16/2017 11:54:28 PM
1-Methylnaphthalene	ND	49.3	H	µg/Kg-dry	1	6/16/2017 11:54:28 PM
Acenaphthylene	ND	49.3	H	µg/Kg-dry	1	6/16/2017 11:54:28 PM
Acenaphthene	ND	49.3	H	µg/Kg-dry	1	6/16/2017 11:54:28 PM
Fluorene	ND	49.3	H	µg/Kg-dry	1	6/16/2017 11:54:28 PM
Phenanthrene	ND	49.3	H	µg/Kg-dry	1	6/16/2017 11:54:28 PM
Anthracene	ND	49.3	H	µg/Kg-dry	1	6/16/2017 11:54:28 PM
Fluoranthene	ND	49.3	H	µg/Kg-dry	1	6/16/2017 11:54:28 PM
Pyrene	ND	49.3	H	µg/Kg-dry	1	6/16/2017 11:54:28 PM
Benz(a)anthracene	ND	49.3	H	µg/Kg-dry	1	6/16/2017 11:54:28 PM
Chrysene	ND	49.3	H	µg/Kg-dry	1	6/16/2017 11:54:28 PM
Benzo(b)fluoranthene	ND	49.3	H	µg/Kg-dry	1	6/16/2017 11:54:28 PM
Benzo(k)fluoranthene	ND	49.3	H	µg/Kg-dry	1	6/16/2017 11:54:28 PM
Benzo(a)pyrene	ND	49.3	H	µg/Kg-dry	1	6/16/2017 11:54:28 PM
Indeno(1,2,3-cd)pyrene	ND	49.3	H	µg/Kg-dry	1	6/16/2017 11:54:28 PM
Dibenz(a,h)anthracene	ND	49.3	H	µg/Kg-dry	1	6/16/2017 11:54:28 PM
Benzo(g,h,i)perylene	ND	49.3	QH	µg/Kg-dry	1	6/16/2017 11:54:28 PM
Surr: 2-Fluorobiphenyl	46.6	24.5-139	H	%Rec	1	6/16/2017 11:54:28 PM
Surr: Terphenyl-d14 (surr)	57.4	44.3-176	H	%Rec	1	6/16/2017 11:54:28 PM

NOTES:

Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Gasoline by NWTPH-Gx

Batch ID: 17405

Analyst: MW

Gasoline	ND	5.70	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
Surr: Toluene-d8	99.1	65-135	H	%Rec	1	6/16/2017 10:42:31 PM
Surr: 4-Bromofluorobenzene	101	65-135	H	%Rec	1	6/16/2017 10:42:31 PM



Analytical Report

Work Order: 1705316
Date Reported: 6/19/2017

Client: GeoEngineers

Collection Date: 5/9/2017 12:35:00 PM

Project: Block 18

Lab ID: 1705316-007

Matrix: Soil

Client Sample ID: B18-2-5.0

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17405

Analyst: MW

Dichlorodifluoromethane (CFC-12)	ND	0.0684	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
Chloromethane	ND	0.0684	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
Vinyl chloride	ND	0.00228	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
Bromomethane	ND	0.103	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
Trichlorofluoromethane (CFC-11)	ND	0.0570	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
Chloroethane	ND	0.0684	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
1,1-Dichloroethene	ND	0.0570	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
Methylene chloride	ND	0.0228	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
trans-1,2-Dichloroethene	ND	0.0228	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
Methyl tert-butyl ether (MTBE)	ND	0.0570	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
1,1-Dichloroethane	ND	0.0228	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
2,2-Dichloropropane	ND	0.0570	QH	mg/Kg-dry	1	6/16/2017 10:42:31 PM
cis-1,2-Dichloroethene	ND	0.0228	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
Chloroform	ND	0.0228	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
1,1,1-Trichloroethane (TCA)	ND	0.0228	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
1,1-Dichloropropene	ND	0.0228	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
Carbon tetrachloride	ND	0.0228	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
1,2-Dichloroethane (EDC)	ND	0.0342	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
Benzene	ND	0.0228	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
Trichloroethene (TCE)	ND	0.0228	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
1,2-Dichloropropane	ND	0.0228	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
Bromodichloromethane	ND	0.0228	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
Dibromomethane	ND	0.0456	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
cis-1,3-Dichloropropene	ND	0.0228	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
Toluene	ND	0.0228	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
trans-1,3-Dichloropropylene	ND	0.0342	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
1,1,2-Trichloroethane	ND	0.0342	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
1,3-Dichloropropane	ND	0.0570	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
Tetrachloroethene (PCE)	ND	0.0228	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
Dibromochloromethane	ND	0.0342	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
1,2-Dibromoethane (EDB)	ND	0.00570	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
Chlorobenzene	ND	0.0228	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
1,1,1,2-Tetrachloroethane	ND	0.0342	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
Ethylbenzene	ND	0.0342	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
m,p-Xylene	ND	0.0228	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
o-Xylene	ND	0.0228	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
Styrene	ND	0.0228	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
Isopropylbenzene	ND	0.0912	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
Bromoform	ND	0.0228	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM



Analytical Report

Work Order: 1705316
Date Reported: 6/19/2017

Client: GeoEngineers

Collection Date: 5/9/2017 12:35:00 PM

Project: Block 18

Lab ID: 1705316-007

Matrix: Soil

Client Sample ID: B18-2-5.0

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17405

Analyst: MW

1,1,2,2-Tetrachloroethane	ND	0.0228	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
n-Propylbenzene	ND	0.0228	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
Bromobenzene	ND	0.0342	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
1,3,5-Trimethylbenzene	ND	0.0228	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
2-Chlorotoluene	ND	0.0228	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
4-Chlorotoluene	ND	0.0228	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
tert-Butylbenzene	ND	0.0228	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
1,2,3-Trichloropropane	ND	0.0228	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
1,2,4-Trichlorobenzene	ND	0.0570	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
sec-Butylbenzene	ND	0.0228	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
4-Isopropyltoluene	ND	0.0228	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
1,3-Dichlorobenzene	ND	0.0228	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
1,4-Dichlorobenzene	ND	0.0228	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
n-Butylbenzene	ND	0.0228	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
1,2-Dichlorobenzene	ND	0.0228	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
1,2-Dibromo-3-chloropropane	ND	0.570	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
1,2,4-Trimethylbenzene	ND	0.0228	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
Hexachlorobutadiene	ND	0.114	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
Naphthalene	ND	0.0342	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
1,2,3-Trichlorobenzene	ND	0.0228	H	mg/Kg-dry	1	6/16/2017 10:42:31 PM
Surr: Dibromofluoromethane	90.9	56.5-129	H	%Rec	1	6/16/2017 10:42:31 PM
Surr: Toluene-d8	103	64.5-151	H	%Rec	1	6/16/2017 10:42:31 PM
Surr: 1-Bromo-4-fluorobenzene	98.2	63.1-141	H	%Rec	1	6/16/2017 10:42:31 PM

NOTES:

Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Mercury by EPA Method 7471

Batch ID: 17411

Analyst: WF

Mercury	ND	0.325	H	mg/Kg-dry	1	6/19/2017 1:17:51 PM
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Total Metals by EPA Method 6020

Batch ID: 17386

Analyst: TN

Arsenic	5.42	0.0942		mg/Kg-dry	1	6/16/2017 5:44:24 PM
Barium	141	0.471		mg/Kg-dry	1	6/16/2017 5:44:24 PM
Cadmium	ND	0.188		mg/Kg-dry	1	6/16/2017 5:44:24 PM
Chromium	68.7	0.0942		mg/Kg-dry	1	6/16/2017 5:44:24 PM
Lead	5.30	0.188		mg/Kg-dry	1	6/16/2017 5:44:24 PM
Selenium	1.86	0.471		mg/Kg-dry	1	6/16/2017 5:44:24 PM



Analytical Report

Work Order: 1705316
Date Reported: 6/19/2017

Client: GeoEngineers

Collection Date: 5/9/2017 12:35:00 PM

Project: Block 18

Lab ID: 1705316-007

Matrix: Soil

Client Sample ID: B18-2-5.0

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Total Metals by EPA Method 6020

Batch ID: 17386 Analyst: TN

Silver	ND	0.0942		mg/Kg-dry	1	6/16/2017 5:44:24 PM
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Sample Moisture (Percent Moisture)

Batch ID: R36834 Analyst: BB

Percent Moisture	23.0			wt%	1	6/15/2017 8:30:21 AM
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Analytical Report

Work Order: 1705316
Date Reported: 6/19/2017

Client: GeoEngineers

Collection Date: 5/9/2017 12:45:00 PM

Project: Block 18

Lab ID: 1705316-009

Matrix: Soil

Client Sample ID: B18-2-10.0

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

Batch ID: 17188

Analyst: SB

Diesel (Fuel Oil)	ND	23.6	H	mg/Kg-dry	1	5/27/2017 7:57:38 AM
Heavy Oil	ND	58.9	H	mg/Kg-dry	1	5/27/2017 7:57:38 AM
Surr: 2-Fluorobiphenyl	73.5	50-150	H	%Rec	1	5/27/2017 7:57:38 AM
Surr: o-Terphenyl	82.2	50-150	H	%Rec	1	5/27/2017 7:57:38 AM

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Batch ID: 17196

Analyst: BT

Naphthalene	ND	49.6	H	µg/Kg-dry	1	5/31/2017 12:27:17 AM
2-Methylnaphthalene	ND	49.6	H	µg/Kg-dry	1	5/31/2017 12:27:17 AM
1-Methylnaphthalene	ND	49.6	H	µg/Kg-dry	1	5/31/2017 12:27:17 AM
Acenaphthylene	ND	49.6	H	µg/Kg-dry	1	5/31/2017 12:27:17 AM
Acenaphthene	ND	49.6	H	µg/Kg-dry	1	5/31/2017 12:27:17 AM
Fluorene	ND	49.6	H	µg/Kg-dry	1	5/31/2017 12:27:17 AM
Phenanthrene	ND	49.6	H	µg/Kg-dry	1	5/31/2017 12:27:17 AM
Anthracene	ND	49.6	H	µg/Kg-dry	1	5/31/2017 12:27:17 AM
Fluoranthene	ND	49.6	H	µg/Kg-dry	1	5/31/2017 12:27:17 AM
Pyrene	ND	49.6	H	µg/Kg-dry	1	5/31/2017 12:27:17 AM
Benz(a)anthracene	ND	49.6	H	µg/Kg-dry	1	5/31/2017 12:27:17 AM
Chrysene	ND	49.6	H	µg/Kg-dry	1	5/31/2017 12:27:17 AM
Benzo(b)fluoranthene	ND	49.6	H	µg/Kg-dry	1	5/31/2017 12:27:17 AM
Benzo(k)fluoranthene	ND	49.6	H	µg/Kg-dry	1	5/31/2017 12:27:17 AM
Benzo(a)pyrene	ND	49.6	H	µg/Kg-dry	1	5/31/2017 12:27:17 AM
Indeno(1,2,3-cd)pyrene	ND	49.6	H	µg/Kg-dry	1	5/31/2017 12:27:17 AM
Dibenz(a,h)anthracene	ND	49.6	H	µg/Kg-dry	1	5/31/2017 12:27:17 AM
Benzo(g,h,i)perylene	ND	49.6	H	µg/Kg-dry	1	5/31/2017 12:27:17 AM
Surr: 2-Fluorobiphenyl	71.6	24.5-139	H	%Rec	1	5/31/2017 12:27:17 AM
Surr: Terphenyl-d14 (surr)	82.9	44.3-176	H	%Rec	1	5/31/2017 12:27:17 AM

Gasoline by NWTPH-Gx

Batch ID: 17217

Analyst: EM

Gasoline	ND	5.84	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
Surr: Toluene-d8	102	65-135	H	%Rec	1	6/1/2017 7:18:54 PM
Surr: 4-Bromofluorobenzene	96.9	65-135	H	%Rec	1	6/1/2017 7:18:54 PM

Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17217

Analyst: EM

Dichlorodifluoromethane (CFC-12)	ND	0.0701	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
Chloromethane	ND	0.0701	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
Vinyl chloride	ND	0.00234	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM



Analytical Report

Work Order: 1705316
Date Reported: 6/19/2017

Client: GeoEngineers

Collection Date: 5/9/2017 12:45:00 PM

Project: Block 18

Lab ID: 1705316-009

Matrix: Soil

Client Sample ID: B18-2-10.0

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17217

Analyst: EM

Bromomethane	ND	0.105	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
Trichlorofluoromethane (CFC-11)	ND	0.0584	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
Chloroethane	ND	0.0701	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
1,1-Dichloroethene	ND	0.0584	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
Methylene chloride	ND	0.0234	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
trans-1,2-Dichloroethene	ND	0.0234	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
Methyl tert-butyl ether (MTBE)	ND	0.0584	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
1,1-Dichloroethane	ND	0.0234	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
2,2-Dichloropropane	ND	0.0584	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
cis-1,2-Dichloroethene	ND	0.0234	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
Chloroform	ND	0.0234	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
1,1,1-Trichloroethane (TCA)	ND	0.0234	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
1,1-Dichloropropene	ND	0.0234	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
Carbon tetrachloride	ND	0.0234	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
1,2-Dichloroethane (EDC)	ND	0.0350	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
Benzene	ND	0.0234	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
Trichloroethene (TCE)	ND	0.0234	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
1,2-Dichloropropane	ND	0.0234	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
Bromodichloromethane	ND	0.0234	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
Dibromomethane	ND	0.0467	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
cis-1,3-Dichloropropene	ND	0.0234	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
Toluene	ND	0.0234	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
trans-1,3-Dichloropropylene	ND	0.0350	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
1,1,2-Trichloroethane	ND	0.0350	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
1,3-Dichloropropane	ND	0.0584	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
Tetrachloroethene (PCE)	ND	0.0234	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
Dibromochloromethane	ND	0.0350	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
1,2-Dibromoethane (EDB)	ND	0.00584	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
Chlorobenzene	ND	0.0234	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
1,1,1,2-Tetrachloroethane	ND	0.0350	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
Ethylbenzene	ND	0.0350	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
m,p-Xylene	ND	0.0234	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
o-Xylene	ND	0.0234	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
Styrene	ND	0.0234	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
Isopropylbenzene	ND	0.0934	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
Bromoform	ND	0.0234	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
1,1,2,2-Tetrachloroethane	ND	0.0234	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
n-Propylbenzene	ND	0.0234	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
Bromobenzene	ND	0.0350	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM



Analytical Report

Work Order: 1705316
Date Reported: 6/19/2017

Client: GeoEngineers

Collection Date: 5/9/2017 12:45:00 PM

Project: Block 18

Lab ID: 1705316-009

Matrix: Soil

Client Sample ID: B18-2-10.0

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17217

Analyst: EM

1,3,5-Trimethylbenzene	ND	0.0234	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
2-Chlorotoluene	ND	0.0234	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
4-Chlorotoluene	ND	0.0234	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
tert-Butylbenzene	ND	0.0234	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
1,2,3-Trichloropropane	ND	0.0234	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
1,2,4-Trichlorobenzene	ND	0.0584	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
sec-Butylbenzene	ND	0.0234	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
4-Isopropyltoluene	ND	0.0234	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
1,3-Dichlorobenzene	ND	0.0234	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
1,4-Dichlorobenzene	ND	0.0234	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
n-Butylbenzene	ND	0.0234	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
1,2-Dichlorobenzene	ND	0.0234	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
1,2-Dibromo-3-chloropropane	ND	0.584	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
1,2,4-Trimethylbenzene	ND	0.0234	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
Hexachlorobutadiene	ND	0.117	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
Naphthalene	ND	0.0350	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
1,2,3-Trichlorobenzene	ND	0.0234	H	mg/Kg-dry	1	6/1/2017 7:18:54 PM
Surr: Dibromofluoromethane	89.2	56.5-129	H	%Rec	1	6/1/2017 7:18:54 PM
Surr: Toluene-d8	99.3	64.5-151	H	%Rec	1	6/1/2017 7:18:54 PM
Surr: 1-Bromo-4-fluorobenzene	92.3	63.1-141	H	%Rec	1	6/1/2017 7:18:54 PM

Mercury by EPA Method 7471

Batch ID: 17208

Analyst: WF

Mercury	ND	0.312		mg/Kg-dry	1	5/31/2017 12:32:25 PM
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Total Metals by EPA Method 6020

Batch ID: 17190

Analyst: TN

Arsenic	5.48	0.0999		mg/Kg-dry	1	5/30/2017 4:50:23 PM
Barium	124	0.499		mg/Kg-dry	1	5/30/2017 4:50:23 PM
Cadmium	ND	0.200		mg/Kg-dry	1	5/30/2017 4:50:23 PM
Chromium	67.3	0.0999		mg/Kg-dry	1	5/30/2017 4:50:23 PM
Lead	4.68	0.200		mg/Kg-dry	1	5/30/2017 4:50:23 PM
Selenium	2.25	0.499		mg/Kg-dry	1	5/30/2017 4:50:23 PM
Silver	ND	0.0999		mg/Kg-dry	1	5/30/2017 4:50:23 PM

Sample Moisture (Percent Moisture)

Batch ID: R36474

Analyst: BB

Percent Moisture	23.0			wt%	1	5/31/2017 8:39:07 AM
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Analytical Report

Work Order: 1705316
Date Reported: 6/19/2017

Client: GeoEngineers

Collection Date: 5/10/2017 12:00:00 PM

Project: Block 18

Lab ID: 1705316-011

Matrix: Soil

Client Sample ID: MW18-1-2.5

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

Batch ID: 17188

Analyst: SB

Diesel (Fuel Oil)	ND	19.9	H	mg/Kg-dry	1	5/27/2017 8:29:19 AM
Heavy Oil	138	49.9	H	mg/Kg-dry	1	5/27/2017 8:29:19 AM
Surr: 2-Fluorobiphenyl	88.5	50-150	H	%Rec	1	5/27/2017 8:29:19 AM
Surr: o-Terphenyl	91.7	50-150	H	%Rec	1	5/27/2017 8:29:19 AM

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Batch ID: 17196

Analyst: BT

Naphthalene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 12:49:05 AM
2-Methylnaphthalene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 12:49:05 AM
1-Methylnaphthalene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 12:49:05 AM
Acenaphthylene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 12:49:05 AM
Acenaphthene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 12:49:05 AM
Fluorene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 12:49:05 AM
Phenanthrene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 12:49:05 AM
Anthracene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 12:49:05 AM
Fluoranthene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 12:49:05 AM
Pyrene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 12:49:05 AM
Benz(a)anthracene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 12:49:05 AM
Chrysene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 12:49:05 AM
Benzo(b)fluoranthene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 12:49:05 AM
Benzo(k)fluoranthene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 12:49:05 AM
Benzo(a)pyrene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 12:49:05 AM
Indeno(1,2,3-cd)pyrene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 12:49:05 AM
Dibenz(a,h)anthracene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 12:49:05 AM
Benzo(g,h,i)perylene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 12:49:05 AM
Surr: 2-Fluorobiphenyl	83.2	24.5-139	H	%Rec	1	5/31/2017 12:49:05 AM
Surr: Terphenyl-d14 (surr)	99.4	44.3-176	H	%Rec	1	5/31/2017 12:49:05 AM

Gasoline by NWTPH-Gx

Batch ID: 17217

Analyst: EM

Gasoline	ND	6.28	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
Surr: Toluene-d8	102	65-135	H	%Rec	1	6/1/2017 7:47:34 PM
Surr: 4-Bromofluorobenzene	97.2	65-135	H	%Rec	1	6/1/2017 7:47:34 PM

Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17217

Analyst: EM

Dichlorodifluoromethane (CFC-12)	ND	0.0753	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
Chloromethane	ND	0.0753	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
Vinyl chloride	ND	0.00251	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM



Analytical Report

Work Order: 1705316
Date Reported: 6/19/2017

Client: GeoEngineers

Collection Date: 5/10/2017 12:00:00 PM

Project: Block 18

Lab ID: 1705316-011

Matrix: Soil

Client Sample ID: MW18-1-2.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17217

Analyst: EM

Bromomethane	ND	0.113	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
Trichlorofluoromethane (CFC-11)	ND	0.0628	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
Chloroethane	ND	0.0753	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
1,1-Dichloroethene	ND	0.0628	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
Methylene chloride	0.0419	0.0251	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
trans-1,2-Dichloroethene	ND	0.0251	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
Methyl tert-butyl ether (MTBE)	ND	0.0628	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
1,1-Dichloroethane	ND	0.0251	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
2,2-Dichloropropane	ND	0.0628	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
cis-1,2-Dichloroethene	ND	0.0251	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
Chloroform	ND	0.0251	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
1,1,1-Trichloroethane (TCA)	ND	0.0251	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
1,1-Dichloropropene	ND	0.0251	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
Carbon tetrachloride	ND	0.0251	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
1,2-Dichloroethane (EDC)	ND	0.0377	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
Benzene	ND	0.0251	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
Trichloroethene (TCE)	ND	0.0251	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
1,2-Dichloropropane	ND	0.0251	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
Bromodichloromethane	ND	0.0251	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
Dibromomethane	ND	0.0502	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
cis-1,3-Dichloropropene	ND	0.0251	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
Toluene	ND	0.0251	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
trans-1,3-Dichloropropylene	ND	0.0377	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
1,1,2-Trichloroethane	ND	0.0377	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
1,3-Dichloropropane	ND	0.0628	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
Tetrachloroethene (PCE)	ND	0.0251	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
Dibromochloromethane	ND	0.0377	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
1,2-Dibromoethane (EDB)	ND	0.00628	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
Chlorobenzene	ND	0.0251	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
1,1,1,2-Tetrachloroethane	ND	0.0377	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
Ethylbenzene	ND	0.0377	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
m,p-Xylene	ND	0.0251	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
o-Xylene	ND	0.0251	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
Styrene	ND	0.0251	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
Isopropylbenzene	ND	0.100	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
Bromoform	ND	0.0251	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
1,1,2,2-Tetrachloroethane	ND	0.0251	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
n-Propylbenzene	ND	0.0251	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
Bromobenzene	ND	0.0377	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM



Analytical Report

Work Order: 1705316
Date Reported: 6/19/2017

Client: GeoEngineers

Collection Date: 5/10/2017 12:00:00 PM

Project: Block 18

Lab ID: 1705316-011

Matrix: Soil

Client Sample ID: MW18-1-2.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17217

Analyst: EM

1,3,5-Trimethylbenzene	ND	0.0251	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
2-Chlorotoluene	ND	0.0251	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
4-Chlorotoluene	ND	0.0251	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
tert-Butylbenzene	ND	0.0251	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
1,2,3-Trichloropropane	ND	0.0251	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
1,2,4-Trichlorobenzene	ND	0.0628	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
sec-Butylbenzene	ND	0.0251	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
4-Isopropyltoluene	ND	0.0251	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
1,3-Dichlorobenzene	ND	0.0251	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
1,4-Dichlorobenzene	ND	0.0251	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
n-Butylbenzene	ND	0.0251	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
1,2-Dichlorobenzene	ND	0.0251	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
1,2-Dibromo-3-chloropropane	ND	0.628	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
1,2,4-Trimethylbenzene	ND	0.0251	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
Hexachlorobutadiene	ND	0.126	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
Naphthalene	ND	0.0377	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
1,2,3-Trichlorobenzene	ND	0.0251	H	mg/Kg-dry	1	6/1/2017 7:47:34 PM
Surr: Dibromofluoromethane	89.3	56.5-129	H	%Rec	1	6/1/2017 7:47:34 PM
Surr: Toluene-d8	98.4	64.5-151	H	%Rec	1	6/1/2017 7:47:34 PM
Surr: 1-Bromo-4-fluorobenzene	92.7	63.1-141	H	%Rec	1	6/1/2017 7:47:34 PM

Mercury by EPA Method 7471

Batch ID: 17208

Analyst: WF

Mercury	ND	0.226		mg/Kg-dry	1	5/31/2017 12:34:03 PM
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Total Metals by EPA Method 6020

Batch ID: 17190

Analyst: TN

Arsenic	1.94	0.0840		mg/Kg-dry	1	5/30/2017 4:54:25 PM
Barium	39.9	0.420		mg/Kg-dry	1	5/30/2017 4:54:25 PM
Cadmium	ND	0.168		mg/Kg-dry	1	5/30/2017 4:54:25 PM
Chromium	32.7	0.0840		mg/Kg-dry	1	5/30/2017 4:54:25 PM
Lead	1.86	0.168		mg/Kg-dry	1	5/30/2017 4:54:25 PM
Selenium	0.980	0.420		mg/Kg-dry	1	5/30/2017 4:54:25 PM
Silver	ND	0.0840		mg/Kg-dry	1	5/30/2017 4:54:25 PM

Sample Moisture (Percent Moisture)

Batch ID: R36474

Analyst: BB

Percent Moisture	6.26			wt%	1	5/31/2017 8:39:07 AM
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Analytical Report

Work Order: 1705316
Date Reported: 6/19/2017

Client: GeoEngineers

Collection Date: 5/10/2017 12:10:00 PM

Project: Block 18

Lab ID: 1705316-013

Matrix: Soil

Client Sample ID: MW18-1-7.5

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

Batch ID: 17188

Analyst: SB

Diesel (Fuel Oil)	ND	20.9	H	mg/Kg-dry	1	5/27/2017 9:01:04 AM
Heavy Oil	ND	52.2	H	mg/Kg-dry	1	5/27/2017 9:01:04 AM
Surr: 2-Fluorobiphenyl	90.5	50-150	H	%Rec	1	5/27/2017 9:01:04 AM
Surr: o-Terphenyl	92.0	50-150	H	%Rec	1	5/27/2017 9:01:04 AM

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Batch ID: 17196

Analyst: BT

Naphthalene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 1:10:50 AM
2-Methylnaphthalene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 1:10:50 AM
1-Methylnaphthalene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 1:10:50 AM
Acenaphthylene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 1:10:50 AM
Acenaphthene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 1:10:50 AM
Fluorene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 1:10:50 AM
Phenanthrene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 1:10:50 AM
Anthracene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 1:10:50 AM
Fluoranthene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 1:10:50 AM
Pyrene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 1:10:50 AM
Benz(a)anthracene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 1:10:50 AM
Chrysene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 1:10:50 AM
Benzo(b)fluoranthene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 1:10:50 AM
Benzo(k)fluoranthene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 1:10:50 AM
Benzo(a)pyrene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 1:10:50 AM
Indeno(1,2,3-cd)pyrene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 1:10:50 AM
Dibenz(a,h)anthracene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 1:10:50 AM
Benzo(g,h,i)perylene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 1:10:50 AM
Surr: 2-Fluorobiphenyl	75.1	24.5-139	H	%Rec	1	5/31/2017 1:10:50 AM
Surr: Terphenyl-d14 (surr)	108	44.3-176	H	%Rec	1	5/31/2017 1:10:50 AM

Gasoline by NWTPH-Gx

Batch ID: 17217

Analyst: EM

Gasoline	ND	5.99	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
Surr: Toluene-d8	102	65-135	H	%Rec	1	6/1/2017 8:16:11 PM
Surr: 4-Bromofluorobenzene	97.5	65-135	H	%Rec	1	6/1/2017 8:16:11 PM

Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17217

Analyst: EM

Dichlorodifluoromethane (CFC-12)	ND	0.0718	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
Chloromethane	ND	0.0718	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
Vinyl chloride	ND	0.00239	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM



Analytical Report

Work Order: 1705316
Date Reported: 6/19/2017

Client: GeoEngineers

Collection Date: 5/10/2017 12:10:00 PM

Project: Block 18

Lab ID: 1705316-013

Matrix: Soil

Client Sample ID: MW18-1-7.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17217

Analyst: EM

Bromomethane	ND	0.108	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
Trichlorofluoromethane (CFC-11)	ND	0.0599	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
Chloroethane	ND	0.0718	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
1,1-Dichloroethene	ND	0.0599	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
Methylene chloride	ND	0.0239	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
trans-1,2-Dichloroethene	ND	0.0239	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
Methyl tert-butyl ether (MTBE)	ND	0.0599	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
1,1-Dichloroethane	ND	0.0239	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
2,2-Dichloropropane	ND	0.0599	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
cis-1,2-Dichloroethene	ND	0.0239	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
Chloroform	ND	0.0239	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
1,1,1-Trichloroethane (TCA)	ND	0.0239	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
1,1-Dichloropropene	ND	0.0239	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
Carbon tetrachloride	ND	0.0239	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
1,2-Dichloroethane (EDC)	ND	0.0359	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
Benzene	ND	0.0239	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
Trichloroethene (TCE)	ND	0.0239	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
1,2-Dichloropropane	ND	0.0239	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
Bromodichloromethane	ND	0.0239	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
Dibromomethane	ND	0.0479	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
cis-1,3-Dichloropropene	ND	0.0239	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
Toluene	ND	0.0239	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
trans-1,3-Dichloropropylene	ND	0.0359	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
1,1,2-Trichloroethane	ND	0.0359	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
1,3-Dichloropropane	ND	0.0599	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
Tetrachloroethene (PCE)	ND	0.0239	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
Dibromochloromethane	ND	0.0359	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
1,2-Dibromoethane (EDB)	ND	0.00599	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
Chlorobenzene	ND	0.0239	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
1,1,1,2-Tetrachloroethane	ND	0.0359	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
Ethylbenzene	ND	0.0359	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
m,p-Xylene	ND	0.0239	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
o-Xylene	ND	0.0239	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
Styrene	ND	0.0239	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
Isopropylbenzene	ND	0.0958	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
Bromoform	ND	0.0239	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
1,1,2,2-Tetrachloroethane	ND	0.0239	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
n-Propylbenzene	ND	0.0239	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
Bromobenzene	ND	0.0359	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM



Analytical Report

Work Order: 1705316
Date Reported: 6/19/2017

Client: GeoEngineers

Collection Date: 5/10/2017 12:10:00 PM

Project: Block 18

Lab ID: 1705316-013

Matrix: Soil

Client Sample ID: MW18-1-7.5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17217

Analyst: EM

1,3,5-Trimethylbenzene	ND	0.0239	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
2-Chlorotoluene	ND	0.0239	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
4-Chlorotoluene	ND	0.0239	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
tert-Butylbenzene	ND	0.0239	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
1,2,3-Trichloropropane	ND	0.0239	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
1,2,4-Trichlorobenzene	ND	0.0599	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
sec-Butylbenzene	ND	0.0239	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
4-Isopropyltoluene	ND	0.0239	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
1,3-Dichlorobenzene	ND	0.0239	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
1,4-Dichlorobenzene	ND	0.0239	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
n-Butylbenzene	ND	0.0239	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
1,2-Dichlorobenzene	ND	0.0239	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
1,2-Dibromo-3-chloropropane	ND	0.599	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
1,2,4-Trimethylbenzene	ND	0.0239	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
Hexachlorobutadiene	ND	0.120	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
Naphthalene	ND	0.0359	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
1,2,3-Trichlorobenzene	ND	0.0239	H	mg/Kg-dry	1	6/1/2017 8:16:11 PM
Surr: Dibromofluoromethane	89.7	56.5-129	H	%Rec	1	6/1/2017 8:16:11 PM
Surr: Toluene-d8	99.0	64.5-151	H	%Rec	1	6/1/2017 8:16:11 PM
Surr: 1-Bromo-4-fluorobenzene	92.8	63.1-141	H	%Rec	1	6/1/2017 8:16:11 PM

Mercury by EPA Method 7471

Batch ID: 17208

Analyst: WF

Mercury	ND	0.259		mg/Kg-dry	1	5/31/2017 12:35:41 PM
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Total Metals by EPA Method 6020

Batch ID: 17190

Analyst: TN

Arsenic	3.19	0.0777		mg/Kg-dry	1	5/30/2017 4:58:26 PM
Barium	45.1	0.388		mg/Kg-dry	1	5/30/2017 4:58:26 PM
Cadmium	ND	0.155		mg/Kg-dry	1	5/30/2017 4:58:26 PM
Chromium	30.4	0.0777		mg/Kg-dry	1	5/30/2017 4:58:26 PM
Lead	1.93	0.155		mg/Kg-dry	1	5/30/2017 4:58:26 PM
Selenium	1.12	0.388		mg/Kg-dry	1	5/30/2017 4:58:26 PM
Silver	ND	0.0777		mg/Kg-dry	1	5/30/2017 4:58:26 PM

Sample Moisture (Percent Moisture)

Batch ID: R36474

Analyst: BB

Percent Moisture	5.31			wt%	1	5/31/2017 8:39:07 AM
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Work Order: 1705316
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

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

Sample ID: MB-17394		SampType: MBLK		Units: mg/Kg		Prep Date: 6/16/2017			RunNo: 36882			
Client ID: MBLKS		Batch ID: 17394					Analysis Date: 6/16/2017			SeqNo: 708248		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Diesel (Fuel Oil)	ND	20.0									
Heavy Oil	ND	50.0									
Surr: 2-Fluorobiphenyl	21.4		20.00		107	50	150				
Surr: o-Terphenyl	21.6		20.00		108	50	150				

Sample ID: LCS-17394		SampType: LCS			Units: mg/Kg		Prep Date: 6/16/2017			RunNo: 36882		
Client ID: LCSS		Batch ID: 17394			Analysis Date: 6/16/2017					SeqNo: 708249		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Diesel (Fuel Oil)	539	20.0	500.0	0	108	65	135				
Surr: 2-Fluorobiphenyl	21.0		20.00		105	50	150				
Surr: o-Terphenyl	22.7		20.00		114	50	150				

Sample ID: 1706168-001ADUP		SampType: DUP			Units: mg/Kg-dry		Prep Date: 6/16/2017			RunNo: 36882		
Client ID: BATCH		Batch ID: 17394			Analysis Date: 6/16/2017					SeqNo: 708759		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Diesel (Fuel Oil)	ND	27.3						0		30	
Heavy Oil	ND	68.4						0		30	
Surr: 2-Fluorobiphenyl	29.5		27.35		108	50	150		0		
Surr: o-Terphenyl	30.0		27.35		110	50	150		0		

Sample ID: 1706168-001AMS		SampType: MS			Units: mg/Kg-dry		Prep Date: 6/16/2017		RunNo: 36882		
Client ID: BATCH		Batch ID: 17394			Analysis Date: 6/16/2017				SeqNo: 708760		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Diesel (Fuel Oil)	727	27.0	673.8	0	108	65	135				
Surr: 2-Fluorobiphenyl	28.0		26.95		104	50	150				
Surr: o-Terphenyl	30.5		26.95		113	50	150				

Work Order: 1705316
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

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

Sample ID: 1706168-001AMS		SampType: MS			Units: mg/Kg-dry		Prep Date: 6/16/2017			RunNo: 36882		
Client ID: BATCH		Batch ID: 17394			Analysis Date: 6/16/2017			SeqNo: 708760				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Sample ID: 1706168-001AMSD	SampType: MSD	Units: mg/Kg-dry				Prep Date: 6/16/2017			RunNo: 36882		
Client ID: BATCH	Batch ID: 17394					Analysis Date: 6/16/2017			SeqNo: 708761		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	814	27.5	687.7	0	118	65	135	727.1	11.3	30	
Surr: 2-Fluorobiphenyl	28.5		27.51		104	50	150		0		
Surr: o-Terphenyl	31.4		27.51		114	50	150		0		

Sample ID: 1706171-003ADUP		SampType: DUP		Units: mg/Kg-dry		Prep Date: 6/16/2017			RunNo: 36882		
Client ID: BATCH		Batch ID: 17394					Analysis Date: 6/16/2017			SeqNo: 708767	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	ND	20.3						0		30	
Heavy Oil	ND	50.9						0		30	
Surr: 2-Fluorobiphenyl	21.2		20.35		104	50	150		0		
Surr: o-Terphenyl	21.5		20.35		106	50	150		0		

Work Order: 1705316
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

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

Sample ID: MB-17188		SampType: MBLK			Units: mg/Kg		Prep Date: 5/26/2017			RunNo: 36481		
Client ID: MBLKS		Batch ID: 17188			Analysis Date: 5/27/2017			SeqNo: 699922				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Diesel (Fuel Oil)	ND	20.0									
Heavy Oil	ND	50.0									
Surr: 2-Fluorobiphenyl	22.4		20.00		112	50	150				
Surr: o-Terphenyl	22.8		20.00		114	50	150				

Sample ID: LCS-17188		SampType: LCS			Units: mg/Kg		Prep Date: 5/26/2017			RunNo: 36481		
Client ID: LCSS		Batch ID: 17188			Analysis Date: 5/27/2017					SeqNo: 699921		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Diesel (Fuel Oil)	543	20.0	500.0	0	109	65	135				
Surr: 2-Fluorobiphenyl	21.6		20.00		108	50	150				
Surr: o-Terphenyl	23.2		20.00		116	50	150				

Sample ID: 1705307-008ADUP		SampType: DUP			Units: mg/Kg-dry		Prep Date: 5/26/2017			RunNo: 36481		
Client ID: BATCH		Batch ID: 17188			Analysis Date: 5/27/2017					SeqNo: 699895		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Diesel (Fuel Oil)	ND	24.2						0		30	
Heavy Oil	ND	60.6						0		30	
Surr: 2-Fluorobiphenyl	21.6		24.23		89.2	50	150		0		
Surr: o-Terphenyl	21.9		24.23		90.4	50	150		0		

Sample ID: 1705307-011AMS		SampType: MS			Units: mg/Kg-dry		Prep Date: 5/26/2017			RunNo: 36481		
Client ID: BATCH		Batch ID: 17188			Analysis Date: 5/27/2017					SeqNo: 699897		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Diesel (Fuel Oil)	531	21.1	526.6	0	101	65	135				
Surr: 2-Fluorobiphenyl	20.7		21.06		98.3	50	150				
Surr: o-Terphenyl	22.7		21.06		108	50	150				

Work Order: 1705316
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

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

Sample ID: 1705307-011AMS		SampType: MS			Units: mg/Kg-dry		Prep Date: 5/26/2017			RunNo: 36481		
Client ID: BATCH		Batch ID: 17188			Analysis Date: 5/27/2017			SeqNo: 699897				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Sample ID: 1705307-011AMSD	SampType: MSD	Units: mg/Kg-dry				Prep Date: 5/26/2017			RunNo: 36481		
Client ID: BATCH	Batch ID: 17188					Analysis Date: 5/27/2017			SeqNo: 699898		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	556	20.8	518.8	0	107	65	135	530.7	4.69	30	
Surr: 2-Fluorobiphenyl	21.2		20.75		102	50	150		0		
Surr: o-Terphenyl	22.3		20.75		108	50	150		0		

Sample ID: 1705317-002ADUP		SampType: DUP		Units: mg/Kg-dry		Prep Date: 5/26/2017			RunNo: 36481		
Client ID: BATCH		Batch ID: 17188					Analysis Date: 5/27/2017			SeqNo: 699907	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	ND	22.7						0		30	H
Heavy Oil	79.8	56.6						104.0	26.4	30	H
Surr: 2-Fluorobiphenyl	20.0		22.65		88.4	50	150		0		H
Surr: o-Terphenyl	20.7		22.65		91.5	50	150		0		H

Work Order: 1705316
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Gasoline by NWTPH-Gx

Sample ID: LCS-17405		SampType: LCS			Units: mg/Kg		Prep Date: 6/16/2017			RunNo: 36912		
Client ID: LCSS		Batch ID: 17405			Analysis Date: 6/16/2017					SeqNo: 708948		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Gasoline	26.0	5.00	25.00	0	104	65	135				
Surr: Toluene-d8	1.24		1.250		99.0	65	135				
Surr: 4-Bromofluorobenzene	1.25		1.250		100	65	135				

Sample ID: MB-17405		SampType: MBLK			Units: mg/Kg		Prep Date: 6/16/2017			RunNo: 36912		
Client ID: MBLKS		Batch ID: 17405			Analysis Date: 6/16/2017					SeqNo: 708949		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Gasoline	ND	5.00									
Surr: Toluene-d8	1.24		1.250		99.1	65	135				
Surr: 4-Bromofluorobenzene	1.23		1.250		98.7	65	135				

Sample ID: 1706145-001BDUP		SampType: DUP			Units: mg/Kg-dry		Prep Date: 6/16/2017			RunNo: 36912		
Client ID: BATCH		Batch ID: 17405			Analysis Date: 6/17/2017					SeqNo: 708927		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Gasoline	ND	5.12						0		30	
Surr: Toluene-d8	1.27		1.280		99.5	65	135		0		
Surr: 4-Bromofluorobenzene	0.00320		1.280		0.250	65	135		0		S

Sample ID: 1706145-003BDUP		SampType: DUP			Units: mg/Kg-dry		Prep Date: 6/16/2017			RunNo: 36912		
Client ID: BATCH		Batch ID: 17405			Analysis Date: 6/17/2017					SeqNo: 708930		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Gasoline	ND	4.99						0		30	
Surr: Toluene-d8	1.24		1.247		99.1	65	135		0		
Surr: 4-Bromofluorobenzene	1.21		1.247		97.3	65	135		0		

Work Order: 1705316
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Gasoline by NWTPH-Gx

Sample ID: 1706171-001BMS		SampType: MS			Units: mg/Kg-dry		Prep Date: 6/16/2017			RunNo: 36912		
Client ID: BATCH		Batch ID: 17405			Analysis Date: 6/17/2017			SeqNo: 708934				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Gasoline	30.4	8.21	41.04	0	74.1	65	135				
Surr: Toluene-d8	2.03		2.052		98.8	65	135				
Surr: 4-Bromofluorobenzene	2.09		2.052		102	65	135				

Sample ID: 1706171-001BMSD		SampType: MSD		Units: mg/Kg-dry		Prep Date: 6/16/2017			RunNo: 36912		
Client ID: BATCH		Batch ID: 17405		Analysis Date: 6/17/2017					SeqNo: 708935		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Gasoline	29.4	8.21	41.04	0	71.7	65	135	30.43	3.39	30	
Surr: Toluene-d8	2.02		2.052		98.4	65	135		0		
Surr: 4-Bromofluorobenzene	2.09		2.052		102	65	135		0		

Work Order: 1705316
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Gasoline by NWTPH-Gx

Sample ID: LCS-17217		SampType: LCS			Units: mg/Kg		Prep Date: 5/31/2017			RunNo: 36522		
Client ID: LCSS		Batch ID: 17217			Analysis Date: 6/1/2017					SeqNo: 700591		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Gasoline	24.9	5.00	25.00	0	99.8	65	135				
Surr: Toluene-d8	1.26		1.250		101	65	135				
Surr: 4-Bromofluorobenzene	1.30		1.250		104	65	135				

Sample ID: MB-17217		SampType: MBLK			Units: mg/Kg		Prep Date: 5/31/2017			RunNo: 36522		
Client ID: MBLKS		Batch ID: 17217			Analysis Date: 6/1/2017			SeqNo: 700592				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Gasoline	ND	5.00									
Surr: Toluene-d8	1.26		1.250		101	65	135				
Surr: 4-Bromofluorobenzene	1.24		1.250		99.1	65	135				

Sample ID: 1705293-001BDUP		SampType: DUP			Units: mg/Kg-dry		Prep Date: 5/31/2017			RunNo: 36522		
Client ID: BATCH		Batch ID: 17217			Analysis Date: 6/1/2017					SeqNo: 700574		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Gasoline	ND	5.67						0		30	
Surr: Toluene-d8	1.45		1.418		102	65	135		0		
Surr: 4-Bromofluorobenzene	1.37		1.418		96.5	65	135		0		

Sample ID: 1705293-004BDUP		SampType: DUP			Units: mg/Kg-dry		Prep Date: 5/31/2017			RunNo: 36522		
Client ID: BATCH		Batch ID: 17217			Analysis Date: 6/1/2017					SeqNo: 700578		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Gasoline	ND	5.99						0		30	
Surr: Toluene-d8	1.50		1.498		100	65	135		0		
Surr: 4-Bromofluorobenzene	1.47		1.498		98.2	65	135		0		



Work Order: 1705316
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Gasoline by NWTPH-Gx

Sample ID: 1705307-012BMS	SampType: MS	Units: mg/Kg-dry			Prep Date: 5/31/2017			RunNo: 36522			
Client ID: BATCH	Batch ID: 17217				Analysis Date: 6/1/2017			SeqNo: 700706			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Gasoline	23.9	5.85	29.27	0	81.7	65	135				
Surr: Toluene-d8	1.48		1.464		101	65	135				
Surr: 4-Bromofluorobenzene	1.45		1.464		99.2	65	135				

Sample ID: 1705307-012BMSD	SampType: MSD	Units: mg/Kg-dry				Prep Date: 5/31/2017			RunNo: 36522		
Client ID: BATCH	Batch ID: 17217	Analysis Date: 6/1/2017						SeqNo: 700707			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Gasoline	24.4	5.85	29.27	0	83.5	65	135	23.92	2.15	30	
Surr: Toluene-d8	1.49		1.464		102	65	135		0		
Surr: 4-Bromofluorobenzene	1.47		1.464		100	65	135		0		

Work Order: 1705316
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Mercury by EPA Method 7471

Sample ID: MB-17411		SampType: MBLK			Units: mg/Kg		Prep Date: 6/19/2017			RunNo: 36902		
Client ID: MBLKS		Batch ID: 17411			Analysis Date: 6/19/2017			SeqNo: 709052				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Mercury ND 0.250

Sample ID: LCS-17411		SampType: LCS			Units: mg/Kg		Prep Date: 6/19/2017			RunNo: 36902		
Client ID: LCSS		Batch ID: 17411			Analysis Date: 6/19/2017			SeqNo: 709053				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Mercury 0.492 0.250 0.5000 0 98.4 80 120

Sample ID: 1706193-001ADUP		SampType: DUP			Units: mg/Kg-dry		Prep Date: 6/19/2017			RunNo: 36902		
Client ID: BATCH		Batch ID: 17411			Analysis Date: 6/19/2017			SeqNo: 709055				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Mercury ND 0.256 0 20

Sample ID: 1706193-001AMS		SampType: MS			Units: mg/Kg-dry		Prep Date: 6/19/2017			RunNo: 36902		
Client ID: BATCH		Batch ID: 17411			Analysis Date: 6/19/2017			SeqNo: 709056				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Mercury 0.538 0.246 0.4928 0.01202 107 70 130

Sample ID: 1706193-001AMSD		SampType: MSD			Units: mg/Kg-dry		Prep Date: 6/19/2017			RunNo: 36902		
Client ID: BATCH		Batch ID: 17411			Analysis Date: 6/19/2017					SeqNo: 709018		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Mercury 0.621 0.261 0.5224 0.01202 116 70 130 0.5382 14.2 20

Work Order: 1705316
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Mercury by EPA Method 7471

Sample ID: MB-17208		SampType: MBLK		Units: mg/Kg		Prep Date: 5/31/2017			RunNo: 36485			
Client ID: MBLKS		Batch ID: 17208					Analysis Date: 5/31/2017			SeqNo: 700048		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Mercury ND 0.250

Sample ID: LCS-17208		SampType: LCS			Units: mg/Kg		Prep Date: 5/31/2017			RunNo: 36485		
Client ID: LCSS		Batch ID: 17208			Analysis Date: 5/31/2017			SeqNo: 700049				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Mercury 0.430 0.250 0.5000 0 86.0 80 120

Sample ID: 1705293-002ADUP		SampType: DUP			Units: mg/Kg-dry		Prep Date: 5/31/2017			RunNo: 36485		
Client ID: BATCH		Batch ID: 17208			Analysis Date: 5/31/2017					SeqNo: 700051		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Mercury ND 0.284 0 20

Sample ID: 1705293-002AMS		SampType: MS			Units: mg/Kg-dry		Prep Date: 5/31/2017			RunNo: 36485		
Client ID: BATCH		Batch ID: 17208			Analysis Date: 5/31/2017			SeqNo: 700052				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Mercury 0.634 0.289 0.5782 0.05238 101 70 130

Sample ID: 1705293-002AMSD		SampType: MSD			Units: mg/Kg-dry		Prep Date: 5/31/2017			RunNo: 36485		
Client ID: BATCH		Batch ID: 17208			Analysis Date: 5/31/2017					SeqNo: 700053		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Mercury 0.632 0.284 0.5673 0.05238 102 70 130 0.6337 0.276 20

Work Order: 1705316
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID: MB-17400	SampType: MBLK	Units: µg/Kg			Prep Date: 6/16/2017			RunNo: 36907			
Client ID: MBLKS	Batch ID: 17400	Analysis Date: 6/16/2017						SeqNo: 708811			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	40.0									
2-Methylnaphthalene	ND	40.0									
1-Methylnaphthalene	ND	40.0									
Acenaphthylene	ND	40.0									
Acenaphthene	ND	40.0									
Fluorene	ND	40.0									
Phenanthrene	ND	40.0									
Anthracene	ND	40.0									
Fluoranthene	ND	40.0									
Pyrene	ND	40.0									
Benz(a)anthracene	ND	40.0									
Chrysene	ND	40.0									
Benzo(b)fluoranthene	ND	40.0									
Benzo(k)fluoranthene	ND	40.0									
Benzo(a)pyrene	ND	40.0									
Indeno(1,2,3-cd)pyrene	ND	40.0									
Dibenz(a,h)anthracene	ND	40.0									
Benzo(g,h,i)perylene	ND	40.0									Q
Surr: 2-Fluorobiphenyl	337		500.0		67.4	24.5	139				
Surr: Terphenyl-d14 (surr)	438		500.0		87.7	44.3	176				

NOTES:

Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Sample ID: LCS-17400	SampType: LCS	Units: µg/Kg				Prep Date: 6/16/2017			RunNo: 36907		
Client ID: LCSS	Batch ID: 17400					Analysis Date: 6/16/2017			SeqNo: 708812		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	805	40.0	1,000	0	80.5	46.4	125				
2-Methylnaphthalene	847	40.0	1,000	0	84.7	45.1	135				
1-Methylnaphthalene	805	40.0	1,000	0	80.5	46.2	133				
Acenaphthylene	853	40.0	1,000	0	85.3	32.8	136				

Work Order: 1705316
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID: LCS-17400		SampType: LCS		Units: µg/Kg		Prep Date: 6/16/2017			RunNo: 36907		
Client ID: LCSS		Batch ID: 17400					Analysis Date: 6/16/2017			SeqNo: 708812	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acenaphthene	813	40.0	1,000	0	81.3	38.7	129				
Fluorene	860	40.0	1,000	0	86.0	41.4	144				
Phenanthrene	832	40.0	1,000	0	83.2	43.9	133				
Anthracene	873	40.0	1,000	0	87.3	44.2	136				
Fluoranthene	880	40.0	1,000	0	88.0	45.9	137				
Pyrene	874	40.0	1,000	0	87.4	46.2	137				
Benz(a)anthracene	876	40.0	1,000	0	87.6	41.2	141				
Chrysene	889	40.0	1,000	0	88.9	46.9	138				
Benzo(b)fluoranthene	911	40.0	1,000	0	91.1	41	155				
Benzo(k)fluoranthene	877	40.0	1,000	0	87.7	41.8	153				
Benzo(a)pyrene	965	40.0	1,000	0	96.5	30.2	171				
Indeno(1,2,3-cd)pyrene	815	40.0	1,000	0	81.5	31.3	159				
Dibenz(a,h)anthracene	799	40.0	1,000	0	79.9	28	158				
Benzo(g,h,i)perylene	785	40.0	1,000	0	78.5	32.4	144				
Surr: 2-Fluorobiphenyl	434		500.0		86.7	24.5	139				
Surr: Terphenyl-d14 (surr)	449		500.0		89.8	44.3	176				

Sample ID: 1706193-001ADUP		SampType: DUP		Units: µg/Kg-dry		Prep Date: 6/16/2017			RunNo: 36907		
Client ID: BATCH		Batch ID: 17400					Analysis Date: 6/16/2017			SeqNo: 708814	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	35.0						0		30	
2-Methylnaphthalene	ND	35.0						0		30	
1-Methylnaphthalene	ND	35.0						0		30	
Acenaphthylene	ND	35.0						0		30	
Acenaphthene	ND	35.0						0		30	
Fluorene	ND	35.0						0		30	
Phenanthrene	ND	35.0						0		30	
Anthracene	ND	35.0						0		30	
Fluoranthene	ND	35.0						0		30	

Work Order: 1705316
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID: 1706193-001ADUP		SampType: DUP		Units: µg/Kg-dry		Prep Date: 6/16/2017			RunNo: 36907		
Client ID: BATCH		Batch ID: 17400					Analysis Date: 6/16/2017			SeqNo: 708814	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Pyrene	ND	35.0						0		30	
Benz(a)anthracene	ND	35.0						0		30	
Chrysene	ND	35.0						0		30	
Benzo(b)fluoranthene	ND	35.0						0		30	
Benzo(k)fluoranthene	ND	35.0						0		30	
Benzo(a)pyrene	ND	35.0						0		30	
Indeno(1,2,3-cd)pyrene	ND	35.0						0		30	
Dibenz(a,h)anthracene	ND	35.0						0		30	
Benzo(g,h,i)perylene	ND	35.0						0		30	Q
Surr: 2-Fluorobiphenyl	354		437.9		80.7	24.5	139		0		
Surr: Terphenyl-d14 (surr)	358		437.9		81.8	44.3	176		0		

NOTES:

Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Sample ID: 1706193-001AMS		SampType: MS		Units: µg/Kg-dry		Prep Date: 6/16/2017			RunNo: 36907		
Client ID: BATCH		Batch ID: 17400					Analysis Date: 6/16/2017			SeqNo: 708815	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	687	41.6	1,041	0	66.0	42.9	138				
2-Methylnaphthalene	746	41.6	1,041	0	71.7	42.8	151				
1-Methylnaphthalene	710	41.6	1,041	0	68.2	41.6	148				
Acenaphthylene	759	41.6	1,041	0	72.9	32.6	160				
Acenaphthene	720	41.6	1,041	0	69.2	46.3	142				
Fluorene	766	41.6	1,041	0	73.6	43.4	153				
Phenanthrene	755	41.6	1,041	23.59	70.2	45.5	140				
Anthracene	800	41.6	1,041	0	76.8	32.6	160				
Fluoranthene	830	41.6	1,041	8.247	79.0	44.6	161				
Pyrene	828	41.6	1,041	21.02	77.6	48.3	158				
Benz(a)anthracene	833	41.6	1,041	15.41	78.5	34.9	139				
Chrysene	845	41.6	1,041	25.71	78.7	45.2	146				
Benzo(b)fluoranthene	847	41.6	1,041	25.51	79.0	42.2	168				

Work Order: 1705316
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID: 1706193-001AMS		SampType: MS		Units: µg/Kg-dry		Prep Date: 6/16/2017			RunNo: 36907		
Client ID: BATCH		Batch ID: 17400					Analysis Date: 6/16/2017			SeqNo: 708815	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzo(k)fluoranthene	830	41.6	1,041	0	79.8	34.8	147				
Benzo(a)pyrene	910	41.6	1,041	27.37	84.8	34.4	179				
Indeno(1,2,3-cd)pyrene	667	41.6	1,041	11.01	63.1	5	113				
Dibenz(a,h)anthracene	659	41.6	1,041	8.481	62.5	17.3	156				
Benzo(g,h,i)perylene	609	41.6	1,041	19.39	56.6	24.9	119				
Surr: 2-Fluorobiphenyl	398		520.3		76.5	24.5	139				
Surr: Terphenyl-d14 (surr)	387		520.3		74.4	44.3	176				

Sample ID: 1706193-001AMSD		SampType: MSD		Units: µg/Kg-dry		Prep Date: 6/16/2017			RunNo: 36907		
Client ID: BATCH		Batch ID: 17400		Analysis Date: 6/16/2017						SeqNo: 708816	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	711	41.0	1,024	0	69.5	42.9	138	686.9	3.50	30	
2-Methylnaphthalene	767	41.0	1,024	0	74.9	42.8	151	746.3	2.79	30	
1-Methylnaphthalene	731	41.0	1,024	0	71.3	41.6	148	710.0	2.88	30	
Acenaphthylene	787	41.0	1,024	0	76.8	32.6	160	758.6	3.62	30	
Acenaphthene	745	41.0	1,024	0	72.7	46.3	142	719.7	3.47	30	
Fluorene	784	41.0	1,024	0	76.5	43.4	153	765.8	2.33	30	
Phenanthrene	761	41.0	1,024	23.59	72.0	45.5	140	754.5	0.823	30	
Anthracene	801	41.0	1,024	0	78.2	32.6	160	799.7	0.216	30	
Fluoranthene	836	41.0	1,024	8.247	80.8	44.6	161	830.1	0.689	30	
Pyrene	853	41.0	1,024	21.02	81.2	48.3	158	828.4	2.93	30	
Benz(a)anthracene	841	41.0	1,024	15.41	80.6	34.9	139	832.7	0.975	30	
Chrysene	852	41.0	1,024	25.71	80.7	45.2	146	844.8	0.888	30	
Benzo(b)fluoranthene	849	41.0	1,024	25.51	80.3	42.2	168	847.1	0.162	30	
Benzo(k)fluoranthene	841	41.0	1,024	0	82.1	34.8	147	830.3	1.27	30	
Benzo(a)pyrene	902	41.0	1,024	27.37	85.4	34.4	179	909.5	0.842	30	
Indeno(1,2,3-cd)pyrene	615	41.0	1,024	11.01	59.0	5	113	667.5	8.20	30	
Dibenz(a,h)anthracene	615	41.0	1,024	8.481	59.2	17.3	156	659.3	6.98	30	
Benzo(g,h,i)perylene	539	41.0	1,024	19.39	50.8	24.9	119	608.8	12.1	30	



Work Order: 1705316
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QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID: 1706193-001AMSD		SampType: MSD			Units: µg/Kg-dry		Prep Date: 6/16/2017		RunNo: 36907		
Client ID: BATCH		Batch ID: 17400			Analysis Date: 6/16/2017				SeqNo: 708816		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 2-Fluorobiphenyl	407		512.2		79.4	24.5	139		0		
Surr: Terphenyl-d14 (surr)	383		512.2		74.7	44.3	176		0		

Work Order: 1705316
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID: MB-17196	SampType: MBLK	Units: µg/Kg				Prep Date: 5/30/2017			RunNo: 36484		
Client ID: MBLKS	Batch ID: 17196	Analysis Date: 5/30/2017							SeqNo: 699988		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	40.0									
2-Methylnaphthalene	ND	40.0									
1-Methylnaphthalene	ND	40.0									
Acenaphthylene	ND	40.0									
Acenaphthene	ND	40.0									
Fluorene	ND	40.0									
Phenanthrene	ND	40.0									
Anthracene	ND	40.0									
Fluoranthene	ND	40.0									
Pyrene	ND	40.0									
Benzo(a)anthracene	ND	40.0									
Chrysene	ND	40.0									
Benzo(b)fluoranthene	ND	40.0									
Benzo(k)fluoranthene	ND	40.0									
Benzo(a)pyrene	ND	40.0									
Indeno(1,2,3-cd)pyrene	ND	40.0									
Dibenz(a,h)anthracene	ND	40.0									
Benzo(g,h,i)perylene	ND	40.0									
Surr: 2-Fluorobiphenyl	395		500.0		79.0	24.5	139				
Surr: Terphenyl-d14 (surr)	600		500.0		120	44.3	176				

Sample ID: LCS-17196	SampType: LCS	Units: µg/Kg				Prep Date: 5/30/2017			RunNo: 36484		
Client ID: LCSS	Batch ID: 17196					Analysis Date: 5/30/2017			SeqNo: 699989		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	980	40.0	1,000	0	98.0	46.4	125				
2-Methylnaphthalene	1,000	40.0	1,000	0	100	45.1	135				
1-Methylnaphthalene	957	40.0	1,000	0	95.7	46.2	133				
Acenaphthylene	1,100	40.0	1,000	0	110	32.8	136				
Acenaphthene	952	40.0	1,000	0	95.2	38.7	129				

Work Order: 1705316
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID: LCS-17196	SampType: LCS	Units: µg/Kg				Prep Date: 5/30/2017			RunNo: 36484		
Client ID: LCSS	Batch ID: 17196					Analysis Date: 5/30/2017			SeqNo: 699989		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluorene	1,030	40.0	1,000	0	103	41.4	144				
Phenanthrene	964	40.0	1,000	0	96.4	43.9	133				
Anthracene	1,100	40.0	1,000	0	110	44.2	136				
Fluoranthene	1,080	40.0	1,000	0	108	45.9	137				
Pyrene	1,070	40.0	1,000	0	107	46.2	137				
Benz(a)anthracene	1,110	40.0	1,000	0	111	41.2	141				
Chrysene	971	40.0	1,000	0	97.1	46.9	138				
Benzo(b)fluoranthene	1,220	40.0	1,000	0	122	41	155				
Benzo(k)fluoranthene	1,080	40.0	1,000	0	108	41.8	153				
Benzo(a)pyrene	1,150	40.0	1,000	0	115	34.3	157				
Indeno(1,2,3-cd)pyrene	1,130	40.0	1,000	0	113	31.3	159				
Dibenz(a,h)anthracene	1,100	40.0	1,000	0	110	28	158				
Benzo(g,h,i)perylene	1,050	40.0	1,000	0	105	32.4	144				
Surr: 2-Fluorobiphenyl	424		500.0		84.8	24.5	139				
Surr: Terphenyl-d14 (surr)	587		500.0		117	44.3	176				

Sample ID: 1705298-001ADUP		SampType: DUP		Units: µg/Kg-dry		Prep Date: 5/30/2017			RunNo: 36484		
Client ID: BATCH		Batch ID: 17196		Analysis Date: 5/30/2017						SeqNo: 699991	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	41.4						0		30	
2-Methylnaphthalene	ND	41.4						0		30	
1-Methylnaphthalene	ND	41.4						0		30	
Acenaphthylene	ND	41.4						0		30	
Acenaphthene	ND	41.4						0		30	
Fluorene	ND	41.4						0		30	
Phenanthrene	ND	41.4						0		30	
Anthracene	ND	41.4						0		30	
Fluoranthene	ND	41.4						0		30	
Pyrene	ND	41.4						0		30	

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QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID: 1705298-001ADUP		SampType: DUP		Units: µg/Kg-dry		Prep Date: 5/30/2017			RunNo: 36484		
Client ID: BATCH		Batch ID: 17196					Analysis Date: 5/30/2017			SeqNo: 699991	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benz(a)anthracene	ND	41.4						0		30	
Chrysene	ND	41.4						0		30	
Benzo(b)fluoranthene	ND	41.4						0		30	
Benzo(k)fluoranthene	ND	41.4						0		30	
Benzo(a)pyrene	ND	41.4						0		30	
Indeno(1,2,3-cd)pyrene	ND	41.4						0		30	
Dibenz(a,h)anthracene	ND	41.4						0		30	
Benzo(g,h,i)perylene	ND	41.4						0		30	
Surr: 2-Fluorobiphenyl	337		517.1		65.2	24.5	139		0		
Surr: Terphenyl-d14 (surr)	480		517.1		92.8	44.3	176		0		

Sample ID: 1705298-001AMS		SampType: MS		Units: µg/Kg-dry		Prep Date: 5/30/2017			RunNo: 36484		
Client ID: BATCH		Batch ID: 17196					Analysis Date: 5/30/2017			SeqNo: 699992	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	981	41.9	1,047	0	93.7	42.9	138				
2-Methylnaphthalene	1,030	41.9	1,047	0	98.7	42.8	151				
1-Methylnaphthalene	989	41.9	1,047	0	94.5	41.6	148				
Acenaphthylene	1,130	41.9	1,047	0	108	32.6	160				
Acenaphthene	1,010	41.9	1,047	0	96.1	46.3	142				
Fluorene	1,070	41.9	1,047	0	102	43.4	153				
Phenanthrene	1,000	41.9	1,047	2.137	95.7	45.5	140				
Anthracene	1,110	41.9	1,047	0	106	32.6	160				
Fluoranthene	1,110	41.9	1,047	3.760	105	44.6	161				
Pyrene	1,090	41.9	1,047	4.552	104	48.3	158				
Benz(a)anthracene	1,120	41.9	1,047	6.013	107	34.9	139				
Chrysene	1,030	41.9	1,047	0	98.7	45.2	146				
Benzo(b)fluoranthene	1,220	41.9	1,047	3.263	116	42.2	168				
Benzo(k)fluoranthene	1,150	41.9	1,047	0	110	34.8	147				
Benzo(a)pyrene	1,170	41.9	1,047	7.823	111	34.4	179				

Work Order: 1705316
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID: 1705298-001AMS		SampType: MS		Units: µg/Kg-dry		Prep Date: 5/30/2017			RunNo: 36484		
Client ID: BATCH		Batch ID: 17196					Analysis Date: 5/30/2017			SeqNo: 699992	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Indeno(1,2,3-cd)pyrene	1,160	41.9	1,047	0	111	5	113				
Dibenz(a,h)anthracene	1,140	41.9	1,047	0	109	17.3	156				
Benzo(g,h,i)perylene	1,090	41.9	1,047	3.542	104	24.9	119				
Surr: 2-Fluorobiphenyl	431		523.3		82.4	24.5	139				
Surr: Terphenyl-d14 (surr)	588		523.3		112	44.3	176				

Sample ID: 1705298-001AMSD		SampType: MSD		Units: µg/Kg-dry		Prep Date: 5/30/2017			RunNo: 36484		
Client ID: BATCH		Batch ID: 17196					Analysis Date: 5/30/2017			SeqNo: 699993	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	800	36.4	909.2	0	87.9	42.9	138	980.8	20.4	30	
2-Methylnaphthalene	847	36.4	909.2	0	93.2	42.8	151	1,032	19.7	30	
1-Methylnaphthalene	809	36.4	909.2	0	88.9	41.6	148	988.8	20.0	30	
Acenaphthylene	923	36.4	909.2	0	102	32.6	160	1,134	20.5	30	
Acenaphthene	818	36.4	909.2	0	90.0	46.3	142	1,005	20.5	30	
Fluorene	885	36.4	909.2	0	97.3	43.4	153	1,071	19.0	30	
Phenanthrene	826	36.4	909.2	2.137	90.7	45.5	140	1,004	19.4	30	
Anthracene	917	36.4	909.2	0	101	32.6	160	1,106	18.7	30	
Fluoranthene	907	36.4	909.2	3.760	99.3	44.6	161	1,105	19.7	30	
Pyrene	902	36.4	909.2	4.552	98.7	48.3	158	1,094	19.2	30	
Benz(a)anthracene	939	36.4	909.2	6.013	103	34.9	139	1,121	17.6	30	
Chrysene	827	36.4	909.2	0	90.9	45.2	146	1,032	22.1	30	
Benzo(b)fluoranthene	1,000	36.4	909.2	3.263	110	42.2	168	1,215	19.1	30	
Benzo(k)fluoranthene	923	36.4	909.2	0	102	34.8	147	1,152	22.0	30	
Benzo(a)pyrene	945	36.4	909.2	7.823	103	34.4	179	1,170	21.3	30	
Indeno(1,2,3-cd)pyrene	942	36.4	909.2	0	104	5	113	1,160	20.8	30	
Dibenz(a,h)anthracene	928	36.4	909.2	0	102	17.3	156	1,141	20.6	30	
Benzo(g,h,i)perylene	885	36.4	909.2	3.542	96.9	24.9	119	1,089	20.7	30	
Surr: 2-Fluorobiphenyl	359		454.6		78.9	24.5	139		0		
Surr: Terphenyl-d14 (surr)	469		454.6		103	44.3	176		0		



Work Order: 1705316
CLIENT: GeoEngineers
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QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID: 1705298-001AMSD	SampType: MSD	Units: µg/Kg-dry	Prep Date: 5/30/2017	RunNo: 36484							
Client ID: BATCH	Batch ID: 17196		Analysis Date: 5/30/2017	SeqNo: 699993							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual



Work Order: 1705316
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Sample Moisture (Percent Moisture)

Sample ID: 1706127-016ADUP		SampType: DUP		Units: wt%		Prep Date: 6/15/2017			RunNo: 36834		
Client ID: BATCH		Batch ID: R36834					Analysis Date: 6/15/2017			SeqNo: 707179	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Percent Moisture	9.65	0.500						9.663	0.182	20	

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QC SUMMARY REPORT

Sample Moisture (Percent Moisture)

Sample ID: 1705344-001ADUP		SampType: DUP		Units: wt%		Prep Date: 5/31/2017			RunNo: 36474		
Client ID: BATCH		Batch ID: R36474		Analysis Date: 5/31/2017			SeqNo: 699725				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Percent Moisture	5.73	0.500						5.589	2.52	20	

Sample ID: 1705317-005ADUP		SampType: DUP		Units: wt%		Prep Date: 5/31/2017			RunNo: 36474		
Client ID: BATCH		Batch ID: R36474		Analysis Date: 5/31/2017			SeqNo: 699750				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Percent Moisture	5.44	0.500						7.368	30.0	20	R

Work Order: 1705316
CLIENT: GeoEngineers
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QC SUMMARY REPORT

Total Metals by EPA Method 6020

Sample ID: MB-17386		SampType: MBLK		Units: mg/Kg		Prep Date: 6/15/2017			RunNo: 36889		
Client ID: MBLKS		Batch ID: 17386		Analysis Date: 6/16/2017					SeqNo: 708416		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	0.0719									
Barium	ND	0.360									
Cadmium	ND	0.144									
Chromium	ND	0.0719									Q
Lead	ND	0.144									
Selenium	ND	0.360									
Silver	ND	0.0719									

NOTES:

Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Sample ID: LCS-17386		SampType: LCS		Units: mg/Kg		Prep Date: 6/15/2017			RunNo: 36889		
Client ID: LCSS		Batch ID: 17386		Analysis Date: 6/16/2017					SeqNo: 708417		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	36.9	0.0741	37.04	0	99.7	80	120				
Barium	36.1	0.370	37.04	0	97.5	80	120				
Cadmium	1.95	0.148	1.852	0	105	80	120				
Chromium	33.6	0.0741	37.04	0	90.7	80	120				
Lead	19.9	0.148	18.52	0	107	80	120				
Selenium	3.62	0.370	3.704	0	97.6	80	120				
Silver	9.67	0.0741	9.259	0	104	80	120				

Sample ID: 1706127-001ADUP		SampType: DUP		Units: mg/Kg-dry		Prep Date: 6/15/2017			RunNo: 36889		
Client ID: BATCH		Batch ID: 17386				Analysis Date: 6/16/2017			SeqNo: 708419		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	2.72	0.0849						2.404	12.4	20	
Barium	141	0.425						122.8	13.8	20	
Cadmium	ND	0.170						0		20	
Chromium	56.8	0.0849						53.24	6.53	20	Q
Lead	4.69	0.170						4.831	2.90	20	

Work Order: 1705316
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Total Metals by EPA Method 6020

Sample ID: 1706127-001ADUP		SampType: DUP		Units: mg/Kg-dry		Prep Date: 6/15/2017			RunNo: 36889		
Client ID: BATCH		Batch ID: 17386		Analysis Date: 6/16/2017						SeqNo: 708419	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Selenium	0.986	0.425						0.8126	19.3	20	
Silver	ND	0.0849						0		20	

NOTES:

Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Sample ID: 1706127-001AMS		SampType: MS		Units: mg/Kg-dry		Prep Date: 6/15/2017			RunNo: 36889		
Client ID: BATCH		Batch ID: 17386					Analysis Date: 6/16/2017			SeqNo: 708421	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	48.1	0.0856	42.78	2.404	107	75	125				
Barium	180	0.428	42.78	122.8	134	75	125				S
Cadmium	2.30	0.171	2.139	0.06773	105	75	125				
Chromium	107	0.0856	42.78	53.24	125	75	125				
Lead	26.0	0.171	21.39	4.831	99.0	75	125				
Selenium	4.84	0.428	4.278	0.8126	94.2	75	125				
Silver	8.98	0.0856	10.70	0.04702	83.6	75	125				

NOTES:

S - Outlying spike recovery(ies) observed. A duplicate analysis was performed with similar results indicating a possible matrix effect.

Sample ID: 1706127-001AMSD		SampType: MSD			Units: mg/Kg-dry		Prep Date: 6/15/2017			RunNo: 36889		
Client ID: BATCH		Batch ID: 17386			Analysis Date: 6/16/2017				SeqNo: 708422			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Arsenic	45.5	0.0856	42.78	2.404	101	75	125	48.10	5.48	20	S	
Barium	181	0.428	42.78	122.8	137	75	125	180.3	0.680	20		
Cadmium	2.27	0.171	2.139	0.06773	103	75	125	2.305	1.51	20		
Chromium	98.0	0.0856	42.78	53.24	105	75	125	106.5	8.31	20		
Lead	25.0	0.171	21.39	4.831	94.3	75	125	26.02	3.95	20		
Selenium	4.93	0.428	4.278	0.8126	96.2	75	125	4.841	1.79	20		
Silver	9.01	0.0856	10.70	0.04702	83.8	75	125	8.984	0.259	20		



Date: 6/19/2017

Work Order: 1705316
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT
Total Metals by EPA Method 6020

Sample ID: 1706127-001AMSD		SampType: MSD		Units: mg/Kg-dry		Prep Date: 6/15/2017			RunNo: 36889		
Client ID: BATCH		Batch ID: 17386					Analysis Date: 6/16/2017			SeqNo: 708422	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

NOTES:

S - Outlying spike recovery(ies) observed. A duplicate analysis was performed with similar results indicating a possible matrix effect.

Sample ID: 1706127-001APDS		SampType: PDS		Units: mg/Kg-dry		Prep Date: 6/15/2017		RunNo: 36889			
Client ID: BATCH		Batch ID: 17386				Analysis Date: 6/16/2017		SeqNo: 708423			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium	167	0.428	42.8	123	103	80	120				

Work Order: 1705316
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Total Metals by EPA Method 6020

Sample ID: MB-17190		SampType: MBLK		Units: mg/Kg		Prep Date: 5/30/2017			RunNo: 36467		
Client ID: MBLKS		Batch ID: 17190		Analysis Date: 5/30/2017						SeqNo: 699569	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	0.0752									
Barium	ND	0.376									
Cadmium	ND	0.150									
Chromium	ND	0.0752									
Lead	ND	0.150									
Selenium	ND	0.376									
Silver	ND	0.0752									

Sample ID: LCS-17190		SampType: LCS		Units: mg/Kg		Prep Date: 5/30/2017			RunNo: 36467		
Client ID: LCSS		Batch ID: 17190		Analysis Date: 5/30/2017					SeqNo: 699570		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	37.7	0.0763	38.17	0	98.8	80	120				
Barium	38.9	0.382	38.17	0	102	80	120				
Cadmium	1.80	0.153	1.908	0	94.1	80	120				
Chromium	37.9	0.0763	38.17	0	99.4	80	120				
Lead	20.2	0.153	19.08	0	106	80	120				
Selenium	3.49	0.382	3.817	0	91.5	80	120				
Silver	8.17	0.0763	9.542	0	85.6	80	120				

Sample ID: 1704275-005ADUP		SampType: DUP		Units: mg/Kg-dry		Prep Date: 5/30/2017			RunNo: 36467		
Client ID: BATCH		Batch ID: 17190					Analysis Date: 5/30/2017			SeqNo: 699572	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	2.28	0.0821						2.192	3.85	20	
Barium	33.6	0.410						35.93	6.77	20	
Cadmium	ND	0.164						0		20	
Chromium	22.7	0.0821						25.11	9.90	20	
Lead	1.40	0.164						1.490	5.98	20	
Selenium	0.929	0.410						1.027	9.99	20	

Work Order: 1705316
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Total Metals by EPA Method 6020

Sample ID: 1704275-005ADUP		SampType: DUP		Units: mg/Kg-dry		Prep Date: 5/30/2017			RunNo: 36467		
Client ID: BATCH		Batch ID: 17190		Analysis Date: 5/30/2017						SeqNo: 699572	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Silver	ND	0.0821						0.1475	133	20	R

NOTES:

R - High RPD observed. The method is in control as indicated by the LCS.

Sample ID: 1704275-005AMS	SampType: MS	Units: mg/Kg-dry				Prep Date: 5/30/2017			RunNo: 36467		
Client ID: BATCH	Batch ID: 17190	Analysis Date: 5/30/2017							SeqNo: 699574		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	41.7	0.0821	41.05	2.192	96.3	75	125				
Barium	73.2	0.410	41.05	35.93	90.8	75	125				
Cadmium	1.99	0.164	2.052	0.05422	94.5	75	125				
Chromium	64.3	0.0821	41.05	25.11	95.4	75	125				
Lead	19.7	0.164	20.52	1.490	88.5	75	125				
Selenium	4.91	0.410	4.105	1.027	94.7	75	125				
Silver	7.71	0.0821	10.26	0.1475	73.7	75	125				S

NOTES:

S - Outlying spike recovery(ies) observed. A duplicate analysis was performed and recovered within range.

Sample ID: 1704275-005AMSD	SampType: MSD			Units: mg/Kg-dry		Prep Date: 5/30/2017			RunNo: 36467		
Client ID: BATCH	Batch ID: 17190			Analysis Date: 5/30/2017					SeqNo: 699575		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	42.0	0.0821	41.05	2.192	97.0	75	125	41.70	0.779	20	
Barium	76.0	0.410	41.05	35.93	97.6	75	125	73.20	3.74	20	
Cadmium	2.06	0.164	2.052	0.05422	97.8	75	125	1.993	3.40	20	
Chromium	63.2	0.0821	41.05	25.11	92.7	75	125	64.25	1.71	20	
Lead	19.8	0.164	20.52	1.490	89.1	75	125	19.66	0.599	20	
Selenium	4.84	0.410	4.105	1.027	92.8	75	125	4.915	1.60	20	
Silver	8.76	0.0821	10.26	0.1475	84.0	75	125	7.715	12.7	20	

Work Order: 1705316
CLIENT: GeoEngineers
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QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID: LCS-17405	SampType: LCS	Units: mg/Kg				Prep Date: 6/16/2017			RunNo: 36899		
Client ID: LCSS	Batch ID: 17405	Analysis Date: 6/16/2017							SeqNo: 708655		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	0.890	0.0600	1.000	0	89.0	14.3	167				
Chloromethane	1.00	0.0600	1.000	0	100	46	144				
Vinyl chloride	1.01	0.00200	1.000	0	101	43.4	151				
Bromomethane	1.24	0.0900	1.000	0	124	40.9	157				
Trichlorofluoromethane (CFC-11)	1.12	0.0500	1.000	0	112	36.9	156				
Chloroethane	1.02	0.0600	1.000	0	102	33.4	155				
1,1-Dichloroethene	1.02	0.0500	1.000	0	102	49.7	142				
Methylene chloride	1.05	0.0200	1.000	0	105	46.3	140				
trans-1,2-Dichloroethene	1.07	0.0200	1.000	0	107	68	130				
Methyl tert-butyl ether (MTBE)	0.863	0.0500	1.000	0	86.3	66.3	145				
1,1-Dichloroethane	1.06	0.0200	1.000	0	106	61.9	137				
2,2-Dichloropropane	1.04	0.0500	1.000	0	104	35.5	186				
cis-1,2-Dichloroethene	1.06	0.0200	1.000	0	106	71.3	135				
Chloroform	1.04	0.0200	1.000	0	104	69	145				
1,1,1-Trichloroethane (TCA)	1.07	0.0200	1.000	0	107	69	132				
1,1-Dichloropropene	1.09	0.0200	1.000	0	109	72.7	131				
Carbon tetrachloride	1.27	0.0200	1.000	0	127	63.4	137				
1,2-Dichloroethane (EDC)	1.04	0.0300	1.000	0	104	50.9	162				
Benzene	1.07	0.0200	1.000	0	107	64.3	133				
Trichloroethene (TCE)	1.09	0.0200	1.000	0	109	65.5	137				
1,2-Dichloropropane	1.05	0.0200	1.000	0	105	63.2	142				
Bromodichloromethane	1.03	0.0200	1.000	0	103	53.4	131				
Dibromomethane	1.04	0.0400	1.000	0	104	60.1	146				
cis-1,3-Dichloropropene	1.03	0.0200	1.000	0	103	59.1	143				
Toluene	1.06	0.0200	1.000	0	106	67.3	138				
trans-1,3-Dichloropropylene	0.983	0.0300	1.000	0	98.3	49.2	149				
1,1,2-Trichloroethane	1.04	0.0300	1.000	0	104	56.9	147				
1,3-Dichloropropane	1.04	0.0500	1.000	0	104	56.1	153				
Tetrachloroethene (PCE)	1.08	0.0200	1.000	0	108	52.7	150				
Dibromochloromethane	0.986	0.0300	1.000	0	98.6	70.6	144				
1,2-Dibromoethane (EDB)	1.01	0.00500	1.000	0	101	50.5	154				

Work Order: 1705316
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID: LCS-17405	SampType: LCS	Units: mg/Kg				Prep Date: 6/16/2017			RunNo: 36899		
Client ID: LCSS	Batch ID: 17405	Analysis Date: 6/16/2017						SeqNo: 708655			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorobenzene	1.06	0.0200	1.000	0	106	76.1	123				
1,1,1,2-Tetrachloroethane	1.02	0.0300	1.000	0	102	65.9	141				
Ethylbenzene	1.13	0.0300	1.000	0	113	74	129				
m,p-Xylene	2.18	0.0200	2.000	0	109	70	124				
o-Xylene	0.992	0.0200	1.000	0	99.2	68.1	139				
Styrene	1.06	0.0200	1.000	0	106	73.3	146				
Isopropylbenzene	1.05	0.0800	1.000	0	105	70	130				
Bromoform	0.951	0.0200	1.000	0	95.1	67	154				
1,1,2,2-Tetrachloroethane	0.956	0.0200	1.000	0	95.6	44.8	165				
n-Propylbenzene	1.15	0.0200	1.000	0	115	74.8	125				
Bromobenzene	1.02	0.0300	1.000	0	102	49.2	144				
1,3,5-Trimethylbenzene	1.05	0.0200	1.000	0	105	74.6	123				
2-Chlorotoluene	1.06	0.0200	1.000	0	106	76.7	129				
4-Chlorotoluene	1.06	0.0200	1.000	0	106	77.5	125				
tert-Butylbenzene	0.966	0.0200	1.000	0	96.6	66.2	130				
1,2,3-Trichloropropane	1.01	0.0200	1.000	0	101	67.9	136				
1,2,4-Trichlorobenzene	1.05	0.0500	1.000	0	105	62.6	143				
sec-Butylbenzene	1.11	0.0200	1.000	0	111	75.6	133				
4-Isopropyltoluene	1.05	0.0200	1.000	0	105	76.8	131				
1,3-Dichlorobenzene	1.09	0.0200	1.000	0	109	72.8	128				
1,4-Dichlorobenzene	1.08	0.0200	1.000	0	108	72.6	126				
n-Butylbenzene	1.10	0.0200	1.000	0	110	65.3	136				
1,2-Dichlorobenzene	1.07	0.0200	1.000	0	107	72.8	126				
1,2-Dibromo-3-chloropropane	0.981	0.500	1.000	0	98.1	40.2	155				
1,2,4-Trimethylbenzene	1.05	0.0200	1.000	0	105	77.5	129				
Hexachlorobutadiene	1.09	0.100	1.000	0	109	42	151				
Naphthalene	0.934	0.0300	1.000	0	93.4	58.4	160				
1,2,3-Trichlorobenzene	1.05	0.0200	1.000	0	105	54.8	143				
Surr: Dibromofluoromethane	1.24		1.250		99.0	56.5	129				
Surr: Toluene-d8	1.26		1.250		101	64.5	151				
Surr: 1-Bromo-4-fluorobenzene	1.26		1.250		101	63.1	141				

Work Order: 1705316
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID: LCS-17405		SampType: LCS			Units: mg/Kg		Prep Date: 6/16/2017			RunNo: 36899		
Client ID: LCSS		Batch ID: 17405			Analysis Date: 6/16/2017			SeqNo: 708655				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Sample ID: MB-17405		SampType: MBLK			Units: mg/Kg		Prep Date: 6/16/2017			RunNo: 36899		
Client ID: MBLKS		Batch ID: 17405			Analysis Date: 6/16/2017					SeqNo: 708656		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Dichlorodifluoromethane (CFC-12)	ND	0.0600
Chloromethane	ND	0.0600
Vinyl chloride	ND	0.00200
Bromomethane	ND	0.0900
Trichlorofluoromethane (CFC-11)	ND	0.0500
Chloroethane	ND	0.0600
1,1-Dichloroethene	ND	0.0500
Methylene chloride	ND	0.0200
trans-1,2-Dichloroethene	ND	0.0200
Methyl tert-butyl ether (MTBE)	ND	0.0500
1,1-Dichloroethane	ND	0.0200
2,2-Dichloropropane	ND	0.0500
cis-1,2-Dichloroethene	ND	0.0200
Chloroform	ND	0.0200
1,1,1-Trichloroethane (TCA)	ND	0.0200
1,1-Dichloropropene	ND	0.0200
Carbon tetrachloride	ND	0.0200
1,2-Dichloroethane (EDC)	ND	0.0300
Benzene	ND	0.0200
Trichloroethene (TCE)	ND	0.0200
1,2-Dichloropropane	ND	0.0200
Bromodichloromethane	ND	0.0200
Dibromomethane	ND	0.0400
cis-1,3-Dichloropropene	ND	0.0200
Toluene	ND	0.0200

Q

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CLIENT: GeoEngineers
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QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID: MB-17405	SampType: MBLK	Units: mg/Kg			Prep Date: 6/16/2017			RunNo: 36899			
Client ID: MBLKS	Batch ID: 17405	Analysis Date: 6/16/2017						SeqNo: 708656			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
trans-1,3-Dichloropropylene	ND	0.0300									
1,1,2-Trichloroethane	ND	0.0300									
1,3-Dichloropropane	ND	0.0500									
Tetrachloroethene (PCE)	ND	0.0200									
Dibromochloromethane	ND	0.0300									
1,2-Dibromoethane (EDB)	ND	0.00500									
Chlorobenzene	ND	0.0200									
1,1,1,2-Tetrachloroethane	ND	0.0300									
Ethylbenzene	ND	0.0300									
m,p-Xylene	ND	0.0200									
o-Xylene	ND	0.0200									
Styrene	ND	0.0200									
Isopropylbenzene	ND	0.0800									
Bromoform	ND	0.0200									
1,1,2,2-Tetrachloroethane	ND	0.0200									
n-Propylbenzene	ND	0.0200									
Bromobenzene	ND	0.0300									
1,3,5-Trimethylbenzene	ND	0.0200									
2-Chlorotoluene	ND	0.0200									
4-Chlorotoluene	ND	0.0200									
tert-Butylbenzene	ND	0.0200									
1,2,3-Trichloropropane	ND	0.0200									
1,2,4-Trichlorobenzene	ND	0.0500									
sec-Butylbenzene	ND	0.0200									
4-Isopropyltoluene	ND	0.0200									
1,3-Dichlorobenzene	ND	0.0200									
1,4-Dichlorobenzene	ND	0.0200									
n-Butylbenzene	ND	0.0200									
1,2-Dichlorobenzene	ND	0.0200									
1,2-Dibromo-3-chloropropane	ND	0.500									
1,2,4-Trimethylbenzene	ND	0.0200									

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CLIENT: GeoEngineers
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QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID: MB-17405		SampType: MBLK			Units: mg/Kg		Prep Date: 6/16/2017			RunNo: 36899		
Client ID: MBLKS		Batch ID: 17405						Analysis Date: 6/16/2017			SeqNo: 708656	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Hexachlorobutadiene	ND	0.100									
Naphthalene	ND	0.0300									
1,2,3-Trichlorobenzene	ND	0.0200									
Surr: Dibromofluoromethane	1.24		1.250		99.2	56.5	129				
Surr: Toluene-d8	1.19		1.250		95.4	64.5	151				
Surr: 1-Bromo-4-fluorobenzene	1.20		1.250		96.3	63.1	141				

NOTES:

Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Sample ID: 1706145-001BDUP		SampType: DUP		Units: mg/Kg-dry		Prep Date: 6/16/2017			RunNo: 36899			
Client ID: BATCH		Batch ID: 17405					Analysis Date: 6/17/2017			SeqNo: 708632		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Dichlorodifluoromethane (CFC-12)	ND	0.0614						0		30	
Chloromethane	ND	0.0614						0		30	
Vinyl chloride	ND	0.00205						0		30	
Bromomethane	ND	0.0922						0		30	
Trichlorofluoromethane (CFC-11)	ND	0.0512						0		30	
Chloroethane	ND	0.0614						0		30	
1,1-Dichloroethene	ND	0.0512						0		30	
Methylene chloride	ND	0.0205						0		30	
trans-1,2-Dichloroethene	ND	0.0205						0		30	
Methyl tert-butyl ether (MTBE)	ND	0.0512						0		30	
1,1-Dichloroethane	ND	0.0205						0		30	
2,2-Dichloropropane	ND	0.0512						0		30	Q
cis-1,2-Dichloroethene	ND	0.0205						0		30	
Chloroform	ND	0.0205						0		30	
1,1,1-Trichloroethane (TCA)	ND	0.0205						0		30	
1,1-Dichloropropene	ND	0.0205						0		30	
Carbon tetrachloride	ND	0.0205						0		30	
1,2-Dichloroethane (EDC)	ND	0.0307						0		30	

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QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID: 1706145-001BDUP	SampType: DUP	Units: mg/Kg-dry			Prep Date: 6/16/2017			RunNo: 36899			
Client ID: BATCH	Batch ID: 17405	Analysis Date: 6/17/2017						SeqNo: 708632			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	ND	0.0205						0		30	
Trichloroethene (TCE)	ND	0.0205						0		30	
1,2-Dichloropropane	ND	0.0205						0		30	
Bromodichloromethane	ND	0.0205						0		30	
Dibromomethane	ND	0.0410						0		30	
cis-1,3-Dichloropropene	ND	0.0205						0		30	
Toluene	ND	0.0205						0		30	
trans-1,3-Dichloropropylene	ND	0.0307						0		30	
1,1,2-Trichloroethane	ND	0.0307						0		30	
1,3-Dichloropropane	ND	0.0512						0		30	
Tetrachloroethene (PCE)	ND	0.0205						0		30	
Dibromochloromethane	ND	0.0307						0		30	
1,2-Dibromoethane (EDB)	ND	0.00512						0		30	
Chlorobenzene	ND	0.0205						0		30	
1,1,1,2-Tetrachloroethane	ND	0.0307						0		30	
Ethylbenzene	ND	0.0307						0		30	
m,p-Xylene	ND	0.0205						0		30	
o-Xylene	ND	0.0205						0		30	
Styrene	ND	0.0205						0		30	
Isopropylbenzene	ND	0.0819						0		30	
Bromoform	ND	0.0205						0		30	
1,1,2,2-Tetrachloroethane	ND	0.0205						0		30	
n-Propylbenzene	ND	0.0205						0		30	
Bromobenzene	ND	0.0307						0		30	
1,3,5-Trimethylbenzene	ND	0.0205						0		30	
2-Chlorotoluene	ND	0.0205						0		30	
4-Chlorotoluene	ND	0.0205						0		30	
tert-Butylbenzene	ND	0.0205						0		30	
1,2,3-Trichloropropane	ND	0.0205						0		30	
1,2,4-Trichlorobenzene	ND	0.0512						0		30	
sec-Butylbenzene	ND	0.0205						0		30	

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QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID: 1706145-001BDUP	SampType: DUP	Units: mg/Kg-dry			Prep Date: 6/16/2017			RunNo: 36899			
Client ID: BATCH	Batch ID: 17405				Analysis Date: 6/17/2017			SeqNo: 708632			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4-Isopropyltoluene	ND	0.0205						0		30	
1,3-Dichlorobenzene	ND	0.0205						0		30	
1,4-Dichlorobenzene	ND	0.0205						0		30	
n-Butylbenzene	ND	0.0205						0		30	
1,2-Dichlorobenzene	ND	0.0205						0		30	
1,2-Dibromo-3-chloropropane	ND	0.512						0		30	
1,2,4-Trimethylbenzene	ND	0.0205						0		30	
Hexachlorobutadiene	ND	0.102						0		30	
Naphthalene	ND	0.0307						0		30	
1,2,3-Trichlorobenzene	ND	0.0205						0		30	
Surr: Dibromofluoromethane	1.16		1.280		90.4	56.5	129		0		
Surr: Toluene-d8	1.33		1.280		104	64.5	151		0		
Surr: 1-Bromo-4-fluorobenzene	1.23		1.280		96.2	63.1	141		0		

NOTES:

Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Sample ID: 1706145-003BDUP		SampType: DUP		Units: mg/Kg-dry		Prep Date: 6/16/2017			RunNo: 36899		
Client ID: BATCH		Batch ID: 17405					Analysis Date: 6/17/2017			SeqNo: 708635	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	ND	0.0599						0		30	
Chloromethane	ND	0.0599						0		30	
Vinyl chloride	ND	0.00200						0		30	
Bromomethane	ND	0.0898						0		30	
Trichlorofluoromethane (CFC-11)	ND	0.0499						0		30	
Chloroethane	ND	0.0599						0		30	
1,1-Dichloroethene	ND	0.0499						0		30	
Methylene chloride	ND	0.0200						0		30	
trans-1,2-Dichloroethene	ND	0.0200						0		30	
Methyl tert-butyl ether (MTBE)	ND	0.0499						0		30	
1,1-Dichloroethane	ND	0.0200						0		30	

Work Order: 1705316
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID: 1706145-003BDUP		SampType: DUP		Units: mg/Kg-dry		Prep Date: 6/16/2017			RunNo: 36899		
Client ID: BATCH		Batch ID: 17405		Analysis Date: 6/17/2017					SeqNo: 708635		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
2,2-Dichloropropane	ND	0.0499						0		30	
cis-1,2-Dichloroethene	ND	0.0200						0		30	
Chloroform	ND	0.0200						0		30	
1,1,1-Trichloroethane (TCA)	ND	0.0200						0		30	
1,1-Dichloropropene	ND	0.0200						0		30	
Carbon tetrachloride	ND	0.0200						0		30	
1,2-Dichloroethane (EDC)	ND	0.0299						0		30	
Benzene	ND	0.0200						0		30	
Trichloroethene (TCE)	ND	0.0200						0		30	
1,2-Dichloropropane	ND	0.0200						0		30	
Bromodichloromethane	ND	0.0200						0		30	
Dibromomethane	ND	0.0399						0		30	
cis-1,3-Dichloropropene	ND	0.0200						0		30	
Toluene	ND	0.0200						0		30	
trans-1,3-Dichloropropylene	ND	0.0299						0		30	
1,1,2-Trichloroethane	ND	0.0299						0		30	
1,3-Dichloropropane	ND	0.0499						0		30	
Tetrachloroethene (PCE)	ND	0.0200						0		30	
Dibromochloromethane	ND	0.0299						0		30	
1,2-Dibromoethane (EDB)	ND	0.00499						0		30	
Chlorobenzene	ND	0.0200						0		30	
1,1,1,2-Tetrachloroethane	ND	0.0299						0		30	
Ethylbenzene	ND	0.0299						0		30	
m,p-Xylene	ND	0.0200						0		30	
o-Xylene	ND	0.0200						0		30	
Styrene	ND	0.0200						0		30	
Isopropylbenzene	ND	0.0798						0		30	
Bromoform	ND	0.0200						0		30	
1,1,2,2-Tetrachloroethane	ND	0.0200						0		30	
n-Propylbenzene	ND	0.0200						0		30	
Bromobenzene	ND	0.0299						0		30	

Work Order: 1705316
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID: 1706145-003BDUP		SampType: DUP		Units: mg/Kg-dry		Prep Date: 6/16/2017			RunNo: 36899		
Client ID: BATCH		Batch ID: 17405					Analysis Date: 6/17/2017			SeqNo: 708635	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,3,5-Trimethylbenzene	ND	0.0200						0		30	
2-Chlorotoluene	ND	0.0200						0		30	
4-Chlorotoluene	ND	0.0200						0		30	
tert-Butylbenzene	ND	0.0200						0		30	
1,2,3-Trichloropropane	ND	0.0200						0		30	
1,2,4-Trichlorobenzene	ND	0.0499						0		30	
sec-Butylbenzene	ND	0.0200						0		30	
4-Isopropyltoluene	ND	0.0200						0		30	
1,3-Dichlorobenzene	ND	0.0200						0		30	
1,4-Dichlorobenzene	ND	0.0200						0		30	
n-Butylbenzene	ND	0.0200						0		30	
1,2-Dichlorobenzene	ND	0.0200						0		30	
1,2-Dibromo-3-chloropropane	ND	0.499						0		30	
1,2,4-Trimethylbenzene	ND	0.0200						0		30	
Hexachlorobutadiene	ND	0.0998						0		30	
Naphthalene	ND	0.0299						0		30	
1,2,3-Trichlorobenzene	ND	0.0200						0		30	
Surr: Dibromofluoromethane	1.10		1.247		87.8	56.5	129		0		
Surr: Toluene-d8	1.30		1.247		104	64.5	151		0		
Surr: 1-Bromo-4-fluorobenzene	1.18		1.247		94.8	63.1	141		0		

NOTES:

Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Sample ID: 1706145-004BMS		SampType: MS		Units: mg/Kg-dry		Prep Date: 6/16/2017		RunNo: 36899			
Client ID: BATCH		Batch ID: 17405				Analysis Date: 6/17/2017		SeqNo: 708637			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	0.885	0.0782	1.304	0	67.9	43.5	121				
Chloromethane	1.31	0.0782	1.304	0	101	45	130				
Vinyl chloride	1.19	0.00261	1.304	0	91.0	51.2	146				
Bromomethane	1.03	0.117	1.304	0	79.2	21.3	120				

Work Order: 1705316
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID: 1706145-004BMS		SampType: MS		Units: mg/Kg-dry		Prep Date: 6/16/2017		RunNo: 36899			
Client ID: BATCH		Batch ID: 17405				Analysis Date: 6/17/2017		SeqNo: 708637			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Trichlorofluoromethane (CFC-11)	0.652	0.0652	1.304	0	50.0	35	131				
Chloroethane	0.606	0.0782	1.304	0	46.5	31.9	123				
1,1-Dichloroethene	1.07	0.0652	1.304	0	82.1	61.9	141				
Methylene chloride	1.29	0.0261	1.304	0	98.6	54.7	142				
trans-1,2-Dichloroethene	1.28	0.0261	1.304	0	98.4	52	136				
Methyl tert-butyl ether (MTBE)	1.26	0.0652	1.304	0	96.7	54.4	132				
1,1-Dichloroethane	1.31	0.0261	1.304	0	100	51.8	141				
2,2-Dichloropropane	1.62	0.0652	1.304	0	124	36	123				S
cis-1,2-Dichloroethene	1.33	0.0261	1.304	0	102	58.6	136				
Chloroform	1.33	0.0261	1.304	0	102	53.2	129				
1,1,1-Trichloroethane (TCA)	1.30	0.0261	1.304	0	99.6	58.3	145				
1,1-Dichloropropene	1.30	0.0261	1.304	0	99.4	55.1	138				
Carbon tetrachloride	1.43	0.0261	1.304	0	110	53.3	144				
1,2-Dichloroethane (EDC)	1.35	0.0391	1.304	0	104	51.3	139				
Benzene	1.36	0.0261	1.304	0	104	63.5	133				
Trichloroethene (TCE)	2.10	0.0261	1.304	0	161	68.6	132				S
1,2-Dichloropropane	1.36	0.0261	1.304	0	104	59	136				
Bromodichloromethane	1.14	0.0261	1.304	0	87.5	50.7	141				
Dibromomethane	1.28	0.0521	1.304	0	97.8	50.6	137				
cis-1,3-Dichloropropene	1.29	0.0261	1.304	0	99.1	50.4	138				
Toluene	1.38	0.0261	1.304	0	106	63.4	132				
trans-1,3-Dichloropropylene	1.13	0.0391	1.304	0	86.6	44.1	147				
1,1,2-Trichloroethane	1.29	0.0391	1.304	0	98.8	51.6	137				
1,3-Dichloropropane	1.40	0.0652	1.304	0	107	53.1	134				
Tetrachloroethene (PCE)	1.29	0.0261	1.304	0	98.9	35.6	158				
Dibromochloromethane	1.05	0.0391	1.304	0	80.6	55.3	140				
1,2-Dibromoethane (EDB)	1.27	0.00652	1.304	0	97.6	50.4	136				
Chlorobenzene	1.37	0.0261	1.304	0	105	60	133				
1,1,1,2-Tetrachloroethane	1.23	0.0391	1.304	0	94.0	53.1	142				
Ethylbenzene	1.43	0.0391	1.304	0	110	54.5	134				
m,p-Xylene	2.97	0.0261	2.607	0	114	53.1	132				

Work Order: 1705316
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID: 1706145-004BMS		SampType: MS		Units: mg/Kg-dry		Prep Date: 6/16/2017		RunNo: 36899			
Client ID: BATCH		Batch ID: 17405				Analysis Date: 6/17/2017		SeqNo: 708637			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
o-Xylene	1.35	0.0261	1.304	0	104	53.3	139				
Styrene	1.46	0.0261	1.304	0	112	51.1	132				
Isopropylbenzene	1.44	0.104	1.304	0	110	58.9	138				
Bromoform	0.869	0.0261	1.304	0	66.7	57.9	130				
1,1,2,2-Tetrachloroethane	0.264	0.0261	1.304	0	20.3	51.9	131				S
n-Propylbenzene	1.59	0.0261	1.304	0	122	53.6	140				
Bromobenzene	1.34	0.0391	1.304	0	103	54.2	140				
1,3,5-Trimethylbenzene	1.39	0.0261	1.304	0	106	51.8	136				
2-Chlorotoluene	1.24	0.0261	1.304	0	95.4	51.6	136				
4-Chlorotoluene	1.38	0.0261	1.304	0	106	50.1	139				
tert-Butylbenzene	1.34	0.0261	1.304	0	102	50.5	135				
1,2,3-Trichloropropane	1.15	0.0261	1.304	0	88.4	50.5	131				
1,2,4-Trichlorobenzene	1.43	0.0652	1.304	0	109	50.8	130				
sec-Butylbenzene	1.46	0.0261	1.304	0	112	52.6	141				
4-Isopropyltoluene	1.41	0.0261	1.304	0	108	52.9	134				
1,3-Dichlorobenzene	1.38	0.0261	1.304	0	106	52.6	131				
1,4-Dichlorobenzene	1.37	0.0261	1.304	0	105	52.9	129				
n-Butylbenzene	1.45	0.0261	1.304	0	111	52.6	130				
1,2-Dichlorobenzene	1.36	0.0261	1.304	0	105	55.8	129				
1,2-Dibromo-3-chloropropane	0.879	0.652	1.304	0	67.5	40.5	131				
1,2,4-Trimethylbenzene	1.40	0.0261	1.304	0	107	50.6	137				
Hexachlorobutadiene	1.47	0.130	1.304	0	113	40.6	158				
Naphthalene	1.24	0.0391	1.304	0	95.0	52.3	124				
1,2,3-Trichlorobenzene	1.43	0.0261	1.304	0	109	54.4	124				
Surr: Dibromofluoromethane	1.49		1.629		91.6	56.5	129				
Surr: Toluene-d8	1.66		1.629		102	64.5	151				
Surr: 1-Bromo-4-fluorobenzene	1.65		1.629		101	63.1	141				

NOTES:

S - Outlying spike recoveries observed.

Work Order: 1705316
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID: 1706145-004BMSD		SampType: MSD		Units: mg/Kg-dry		Prep Date: 6/16/2017			RunNo: 36899		
Client ID: BATCH		Batch ID: 17405		Analysis Date: 6/17/2017					SeqNo: 708638		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	0.850	0.0782	1.304	0	65.2	43.5	121	0.8853	4.12	30	
Chloromethane	1.27	0.0782	1.304	0	97.6	45	130	1.312	3.05	30	
Vinyl chloride	1.16	0.00261	1.304	0	88.8	51.2	146	1.186	2.46	30	
Bromomethane	1.11	0.117	1.304	0	85.1	21.3	120	1.032	7.22	30	
Trichlorofluoromethane (CFC-11)	0.777	0.0652	1.304	0	59.6	35	131	0.6517	17.6	30	
Chloroethane	0.588	0.0782	1.304	0	45.1	31.9	123	0.6063	3.13	30	
1,1-Dichloroethene	1.08	0.0652	1.304	0	82.5	61.9	141	1.070	0.476	30	
Methylene chloride	1.24	0.0261	1.304	0	95.5	54.7	142	1.285	3.19	30	
trans-1,2-Dichloroethene	1.27	0.0261	1.304	0	97.2	52	136	1.282	1.14	30	
Methyl tert-butyl ether (MTBE)	1.22	0.0652	1.304	0	93.5	54.4	132	1.261	3.37	30	
1,1-Dichloroethane	1.28	0.0261	1.304	0	98.0	51.8	141	1.310	2.48	30	
2,2-Dichloropropane	1.55	0.0652	1.304	0	119	36	123	1.620	4.75	30	
cis-1,2-Dichloroethene	1.29	0.0261	1.304	0	98.9	58.6	136	1.328	2.93	30	
Chloroform	1.27	0.0261	1.304	0	97.4	53.2	129	1.326	4.30	30	
1,1,1-Trichloroethane (TCA)	1.29	0.0261	1.304	0	98.6	58.3	145	1.299	1.01	30	
1,1-Dichloropropene	1.28	0.0261	1.304	0	98.5	55.1	138	1.296	0.913	30	
Carbon tetrachloride	1.44	0.0261	1.304	0	110	53.3	144	1.435	0.185	30	
1,2-Dichloroethane (EDC)	1.32	0.0391	1.304	0	101	51.3	139	1.350	2.44	30	
Benzene	1.33	0.0261	1.304	0	102	63.5	133	1.360	1.91	30	
Trichloroethene (TCE)	2.07	0.0261	1.304	0	158	68.6	132	2.101	1.70	30	S
1,2-Dichloropropane	1.33	0.0261	1.304	0	102	59	136	1.356	2.20	30	
Bromodichloromethane	1.11	0.0261	1.304	0	85.1	50.7	141	1.141	2.82	30	
Dibromomethane	1.23	0.0521	1.304	0	94.6	50.6	137	1.275	3.30	30	
cis-1,3-Dichloropropene	1.25	0.0261	1.304	0	96.3	50.4	138	1.292	2.93	30	
Toluene	1.36	0.0261	1.304	0	104	63.4	132	1.383	2.01	30	
trans-1,3-Dichloropropylene	1.10	0.0391	1.304	0	84.6	44.1	147	1.128	2.29	30	
1,1,2-Trichloroethane	1.24	0.0391	1.304	0	95.0	51.6	137	1.289	4.01	30	
1,3-Dichloropropane	1.35	0.0652	1.304	0	103	53.1	134	1.398	3.86	30	
Tetrachloroethene (PCE)	1.30	0.0261	1.304	0	99.6	35.6	158	1.290	0.683	30	
Dibromochloromethane	1.03	0.0391	1.304	0	78.8	55.3	140	1.050	2.18	30	
1,2-Dibromoethane (EDB)	1.23	0.00652	1.304	0	94.1	50.4	136	1.273	3.67	30	

Work Order: 1705316
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID: 1706145-004BMSD	SampType: MSD	Units: mg/Kg-dry				Prep Date: 6/16/2017			RunNo: 36899		
Client ID: BATCH	Batch ID: 17405	Analysis Date: 6/17/2017							SeqNo: 708638		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorobenzene	1.35	0.0261	1.304	0	103	60	133	1.367	1.55	30	
1,1,1,2-Tetrachloroethane	1.20	0.0391	1.304	0	91.9	53.1	142	1.225	2.29	30	
Ethylbenzene	1.43	0.0391	1.304	0	109	54.5	134	1.434	0.614	30	
m,p-Xylene	2.93	0.0261	2.607	0	112	53.1	132	2.972	1.37	30	
o-Xylene	1.32	0.0261	1.304	0	102	53.3	139	1.350	1.87	30	
Styrene	1.43	0.0261	1.304	0	110	51.1	132	1.462	2.24	30	
Isopropylbenzene	1.47	0.104	1.304	0	113	58.9	138	1.438	2.43	30	
Bromoform	0.857	0.0261	1.304	0	65.7	57.9	130	0.8689	1.41	30	
1,1,2,2-Tetrachloroethane	0.253	0.0261	1.304	0	19.4	51.9	131	0.2640	4.28	30	S
n-Propylbenzene	1.58	0.0261	1.304	0	121	53.6	140	1.590	0.805	30	
Bromobenzene	1.31	0.0391	1.304	0	100	54.2	140	1.338	2.35	30	
1,3,5-Trimethylbenzene	1.36	0.0261	1.304	0	105	51.8	136	1.387	1.74	30	
2-Chlorotoluene	1.23	0.0261	1.304	0	94.5	51.6	136	1.243	0.900	30	
4-Chlorotoluene	1.35	0.0261	1.304	0	104	50.1	139	1.379	1.86	30	
tert-Butylbenzene	1.33	0.0261	1.304	0	102	50.5	135	1.336	0.700	30	
1,2,3-Trichloropropane	1.13	0.0261	1.304	0	86.3	50.5	131	1.153	2.42	30	
1,2,4-Trichlorobenzene	1.51	0.0652	1.304	0	116	50.8	130	1.425	5.66	30	
sec-Butylbenzene	1.45	0.0261	1.304	0	112	52.6	141	1.462	0.494	30	
4-Isopropyltoluene	1.41	0.0261	1.304	0	108	52.9	134	1.406	0.0135	30	
1,3-Dichlorobenzene	1.39	0.0261	1.304	0	106	52.6	131	1.382	0.269	30	
1,4-Dichlorobenzene	1.37	0.0261	1.304	0	105	52.9	129	1.369	0.318	30	
n-Butylbenzene	1.52	0.0261	1.304	0	116	52.6	130	1.453	4.41	30	
1,2-Dichlorobenzene	1.35	0.0261	1.304	0	104	55.8	129	1.365	0.810	30	
1,2-Dibromo-3-chloropropane	0.889	0.652	1.304	0	68.2	40.5	131	0.8794	1.06	30	
1,2,4-Trimethylbenzene	1.39	0.0261	1.304	0	106	50.6	137	1.400	1.05	30	
Hexachlorobutadiene	1.51	0.130	1.304	0	116	40.6	158	1.467	3.16	30	
Naphthalene	1.55	0.0391	1.304	0	119	52.3	124	1.239	22.6	30	
1,2,3-Trichlorobenzene	1.51	0.0261	1.304	0	116	54.4	124	1.425	5.66	30	
Surr: Dibromofluoromethane	1.51		1.629		92.4	56.5	129		0		
Surr: Toluene-d8	1.66		1.629		102	64.5	151		0		
Surr: 1-Bromo-4-fluorobenzene	1.66		1.629		102	63.1	141		0		



Work Order: 1705316
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID: 1706145-004BMSD	SampType: MSD	Units: mg/Kg-dry			Prep Date: 6/16/2017			RunNo: 36899			
Client ID: BATCH	Batch ID: 17405				Analysis Date: 6/17/2017			SeqNo: 708638			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

NOTES:

S - Outlying spike recoveries observed.

Work Order: 1705316
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID: LCS-17217	SampType: LCS	Units: mg/Kg			Prep Date: 5/31/2017			RunNo: 36521			
Client ID: LCSS	Batch ID: 17217	Analysis Date: 6/1/2017						SeqNo: 700569			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	2.07	0.0600	1.000	0	207	14.3	167				S
Chloromethane	1.29	0.0600	1.000	0	129	46	144				
Vinyl chloride	1.25	0.00200	1.000	0	125	44	142				
Bromomethane	1.10	0.0900	1.000	0	110	40.9	157				
Trichlorofluoromethane (CFC-11)	1.13	0.0500	1.000	0	113	36.9	156				
Chloroethane	1.18	0.0600	1.000	0	118	33.4	155				
1,1-Dichloroethene	1.13	0.0500	1.000	0	113	49.7	142				
Methylene chloride	1.15	0.0200	1.000	0	115	46.3	140				
trans-1,2-Dichloroethene	1.08	0.0200	1.000	0	108	68	130				
Methyl tert-butyl ether (MTBE)	1.04	0.0500	1.000	0	104	66.3	145				
1,1-Dichloroethane	1.04	0.0200	1.000	0	104	61.9	137				
2,2-Dichloropropane	1.14	0.0500	1.000	0	114	35.5	186				
cis-1,2-Dichloroethene	1.01	0.0200	1.000	0	101	71.3	135				
Chloroform	1.02	0.0200	1.000	0	102	69	145				
1,1,1-Trichloroethane (TCA)	1.04	0.0200	1.000	0	104	69	132				
1,1-Dichloropropene	1.02	0.0200	1.000	0	102	72.7	131				
Carbon tetrachloride	0.975	0.0200	1.000	0	97.5	63.4	137				
1,2-Dichloroethane (EDC)	0.977	0.0300	1.000	0	97.7	50.9	162				
Benzene	1.08	0.0200	1.000	0	108	64.3	133				
Trichloroethene (TCE)	0.997	0.0200	1.000	0	99.7	65.5	137				
1,2-Dichloropropane	1.00	0.0200	1.000	0	100	63.2	142				
Bromodichloromethane	0.969	0.0200	1.000	0	96.9	73.2	131				
Dibromomethane	0.975	0.0400	1.000	0	97.5	60.1	146				
cis-1,3-Dichloropropene	1.10	0.0200	1.000	0	110	59.1	143				
Toluene	1.17	0.0200	1.000	0	117	67.3	138				
trans-1,3-Dichloropropylene	1.09	0.0300	1.000	0	109	49.2	149				
1,1,2-Trichloroethane	0.945	0.0300	1.000	0	94.5	56.9	147				
1,3-Dichloropropane	0.948	0.0500	1.000	0	94.8	56.1	153				
Tetrachloroethene (PCE)	1.05	0.0200	1.000	0	105	52.7	150				
Dibromochloromethane	1.00	0.0300	1.000	0	100	70.6	144				
1,2-Dibromoethane (EDB)	0.955	0.00500	1.000	0	95.5	50.5	154				

Work Order: 1705316
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID: LCS-17217	SampType: LCS	Units: mg/Kg				Prep Date: 5/31/2017			RunNo: 36521		
Client ID: LCSS	Batch ID: 17217	Analysis Date: 6/1/2017						SeqNo: 700569			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorobenzene	1.02	0.0200	1.000	0	102	76.1	123				
1,1,1,2-Tetrachloroethane	1.01	0.0300	1.000	0	101	65.9	141				
Ethylbenzene	1.03	0.0300	1.000	0	103	74	129				
m,p-Xylene	2.12	0.0200	2.000	0	106	70	124				
o-Xylene	1.06	0.0200	1.000	0	106	68.1	139				
Styrene	1.02	0.0200	1.000	0	102	73.3	146				
Isopropylbenzene	1.02	0.0800	1.000	0	102	70	130				
Bromoform	0.890	0.0200	1.000	0	89.0	67	154				
1,1,2,2-Tetrachloroethane	0.911	0.0200	1.000	0	91.1	44.8	165				
n-Propylbenzene	0.994	0.0200	1.000	0	99.4	74.8	125				
Bromobenzene	1.01	0.0300	1.000	0	101	49.2	144				
1,3,5-Trimethylbenzene	0.993	0.0200	1.000	0	99.3	74.6	123				
2-Chlorotoluene	1.03	0.0200	1.000	0	103	76.7	129				
4-Chlorotoluene	1.01	0.0200	1.000	0	101	77.5	125				
tert-Butylbenzene	1.02	0.0200	1.000	0	102	66.2	130				
1,2,3-Trichloropropane	0.921	0.0200	1.000	0	92.1	67.9	136				
1,2,4-Trichlorobenzene	1.06	0.0500	1.000	0	106	62.6	143				
sec-Butylbenzene	1.04	0.0200	1.000	0	104	75.6	133				
4-Isopropyltoluene	1.05	0.0200	1.000	0	105	76.8	131				
1,3-Dichlorobenzene	1.07	0.0200	1.000	0	107	72.8	128				
1,4-Dichlorobenzene	1.05	0.0200	1.000	0	105	72.6	126				
n-Butylbenzene	1.03	0.0200	1.000	0	103	65.3	136				
1,2-Dichlorobenzene	1.03	0.0200	1.000	0	103	72.8	126				
1,2-Dibromo-3-chloropropane	0.876	0.500	1.000	0	87.6	40.2	155				
1,2,4-Trimethylbenzene	1.00	0.0200	1.000	0	100	77.5	129				
Hexachlorobutadiene	1.10	0.100	1.000	0	110	42	151				
Naphthalene	1.08	0.0300	1.000	0	108	58.4	160				
1,2,3-Trichlorobenzene	1.07	0.0200	1.000	0	107	54.8	143				
Surr: Dibromofluoromethane	1.23		1.250		98.5	56.5	129				
Surr: Toluene-d8	1.26		1.250		101	64.5	151				
Surr: 1-Bromo-4-fluorobenzene	1.32		1.250		105	63.1	141				

Work Order: 1705316
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID: LCS-17217		SampType: LCS			Units: mg/Kg		Prep Date: 5/31/2017			RunNo: 36521		
Client ID: LCSS		Batch ID: 17217			Analysis Date: 6/1/2017			SeqNo: 700569				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

NOTES:

S - Outlying spike recovery observed (high bias). Samples are non-detect for this analyte; no further action required.

Sample ID: MB-17217		SampType: MBLK			Units: mg/Kg		Prep Date: 5/31/2017			RunNo: 36521		
Client ID: MBLKS		Batch ID: 17217			Analysis Date: 6/1/2017			SeqNo: 700570				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Dichlorodifluoromethane (CFC-12)	ND	0.0600
Chloromethane	ND	0.0600
Vinyl chloride	ND	0.00200
Bromomethane	ND	0.0900
Trichlorofluoromethane (CFC-11)	ND	0.0500
Chloroethane	ND	0.0600
1,1-Dichloroethene	ND	0.0500
Methylene chloride	ND	0.0200
trans-1,2-Dichloroethene	ND	0.0200
Methyl tert-butyl ether (MTBE)	ND	0.0500
1,1-Dichloroethane	ND	0.0200
2,2-Dichloropropane	ND	0.0500
cis-1,2-Dichloroethene	ND	0.0200
Chloroform	ND	0.0200
1,1,1-Trichloroethane (TCA)	ND	0.0200
1,1-Dichloropropene	ND	0.0200
Carbon tetrachloride	ND	0.0200
1,2-Dichloroethane (EDC)	ND	0.0300
Benzene	ND	0.0200
Trichloroethene (TCE)	ND	0.0200
1,2-Dichloropropane	ND	0.0200
Bromodichloromethane	ND	0.0200
Dibromomethane	ND	0.0400
cis-1,3-Dichloropropene	ND	0.0200

Work Order: 1705316
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID: MB-17217	SampType: MBLK	Units: mg/Kg			Prep Date: 5/31/2017			RunNo: 36521			
Client ID: MBLKS	Batch ID: 17217	Analysis Date: 6/1/2017						SeqNo: 700570			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Toluene	ND	0.0200									
trans-1,3-Dichloropropylene	ND	0.0300									
1,1,2-Trichloroethane	ND	0.0300									
1,3-Dichloropropane	ND	0.0500									
Tetrachloroethene (PCE)	ND	0.0200									
Dibromochloromethane	ND	0.0300									
1,2-Dibromoethane (EDB)	ND	0.00500									
Chlorobenzene	ND	0.0200									
1,1,1,2-Tetrachloroethane	ND	0.0300									
Ethylbenzene	ND	0.0300									
m,p-Xylene	ND	0.0200									
o-Xylene	ND	0.0200									
Styrene	ND	0.0200									
Isopropylbenzene	ND	0.0800									
Bromoform	ND	0.0200									
1,1,2,2-Tetrachloroethane	ND	0.0200									
n-Propylbenzene	ND	0.0200									
Bromobenzene	ND	0.0300									
1,3,5-Trimethylbenzene	ND	0.0200									
2-Chlorotoluene	ND	0.0200									
4-Chlorotoluene	ND	0.0200									
tert-Butylbenzene	ND	0.0200									
1,2,3-Trichloropropane	ND	0.0200									
1,2,4-Trichlorobenzene	ND	0.0500									
sec-Butylbenzene	ND	0.0200									
4-Isopropyltoluene	ND	0.0200									
1,3-Dichlorobenzene	ND	0.0200									
1,4-Dichlorobenzene	ND	0.0200									
n-Butylbenzene	ND	0.0200									
1,2-Dichlorobenzene	ND	0.0200									
1,2-Dibromo-3-chloropropane	ND	0.500									

Work Order: 1705316
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID: MB-17217	SampType: MBLK	Units: mg/Kg				Prep Date: 5/31/2017			RunNo: 36521		
Client ID: MBLKS	Batch ID: 17217	Analysis Date: 6/1/2017							SeqNo: 700570		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trimethylbenzene	ND	0.0200									
Hexachlorobutadiene	ND	0.100									
Naphthalene	ND	0.0300									
1,2,3-Trichlorobenzene	ND	0.0200									
Surr: Dibromofluoromethane	1.20		1.250		95.7	56.5	129				
Surr: Toluene-d8	1.21		1.250		96.8	64.5	151				
Surr: 1-Bromo-4-fluorobenzene	1.17		1.250		93.7	63.1	141				

Sample ID: 1705293-001BDUP		SampType: DUP		Units: mg/Kg-dry		Prep Date: 5/31/2017			RunNo: 36521		
Client ID: BATCH		Batch ID: 17217					Analysis Date: 6/1/2017			SeqNo: 700558	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	ND	0.0681						0		30	
Chloromethane	ND	0.0681						0		30	
Vinyl chloride	ND	0.00227						0		30	
Bromomethane	ND	0.102						0		30	
Trichlorofluoromethane (CFC-11)	ND	0.0567						0		30	
Chloroethane	ND	0.0681						0		30	
1,1-Dichloroethene	ND	0.0567						0		30	
Methylene chloride	ND	0.0227						0		30	
trans-1,2-Dichloroethene	ND	0.0227						0		30	
Methyl tert-butyl ether (MTBE)	ND	0.0567						0		30	
1,1-Dichloroethane	ND	0.0227						0		30	
2,2-Dichloropropane	ND	0.0567						0		30	
cis-1,2-Dichloroethene	ND	0.0227						0		30	
Chloroform	ND	0.0227						0		30	
1,1,1-Trichloroethane (TCA)	ND	0.0227						0		30	
1,1-Dichloropropene	ND	0.0227						0		30	
Carbon tetrachloride	ND	0.0227						0		30	
1,2-Dichloroethane (EDC)	ND	0.0340						0		30	

Work Order: 1705316
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID: 1705293-001BDUP	SampType: DUP	Units: mg/Kg-dry			Prep Date: 5/31/2017			RunNo: 36521			
Client ID: BATCH	Batch ID: 17217	Analysis Date: 6/1/2017						SeqNo: 700558			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	ND	0.0227						0		30	
Trichloroethene (TCE)	ND	0.0227						0		30	
1,2-Dichloropropane	ND	0.0227						0		30	
Bromodichloromethane	ND	0.0227						0		30	
Dibromomethane	ND	0.0454						0		30	
cis-1,3-Dichloropropene	ND	0.0227						0		30	
Toluene	ND	0.0227						0		30	
trans-1,3-Dichloropropylene	ND	0.0340						0		30	
1,1,2-Trichloroethane	ND	0.0340						0		30	
1,3-Dichloropropane	ND	0.0567						0		30	
Tetrachloroethene (PCE)	ND	0.0227						0		30	
Dibromochloromethane	ND	0.0340						0		30	
1,2-Dibromoethane (EDB)	ND	0.00567						0		30	
Chlorobenzene	ND	0.0227						0		30	
1,1,1,2-Tetrachloroethane	ND	0.0340						0		30	
Ethylbenzene	ND	0.0340						0		30	
m,p-Xylene	ND	0.0227						0		30	
o-Xylene	ND	0.0227						0		30	
Styrene	ND	0.0227						0		30	
Isopropylbenzene	ND	0.0907						0		30	
Bromoform	ND	0.0227						0		30	
1,1,2,2-Tetrachloroethane	ND	0.0227						0		30	
n-Propylbenzene	ND	0.0227						0		30	
Bromobenzene	ND	0.0340						0		30	
1,3,5-Trimethylbenzene	ND	0.0227						0		30	
2-Chlorotoluene	ND	0.0227						0		30	
4-Chlorotoluene	ND	0.0227						0		30	
tert-Butylbenzene	ND	0.0227						0		30	
1,2,3-Trichloropropane	ND	0.0227						0		30	
1,2,4-Trichlorobenzene	ND	0.0567						0		30	
sec-Butylbenzene	ND	0.0227						0		30	

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CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID: 1705293-001BDUP		SampType: DUP		Units: mg/Kg-dry		Prep Date: 5/31/2017			RunNo: 36521		
Client ID: BATCH		Batch ID: 17217					Analysis Date: 6/1/2017			SeqNo: 700558	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4-Isopropyltoluene	ND	0.0227						0		30	
1,3-Dichlorobenzene	ND	0.0227						0		30	
1,4-Dichlorobenzene	ND	0.0227						0		30	
n-Butylbenzene	ND	0.0227						0		30	
1,2-Dichlorobenzene	ND	0.0227						0		30	
1,2-Dibromo-3-chloropropane	ND	0.567						0		30	
1,2,4-Trimethylbenzene	ND	0.0227						0		30	
Hexachlorobutadiene	ND	0.113						0		30	
Naphthalene	ND	0.0340						0		30	
1,2,3-Trichlorobenzene	ND	0.0227						0		30	
Surr: Dibromofluoromethane	1.31		1.418		92.6	56.5	129		0		
Surr: Toluene-d8	1.40		1.418		98.6	64.5	151		0		
Surr: 1-Bromo-4-fluorobenzene	1.30		1.418		92.0	63.1	141		0		

Sample ID: 1705293-004BDUP		SampType: DUP		Units: mg/Kg-dry		Prep Date: 5/31/2017			RunNo: 36521		
Client ID: BATCH		Batch ID: 17217					Analysis Date: 6/1/2017			SeqNo: 700560	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	ND	0.0719						0		30	
Chloromethane	ND	0.0719						0		30	
Vinyl chloride	ND	0.00240						0		30	
Bromomethane	ND	0.108						0		30	
Trichlorofluoromethane (CFC-11)	ND	0.0599						0		30	
Chloroethane	ND	0.0719						0		30	
1,1-Dichloroethene	ND	0.0599						0		30	
Methylene chloride	ND	0.0240						0		30	
trans-1,2-Dichloroethene	ND	0.0240						0		30	
Methyl tert-butyl ether (MTBE)	ND	0.0599						0		30	
1,1-Dichloroethane	ND	0.0240						0		30	
2,2-Dichloropropane	ND	0.0599						0		30	

Work Order: 1705316
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID: 1705293-004BDUP	SampType: DUP	Units: mg/Kg-dry			Prep Date: 5/31/2017			RunNo: 36521			
Client ID: BATCH	Batch ID: 17217	Analysis Date: 6/1/2017						SeqNo: 700560			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
cis-1,2-Dichloroethene	ND	0.0240						0		30	
Chloroform	ND	0.0240						0		30	
1,1,1-Trichloroethane (TCA)	ND	0.0240						0		30	
1,1-Dichloropropene	ND	0.0240						0		30	
Carbon tetrachloride	ND	0.0240						0		30	
1,2-Dichloroethane (EDC)	ND	0.0359						0		30	
Benzene	ND	0.0240						0		30	
Trichloroethene (TCE)	ND	0.0240						0		30	
1,2-Dichloropropane	ND	0.0240						0		30	
Bromodichloromethane	ND	0.0240						0		30	
Dibromomethane	ND	0.0479						0		30	
cis-1,3-Dichloropropene	ND	0.0240						0		30	
Toluene	ND	0.0240						0		30	
trans-1,3-Dichloropropylene	ND	0.0359						0		30	
1,1,2-Trichloroethane	ND	0.0359						0		30	
1,3-Dichloropropane	ND	0.0599						0		30	
Tetrachloroethene (PCE)	ND	0.0240						0		30	
Dibromochloromethane	ND	0.0359						0		30	
1,2-Dibromoethane (EDB)	ND	0.00599						0		30	
Chlorobenzene	ND	0.0240						0		30	
1,1,1,2-Tetrachloroethane	ND	0.0359						0		30	
Ethylbenzene	ND	0.0359						0		30	
m,p-Xylene	0.0294	0.0240						0.03320	12.3	30	
o-Xylene	ND	0.0240						0		30	
Styrene	ND	0.0240						0		30	
Isopropylbenzene	ND	0.0958						0		30	
Bromoform	ND	0.0240						0		30	
1,1,2,2-Tetrachloroethane	ND	0.0240						0		30	
n-Propylbenzene	ND	0.0240						0		30	
Bromobenzene	ND	0.0359						0		30	
1,3,5-Trimethylbenzene	ND	0.0240						0		30	

Work Order: 1705316
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID: 1705293-004BDUP		SampType: DUP		Units: mg/Kg-dry		Prep Date: 5/31/2017			RunNo: 36521		
Client ID: BATCH		Batch ID: 17217					Analysis Date: 6/1/2017			SeqNo: 700560	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
2-Chlorotoluene	ND	0.0240						0		30	
4-Chlorotoluene	ND	0.0240						0		30	
tert-Butylbenzene	ND	0.0240						0		30	
1,2,3-Trichloropropane	ND	0.0240						0		30	
1,2,4-Trichlorobenzene	ND	0.0599						0		30	
sec-Butylbenzene	ND	0.0240						0		30	
4-Isopropyltoluene	0.0292	0.0240						0.02711	7.60	30	
1,3-Dichlorobenzene	ND	0.0240						0		30	
1,4-Dichlorobenzene	ND	0.0240						0		30	
n-Butylbenzene	ND	0.0240						0		30	
1,2-Dichlorobenzene	ND	0.0240						0		30	
1,2-Dibromo-3-chloropropane	ND	0.599						0		30	
1,2,4-Trimethylbenzene	ND	0.0240						0		30	
Hexachlorobutadiene	ND	0.120						0		30	
Naphthalene	ND	0.0359						0		30	
1,2,3-Trichlorobenzene	ND	0.0240						0		30	
Surr: Dibromofluoromethane	1.34		1.498		89.2	56.5	129		0		
Surr: Toluene-d8	1.46		1.498		97.6	64.5	151		0		
Surr: 1-Bromo-4-fluorobenzene	1.40		1.498		93.6	63.1	141		0		

Sample ID: 1705307-004BMS		SampType: MS		Units: mg/Kg-dry		Prep Date: 5/31/2017		RunNo: 36521			
Client ID: BATCH		Batch ID: 17217				Analysis Date: 6/1/2017		SeqNo: 700566			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	2.47	0.0791	1.318	0	188	43.5	121				S
Chloromethane	2.15	0.0791	1.318	0	163	45	130				S
Vinyl chloride	2.01	0.00264	1.318	0	152	51.2	146				S
Bromomethane	1.32	0.119	1.318	0	100	21.3	120				
Trichlorofluoromethane (CFC-11)	1.62	0.0659	1.318	0	123	35	131				
Chloroethane	1.62	0.0791	1.318	0	123	31.9	123				

Work Order: 1705316
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID: 1705307-004BMS		SampType: MS		Units: mg/Kg-dry		Prep Date: 5/31/2017		RunNo: 36521			
Client ID: BATCH		Batch ID: 17217		Analysis Date: 6/1/2017				SeqNo: 700566			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	1.67	0.0659	1.318	0	127	61.9	141				
Methylene chloride	1.82	0.0264	1.318	0	138	54.7	142				
trans-1,2-Dichloroethene	1.77	0.0264	1.318	0	135	52	136				
Methyl tert-butyl ether (MTBE)	1.72	0.0659	1.318	0	130	54.4	132				
1,1-Dichloroethane	1.86	0.0264	1.318	0	141	51.8	141				
2,2-Dichloropropane	1.67	0.0659	1.318	0	127	36	123				S
cis-1,2-Dichloroethene	1.74	0.0264	1.318	0	132	58.6	136				
Chloroform	1.79	0.0264	1.318	0	136	53.2	129				S
1,1,1-Trichloroethane (TCA)	1.54	0.0264	1.318	0	117	58.3	145				
1,1-Dichloropropene	1.56	0.0264	1.318	0	119	55.1	138				
Carbon tetrachloride	1.34	0.0264	1.318	0	102	53.3	144				
1,2-Dichloroethane (EDC)	1.55	0.0395	1.318	0	118	51.3	139				
Benzene	1.62	0.0264	1.318	0	123	63.5	133				
Trichloroethene (TCE)	1.61	0.0264	1.318	0	122	68.6	132				
1,2-Dichloropropane	1.58	0.0264	1.318	0	120	59	136				
Bromodichloromethane	1.37	0.0264	1.318	0	104	50.7	141				
Dibromomethane	1.45	0.0527	1.318	0	110	50.6	137				
cis-1,3-Dichloropropene	1.54	0.0264	1.318	0	117	50.4	138				
Toluene	1.69	0.0264	1.318	0	128	63.4	132				
trans-1,3-Dichloropropylene	1.54	0.0395	1.318	0	117	44.1	147				
1,1,2-Trichloroethane	1.48	0.0395	1.318	0	112	51.6	137				
1,3-Dichloropropane	1.53	0.0659	1.318	0	116	53.1	134				
Tetrachloroethene (PCE)	1.63	0.0264	1.318	0	124	35.6	158				
Dibromochloromethane	1.39	0.0395	1.318	0	105	55.3	140				
1,2-Dibromoethane (EDB)	1.51	0.00659	1.318	0	114	50.4	136				
Chlorobenzene	1.62	0.0264	1.318	0	123	60	133				
1,1,1,2-Tetrachloroethane	1.47	0.0395	1.318	0	112	53.1	142				
Ethylbenzene	1.63	0.0395	1.318	0	123	54.5	134				
m,p-Xylene	3.31	0.0264	2.635	0	126	53.1	132				
o-Xylene	1.66	0.0264	1.318	0	126	53.3	139				
Styrene	1.61	0.0264	1.318	0	123	51.1	132				

Work Order: 1705316
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID: 1705307-004BMS		SampType: MS		Units: mg/Kg-dry		Prep Date: 5/31/2017			RunNo: 36521		
Client ID: BATCH		Batch ID: 17217		Analysis Date: 6/1/2017						SeqNo: 700566	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Isopropylbenzene	1.64	0.105	1.318	0	125	58.9	138				
Bromoform	1.14	0.0264	1.318	0	86.7	57.9	130				
1,1,2,2-Tetrachloroethane	1.35	0.0264	1.318	0	103	51.9	131				
n-Propylbenzene	1.61	0.0264	1.318	0	123	53.6	140				
Bromobenzene	1.58	0.0395	1.318	0	120	54.2	140				
1,3,5-Trimethylbenzene	1.61	0.0264	1.318	0	122	51.8	136				
2-Chlorotoluene	1.66	0.0264	1.318	0	126	51.6	136				
4-Chlorotoluene	1.64	0.0264	1.318	0	124	50.1	139				
tert-Butylbenzene	1.65	0.0264	1.318	0	125	50.5	135				
1,2,3-Trichloropropane	1.37	0.0264	1.318	0	104	50.5	131				
1,2,4-Trichlorobenzene	1.67	0.0659	1.318	0	127	50.8	130				
sec-Butylbenzene	1.64	0.0264	1.318	0	125	52.6	141				
4-Isopropyltoluene	1.64	0.0264	1.318	0	125	52.9	134				
1,3-Dichlorobenzene	1.65	0.0264	1.318	0	126	52.6	131				
1,4-Dichlorobenzene	1.63	0.0264	1.318	0	123	52.9	129				
n-Butylbenzene	1.68	0.0264	1.318	0	127	52.6	130				
1,2-Dichlorobenzene	1.57	0.0264	1.318	0	120	55.8	129				
1,2-Dibromo-3-chloropropane	1.09	0.659	1.318	0	82.5	40.5	131				
1,2,4-Trimethylbenzene	1.60	0.0264	1.318	0	122	50.6	137				
Hexachlorobutadiene	1.80	0.132	1.318	0	136	40.6	158				
Naphthalene	1.56	0.0395	1.318	0	118	52.3	124				
1,2,3-Trichlorobenzene	1.65	0.0264	1.318	0	125	54.4	124				S
Surr: Dibromofluoromethane	1.60		1.647		97.4	56.5	129				
Surr: Toluene-d8	1.70		1.647		103	64.5	151				
Surr: 1-Bromo-4-fluorobenzene	1.76		1.647		107	63.1	141				

NOTES:

S - Outlying spike recovery(ies) observed.

Work Order: 1705316
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID: 1705307-004BMSD	SampType: MSD	Units: mg/Kg-dry				Prep Date: 5/31/2017			RunNo: 36521		
Client ID: BATCH	Batch ID: 17217	Analysis Date: 6/1/2017							SeqNo: 700567		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	1.93	0.0791	1.318	0	146	43.5	121	2.472	24.7	30	S
Chloromethane	1.66	0.0791	1.318	0	126	45	130	2.152	25.8	30	
Vinyl chloride	1.65	0.00264	1.318	0	125	51.2	146	2.007	19.8	30	
Bromomethane	1.08	0.119	1.318	0	81.7	21.3	120	1.324	20.6	30	
Trichlorofluoromethane (CFC-11)	1.35	0.0659	1.318	0	103	35	131	1.617	17.7	30	
Chloroethane	1.32	0.0791	1.318	0	100	31.9	123	1.617	20.1	30	
1,1-Dichloroethene	1.42	0.0659	1.318	0	108	61.9	141	1.672	16.1	30	
Methylene chloride	1.42	0.0264	1.318	0	108	54.7	142	1.819	24.7	30	
trans-1,2-Dichloroethene	1.40	0.0264	1.318	0	106	52	136	1.775	23.9	30	
Methyl tert-butyl ether (MTBE)	1.39	0.0659	1.318	0	106	54.4	132	1.717	20.9	30	
1,1-Dichloroethane	1.37	0.0264	1.318	0	104	51.8	141	1.857	29.9	30	
2,2-Dichloropropane	1.32	0.0659	1.318	0	99.9	36	123	1.674	23.9	30	
cis-1,2-Dichloroethene	1.34	0.0264	1.318	0	102	58.6	136	1.739	25.9	30	
Chloroform	1.33	0.0264	1.318	0	101	53.2	129	1.790	29.5	30	
1,1,1-Trichloroethane (TCA)	1.42	0.0264	1.318	0	108	58.3	145	1.538	7.90	30	
1,1-Dichloropropene	1.46	0.0264	1.318	0	111	55.1	138	1.563	6.64	30	
Carbon tetrachloride	1.34	0.0264	1.318	0	102	53.3	144	1.339	0.139	30	
1,2-Dichloroethane (EDC)	1.43	0.0395	1.318	0	108	51.3	139	1.549	8.34	30	
Benzene	1.46	0.0264	1.318	0	111	63.5	133	1.621	10.3	30	
Trichloroethene (TCE)	1.73	0.0264	1.318	0	131	68.6	132	1.607	7.37	30	
1,2-Dichloropropane	1.47	0.0264	1.318	0	112	59	136	1.584	7.22	30	
Bromodichloromethane	1.29	0.0264	1.318	0	97.8	50.7	141	1.374	6.38	30	
Dibromomethane	1.33	0.0527	1.318	0	101	50.6	137	1.453	8.74	30	
cis-1,3-Dichloropropene	1.62	0.0264	1.318	0	123	50.4	138	1.545	4.87	30	
Toluene	1.68	0.0264	1.318	0	127	63.4	132	1.686	0.438	30	
trans-1,3-Dichloropropylene	1.56	0.0395	1.318	0	118	44.1	147	1.537	1.25	30	
1,1,2-Trichloroethane	1.27	0.0395	1.318	0	96.5	51.6	137	1.480	15.1	30	
1,3-Dichloropropane	1.31	0.0659	1.318	0	99.5	53.1	134	1.529	15.4	30	
Tetrachloroethene (PCE)	1.38	0.0264	1.318	0	105	35.6	158	1.634	16.9	30	
Dibromochloromethane	1.21	0.0395	1.318	0	92.2	55.3	140	1.385	13.1	30	
1,2-Dibromoethane (EDB)	1.29	0.00659	1.318	0	97.5	50.4	136	1.505	15.8	30	

Work Order: 1705316
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID: 1705307-004BMSD		SampType: MSD		Units: mg/Kg-dry		Prep Date: 5/31/2017			RunNo: 36521		
Client ID: BATCH		Batch ID: 17217		Analysis Date: 6/1/2017					SeqNo: 700567		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorobenzene	1.49	0.0264	1.318	0	113	60	133	1.621	8.35	30	
1,1,1,2-Tetrachloroethane	1.39	0.0395	1.318	0	105	53.1	142	1.472	5.99	30	
Ethylbenzene	1.50	0.0395	1.318	0	114	54.5	134	1.627	8.01	30	
m,p-Xylene	3.05	0.0264	2.635	0	116	53.1	132	3.313	8.25	30	
o-Xylene	1.52	0.0264	1.318	0	115	53.3	139	1.658	8.77	30	
Styrene	1.49	0.0264	1.318	0	113	51.1	132	1.614	8.05	30	
Isopropylbenzene	1.51	0.105	1.318	0	115	58.9	138	1.643	8.24	30	
Bromoform	1.10	0.0264	1.318	0	83.3	57.9	130	1.143	4.11	30	
1,1,2,2-Tetrachloroethane	1.23	0.0264	1.318	0	93.0	51.9	131	1.354	9.92	30	
n-Propylbenzene	1.48	0.0264	1.318	0	112	53.6	140	1.614	8.69	30	
Bromobenzene	1.48	0.0395	1.318	0	112	54.2	140	1.583	6.90	30	
1,3,5-Trimethylbenzene	1.47	0.0264	1.318	0	112	51.8	136	1.605	8.66	30	
2-Chlorotoluene	1.53	0.0264	1.318	0	116	51.6	136	1.662	8.51	30	
4-Chlorotoluene	1.51	0.0264	1.318	0	115	50.1	139	1.640	8.03	30	
tert-Butylbenzene	1.51	0.0264	1.318	0	115	50.5	135	1.649	8.63	30	
1,2,3-Trichloropropane	1.33	0.0264	1.318	0	101	50.5	131	1.368	2.80	30	
1,2,4-Trichlorobenzene	1.60	0.0659	1.318	0	121	50.8	130	1.672	4.53	30	
sec-Butylbenzene	1.53	0.0264	1.318	0	116	52.6	141	1.643	6.81	30	
4-Isopropyltoluene	1.54	0.0264	1.318	0	117	52.9	134	1.643	6.58	30	
1,3-Dichlorobenzene	1.56	0.0264	1.318	0	118	52.6	131	1.654	6.10	30	
1,4-Dichlorobenzene	1.54	0.0264	1.318	0	117	52.9	129	1.627	5.58	30	
n-Butylbenzene	1.61	0.0264	1.318	0	122	52.6	130	1.680	4.41	30	
1,2-Dichlorobenzene	1.51	0.0264	1.318	0	115	55.8	129	1.575	4.13	30	
1,2-Dibromo-3-chloropropane	1.11	0.659	1.318	0	84.0	40.5	131	1.087	1.77	30	
1,2,4-Trimethylbenzene	1.47	0.0264	1.318	0	111	50.6	137	1.602	8.74	30	
Hexachlorobutadiene	1.73	0.132	1.318	0	131	40.6	158	1.795	3.97	30	
Naphthalene	1.57	0.0395	1.318	0	119	52.3	124	1.559	0.476	30	
1,2,3-Trichlorobenzene	1.61	0.0264	1.318	0	122	54.4	124	1.653	2.60	30	
Surr: Dibromofluoromethane	1.58		1.647		95.8	56.5	129		0		
Surr: Toluene-d8	1.85		1.647		112	64.5	151		0		
Surr: 1-Bromo-4-fluorobenzene	1.75		1.647		106	63.1	141		0		

Work Order: 1705316
CLIENT: GeoEngineers
Project: Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID: 1705307-004BMSD		SampType: MSD		Units: mg/Kg-dry		Prep Date: 5/31/2017			RunNo: 36521		
Client ID: BATCH		Batch ID: 17217					Analysis Date: 6/1/2017			SeqNo: 700567	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

NOTES:

S - Outlying spike recovery(ies) observed.

Client Name: **GEI**
 Logged by: **Clare Griggs**

Work Order Number: **1705316**
 Date Received: **5/10/2017 4:10:00 PM**

Chain of Custody

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

Log In

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

Samples received at appropriate temperature

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

Special Handling (if applicable)

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

Person Notified: Date:
 By Whom: Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person
 Regarding:
 Client Instructions:

19. Additional remarks:

Samples taken off hold May 26.

Item Information

Item #	Temp °C
Cooler	15.9
Sample	9.9
Temp Blank	9.4

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C



3600 Fremont Ave. N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: 5/10 Page: of

Project Name: Block 19

Project No: 20434-001-31

Collected by: CK

Location:

Report To (PM): Chris Brown

PM Email:

cbrown@geoengineers.com

Sample Disposal: ☐ Return to client ☒ Disposal by lab (after 30 days)

Laboratory Project No (Internal): 1705316

Special Remarks:

Client: GEODENGINEERS

Address: 600 Stewart St Suite 1700

City, State, Zip: Seattle, WA

Telephone:

Fax:

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	VOCs (EPA 8260 / 624)	GY/BTEX	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T) Dissolved (D)	Anions (IC)***	EDB (8011)	Comments
1 B15-1-2.5	5/9/17	0810	5011	X		X	X	X	X	X	X	X	X				hold
2 B15-1-5.0		0815															
3 B18-1-7.5		0820		X		X	X	X	X	X	X	X	X				
4 B18-1-10.0		0825															
5 B15-1-15.0		0830															
6 B15-2-2.5		1230		X		X	X	X	X	X	X	X	X				
7 B18-2-5.0		1235															
8 B18-2-7.5		1240															
9 B18-2-10.0		1245		X		X	X	X	X	X	X	X	X				
10 B18-2-15.0		1250															

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

**Metals (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL Individual: Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti Tl U V Zn

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate-Nitrite

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above and that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Retinquished

Date/Time: 5/10 4:10

Received

Date/Time

5/10/2017 16:10

Date/Time

Turn-around Time: ☒ Standard ☐ 3 Day ☐ 2 Day ☐ Next Day ☐ Same Day (specify)



3600 Fremont Ave. N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: 5/10 Page: of:

Laboratory Project No (internal):

Project Name: Blade 18

Special Remarks:

Project No: 20434-001-31

Collected by: CK

Location: Blade 18

Report To (PM): Chris Brown

Sample Disposal: ☐ Return to client ☒ Disposal by lab (after 30 days)

Client: Green Engineers
Address: 600 Stewart St Suite 1700
City, State, Zip: Seattle, WA
Telephone:
Fax:

PM Email: cbrown@greenengineers.com

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	VOCs (EPA 8260 / 624)	GY/BTEX	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DH)	SVOGs (EPA 8270 / 625)	PAHs (EPA 8270 / 625)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T) Dissolved (D)	Anions (IC)***	EDB (8011)	Comments
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1	MW18-1-2.5	5/10	1200	Soil	X	X	X	X	X	X	X	X	X	X	X	X	hold
2	MW18-1-5.0		1205			X											
3	MW18-1-7.5		1210		X		X										
4	MW18-1-10.0		1215				X										
5	MW18-1-15.0		1220														
6																	
7																	
8																	
9																	
10																	

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

**Metals (Circle): MTCA-5 PCBs-8 Priority Pollutants TAL Individual: Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti U V Zn

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate+Nitrite

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above and that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Relinquished	Date/Time	Received	Date/Time	Turn-around Time:
x	5/10	x	5/10/17 1400	☒ Standard
Relinquished	Date/Time	Received	Date/Time	☐ 3 Day
x		x		☐ 2 Day
				☐ Next Day
				Same Day (Specify)

Client: **GEOTECHNICALS**

Address: **600 Stewart St Suite 1700**

City, State, Zip: **Seattle, WA**

Telephone: **620-444-1000**

Fax: **620-444-1000**

Chain of Custody Record & Laboratory Services Agreement

Date: **5/10** Page: **1** of: **1**

Project Name: **Block 1B**

Project No: **20434-001-31**

Collected by: **CK**

Location: **Chris Brown**

Report To (PM): **Chris Brown**

PM Email: **cbrown@geotech.com**

Laboratory Project No (Internal): **1705316**

Special Remarks:

Sample Disposal: ☐ Return to client ☒ Disposal by lab (after 30 days)

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)	VOG (EPA 8260 / 824)	GX/BTEX	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCD)	SVOC (EPA 8270 / 825)	PAHs (EPA 8270 - SIM)	PCBs (EPA 806 / 608)	Metals** (EPA 8000 / 200.5)	Total (T) Dissolved (D)	Anions (IC)***	EDB (801.1)	Comments
1 B15-1-2.5	5/9/17	0810	SO11	X	X	X	X	X	X	X	X	X	X	X	X	hold
2 B18-1-5.0		0815														
3 B18-1-7.5		0820		X	X	X	X	X	X	X	X	X	X	X	X	
4 B18-1-10.0		0825														
5 B18-1-15.0		0830														
6 B18-2-2.5		1230		X	X	X	X	X	X	X	X	X	X	X	X	
7 B18-2-5.0		1235		X	X	X	X	X	X	X	X	X	X	X	X	
8 B18-2-7.5		1240														
9 B18-2-10.0		1245		X	X	X	X	X	X	X	X	X	X	X	X	
10 B18-2-15.0		1250														

Run per C.B. 6/14/17 5th day

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above and that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Received: **5/10 4:10** Date/Time: **5/10/2017 1610**

Retinued: **5/10 4:10** Date/Time: **5/10/2017 1610**

Turn-around Time:

☒ Standard

☐ 3 Day

☐ 2 Day

☐ Next Day

Same Day ☐ (specify)



Fremont
Analytical

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info@fremontanalytical.com

GeoEngineers

Chris Brown
600 Stewart Street, Suite 1700
Seattle, WA 98101

RE: Rufus 2.0 - Block 18
Work Order Number: 1705317

June 05, 2017

Attention Chris Brown:

Fremont Analytical, Inc. received 5 sample(s) on 5/9/2017 for the analyses presented in the following report.

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.
Gasoline by NWTPH-Gx
Mercury by EPA Method 7471
Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)
Sample Moisture (Percent Moisture)
Total Metals by EPA Method 6020
Volatile Organic Compounds by EPA Method 8260C

This report consists of the following:

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

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

Thank you for using Fremont Analytical.

Sincerely,

Mike Ridgeway
Laboratory Director

DoD/ELAP Certification #L2371, ISO/IEC 17025:2005
ORELAP Certification: WA 100009-007 (NELAP Recognized)

CLIENT: GeoEngineers
Project: Rufus 2.0 - Block 18
Work Order: 1705317

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
1705317-001	B18-3-2.5	05/08/2017 8:25 AM	05/09/2017 1:40 PM
1705317-002	B18-3-5.0	05/08/2017 8:30 AM	05/09/2017 1:40 PM
1705317-003	B18-3-7.5	05/08/2017 8:35 AM	05/09/2017 1:40 PM
1705317-004	B18-3-10.0	05/08/2017 8:40 AM	05/09/2017 1:40 PM
1705317-005	B18-3-15.0	05/08/2017 8:45 AM	05/09/2017 1:40 PM

CLIENT: GeoEngineers
Project: Rufus 2.0 - Block 18

I. SAMPLE RECEIPT:

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

II. GENERAL REPORTING COMMENTS:

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

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

III. ANALYSES AND EXCEPTIONS:

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

Qualifiers:

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

Acronyms:

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



Analytical Report

Work Order: 1705317
Date Reported: 6/5/2017

Client: GeoEngineers

Collection Date: 5/8/2017 8:30:00 AM

Project: Rufus 2.0 - Block 18

Lab ID: 1705317-002

Matrix: Soil

Client Sample ID: B18-3-5.0

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

Batch ID: 17188

Analyst: SB

Diesel (Fuel Oil)	ND	22.9	H	mg/Kg-dry	1	5/27/2017 9:32:54 AM
Heavy Oil	104	57.4	H	mg/Kg-dry	1	5/27/2017 9:32:54 AM
Surr: 2-Fluorobiphenyl	82.9	50-150	H	%Rec	1	5/27/2017 9:32:54 AM
Surr: o-Terphenyl	83.3	50-150	H	%Rec	1	5/27/2017 9:32:54 AM

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Batch ID: 17196

Analyst: BT

Naphthalene	ND	43.9	H	µg/Kg-dry	1	5/31/2017 1:32:33 AM
2-Methylnaphthalene	ND	43.9	H	µg/Kg-dry	1	5/31/2017 1:32:33 AM
1-Methylnaphthalene	ND	43.9	H	µg/Kg-dry	1	5/31/2017 1:32:33 AM
Acenaphthylene	ND	43.9	H	µg/Kg-dry	1	5/31/2017 1:32:33 AM
Acenaphthene	ND	43.9	H	µg/Kg-dry	1	5/31/2017 1:32:33 AM
Fluorene	ND	43.9	H	µg/Kg-dry	1	5/31/2017 1:32:33 AM
Phenanthrene	ND	43.9	H	µg/Kg-dry	1	5/31/2017 1:32:33 AM
Anthracene	ND	43.9	H	µg/Kg-dry	1	5/31/2017 1:32:33 AM
Fluoranthene	ND	43.9	H	µg/Kg-dry	1	5/31/2017 1:32:33 AM
Pyrene	ND	43.9	H	µg/Kg-dry	1	5/31/2017 1:32:33 AM
Benz(a)anthracene	ND	43.9	H	µg/Kg-dry	1	5/31/2017 1:32:33 AM
Chrysene	ND	43.9	H	µg/Kg-dry	1	5/31/2017 1:32:33 AM
Benzo(b)fluoranthene	ND	43.9	H	µg/Kg-dry	1	5/31/2017 1:32:33 AM
Benzo(k)fluoranthene	ND	43.9	H	µg/Kg-dry	1	5/31/2017 1:32:33 AM
Benzo(a)pyrene	ND	43.9	H	µg/Kg-dry	1	5/31/2017 1:32:33 AM
Indeno(1,2,3-cd)pyrene	ND	43.9	H	µg/Kg-dry	1	5/31/2017 1:32:33 AM
Dibenz(a,h)anthracene	ND	43.9	H	µg/Kg-dry	1	5/31/2017 1:32:33 AM
Benzo(g,h,i)perylene	ND	43.9	H	µg/Kg-dry	1	5/31/2017 1:32:33 AM
Surr: 2-Fluorobiphenyl	78.9	24.5-139	H	%Rec	1	5/31/2017 1:32:33 AM
Surr: Terphenyl-d14 (surr)	96.9	44.3-176	H	%Rec	1	5/31/2017 1:32:33 AM

Gasoline by NWTPH-Gx

Batch ID: 17238

Analyst: EM

Gasoline	ND	5.00	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
Surr: Toluene-d8	101	65-135	H	%Rec	1	6/2/2017 1:01:50 AM
Surr: 4-Bromofluorobenzene	97.4	65-135	H	%Rec	1	6/2/2017 1:01:50 AM

Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17238

Analyst: EM

Dichlorodifluoromethane (CFC-12)	ND	0.0600	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
Chloromethane	ND	0.0600	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
Vinyl chloride	ND	0.00200	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM

Original



Analytical Report

Work Order: 1705317
Date Reported: 6/5/2017

Client: GeoEngineers
Project: Rufus 2.0 - Block 18
Lab ID: 1705317-002
Client Sample ID: B18-3-5.0

Collection Date: 5/8/2017 8:30:00 AM

Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17238

Analyst: EM

Bromomethane	ND	0.0899	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
Trichlorofluoromethane (CFC-11)	ND	0.0500	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
Chloroethane	ND	0.0600	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
1,1-Dichloroethene	ND	0.0500	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
Methylene chloride	ND	0.0200	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
trans-1,2-Dichloroethene	ND	0.0200	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
Methyl tert-butyl ether (MTBE)	ND	0.0500	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
1,1-Dichloroethane	ND	0.0200	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
2,2-Dichloropropane	ND	0.0500	QH	mg/Kg-dry	1	6/2/2017 1:01:50 AM
cis-1,2-Dichloroethene	ND	0.0200	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
Chloroform	ND	0.0200	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
1,1,1-Trichloroethane (TCA)	ND	0.0200	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
1,1-Dichloropropene	ND	0.0200	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
Carbon tetrachloride	ND	0.0200	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
1,2-Dichloroethane (EDC)	ND	0.0300	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
Benzene	ND	0.0200	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
Trichloroethene (TCE)	ND	0.0200	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
1,2-Dichloropropane	ND	0.0200	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
Bromodichloromethane	ND	0.0200	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
Dibromomethane	ND	0.0400	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
cis-1,3-Dichloropropene	ND	0.0200	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
Toluene	ND	0.0200	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
trans-1,3-Dichloropropylene	ND	0.0300	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
1,1,2-Trichloroethane	ND	0.0300	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
1,3-Dichloropropane	ND	0.0500	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
Tetrachloroethene (PCE)	ND	0.0200	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
Dibromochloromethane	ND	0.0300	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
1,2-Dibromoethane (EDB)	ND	0.00500	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
Chlorobenzene	ND	0.0200	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
1,1,1,2-Tetrachloroethane	ND	0.0300	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
Ethylbenzene	ND	0.0300	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
m,p-Xylene	ND	0.0200	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
o-Xylene	ND	0.0200	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
Styrene	ND	0.0200	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
Isopropylbenzene	ND	0.0800	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
Bromoform	ND	0.0200	QH	mg/Kg-dry	1	6/2/2017 1:01:50 AM
1,1,2,2-Tetrachloroethane	ND	0.0200	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
n-Propylbenzene	ND	0.0200	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
Bromobenzene	ND	0.0300	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM

Original



Analytical Report

Work Order: 1705317
Date Reported: 6/5/2017

Client: GeoEngineers

Collection Date: 5/8/2017 8:30:00 AM

Project: Rufus 2.0 - Block 18

Lab ID: 1705317-002

Matrix: Soil

Client Sample ID: B18-3-5.0

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17238

Analyst: EM

1,3,5-Trimethylbenzene	ND	0.0200	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
2-Chlorotoluene	ND	0.0200	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
4-Chlorotoluene	ND	0.0200	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
tert-Butylbenzene	ND	0.0200	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
1,2,3-Trichloropropane	ND	0.0200	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
1,2,4-Trichlorobenzene	ND	0.0500	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
sec-Butylbenzene	ND	0.0200	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
4-Isopropyltoluene	ND	0.0200	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
1,3-Dichlorobenzene	ND	0.0200	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
1,4-Dichlorobenzene	ND	0.0200	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
n-Butylbenzene	ND	0.0200	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
1,2-Dichlorobenzene	ND	0.0200	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
1,2-Dibromo-3-chloropropane	ND	0.500	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
1,2,4-Trimethylbenzene	ND	0.0200	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
Hexachlorobutadiene	ND	0.0999	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
Naphthalene	ND	0.0300	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
1,2,3-Trichlorobenzene	ND	0.0200	H	mg/Kg-dry	1	6/2/2017 1:01:50 AM
Surr: Dibromofluoromethane	89.3	56.5-129	H	%Rec	1	6/2/2017 1:01:50 AM
Surr: Toluene-d8	99.8	64.5-151	H	%Rec	1	6/2/2017 1:01:50 AM
Surr: 1-Bromo-4-fluorobenzene	92.8	63.1-141	H	%Rec	1	6/2/2017 1:01:50 AM

NOTES:

Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Mercury by EPA Method 7471

Batch ID: 17208

Analyst: WF

Mercury	ND	0.278	mg/Kg-dry	1	5/31/2017 12:37:17 PM
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Total Metals by EPA Method 6020

Batch ID: 17190

Analyst: TN

Arsenic	4.57	0.0921	mg/Kg-dry	1	5/30/2017 5:02:27 PM
Barium	103	0.461	mg/Kg-dry	1	5/30/2017 5:02:27 PM
Cadmium	ND	0.184	mg/Kg-dry	1	5/30/2017 5:02:27 PM
Chromium	55.2	0.0921	mg/Kg-dry	1	5/30/2017 5:02:27 PM
Lead	5.03	0.184	mg/Kg-dry	1	5/30/2017 5:02:27 PM
Selenium	1.77	0.461	mg/Kg-dry	1	5/30/2017 5:02:27 PM
Silver	ND	0.0921	mg/Kg-dry	1	5/30/2017 5:02:27 PM



Analytical Report

Work Order: 1705317
Date Reported: 6/5/2017

Client: GeoEngineers

Collection Date: 5/8/2017 8:30:00 AM

Project: Rufus 2.0 - Block 18

Lab ID: 1705317-002

Matrix: Soil

Client Sample ID: B18-3-5.0

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Sample Moisture (Percent Moisture)

Batch ID: R36474 Analyst: BB

Percent Moisture	15.2			wt%	1	5/31/2017 8:39:07 AM
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Analytical Report

Work Order: 1705317
Date Reported: 6/5/2017

Client: GeoEngineers

Collection Date: 5/8/2017 8:45:00 AM

Project: Rufus 2.0 - Block 18

Lab ID: 1705317-005

Matrix: Soil

Client Sample ID: B18-3-15.0

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<u>Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.</u>				Batch ID: 17188		Analyst: SB
Diesel (Fuel Oil)	ND	20.5	H	mg/Kg-dry	1	5/27/2017 10:36:41 AM
Heavy Oil	ND	51.3	H	mg/Kg-dry	1	5/27/2017 10:36:41 AM
Surr: 2-Fluorobiphenyl	91.0	50-150	H	%Rec	1	5/27/2017 10:36:41 AM
Surr: o-Terphenyl	94.1	50-150	H	%Rec	1	5/27/2017 10:36:41 AM

<u>Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)</u>				Batch ID: 17196		Analyst: BT
Naphthalene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 1:54:27 AM
2-Methylnaphthalene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 1:54:27 AM
1-Methylnaphthalene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 1:54:27 AM
Acenaphthylene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 1:54:27 AM
Acenaphthene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 1:54:27 AM
Fluorene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 1:54:27 AM
Phenanthrene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 1:54:27 AM
Anthracene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 1:54:27 AM
Fluoranthene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 1:54:27 AM
Pyrene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 1:54:27 AM
Benz(a)anthracene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 1:54:27 AM
Chrysene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 1:54:27 AM
Benzo(b)fluoranthene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 1:54:27 AM
Benzo(k)fluoranthene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 1:54:27 AM
Benzo(a)pyrene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 1:54:27 AM
Indeno(1,2,3-cd)pyrene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 1:54:27 AM
Dibenz(a,h)anthracene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 1:54:27 AM
Benzo(g,h,i)perylene	ND	41.8	H	µg/Kg-dry	1	5/31/2017 1:54:27 AM
Surr: 2-Fluorobiphenyl	54.7	24.5-139	H	%Rec	1	5/31/2017 1:54:27 AM
Surr: Terphenyl-d14 (surr)	97.3	44.3-176	H	%Rec	1	5/31/2017 1:54:27 AM

<u>Gasoline by NWTPH-Gx</u>				Batch ID: 17238		Analyst: EM
Gasoline	ND	11.1	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
Surr: Toluene-d8	103	65-135	H	%Rec	1	6/2/2017 1:30:16 AM
Surr: 4-Bromofluorobenzene	97.2	65-135	H	%Rec	1	6/2/2017 1:30:16 AM

<u>Volatile Organic Compounds by EPA Method 8260C</u>				Batch ID: 17238		Analyst: EM
Dichlorodifluoromethane (CFC-12)	ND	0.134	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
Chloromethane	ND	0.134	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
Vinyl chloride	ND	0.00446	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM



Analytical Report

Work Order: 1705317
Date Reported: 6/5/2017

Client: GeoEngineers

Collection Date: 5/8/2017 8:45:00 AM

Project: Rufus 2.0 - Block 18

Lab ID: 1705317-005

Matrix: Soil

Client Sample ID: B18-3-15.0

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17238

Analyst: EM

Bromomethane	ND	0.201	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
Trichlorofluoromethane (CFC-11)	ND	0.111	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
Chloroethane	ND	0.134	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
1,1-Dichloroethene	ND	0.111	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
Methylene chloride	ND	0.0446	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
trans-1,2-Dichloroethene	ND	0.0446	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
Methyl tert-butyl ether (MTBE)	ND	0.111	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
1,1-Dichloroethane	ND	0.0446	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
2,2-Dichloropropane	ND	0.111	QH	mg/Kg-dry	1	6/2/2017 1:30:16 AM
cis-1,2-Dichloroethene	ND	0.0446	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
Chloroform	ND	0.0446	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
1,1,1-Trichloroethane (TCA)	ND	0.0446	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
1,1-Dichloropropene	ND	0.0446	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
Carbon tetrachloride	ND	0.0446	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
1,2-Dichloroethane (EDC)	ND	0.0669	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
Benzene	ND	0.0446	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
Trichloroethene (TCE)	ND	0.0446	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
1,2-Dichloropropane	ND	0.0446	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
Bromodichloromethane	ND	0.0446	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
Dibromomethane	ND	0.0891	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
cis-1,3-Dichloropropene	ND	0.0446	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
Toluene	ND	0.0446	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
trans-1,3-Dichloropropylene	ND	0.0669	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
1,1,2-Trichloroethane	ND	0.0669	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
1,3-Dichloropropane	ND	0.111	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
Tetrachloroethene (PCE)	ND	0.0446	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
Dibromochloromethane	ND	0.0669	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
1,2-Dibromoethane (EDB)	ND	0.0111	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
Chlorobenzene	ND	0.0446	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
1,1,1,2-Tetrachloroethane	ND	0.0669	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
Ethylbenzene	ND	0.0669	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
m,p-Xylene	ND	0.0446	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
o-Xylene	ND	0.0446	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
Styrene	ND	0.0446	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
Isopropylbenzene	ND	0.178	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
Bromoform	ND	0.0446	QH	mg/Kg-dry	1	6/2/2017 1:30:16 AM
1,1,2,2-Tetrachloroethane	ND	0.0446	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
n-Propylbenzene	ND	0.0446	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
Bromobenzene	ND	0.0669	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM



Analytical Report

Work Order: 1705317
Date Reported: 6/5/2017

Client: GeoEngineers

Collection Date: 5/8/2017 8:45:00 AM

Project: Rufus 2.0 - Block 18

Lab ID: 1705317-005

Matrix: Soil

Client Sample ID: B18-3-15.0

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Volatile Organic Compounds by EPA Method 8260C

Batch ID: 17238

Analyst: EM

1,3,5-Trimethylbenzene	ND	0.0446	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
2-Chlorotoluene	ND	0.0446	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
4-Chlorotoluene	ND	0.0446	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
tert-Butylbenzene	ND	0.0446	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
1,2,3-Trichloropropane	ND	0.0446	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
1,2,4-Trichlorobenzene	ND	0.111	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
sec-Butylbenzene	ND	0.0446	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
4-Isopropyltoluene	ND	0.0446	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
1,3-Dichlorobenzene	ND	0.0446	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
1,4-Dichlorobenzene	ND	0.0446	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
n-Butylbenzene	ND	0.0446	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
1,2-Dichlorobenzene	ND	0.0446	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
1,2-Dibromo-3-chloropropane	ND	1.11	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
1,2,4-Trimethylbenzene	ND	0.0446	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
Hexachlorobutadiene	ND	0.223	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
Naphthalene	ND	0.0669	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
1,2,3-Trichlorobenzene	ND	0.0446	H	mg/Kg-dry	1	6/2/2017 1:30:16 AM
Surr: Dibromofluoromethane	88.1	56.5-129	H	%Rec	1	6/2/2017 1:30:16 AM
Surr: Toluene-d8	99.2	64.5-151	H	%Rec	1	6/2/2017 1:30:16 AM
Surr: 1-Bromo-4-fluorobenzene	92.6	63.1-141	H	%Rec	1	6/2/2017 1:30:16 AM

NOTES:

Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Mercury by EPA Method 7471

Batch ID: 17208

Analyst: WF

Mercury	ND	0.241		mg/Kg-dry	1	5/31/2017 12:38:54 PM
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Total Metals by EPA Method 6020

Batch ID: 17190

Analyst: TN

Arsenic	1.48	0.0818		mg/Kg-dry	1	5/30/2017 5:06:28 PM
Barium	48.2	0.409		mg/Kg-dry	1	5/30/2017 5:06:28 PM
Cadmium	ND	0.164		mg/Kg-dry	1	5/30/2017 5:06:28 PM
Chromium	32.3	0.0818		mg/Kg-dry	1	5/30/2017 5:06:28 PM
Lead	1.66	0.164		mg/Kg-dry	1	5/30/2017 5:06:28 PM
Selenium	0.966	0.409		mg/Kg-dry	1	5/30/2017 5:06:28 PM
Silver	ND	0.0818		mg/Kg-dry	1	5/30/2017 5:06:28 PM



Analytical Report

Work Order: 1705317
Date Reported: 6/5/2017

Client: GeoEngineers

Collection Date: 5/8/2017 8:45:00 AM

Project: Rufus 2.0 - Block 18

Lab ID: 1705317-005

Matrix: Soil

Client Sample ID: B18-3-15.0

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Sample Moisture (Percent Moisture)

Batch ID: R36474 Analyst: BB

Percent Moisture	7.37			wt%	1	5/31/2017 8:39:07 AM
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Work Order: 1705317
CLIENT: GeoEngineers
Project: Rufus 2.0 - Block 18

QC SUMMARY REPORT

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

Sample ID	MB-17188	SampType:	MBLK		Units:	mg/Kg		Prep Date:	5/26/2017		RunNo:	36481	
Client ID:	MBLKS	Batch ID:	17188		Analysis Date:				5/27/2017		SeqNo:	699922	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Diesel (Fuel Oil)		ND	20.0										
Heavy Oil		ND	50.0										
Surr: 2-Fluorobiphenyl		22.4		20.00		112	50	150					
Surr: o-Terphenyl		22.8		20.00		114	50	150					

Sample ID	LCS-17188	SampType:	LCS		Units:	mg/Kg		Prep Date:	5/26/2017		RunNo:	36481	
Client ID:	LCSS	Batch ID:	17188		Analysis Date:				5/27/2017		SeqNo:	699921	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Diesel (Fuel Oil)		543	20.0	500.0	0	109	65	135					
Surr: 2-Fluorobiphenyl		21.6		20.00		108	50	150					
Surr: o-Terphenyl		23.2		20.00		116	50	150					

Sample ID	1705307-008ADUP	SampType:	DUP		Units:	mg/Kg-dry		Prep Date:	5/26/2017		RunNo:	36481	
Client ID:	BATCH	Batch ID:	17188		Analysis Date:				5/27/2017		SeqNo:	699895	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Diesel (Fuel Oil)		ND	24.2						0		30		
Heavy Oil		ND	60.6						0		30		
Surr: 2-Fluorobiphenyl		21.6		24.23		89.2	50	150		0			
Surr: o-Terphenyl		21.9		24.23		90.4	50	150		0			

Sample ID	1705307-011AMS	SampType:	MS		Units:	mg/Kg-dry		Prep Date:	5/26/2017		RunNo:	36481	
Client ID:	BATCH	Batch ID:	17188		Analysis Date:				5/27/2017		SeqNo:	699897	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Diesel (Fuel Oil)		531	21.1	526.6	0	101	65	135					
Surr: 2-Fluorobiphenyl		20.7		21.06		98.3	50	150					
Surr: o-Terphenyl		22.7		21.06		108	50	150					

Work Order: 1705317
CLIENT: GeoEngineers
Project: Rufus 2.0 - Block 18

QC SUMMARY REPORT

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

Sample ID	1705307-011AMS	SampType:	MS	Units:	mg/Kg-dry	Prep Date:	5/26/2017	RunNo:	36481		
Client ID:	BATCH	Batch ID:	17188	Analysis Date:				5/27/2017	SeqNo:	699897	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Sample ID	1705307-011AMSD	SampType:	MSD	Units:	mg/Kg-dry	Prep Date:	5/26/2017	RunNo:	36481		
Client ID:	BATCH	Batch ID:	17188			Analysis Date:	5/27/2017	SeqNo:	699898		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	556	20.8	518.8	0	107	65	135	530.7	4.69	30	
Surr: 2-Fluorobiphenyl	21.2		20.75		102	50	150		0		
Surr: o-Terphenyl	22.3		20.75		108	50	150		0		

Sample ID	1705317-002ADUP	SampType:	DUP	Units:	mg/Kg-dry	Prep Date:	5/26/2017	RunNo:	36481		
Client ID:	B18-3-5.0	Batch ID:	17188			Analysis Date:	5/27/2017	SeqNo:	699907		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	ND	22.7						0		30	H
Heavy Oil	79.8	56.6						104.0	26.4	30	H
Surr: 2-Fluorobiphenyl	20.0		22.65		88.4	50	150		0		H
Surr: o-Terphenyl	20.7		22.65		91.5	50	150		0		H

Work Order: 1705317
CLIENT: GeoEngineers
Project: Rufus 2.0 - Block 18

QC SUMMARY REPORT

Gasoline by NWTPH-Gx

Sample ID	LCS-17238	SampType:	LCS	Units:	mg/Kg	Prep Date:	6/1/2017	RunNo:	36581		
Client ID:	LCSS	Batch ID:	17238			Analysis Date:	6/1/2017	SeqNo:	702106		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Gasoline	27.7	5.00	25.00	0	111	65	135				
Surr: Toluene-d8	1.25		1.250		100	65	135				
Surr: 4-Bromofluorobenzene	1.25		1.250		100	65	135				

Sample ID	MB-17238	SampType:	MBLK			Units:	mg/Kg			Prep Date:	6/1/2017		RunNo:	36581	
Client ID:	MBLKS	Batch ID:	17238							Analysis Date:	6/2/2017		SeqNo:	702107	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val		%RPD	RPDLimit	Qual		

Gasoline	ND	5.00									
Surr: Toluene-d8	1.27		1.250		102	65	135				
Surr: 4-Bromofluorobenzene	1.21		1.250		96.8	65	135				

Sample ID	1705317-005BDUP	SampType:	DUP	Units:	mg/Kg-dry	Prep Date:	6/1/2017	RunNo:	36581		
Client ID:	B18-3-15.0	Batch ID:	17238			Analysis Date:	6/2/2017	SeqNo:	702092		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Gasoline	ND	11.1						0		30	H
Surr: Toluene-d8	2.86		2.786		103	65	135		0		H
Surr: 4-Bromofluorobenzene	2.67		2.786		95.8	65	135		0		H

Sample ID	1705319-006BDUP	SampType:	DUP	Units:	mg/Kg-dry	Prep Date:	6/1/2017	RunNo:	36581		
Client ID:	BATCH	Batch ID:	17238			Analysis Date:	6/2/2017	SeqNo:	702096		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Gasoline	ND	6.75						0		30	
Surr: Toluene-d8	1.71		1.687		101	65	135		0		
Surr: 4-Bromofluorobenzene	1.63		1.687		96.9	65	135		0		



Work Order: 1705317
CLIENT: GeoEngineers
Project: Rufus 2.0 - Block 18

QC SUMMARY REPORT

Gasoline by NWTPH-Gx

Sample ID	1705319-012BMS	SampType: MS			Units: mg/Kg-dry		Prep Date: 6/1/2017		RunNo: 36581		
Client ID:	BATCH	Batch ID: 17238			Analysis Date: 6/2/2017				SeqNo: 702099		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Gasoline	29.3	7.38	36.91	0	79.4	65	135				
Surr: Toluene-d8	1.85		1.846		100	65	135				
Surr: 4-Bromofluorobenzene	1.87		1.846		101	65	135				

Sample ID	1705319-012BMSD	SampType:	MSD	Units:	mg/Kg-dry	Prep Date:	6/1/2017	RunNo:	36581		
Client ID:	BATCH	Batch ID:	17238			Analysis Date:	6/2/2017	SeqNo:	702101		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Gasoline	27.9	7.38	36.91	0	75.7	65	135	29.32	4.82	30	
Surr: Toluene-d8	1.87		1.846		101	65	135		0		
Surr: 4-Bromofluorobenzene	1.88		1.846		102	65	135		0		

Work Order: 1705317
CLIENT: GeoEngineers
Project: Rufus 2.0 - Block 18

QC SUMMARY REPORT

Mercury by EPA Method 7471

Sample ID	MB-17208	SampType:	MBLK			Units:	mg/Kg			Prep Date:	5/31/2017		RunNo:	36485	
Client ID:	MBLKS	Batch ID:	17208						Analysis Date:	5/31/2017			SeqNo:	700048	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val		%RPD	RPDLimit	Qual		

Mercury ND 0.250

Sample ID	LCS-17208	SampType:	LCS	Units:	mg/Kg	Prep Date:	5/31/2017	RunNo:	36485		
Client ID:	LCSS	Batch ID:	17208			Analysis Date:	5/31/2017	SeqNo:	700049		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Mercury 0.430 0.250 0.5000 0 86.0 80 120

Sample ID	1705293-002ADUP	SampType:	DUP	Units:	mg/Kg-dry	Prep Date:	5/31/2017	RunNo:	36485			
Client ID:	BATCH	Batch ID:	17208			Analysis Date:	5/31/2017	SeqNo:	700051			
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Mercury ND 0.284 0 20

Sample ID	1705293-002AMS	SampType:	MS	Units:	mg/Kg-dry	Prep Date:	5/31/2017	RunNo:	36485		
Client ID:	BATCH	Batch ID:	17208			Analysis Date:	5/31/2017	SeqNo:	700052		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Mercury 0.634 0.289 0.5782 0.05238 101 70 130

Sample ID	1705293-002AMSD	SampType:	MSD	Units:	mg/Kg-dry	Prep Date:	5/31/2017	RunNo:	36485		
Client ID:	BATCH	Batch ID:	17208			Analysis Date:	5/31/2017	SeqNo:	700053		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Mercury 0.632 0.284 0.5673 0.05238 102 70 130 0.6337 0.276 20

Work Order: 1705317
CLIENT: GeoEngineers
Project: Rufus 2.0 - Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID	MB-17196	SampType:	MBLK		Units:	µg/Kg		Prep Date:	5/30/2017		RunNo:	36484		
Client ID:	MBLKS	Batch ID:	17196						Analysis Date:	5/30/2017		SeqNo:	699988	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual			
Naphthalene	ND	40.0												
2-Methylnaphthalene	ND	40.0												
1-Methylnaphthalene	ND	40.0												
Acenaphthylene	ND	40.0												
Acenaphthene	ND	40.0												
Fluorene	ND	40.0												
Phenanthrene	ND	40.0												
Anthracene	ND	40.0												
Fluoranthene	ND	40.0												
Pyrene	ND	40.0												
Benz(a)anthracene	ND	40.0												
Chrysene	ND	40.0												
Benzo(b)fluoranthene	ND	40.0												
Benzo(k)fluoranthene	ND	40.0												
Benzo(a)pyrene	ND	40.0												
Indeno(1,2,3-cd)pyrene	ND	40.0												
Dibenz(a,h)anthracene	ND	40.0												
Benzo(g,h,i)perylene	ND	40.0												
Surr: 2-Fluorobiphenyl	395		500.0		79.0	24.5	139							
Surr: Terphenyl-d14 (surr)	600		500.0		120	44.3	176							

Sample ID	LCS-17196	SampType:	LCS	Units:	µg/Kg	Prep Date:	5/30/2017	RunNo:	36484		
Client ID:	LCSS	Batch ID:	17196			Analysis Date:	5/30/2017	SeqNo:	699989		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	980	40.0	1,000	0	98.0	46.4	125				
2-Methylnaphthalene	1,000	40.0	1,000	0	100	45.1	135				
1-Methylnaphthalene	957	40.0	1,000	0	95.7	46.2	133				
Acenaphthylene	1,100	40.0	1,000	0	110	32.8	136				
Acenaphthene	952	40.0	1,000	0	95.2	38.7	129				

Work Order: 1705317
CLIENT: GeoEngineers
Project: Rufus 2.0 - Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID	LCS-17196	SampType:	LCS	Units:	µg/Kg	Prep Date:	5/30/2017	RunNo:	36484		
Client ID:	LCSS	Batch ID:	17196			Analysis Date:	5/30/2017	SeqNo:	699989		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluorene	1,030	40.0	1,000	0	103	41.4	144				
Phenanthrene	964	40.0	1,000	0	96.4	43.9	133				
Anthracene	1,100	40.0	1,000	0	110	44.2	136				
Fluoranthene	1,080	40.0	1,000	0	108	45.9	137				
Pyrene	1,070	40.0	1,000	0	107	46.2	137				
Benz(a)anthracene	1,110	40.0	1,000	0	111	41.2	141				
Chrysene	971	40.0	1,000	0	97.1	46.9	138				
Benzo(b)fluoranthene	1,220	40.0	1,000	0	122	41	155				
Benzo(k)fluoranthene	1,080	40.0	1,000	0	108	41.8	153				
Benzo(a)pyrene	1,150	40.0	1,000	0	115	34.3	157				
Indeno(1,2,3-cd)pyrene	1,130	40.0	1,000	0	113	31.3	159				
Dibenz(a,h)anthracene	1,100	40.0	1,000	0	110	28	158				
Benzo(g,h,i)perylene	1,050	40.0	1,000	0	105	32.4	144				
Surr: 2-Fluorobiphenyl	424		500.0		84.8	24.5	139				
Surr: Terphenyl-d14 (surr)	587		500.0		117	44.3	176				

Sample ID	1705298-001ADUP	SampType:	DUP	Units:	µg/Kg-dry	Prep Date:	5/30/2017	RunNo:	36484		
Client ID:	BATCH	Batch ID:	17196			Analysis Date:	5/30/2017	SeqNo:	699991		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	41.4						0		30	
2-Methylnaphthalene	ND	41.4						0		30	
1-Methylnaphthalene	ND	41.4						0		30	
Acenaphthylene	ND	41.4						0		30	
Acenaphthene	ND	41.4						0		30	
Fluorene	ND	41.4						0		30	
Phenanthrene	ND	41.4						0		30	
Anthracene	ND	41.4						0		30	
Fluoranthene	ND	41.4						0		30	
Pyrene	ND	41.4						0		30	

Work Order: 1705317
CLIENT: GeoEngineers
Project: Rufus 2.0 - Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID	1705298-001ADUP	SampType:	DUP	Units:	µg/Kg-dry	Prep Date:	5/30/2017	RunNo:	36484		
Client ID:	BATCH	Batch ID:	17196			Analysis Date:	5/30/2017	SeqNo:	699991		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benz(a)anthracene	ND	41.4						0		30	
Chrysene	ND	41.4						0		30	
Benzo(b)fluoranthene	ND	41.4						0		30	
Benzo(k)fluoranthene	ND	41.4						0		30	
Benzo(a)pyrene	ND	41.4						0		30	
Indeno(1,2,3-cd)pyrene	ND	41.4						0		30	
Dibenz(a,h)anthracene	ND	41.4						0		30	
Benzo(g,h,i)perylene	ND	41.4						0		30	
Surr: 2-Fluorobiphenyl	337		517.1		65.2	24.5	139		0		
Surr: Terphenyl-d14 (surr)	480		517.1		92.8	44.3	176		0		

Sample ID	1705298-001AMS	SampType:	MS	Units:	µg/Kg-dry	Prep Date:	5/30/2017	RunNo:	36484		
Client ID:	BATCH	Batch ID:	17196			Analysis Date:	5/30/2017	SeqNo:	699992		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	981	41.9	1,047	0	93.7	42.9	138				
2-Methylnaphthalene	1,030	41.9	1,047	0	98.7	42.8	151				
1-Methylnaphthalene	989	41.9	1,047	0	94.5	41.6	148				
Acenaphthylene	1,130	41.9	1,047	0	108	32.6	160				
Acenaphthene	1,010	41.9	1,047	0	96.1	46.3	142				
Fluorene	1,070	41.9	1,047	0	102	43.4	153				
Phenanthrene	1,000	41.9	1,047	2.137	95.7	45.5	140				
Anthracene	1,110	41.9	1,047	0	106	32.6	160				
Fluoranthene	1,110	41.9	1,047	3.760	105	44.6	161				
Pyrene	1,090	41.9	1,047	4.552	104	48.3	158				
Benz(a)anthracene	1,120	41.9	1,047	6.013	107	34.9	139				
Chrysene	1,030	41.9	1,047	0	98.7	45.2	146				
Benzo(b)fluoranthene	1,220	41.9	1,047	3.263	116	42.2	168				
Benzo(k)fluoranthene	1,150	41.9	1,047	0	110	34.8	147				
Benzo(a)pyrene	1,170	41.9	1,047	7.823	111	34.4	179				

Work Order: 1705317
CLIENT: GeoEngineers
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QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID	1705298-001AMS	SampType:	MS		Units:	µg/Kg-dry		Prep Date:	5/30/2017		RunNo:	36484	
Client ID:	BATCH	Batch ID:	17196					Analysis Date:	5/30/2017		SeqNo:	699992	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val		%RPD	RPDLimit	Qual
Indeno(1,2,3-cd)pyrene		1,160	41.9	1,047	0	111	5	113					
Dibenz(a,h)anthracene		1,140	41.9	1,047	0	109	17.3	156					
Benzo(g,h,i)perylene		1,090	41.9	1,047	3.542	104	24.9	119					
Surr: 2-Fluorobiphenyl		431		523.3		82.4	24.5	139					
Surr: Terphenyl-d14 (surr)		588		523.3		112	44.3	176					

Sample ID	1705298-001AMSD	SampType: MSD	Units: µg/Kg-dry			Prep Date: 5/30/2017			RunNo: 36484		
Client ID:	BATCH	Batch ID:	17196	Analysis Date: 5/30/2017					SeqNo: 699993		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	800	36.4	909.2	0	87.9	42.9	138	980.8	20.4	30	
2-Methylnaphthalene	847	36.4	909.2	0	93.2	42.8	151	1,032	19.7	30	
1-Methylnaphthalene	809	36.4	909.2	0	88.9	41.6	148	988.8	20.0	30	
Acenaphthylene	923	36.4	909.2	0	102	32.6	160	1,134	20.5	30	
Acenaphthene	818	36.4	909.2	0	90.0	46.3	142	1,005	20.5	30	
Fluorene	885	36.4	909.2	0	97.3	43.4	153	1,071	19.0	30	
Phenanthrene	826	36.4	909.2	2.137	90.7	45.5	140	1,004	19.4	30	
Anthracene	917	36.4	909.2	0	101	32.6	160	1,106	18.7	30	
Fluoranthene	907	36.4	909.2	3.760	99.3	44.6	161	1,105	19.7	30	
Pyrene	902	36.4	909.2	4.552	98.7	48.3	158	1,094	19.2	30	
Benz(a)anthracene	939	36.4	909.2	6.013	103	34.9	139	1,121	17.6	30	
Chrysene	827	36.4	909.2	0	90.9	45.2	146	1,032	22.1	30	
Benzo(b)fluoranthene	1,000	36.4	909.2	3.263	110	42.2	168	1,215	19.1	30	
Benzo(k)fluoranthene	923	36.4	909.2	0	102	34.8	147	1,152	22.0	30	
Benzo(a)pyrene	945	36.4	909.2	7.823	103	34.4	179	1,170	21.3	30	
Indeno(1,2,3-cd)pyrene	942	36.4	909.2	0	104	5	113	1,160	20.8	30	
Dibenz(a,h)anthracene	928	36.4	909.2	0	102	17.3	156	1,141	20.6	30	
Benzo(g,h,i)perylene	885	36.4	909.2	3.542	96.9	24.9	119	1,089	20.7	30	
Surr: 2-Fluorobiphenyl	359		454.6		78.9	24.5	139		0		
Surr: Terphenyl-d14 (surr)	469		454.6		103	44.3	176		0		

Work Order: 1705317
CLIENT: GeoEngineers
Project: Rufus 2.0 - Block 18

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID	1705298-001AMSD	SampType:	MSD	Units:	µg/Kg-dry	Prep Date:	5/30/2017	RunNo:	36484		
Client ID:	BATCH	Batch ID:	17196			Analysis Date:	5/30/2017	SeqNo:	699993		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual



Work Order: 1705317
CLIENT: GeoEngineers
Project: Rufus 2.0 - Block 18

QC SUMMARY REPORT

Sample Moisture (Percent Moisture)

Sample ID 1705344-001ADUP		SampType: DUP			Units: wt%		Prep Date: 5/31/2017		RunNo: 36474		
Client ID: BATCH		Batch ID: R36474			Analysis Date: 5/31/2017				SeqNo: 699725		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Percent Moisture	5.73	0.500						5.589	2.52	20	

Sample ID	1705317-005ADUP		SampType: DUP		Units: wt%		Prep Date: 5/31/2017		RunNo: 36474		
Client ID:	B18-3-15.0		Batch ID: R36474				Analysis Date: 5/31/2017		SeqNo: 699750		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Percent Moisture	5.44	0.500						7.368	30.0	20	R



Date: 6/5/2017

Work Order: 1705317
CLIENT: GeoEngineers
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QC SUMMARY REPORT

Total Metals by EPA Method 6020

Sample ID	MB-17190	SampType:	MBLK			Units:	mg/Kg			Prep Date:	5/30/2017			RunNo:	36467		
Client ID:	MBLKS	Batch ID:	17190						Analysis Date:	5/30/2017			SeqNo:	699569			
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val		%RPD	RPDLimit	Qual				
Arsenic		ND	0.0752														
Barium		ND	0.376														
Cadmium		ND	0.150														
Chromium		ND	0.0752														
Lead		ND	0.150														
Selenium		ND	0.376														
Silver		ND	0.0752														

Sample ID	LCS-17190	SampType:	LCS	Units:	mg/Kg	Prep Date:	5/30/2017			RunNo:	36467	
Client ID:	LCSS	Batch ID:	17190				Analysis Date:	5/30/2017			SeqNo:	699570
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Arsenic	37.7	0.0763	38.17	0	98.8	80	120					
Barium	38.9	0.382	38.17	0	102	80	120					
Cadmium	1.80	0.153	1.908	0	94.1	80	120					
Chromium	37.9	0.0763	38.17	0	99.4	80	120					
Lead	20.2	0.153	19.08	0	106	80	120					
Selenium	3.49	0.382	3.817	0	91.5	80	120					
Silver	8.17	0.0763	9.542	0	85.6	80	120					

Sample ID	1704275-005ADUP	SampType:	DUP			Units:	mg/Kg-dry			Prep Date:	5/30/2017			RunNo:	36467			
Client ID:	BATCH	Batch ID:	17190			Analysis Date:						5/30/2017			SeqNo:	699572		
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val		%RPD	RPDLimit	Qual					
Arsenic		2.28	0.0821						2.192		3.85	20						
Barium		33.6	0.410						35.93		6.77	20						
Cadmium		ND	0.164						0			20						
Chromium		22.7	0.0821						25.11		9.90	20						
Lead		1.40	0.164						1.490		5.98	20						
Selenium		0.929	0.410						1.027		9.99	20						



Work Order: 1705317
CLIENT: GeoEngineers
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QC SUMMARY REPORT

Total Metals by EPA Method 6020

Sample ID	1704275-005ADUP			SampType:	DUP			Units:	mg/Kg-dry			Prep Date:	5/30/2017			RunNo:	36467		
Client ID:	BATCH			Batch ID:	17190						Analysis Date:	5/30/2017			SeqNo:	699572			
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual							
Silver		ND	0.0821						0.1475	133	20	R							

NOTES:

R - High RPD observed. The method is in control as indicated by the LCS.

Sample ID	1704275-005AMS	SampType: MS		Units: mg/Kg-dry		Prep Date: 5/30/2017		RunNo: 36467			
Client ID:	BATCH	Batch ID: 17190		Analysis Date: 5/30/2017				SeqNo: 699574			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	41.7	0.0821	41.05	2.192	96.3	75	125				
Barium	73.2	0.410	41.05	35.93	90.8	75	125				
Cadmium	1.99	0.164	2.052	0.05422	94.5	75	125				
Chromium	64.3	0.0821	41.05	25.11	95.4	75	125				
Lead	19.7	0.164	20.52	1.490	88.5	75	125				
Selenium	4.91	0.410	4.105	1.027	94.7	75	125				
Silver	7.71	0.0821	10.26	0.1475	73.7	75	125				S

NOTES:

S - Outlying spike recovery(ies) observed. A duplicate analysis was performed and recovered within range.

Sample ID	1704275-005AMSD	SampType:	MSD			Units:	mg/Kg-dry			Prep Date:	5/30/2017			RunNo:	36467		
Client ID:	BATCH	Batch ID:	17190			Analysis Date:					5/30/2017			SeqNo:	699575		
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual					
Arsenic		42.0	0.0821	41.05	2.192	97.0	75	125	41.70	0.779	20						
Barium		76.0	0.410	41.05	35.93	97.6	75	125	73.20	3.74	20						
Cadmium		2.06	0.164	2.052	0.05422	97.8	75	125	1.993	3.40	20						
Chromium		63.2	0.0821	41.05	25.11	92.7	75	125	64.25	1.71	20						
Lead		19.8	0.164	20.52	1.490	89.1	75	125	19.66	0.599	20						
Selenium		4.84	0.410	4.105	1.027	92.8	75	125	4.915	1.60	20						
Silver		8.76	0.0821	10.26	0.1475	84.0	75	125	7.715	12.7	20						

Work Order: 1705317
CLIENT: GeoEngineers
Project: Rufus 2.0 - Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID	LCS-17238	SampType:	LCS	Units:	mg/Kg	Prep Date:	6/1/2017	RunNo:	36580		
Client ID:	LCSS	Batch ID:	17238			Analysis Date:	6/1/2017	SeqNo:	702087		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	1.85	0.0600	1.000	0	185	14.3	167				S
Chloromethane	1.77	0.0600	1.000	0	177	46	144				S
Vinyl chloride	1.47	0.00200	1.000	0	147	43.4	151				
Bromomethane	0.869	0.0900	1.000	0	86.9	40.9	157				
Trichlorofluoromethane (CFC-11)	0.882	0.0500	1.000	0	88.2	36.9	156				
Chloroethane	1.02	0.0600	1.000	0	102	33.4	155				
1,1-Dichloroethene	1.12	0.0500	1.000	0	112	49.7	142				
Methylene chloride	1.17	0.0200	1.000	0	117	46.3	140				
trans-1,2-Dichloroethene	1.08	0.0200	1.000	0	108	68	130				
Methyl tert-butyl ether (MTBE)	1.09	0.0500	1.000	0	109	66.3	145				
1,1-Dichloroethane	1.05	0.0200	1.000	0	105	61.9	137				
2,2-Dichloropropane	1.46	0.0500	1.000	0	146	35.5	186				
cis-1,2-Dichloroethene	1.06	0.0200	1.000	0	106	71.3	135				
Chloroform	1.06	0.0200	1.000	0	106	69	145				
1,1,1-Trichloroethane (TCA)	0.995	0.0200	1.000	0	99.5	69	132				
1,1-Dichloropropene	1.02	0.0200	1.000	0	102	72.7	131				
Carbon tetrachloride	0.950	0.0200	1.000	0	95.0	63.4	137				
1,2-Dichloroethane (EDC)	1.00	0.0300	1.000	0	100	50.9	162				
Benzene	1.05	0.0200	1.000	0	105	64.3	133				
Trichloroethene (TCE)	0.994	0.0200	1.000	0	99.4	65.5	137				
1,2-Dichloropropane	1.03	0.0200	1.000	0	103	63.2	142				
Bromodichloromethane	0.862	0.0200	1.000	0	86.2	73.2	131				
Dibromomethane	0.947	0.0400	1.000	0	94.7	60.1	146				
cis-1,3-Dichloropropene	1.09	0.0200	1.000	0	109	59.1	143				
Toluene	1.11	0.0200	1.000	0	111	67.3	138				
trans-1,3-Dichloropropylene	1.08	0.0300	1.000	0	108	49.2	149				
1,1,2-Trichloroethane	0.973	0.0300	1.000	0	97.3	56.9	147				
1,3-Dichloropropane	1.01	0.0500	1.000	0	101	56.1	153				
Tetrachloroethene (PCE)	1.06	0.0200	1.000	0	106	52.7	150				
Dibromochloromethane	0.907	0.0300	1.000	0	90.7	70.6	144				
1,2-Dibromoethane (EDB)	0.982	0.00500	1.000	0	98.2	50.5	154				



Date: 6/5/2017

Work Order: 1705317
CLIENT: GeoEngineers
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QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID	LCS-17238	SampType:	LCS	Units:	mg/Kg	Prep Date:	6/1/2017	RunNo:	36580		
Client ID:	LCSS	Batch ID:	17238			Analysis Date:	6/1/2017	SeqNo:	702087		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorobenzene	1.05	0.0200	1.000	0	105	76.1	123				
1,1,1,2-Tetrachloroethane	0.942	0.0300	1.000	0	94.2	65.9	141				
Ethylbenzene	1.05	0.0300	1.000	0	105	74	129				
m,p-Xylene	2.14	0.0200	2.000	0	107	70	124				
o-Xylene	1.06	0.0200	1.000	0	106	68.1	139				
Styrene	1.03	0.0200	1.000	0	103	73.3	146				
Isopropylbenzene	1.06	0.0800	1.000	0	106	70	130				
Bromoform	0.714	0.0200	1.000	0	71.4	67	154				
1,1,2,2-Tetrachloroethane	0.905	0.0200	1.000	0	90.5	44.8	165				
n-Propylbenzene	1.03	0.0200	1.000	0	103	74.8	125				
Bromobenzene	1.02	0.0300	1.000	0	102	49.2	144				
1,3,5-Trimethylbenzene	1.02	0.0200	1.000	0	102	74.6	123				
2-Chlorotoluene	1.05	0.0200	1.000	0	105	76.7	129				
4-Chlorotoluene	1.03	0.0200	1.000	0	103	77.5	125				
tert-Butylbenzene	1.04	0.0200	1.000	0	104	66.2	130				
1,2,3-Trichloropropane	0.953	0.0200	1.000	0	95.3	67.9	136				
1,2,4-Trichlorobenzene	1.13	0.0500	1.000	0	113	62.6	143				
sec-Butylbenzene	1.07	0.0200	1.000	0	107	75.6	133				
4-Isopropyltoluene	1.07	0.0200	1.000	0	107	76.8	131				
1,3-Dichlorobenzene	1.09	0.0200	1.000	0	109	72.8	128				
1,4-Dichlorobenzene	1.07	0.0200	1.000	0	107	72.6	126				
n-Butylbenzene	1.13	0.0200	1.000	0	113	65.3	136				
1,2-Dichlorobenzene	1.04	0.0200	1.000	0	104	72.8	126				
1,2-Dibromo-3-chloropropane	0.729	0.500	1.000	0	72.9	40.2	155				
1,2,4-Trimethylbenzene	1.03	0.0200	1.000	0	103	77.5	129				
Hexachlorobutadiene	1.20	0.100	1.000	0	120	42	151				
Naphthalene	1.09	0.0300	1.000	0	109	58.4	160				
1,2,3-Trichlorobenzene	1.13	0.0200	1.000	0	113	54.8	143				
Surr: Dibromofluoromethane	1.19		1.250		95.2	56.5	129				
Surr: Toluene-d8	1.30		1.250		104	64.5	151				
Surr: 1-Bromo-4-fluorobenzene	1.32		1.250		105	63.1	141				

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QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID	LCS-17238	SampType:	LCS	Units:	mg/Kg	Prep Date:	6/1/2017	RunNo:	36580		
Client ID:	LCSS	Batch ID:	17238			Analysis Date:	6/1/2017	SeqNo:	702087		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

NOTES:

S - Outlying spike recovery observed (high bias). Samples are non-detect for this analyte; no further action required.

Sample ID	MB-17238	SampType:	MBLK			Units:	mg/Kg			Prep Date:	6/1/2017		RunNo:	36580	
Client ID:	MBLKS	Batch ID:	17238							Analysis Date:	6/2/2017		SeqNo:	702088	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val		%RPD	RPDLimit	Qual		

Dichlorodifluoromethane (CFC-12)	ND	0.0600									
Chloromethane	ND	0.0600									
Vinyl chloride	ND	0.00200									
Bromomethane	ND	0.0900									
Trichlorofluoromethane (CFC-11)	ND	0.0500									
Chloroethane	ND	0.0600									
1,1-Dichloroethene	ND	0.0500									
Methylene chloride	ND	0.0200									
trans-1,2-Dichloroethene	ND	0.0200									
Methyl tert-butyl ether (MTBE)	ND	0.0500									
1,1-Dichloroethane	ND	0.0200									
2,2-Dichloropropane	ND	0.0500									Q
cis-1,2-Dichloroethene	ND	0.0200									
Chloroform	ND	0.0200									
1,1,1-Trichloroethane (TCA)	ND	0.0200									
1,1-Dichloropropene	ND	0.0200									
Carbon tetrachloride	ND	0.0200									
1,2-Dichloroethane (EDC)	ND	0.0300									
Benzene	ND	0.0200									
Trichloroethene (TCE)	ND	0.0200									
1,2-Dichloropropane	ND	0.0200									
Bromodichloromethane	ND	0.0200									
Dibromomethane	ND	0.0400									
cis-1,3-Dichloropropene	ND	0.0200									

Work Order: 1705317
CLIENT: GeoEngineers
Project: Rufus 2.0 - Block 18

QC SUMMARY REPORT
Volatile Organic Compounds by EPA Method 8260C

Sample ID	MB-17238	SampType:	MBLK		Units:	mg/Kg			Prep Date:	6/1/2017		RunNo:	36580	
Client ID:	MBLKS	Batch ID:	17238						Analysis Date:	6/2/2017		SeqNo:	702088	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val		%RPD	RPDLimit	Qual	
Toluene		ND	0.0200											
trans-1,3-Dichloropropylene		ND	0.0300											
1,1,2-Trichloroethane		ND	0.0300											
1,3-Dichloropropane		ND	0.0500											
Tetrachloroethene (PCE)		ND	0.0200											
Dibromochloromethane		ND	0.0300											
1,2-Dibromoethane (EDB)		ND	0.00500											
Chlorobenzene		ND	0.0200											
1,1,1,2-Tetrachloroethane		ND	0.0300											
Ethylbenzene		ND	0.0300											
m,p-Xylene		ND	0.0200											
o-Xylene		ND	0.0200											
Styrene		ND	0.0200											
Isopropylbenzene		ND	0.0800											
Bromoform		ND	0.0200										Q	
1,1,2,2-Tetrachloroethane		ND	0.0200											
n-Propylbenzene		ND	0.0200											
Bromobenzene		ND	0.0300											
1,3,5-Trimethylbenzene		ND	0.0200											
2-Chlorotoluene		ND	0.0200											
4-Chlorotoluene		ND	0.0200											
tert-Butylbenzene		ND	0.0200											
1,2,3-Trichloropropane		ND	0.0200											
1,2,4-Trichlorobenzene		ND	0.0500											
sec-Butylbenzene		ND	0.0200											
4-Isopropyltoluene		ND	0.0200											
1,3-Dichlorobenzene		ND	0.0200											
1,4-Dichlorobenzene		ND	0.0200											
n-Butylbenzene		ND	0.0200											
1,2-Dichlorobenzene		ND	0.0200											
1,2-Dibromo-3-chloropropane		ND	0.500											

Work Order: 1705317
CLIENT: GeoEngineers
Project: Rufus 2.0 - Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID	MB-17238	SampType:	MBLK	Units:	mg/Kg	Prep Date:	6/1/2017	RunNo:	36580		
Client ID:	MBLKS	Batch ID:	17238			Analysis Date:	6/2/2017	SeqNo:	702088		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trimethylbenzene	ND	0.0200									
Hexachlorobutadiene	ND	0.100									
Naphthalene	ND	0.0300									
1,2,3-Trichlorobenzene	ND	0.0200									
Surr: Dibromofluoromethane	1.05		1.250		83.7	56.5	129				
Surr: Toluene-d8	1.25		1.250		99.7	64.5	151				
Surr: 1-Bromo-4-fluorobenzene	1.16		1.250		92.7	63.1	141				

NOTES:

Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Sample ID	1705317-005BDUP	SampType:	DUP			Units:	mg/Kg-dry			Prep Date:	6/1/2017			RunNo:	36580		
Client ID:	B18-3-15.0	Batch ID:	17238						Analysis Date:	6/2/2017			SeqNo:	702074			
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val		%RPD	RPDLimit	Qual				
Dichlorodifluoromethane (CFC-12)		ND	0.134						0			30	H				
Chloromethane		ND	0.134						0			30	H				
Vinyl chloride		ND	0.00446						0			30	H				
Bromomethane		ND	0.201						0			30	H				
Trichlorofluoromethane (CFC-11)		ND	0.111						0			30	H				
Chloroethane		ND	0.134						0			30	H				
1,1-Dichloroethene		ND	0.111						0			30	H				
Methylene chloride		ND	0.0446						0			30	H				
trans-1,2-Dichloroethene		ND	0.0446						0			30	H				
Methyl tert-butyl ether (MTBE)		ND	0.111						0			30	H				
1,1-Dichloroethane		ND	0.0446						0			30	H				
2,2-Dichloropropane		ND	0.111						0			30	QH				
cis-1,2-Dichloroethene		ND	0.0446						0			30	H				
Chloroform		ND	0.0446						0			30	H				
1,1,1-Trichloroethane (TCA)		ND	0.0446						0			30	H				
1,1-Dichloropropene		ND	0.0446						0			30	H				
Carbon tetrachloride		ND	0.0446						0			30	H				

Work Order: 1705317
CLIENT: GeoEngineers
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QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID	1705317-005BDUP	SampType:	DUP	Units:	mg/Kg-dry	Prep Date:	6/1/2017	RunNo:	36580		
Client ID:	B18-3-15.0	Batch ID:	17238			Analysis Date:	6/2/2017	SeqNo:	702074		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2-Dichloroethane (EDC)	ND	0.0669						0		30	H
Benzene	ND	0.0446						0		30	H
Trichloroethene (TCE)	ND	0.0446						0		30	H
1,2-Dichloropropane	ND	0.0446						0		30	H
Bromodichloromethane	ND	0.0446						0		30	H
Dibromomethane	ND	0.0891						0		30	H
cis-1,3-Dichloropropene	ND	0.0446						0		30	H
Toluene	ND	0.0446						0		30	H
trans-1,3-Dichloropropylene	ND	0.0669						0		30	H
1,1,2-Trichloroethane	ND	0.0669						0		30	H
1,3-Dichloropropane	ND	0.111						0		30	H
Tetrachloroethene (PCE)	ND	0.0446						0		30	H
Dibromochloromethane	ND	0.0669						0		30	H
1,2-Dibromoethane (EDB)	ND	0.0111						0		30	H
Chlorobenzene	ND	0.0446						0		30	H
1,1,1,2-Tetrachloroethane	ND	0.0669						0		30	H
Ethylbenzene	ND	0.0669						0		30	H
m,p-Xylene	ND	0.0446						0		30	H
o-Xylene	ND	0.0446						0		30	H
Styrene	ND	0.0446						0		30	H
Isopropylbenzene	ND	0.178						0		30	H
Bromoform	ND	0.0446						0		30	QH
1,1,2,2-Tetrachloroethane	ND	0.0446						0		30	H
n-Propylbenzene	ND	0.0446						0		30	H
Bromobenzene	ND	0.0669						0		30	H
1,3,5-Trimethylbenzene	ND	0.0446						0		30	H
2-Chlorotoluene	ND	0.0446						0		30	H
4-Chlorotoluene	ND	0.0446						0		30	H
tert-Butylbenzene	ND	0.0446						0		30	H
1,2,3-Trichloropropane	ND	0.0446						0		30	H
1,2,4-Trichlorobenzene	ND	0.111						0		30	H

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CLIENT: GeoEngineers
Project: Rufus 2.0 - Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID	1705317-005BDUP	SampType:	DUP	Units:	mg/Kg-dry	Prep Date:	6/1/2017	RunNo:	36580		
Client ID:	B18-3-15.0	Batch ID:	17238			Analysis Date:	6/2/2017	SeqNo:	702074		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
sec-Butylbenzene	ND	0.0446						0		30	H
4-Isopropyltoluene	ND	0.0446						0		30	H
1,3-Dichlorobenzene	ND	0.0446						0		30	H
1,4-Dichlorobenzene	ND	0.0446						0		30	H
n-Butylbenzene	ND	0.0446						0		30	H
1,2-Dichlorobenzene	ND	0.0446						0		30	H
1,2-Dibromo-3-chloropropane	ND	1.11						0		30	H
1,2,4-Trimethylbenzene	ND	0.0446						0		30	H
Hexachlorobutadiene	ND	0.223						0		30	H
Naphthalene	ND	0.0669						0		30	H
1,2,3-Trichlorobenzene	ND	0.0446						0		30	H
Surr: Dibromofluoromethane	2.41		2.786		86.3	56.5	129		0		H
Surr: Toluene-d8	2.77		2.786		99.6	64.5	151		0		H
Surr: 1-Bromo-4-fluorobenzene	2.54		2.786		91.1	63.1	141		0		H

NOTES:

Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Sample ID	1705319-006BDUP	SampType:	DUP	Units:	mg/Kg-dry	Prep Date:	6/1/2017	RunNo:	36580		
Client ID:	BATCH	Batch ID:	17238			Analysis Date:	6/2/2017	SeqNo:	702078		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	ND	0.0810						0		30	
Chloromethane	ND	0.0810						0		30	
Vinyl chloride	ND	0.00270						0		30	
Bromomethane	ND	0.121						0		30	
Trichlorofluoromethane (CFC-11)	ND	0.0675						0		30	
Chloroethane	ND	0.0810						0		30	
1,1-Dichloroethene	ND	0.0675						0		30	
Methylene chloride	ND	0.0270						0		30	
trans-1,2-Dichloroethene	ND	0.0270						0		30	
Methyl tert-butyl ether (MTBE)	ND	0.0675						0		30	



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Volatile Organic Compounds by EPA Method 8260C

Sample ID: 1705319-006BDUP	SampType: DUP	Units: mg/Kg-dry				Prep Date: 6/1/2017			RunNo: 36580		
Client ID: BATCH	Batch ID: 17238					Analysis Date: 6/2/2017			SeqNo: 702078		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethane	ND	0.0270						0		30	
2,2-Dichloropropane	ND	0.0675						0		30	Q
cis-1,2-Dichloroethene	ND	0.0270						0		30	
Chloroform	ND	0.0270						0		30	
1,1,1-Trichloroethane (TCA)	ND	0.0270						0		30	
1,1-Dichloropropene	ND	0.0270						0		30	
Carbon tetrachloride	ND	0.0270						0		30	
1,2-Dichloroethane (EDC)	ND	0.0405						0		30	
Benzene	ND	0.0270						0		30	
Trichloroethene (TCE)	ND	0.0270						0		30	
1,2-Dichloropropane	ND	0.0270						0		30	
Bromodichloromethane	ND	0.0270						0		30	
Dibromomethane	ND	0.0540						0		30	
cis-1,3-Dichloropropene	ND	0.0270						0		30	
Toluene	0.0275	0.0270						0.02478	10.3	30	
trans-1,3-Dichloropropylene	ND	0.0405						0		30	
1,1,2-Trichloroethane	ND	0.0405						0		30	
1,3-Dichloropropane	ND	0.0675						0		30	
Tetrachloroethene (PCE)	ND	0.0270						0		30	
Dibromochloromethane	ND	0.0405						0		30	
1,2-Dibromoethane (EDB)	ND	0.00675						0		30	
Chlorobenzene	ND	0.0270						0		30	
1,1,1,2-Tetrachloroethane	ND	0.0405						0		30	
Ethylbenzene	ND	0.0405						0		30	
m,p-Xylene	0.0450	0.0270						0.04503	0.00449	30	
o-Xylene	ND	0.0270						0		30	
Styrene	ND	0.0270						0		30	
Isopropylbenzene	ND	0.108						0		30	
Bromoform	ND	0.0270						0		30	Q
1,1,1,2,2-Tetrachloroethane	ND	0.0270						0		30	
n-Propylbenzene	ND	0.0270						0		30	

Work Order: 1705317
CLIENT: GeoEngineers
Project: Rufus 2.0 - Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID: 1705319-006BDUP	SampType: DUP	Units: mg/Kg-dry			Prep Date: 6/1/2017			RunNo: 36580			
Client ID: BATCH	Batch ID: 17238				Analysis Date: 6/2/2017			SeqNo: 702078			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Bromobenzene	ND	0.0405						0		30	
1,3,5-Trimethylbenzene	ND	0.0270						0		30	
2-Chlorotoluene	ND	0.0270						0		30	
4-Chlorotoluene	ND	0.0270						0		30	
tert-Butylbenzene	ND	0.0270						0		30	
1,2,3-Trichloropropane	ND	0.0270						0		30	
1,2,4-Trichlorobenzene	ND	0.0675						0		30	
sec-Butylbenzene	ND	0.0270						0		30	
4-Isopropyltoluene	ND	0.0270						0		30	
1,3-Dichlorobenzene	ND	0.0270						0		30	
1,4-Dichlorobenzene	ND	0.0270						0		30	
n-Butylbenzene	ND	0.0270						0		30	
1,2-Dichlorobenzene	ND	0.0270						0		30	
1,2-Dibromo-3-chloropropane	ND	0.675						0		30	
1,2,4-Trimethylbenzene	0.0586	0.0270						0.05817	0.743	30	
Hexachlorobutadiene	ND	0.135						0		30	
Naphthalene	ND	0.0405						0		30	
1,2,3-Trichlorobenzene	ND	0.0270						0		30	
Surr: Dibromofluoromethane	1.49		1.687		88.5	56.5	129		0		
Surr: Toluene-d8	1.68		1.687		99.8	64.5	151		0		
Surr: 1-Bromo-4-fluorobenzene	1.56		1.687		92.3	63.1	141		0		

NOTES:

Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Sample ID	1705317-002BMS	SampType:	MS	Units:	mg/Kg-dry	Prep Date:	6/1/2017	RunNo:	36580		
Client ID:	B18-3-5.0	Batch ID:	17238			Analysis Date:	6/2/2017	SeqNo:	702071		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	1.79	0.0600	0.9994	0	180	43.5	121				SH
Chloromethane	1.37	0.0600	0.9994	0	137	45	130				SH
Vinyl chloride	1.22	0.00200	0.9994	0	123	51.2	146				H

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CLIENT: GeoEngineers
Project: Rufus 2.0 - Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID	1705317-002BMS	SampType:	MS	Units:	mg/Kg-dry	Prep Date:	6/1/2017	RunNo:	36580		
Client ID:	B18-3-5.0	Batch ID:	17238			Analysis Date:	6/2/2017	SeqNo:	702071		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Bromomethane	0.861	0.0899	0.9994	0	86.1	21.3	120				H
Trichlorofluoromethane (CFC-11)	0.998	0.0500	0.9994	0	99.9	35	131				H
Chloroethane	1.03	0.0600	0.9994	0	103	31.9	123				H
1,1-Dichloroethene	0.990	0.0500	0.9994	0	99.1	61.9	141				H
Methylene chloride	1.09	0.0200	0.9994	0	109	54.7	142				H
trans-1,2-Dichloroethene	1.04	0.0200	0.9994	0	104	52	136				H
Methyl tert-butyl ether (MTBE)	1.02	0.0500	0.9994	0	102	54.4	132				H
1,1-Dichloroethane	1.06	0.0200	0.9994	0	106	51.8	141				H
2,2-Dichloropropane	1.06	0.0500	0.9994	0	106	36	123				H
cis-1,2-Dichloroethene	1.02	0.0200	0.9994	0	102	58.6	136				H
Chloroform	1.03	0.0200	0.9994	0	103	53.2	129				H
1,1,1-Trichloroethane (TCA)	0.942	0.0200	0.9994	0	94.3	58.3	145				H
1,1-Dichloropropene	0.961	0.0200	0.9994	0	96.1	55.1	138				H
Carbon tetrachloride	0.785	0.0200	0.9994	0	78.5	53.3	144				H
1,2-Dichloroethane (EDC)	0.996	0.0300	0.9994	0	99.7	51.3	139				H
Benzene	1.04	0.0200	0.9994	0	104	63.5	133				H
Trichloroethene (TCE)	1.08	0.0200	0.9994	0	108	68.6	132				H
1,2-Dichloropropane	1.02	0.0200	0.9994	0	102	59	136				H
Bromodichloromethane	0.852	0.0200	0.9994	0	85.3	50.7	141				H
Dibromomethane	0.933	0.0400	0.9994	0	93.4	50.6	137				H
cis-1,3-Dichloropropene	1.02	0.0200	0.9994	0	102	50.4	138				H
Toluene	1.08	0.0200	0.9994	0	108	63.4	132				H
trans-1,3-Dichloropropylene	0.997	0.0300	0.9994	0	99.8	44.1	147				H
1,1,2-Trichloroethane	0.966	0.0300	0.9994	0	96.7	51.6	137				H
1,3-Dichloropropane	0.977	0.0500	0.9994	0	97.7	53.1	134				H
Tetrachloroethene (PCE)	1.03	0.0200	0.9994	0	103	35.6	158				H
Dibromochloromethane	0.882	0.0300	0.9994	0	88.3	55.3	140				H
1,2-Dibromoethane (EDB)	0.972	0.00500	0.9994	0	97.3	50.4	136				H
Chlorobenzene	1.02	0.0200	0.9994	0	102	60	133				H
1,1,1,2-Tetrachloroethane	0.928	0.0300	0.9994	0	92.8	53.1	142				H
Ethylbenzene	1.02	0.0300	0.9994	0	103	54.5	134				H

Work Order: 1705317
CLIENT: GeoEngineers
Project: Rufus 2.0 - Block 18

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Volatile Organic Compounds by EPA Method 8260C

Sample ID	1705317-002BMS		SampType: MS		Units: mg/Kg-dry		Prep Date: 6/1/2017		RunNo: 36580		
Client ID:	B18-3-5.0		Batch ID: 17238		Analysis Date: 6/2/2017				SeqNo: 702071		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
m,p-Xylene	2.07	0.0200	1.999	0	104	53.1	132				H
o-Xylene	1.04	0.0200	0.9994	0	104	53.3	139				H
Styrene	1.01	0.0200	0.9994	0	101	51.1	132				H
Isopropylbenzene	1.01	0.0800	0.9994	0	101	58.9	138				H
Bromoform	0.681	0.0200	0.9994	0	68.1	57.9	130				H
1,1,2,2-Tetrachloroethane	0.772	0.0200	0.9994	0	77.3	51.9	131				H
n-Propylbenzene	0.975	0.0200	0.9994	0	97.6	53.6	140				H
Bromobenzene	0.989	0.0300	0.9994	0	99.0	54.2	140				H
1,3,5-Trimethylbenzene	0.992	0.0200	0.9994	0	99.3	51.8	136				H
2-Chlorotoluene	1.03	0.0200	0.9994	0	103	51.6	136				H
4-Chlorotoluene	1.00	0.0200	0.9994	0	100	50.1	139				H
tert-Butylbenzene	1.01	0.0200	0.9994	0	101	50.5	135				H
1,2,3-Trichloropropane	0.915	0.0200	0.9994	0	91.6	50.5	131				H
1,2,4-Trichlorobenzene	1.08	0.0500	0.9994	0	108	50.8	130				H
sec-Butylbenzene	1.02	0.0200	0.9994	0	102	52.6	141				H
4-Isopropyltoluene	1.03	0.0200	0.9994	0	103	52.9	134				H
1,3-Dichlorobenzene	1.08	0.0200	0.9994	0	108	52.6	131				H
1,4-Dichlorobenzene	1.07	0.0200	0.9994	0	107	52.9	129				H
n-Butylbenzene	1.08	0.0200	0.9994	0	109	52.6	130				H
1,2-Dichlorobenzene	1.03	0.0200	0.9994	0	104	55.8	129				H
1,2-Dibromo-3-chloropropane	0.673	0.500	0.9994	0	67.3	40.5	131				H
1,2,4-Trimethylbenzene	0.997	0.0200	0.9994	0	99.8	50.6	137				H
Hexachlorobutadiene	1.24	0.0999	0.9994	0	124	40.6	158				H
Naphthalene	1.02	0.0300	0.9994	0	102	52.3	124				H
1,2,3-Trichlorobenzene	1.05	0.0200	0.9994	0	105	54.4	124				H
Surr: Dibromofluoromethane	1.24		1.249		98.9	56.5	129				H
Surr: Toluene-d8	1.31		1.249		105	64.5	151				H
Surr: 1-Bromo-4-fluorobenzene	1.30		1.249		104	63.1	141				H

NOTES:

S - Outlying spike recovery(ies) observed.

Work Order: 1705317
CLIENT: GeoEngineers
Project: Rufus 2.0 - Block 18

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260C

Sample ID	1705317-002BMSD		SampType: MSD		Units: mg/Kg-dry		Prep Date: 6/1/2017		RunNo: 36580		
Client ID:	B18-3-5.0		Batch ID: 17238		Analysis Date: 6/2/2017				SeqNo: 702072		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dichlorodifluoromethane (CFC-12)	1.78	0.0600	0.9994	0	178	43.5	121	1.795	0.908	30	SH
Chloromethane	1.77	0.0600	0.9994	0	177	45	130	1.374	25.4	30	SH
Vinyl chloride	1.37	0.00200	0.9994	0	137	51.2	146	1.225	11.1	30	H
Bromomethane	0.914	0.0899	0.9994	0	91.5	21.3	120	0.8610	5.99	30	H
Trichlorofluoromethane (CFC-11)	1.04	0.0500	0.9994	0	104	35	131	0.9984	4.15	30	H
Chloroethane	1.06	0.0600	0.9994	0	106	31.9	123	1.032	2.81	30	H
1,1-Dichloroethene	1.03	0.0500	0.9994	0	103	61.9	141	0.9903	4.10	30	H
Methylene chloride	1.06	0.0200	0.9994	0	106	54.7	142	1.086	2.36	30	H
trans-1,2-Dichloroethene	1.03	0.0200	0.9994	0	103	52	136	1.038	1.15	30	H
Methyl tert-butyl ether (MTBE)	1.02	0.0500	0.9994	0	102	54.4	132	1.020	0.148	30	H
1,1-Dichloroethane	1.06	0.0200	0.9994	0	106	51.8	141	1.057	0.219	30	H
2,2-Dichloropropane	1.08	0.0500	0.9994	0	108	36	123	1.057	1.80	30	H
cis-1,2-Dichloroethene	1.03	0.0200	0.9994	0	103	58.6	136	1.018	1.09	30	H
Chloroform	1.01	0.0200	0.9994	0	101	53.2	129	1.030	2.07	30	H
1,1,1-Trichloroethane (TCA)	0.953	0.0200	0.9994	0	95.4	58.3	145	0.9420	1.18	30	H
1,1-Dichloropropene	0.959	0.0200	0.9994	0	96.0	55.1	138	0.9605	0.137	30	H
Carbon tetrachloride	0.888	0.0200	0.9994	0	88.8	53.3	144	0.7849	12.3	30	H
1,2-Dichloroethane (EDC)	0.986	0.0300	0.9994	0	98.7	51.3	139	0.9964	1.03	30	H
Benzene	1.01	0.0200	0.9994	0	101	63.5	133	1.037	2.90	30	H
Trichloroethene (TCE)	1.06	0.0200	0.9994	0	106	68.6	132	1.077	1.18	30	H
1,2-Dichloropropane	1.01	0.0200	0.9994	0	101	59	136	1.017	1.18	30	H
Bromodichloromethane	0.857	0.0200	0.9994	0	85.7	50.7	141	0.8523	0.501	30	H
Dibromomethane	0.932	0.0400	0.9994	0	93.2	50.6	137	0.9330	0.129	30	H
cis-1,3-Dichloropropene	1.03	0.0200	0.9994	0	103	50.4	138	1.020	1.33	30	H
Toluene	1.05	0.0200	0.9994	0	106	63.4	132	1.078	2.20	30	H
trans-1,3-Dichloropropylene	1.01	0.0300	0.9994	0	101	44.1	147	0.9970	1.69	30	H
1,1,2-Trichloroethane	0.941	0.0300	0.9994	0	94.1	51.6	137	0.9665	2.72	30	H
1,3-Dichloropropane	0.977	0.0500	0.9994	0	97.7	53.1	134	0.9769	0.0116	30	H
Tetrachloroethene (PCE)	1.02	0.0200	0.9994	0	102	35.6	158	1.027	0.527	30	H
Dibromochloromethane	0.877	0.0300	0.9994	0	87.7	55.3	140	0.8822	0.638	30	H
1,2-Dibromoethane (EDB)	0.950	0.00500	0.9994	0	95.0	50.4	136	0.9725	2.34	30	H

Work Order: 1705317
CLIENT: GeoEngineers
Project: Rufus 2.0 - Block 18

QC SUMMARY REPORT
Volatile Organic Compounds by EPA Method 8260C

Sample ID	1705317-002BMSD	SampType: MSD	Units: mg/Kg-dry			Prep Date: 6/1/2017			RunNo: 36580		
Client ID:	B18-3-5.0	Batch ID:	17238				Analysis Date: 6/2/2017			SeqNo: 702072	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorobenzene	1.02	0.0200	0.9994	0	102	60	133	1.024	0.0923	30	H
1,1,1,2-Tetrachloroethane	0.918	0.0300	0.9994	0	91.8	53.1	142	0.9276	1.08	30	H
Ethylbenzene	1.02	0.0300	0.9994	0	102	54.5	134	1.025	0.802	30	H
m,p-Xylene	2.05	0.0200	1.999	0	102	53.1	132	2.070	1.12	30	H
o-Xylene	1.03	0.0200	0.9994	0	103	53.3	139	1.043	0.965	30	H
Styrene	1.00	0.0200	0.9994	0	100	51.1	132	1.009	0.809	30	H
Isopropylbenzene	1.01	0.0800	0.9994	0	101	58.9	138	1.014	0.0453	30	H
Bromoform	0.684	0.0200	0.9994	0	68.5	57.9	130	0.6810	0.486	30	H
1,1,2,2-Tetrachloroethane	0.779	0.0200	0.9994	0	77.9	51.9	131	0.7725	0.827	30	H
n-Propylbenzene	0.980	0.0200	0.9994	0	98.0	53.6	140	0.9754	0.455	30	H
Bromobenzene	0.995	0.0300	0.9994	0	99.5	54.2	140	0.9890	0.580	30	H
1,3,5-Trimethylbenzene	0.993	0.0200	0.9994	0	99.3	51.8	136	0.9920	0.0846	30	H
2-Chlorotoluene	1.02	0.0200	0.9994	0	102	51.6	136	1.028	1.01	30	H
4-Chlorotoluene	0.999	0.0200	0.9994	0	100	50.1	139	1.002	0.301	30	H
tert-Butylbenzene	1.00	0.0200	0.9994	0	100	50.5	135	1.006	0.518	30	H
1,2,3-Trichloropropane	0.851	0.0200	0.9994	0	85.2	50.5	131	0.9153	7.26	30	H
1,2,4-Trichlorobenzene	1.11	0.0500	0.9994	0	111	50.8	130	1.079	2.82	30	H
sec-Butylbenzene	1.02	0.0200	0.9994	0	102	52.6	141	1.021	0.00245	30	H
4-Isopropyltoluene	1.04	0.0200	0.9994	0	104	52.9	134	1.031	0.742	30	H
1,3-Dichlorobenzene	1.08	0.0200	0.9994	0	108	52.6	131	1.076	0.0607	30	H
1,4-Dichlorobenzene	1.05	0.0200	0.9994	0	105	52.9	129	1.066	1.56	30	H
n-Butylbenzene	1.10	0.0200	0.9994	0	110	52.6	130	1.084	1.10	30	H
1,2-Dichlorobenzene	1.04	0.0200	0.9994	0	104	55.8	129	1.035	0.378	30	H
1,2-Dibromo-3-chloropropane	0.698	0.500	0.9994	0	69.8	40.5	131	0.6728	3.63	30	H
1,2,4-Trimethylbenzene	0.987	0.0200	0.9994	0	98.7	50.6	137	0.9975	1.10	30	H
Hexachlorobutadiene	1.26	0.0999	0.9994	0	126	40.6	158	1.240	1.47	30	H
Naphthalene	1.10	0.0300	0.9994	0	111	52.3	124	1.023	7.71	30	H
1,2,3-Trichlorobenzene	1.09	0.0200	0.9994	0	109	54.4	124	1.046	4.38	30	H
Surr: Dibromofluoromethane	1.23		1.249		98.6	56.5	129		0		H
Surr: Toluene-d8	1.30		1.249		104	64.5	151		0		H
Surr: 1-Bromo-4-fluorobenzene	1.32		1.249		106	63.1	141		0		H



Date: 6/5/2017

Work Order: 1705317
CLIENT: GeoEngineers
Project: Rufus 2.0 - Block 18

QC SUMMARY REPORT
Volatile Organic Compounds by EPA Method 8260C

Sample ID	1705317-002BMSD	SampType:	MSD	Units:	mg/Kg-dry	Prep Date:	6/1/2017	RunNo:	36580		
Client ID:	B18-3-5.0	Batch ID:	17238			Analysis Date:	6/2/2017	SeqNo:	702072		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

NOTES:

S - Outlying spike recovery(ies) observed.

Client Name: **GEI**
 Logged by: **Clare Griggs**

Work Order Number: **1705317**
 Date Received: **5/9/2017 1:40:00 PM**

Chain of Custody

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

Log In

3. Coolers are present? Yes ☒ No ☐ NA ☐
 4. Shipping container/cooler in good condition? Yes ☒ No ☐
 5. Custody Seals present on shipping container/cooler?
 (Refer to comments for Custody Seals not intact) Yes ☐ No ☐ Not Required ☒
 6. Was an attempt made to cool the samples? Yes ☒ No ☐ NA ☐
 7. Were all items received at a temperature of >0°C to 10.0°C* Yes ☐ No ☒ NA ☐
Please refer to item information.
 8. Sample(s) in proper container(s)? Yes ☒ No ☐
 9. Sufficient sample volume for indicated test(s)? Yes ☒ No ☐
 10. Are samples properly preserved? Yes ☒ No ☐
 11. Was preservative added to bottles? Yes ☐ No ☒ NA ☐
 12. Is there headspace in the VOA vials? Yes ☐ No ☐ NA ☒
 13. Did all samples containers arrive in good condition(unbroken)? Yes ☒ No ☐
 14. Does paperwork match bottle labels? Yes ☒ No ☐
 15. Are matrices correctly identified on Chain of Custody? Yes ☒ No ☐
 16. Is it clear what analyses were requested? Yes ☒ No ☐
 17. Were all holding times able to be met? Yes ☐ No ☒

Special Handling (if applicable)

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

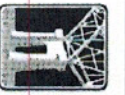
Person Notified: Date
 By Whom: Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person
 Regarding:
 Client Instructions:

19. Additional remarks:

Item Information

Item #	Temp °C
Cooler	12.6
Sample	13.7
TempBlank	13.8

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C



Fremont

3600 Fremont Ave. N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: 5-8-17

Page: 1 of 1

Laboratory Project No (internal):

1705317

Project Name: R/Ls 2.0 - Block 18

Special Remarks:

Project No: 70434-001-31

Collected by: Connor Kingston

Location: Seattle, WA

Report To (PM): Chris Brown

Sample Disposal: ☐ Return to client ☒ Disposal by lab (after 30 days)

Client: Geo Engineers

Address: 600 Stewart St, Suite 1700

City, State, Zip: Seattle, WA

Telephone:

Fax:

PM Email: chbrown@geoengineers.com

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	VOCs (EPA 8260 / 624)	GX/BTEX	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DO)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T) Dissolved (D)	Anions (IC)**	EDB (8011)	Comments	
1 B18-3-2.5	5-8-17	0825	S															Held
2 B18-3-5.0		0830		X			X						X					
3 B18-3-7.5		0835																
4 B18-3-10.0		0840																
5 B18-3-15.0		0845		X			X						X					
6																		
7																		
8																		
9																		
10																		

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

**Metals (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL Individual: Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Tl Ti U V Zn

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate-Nitrite

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above and that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Relinquished Date/Time

5/8/17 1:40

Received

5/8/17

Date/Time

5/8/17 1340

Relinquished Date/Time

5/8/17 1340

Received

5/8/17

Date/Time

5/8/17 1340

Turn-around Time:

☒ Standard

☐ 3 Day

☐ 2 Day

☐ Next Day

☐ Same Day

(specify)



Fremont
Analytical

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

GeoEngineers

Chris Brown
600 Stewart Street, Suite 1700
Seattle, WA 98101

RE: Rufus 2.0 Block 18
Work Order Number: 1706341

June 29, 2017

Attention Chris Brown:

Fremont Analytical, Inc. received 1 sample(s) on 6/28/2017 for the analyses presented in the following report.

Dissolved Metals by EPA Method 200.8

Total Metals by EPA Method 200.8

This report consists of the following:

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

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

Thank you for using Fremont Analytical.

Sincerely,

Mike Ridgeway
Laboratory Director

DoD/ELAP Certification #L17-135, ISO/IEC 17025:2005
ORELAP Certification: WA 100009-007 (NELAP Recognized)

Original

www.fremontanalytical.com

Page 1 of 10

CLIENT: GeoEngineers
Project: Rufus 2.0 Block 18
Work Order: 1706341

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
1706341-001	MW18-1-06272017	06/27/2017 8:00 PM	06/28/2017 11:30 AM

CLIENT: GeoEngineers
Project: Rufus 2.0 Block 18

I. SAMPLE RECEIPT:

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

II. GENERAL REPORTING COMMENTS:

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

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

III. ANALYSES AND EXCEPTIONS:

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

Qualifiers:

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

Acronyms:

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



Analytical Report

Work Order: 1706341
Date Reported: 6/29/2017

Client: GeoEngineers

Collection Date: 6/27/2017 8:00:00 PM

Project: Rufus 2.0 Block 18

Lab ID: 1706341-001

Matrix: Water

Client Sample ID: MW18-1-06272017

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
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Dissolved Metals by EPA Method 200.8

Batch ID: 17495

Analyst: TN

Arsenic	1.05	1.00		µg/L	1	6/29/2017 11:19:56 AM
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Total Metals by EPA Method 200.8

Batch ID: 17496

Analyst: TN

Arsenic	1.27	1.00		µg/L	1	6/29/2017 12:00:14 PM
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Work Order: 1706341
CLIENT: GeoEngineers
Project: Rufus 2.0 Block 18

QC SUMMARY REPORT

Dissolved Metals by EPA Method 200.8

Sample ID	MB-17494FB	SampType:	MBLK			Units:	µg/L			Prep Date:	6/29/2017		RunNo:	37097	
Client ID:	MBLKW	Batch ID:	17495						Analysis Date:	6/29/2017			SeqNo:	712812	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val		%RPD	RPDLimit	Qual		

Arsenic ND 1.00

NOTES:
 Filter Blank

Sample ID	MB-17495	SampType:	MBLK			Units:	µg/L			Prep Date:	6/29/2017		RunNo:	37097	
Client ID:	MBLKW	Batch ID:	17495							Analysis Date:	6/29/2017		SeqNo:	712813	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val		%RPD	RPDLimit	Qual		

Arsenic ND 1.00

Sample ID	LCS-17495	SampType:	LCS	Units:	µg/L	Prep Date:	6/29/2017	RunNo:	37097		
Client ID:	LCSW	Batch ID:	17495			Analysis Date:	6/29/2017	SeqNo:	712814		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Arsenic 101 1.00 100.0 0 101 85 115

Sample ID	1706341-001BDUP	SampType:	DUP	Units:	µg/L	Prep Date:	6/29/2017	RunNo:	37097			
Client ID:	MW18-1-06272017	Batch ID:	17495			Analysis Date:	6/29/2017	SeqNo:	712816			
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Arsenic ND 1.00 1.052 11.1 30

Sample ID	1706341-001BMS	SampType:	MS	Units:	µg/L	Prep Date:	6/29/2017	RunNo:	37097			
Client ID:	MW18-1-06272017	Batch ID:	17495			Analysis Date:	6/29/2017	SeqNo:	712817			
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Arsenic 546 1.00 500.0 1.052 109 70 130



Work Order: 1706341
CLIENT: GeoEngineers
Project: Rufus 2.0 Block 18

QC SUMMARY REPORT

Dissolved Metals by EPA Method 200.8

Sample ID	1706341-001BMSD	SampType: MSD			Units: µg/L	Prep Date: 6/29/2017			RunNo: 37097		
Client ID:	MW18-1-06272017	Batch ID: 17495			Analysis Date: 6/29/2017			SeqNo: 712818			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	550	1.00	500.0	1.052	110	70	130	545.6	0.728	30	



Date: 6/29/2017

Work Order: 1706341
CLIENT: GeoEngineers
Project: Rufus 2.0 Block 18

QC SUMMARY REPORT
Total Metals by EPA Method 200.8

Sample ID	MB-17496	SampType:	MBLK			Units:	µg/L			Prep Date:	6/29/2017		RunNo:	37108	
Client ID:	MBLKW	Batch ID:	17496						Analysis Date:	6/29/2017			SeqNo:	713008	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val		%RPD	RPDLimit	Qual		

Arsenic ND 1.00

Sample ID	LCS-17496	SampType:	LCS	Units:	µg/L	Prep Date:	6/29/2017	RunNo:	37108			
Client ID:	LCSW	Batch ID:	17496			Analysis Date:	6/29/2017	SeqNo:	713011			
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Arsenic 102 1.00 100.0 0 102 85 115

Sample ID	1706341-001ADUP	SampType:	DUP	Units:	µg/L	Prep Date:	6/29/2017	RunNo:	37108			
Client ID:	MW18-1-06272017	Batch ID:	17496			Analysis Date:	6/29/2017	SeqNo:	713013			
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Arsenic 1.54 1.00 1.270 19.1 30

Sample ID	1706341-001AMS	SampType:	MS	Units:	µg/L	Prep Date:	6/29/2017	RunNo:	37108			
Client ID:	MW18-1-06272017	Batch ID:	17496			Analysis Date:	6/29/2017	SeqNo:	713014			
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Arsenic 539 1.00 500.0 1.270 108 70 130

Sample ID	1706341-001AMSD	SampType:	MSD	Units:	µg/L	Prep Date:	6/29/2017	RunNo:	37108			
Client ID:	MW18-1-06272017	Batch ID:	17496			Analysis Date:	6/29/2017	SeqNo:	713015			
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Arsenic 507 1.00 500.0 1.270 101 70 130 539.5 6.25 30

Client Name: **GEI**
 Logged by: **Clare Griggs**

Work Order Number: **1706341**
 Date Received: **6/28/2017 11:30:00 AM**

Chain of Custody

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

Log In

3. Coolers are present? Yes ☒ No ☐ NA ☐
 4. Shipping container/cooler in good condition? Yes ☒ No ☐
 5. Custody Seals present on shipping container/cooler?
 (Refer to comments for Custody Seals not intact) Yes ☐ No ☐ Not Required ☒
 6. Was an attempt made to cool the samples? Yes ☒ No ☐ NA ☐
 7. Were all items received at a temperature of >0°C to 10.0°C* Yes ☒ No ☐ NA ☐
 8. Sample(s) in proper container(s)? Yes ☒ No ☐
 9. Sufficient sample volume for indicated test(s)? Yes ☒ No ☐
 10. Are samples properly preserved? Yes ☒ No ☐
 11. Was preservative added to bottles? Yes ☐ No ☒ NA ☐
 12. Is there headspace in the VOA vials? Yes ☐ No ☐ NA ☒
 13. Did all samples containers arrive in good condition(unbroken)? Yes ☒ No ☐
 14. Does paperwork match bottle labels? Yes ☒ No ☐
 15. Are matrices correctly identified on Chain of Custody? Yes ☒ No ☐
 16. Is it clear what analyses were requested? Yes ☒ No ☐
 17. Were all holding times able to be met? Yes ☒ No ☐

Special Handling (if applicable)

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

Person Notified: Date
 By Whom: Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person
 Regarding:
 Client Instructions:

19. Additional remarks:

Item Information

Item #	Temp °C
Cooler	4.2
Sample	9.4

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C



3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: 6/28/2017 Page: 1 of 1

Project Name: Rufus 2.0 Block 18

Project No:

Collected by: Lenor Kingston

Location: Block 18

Report To (PM): Chris Brown

PM Email: lbrown@geosynetics.com

Laboratory Project No (Internal): 17060341

Special Remarks:

Sample Disposal: ☐ Return to client ☒ Disposal by lab (after 30 days)

Client: Geosynetics

Address: 600 Stewart St. Suite 1700

City, State, zip: Seattle, WA

Telephone:

Fax:

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	VOCs (EPA 8260 / 624)	GX/BTEX	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DH)	SVOCS (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T) / Dissolved (D)	Anions (IC)***	EDB (8011)	Comments
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1 MW18-1 - 06272017

6/27

2000

Water

X

X

Total + Dissolved As.

2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

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

**Metals (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL Individual: Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Tl Ti U V Zn

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate+Nitrite

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above and that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Retinquished

Date/Time 6/25/2017 1130

Received

Date/Time 6/28/17 1130

Received

Date/Time

Same Day

(specify)

Have we delivered World Class Client Service?

Please let us know by visiting [**www.geoengineers.com/feedback**](http://www.geoengineers.com/feedback).

