Pilot Test Report
Boeing Field Chevron
10805 East Marginal Way South
Tukwila, Washington 98168
Ecology Facility/Site No.: 2551
Agreed Order No.: DE-10947

Prepared for: Mr. Rajbir Sandhu
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G-Logics Project 01-0410-R

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Mr. Dale Myers
Washington State Department of Ecology, NWRO
15700 Dayton Avenue North
Shoreline, Washington 98133

Subject: **Revised Pilot Test Report**
Boeing Field Chevron
10805 East Marginal Way South
Tukwila, Washington 98168

Dear Mr. Myers:

This revised Pilot Test Report presents the purpose, approach, and results of the in-situ chemical oxidation (ISCO) and total liquids extraction pilot test performed by G-Logics, an Atlas Geosciences NW Company, at the above-referenced property. The revised Pilot Test Report addresses comments made by the Washington State Department of Ecology on the draft Pilot Test Report dated November 20, 2023. We trust the information presented in this report meets your needs at this time. Should you require additional information or have any questions, please contact us at your convenience. Thank you again for this opportunity to be of service.

Sincerely,
G-Logics, an Atlas Geosciences NW Company

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Principal Project Manager

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1.0 INTRODUCTION

G-Logics, an Atlas Geosciences NW company, completed an in-situ chemical oxidation (ISCO) and total liquids extraction pilot test at the Boeing Field Chevron property (Property) located at 10805 East Marginal Way South, in Tukwila, Washington 98168 (Figure 1). The pilot test was performed in accordance with the *Pilot Test Workplan, Boeing Field Chevron, 10805 East Marginal Way South, Tukwila, Washington,* prepared by G-Logics and dated June 21, 2022 (the Pilot Test Workplan). The purpose of the pilot test was to evaluate the reduction of light nonaqueous-phase liquid (LNAPL) and the reduction of dissolved and soil-sorbed gasoline contaminant mass in groundwater at the Property using the ISCO reagent product PetroCleanze™. PetroCleanze is a combination of RegenOx® Part A and PetroCleanze activator (the injectate). The Pilot Test Workplan presents a detailed discussion of the injectate.

For the purposes of this document, the "Site" refers to the areas of soil, groundwater, and soil gas that have been impacted with petroleum contaminants originating from the fuel storage and dispensing operations on the Property. Contaminants of concern have been identified as LNAPL, gasoline range organics (GRO), and benzene.

2.0 BACKGROUND

Service-station operations have been conducted on, or adjacent to, the Property since at least 1941. During this period, the Site, as defined in the Remedial Investigation Report, prepared by G-Logics and dated October 7, 2020 (RI Report), has been impacted by at least three separate releases of petroleum products. The first two of these consisted of unquantified releases of petroleum products associated with service-station operations through approximately 1984 (reported in 1990) and a minor release in 1996 of unspecified petroleum products discovered during the removal of an underground storage tank. The most recent release of gasoline products was associated with a fuel supply line leak, first reported to the Washington State Department of Ecology (Ecology) in 2003.

Three general phases of environmental assessment and remediation efforts have been conducted at the Property since 1990. The first phase of work was performed in association with releases reported in 1990 and 1996 (soil excavation), and a second phase was performed as an initial response to the 2003 release (supply line repairs and additional soil excavation)

and included enhanced fluid recovery in 2006, additional exploration, ISCO using Fenton's Reagent, and passive fluid recovery between 2006 and 2008. Following the execution of the Agreed Order, a third phase of environmental assessment and remediation activities was initiated for the Site, which included additional site characterization, decommissioning of wells, a tidal study, aquifer testing, and a sparge and soil vapor extraction pilot test. A detailed discussion of the historical environmental actions at the Site between 1990 and 2017 is included in Section 2.7 of the RI Report.

2.1 Environmental Conditions

A review of a regional geologic map indicates that the surface of the Site is underlain by Quaternary Alluvium (Qa). Qa deposits are typically silt, sand, and gravel deposited in stream beds and river valleys.

Soil borings on the Site generally encountered fill materials, as well as silty sand and gravel to approximately 12 feet below ground surface (bgs). Beneath this layer, silty clay was found to depths of approximately 12 to 18 feet bgs. Deeper borings recovered coarser-grained black sand from approximately 18 feet to 40 feet bgs

2.2 Hydrogeology

Two separate water-bearing zones underlie the Site. These two zones are identified as an upper, laterally discontinuous, perched zone (Upper Saturated Zone) and a lower, semi-confined aquifer (Lower Saturated Zone). The Upper Saturated Zone occurs within the fill materials and within native shallow silty sands. Tidal fluctuations in the Upper Saturated Zone are minimal to absent. The Lower Saturated Zone is within the lower sand unit and is tidally influenced by the Duwamish River located approximately 275 feet to the west. The two saturated zones are separated by a 2- to 6-foot-thick layer of clayey silt and organic material, which appears to serve as a semi-confining layer between the two zones. In the western portion of the Site, this layer may have been partially removed by previous remedial excavations and/or excavations for the utility corridor within the Tukwila International Boulevard (TIB) right-of-way.

Based on results from the 2016 tidal study performed at the Site by G-Logics, the tidal effect of the Duwamish River on the Lower Saturated Zone extends into the TIB right-of-way and partially into the Property. At high tide, the groundwater in the Lower Saturated Zone flows from the Duwamish River toward the Property. Groundwater in the Upper Saturated Zone at

low and high tide generally flows from the Property toward the Duwamish River. At low tide, the groundwater in the Lower Saturated Zones flows from the Property toward the Duwamish River. Additional details regarding the hydrogeologic conditions at the Site, including tidal influence, are included in the RI Report.

3.0 PILOT TEST APPROACH

The active applications of ISCO reagent during this pilot test were performed within the Upper Saturated Zone, in accordance with the Pilot Test Workplan. This focus was expected to allow evaluation of the remedy effects with limited potential for interference from conditions in other portions of the contaminated area, such as from the Lower Saturated Zone.

The injections targeted the Upper Saturated Zone near the suspected release point because of the high concentrations of GRO, DRO, and benzene in the groundwater at monitoring well IP-4 suggested the presence of LNAPL or anomalously high levels of residual petroleum entrained in soil near that well. Focus on injection within the Upper Saturated Zone in this area was expected to provide appropriate information to address the objectives of the pilot test.

Injection of ISCO reagent within the Lower Saturated Zone was not included as part of this pilot test. Injection into the Lower Saturated Zone was not planned for several reasons:

- Evaluation of hydraulic connection and LNAPL transport between the Upper Saturated Zone and Lower Saturated Zone could not be effectively evaluated if injections were completed in both zones.
- Pilot test injection into that zone was not expected to provide meaningful results because the larger contaminant mass within the Lower Saturated Zone was too large and stoichiometrically incompatible with even a full-scale ISCO injection program.
- The hydrogeologic complexities of the Lower Saturated Zone, including daily tidal influence on groundwater flow direction, were expected to further confound meaningful data interpretation for pilot test injections within that zone.

However, monitoring was performed during the pilot test to evaluate the remedy effects on the mass of petroleum hydrocarbons in the Lower Saturated Zone. The evaluation was

completed using changes in LNAPL accumulation, dissolved-phase concentrations, and geochemical conditions in the Lower Saturated Zone resulting from the pilot testing efforts.

For the pilot test, ISCO reagent product PetroCleanze was used, which is a combination of RegenOx Part A and PetroCleanze activator. In addition to oxidizing contaminants, the reaction of these chemicals with petroleum contaminants generates surfactant-like properties, increasing the desorption of petroleum hydrocarbons present in saturated soils. Dissolved oxygen is also another byproduct of the PetroCleanze reaction, potentially increasing the biodegradation of petroleum contaminants. The ISCO effect of the PetroCleanze reagent was expected to chemically oxidize and destroy the additional petroleum hydrocarbon mass made available by the PetroCleanze reaction. Additionally, the reagent is designed to mobilized LNAPL, which can be then physically removed by total liquids extraction at select wells by vacuum extraction.

4.0 PILOT TEST SCOPE OF WORK

The objectives of the pilot test were to evaluate whether PetroCleanze and total liquids extraction can be effective at mobilizing and accelerating the reduction of LNAPL mass and reducing dissolved-phase petroleum concentrations. The pilot test began with the installation of monitoring wells TW-4 and TW-5 in the Upper Saturated Zone. A baseline groundwater sampling event was performed to document Site conditions prior to the implementation of the pilot test. Progress groundwater monitoring was performed during the pilot test. Pilot test target wells for baseline and progress groundwater monitoring events included Upper Saturated Zone wells AS-1, IP-4, SVE-1, TW-1, TW-2, TW-3, TW-4, and TW-5, and Lower Saturated Zone wells IP-3, IP-5, and IP-7. The pilot test target well locations are shown in Figure 2. Figure 3 shows a representative cross section of Upper and Lower Saturated Zones. Figures 2 and 3 show the nature and extent of petroleum hydrocarbons on the Property at the time of the baseline groundwater monitoring event. Boring logs for pilot test wells TW-4 and TW-5 are presented in Appendix A.

It was anticipated that the surfactant-like effect of the ISCO reactions would enhance the recovery of LNAPL entrained in soil pore spaces and render it more available for physical removal, mobilizing LNAPL to the Upper Saturated Zone well IP-4, which is located approximately 8 to 10 feet from the injection points and in an area of potential LNAPL accumulation as determined in the RI Report (Figure 2). Fluid levels were measured before

and after each injection event and during progress groundwater sampling performed at the pilot test target wells AS-1, IP-3, IP-4, IP-5, IP-7, SVE-1, TW-1, TW-2, TW-3, TW-4, and TW-5 (Figure 2). Details discussing the progress groundwater monitoring program are included in Pilot Test Workplan.

5.0 PILOT TEST IMPLEMENTATION

The pilot test was implemented from August 2022 to July 2023. Scheduled pilot test events occurred as follows:

- Wells TW-4 and TW-5 were installed in the Upper Saturated Zone on August 12, 2022. The wells were installed by Cascade Drilling of Woodville, Washington (Cascade), under the observation of G-Logics. The wells were designed and installed in accordance with the Pilot Test Workplan. Four soil samples were collected from each of the borings. One soil sample from each boring was analyzed for total organic carbon (TOC) by U.S. Environmental Protection Agency (USEPA) Method 9060.

- G-Logics performed baseline groundwater monitoring on August 15, 2022, in accordance with the Pilot Test Workplan. Groundwater samples were analyzed for the following: GRO by Ecology Method NWTPH-Gx; benzene, toluene, ethylbenzene, and xylenes (BTEX) by USEPA Method 8260C; and diesel and oil range organics (DRO and ORO, respectively) by Ecology Method NWTPH-Dx. Groundwater samples collected during the baseline groundwater sampling event from Lower Saturated Zone wells IP-3, IP-5, and IP-7 were additionally analyzed for dissolved TOC by USEPA Method 9060A.

- Under the observation of G-Logics, Cascade advanced direct-push borings and performed injections in each boring on September 7, October 18, and December 20, 2022, in accordance with the Pilot Test Workplan. The injectate was only injected into the Upper Saturated Zone.. At each injection event, three borings were advanced and used as injection points. The first injection event occurred at injection points labeled with a “1” in Figure 2. The second and third injection events were performed at injection points labeled “2” and “3” in Figure 2. The direct-push drilling rig was used to push hollow, stainless steel drill rods with a retractable 4-foot slotted screen to the target depth of the injection borings, 13 feet. The rods were then pulled back 3 feet to expose 3 feet of slotted screen. The annular space around the upper 5 feet of

the rod (the void from utility check excavation) was filled with lean bentonite cement grout as an additional seal to prevent injectate from traveling up the drilling rod to the surface. After completion of each injection, the drilling tools were extracted from the borehole and the surface at the boring was restored.

- Cascade, under the direction of G-Logics, injected 360 to 375 gallons of injectate solution in each direct-push boring. Cascade mixed the injectate at the Site using RegenOx Part A and PetroCleanze activator, in accordance with the Pilot Test Workplan. The injectate was delivered to the subsurface at pressures ranging from 20 to 25 pounds per square inch (psi). The injection pressures at each well did not substantially vary from the beginning to the end of the injections. G-Logics did not observe injectate daylighting from the annular space of the borings or from near-surface utilities.

- G-Logics performed pilot test progress groundwater monitoring events on September 27, 2022, February 22 and 23, 2023, April 24 and 25, 2023, and July 19 and 20, 2023, in accordance with the Pilot Test Workplan. Groundwater samples were collected using a low-flow sampling method, and groundwater field parameters were measured using a YSI flow-through cell. LNAPL was present on the groundwater at well IP-7 during each groundwater sampling event; therefore, LNAPL was removed from the well using a hand-bailer prior to sampling. Groundwater samples were analyzed for GRO by Ecology Method NWTPH-Gx, BTEX by USEPA Method 8260C, and DRO and ORO by Ecology Method NWTPH-Dx.

- Under the direction of G-Logics, Northern Environmental performed liquid extraction events on October 7, 2022, December 16, 2022, and January 20, 2023, using a truck-mounted vacuum. The liquid extractions were performed in accordance with the Pilot Test Workplan. LNAPL was observed only in the Lower Saturated Zone well IP-7 during the extraction events. As presented in Table 1, the thickness of LNAPL at the beginning of the extraction events was measured at 2.37 feet on October 7, 2022, 2.14 feet on December 16, 2022, and 0.35 feet on January 20, 2023. The volume of water removed from well IP-7 during the extraction events ranged from 500 to 550 gallons over the time-lapse of the extraction events. According to Northern Environmental, approximately 3 gallons of LNAPL were extracted from well IP-7 at the first extraction event; thereafter, only trace amounts of fuel were extracted.

Field notes from the groundwater progress monitoring, injection, and extraction events are presented in Appendix B.

5.1 Deviations from Pilot Test Workplan

Deviations from the Pilot Test Workplan occurred during the life cycle of the pilot test, which are discussed below. The potential impact of the deviations on the pilot test results are presented in Section 7.0 of this report.

- Fluid extraction events were not performed at well IP-4 as presented in the Pilot Test Workplan because LNAPL did not accumulate in the well during the pilot test. Total fluids extraction was scoped in the Pilot Test Workplan for points where LNAPL was observed. Groundwater samples were not collected at monitoring wells TW-1, TW-2, and TW3 during the pre-injection baseline groundwater monitoring event or during the September 2022 event because the wells contained less than 18 inches of water, which is an insufficient volume for sampling. Well SVE-1, which was installed as vadose zone well, was not sampled during progress groundwater monitoring events because the well was dry.

- The Pilot Test Workplan indicated that the second extraction event was to occur 2 to 4 weeks after the second injection event. The second extraction event occurred 8 weeks after the second injection event. The additional 4 weeks between the second injection and second extraction event resulted from a scheduling error.

- Except for the event performed on December 20, 2022, all injections were performed at constant pressures of 20 psi. At one injection point on December 20, 2022, the injection pressure varied between 20 and 25 psi. The increased injection pressure of 25 psi did not result in daylighting of the injectate. It may have led to some minor fracking of the formation; however, empirical evidence does not support this hypothesis.

- G-Logics began measuring turbidity during progress groundwater monitoring events in February 2023 because the purge water in some pilot test target wells was often described in previous progress groundwater monitoring events as opaque or cloudy. This condition may have suggested the presence of oxidant or surfactant from the injectate. Although turbidity measurements were not scoped in the Pilot Test Workplan because turbidity was not anticipated as a relevant parameter for the pilot

test, field observations indicated that turbidity measurements could have value for the test and were therefore added to the field measurements.

- During the life cycle of the pilot test, G-Logics attempted to measure the depth of the groundwater in pilot test target wells before and after injection and extraction events. G-Logics collected the water levels as one line of evidence to assess the radius of influence of injectate during injection events and drawdown in water levels in the saturated zones as a result of the vacuum applied during the excavation events at monitoring well IP-7. To this end, the most complete data sets were gathered from the injection event performed on September 7, 2022, because the injection events were performed and completed on the same day. For the October 2022 injection event, pre-injection water levels were collected the day before the injection event occurred on October 18, 2022, while the post-injection event water levels were collected after the injection event was completed on October 18, 2022. For the December 2022 pre-injection event, water levels were measured on December 19, 2022, but were not measured after the injection event was completed because the heavy snow event on that day required the field crew to be demobilized from the Site for health and safety reasons.

6.0 PILOT TEST PERFORMANCE MONITORING RESULTS

Pilot test performance monitoring results were used to evaluate the efficacy of the injectate in mobilizing LNAPL and reducing dissolved and soil-sorbed petroleum hydrocarbon mass in the Upper and Lower Saturated Zones at the Site. G-Logics evaluated the efficacy of the injectate based on time-series analyses of dissolved-phase petroleum hydrocarbons, the presence or absence of LNAPL on the groundwater, the thickness of LNAPL, the volume of LNAPL recovered during liquid extraction events, and changes in groundwater field parameters during groundwater progress monitoring events. Groundwater elevations and LNAPL thickness are presented in Table 1. Groundwater analytical results are presented in Table 2. Groundwater field parameter measurements are presented in Table 3. Changes in groundwater elevations during the pilot test injection events and one extraction event are presented in Table 4. Laboratory reports are presented in Appendix C. Charts showing changes in field parameters and GRO, DRO, and benzene concentrations in groundwater over the life cycle of the pilot test are presented Appendix D. Appendix E presents statistical trend analyses of groundwater results for GRO, DRO, and benzene.

6.1 Soil Total Organic Carbon

TOC analyses were performed to support an evaluation of natural oxidant demand in the Upper Saturated Zone. It was expected that the TOC results would be helpful in calculating the final mass balance requirements for a full-scale ICSO injection. The TOC concentrations in the soil samples collected from TW-4 and TW-5 were reported at 0.38 percent and less than the laboratory reporting limit (0.150 percent), respectively. The samples were collected at 10 to 10.5 feet bgs in oreder to evaluate conditions within the Upper Saturated Zone. According to Regenesis, the percent TOC in the soil sample collected from boring/well TW-4 indicates the potential for a moderate natural oxidant demand for the injectate. However, it is unknown whether the presence of TOC in the sample is native to the formation or if it represents anthropogenic petroleum hydrocarbons in the soil. For any future remedy using an ISCO approach, the oxidant demand would need to be considered for any ISCO considered during the design phase. The laboratory report for the TOC results is presented in Appendix C.

6.2 Dissolved Phase Groundwater Concentrations

Prior to implementing the pilot test, G-Logics performed a baseline groundwater sampling event in August 2022. During the pilot test progress groundwater monitoring events performed in September 2022, February 2023, April 2023, and July 2023, G-Logics collected groundwater samples from Upper Saturated Zone pilot test target wells AS-1, IP-4, TW-1, TW-2, TW-3, TW-4, and TW-5, and Lower Saturated Zone pilot target monitoring wells IP-3, IP-5, and IP-7. Groundwater samples were not collected from well SVE-1, as planned for in the Pilot Test Workplan because the well was dry during all sampling events. Groundwater samples were not collected from wells TW-1, TW-2, and TW-3 during at least one of the groundwater sampling events because there was an insufficient volume of water in the wells to collect representative samples. Wells IP-3, IP-5, and IP-7 were sampled during the baseline groundwater sampling event but were not sampled again until after the September 2022 progress groundwater monitoring event, in accordance with the Pilot Test Workplan.

Appendix D presents a series of charts (D1 through D7) showing the qualitative changes in the concentrations of GRO, DRO, and benzene in the Upper and Lower Saturated Zone wells from August 2022 to July 2023, relative to the dates of the pilot test injection events. A chart was not prepared for well TW-1 because concentrations of GRO, DRO, and benzene in the groundwater were consistently below applicable groundwater cleanup levels. A chart was not prepared for well TW-3 because groundwater samples were only collected from the well

during two progress groundwater monitoring events. Groundwater samples were not collected from the TW series wells before the baseline groundwater sampling event. Toluene, ethylbenzene, and total xylene (TEX) results are not presented in the charts but are presented in Table 2.

Appendix E presents the statistical trend analyses for pilot test target wells from the progress groundwater monitoring events performed during the life cycle of the pilot test. The trend analyses were performed following Ecology's *Guidance on Remediation of Petroleum-Contaminated Ground Water by Natural Attenuation*, dated July 2005 (Ecology 2005). The trend analyses provide another line of evidence regarding the efficacy of the injectate to treat the media of concern at the Site. G-Logics performed the trend analyses using analytical results for GRO, DRO, and benzene. Pilot test target wells not included in the trend analysis did not contain concentrations of GRO, DRO, or benzene above the laboratory reporting limits; the concentrations were below groundwater cleanup levels for three consecutive progress groundwater monitoring events.

The "target wells" used to perform the trend analyses and evaluate the stability of the plume include Upper Saturated Zone monitoring wells AS-1, IP-4, TW-1, TW-2, and TW-5, and Lower Saturated Zone monitoring wells IP-3, IP-5, and IP-7. The statistical trend analyses were performed using the Mann-Kendell non-parametric trend analysis method if the data set contained four or more results, or linear regression parametric trend analysis if the data set contained three results. A trend analysis was not performed if the data set contained less than three results. Non-detect results were input at half the laboratory reporting limit to perform the trend analyses. Statistical trends in GRO, DRO, and benzene results are reported as expanding, shrinking, stable, or undetermined with time. Undetermined is defined as insufficient evidence to identify a significant trend at the specified level of significance, A summary table of trend analyses and output from the trend analyses is provided in Appendix E.

Changes observed in the concentrations of GRO, DRO, and benzene in the groundwater at pilot test target wells AS-1, TW-2, TW-5, IP-3, IP-4, IP-5, and IP-7 during the time-lapse of the pilot were as follows:

- As shown in Chart D-1, the concentrations of GRO, DRO, and benzene in the groundwater at Upper Saturated Zone well AS-1 appears to increase compared to their baseline concentrations during pilot test injections and declined in concentration

thereafter. As shown in Table 2, concentrations of TEX behave similarly to GRO, DRO, and benzene. The statistical trend analysis for AS-1 indicates that the concentration of GRO is stable over the life cycle of the pilot test, and the trend in DRO and benzene concentrations are statistically undetermined. The observed trend in petroleum hydrocarbons at well AS-1 may be anomalous, since the baseline concentrations of GRO and benzene (474 micrograms per liter [µg/L] and 5.98 µg/L, respectively) are substantially lower than last reported in 2019 (4,150 µg/L and 702, µg/L, respectively), as shown in Table 5-1 of the RI Report, which is presented in Appendix F. The concentrations of GRO and benzene in April of 2019 are similar to concentrations observed during the progress groundwater monitoring events.

- As shown in Chart D-2, the concentrations of GRO and DRO in the groundwater at Upper Saturated Zone well TW-2 appear relatively stable 2 to 4 months after the last pilot test injection (December 20, 2022), while the concentration of benzene declines. After the April 2023 sampling event, concentrations of GRO and DRO increased. As shown in Table 2, TEX concentrations generally follow those of GRO and DRO. The statistical trend analyses for well TW-2 indicate that the concentration of GRO is expanding with time, the concentration of DRO is stable with time, and the trend in the benzene concentrations over time is statistically undetermined. Groundwater samples were not collected from the TW series wells prior to the baseline groundwater sampling event.

- As shown in Chart D-3, the concentration trends for GRO and benzene in the groundwater at Upper Saturated Zone well TW-5 appear to decline after the first injection event but remain relatively stable during the time-lapse of the pilot test compared to baseline conditions. The concentrations of DRO appear relatively stable over the same period. Seven months after the last injection event, the concentration of benzene was similar to the benzene baseline concentration. As shown in Table 2, concentrations of TEX appear to remain relatively stable during the time-lapse of the pilot test. The statistical trend analyses for well TW-5 indicate that the concentrations of GRO, DRO, and benzene over the life cycle of the pilot test are stable. There are no groundwater analytical results for well TW-5 before the baseline event.

- As shown in Chart D-4, the concentrations of GRO, DRO, and benzene in the groundwater at Upper Saturated Zone well IP-4 decreased compared to the baseline concentrations during the time-lapse of the pilot test. Seven months after the last

injection event, the concentrations of GRO, DRO, and benzene appear to increase. Concentrations of GRO, DRO, and benzene for the baseline groundwater sample collected from well IP-4 are similar to their concentrations in Table 5-1 of the RI Report (Appendix F). As shown in Table 2, concentrations of toluene show a similar concentration trend as GRO, DRO, and benzene, while concentrations of ethylbenzene and total xylenes remain relatively stable. The statistical trend analyses for well IP-4 indicate that the concentrations of GRO and benzene are shrinking with time, while the concentration of DRO is stable with time.

- As shown in Chart D-5, the concentrations of GRO, DRO, and benzene in the groundwater at Lower Saturated Zone well IP-3 appear to increase compared to their baseline concentrations. Four months after the last injection event on December 20, 2022, concentrations of GRO, DRO, and benzene began to decline. As shown in Table 2, concentrations of TEX show similar trends as GRO, DRO, and benzene or remain relatively stable during the time-lapse of the pilot test. The baseline concentrations of GRO, DRO, benzene, and TEX in the groundwater at well IP-3 are similar to their concentrations presented Table 5-1 of RI Report (Appendix F). Concentrations of GRO, DRO, benzene, and TEX in the groundwater at well IP-3 after the baseline sampling event are substantially higher when compared to their concentrations in Table 5-1 of the RI Report. The statistical trend analyses for IP-3 indicate that concentrations of GRO, DRO, and benzene are stable over the life cycle of the pilot test.

- As shown in Chart D-6, the concentrations of GRO, DRO, and benzene in the groundwater at Lower Saturated Zone well IP-5 appear to remain relatively stable over time, confirmed by the statistical trend analyses for well IP-5. As shown in Table 2, the trend in the concentrations of TEX is similar to the trends for GRO, DRO, and benzene. The concentrations of GRO, DRO, and benzene in groundwater at well IP-5 during the time-lapse of the pilot test are similar to concentrations presented in Table 5-1 of the RI Report (Appendix F).

- As shown in Chart D-7, the concentrations of GRO, DRO, and benzene in the groundwater at Lower Saturated Zone well IP-7 appear to decrease compared to the baseline concentrations during the time-lapse of the pilot test and remain relatively stable 4 months after the last injection event, except for benzene which appears to return to near its baseline concentration. As shown in Table 2, TEX concentration

trends are similar to that of GRO, DRO, and benzene during the time-lapse of the pilot test. The statistical trend analyses for IP-7 indicates that concentrations of GRO and benzene are stable over time, while the trend in the concentration of DRO is undetermined. LNAPL was present on the groundwater at well IP-7 prior to each sampling event and was removed from the well with a bailer before sampling. Field notes indicate the presence of a sheen on the discharge water during purging. Groundwater samples were not collected from well IP-7 before the baseline groundwater sampling.

6.3 Groundwater Total Organic Carbon

Dissolved-phase TOC concentrations in groundwater samples collected from wells IP-3, IP-5, and IP-7 were reported at 8.43, 7.94, and 20.7 milligrams per liter, respectively. Dissolved-phase TOC samples were collected to assess the natural oxidant demand in the Lower Saturated Zone for a full-scale ICSO injection program. Dissolved-phase TOC results likely represent dissolved petroleum hydrocarbons and not native or intrinsic oxidant sinks in the Lower Saturated Zones. Dissolved-phase TOC samples were not collected outside the known impacted areas to determine background TOC concentrations because the effort was not included in the Pilot Test Workplan.

6.4 Groundwater Field Parameters

During the pilot test groundwater performance monitoring events, G-Logics collected groundwater field parameters at each pilot test target in accordance with the Pilot Test Workplan. The field parameters included pH, conductivity, turbidity, temperature, oxidation-reduction potential (ORP), and dissolved oxygen. Changes in the field parameters were evaluated to determine whether they could be used to evaluate the presence or absence of injectate in the Upper and Lower Saturated Zones.

Groundwater field parameters measured during the groundwater performance monitoring events are presented in Table 3. Charts of groundwater field parameters with time are presented in Appendix D (Charts D-8 through D-12). The following conditions were observed in the field parameters:

- As shown in Chart D-8, the highest pH measurements for the pilot test target wells occurred during the February 2023 progress groundwater monitoring event, almost 3 months after the last injection event in December 2022. In February 2023, some of

the highest pH readings were measured at Upper Saturated Zone wells TW-1, TW-4, TW-5, and Lower Saturated Zone wells IP-3 and IP-5. This condition could suggest the presence of the injectate at those wells, which could cause the degradation or mobilize petroleum hydrocarbons. However, statistically, concentrations of GRO, DRO, and benzene at Upper Saturated Zone well TW-5 and Lower Saturated Zone wells IP-3 and IP-5 remained stable over time. In contrast, concentrations of GRO are shrinking over time at well IP-4 even though pH readings are relatively stable with time compared to pH readings at wells TW-4 and TW-5. Since wells IP-4, TW-4, and TW-5 are similar in distance from the injection points, pH in this instance does not appear to be a solid indicator for the presence of the injectate.

- Changes in pH during the life cycle of the pilot test appear to be affected more by the changes in groundwater elevations than by the introduction of the injectate into the Upper Saturated Zone. Furthermore, the magnitude, direction, and permanence of the pH changes are dependent on several factors, such as the buffering capacity of the aquifer material, the amount and type of contaminant oxidized, and the mass of the oxidant. These factors are variable throughout a saturated zone. In consultation with Regenesis, introducing the injectate into the groundwater should have increased the pH into the alkaline range (i.e., 10 to 12) compared to baseline conditions. Regenesis suggested that the absence of alkaline conditions in the groundwater may indicate that the oxidant component of injectate was spent by the time the progress groundwater monitoring event was performed or the oxidant demand of petroleum hydrocarbons overwhelmed the injectate, limiting its effectiveness.

- As shown in Chart D-9, the highest electrical conductivity readings for pilot test target wells, except for Upper Saturated Zone wells IP-4, TW-4, and AS-1, occurred during February and April 2023 progress groundwater sampling events. The increases occurred 2 to 4 months after the last injection event on December 2022. The high conductivity readings that occurred in February and April 2023 at Upper Saturated Zone well TW-5 and Lower Saturated Zone wells IP-3 and IP-5 may suggest the presence of the injectate at those wells. This condition could cause the degradation or mobilization of petroleum hydrocarbons. However, since concentrations of GRO, DRO, and benzene at wells TW-5, IP-3, and IP-5 remain statistically stable over the life cycle of the pilot test, injectate appears to have had no substantial impact on petroleum hydrocarbon at those wells. In contrast, Upper Saturated Zone well IP-4 showed little change in conductivity readings, but GRO and benzene concentrations

statically shrank during the pilot test. The increase in conductivity at Lower Saturated Zone wells IP-3 and IP-5 may also result from an influx of salt water from the Duwamish River in the Lower Saturated Zone at the time of sampling. There was an extremely high tide event (9 to 10 feet of change) at the time of sampling at wells IP-3 and IP-5. In consultation with Regenesis, they suggested an increase in electrical conductivity compared to baseline measurements may indicate the presence of salts released from the injectate but does not necessarily indicate the oxidant in the injectate is reacting in the groundwater to degrade petroleum hydrocarbons.

- As shown in Chart D-10, ORP readings measured during the baseline groundwater sampling event and progress groundwater monitoring events generally indicated that anoxic to anaerobic conditions were present in the Upper and Lower Saturated Zones until the July 2023 progress groundwater monitoring event. The July 2023 ORP readings at the pilot test target wells, except for well TW-5, indicated the groundwater was aerobic. The change to aerobic conditions in the Upper and Lower Saturated Zones is unexplained since the injectate was likely spent at the time of the July 2023 progress groundwater monitoring event; however, it does appear to coincide with a slight increase in concentrations of GRO or benzene in some the pilot test target wells (e.g., wells IP-4, IP-5, TW-2, and TW-5). In consultation with Regenesis, introducing an oxidant in the Upper Saturated Zone should have led to a substantial increase in ORP readings during the progress groundwater monitoring events compared to baseline conditions. They suggested that the injectate was likely spent within a week to two weeks after the last injection event. It is more likely that whatever was driving the anaerobic conditions observed during the progress groundwater monitoring event was no longer affecting the groundwater chemistry in July 2023.

- Dissolved oxygen results suggest groundwater in the saturated zones is under anoxic to anaerobic conditions, except for dissolved oxygen results from the February 2023 groundwater sampling event. Introducing an oxidant in the Upper Saturated Zone should have led to a substantial increase in dissolved oxygen concentrations compared to baseline conditions. The absence of elevated concentrations of dissolved oxygen may indicate that the oxidant component of injectate was spent by the time the progress groundwater monitoring event was performed, was overwhelmed by the oxidant demand in the saturated zones, or the oxygen sensor on the YSI meter was not calibrated correctly, or the calibration drifted during use (flow-through cells were rented from, and calibrated by, a vendor). It should be noted that except for well

TW-5, the February 2023 dissolved oxygen results are considered anomalous because dissolved oxygen concentrations in the groundwater reflect the solubility limit of oxygen at the temperatures in groundwater at the Site. The anomalous readings may suggest that YSI oxygen meter for the February 2023 monitoring event was not operating properly. Dissolved oxygen readings are not presented in a chart since there is some uncertainty in the readings and value to assess the efficacy of the injectate. Temperature readings did not substantially change in the groundwater during the time-lapses of the progress groundwater monitoring events compared to baseline conditions, except the temperature readings from the February 22, 2023, progress groundwater monitoring event, which are 3 to 4 degrees centigrade lower compared to temperature readings from previous groundwater progress monitoring events. This condition is shown in Chart D-11. According to Regenesis, the temperature of groundwater does not typically change because of the introduction of PetroCleanze. Furthermore, the elevated temperature readings are not anomalous for the Site. For example, the temperature readings at on-Property wells MW26S, MW27S, MW-28S, MW29S, and MW28D in August 2018 ranged from 17.28 to 19.74 degrees centigrade and are similar to temperature readings in the July 2023 sampling event at wells TW-1, TW-2, TW-3, and TW-4. Fluctuations in temperature could be due to the outdoor ambient air temperature at the time the readings were taken. The purge water passes through a flow cell that is outside of the well. The cell can be chilled or warmed by the outdoor ambient temperature. This may explain why temperature readings were lower during the February 22, 2023, progress groundwater monitoring event when the ambient temperature was 2 degrees centigrade.

- Turbidity is a measure of the cloudiness, or clarity, of water. As shown in Chart D-12, turbidity readings were the lowest during the April 2023 progress groundwater monitoring event, as was the pH. A reduction in pH can lead to greater chemical oxidation of substances that cause color in water, resulting in lower turbidity. Lower turbidity readings also appear to be associated with slightly lower concentrations of GRO, DRO, and benzene over the life cycle of pilot test; however, the significance of that relationship is unknown. Furthermore, since turbidity readings were not collected during the baseline groundwater sampling event and the first progress groundwater monitoring event, turbidity readings do not provide any useful information to aid in the interpretation of pilot test results.

Based on analysis of field parameters, it appears that pH and conductivity may in some instances suggest the presence of the injectate, although Regenesis did not find the changes in pH and conductivity during the life cycle of the pilot test, compared to baseline conditions, provided any evidence that injectate was performing as designed. In addition, elevated pH and conductivity readings may be influenced by tidal effect, changes in groundwater elevations, ambient conductions, or the drift in the instrument calibration.

6.5 Pilot Test Hydraulic Effect

The hydraulic effect of injection and extraction events on the groundwater elevations was assessed using changes in pre- and post-injection groundwater elevations measured from the September 7, 2022, injection event and changes in the water level of well IP-5 during the extraction event on October 7, 2022. G-Logics selected data collected during the September 2022 injection and October 2022 extraction events to assess the hydraulic effect of the pilot test because the water level measurements from the September and October 2022 events were the most complete. G-Logics also evaluated the temporal changes in groundwater elevations at the pilot test target well during the progress groundwater monitoring events.

The following hydraulic effects were observed:

- As shown in Chart D-13, groundwater elevations in the Upper and Lower Saturated Zones appear to be relatively stable after the baseline groundwater monitoring event. Overall, there was a moderate increase in groundwater elevations Upper Saturated Zone during the February and April 2023 progress groundwater monitoring events, which probably can be associated with seasonal flux in groundwater elevation during the rainy season Pacific Northwest.

- Immediately after the September 2022 injection event, groundwater elevations in the Upper Saturated Zone wells increased, except for groundwater elevation at well IP-4. As shown in Table 4, the increase in groundwater elevations ranged from 0.01 feet at well TW-1 to 1.25 feet at well TW-3. The maximum hydraulic effect on the Upper Saturated Zone is estimated to extend approximately 30 feet from the injection points based on the groundwater elevation change at well TW-3. Water levels measured prior to the injections were measured during an ebbing tide. It is unlikely that tidal fluctuation affected the increase in groundwater elevations in the Upper Saturated

Zone since, according the RI Report, the Upper Saturated Zone on the Property is not tidally influenced.

- Immediately after the September 2022 injections, groundwater elevations for the Lower Saturated Zone wells increased. As shown in Table 4, the increase in the groundwater elevation ranged from 1.59 feet at well IP-3 to 2.16 feet at well IP-5. The maximum hydraulic effect on the Lower Saturated Zone from the injection event is estimated at approximately 30 to 35 feet from the points of injection based on the groundwater elevation change at IP-7 of 2.01 feet immediately after the September 2022 injection event. Water levels measured after the injection event were measured during a rising tide. It is possible that tidal fluctuation increased the groundwater elevations in the Lower Saturated Zone since, according to the RI Report, the Lower Saturated Zone on the Property is tidally influenced.

- During the October 2022 extraction event, the hydraulic effect of the liquid extraction on the Lower Saturated Zone was monitored by measuring changes in groundwater elevation at Lower Saturated Zone well IP-5, while a vacuum was applied to well IP-7. Well IP-5 is located approximately 40 feet south of well IP-7. A vacuum was applied to well IP-7 for approximately 110 minutes with an extraction rate of 0.2 gallons per minute (with a vacuum estimated at 12-inches of water)). During this time, the groundwater elevation at well IP-5 changed from 4.54 feet 20 minutes before the extraction event started to 3.78 feet 190 minutes after the extraction event ended, which is a difference of –0.76 feet. The maximum difference in the groundwater elevation compared to 20 minutes before the extraction event began was –1.03 feet 80 minutes after the start of the extraction event. Both the pre- and post-water levels measured during the extraction event were taken during a rising tide. It is possible that tidal fluctuation affected the observed changes in groundwater elevations in the Lower Saturated Zone, since according to the RI Report, the Lower Saturated Zone on the Property is tidally influenced. The results from the hydraulic effect observed during the extraction event may inform the design of various remedial alternatives for the Feasibility Study. The change in groundwater elevations at well IP-5 with time is shown in Table 4.

- As shown in Table 4, during injection events there are generally larger groundwater level responses observed in the pilot test target wells screened in the Lower Saturated Zone wells compared to the pilot test target wells screened in the Upper Saturated

Zone wells. Since the saturated zones are separated by a semi-confining layer, it is not surprising groundwater levels in the Lower Saturated Zone responded to an increase in hydraulic press in the Upper Saturated during injection events. The large groundwater level response in the Lower Saturated Zone may also result from the pressure wave generated during tidal flux. It is unknown if the larger groundwater level responses in Lower Saturated Zones indicate that the injectate was lost to the Lower Saturated Zone instead of treating the Upper Saturated Zone. However, some injectate was likely lost to the Lower Saturated Zone because it is semi-confined and because remedial excavations performed at the Property may have created preferential pathways between the saturated zones.

6.6 Field Observations

During progress groundwater monitoring events, water was purged from wells following the procedure presented in the Pilot Test Workplan. Field observations made during progress groundwater monitoring events are presented in Appendix B. G-Logics made the following observations during the purging of the pilot test target wells:

- At the start of purging, the water discharged from some of the pilot test target wells emitted a mild to strong petroleum hydrocarbon odor. The petroleum odor from the purge water is not considered anomalous, since high concentrations of dissolved-phase petroleum hydrocarbons are present in the groundwater on the Site.
- At the start of purging, the water discharged from some of the pilot test target wells was described as opaque or cloudy. The purge water was generally clear by the end of the purge cycle. Initial cloudiness of purge water may suggest the presence of salts in groundwater from the degradation of the injectate oxidant, the formation of other precipitates (e.g., metal oxyhydroxides), the presence of the injectate surfactant, or the presence of an emulsion of petroleum hydrocarbons and surfactant in the groundwater.

- At the start of purging, the color of the water discharged from Upper Saturated Zone wells TW-1, TW-4, TW-5, and AS-1 and from Lower Saturated Zone wells IP-3 and IP-5 was sometimes described as amber or brown. In consultation with Regenesis, the amber and brown colors may represent an emulsion of surfactant and fine petroleum hydrocarbon droplets or the formation of precipitates (e.g., metal oxyhydroxides). An emulsifier acts like a detergent, dissolving the oil into the water. Instead of an oil layer

on top of the water, there are dissolved oil and fine immiscible oil droplets in the water. The surfactant dissolves the oil and disperses it throughout the water column rather than allowing it to float on the surface (ITRC 2024a). The color of the water may also indicate the presence of non-petroleum precipitates in the water created from the presence of oxidant and salts from the injectate.

- At the start of purging during the July 2023 progress groundwater monitoring event, a sheen was observed on the discharge water at Upper Saturated Zone pilot test target well TW-5 and Lower Saturated Zone well IP-4. The presence of a sheen may indicate that LNAPL is present in the formation at or below residual saturation. LNAPL at residual saturation will not appear in the well, although the presence of a sheen is a possible indicator of petroleum hydrocarbon at residual saturation in the formation (ITRC 2024b).

- In the field notes for the February 2023 progress groundwater monitoring event, well TW-5 is shown to contain LNAPL (0.84 feet thick); however, no measurable product was observed in the well. This erroneous entry for product thickness was associated with well IP-7.

7.0 DEVIATION FROM THE PILOT TEST WORKPLAN—IMPACT ON PILOT TEST RESULTS

Deviations from the Pilot Test Workplan during the time-lapse of the pilot test are detailed in Section 5.1 of this Pilot Test Report. The potential impact of the deviations on the results from the pilot test are discussed below:

- During the time-lapse of the pilot test, LNAPL did not accumulate in Upper Saturated Zone well IP-4. The absence of LNAPL in the well, given the elevated concentrations of dissolved-phase hydrocarbons in the groundwater collected from the well, suggests that LNAPL in the formation proximal to well IP-4 is at residual saturation and will not flow to the well naturally or in the presence of a surfactant and, therefore, is not recoverable. In addition, extracting groundwater at well IP-4 in the absence of LNAPL would have generated large volumes of groundwater containing high concentrations of dissolved-phase petroleum hydrocarbons and would unnecessarily increase disposal costs.

- The absence of sufficient groundwater to collect groundwater samples from pilot test target wells SVE-1, TW-1, TW-2, and TW-3 during the pre-injection baseline groundwater monitoring event may have some impact on the interpretation of the pilot test results when trying to compare baseline concentrations with concentrations from later progress groundwater monitoring events. However, it is not surprising that wells TW-1, TW-2, and TW-3 are occasionally dry, since they were installed as vadose zone wells, as stated in Section 3.2.11 of the RI Report. Soil vapor extraction well SVE-1 was also installed as a vadose well, as discussed in Section 3.0 of the Feasibility Study Pilot Test Workplan (G-Logics 2019).

- The Pilot Test Workplan indicated that the second extraction event was to occur 2 to 4 weeks after the second injection event; however, the second extraction event occurred 8 weeks after the second injection event. The additional 4 weeks between the second injection and second extraction events does not appear to have any impact on interpreting the pilot test results, since LNAPL was not observed in the pilot test target wells at the time other extraction events were performed, except at Lower Saturated Zone Well IP-7.

- The increase in the injection pressure from 20 to 25 psi on the December 20, 2022, injection event unlikely had any bearing on the pilot test results, since the formation did not refuse the injectate at the higher pressure, which suggests the increased injection pressure did not exceed the overburn pressure of the formation.

8.0 DATA VALIDATION

Data validation for the laboratory analytical results was performed on samples collected from August 2022 to July 2023. The laboratory analyzed the groundwater samples for GRO, BTEX, DRO, and ORO. Select groundwater samples were analyzed for dissolved TOC. Soil samples collected from borings used to install wells TW-4 and TW-5 were analyzed for TOC. The usability of the laboratory analytical results to meet the data quality objective was evaluated based on holding times, preservation, field duplicate, laboratory method blanks, and accuracy and precision. Laboratory reports are presented in Appendix C.

8.1 Holding Times and Preservation

For Ecology Methods NWTPH-Gx and Dx and USEPA Method 8260, all groundwater samples analyzed met the acceptance criterion of analysis from the date of sample collection. For USEPA Method 9060 and 9060A, soil and groundwater sample holding times met the acceptance criterion of analysis from the date of the sample. The preservation for each sample met the acceptance criterion of 4 degrees Celsius at the time the samples were received at the laboratory.

8.2 Laboratory Method Blanks

A laboratory method blank is used to monitor for possible contamination resulting from either the reagents (acids) or the equipment used during sample processing, including filtration. Laboratory method blanks were prepared and analyzed for each analyte for each medium. Analytes of concern were not detected in the method blanks for each medium at concentrations above laboratory reporting limits.

8.3 Accuracy and Precision

The laboratory measured accuracy and precision with surrogate recoveries, blank spikes, and blank spike duplicates for each batch of samples analyzed for analytes of concern. Blank spikes and blank spike duplicates were spiked with analytes of interest as applicable to the analytical method. Percent recoveries and relative percent differences for all blank spikes blank, spike duplicates, and surrogate recoveries met the laboratory acceptance criteria with the following exception:

- The DRO and ORO surrogate recoveries for groundwater samples collected from well TW-5 on February 22, 2023, were outside the laboratory control limits. The laboratory reported the concentrations of DRO and ORO in the groundwater sample collected from well TW-5 at estimated concentrations greater than the laboratory reporting limit.

- The surrogate recoveries for DRO and ORO for groundwater samples collected from wells AS-1 and IP-3 on April 25, 2023, were outside the laboratory control limits. Concentrations of DRO and ORO in the groundwater samples collected from wells AS-1 and IP-3 were reported as less than the laboratory reporting limit.

- The DRO and ORO surrogate recoveries for groundwater samples collected from wells AS-1 on July 20, 2023, and TW-5 on July 19, 2023, were outside the laboratory control limits. Concentrations of DRO in the groundwater samples collected from wells AS-1 and TW-5 were reported at estimated concentrations greater than the laboratory reporting limit.

- The surrogate recoveries for AS-1 and IP-3 are biased low for the April and July 2023 sampling results. The concentration of DRO in these samples is likely a result of late-eluting gasoline-range compounds and not a separate DRO fraction. Therefore, the DRO results for AS-1 and IP-3, whether biased high or low based on surrogate recoveries, do not affect the usability of the results for purposes of the pilot test. The laboratory attributed the low surrogate recoveries to matrix interference. Results are likely biased low. The affected sample results are flagged with a Q in Table 2.

8.4 Groundwater Sample Field Duplicates

Groundwater field duplicates were collected from wells AS-1, IP-3, and TW-1. Duplicate results are presented in Table 2. The relative percent difference (RPD) for GRO ranged from 0 to 42%, DRO RPDs ranged from 10 to 41%, and benzene RPDs ranged from 1 to 29%. According to the USEPA, criteria for acceptance of duplicate results for environmental samples is generally in the range of 30 to 50% (Eva L Davis, USEPA Poster Session). RPDs were not calculated for TEX because RPDs likely fall within same range for GRO, DRO, and benzene. RPDs for GRO, DRO, and benzene fall within the USEPA criteria for acceptance.

9.0 DISCUSSION OF PILOT TEST FINDINGS

The purpose of the pilot test was to determine whether PetroCleanze injected into the Upper Saturated Zone could mobilize LNAPL and reduce dissolved and soil-sorbed gasoline contaminant mass in the Upper and Lower Saturated Zones at the Site. Changes in the dissolved-phase petroleum hydrocarbons concentrations, TOC concentrations, field parameter measurements, and presence or absence of LNAPL during the time-lapse of the pilot test may suggest the following conditions related to the efficacy of using PetroCleanze as a remedial alternative for Site:

- The TOC concentration in the soil sample collected from boring TW-5 at depth of 10.5 bgs may not be representative of natural organic carbon in soil because the field

screening readings from a handheld photoionization detector (PID) indicated the presence of petroleum hydrocarbons in the soil at the depth the sample was collected. TOC was not detected above the laboratory reporting limit in the soil sample collected from boring TW-4, and PID readings did not indicate the presence of petroleum hydrocarbons. However, soil TOC results do not account for oxygen demand that may be placed on the injectate by reduced species of metals, such as ferrous iron, manganese, and sulfides. TOC results are presented in Appendix C.

- The concentrations of dissolved TOC reported in wells IP-3, IP-5, and IP-7 likely reflect dissolved-phase petroleum hydrocarbons in the groundwater from the release at the Site and not the natural background concentrations of TOC in the Lower Saturated Zone. Elevated concentrations of petroleum hydrocarbons were present in the groundwater at wells IP-3, IP-5, and IP-7 when samples for TOC analysis were collected.

- The increase in concentrations of dissolved-phase petroleum hydrocarbons after the baseline groundwater sampling event in the Upper Saturated Zone well AS-1 (assuming the baseline concentrations are not anomalous) and Lower Saturated Zone wells IP-3 and IP-5 (Charts D-1 , D-5, and D-6) may be the result of partitioning from LNAPL to the dissolved phase and desorption of petroleum hydrocarbons from the soil to the dissolved phase because of the surfactant properties of the injectate. According to Regenesis, the decrease in the concentration of dissolved-phase petroleum hydrocarbons at wells AS-1 and IP-3 4 months after the last injection event may indicate the loss of dissolved-phase mass due to intrinsic biodegradation. However, stable or undetermined statistical trends in the groundwater concentrations GRO, DRO, and benzene at wells AS-1, IP-3, and IP-5 may also suggest the mass petroleum hydrocarbons in Upper and Lower Saturated Zones puts an excessive oxidant demand on injectate, which limited its ability to continually create conditions that are conducive to the sustained degradation of petroleum hydrocarbons over time. The apparent decrease in GRO, DRO, and benzene concentrations in July 2023 progress groundwater monitoring event compared to the previous sampling events, excluding the baseline event, may be related to a seasonal decline in water levels during the dry season in the Pacific Northwest. During the dry times of year, the groundwater level may fall below the zone where the where the mass of petroleum hydrocarbons is greater.

- The apparent and statistical decrease in the concentration of GRO and benzene (DRO was statistically stable over time) in the groundwater at Upper Saturated Zone well IP-4 (Chart D-4) during the time-lapse of the pilot test suggests that surfactant properties of the injectate desorbed petroleum hydrocarbons from soil to the dissolved phase where petroleum hydrocarbons were likely oxidized by the oxidant properties of the injectate and biologically degraded. The apparent increase in the concentration of GRO and benzene in July 2023 may also suggest the surfactant and oxidative properties of the injectate are spent as of July 2023, the injectate did not reach the Upper Saturated Zone well IP-4, or the injectate was consumed between the injection event and the following groundwater monitoring event. This conclusion may be supported by the fact that conductivity and pH readings, which may reflect the presence of the injectate, were relatively stable over the life cycle of the pilot test when compared to baseline readings for example when compared to pH and conductivity readings taken at wells IP-5 and TW-5. One goal of the pilot test was to mobilize LNAPL to well IP-4. Measurable LNAPL was not observed at well IP-4 during the time-lapse of the pilot test.

- The apparent and statistical stability of GRO, DRO, and benzene concentrations in the groundwater at Upper Saturated Zone well TW-5 over time suggests that surfactant and oxidative properties of the injectate failed to impact the mass of petroleum hydrocarbon in the saturated zone proximal to the well, even though the well is located hydraulically downgradient and a similar distance from injection points as upgradient well IP-4. Furthermore, the relatively elevated readings of pH and conductivity at well TW-5 could suggest the presence of the injectate did not lead to the degradation of GRO, DRO, and benzene in the dissolved phase. The relative increase in the concentrations of GRO, DRO, and benzene in the groundwater at well TW-5, 7 months after the last injection event (July 20, 2023), may represent a seasonal fluctuation in the groundwater concentrations when compared to results presented in Table 5-1 of the RI Report (Appendix F).

- The location of well TW-2 in relationship to the injection area, approximately 20 feet, may account for the minimal hydraulic effect observed at well TW-2 during the September 7, 2022, injection event. The minimal hydraulic effect and relatively stable pH and conductivity readings over time may also suggest the injectate had no effect on petroleum hydrocarbons at well TW-2. The increase in concentrations of GRO, DRO, and benzene in the groundwater at well TW-2, 7 months after the last injection

event (July 20, 2023), is likely related to a seasonal fluctuation in the water level when compared to historical water levels for other wells in the monitoring well network, as shown in Table 5-1 of the RI Report (Appendix F). However, the absence of baseline groundwater results for well TW-2, and the fact that the well was not sampled during the remedial investigation suggests that there is a high degree of uncertainty in the interpretation of analytical results for wells TW-2.

- The decrease in the concentrations of GRO, DRO, and benzene in the groundwater at Lower Saturated Zone well IP-7 during the time-lapse of the pilot test could suggest the injectate supported the degradation of petroleum hydrocarbons in the groundwater. However, given the distance of well IP-7 from the injection area (approximately 30 feet) and relatively stable pH and conductivity readings over time, it is unlikely the injectate had any impact on the concentrations of petroleum hydrocarbons at well IP-7. As seen in other pilot test wells, the increase in concentrations of GRO, DRO, and benzene in the groundwater at well IP-7, 7 months after the last injection event (July 20, 2023), is likely related to a seasonal fluctuation in the water level when compared to historical water levels for other wells in the monitoring well network, as shown in Table 5-1 of the RI Report (Appendix F). In addition, there is some uncertainty in groundwater results collected during the pilot test because of the presence of LNAPL in well IP-7 that ranged in thickness from 0.17 to 2.66 feet. LNAPL was removed from well IP-7 before each sampling event using a hand-bailer.

- In reviewing the field parameters results with Regenesis, they concluded that groundwater field parameters did not indicate that injecting PetroCleanze in the Upper Saturated Zone created optimum conditions to desorb petroleum hydrocarbons from the soil and degrade dissolved-phase petroleum hydrocarbons. Regenesis suggested that the absence of optimum conditions may indicate that the oxidant component of injectate was spent by the time the progress groundwater monitoring event was performed. Alternatively, the absence of optimum conditions to mobilize LNAPL and degrade dissolved-phase petroleum hydrocarbons may indicate that the mass of petroleum hydrocarbons in the saturated zones was greater than anticipated by the pilot test. This condition overwhelmed the oxidative and surfactant properties of the injectate and limited its effectiveness.

- Hydraulic effects data collected at the September 7, 2022, injection event suggested that the hydraulic pressure wave from injecting PetroCleanze into the Upper Saturated Zone extended approximately 30 feet from the perimeter of the injection area. However, field parameters and other lines of evidence previously discussed suggest the radius of influence for injectate may be 5 to 10 feet. The volume of PetroCleanze injected into each injection point was approximately 360 to 375 gallons. According to Section 4.1 of the Pilot Test Workplan, a design volume of 360 gallons was selected as the estimated available pore space volume within the expected radius of hydraulic influence of 15 feet from each injection point.

- Based on changes in groundwater elevations at measured during the September 2022 progress groundwater monitoring event at Lower Saturated Zone wells IP-3, IP-5 and IP-7, injections in the Upper Saturated Zone may have created a rise in water levels in the wells. In addition, conductivity and pH readings measured during the February 2023 progress groundwater monitoring event may suggest that the injectate reached wells IP-3 and IP-5. However, the Lower Saturated Zone is tidally influenced, which may have resulted in an influx of salts from a very high tidal cycle during the February 2023 progress groundwater monitoring event. Furthermore, GRO, DRO, and benzene concentrations were statistically stable over the life cycle of the pilot, which suggests the injectate had little or no impact on the mass of petroleum hydrocarbons in the saturated zone proximal to wells IP-3, IP-5, and IP-7.

10.0 CONCLUSIONS

The pilot test gathered sufficient data to evaluate the efficacy of using the ISCO reagent PetroCleanze to reduce LNAPL and dissolve petroleum hydrocarbons in groundwater at the Site. The data collected for the pilot test suggests that the PetroCleanze injections may have resulted in minor reductions in dissolved-phase petroleum hydrocarbon concentrations in several wells (e.g., IP-4). The results may also provide some evidence that PetroCleanze was effective in increasing the desorption of petroleum hydrocarbons present in saturated soils through its surfactant-like properties, which is suggested by the increases in dissolved-phase petroleum hydrocarbon concentrations observed at monitoring wells IP-3 and IP-5, although statistically the concentrations of GRO, DRO, and benzene were stable over the duration of the pilot test.

However, collectively the lines of evidence presented in this Pilot Test Report do not provide sufficient evidence to suggest that a PetroCleanze-based remediation strategy would be successful at the Site. G-Logics believes that the uninspiring performance of PetroCleanze during the pilot test was due to the complex geology and hydrogeology at the Site, which may not be conducive to effectively introducing an oxidizing reagent to the areas where hydrocarbon contaminant mass is greatest. In addition, or alternatively, the mass of petroleum hydrocarbons present at the Site may be sufficiently large to have essentially overwhelmed the mass of ISCO reagent injected for the pilot test. Regardless of the cause, these results suggest that full-scale implementation of an ISCO-based remediation strategy would be unlikely to achieve the cleanup objectives for the Site in a cost-effective manner.

11.0 RECOMMENDATIONS

G-Logics recommends using the information and data collected during the air-sparge/soil vapor extraction pilot test previously conducted and the data collected as part of this ISCO pilot test to update and complete the Draft Feasibility Study.

G-Logics will revise the alternative screening sections and rescore the alternatives, taking the recently acquired data into consideration. Using the pilot test results, G-Logics will consider other active remedial alternatives as well as plume containment alternatives, which could be implemented until such time as the service station is no longer in use, at which time a full-scale remediation could be completed.

12.0 LIMITATIONS

The scope of work on this project was presented in our identified workplan and subsequently approved by RPNP Corporation. Please be aware our scope of work was limited to those items specifically identified in the Workplan and regulatory comments on deliverables. Other activities not specifically included in the presented scope of work (in a workplan, correspondence, or this report) are excluded and are therefore not part of our services.

Land use, site conditions (both on-site and off-site), and other factors will change over time. Since site activities and regulations beyond our control could change at any time after the completion of this report, our observations, findings, and opinions can be considered valid only as of the July 19, 2023.

The property owner is solely responsible for notifying all governmental agencies and the public at large of the existence, release, treatment, or disposal of any hazardous materials identified at the project site. G-Logics assumes no responsibility or liability whatsoever for any claim, loss of property value, damage, or injury which results from pre-existing hazardous materials being encountered or present on the project site, or from the discovery of such hazardous materials.

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No warranty, either express or implied, is made.

13.0 REFERENCES

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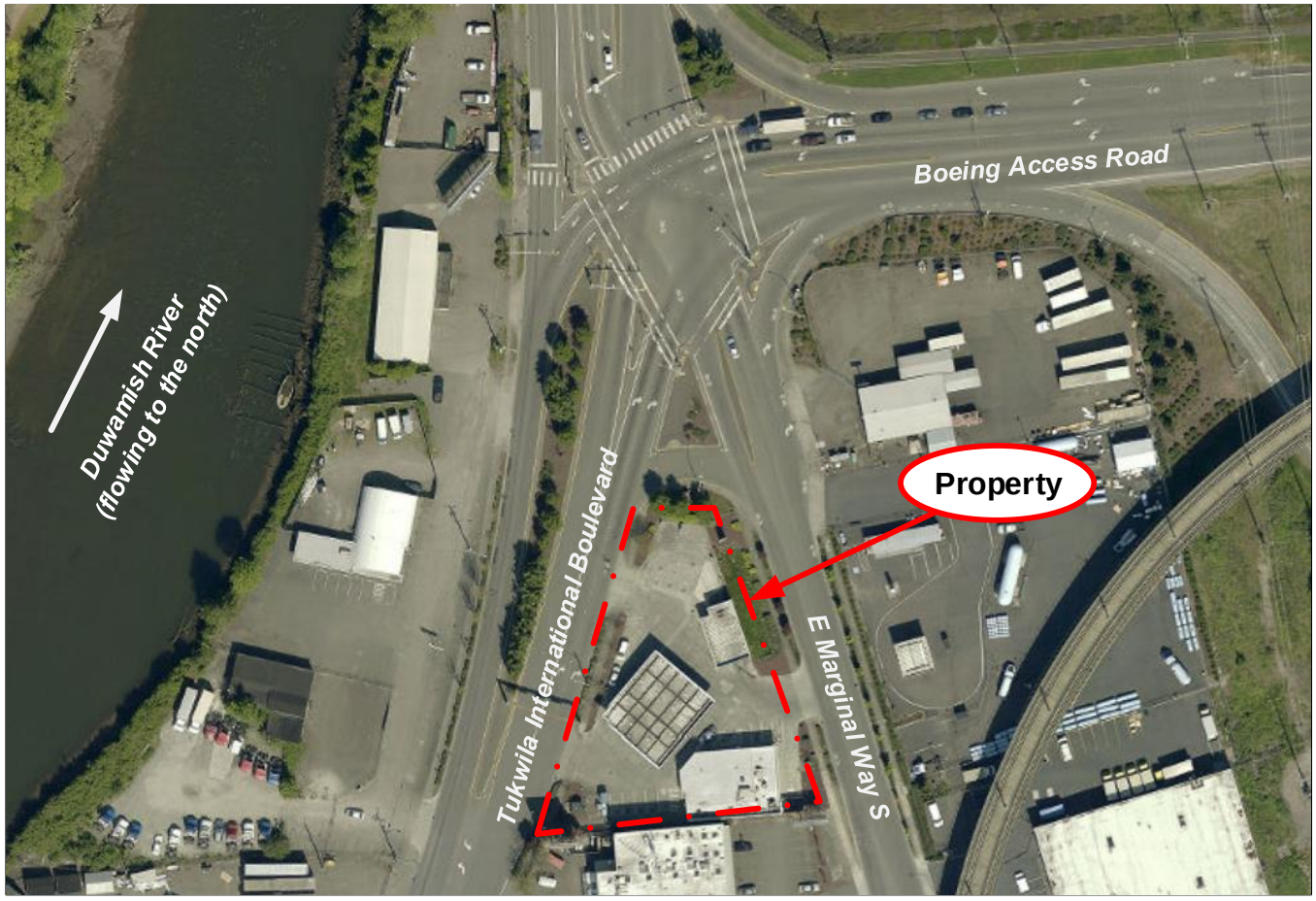
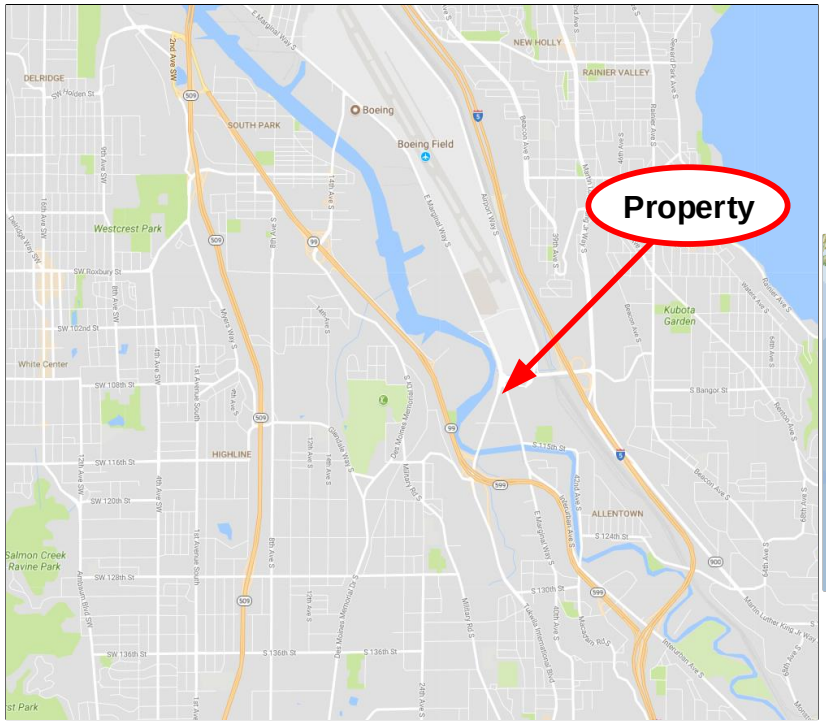
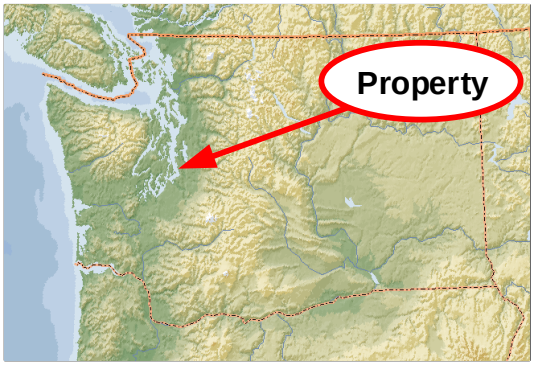
FIGURES







g-logics | AN ATLAS GEOSCIENCES NW COMPANY	***Site Location Maps*** ***Boeing Field Chevron*** ***10805 East Marginal Way South*** ***Tukwila, Washington***	Figure 1

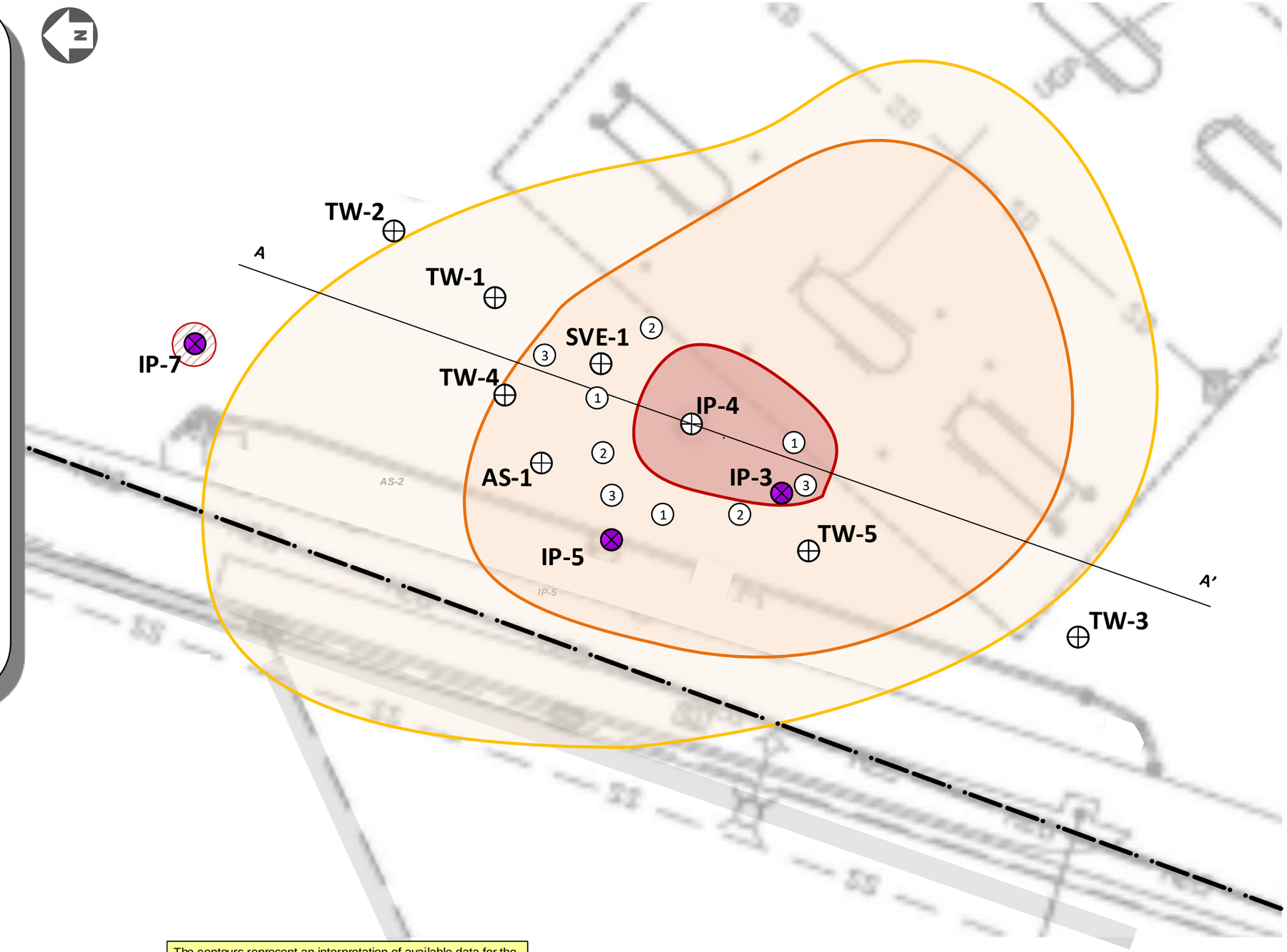
Project File: 01-0410-R F1.vsdx

Mapping Reference: Delorme, King County iMap, and Google Maps

Legend

- GRO/Benzene Detected Greater than Site Cleanup Levels (800/1.6 µg/L)
- GRO/Benzene Detected Greater than 8,000/50 µg/L
- Area of Possible LNAPL
- Area of LNAPL
- Upper Saturated Zone Monitoring Well
- Lower Saturated Zone Monitoring Well
- ISCO Injection Location (Numeral Indicates Injection Event)
  - Group 1 - 09/07/2022
  - Group 2 – 10/18/2022
  - Group 3 – 12/20/2022
- Property Boundary
- Understood Utility Trench Locations (Adjacent to Property)

Note: Concentration contours and area of possible NAPL, developed from Remedial Investigation Report (October 2020). Interpreted contours are based on available analytical data for groundwater samples collected in November 2018 and April 2019.



The contours represent an interpretation of available data for the indicated date. Site groundwater contours may change with additional measurements and/or data points, weather changes, construction activities, and/or other influences.

Note: This figure contains information in color. Black & white photocopies may not be suitable for review.

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Approximate Drawing Scale: 1" = 10'

0 ft. 6 ft. 10 ft. 20 ft.

ISCO Injection and Monitoring Schematic
Boeing Field Chevron
10805 East Marginal Way South
Tukwila, Washington

Figure 2

Project File: 01-0410-R F2_tlq_tjc_tlq_tlq_tlq.vsdx

Mapping References: PLS Survey 2016, G-Logics Field Measurements, Previous Site Report Figures.

N

S

A

A'

TW-2

TW-1

TW-4

AS-1

SVE-1

IP-4

TW-5

TW-3

20'

15'

10'

5'

Approximate Elevation (Feet) Above Mean Sea Level

Vadose Soils (0-9')

Upper Saturated Zone

Upper Saturated Zone

SW

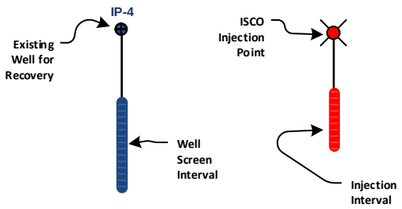
SM

ML

SW

Legend

- ISCO Injection Point
- ISCO Injection Location (Numeral Indicates Injection Event, See Figure 2)
- Extraction Well
- Upper Saturated Zone Monitoring Well
- GRO/Benzene Detected in Soil Greater than 30/0.03 mg/kg
- GRO/Benzene Detected in Soil Greater than 300/0.3 mg/kg
- Area of LNAPL, Previously Reported
- Potentiometric Surface of Upper Water-Bearing Unit (Approximate, See RI)
- Approximate Extent of Historical Remedial Excavations/Fill



- ML — Silt
- SW — Sand, Well Graded
- SM — Silty Sand
- Geologic Contact

Note: Interpreted contours are based on available analytical data for soil samples collected between 2008 and 2019.

The contours represent an interpretation of available data for the indicated date. Site groundwater contours may change with additional measurements and/or data points, weather changes, construction activities, and/or other influences.

Project File: 01-0410-R F3_tlq_tjc_tlq_tlq_tlq.vsdx

g-logics | ATLAS GEOSCIENCES NW COMPANY

Approximate Horizontal Drawing Scale: 1" = 10'

0 ft. 6 ft. 10 ft. 20 ft.

4X Vertical Exaggeration

Note: This figure contains information in color. Black & white photocopies may not be suitable for review.

ISCO Injection and Monitoring Cross Section, A-A'
Upper Saturated Zone, Boeing Field Chevron
10805 East Marginal Way South
Tukwila, Washington

Figure 3

Mapping Reference: PLS Survey 2016, G-Logics Field Measurements, G-Logics Remedial Investigation Report, Compiled Data.

TABLES

Table 1

Project No. 01-0410-R

Groundwater Elevation Measurements and LNAPL Levels
Boeing Field Chevron
10805 East Marginal Way South
Tukwila, Washington

Monitoring Well	Well Installation Date	Elevation Top of Well Casing (feet)[1]	Depth to Top of Well Screen (feet)	Depth to Bottom of Well Screen (feet)	Well Diameter (inches)	Water Level Date Measured	Depth to Water (feet)[2]	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevation (feet)
Upper Saturated Zone										
AS-1	4/10/2019	20.83	12	14	2	8/15/2022	10.32	NM	NM	10.51
						9/7/2022	10.71	NM	NM	10.12
						9/27/2022	10.90	NM	NM	9.93
						10/17/2022	11.19	---	0	9.64
						2/22/2023	9.33	---	0	11.50
						4/24/2023	9.29	---	0	11.54
						7/19/2023	10.36	---	0	10.47
IP-4	4/19/2006	20.49	8	14	2	8/15/2022	10.04	NM	NM	10.45
						9/7/2022	10.49	NM	NM	10.00
						9/27/2022	10.69	---	0	9.80
						10/17/2022	10.95	NM	NM	9.54
						2/22/2023	9.12	---	0	11.37
						4/24/2023	9.01	---	0	11.48
						7/19/2023	10.08	---	0	10.41
SVE-1	4/11/2019	20.68	5	9	4	8/15/2022	DRY	NM	NM	DRY
						9/7/2022	DRY	NM	NM	DRY
						9/27/2022	DRY	NM	NM	DRY
						10/17/2022	DRY	NM	NM	DRY
						2/22/2023	DRY	NM	NM	DRY
						4/24/2023	DRY	NM	NM	DRY
						7/19/2023	DRY	NM	NM	DRY
TW-1	4/11/2019	20.59	5	9	2	8/15/2022	9.64	NM	NM	10.95
						9/7/2022	9.87	NM	NM	10.72
						9/27/2022	10.04	NM	NM	10.55
						10/17/2022	10.18	NM	NM	10.41
						2/22/2023	7.31	---	---	13.28
						4/24/2023	8.34	---	---	12.25
						7/19/2023	9.61	---	---	10.98
TW-2	4/11/2019	20.52	5	9	2	8/15/2022	9.29	NM	NM	11.23
						9/7/2022	9.46	NM	NM	11.06
						9/27/2022	9.63	NM	NM	10.89
						10/17/2022	9.84	NM	NM	10.68
						2/22/2023	8.49	---	---	12.03
						4/24/2023	8.26	---	---	12.26
						7/19/2023	9.54	---	---	10.98
TW-3	4/11/2019	20.38	5	9	2	8/15/2022	9.30	NM	NM	11.08
						9/7/2022	9.50	NM	NM	10.88
						9/27/2022	9.72	NM	NM	10.66
						10/17/2022	10.00	NM	NM	10.38
						2/22/2023	8.05	---	---	12.33
						4/24/2023	8.01	---	---	12.37
						7/19/2023	9.15	---	---	11.23
TW-4	8/12/2022	20.42	5	15	2	8/15/2022	10.26	NM	NM	10.16
						9/7/2022	10.64	NM	NM	9.78
						9/27/2022	10.76	NM	NM	9.66
						10/17/2022	11.03	NM	NM	9.39
						2/22/2023	9.00	---	---	11.42
						4/24/2023	8.67	---	---	11.75
						7/19/2023	10.09	---	---	10.33

Table 1

Project No. 01-0410-R

Groundwater Elevation Measurements and LNAPL Levels
Boeing Field Chevron
10805 East Marginal Way South
Tukwila, Washington

Monitoring Well	Well Installation Date	Elevation Top of Well Casing (feet)[1]	Depth to Top of Well Screen (feet)	Depth to Bottom of Well Screen (feet)	Well Diameter (inches)	Water Level Date Measured	Depth to Water (feet)[2]	Depth to Product (feet)	Product Thickness (feet)	Groundwater Elevation (feet)
TW-5	8/12/2022	20.35	7	12	2	8/15/2022	9.93	NM	NM	10.42
						9/7/2022	10.26	NM	NM	10.09
						9/27/2022	10.42	NM	NM	9.93
						10/17/2022	10.67	NM	NM	9.68
						2/22/2023	8.98	---	---	11.37
						4/24/2023	8.85	---	---	11.50
						7/19/2023	9.93	---	---	10.42
Lower Saturated Zone										
IP-3	4/19/2006	20.28	18	24	2	8/15/2022	14.06	NM	NM	6.22
						9/7/2022	15.87	---	0	4.41
						9/27/2022	14.15	NM	NM	6.13
						10/17/2022	14.65	NM	NM	5.63
						2/22/2023	12.81	---	---	7.47
						4/24/2023	12.91	---	---	7.37
						7/19/2023	14.22	---	---	6.06
IP-5	4/26/2006	21.08	18	24	2	8/15/2022	12.13	NM	NM	8.95
						9/7/2022	16.45	---	0	4.63
						9/27/2022	14.92	NM	NM	6.16
						10/17/2022	15.41	NM	NM	5.67
						2/22/2023	13.63	---	---	7.45
						4/24/2023	13.52	---	---	7.56
						7/19/2023	14.97	---	---	6.11
IP-7*	8/4/2006	20.31	17	23	2	8/15/2022	13.93	12.93	2.33	6.38
						9/7/2022	15.67	15.26	2.05	4.64
						9/27/2022	14.10	13.43	0.67	6.21
						10/7/2022[3]	12.27	15.34	2.37	8.04
						10/17/2022	14.47	14.14	1.66	5.84
						12/16/2022[3]	10.16	13.27	2.14	10.15
						12/19/2022	10.16	13.10	0.17	10.15
						1/20/2023[3]	9.78	12.23	0.35	10.53
						2/22/2023	12.79	12.62	0.84	7.52
						4/24/2023	12.77	12.32	2.23	7.54
						7/19/2023	14.16	13.63	2.66	6.15

Notes:

[1] Elevations based on subject property specific datum established during previous well installation program

[2] Depth to water measured from the top of the well casing

[3] Extraction Event

--- No product detected

DRY Dry well, depth to water greater than well depth

NM Not measured

IP-7* Depth to water corrected for product DTW-(DTW-DTP) x 0.8

DTW Depth to Water

DTP Depth to Product

0 No product detected with interface probe

LNAPL Light nonaqueous-phase liquids

TABLE 2

Groundwater Sample Analytical Results
Boeing Field Chevron
10805 East Marginal Way
Tukwila, Washington

Sample Identification	Sample Date	Total Petroleum Hydrocarbons (µg/L)			Volatile Organic Compounds (µg/L)				Total Organic Carbon (mg/L)
		Gasoline Range Organics	Diesel Range Organics	Heavy Oil Range Organics	Benzene	Toluene	Ethylbenzene	Total Xylenes [1]	
MTCA Method A Cleanup Level [2]		1,000/800 [3]	500	500	5	1,000	700	1,000	NE
AS-1	8/15/2022	474	617	478	5.98	<0.750	31.8	26.7	---
	9/27/2022	5,780 D	3,610	<93.0	104 D	14.8 D	464 D	240 D	---
	9/27/2022*	5,960	3,990	<92.6	109 D	15.1 D	486 DE	250	---
	2/23/2023	6,000	2,900 M	620	32	36	310	710	---
	2/23/2023*	9,200	4,400 M	740	43	44	390	870	---
	4/25/2023	3,000	<450 M1 Q U1	<220 Q	16	15	150	350	---
	7/20/2023	2,900	720 MQ	<220 Q	25	18	150	380	---
IP-3	8/15/2022	4,450 D	277	612	1,080 DE	21.9	43.1 D	92.1 D	8.43
	8/15/2022*	4, 540 D	306	<94.4	1,070 DE	20.9	43.3	106	9.56
	2/23/2023	29,000	2,100 M	480	3,100	4,700	1,200	3,410	---
	4/25/2023	21,000	<930 M1 Q U1	<210 Q	2,100	3,700	1,200	3,720	---
	7/20/2023	20,000	1600 MQ	400	1,100	1,600	1,300	3,200	---
IP-4	8/15/2022	126,000 DE	9,500	<1,110	54.6 D	2,140 DE	5,100 DE	14,500 DE	---
	9/27/2022	114,000 D	17,300	<92.7	47.2 JD	2,420 D	4,110 D	17,600 D	---
	2/23/2023	63,000	3,300 M	530	27	81	1,600	6,600	---
	4/25/2023	57,000	<4,500 M1 U1	320	26	110	3,100	10,800	---
	7/20/2023	66,000	6300 M	570	41	340	4,800	12,100	---
IP-5	8/15/2022	13,200 D	625	<95.7	1,940 D	346 D	358 D	916 D	7.94
	2/22/2023	21,000	3,400 M	550	3,000	350	1,100	2,990	---
	4/24/2023	14,000	<2,000 M1 U1	460	1,700	190	860	2,050	---
	7/19/2023	25,000	2,600	430	4,900	3,000	1,400	3,240	---
IP-7	8/15/2022	111,000 D	49,300 D	<93.9	1,040 D	3,620 D	2,920 D	15,300 D	20.7
	2/23/2023	82,000	16,000 M	680	850	6,700	2,600	13,600	---
	4/25/2023	53,000	<2,200 M1 U1	260	450	4,400	2,300	11,900	---
	7/20/2023	54,000	4,000	380	840	5,300	2,500	12,500	---
TW-1	8/15/2022	NS	NS	NS	NS	NS	NS	NS	---
	2/22/2023	<100	130	350	<0.20	<1.0	<0.20	<0.40	---
	4/24/2023	<100	<210	<220	<0.20	<1.0	<0.20	<0.40	---
	4/24/2023*	<100	<210	<220	<0.20	<1.0	<0.20	<0.40	---
	7/19/2023	<100	170	300	0.30	1.1	0.89	4.9	---
	7/19/2023*	<100	230	570	0.33	1.2	0.99	5.5	---
TW-2	8/15/2022	NS	NS	NS	NS	NS	NS	NS	---
	2/22/2023	100	110 M	310	0.24	9.3	7.5	42	---
	4/24/2023	330	<210	<220	<0.40	7.1	5.6	31	---
	7/19/2023	7,400	170	600	1.3	28	18	90	---
TW-3	8/15/2022	NS	NS	NS	NS	NS	NS	NS	---
	9/27/2022	NS	NS	NS	NS	NS	NS	NS	---
	2/22/2023	14,000	4,800 M	620	2,800	<100	1,500	1,200	---
	4/24/2023	13,000	<3,700 M1 U1	350	2,400	96	1,600	1,900	---
TW-4	8/15/2022	139	561	<94.7	<0.440	4.25	0.811	4.88	---
	9/27/2022	133	381	<91.9	<0.440	6.35	0.978	4.20	---
	2/22/2023	<100	<120	310	<0.20	1.1	0.30	1.28	---
	4/24/2023	<100	<230	<230	<0.40	<2.0	0.86	4.40	---
	7/19/2023	<100	120	300	<0.20	<1.0	<0.20	0.41	---

TABLE 2

Groundwater Sample Analytical Results
Boeing Field Chevron
10805 East Marginal Way
Tukwila, Washington

		Total Petroleum Hydrocarbons (µg/L)			Volatile Organic Compounds (µg/L)				Total Organic Carbon (mg/L)
Sample Identification	**Sample Date**	**Gasoline Range Organics**	**Diesel Range Organics**	**Heavy Oil Range Organics**	**Benzene**	**Toluene**	**Ethylbenzene**	**Total Xylenes [1]**	
MTCA Method A Cleanup Level [2]		1,000/800 [3]	500	500	5	1,000	700	1,000	NE
TW-5	8/15/2022	**214,000 DE**	**8,850**	<94.2	**351 D**	**38,400 DE**	**6,000 DE**	**23,800 DE**	---
	9/27/2022	**178,000 D**	**8,520**	<94.2	**258 JD**	**30,600 D**	**3,890 D**	**20,900 D**	---
	2/22/2023	**140,000**	**9,200 QM**	**540 Q**	**220**	**24,000**	**4,200**	**21,000**	---
	4/24/2023	**150,000**	<4,400 M1 U1	**330**	**220**	**25,000**	**5,400**	**26,700**	---
	7/19/2023	**150,000**	**3400 QM**	**440 Q**	**340**	**41,000**	**5,800**	**29,000**	---

Notes:

Only those analytes detected or specifically targeted for evaluation are included in the table. Refer to the laboratory reports in Appendix C for full list of analytes and analytical methods.

[1]	Results for xylenes is the sum of m,p-xylenes and o-xylenes, as indicated in the laboratory analytical package
[2]	MTCA Standard Method A Groundwater Cleanup Levels for Unrestricted Land Uses
[3]	Lower cleanup level applies to groundwater with detectable benzene
---	Sample not analyzed
<5.02	The analyte was not detected at a concentration above the indicated reporting limit
27.2	Bold value indicates contaminant detected
3,490	Bold value and yellow shading indicates concentration exceeds applicable cleanup level
D	The sample was diluted; detection limits were raised and surrogate recoveries may not be meaningful
E	Value is above the quantitation range
M	Hydrocarbons in the gasoline range are impacting the diesel range result
M1	Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample
MTCA	Washington State Model Toxics Control Act
NE	Not established
Q	Surrogate recovery is out of the control limits
U1	The practical quantitation limit is elevated due to interferences present in the sample
NS	Not sampled due to insufficient volume of water in the well to collect a sample
*	Field duplicate sample
mg/L	Milligrams per liter
µg/L	Micrograms per liter

Table 3

Project No. 01-0410-R

Groundwater Field Parameter Measurements
Boeing Field Chevron
10805 East Marginal Way South
Tukwila, Washington

Monitoring Well	Observation Date	pH	Conductivity (microsiemens per centimeter)	Turbidity (nephelometric turbidity units)	Temperature (degrees Celsius)	Oxidation-Reduction Potential (millivolts)	Dissolved Oxygen (milligrams per liter)
AS-1	8/15/2022	6.60	900	NM	17.10	-0.9	0.54
	9/27/2022	7.67	3,254	NM	17.5	-240.4	0.10
	2/23/2023	7.85	2,679	378.75	10.0	-258.9	8.09
	4/25/2023	7.01	3,343	37.90	12.2	-73.3	0.68
	7/20/2023	7.23	2,554	55.74	16.5	520.9	0.41
IP-3	8/15/2022	6.35	400	NM	15.9	-37.1	0.24
	2/23/2023	9.39	3,353	590.60	10.4	-319.4	13.05
	4/25/2023	7.75	3,526	8.37	13.6	-133.5	0.35
	7/20/2023	7.44	3,342	121.39	15.4	237.2	0.55
IP-4	8/15/2022	6.53	992	NM	16.6	-115.5	0.32
	9/27/2022	6.66	1,100	NM	17.3	-134.7	0.16
	2/23/2023	7.34	1,071	33.40	8.5	-98.5	8.06
	4/25/2023	6.77	1,838	27.73	12.5	-56.1	0.43
	7/20/2023	6.70	1,000	2.94	16.4	368.4	0.70
IP-5	8/15/2022	5.89	222.8	NM	15.5	31.0	0.34
	2/22/2023	10.38	4,682	76.67	11.8	-147.9	7.20
	4/24/2023	9.06	3,037	12.37	14.4	-307.1	0.29
	7/19/2023	7.62	2,975	240.66	16.8	268.9	0.30
IP-7	2/23/2023	6.58	501	118.75	11.4	-103.9	14.14
	4/25/2023	6.32	679	5.41	13.3	-15.5	0.45
	7/20/2023	6.52	574	86.24	17.3	398.6	0.54
TW-1	2/22/2023	9.31	1,259	135.34	8.9	37.7	7.20
	4/24/2023	8.39	1,510	7.16	11.50	80.1	3.08
	7/19/2023	8.13	1,593	0.29	18.5	450.6	0.69
TW-2	2/22/2023	7.82	1,517	26.96	8.3	89.7	16.09
	4/24/2023	7.05	1,667	18.32	11.3	106.9	6.56
	7/19/2023	6.90	1,428	19.63	20.2	497.3	1.72
TW-3	2/22/2023	6.82	954	3.55	9.8	-134.1	8.25
	4/24/2023	6.52	1,364	4.60	12.1	-86.2	0.60
	7/19/2023	6.75	1,318	0.55	20.7	325.5	0.59
TW-4	8/15/2022	6.73	864	NM	18.2	-54.9	0.60
	9/27/2022	6.73	734	NM	18.0	-88.1	0.26
	2/22/2023	9.52	1,441	166.40	10.0	-7.3	9.17
	4/24/2023	7.84	1,406	19.01	12.4	-35.2	7.34
	7/19/2023	7.50	1,640	0.78	19.6	299.2	0.47
TW-5	8/15/2022	6.62	829	NM	16.6	-87.9	1.18
	9/27/2022	6.42	812	NM	17.2	-147.9	0.25
	2/22/2023	9.78	7,786	213.89	10.3	-428.6	5.47
	4/24/2023	8.74	7,506	95.29	12.8	-383.6	0.25
	7/19/2023	8.87	3,958	0.14	16.8	-246.3	0.26

Notes:

Groundwater field parameters measured with YSI ProDss-10 Multiparameter Digital Water Quality Meter with flow-through cell

NM Not measured

Table 4
Groundwater Elevation Changes
Boeing Field Chevron
10805 East Marginal Way South
Tukwila, Washington

Monitoring Well	Well Installation Date	Elevation Top of Well Casing (feet) [1]	Depth to Top of Well Screen (feet)	Depth to Bottom of Well Screen (feet)	Well Diameter (inches)	Water Level Date Measured	Depth to Water (feet): Pre-Event [2]	Groundwater Elevation: Pre-Event (feet)	Depth to Water (feet): Post-Event [2]	Groundwater Elevation: Post- Event (feet)	Difference in Groundwater Elevation	Tide Cycle Pre/Post	Tidal Effect per RI Report [5]
Upper Saturated Zone													
AS-1	4/10/2019	20.83	12	14	2	9/7/2022[3]	10.71	10.12	9.72	11.11	0.99	Falling/Rising	No
IP-4	4/19/2006	20.49	8	14	2	9/7/2022[3]	10.49	10.00	10.60	9.89	-0.11	Falling/Rising	No
SVE-1	4/11/2019	20.68	5	9	4	9/7/2022	DRY	DRY	DRY	DRY	DRY	Falling/Rising	NA
TW-1	4/11/2019	20.59	5	9	2	9/7/2022[3]	9.87	10.72	9.86	10.73	0.01	Falling/Rising	No
TW-2	4/11/2019	20.52	5	9	2	9/7/2022[3]	9.46	11.06	9.44	11.08	0.02	Falling/Rising	No
TW-3	4/11/2019	20.38	5	9	2	9/7/2022[3]	9.50	10.88	8.25	12.13	1.25	Falling/Rising	No
						10/7/2022[4]	9.96	10.42	9.96	10.42	0.00	Rising/Rising	
TW-4	8/12/2022	20.42	5	15	2	9/7/2022[3]	10.64	9.78	10.06	10.36	0.58	Falling/Rising	No
TW-5	8/12/2022	20.35	7	12	2	9/7/2022[3]	10.26	10.09	9.82	10.53	0.44	Falling/Rising	No
Lower Saturated Zone													
IP-3	4/19/2006	20.28	18	24	2	9/7/2022[3]	15.87	4.41	14.28	6.00	1.59	Falling/Rising	Yes
IP-5	4/26/2006	21.08	18	24	2	9/7/2022[3]	15.41	5.67	13.25	7.83	2.16	Falling/Rising	Yes
						10/7/2022[4, 7]	16.54	4.54	NA	NA	NA	Rising/Rising	
									17.02	4.06	-0.48	Rising/Rising	
									17.30	3.78	-0.76	Rising/Rising	
									17.39	3.69	-0.85	Rising/Rising	
									17.49	3.59	-0.95	Rising/Rising	
									17.57	3.51	-1.03	Rising/Rising	
									17.30	3.78	-0.76	Rising/Rising	
IP-7[6]	8/4/2006	20.31	17	23	2	9/7/2022	15.67	4.64	13.66	6.65	2.01	Falling/Rising	Yes
						10/7/2022[4]	12.27	8.04	16.84	3.47	-1.07	Rising/Rising	

Notes:

1 Elevations based on subject property specific datum established during previous well installation program

2 Depth to water measured from the top of the well casing

3 Injection Event

4 Extraction Event

5 Section 2.7 of the G Logics. 2020. *Remedial Investigation Report, Boeing Field Chevron, 10805 East Marginal Way South, Tukwila, Washington 98168*. October 7, 2020.

6 Depth to water corrected for product DTW-(DTW-DTP) x 0.8 when measurable LNAPL was present; measurable LNAPL not present in IP-7 after extraction event

7 Depth to water collected over time during extraction event

DTW	Depth to water
DTP	Depth to product
LNAPL	Light nonaqueous-phase liquid
NA	Not Applicable

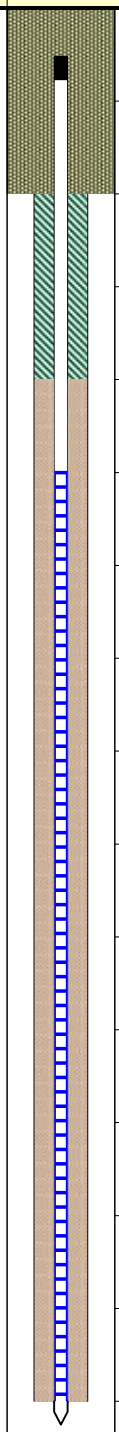
APPENDIX A

BORING LOGS

g-logics AN ATLAS GEOSCIENCES NW COMPANY	PROJECT/PROJECT NO: **Boeing Field Chevron**	PROJECT NUMBER: **01-0410-R**	DRILLING DATE: **8/12/2022**
	DRILLING CONTRACTOR: **Cascade Drilling**	BORING DIAMETER: **2"**	WEATHER: **Partly Cloudy**
BORING/WELL ID: **TW-4**	DRILLING METHOD: **Direct Push**	TOTAL DEPTH: **15'**	DEPTH TO WATER: **10.38**
	LOCATION: **Seattle, Washington**		LOGGED BY: **JMS**

NOTES:

Depth (feet)	USCS Soil Type/Graphic	Description	Interval and % Recovery	PID	Sample ID
0	Conc	0-0.5': Concrete.			
		0.5-5': Air knife extraction.			
5	SW	5-9': SAND, dark gray to dark brown, medium grained, pebbles/gravel, dry, no odor, dense.		0.3	TW-4-5.5-6
				0	TW-4-8-8.5
10	SM	9-11': SILTY SAND, dark brown, fine to medium grained with gravel, dry, no odor. Becomes wet at 10 feet.		0	TW-10-10.5
		11-12.5': SILTY SAND, light gray, fine to medium grained, wet, nonplastic, no odor, dense. Increased silt at 11.5 feet. Increased silt.			
	ML	12.5-14.5': SILT, damp to saturated.		0	
15	SM	14.5-15': SILTY SAND, fine to medium grained, damp, dense.		0	TW-4-14.5-15
		Boring terminated at 15'.			



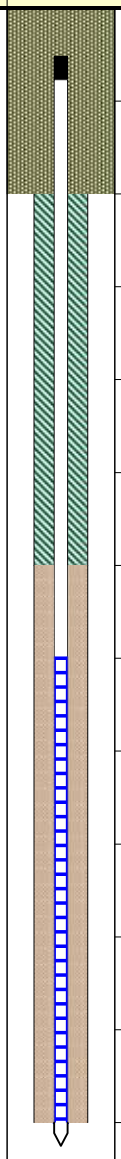
Well Construction

- 0: Flush mounted 8" cover
- Concrete Seal
- Bentonite Seal
- 2" PVC Blank
- 5
- Sand Pack
- 10
- 2" O.D. Well Screen (10 slot)
- 15

g-logics AN ATLAS GEOSCIENCES NW COMPANY	PROJECT/PROJECT NO: **Boeing Field Chevron**	PROJECT NUMBER: **01-0410-R**	DRILLING DATE: **8/12/2022**
	DRILLING CONTRACTOR: **Cascade Drilling**	BORING DIAMETER: **2"**	WEATHER: **Partly Cloudy**
BORING/WELL ID: **TW-5**	DRILLING METHOD: **Direct Push**	TOTAL DEPTH: **12'**	DEPTH TO WATER: **9.94**
	LOCATION: **Seattle, Washington**		LOGGED BY: **JMS**

NOTES:

Depth (feet)	USCS Soil Type/Graphic	Description	Interval and % Recovery	PID	Sample ID
0	Pav	0-0.5': Concrete.			
		0.5-5': Air knife extraction. 3-3.5' Cobbles, gray, dry. 3.5-5' Fill material, medium grained sand, dark brown, dry.			
5	SW	5-7': SAND, dark gray, medium grained, dry, soft, no odor. Becomes dark brown at 6 feet.		1238	TW-5-5.5-6
	SM	7-10': SILTY SAND, dark brown, fine to coarse grained, dry, soft, no odor.		3	TW-5-8-8.5
10	SM	10-11.5': SILTY SAND, dark gray, fine to medium grained, wet to almost saturated, strong odor, soft.		1195	TW-5-10-10.5
		11.5-12': SILTY SAND, fine to medium grained, moist, soft, no odor.		3.8	TW-5-11.5-12
		Boring terminated at 12'.			
15					



Well Construction

0 — Flush mounted 8" cover

Concrete Seal

Bentonite Seal

2" PVC Blank

5

Sand Pack

2" O.D. Well Screen (10 slot)

10

15

APPENDIX B

FIELD NOTES

August 2022

01-0410-R Task 2A 8/12/2022
BFC, Well Install 64° F, Partly Cloudy

0753 JMS arrives to site. Check in with tenant + set up cones to block off work zone.
0802 Cascade arrives to site with (1) vac. truck and (1) truck w/ trailer & geoprobe DPT rig + support supplies.
0810 Tailgate + safety meeting to discuss scope, safety concerns, + other site information.
0823 Unload equipment + delineate work area with cones + caution tape. Begin setup at TW-5
0850 Begin concrete cutting at TW-5
0917 Generator overheats, give it a rest before proceeding.
0924 Coring completed at TW-5. Setup concrete cutting equipment at TW-4
0932 Begin air knife at TW-5.
1018 Complete air knife at TW-5.

Scale: 1 square = _____ Pg. 1 of 3.

1020 Begin cutting core at TW-4
1045 Coring completed at TW-4.
1049 One crew member proceeds with removing concrete from TW-4 + begin air knife. Other crew member sets up DPT at TW-5.
1100 Begin drilling at TW-5.
1120 Complete air knife at TW-4
1139 Complete drilling at TW-5. Call PM to confirm findings + well construction detail
1140 Set well screen + construct well

0-2	concrete
2-6	hydrated bentonite
6-12	silica sand
0-7	riser
7-12	slotted screen

flush finish.
1147 Set up DPT rig at TW-4.
1148 Begin drilling TW-4
1210 Complete drilling at TW-4. Text PM to confirm that lithology is as expected.

Scale: 1 square = Pg. 2 of 3

1212 Begin well construction at TW-4 + complete concrete surface completion at TW-5.

0-2	concrete
2-4	hydrated bentonite
4-15	silica sand
0-5	riser
5-15	slotted screen (prepacked)

1230 DTW at TW-5 is 9.94'
1235 continue well construction at TW-4, ~~finish~~
1248 Begin development at TW-5.
1250 well continuously runs dry.
1307 DTW at TW-4 is 10.38'
1419 Development finished at TW-5, 2 gallons purged.
1420 Begin development at TW-4
1505 development finished at TW-4. 4 gallons purged.
* 1 soil + 1 water drum at site.
1510 Clean + restore site. All parties depart site.

8/12/22 Kate in the rain

Scale: 1 square = Pg. 3 of 3

01-0410-R TASK 2A
Boeing Field Chevron
Cascade drilling 8/12/22

2" PVC well, prepacked screen, flush finish

TW-4

depth	description	PID	sample	construction
	0-0.5 concrete			
	0.5-5.5 (air knife extraction)			
2		x		
4				
	5-9 Medium grained sand (SW), contains pebbles/gravel. dark gray to dark brown mixed color, dry, no odors, hard	x	TW-4: 5.5-6 @ 1158	5
6		0.3		
8			TW-4: 8-8.5 @ 1159	
	9-10 fine to medium grained sand w/ gravel (SM), dark brown, dry, no odors	0		
10	10-11 SAA wet		TW-4: 10-10.5 @ 1200	
	11-13.5 ~~gravel~~ (SM) medium to fine grained sand, light gray color, wet, nonplastic, dense	0		
12				
	@ 11.5 ~~wet~~, increased silt content ML @ 12.5 saturated	0		
14	13.5-14.5 ML damp		TW-4: 14.5-15 @ 1201	
	14.5-15 SM, fine to medium grained sand, damp, dense	0		15
16				

TD = 15'

01-0410-R Task 2A, BFC
Cascade Drilling 8/12/22

2" PVC, prepacked screen, flush finish

TW-5

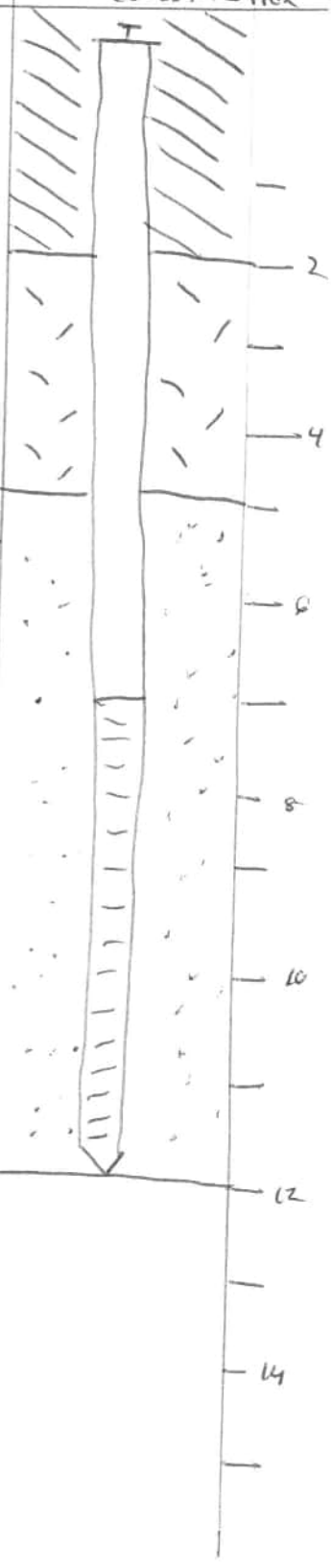
Depth	Description	PID	Sample
0	0-0.5 concrete		
1	0.5-5 (air knife extraction)	X	X
2	3-3.5 cobbles, gray, dry		
3	3.5-5 fill material, medium grained sand, dark brown, dry	X	X
4			
5	5-7 Medium sand (SW), dark gray, dry, soft, no odors		
6	@ 6' - color change to dark brown	1238	TW-5: 5.5-6 @ 1120
7	7-10 fine to coarse grained sand (SM) and silt. dark brown color, dry, no odors, soft		
8		3.0	TW-5: 8-8.5 @ 1125
9			
10	10-11 silty sand (SM). fine to medium grained. dark gray, wet to almost saturated. strong odors, soft	1195	TW-5: 10-10.5 @ 1126
11			
12	11-11.5 SAA	3.8	TW-5: 11.5-12 @ 1130
13	11.5-12 silty sand (SM) w/ fine to med. grained sand, no odors, soft, moist		
14			
15			

TD = 12'

riser 0-7

screen 7-12

Construction



Drum Inventory Sheet

Project Name: Boeing Field Chevron

Property Address: 10805 E Marginal Way S, Tukwila, WA

Project Number: 01-0410-R Task 2A & 2B

Date: 8/12/22, confirmed 8/16/22

Drum ID	Content (Soil/Water)	Date Drum Started	Fullness (%)	Drum Label (Y/N)	Drum Location, Access, and Other Comments
1	Soil	8/12	100	Y	along southern property
2	Water	8/12	30	Y	boundary near
~~3~~					sidewalk/walkway
~~4~~					
~~5~~					

01-0410-R Task 2B 8/15/2022
Boeing Field Chevron . sunny, 65°F
GWME

0820 JMS arrives to site. Tailgate + safety meeting. 1 person in attendance.
0826 Check in with staff + secure work area with cones.
0834 Open purge water drum.
0840 Begin opening all wells to sample (11x)
0927 Confirm construction details on wells. Get TDs from boring logs
0943 Begin gauging all wells. Start w/ 2 interface probe measurements
1028 Finish gauging all wells
1029 Confirm TDs at TW-1, TW-2
1035 Confirm gauging w/ PM
1040 set up TW-5
1053 Begin monitoring TW-5
1100 No water - troubleshooting
1110 depart site for geotech
230 JMS arrives back to site. Resetup equipment at TW-5
1240 Troubleshooting w/ pump

Scale: 1 square = _____ Pg. 1 of 3 →

1255 Begin measurements TW-5
1335 Collect sample TW-5
1340 Decon equipment + set up at AS-1
1355 Begin measurements AS-1
1408 Collect AS-1
1412 decon. equipment + set up at TW-4
1425 Begin measurements at TW-4
1444 collect TW-4
1448 decon equipment + set up at IP-4
1510 Begin measurements at IP-5
1531 collect IP-5
1540 decon equipment + set up at IP-3
1550 Begin measurements IP-3
1617 collect IP-3 AND DUP-01 (0800)
1630 decon equipment + set up at IP-4
1645 Begin measurements at IP-4, does NOT contain product
1707 collect IP-4
1712 decon equipment and close all wells.

Scale: 1 square = Pg 2 of 3 Rite in the Rain

01-0410-R Task 2B

1725 Close drum + pick up traffic cones.

1740 All parties depart site - to return tomorrow to finish sampling + survey new wells

8/15/22
JMS

01-0410-R Task 2B 8/16/2022

Boeing Field Chevron overcast, 60°F

GWME

0822 JMS arrives to site. Tailgate + safety meeting

0830 Check in with staff + secure work zone with cones

0840 Open 4 wells for survey & sampling

0845 Begin bailing IP-7

0912 5 gallons purged

0915 Collect IP-7

0926 Begin survey/well measurements use IP-4 as baseline

1010 complete survey

1021 Restore site. Close drums + wells, remove cones from work area

1028 JMS departs site.

8/16/22 JMS

Groundwater Monitoring Well Gauging Form

Project Name: Boeing Field Chevron
Project Number: 01-0410-R Task 2B
Date: 8/15/2022
Page: 1

g-logics

DTP DTW Thickness of Product

	Well Identification	Well Diam. (in)	Time Opened	Time Measured	Depth to Water (ft)	Free Product Thickness (in)	Sheen Y/N	Well Sampled Y/N	TD	Observations/Notes
X	TW-2		0845	0943	–	9.29	–	N	(9')	X TD=10.20 <18" GW
X	TW-1		0847	1010	–	9.64	–	N	(9')	X TD=10.18 <18" GW
	TW-4		0849	1016	–	10.26	–	(Y)	✓ 15'	
X	SVE-1		0853	1018	–	DRY	–	N	(9')	X 8.83 bottom <18" GW
★	IP-4		0855	1000	–	10.04	–		✓ 14'	
	TW-5		0900	1014	–	9.93	–	(Y)	✓ 12'	
X	TW-3		0901	1013	–	9.30	–	N	(9')	X 10.17 =TD <18" GW
	AS-1		0905	1020	–	10.32	–	(Y)	✓ 16'	
PRODUCT ★	IP-9		0907	0950	12.93	17.93	5.00	BAIL	✓ 23'	odors
	IP-5		0908	1019	–	12.13	–	(Y)	✓ 24'	strong odors, product in monument
	IP-3		0914	1025	–	14.06	–		✓ 24'	24

Comments:

Well Number: AS-1	Project Name: BFC	
Project Number: 01-0410-R 2B	Date: 8-15-22	Weather: sunny, 78°F
Development / Purge Method: Low flow	Well Screen Interval: 12 to 14	Tidally Influenced?
Logged By: JMS	Water Depth Start: 10.40	Field Comments: new tubing
Purge Water Disposal Method: drums	Water Depth Finish: 10.90	
Purge Water Disposal Volume: 0.5-gallons	Bails Dry? Yes (No) What Volume?	Well Conditions: (OK) Not OK
		Explain:

Well Development / Purging (circle one)

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft
Purge Volumes: 1" Diam 0.041 * 3 casings * 10' screen = 1.23 gallons, 2" Diam 0.163 * 3 casings * 10' screen = 4.89 gallons

	Time	1355	1358	1401	1404	1407	~~1410~~		
	Water Level (ft)	10.82	11.11	11.43	10.62	10.81			
± 0.1	pH	6.60	6.57	6.55	6.59	6.60			
±10	Conductivity (mS/cm)	909	905	903	903	900			
±0.1	Temperature (F)	17.0	16.9	17.0	17.2	17.1			
±10	ORP (mV)	19.9	10.2	6.0	0.8	-0.9			
~~<10~~	~~Turbidity (NTUs)~~								
±0.2	Diss. Ox. (mg/L,%)	0.97	0.56	0.51	0.62	0.54			
	Color	clear	clear	clear	clear	clear			
	Purge Volume	0.1	0.1	0.1	0.1	0.1			

Well Sampling Information (complete if well is sampled)

Decon Method: Alconox + distilled
Water Level Start: 10.40
Sampling Method: Low flow
Filter Type: NA

Sample Number: AS-1 @ 1408
Water Level Finish: 10.90
Field comments: —

g-logics

Well Number:	R-3 / DUP-01	Project Name:	BFC
Project Number:	01-0410-R 2B	Date:	8-15-22
Development / Purge Method:	LOW FLOW	Well Screen Interval:	18 to 24
Logged By:	JMS	Water Depth Start:	16.01
Purge Water Disposal Method:	drums	Water Depth Finish:	16.04
Purge Water Disposal Volume:	0.8 gallons	Bails Dry? Yes (No)	What Volume?

Weather: sunny, 82°F

Tidally Influenced?

Field Comments: New tubing

Well Conditions: (OK) Not OK

Explain:

Well Development / Purging (circle one)

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft
Purge Volumes: 1" Diam 0.041 * 3 casings * 10' screen = 1.23 gallons, 2" Diam 0.163 * 3 casings * 10' screen = 4.89 gallons

	Time	1555	1558	1601	1604	1607	1610	1613	1616
	Water Level (ft)	16.05	16.04	16.02	16.01	16.00	16.00	16.00	15.98
± 0.1	pH	6.17	6.21	6.23	6.19	6.28	6.34	6.35	6.35
±10	Conductivity (mS/cm)	369.6	393.8	404.3	416.0	412.6	402.8	401.3	399.5
±0.1	Temperature (F)	16.0	16.1	16.1	15.9	16.0	16.0	16.0	15.9
±10	ORP (mV)	36.2	-1.3	-12.2	-17.6	-28.3	-34.4	-35.6	-37.1
~~<10~~	~~Turbidity (NTUs)~~								
±0.2	Diss. Ox. (mg/L,%)	0.56	0.33	0.29	0.25	0.24	0.25	0.26	0.24
	Color	clear	clear	clear	clear	clear	clear	clear	clear
	Purge Volume	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

Well Sampling Information (complete if well is sampled)

Decon Method: Alconox + distilled

Water Level Start: 16.01

Sampling Method: LOW flow

Filter Type: NA

Sample Number: DUP-01 @ 0800
IP-3 @ 1617

Water Level Finish: 16.04

Field comments: —

g-logics

Well Number: IP-4	Project Name: BFC	
Project Number: 01-0410-R 28	Date: 8-15-22	Weather: sunny, 82° F
Development / Purge Method: Low flow	Well Screen Interval: 8 to 14	Tidally Influenced?
Logged By: JMS	Water Depth Start: 10.13 no product	Field Comments: New tubing
Purge Water Disposal Method: drums	Water Depth Finish:	
Purge Water Disposal Volume:	Bails Dry? Yes (No) What Volume?	Well Conditions: (OK) Not OK
		Explain:

Well Development / Purging (circle one)

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft
Purge Volumes: 1" Diam 0.041 * 3 casings * 10' screen = 1.23 gallons, 2" Diam 0.163 * 3 casings * 10' screen = 4.89 gallons

	Time	1648	1651	1654	1657	1700	1703	1706	
	Water Level (ft)	10.42	10.49	10.55	10.57				
± 0.1	pH	6.51	6.49	6.52	6.54	6.54	6.53	6.53	
±10	Conductivity (mS/cm)	978	976	984	989	988	994	992	
±0.1	Temperature (F)	16.6	16.9	16.7	16.6	16.6	16.5	16.6	
±10	ORP (mV)	-87.0	-99.7	-106.5	-112.6	-114.0	-115.1	-115.5	
~~±10~~	~~Turbidity (NTUs)~~								
±0.2	Diss. Ox. (mg/L,%)	1.40	0.40	0.32	0.54	0.50	0.38	0.32	
	Color	clear	clear	clear	clear	clear	clear	clear	
	Purge Volume	0.1	0.1	0.1	0.1	0.1	0.1	0.1	

Well Sampling Information (complete if well is sampled)

Decon Method: Alconox + distilled
Water Level Start: 10.13
Sampling Method: Low Flow
Filter Type: NA

Sample Number: IP-4 @ 1707
Water Level Finish:
Field comments: odors present

g-logics

Well Number: IP-5	Project Name:	
Project Number: 01-0410-R 2B	Date: 8-15-22	Weather: Sunny, 83°F
Development / Purge Method: Low flow	Well Screen Interval: 16 to 24	Tidally Influenced?
Logged By: JMS	Water Depth Start: 13.42	Field Comments: brown yellow chunky gunk in well
Purge Water Disposal Method: drums	Water Depth Finish: 15.51	
Purge Water Disposal Volume: 0-6 gallons	Bails Dry? Yes (No) What Volume?	Well Conditions: (OK) Not OK
		Explain: Manway contained product

Well Development / Purging (circle one)

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft
Purge Volumes: 1" Diam 0.041 * 3 casings * 10' screen = 1.23 gallons, 2" Diam 0.163 * 3 casings * 10' screen = 4.89 gallons

	Time	1515	1518	1521	1524	1527	1530
	Water Level (ft)	14.30	14.62	14.95	15.20	15.29	15.42
± 0.1	pH	5.88	5.75	5.77	5.82	5.86	5.89
±10	Conductivity (mS/cm)	233.6	232.4	231.2	228.7	226.8	222.8
±0.1	Temperature (F)	15.5	15.4	15.4	15.4	15.4	15.5
±10	ORP (mV)	46.0	49.0	44.4	39.6	34.8	31.0
~~<10~~	~~Turbidity (NTUs)~~						
±0.2	Diss. Ox. (mg/L,%)	0.52	0.45	0.41	0.43	0.37	0.34
	Color	clear	clear	clear	clear	clear	clear
	Purge Volume	0.1	0.1	0.1	0.1	0.1	0.1

Well Sampling Information (complete if well is sampled)

Decon Method:	Alconox + distilled	Sample Number:	IP-5 @ 1531
Water Level Start:	13.42	Water Level Finish:	15.51
Sampling Method:	Low flow	Field comments:	new tubing
Filter Type:	NA		

g-logics

* PRODUCT - NO EQUIPMENT

Well Number: IP-7	**Project Name:**	
Project Number: 01-0410-R 2B	Date: 8-16-22	Weather: Overcast 60°F
Development / Purge Method: bailer	Well Screen Interval: _____ to _____	Tidally Influenced?
Logged By: JMS	Water Depth Start:	Field Comments:
Purge Water Disposal Method: drums	Water Depth Finish:	
Purge Water Disposal Volume: 5 gallons	Bails Dry? Yes (No) What Volume?	Well Conditions: OK Not OK
		Explain: LNAPL ~5.00'

Well Development / Purging (circle one)

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft
Purge Volumes: 1" Diam 0.041 * 3 casings * 10' screen = 1.23 gallons, 2" Diam 0.163 * 3 casings * 10' screen = 4.89 gallons

Time								
Water Level (ft)								
± 0.1 pH								
±10 Conductivity (mS/cm)								
±0.1 Temperature (F)								
±10 ORP (mV)								
<10 Turbidity (NTUs)								
±0.2 Diss. Ox. (mg/L,%)								
Color								
Purge Volume								

Well Sampling Information (complete if well is sampled)

Decon Method: _____
Water Level Start: _____
Sampling Method: bailer - grab
Filter Type: N/A

Sample Number: IP-7 @ 0915
Water Level Finish: _____
Field comments: _____

g-logics

Well Number: TW-4	Project Name: BFC	
Project Number: 01-0410-R T2B	Date: 8-15-22	Weather: Sunny, 81°F
Development / Purge Method: Low Flow	Well Screen Interval: 5 to 15	Tidally Influenced?
Logged By: JMS	Water Depth Start: 10.41	Field Comments:
Purge Water Disposal Method: drums	Water Depth Finish: 12.02	New tubing
Purge Water Disposal Volume: 0.7 gallons	Bails Dry? Yes (No) What Volume?	Well Conditions: (OK) Not OK
		Explain: NEW

Well Development / Purging (circle one)

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft
Purge Volumes: 1" Diam 0.041 * 3 casings * 10' screen = 1.23 gallons, 2" Diam 0.163 * 3 casings * 10' screen = 4.89 gallons

	Time	1425	1428	1431	1433	1437	1440	1443	
	Water Level (ft)	10.88	11.10	11.30	11.52	11.65	11.73	11.93	
± 0.1	pH	6.75	6.73	6.74	6.74	6.74	6.74	6.73	
±10	Conductivity (mS/cm)	863	859	857	860	861	862	864	
±0.1	Temperature (F)	18.7	18.8	18.9	18.8	18.7	18.5	18.2	
±10	ORP (mV)	-20.1	-31.6	-32.2	-39.4	-45.7	-51.9	-54.9	
≤10	~~Turbidity (NTUs)~~								
±0.2	Diss. Ox. (mg/L,%)	1.61	0.71	0.72	0.64	0.59	0.58	0.60	
	Color	clear	clear	clear	clear	clear	clear	clear	
	Purge Volume	0.1	0.1	0.1	0.1	0.1	0.1	0.1	

Well Sampling Information (complete if well is sampled)

Decon Method: Alconox + distilled
Water Level Start: 10.41
Sampling Method: Low flow
Filter Type: NA

Sample Number: TW-4 @ 1444
Water Level Finish: 12.02
Field comments: —

g-logics

Well Number: TW-5	Project Name: BFC	
Project Number: 01-0410-R TB	Date: 8-15-22	Weather: Sunny, 68°F
Development / Purge Method: Low flow	Well Screen Interval: 7 to 12	Tidally Influenced?
Logged By: JMS	Water Depth Start: 9.93	Field Comments: new tubing
Purge Water Disposal Method: drum	Water Depth Finish: 10.71	
Purge Water Disposal Volume: 1.5 gallons	Bails Dry? Yes (No) What Volume?	Well Conditions: (OK) Not OK
		Explain: NEW

Well Development / Purging (circle one)

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft
Purge Volumes: 1" Diam 0.041 * 3 casings * 10' screen = 1.23 gallons, 2" Diam 0.163 * 3 casings * 10' screen = 4.89 gallons

	Time	1255	1258	1301	1304	1307	1310	1313	1316
	Water Level (ft)	10.60	10.63	10.61	10.58	10.55	10.57	10.57	10.58
± 0.1	pH	6.27	6.26	6.30	6.34	6.38	6.41	6.44	6.45
±10	Conductivity (mS/cm)	604	651	651	668	700	716	726	755
±0.1	Temperature (F)(C)	16.3	16.3	16.8	16.8	16.7	16.8	16.7	16.7
±10	ORP (mV)	48.7	32.4	12.2	-10.0	-17.7	-20.9	-41.6	-52.7
~~<10~~	~~Turbidity (NTUs)~~								
±0.2	Diss. Ox. (mg/L)(%)	1.84	1.45	1.27	1.46	1.36	1.26	1.17	1.24
	Color	clear	clear	clear	clear	clear	clear	clear	clear
	Purge Volume (gal)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

→ measurements continued

Well Sampling Information (complete if well is sampled)

Decon Method: Alconox + distilled
Water Level Start: 9.94
Sampling Method: Low flow
Filter Type: NA

Sample Number: TW-5
Water Level Finish: 10.71
Field comments: new tubing, slight odor

SAMPLE TIME: 1335

g-logics

Well Number: TW-5 continued	Project Name: BFC	
Project Number:	Date:	Weather:
Development / Purge Method: see pg. 1	Well Screen Interval: _____ to _____	Tidally Influenced?
Logged By:	Water Depth Start:	Field Comments:
Purge Water Disposal Method:	Water Depth Finish:	
Purge Water Disposal Volume:	Bails Dry? Yes No What Volume?	Well Conditions: OK Not OK
		Explain:

Well Development / Purging (circle one)

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft
Purge Volumes: 1" Diam 0.041 * 3 casings * 10' screen = 1.23 gallons, 2" Diam 0.163 * 3 casings * 10' screen = 4.89 gallons

	Time	1319	1322	1325	1328	1331	1334		
	Water Level (ft)	10.61	10.64	10.66	10.68	10.69	10.69		
✓	± 0.1 pH	6.48	6.60	6.60	6.61	6.61	6.62		
	±10 Conductivity (mS/cm)	773	798	810	821	826	829		
✓	±0.1 Temperature (F)	16.7	16.6	16.6	16.6	16.7	16.6		
	±10 ORP (mV)	-60.8	-70.4	-75.2	-79.3	-80.3	-89.9		
	~~≤10 Turbidity (NTUs)~~								
✓	±0.2 Diss. Ox. (mg/L,%)	1.25	1.24	1.23	1.21	1.19	1.18		
	Color	clear	clear	clear	clear	clear	clear		
	Purge Volume	0.1	0.1	0.1	0.1	0.1	0.1		

Well Sampling Information (complete if well is sampled)

Decon Method: _____
Water Level Start: see pg. 1
Sampling Method: _____
Filter Type: _____

Sample Number: _____
Water Level Finish: _____
Field comments: _____

g-logics

September 2022

INJECTIONS

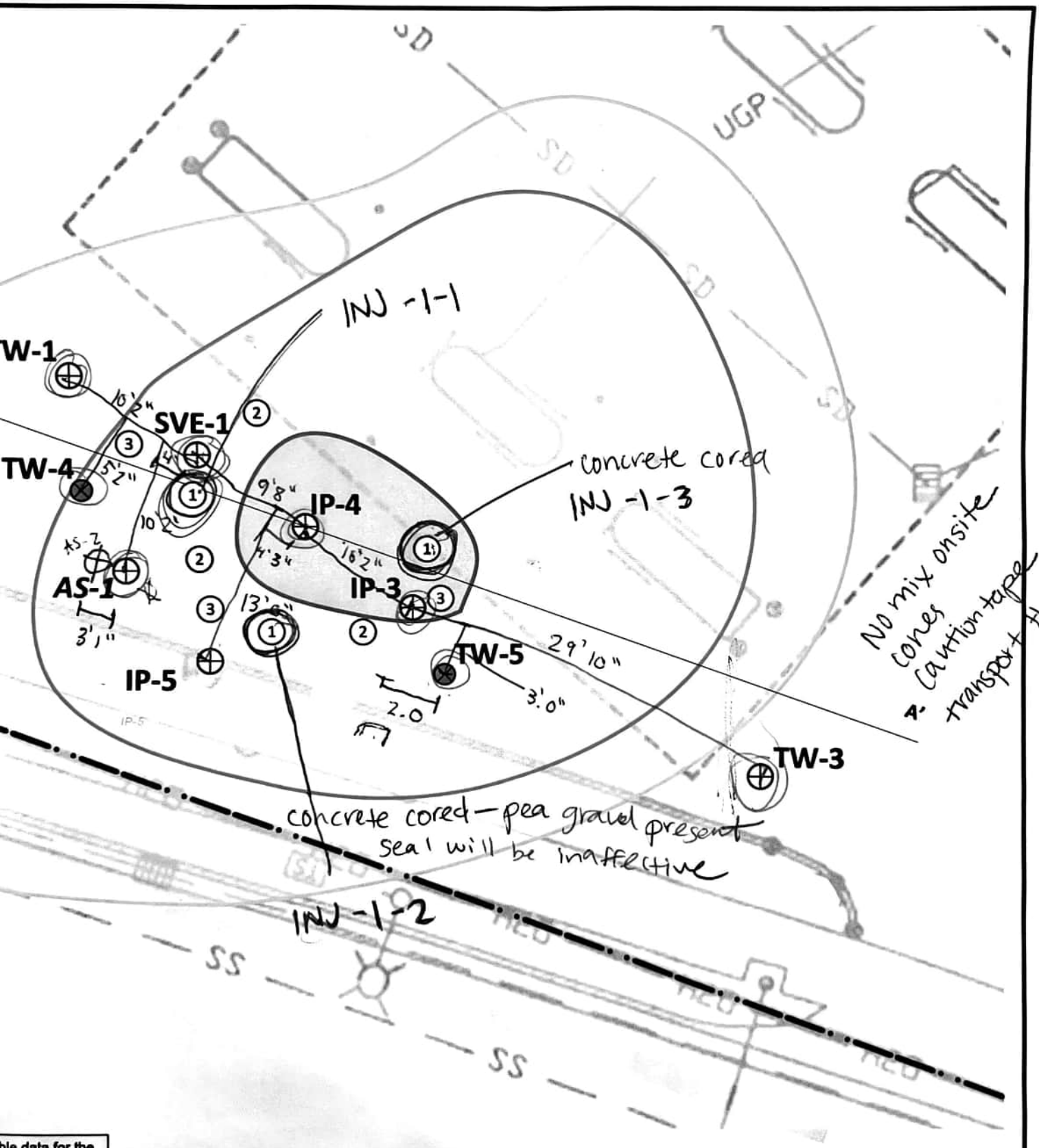
WLM
Interface probe
depth to water table
injection volume/pressure table

Task 3

Injection 1

Table 1
Summary of Information Needs
ISCO and Total Liquids Extraction Pilot Test
Boeing Field Chevron, 10805 East Marginal Way South
Tukwila, Washington

Information Need	Field Data Development Plan
Establish baseline groundwater quality conditions in the Upper and Lower Hydraulic Zones prior to pilot testing	Install two new monitoring wells (TW-4 and TW-5) in the pilot test injection area
	Collect groundwater samples from wells AS-1, IP-3, IP-4, IP-5, IP-7, SVE-1, and TW-1 through TW-5 prior to initial injection phase, field screen groundwater for presence of LNAPL (wells IP-4 and IP-7 only), pH, reduction/oxidation potential, dissolved oxygen, specific conductance, and temprerature; and analyze for GRO, DRO, BTEX, and total organic carbon
Evaluate LNAPL accumulation and reduction in Upper and Lower Hydraulic Zone wells	Measure LNAPL thickness in well IP-4 and IP-7 using an oil/water interface probe prior to each injection phase and prior to and immediately after each total liquids extraction phase
	Measure or estimate volume of recovered LNAPL during each total liquids extraction event
Evaluate ISCO injection delivery effectiveness	Confirm ISCO reagent mass and water volume injected at each point
	Record injection fluid pressure at each point
	Record start and end time of injection at each point
	Measure water levels in wells AS-1, IP-3, IP-4, IP-5, IP-7, SVE-1, and TW-1 through TW-5 during each injection phase
	Measure dissolved oxygen and reduction/oxidation potential in wells AS-1, IP-3, IP-4, IP-5, IP-7, SVE-1, and TW-1 through TW-5 during each groundwater monitoring event
Evaluate change in dissolved phase petroleum hydrocarbon concentrations in Upper Hydraulic Zone	Collect groundwater samples from AS-1, IP-4, SVE-1, and TW-1 through TW-5 prior to injections and analyze for GRO, DRO, and BTEX prior to injections, between first and second injection phases, and at 1 month, 3 months, and 6 months after the final phase of injection and total liquids extraction
Evaluate change in dissolved phase petroleum hydrocarbon concentrations in Lower Hydraulic Zone	Collect groundwater samples from IP-3, IP-5, and IP-7 and analyze for TPH-G and BTEX prior to injections and at 1 month, 3 months, and 6 months after the final phase of injection and total liquids extraction
Evaluate radius of hydraulic and chemical influence from injections (Upper and Lower Hydraulic Zones)	Measure water levels in wells AS-1, IP-3, IP-4, IP-5, IP-7, SVE-1, and TW-1 through TW-5 prior to each injection phase and and within 2 hours after each injection phase is completed
	Measure pH, reduction/oxidation potential, dissolved oxygen, specific conductance, and temprerature in AS-1, IP-3, IP-4, IP-5, IP-7, SVE-1, and TW-1 through TW-5 prior to the initial injection phase, between the first and second injection phases (omit Lower Zone wells), and at 1 month, 3 months, and 6 months after the final injection and total fluid extraction phases are complete
Evaluate effectiveness of total liquids extraction	Measure or approximate volume of liquids and LNAPL removed from well IP-4 and other wells containing LNAPL during each event. Record start and end time of total liquids extraction at wells IP-4 and other wells containing LNAPL.
Evaluate radius of hydraulic influence from total liquids extraction in the Upper and Lower Hydraulic Zones	Measure water levels in AS-1, AS-2, IP-3, IP-4, IP-5, IP-7, SVE-1, and TW-1 through TW-5 prior to each total liquids extraction phase and as soon as possible after each extraction phase is completed
Evaluate rebound of LNAPL accumulation in the Upper and Lower Hydraulic Zones	Measure LNAPL thickness in wells IP-4 using an oil/water interface probe at 1 month, 3 months, and 6 months after the final total liquids extraction event. Screen for LNAPL and, if present, measure LNAPL using an oil/water interface probe in the remaining wells in the pilot test monitroing program.
Evaluate rebound of dissolved-phase petroleum hydrocarbons in the Upper and Lower Hydraulic Zones	Collect groundwater samples from AS-1, IP-3, IP-4, IP-5, IP-7, SVE-1, and TW-1 through TW-5 and analyze for GRO, DRO, and BTEX at 1 month, 3 months, and 6 months after the final total liquids extraction event



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ISCO Injection and Monitoring Schematic
Boeing Field Chevron
10805 East Marginal Way South
Tukwila, Washington

Figure
3

Boeing Field Chevron
01-0410-R TASK 3
10805 E. Marginal Way, Tukwila, WA

September 6, 2022
Injection Event #1

1232 JMS arrives to site. Cone off workzone areas + check in with staff
1245 Cascade arrives to site. Trucks staff offsite. Conduct tailgate + safety meeting. Scope discussed
1256 Mobilize trucks + equipment onsite
1340 Set up equipment to core concrete at 3 first round injection points
1352 Begin concrete coring
1421 Begin opening wells for water depth/product depth measurements
1448 All 3 cores for injection points are cut. Begin hand clearing point to 5'
1516 INJ-1-2 is pea gravel from former remedial excavation - cleared with T-Stick to 5' bgs
INJ-1-1 was hand augered to 10" bgs before refusal by concrete piece that was too large to get up the hole.
INJ-1-3 was hand augered to 1' bgs before refusal by piece of concrete that was too large to come up hole.
1517 called PMs to confirm that we are good to proceed
1525 Continue setup on injection points + equipment
1600 continue setup
1618 rearrange equipment trailers to get water closer to points
1705 Setup complete - to return tomorrow for injections.
1720 All parties depart site.

9/6/22
JMS

Boeing Field Chevron
01-0410-R Task 3
1080S E. Marginal Way, Tukwila, WA

September 7, 2022
Injection Event #1

0620 JMS arrives to site. Begin opening wells, delineate work area
0623 Set cones + open wells
0645 Begin water level measurements
0700 Cascade arrives to site - begin set up for the day
0730 Finish water level measurements
0740 Tailgate + safety meeting. Discuss scope for the day. Injections, spill response, assembly area, etc.
0755 continue injection setup
1110 Begin injection 1, INJ-1-1

start time: 1110	end time: 1137
start pressure: 20	end pressure: 20
sustained pressure: 20	total volume injected: 360

1140 Set up at #2, INJ-1-3

start time: 1150	end time: 1216
start pressure: 20	end pressure: 20
sustained pressure: 20	total vol. injected: 365

1230 Set up injection 3, INJ-1-2

start time: 1255	end time: 1319
start pressure: 20	end pressure: 20
sustained pressure: 20	total vol. injected: 360

1330 Begin cleanup
1348 Begin water level measurements
1430 Finish WL measurements

BFC

01-0410-R Task 3

10805 E. Marginal Way, Tukwila, WA

September 7, 2022

Injection Event #1

1431 ~~Begin~~ Continue cleanup of injection equipment.

1520 Lunch

1548 Lunch ends

1550 continue cleanup activities

1700 continue cleanup

1821 All parties depart site. To return tomorrow AM for final cleanup and demob.

9/7/2022

Project Name: Boeing Field Chevron — September 7, 2022
Project Number: 01-0410-R Task 3 — Injection event #1
Address: 10805 E Marginal Way, Tukwila, WA

WATER LEVEL MEASUREMENTS

WELL	TIME ~~OPENED~~ Measured	~~TIME MEASURED~~ DTW	Depth to Product	~~Depth to Water~~	Product Thickness	Notes
AS-1	0710	10.71	NM		—	
IP-3 (*)	0715	15.57	—		~~0~~	odors
IP-4 (*)	0721	10.49	—		~~0~~	odors
IP-5 (*)	0711	16.45	—		~~0~~	odors
IP-7 (*)	0727	17.31	15.26		2.05	odors + product
SVE-1	0707	DRY	NM		—	
TW-1	0703	9.87	NM		—	
TW-2	0700	9.46	NM		—	
TW-3	0650	9.50	NM		—	
TW-4	0656	10.64	NM		—	
TW-5	0658	10.26	NM		—	

NM = not measured

(*) = interface probe

Boeing Field Chevron
01-0410-R Task 3
10805 E. Marginal Way, Tukwila, WA

September 7, 2022
* After Injection Event #1 Injections

WELL	TIME MEASURED	DTW	DTP	Product Thickness	Notes
AS-1	1410	9.72	NM	–	
IP-3 *	1416	14.28	~~0~~	~~0~~	
IP-4 *	1420	10.60	~~0~~	~~0~~	
IP-5 *	1412	13.25	~~0~~	~~0~~	
IP-7 (*)	1428	13.66	15.67	2.01	
SVE-1	1405	~~DRY~~	NM	–	
TW-1	1402	9.86	NM	–	
TW-2	1400	9.44	NM	✓	
TW-3	1350	6.25	NM	–	
TW-4	1352	10.06	NM	–	
TW-5	1356	9.82	NM	✓	

01-0410-R TASK 4A 9/27/22
Boeing Field Chevron
GWME

0725 JMS arrives to site. Check in with staff + delineate work zone with cones.
0732 Tailgate + safety meeting 1 in attendance. Sign HASP
0740 Begin opening MWs for gauging/monitoring.
0820 Begin gauging water/product depths.
0855 Complete gauging
0859 Bail product from IP-7 with disposable bailer. Product to be placed in drum.
0923 Complete bail from IP-7. Product to drum. About gallons removed.
0930 Close wells not sampled during this event.
0946 set up at TW-5
0950 begin sampling TW-5
1010 Pump problems - troubleshoot

Scale: 1 square =_____ Pg. 1 of 2

1025 Begin sampling TW-5
1041 TW-5 collected
1050 Decon equipment + close well
1053 set up equipment at TW-4
1110 Pump problems
1130 Begin measurements at TW-4
1148 Collect TW-4
1208 Decon equipment + close well
1210 set up at AS-1
1216 Pump troubles
1240 Begin measurements at AS-1
1244 Call PM to tell them of opaque, rust-colored GW + that parameters may not stabilize
1319 AS-1 collected, DUP-1 (0800) is collected
1339 Decon equipment + close well
1342 set up at IP-4
1345 Begin measurements at IP-4
1412 collect IP-4
1425 Decon equipment + close all wells
1430 Purge water to drum + close Restore site
1445 All parties depart site.

Scale: 1 square =_____ Pg. 2 of 2

Rite in the Rain

Groundwater Monitoring Well Gauging Form

Project Name: Boeing Field Chevron

Project Number: 01-0410-R Task 4a

Date: 9/27/2022

Sampler: Jessica Soliz

g-logics ATLAS GEOSCIENCE INC COMPANY

→ taken from previous event

	Well Identification	Time Opened	Time Measured	Total Depth (feet)	Depth to Water (feet)	** Depth to Product (feet)	Product Thickness (feet)	Sheen Y/N	Observations/Notes
	Upper Saturated Zone								
7	AS-1	0754	0836	16'	10.90	NM			
10	IP-4**	0801	0847	14'	10.69	~~0~~			No product detected
8	SVE-1	0756	0839	DRY	DRY	NM			Not sampled - dry
2	TW-1 NS	0745	0822	10.18	10.04	NM			Not enough volume to sample
1	TW-2 NS	0742	0820	10.20	9.63	NM			Not enough volume to sample
3	TW-3 NS	0747	0825	10.17	9.72	NM			Not enough volume to sample
5	TW-4	0751	0830	15'	10.76	NM			
4	TW-5	0750	0827	12'	10.42	NM			
	Lower Saturated Zone								
9	IP-3 NS	0759	0842	24'	14.15	NM			Not sampled during this event
6	IP-5 NS	0752	0833	24'	14.92	NM			Not sampled during this event / strong odors
11	IP-7** NS	0803	0851	23'	16.76	13.43			Not sampled during this event / product bailed to drum

Comments: ** = Interface Probe used to measure product thickness

NS - not sampled for analytical

GROUNDWATER SAMPLING						
Zone	Well ID	Gauge	Dup	Analysis	Container	Method
Upper Saturated Zone	AS-1	Y	Y	GRO, DRO, BTEX	3x40 mL VOAs w/HCL, 500 mL amber w/ HCl	NWTPH-Gx, NWTPH-Dx, EPA 8060C
	IP-4 ★	Y	---	GRO, DRO, BTEX	3x40 mL VOAs w/HCL, 500 mL amber w/ HCl	NWTPH-Gx, NWTPH-Dx, EPA 8060C
	SVE-1	Y	---	GRO, DRO, BTEX	3x40 mL VOAs w/HCL, 500 mL amber w/ HCl	NWTPH-Gx, NWTPH-Dx, EPA 8060C
	TW-1	Y	---	GRO, DRO, BTEX	3x40 mL VOAs w/HCL, 500 mL amber w/ HCl	NWTPH-Gx, NWTPH-Dx, EPA 8060C
	TW-2	Y	---	GRO, DRO, BTEX	3x40 mL VOAs w/HCL, 500 mL amber w/ HCl	NWTPH-Gx, NWTPH-Dx, EPA 8060C
	TW-3	Y	---	GRO, DRO, BTEX	3x40 mL VOAs w/HCL, 500 mL amber w/ HCl	NWTPH-Gx, NWTPH-Dx, EPA 8060C
	TW-4	Y	---	GRO, DRO, BTEX	3x40 mL VOAs w/HCL, 500 mL amber w/ HCl	NWTPH-Gx, NWTPH-Dx, EPA 8060C
	TW-5	Y	---	GRO, DRO, BTEX	3x40 mL VOAs w/HCL, 500 mL amber w/ HCl	NWTPH-Gx, NWTPH-Dx, EPA 8060C
Lower Saturated Zone	IP-3	Y	---	None	---	---
	IP-5	Y	---	None	---	---
	IP-7 ★	Y	---	None	---	---

TASK 4a

★ = Interface probe

Well Number: AS-1 / DUP-1 **Project Name:** Boeing Field Chevron

Project Number: 01-0410-R Task 4a	**Date:** ~~09/26/2022~~ 9/27/2022	**Weather:** Sunny, smoky, 73°F
Development / Purge Method: Low Flow	**Well Screen Interval:** 12 to 14	**Tidally Influenced?**
Logged By: JMS	**Water Depth Start:** 11.01	**Field Comments:** New tubing
Purge Water Disposal Method: Drum	**Water Depth Finish:**	
Purge Water Disposal Volume:	**Bails Dry?** Yes No **What Volume?**	**Well Conditions:** (OK) Not OK
		Explain:

Well Development / Purging (circle one)

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft
Purge Volumes: 1" Diam 0.041 * 3 casings * 10' screen = 1.23 gallons, 2" Diam 0.163 * 3 casings * 10' screen = 4.89 gallons

↓ ↳ 1.46 gallons

	Time	1243	1246	1249	1252	1255	1258	1303	1308
	Water Level (ft)	11.74	12.08	12.10	12.16	12.23	12.27	12.53	12.80
± 0.1	pH	9.25	9.09	9.03	8.92	8.77	8.56	9.12	7.79
±10	Conductivity (mS/cm)	5429	5053	4925	4706	4456	4275	3736	3347
±0.1	Temperature (F)(C)	17.9	18.1	18.1	18.0	18.0	17.8	17.6	17.7
±10	ORP (mV)	-313.9	-314.7	-321.2	-328.5	-324.6	-317.0	-283.4	-259.2
~~<10~~	~~Turbidity (NTUs)~~	DUP=0.43							NM
±0.2	Diss. Ox. (mg/L,%)	~~0.13~~	0.24	0.10	0.11	0.11	0.10	0.11	0.10
	Color	Rusty	Rusty	Rusty	Rusty	Rusty	Rusty	Rusty	Rusty
	Purge Volume	0.1	0.2	0.3	0.4	0.5	0.6	0.9	1.2

Pg. 1 of 2 →

Well Sampling Information (complete if well is sampled)

Decon Method: Alconox
Water Level Start: 11.01
Sampling Method: Low Flow, Peri Pump
Filter Type: None

Sample Number: AS-1@1319 / DUP-1@0800
Water Level Finish:
Field comments: NM = not measured

Color: fluid is opaque + an orange/red rust color

g-logics

Well Number: AS-1 | DUP-1 **Project Name:** Boeing Field Chevron

Project Number: 01-0410-R Task 4a	**Date:** ~~09/26/2022~~ 9/27/22	**Weather:** Sunny, Smoky, 73°F
Development / Purge Method: Low Flow	**Well Screen Interval:** 12 to 14	**Tidally Influenced?**
Logged By: JMS	**Water Depth Start:** 11.01	**Field Comments:** new tubing
Purge Water Disposal Method: Drum	**Water Depth Finish:**	
Purge Water Disposal Volume:	**Bails Dry?** Yes No **What Volume?**	**Well Conditions:** (OK) Not OK
		Explain:

Well Development / Purging (circle one)

(continued)

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft
Purge Volumes: 1" Diam 0.041 * 3 casings * 10' screen = 1.23 gallons, 2" Diam 0.163 * 3 casings * 10' screen = 4.89 gallons

	Time	1313	1318
	Water Level (ft)		
± 0.1	pH	7.68	7.67
±10	Conductivity (mS/cm)	3247	3254
±0.1	Temperature (F)	17.6	17.5
±10	ORP (mV)	-246.7	-240.4
~~≤10~~	~~Turbidity (NTUs)~~		
±0.2	Diss. Ox. (mg/L,%)	0.10	0.10
	Color	Rusty	Rusty
	Purge Volume	1.5	1.8

Pg. 2 of 2

NM

Well Sampling Information (complete if well is sampled)

Decon Method: Alconox
Water Level Start: 11.01
Sampling Method: Low flow / Peri pump
Filter Type: None

Sample Number: AS-1 @ 1319 / DUP-1 @ 0900
Water Level Finish:
Field comments: NM = not measured

3 Well Volumes purged before collection

g-logics

Well Number: IP-4	**Project Name:** Boeing Field Chevron	
Project Number: 01-0410-R Task 4a	Date: ~~08/26/2022~~ 9/27/2022	Weather: Sunny, Smoky, 75°F
Development / Purge Method: Low Flow	Well Screen Interval: 8 to 14	Tidally Influenced?
Logged By: JMS	Water Depth Start: 10.86	Field Comments:
Purge Water Disposal Method: Drum	Water Depth Finish: 11.54	new tubing
Purge Water Disposal Volume:	Bails Dry? Yes No What Volume?	Well Conditions: (OK) Not OK
		Explain:

Well Development / Purging (circle one)

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft
Purge Volumes: 1" Diam 0.041 * 3 casings * 10' screen = 1.23 gallons, 2" Diam 0.163 * 3 casings * 10' screen = 4.89 gallons

	Time	1350	1353	1356	1359	1402	1405	1408	1411
	Water Level (ft)	11.04	11.07	11.10	11.19	11.26	11.38	11.40	11.46
± 0.1	pH	6.62	6.57	6.55	6.55	6.60	6.61	6.64	6.66
±10	Conductivity (mS/cm)	1098	1050	1025	993	1004	1026	1094	1100
±0.1	Temperature ~~(F)~~ (C)	17.1	17.1	17.2	17.3	17.3	17.3	17.4	17.3
±10	ORP (mV)	-108.4	-111.6	-113.8	-117.5	-120.1	-125.9	-131.5	-134.7
	~~<10 Turbidity (NTUs)~~								NM
±0.2	Diss. Ox. (mg/L,%)	0.21	0.21	0.19	0.16	0.16	0.15	0.15	0.16
	Color	opaque	opaque	opaque	opaque	opaque	opaque	opaque	opaque
	Purge Volume	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8

Well Sampling Information (complete if well is sampled)

Decon Method: Alconox
Water Level Start: 10.86
Sampling Method: Low flow, Peri. pump
Filter Type: None

Sample Number: IP-4 @ 1412
Water Level Finish: 11.54
Field comments: NM= not measured

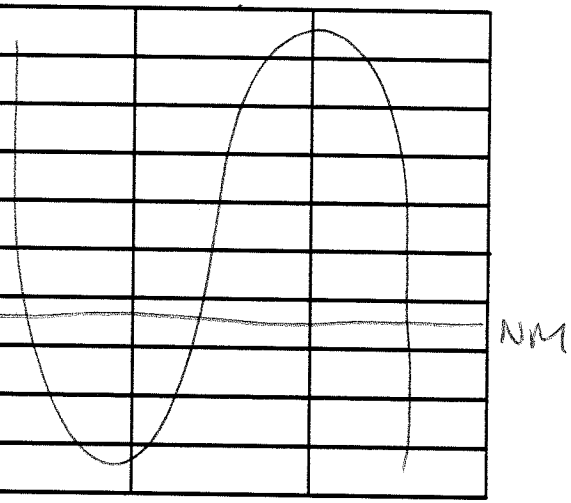
g-logics

Well Number: TW-4	**Project Name:** Boeing Field Chevron	
Project Number: 01-0410-R Task 4a	Date: ~~09/20/2022~~ 9/27/2022	Weather: Sunny, smoky, 68°F
Development / Purge Method: Low Flow	Well Screen Interval: 5 to 15	Tidally Influenced?
Logged By: JMS	Water Depth Start: 10.80	Field Comments: new tubing
Purge Water Disposal Method: Drum	Water Depth Finish: 13.04	
Purge Water Disposal Volume:	Balls Dry? Yes No What Volume?	Well Conditions: (OK) Not OK
		Explain:

Well Development / ~~Purging~~ (circle one)

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft
Purge Volumes: 1" Diam 0.041 * 3 casings * 10' screen = 1.23 gallons, 2" Diam 0.163 * 3 casings * 10' screen = 4.89 gallons

	Time	1135	1138	1141	1144	1147
	Water Level (ft)	11.28	11.83	12.31	12.50	12.72
± 0.1	pH	6.73	6.74	6.74	6.74	6.73
±10	Conductivity (mS/cm)	732	733	733	733	734
±0.1	Temperature (F)(C)	18.4	18.2	18.2	18.1	18.0
±10	ORP (mV)	-60.4	-78.8	-83.5	-86.6	-88.1
~~<10~~	~~Turbidity (NTUs)~~					
±0.2	Diss. Ox. (mg/L,%)	0.44	0.28	0.29	0.28	0.26
	Color	clear	clear	clear	clear	clear
	Purge Volume	0.1	0.2	0.3	0.4	0.5



Well Sampling Information (complete if well is sampled)

Decon Method: Alconox
Water Level Start: 10.80
Sampling Method: Low flow Peri Pump
Filter Type: None

Sample Number: TW-4@1148
Water Level Finish: 13.04
Field comments: NM = not measured

extra containers collected for lab (requested qc)

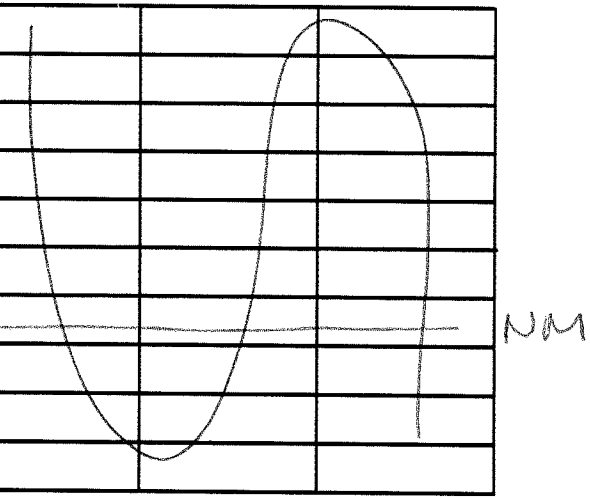
g-logics

Well Number: TW-5	**Project Name:** Boeing Field Chevron	
Project Number: 01-0410-R Task 4a	**Date:** ~~09/26/2022~~ 9/27/2022	**Weather:** Sunny, smoky, 66°F
Development / Purge Method: Low Flow	**Well Screen Interval:** 7 to 12	**Tidally Influenced?**
Logged By: JMS	**Water Depth Start:** 10.43	**Field Comments:** new tubing
Purge Water Disposal Method: Drum	**Water Depth Finish:** 11.97	
Purge Water Disposal Volume: 0.7	**Bails Dry?** Yes No **What Volume?**	**Well Conditions:** (OK) Not OK
		Explain:

Well Development / Purging (circle one)

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft
Purge Volumes: 1" Diam 0.041 * 3 casings * 10' screen = 1.23 gallons, 2" Diam 0.163 * 3 casings * 10' screen = 4.89 gallons

	Time	1028	1031	1034	1037	1040
	Water Level (ft)	11.07	11.46	11.73	11.92	11.95
± 0.1	pH	6.35	6.35	6.38	6.41	6.42
±10	Conductivity (mS/cm)	826	819	815	816	812
±0.1	Temperature (F)(C)	17.1	17.2	17.3	17.2	17.2
±10	ORP (mV)	-142.4	-146.9	-149.0	-149.6	-147.9
<10	Turbidity (NTUs)					
±0.2	Diss. Ox. (mg/L,%)	0.47	0.39	0.30	0.28	0.25
	Color	clear	clear	clear	clear	clear
	Purge Volume	0.1	0.2	0.3	0.4	0.5



Well Sampling Information (complete if well is sampled)

Decon Method:	Alconox	Sample Number:	TW-5 @ 1041
Water Level Start:	10.43	Water Level Finish:	11.97
Sampling Method:	Low flow, peri pump	Field comments:	NM = not measured
Filter Type:	None		

g-logics

October 2022

01-0410-R Task 3, BFC J. Soliz
Injection Event #2
October 17, 2022

0802 JMS arrives to site. AUUL (locator) onsite.
0805 Discuss scope + delineate work area w/ cones.
0812 Check in with staff
0815 Begin clearing work area and private locate scan.
0840 Locate completed. All injection points cleared. One underground line marked - is the fuel line from tanks to pump islands.
0841 AUUL departs site. Begin opening all wells for gauging.
0855 All wells opened. Depart site to pick up interface probe.
0915 Return to site.
0920 Begin gauging wells.
0950 All wells gauged.
0952 Get staff to relocate cars within work area.
1000 Wait for Cascade to arrive.

Scale: 1 square = _____ Pg. 1 of 2

1145 Call cascade to confirm arrival. Delayed on picking up supplies. Plans to be onsite by 2pm.
1200 JMS departs site until 2pm.
1300 JMS returns to site to make sure work area is still delineated
1350 Cascade to site. Informed me that they still need to pick up additional equipment before starting.
1400 Cascade departs site.
1410 Water tanker truck arrives to site.
1503 Cascade arrives to site. Begin staging equipment/support trucks.
1523 Water delivery complete. Departs site.
1525 Continue staging equipment, set up spill containment, prep for injections
1625 Tailgate meeting to discuss full scope + safety hazards
1652 All parties depart site. End day 1.

10/17/22
MJS
Rain in the Rain

Scale: 1 square = _____ Pg. 2 of 2

01-0410-R Task 3, BFC J. Soliz

Injection Event #2

October 18, 2022

0655 JMS arrives to site. Cascade onsite.

0702 Tailgate + safety meeting. Discuss scope + daily plan.

0710 Continue setup for injections

0730 Discuss + sign HASP. 4 people in attendance

0742 Begin concrete coreing for INJ-2-1, INJ-2-2, and INJ-2-3.

0835 Complete concrete coreing. Continue injection trailer setup.

0842 Begin hand clearing at INJ-2-1.

0850 Location of INJ-2-2 is within peagravel of former excavation limits.

0856 Begin advancing geoprobe for temp installation at INJ-2-2

0934 Begin advancing geoprobe for temp installation at INJ-2-1. Continue hand clearing at INJ-2-3.

1008 Set up for INJ-2-2 injection.

INJ-2-2

start time: 1009	end time: 1031
start pressure: 19	end pressure: 19
sustained pressure: 19	Total. J
	Vol injected: 365

1036 Complete geoprobe temp install at INJ-2-1.

1053 Set up for INJ-2-1 injection

INJ-2-1

start time: 1107	end time: 1132
start pressure: 20	end pressure: 20
sustained pressure: 20	Tot. Vol. injected: 365

1140 Begin advancing geoprobe for temp installation at INJ-2-3

1212 Set up for INJ-2-3 injection.

INJ-2-3

start time: 1213	end time: 1240
start pressure: 20	end pressure: 20
sustained pressure: 20	Tot. vol. injected: 365

1246 All 3 injections completed. Begin →

deconstruction of injection points.

1339 Continue cleanup. Gather hoses + extension chords.

1403 Completed restoring injection points to surface- backfilled with bentonite chips + sealed at surface with concrete patch. Continue site cleanup/restore

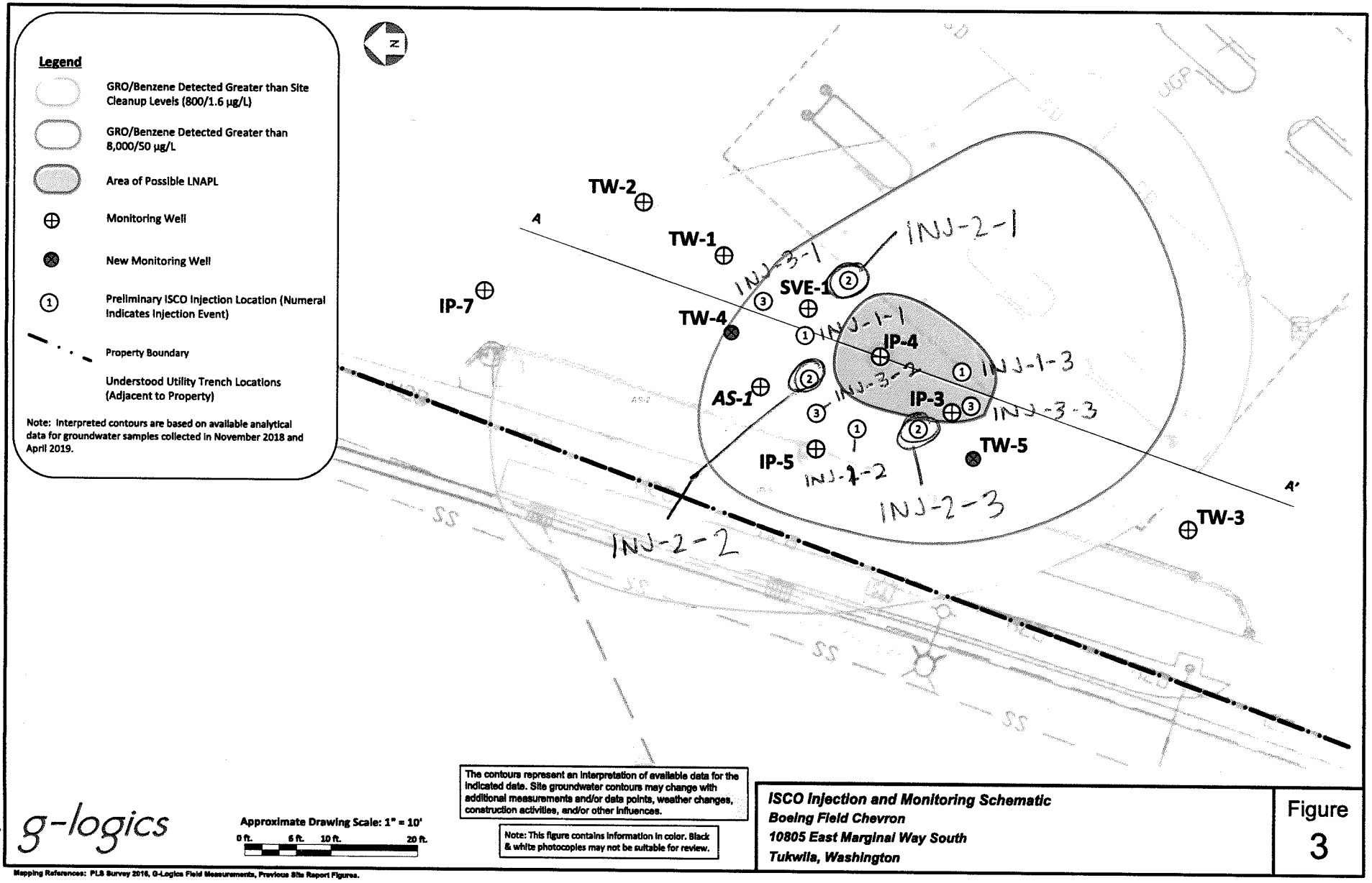
1452 Continue cleanup. Begin opening all wells for gauging

1530 Gauge all wells.

1544 Finalize restoring/Cleaning site.

1600 All parties depart site. End day 2. One truck (support truck w/ probe trailer will stay onsite overnight + will be picked up + driven offsite tomorrow by 08:00. Approved plan w/ site staff.

10/18/22 JMY



The contours represent an interpretation of available data for the indicated date. Site groundwater contours may change with additional measurements and/or data points, weather changes, construction activities, and/or other influences.

Note: This figure contains information in color. Black & white photocopies may not be suitable for review.

g-logics

Approximate Drawing Scale: 1" = 10'

0 ft. 5 ft. 10 ft. 20 ft.

Mapping References: PLS Survey 2016, G-Logics Field Measurements, Previous Site Report Figures.

Project File: 01-0410-Q F3.vsdx

ISCO Injection and Monitoring Schematic
Boeing Field Chevron
10805 East Marginal Way South
Tukwila, Washington

Figure 3

Pre-injection #2

Groundwater Monitoring Well Sample Form

g-logics ATLAS

Project Name: Boeing Field Chevron

Project Number: 01-0410-R Task 3

Address: 10805 East Marginal Way, Tukwila, WA

Date: 10/17/2022

Sampler: Jessica Soliz

	Well Identification	Time Opened	Time Measured	Total Depth (feet)	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Sheen Y/N	Observations/Notes
	Lower Saturated Zone								
4	AS-1	0845	0927	16'	NM	11.19	NM		
10	IP-4	0852	0943	14'	~~NM~~	10.95	0		NO Product — interface probe
6	SVE-1	0847	0933		NM	DRY	NM		
7	TW-1	0849	0934	10.18	NM	10.18	NM		
8	TW-2	0850	0937	10.2	NM	9.84	NM		
1	TW-3	0841	0920	10.17	NM	10.00	NM		
5	TW-4	0846	0930	15'	NM	11.03	NM		
2	TW-5	0842	0923	12'	NM	10.67	NM		
	Upper Saturated Zone								
9	IP-3	0851	0940	24'	NM	14.65	NM		
3	IP-5	0843	0925	24'	NM	15.41	NM		
11	IP-7	0854	0946	23'	14.14	15.80	1.66		interface probe
	Additional Wells								

Comments: Total depths taken from previous phase of work

~~Interface probe used on all wells prior to, during, and after extraction event~~

post-injection #2 gauging

g-logics ATLAS

Groundwater Monitoring Well Sample Form

Project Name: Boeing Field Chevron

Project Number: 01-0410-R Task 3

Address: 10805 East Marginal Way, Tukwila, WA

Date: 10/18/22

Sampler: Jessica Soliz

	Well Identification	Time Opened	Time Measured	Total Depth (feet)	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Sheen Y/N	Observations/Notes
	Lower Saturated Zone								
4	AS-1	1457		16'	NM	10.17	—		
10	IP-4 *	1506		14'	0	10.24	0		
6	SVE-1	1500			NM	DRY	—		
7	TW-1	1501		10.18	NM	10.20	—		jelly substance/buildup, cannot breakthrough
8	TW-2	1502		10.2	NM	9.84	—		
1	TW-3	1453		10.17	NM	10.01	—		
5	TW-4	1458		15'	NM	10.93	—		
2	TW-5	1454		12'	NM	10.26	—		
	Upper Saturated Zone								
9	IP-3	1504		24'	NM	14.03	—		
3	IP-5	1456		24'	NM	14.77	—		
11	IP-7 *	1507		23'	14.08	15.77	1.69		
	Additional Wells								

Comments: Total depths taken from previous phase of work

~~Interface probe used on all wells prior to, during, and after extraction event~~

*= interface probe

Drum Inventory Sheet

* will need new soil drum for future injection event

Project Name: BFC
Property Address: 10805 E Marginal Way, Tukwila
Project Number: 01-0410-R TASK 3
Date: October 18, 2022

J. Soliz

Drum ID	Content (Soil/Water)	Date Drum Started	Fullness (%)	Drum Label (Y/N)	Drum Location, Access, and Other Comments
1	S	8/11/22	100	Y	
2	W	8/11/22	5	Y	recently evacuated via vac. truck event.
					* both located on SW side of property building

g-logics ATLAS GEOSCIENCES INC. COMPANY

01-0410-R TASK 3, BFC
Extraction Event #1
October 7, 2022

0725 JMS arrives to site. Check in with store clerk. Delineate work space with cones
0745 Begin opening MWs for gauging
0758 Northern Environmental (1) arrives to site. Tola to hang tight for/ cars to be cleared in the area
0815 Begin product/water level measurements
0840 Set up vac. truck at IP-7
0855 Begin evacuating IP-7
0923 Continue pumping on IP-7. Update PM of site conditions.
0950 approx 200-300 gallons evacuated so far. Hard to tell product vs. water amounts.
1009 Pull vac off well to check product/ water level. 500 gallons evacuated
1012 DTP = 16.76 DTW = 16.77 TD = 22.35
Product thickness = 0.01 ft
1015 Hook back up to IP-7 to continue

evacuating product.
1017 Turn on vac truck & continue pumping for 10 minutes.
1027 Vac truck off. collect product/ water level again
DTP = NP ∅ DTW = 16.84 Δ = none
1030 End vac event at IP-7
total Vol. extracted = 550 gallons approximate
1041 estimated percentage of product: MAYBE 10 gallons → vac truck driver indicates that this is likely a bad/inaccurate measurement due to constraints on product thickness measurements in vac truck being uneven (at an angle). Driver will call us when emptying truck with a better estimate.
1043 Begin packing up vac truck materials.
1100 Relocate truck to evacuate drum onsite. Liquid extracted ≈ 25 gallons
1118 Vac truck departs site

01-0410-R Task 3, BFC 10/7/22

1120 Begin round 2 of product/water level measurements

1200 Set up monitoring equipment at MW-29S

1217 Begin parameter readings NO SAMPLE COLLECTED

1240 Set up at MW-27S, no sample collected

1307 Set up at MW-27D, NO sample collected

1330 Purge water to drum

1335 Clean equipment + restore site. Remove cone delinators from work area

1410 Check out with clerk staff in store/shop.

1420 All parties depart site + returns rental equipment.

10/7/22
jmg

Scale: 1 square = _____ Pg 3 of 3

Scale: 1 square = _____

Pre-Vac

Groundwater Monitoring Well Sample Form

g-logics ATLAS

Project Name: Boeing Field Chevron

Project Number: 01-0410-R Task 3

Address: 10805 East Marginal Way, Tukwila, WA

Date: 10/7/22

Sampler: Jessica Soliz

	Well Identification	Time Opened	Time Measured	Total Depth (feet)	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Sheen Y/N	Observations/Notes
	Lower Saturated Zone								
6	AS-1	0753	0826	16'	0	11.00	0	N	
10	IP-4	0759	0837	14'	0	10.83	0	N	strong odors
8	SVE-1	0756	0832		DRY				
3	TW-1	0749	0821	10.18	0	10.04	0	N	Product/sediment buildup on top of water brown
2	TW-2	0747	0819	10.2	0	9.76	0	N	
1	TW-3	0746	0816	10.17	0	9.96	0	N	
5	TW-4	0752	0825	15'	0	11.01	0	N	
4	TW-5	0751	0823	12'	0	10.61	0	N	
	Upper Saturated Zone								
9	IP-3	0757	0834	24'	0	15.68	0	N	
7	IP-5	0755	0830	24'	0	16.54	0	N	strong odors
11	IP-7	0800	0839	23'	15.34	17.71	2.37	LNAPL Present	strong odors
	Additional Wells								
	MW-23			15.5					
	MW-25			14					
	MW-27S			12					
	MW-27D			?					
	MW-29			25					MW-29D?

Comments: Total depths taken from previous phase of work

Interface probe used on all wells prior to, during, and after extraction event

Observation Well

during vac

Groundwater Monitoring Well Sample Form

g-logics ATLAS

Project Name: Boeing Field Chevron

Project Number: 01-0410-R Task 3

Address: 10805 East Marginal Way, Tukwila, WA

Date: 10/7/22

Sampler: Jessica Soliz

IP-5

TWA2

Well Identification	Time Opened	Time Measured	Total Depth (feet)	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Sheen Y/N	Observations/Notes
Lower Saturated Zone								
AS-1		0830	16'	NP	16.54	0		
IP-4		0900	14'		17.02			
SVE-1		0915			17.30			
TW-1		0930	10.18		17.39			
TW-2		0945	10.2		17.49			
TW-3		1000	10.17		17.57			
TW-4			15'					
TW-5			12'					
Upper Saturated Zone								
IP-3			24'					
IP-5			24'					
IP-7			23'					
Additional Wells								
MW-23			15.5					
MW-25			14					
MW-27S			12					
MW-27D			?					
MW-29			25					MW-29D?

Comments: Total depths taken from previous phase of work

Interface probe used on all wells prior to, during, and after extraction event

Groundwater Monitoring Well Sample Form

Post-vac

g-logics ATLAS

Project Name: Boeing Field Chevron

Project Number: 01-0410-R Task 3

Address: 10805 East Marginal Way, Tukwila, WA

Date: 10/07/22

Sampler: Jessica Soliz

	Well Identification	Time Opened	Time Measured	Total Depth (feet)	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Sheen Y/N	Observations/Notes
	Lower Saturated Zone								
6	AS-1		1136	16'					
10	IP-4		1149	14'	~~0~~	10.83	~~0~~		4" SS w/ 2" connector
8	SVE-1		1143		DRY				4" PVC
3	TW-1		1126	~~10.18~~ 10.20	DRY				
2	TW-2		1123	10.2	~~0~~	9.77	~~0~~		2" PVC
1	TW-3		1120	10.17	~~0~~	9.96	~~0~~		2" PVC
5	TW-4		1133	15'	~~0~~	11.09	~~0~~		2" PVC
4	TW-5		1130	12'	~~0~~	10.60	~~0~~		2" PVC
	Upper Saturated Zone								
9	IP-3		1145	24'	~~0~~	16.50	~~0~~		2" SS
7	IP-5		1140	24'	~~0~~	17.30	~~0~~		2" SS
11	IP-7		1152	23'	~~0~~	16.84	~~0~~		Well was just evacuated of product water today, 2" SS
	Additional Wells								
	MW-23			15.5					
	MW-25			14					
	MW-27S			12					
	MW-27D			?					
	MW-29			25					MW-29D?

Comments: Total depths taken from previous phase of work

Interface probe used on all wells prior to, during, and after extraction event

Well Number: MW-27D	**Project Name:** Boeing Field Chevron	
Project Number: 01-0410-R Task ____	**Date:** 10/7/22	**Weather:** Sunny, Smoky, 74°F
Development / Purge Method: Low Flow, Peri Pump	**Well Screen Interval:** _____ to _____	**Tidally Influenced?**
Logged By: JMS	**Water Depth Start:** 15.06	**Field Comments:** 2" PVC black sludge all in top of well [illegible]
Purge Water Disposal Method: Drums	**Water Depth Finish:**	
Purge Water Disposal Volume:	**Bails Dry?** Yes No **What Volume?**	**Well Conditions:** OK Not OK
		Explain: Very odorous

Well Development / Purging (circle one)

1310 begin low flow

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft
Purge Volumes: 1" Diam 0.041 * 3 casings * 10' screen = 1.23 gallons, 2" Diam 0.163 * 3 casings * 10' screen = 4.89 gallons

Time	1313	1316	1319	1322	1325			
Water Level (ft)								
pH	6.23	6.03	6.01	5.99	5.97			
Conductivity (mS/cm)	389.7	384.8	382.1	375.6	374.2			
Temperature (F)	15.7	15.6	15.6	15.6	15.5			
ORP (mV)	-40.8	-38.1	-38.2	-38.0	-38.7			
Turbidity (NTUs)								NM
Dissolved Oxygen (mg/L,%)	2.34	2.09	2.05	2.06	1.88			
Color	opaque	[illegible]	[illegible]	opaque	[illegible]			
Purge Volume	0.1	0.2	0.3	0.4	0.5			

Well Sampling Information (complete if well is sampled)

Decon Method: _____

Water Level Start: _____

Sampling Method: _____

Filter Type: N/A

Sample Number: _____

Water Level Finish: _____

Field comments: Well not sampled

g-logics

Well Number: MW-27D | **Project Name:** Boeing Field Chevron

Project Number:	01-0410-R Task ____	**Date:**	10/7/22	**Weather:**	Sunny, Smoky, 73°F
Development / Purge Method:	Low Flow, Peri Pump	**Well Screen Interval:**	________ to ________	**Tidally Influenced?**	
Logged By:	JMS	**Water Depth Start:**	9.79	**Field Comments:**	2" [illegible] well [illegible] filled well [illegible]
Purge Water Disposal Method:	Drums	**Water Depth Finish:**	10.16		
Purge Water Disposal Volume:		**Bails Dry?** Yes No **What Volume?**		**Well Conditions:** OK Not OK	
				Explain:	

Well Development / Purging (circle one)

begin low flow at 1245

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft
Purge Volumes: 1" Diam 0.041 * 3 casings * 10' screen = 1.23 gallons, 2" Diam 0.163 * 3 casings * 10' screen = 4.89 gallons

Time	1248	1251	1254	1257	1300			
Water Level (ft)	9.96	10.07	10.11	10.14	10.16			
pH	6.35	6.26	6.25	6.26	6.27			
Conductivity (mS/cm)	835	826	809	792	741			
Temperature (F)	19.1	19.2	19.2	19.2	19.2			
ORP (mV)	104.3	109.5	111.8	112.3	112.9			
Turbidity (NTUs)	—	—	—	—	—	—	—	NM
Dissolved Oxygen (mg/L,%)	0.38	0.35	0.26	0.21	0.19			
Color	opaque	opaque	opaque	opaque	opaque			
Purge Volume	0.1	0.2	0.3	0.4	0.5			

Well Sampling Information (complete if well is sampled)

Decon Method:		Sample Number:	
Water Level Start:		Water Level Finish:	
Sampling Method:		Field comments:	Well not sampled
Filter Type:	N/A		

g-logics

15.00

Well Number: MW-29S | **Project Name:** Boeing Field Chevron

Project Number: 01-0410-R Task ___	**Date:** 10/7/22	**Weather:** Sunny, Smoky, 73°F
Development / Purge Method: Low Flow, Peri Pump	**Well Screen Interval:** 5 to 15?	**Tidally Influenced?**
Logged By: JMS	**Water Depth Start:** 11.72	**Field Comments:** 1" PVC well w/ screw top cap (PVC)
Purge Water Disposal Method: Drums	**Water Depth Finish:** DRY	
Purge Water Disposal Volume:	**Bails Dry?** Yes No **What Volume?**	**Well Conditions:** OK Not OK
		Explain: lots of rust colored water in well casing

Well Development / Purging (circle one)

1217 begin low flow

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft
Purge Volumes: 1" Diam 0.041 * 3 casings * 10' screen = 1.23 gallons, 2" Diam 0.163 * 3 casings * 10' screen = 4.89 gallons

water is light yellow in color

Time	1220	1225	1227	1229	1232	1235		
Water Level (ft)	1" well, cannot use WLM during measurements							
pH	6.51	*Well	6.30	6.41	*	6.39		
Conductivity (mS/cm)	421.1	Purges	424.5	428.3	Well	429.9		
Temperature (F)	19.4	dry	20.3	20.3	Purges	20.4		
ORP (mV)	-2.3		-7.5	-14.7	dry	-14.0		
Turbidity (NTUs)							NM = not measured	
Dissolved Oxygen (mg/L,%)	2.03	no	2.65	2.36	no	2.40		
Color	lt. yellow	Parameters	lt. yellow	lt. yellow	Parameters			
Purge Volume								

Well Sampling Information (complete if well is sampled)

Decon Method:	Alconox	Sample Number:	NONE
Water Level Start:		Water Level Finish:	
Sampling Method:		Field comments:	Well not sampled
Filter Type:	N/A		

g-logics

Drum Inventory Sheet

Project Name: Boeing Field Chevron
Property Address: 10805 East Marginal Way, Tukwila, WA
Project Number: 01-0410-R
Date: October 7, 2022

JMS

Drum ID	Content (Soil/Water)	Date Drum Started	Fullness (%)	Drum Label (Y/N)	Drum Location, Access, and Other Comments
1	S	8/12/22	100	Y	
2	W	10/7/22	5%	Y	Was evacuated today + partially filled w/ new MW purge water

g-logics ATLAS GEOSCIENCES, INC.

B.O.L. # 13394

SHIPPING PAPER

Northern ENVIRONMENTAL
EPAID# WAH000039211
USDOT# 2133996
253.503.3096

DATE 10-7-22	WO # 69517
SHIPPER / CUSTOMER Atlas Geo	CONTACT NAME Jessica
ADDRESS 10505 E Marginal Way S	PHONE # 281-513-4676
CITY, STATE, ZIP Seattle, WA	
CONSIGNEE / FACILITY Mar Vac	CONTACT NAME Ray
ADDRESS 1516 S. Graham St.	PHONE #
CITY, STATE, ZIP Seattle WA 98108	

HM	US DOT Description *(Including Proper Shipping Name, Hazard Class, and ID Number)*	Containers No.	Containers Type	Total Quantity	UOM	CHLOR	pH
A	**MATERIAL NOT REGULATED BY DOT** ground water	1	tt	550	g		
B			X				
C							
D							
E							
F							

Special Handling Instruction and Additional Information:

A) Profile #

SHIPPER'S CERTIFICATION: "I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packaged, marked and labelled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations." I also certify that all times listed above are true and correct.

		MONTH	DAY	YEAR
(SHIPPER) PRINT OR TYPE NAME X Jessica Soliz on behalf of generator	SIGNATURE X	10	07	2022
(CARRIER/TRANSPORTER) PRINT OR TYPE NAME X Tesse Peckham	SIGNATURE X	10	7	22
(CONSIGNEE/FACILITY) PRINT OR TYPE NAME X	SIGNATURE X	MONTH	DAY	YEAR

Northern ENVIRONMENTAL

2661 North Pearl St. #145
Tacoma, WA 98407
253.503.3096

DATE	WORK ORDER #	TICKET #
10-7-22	69517	36207

OPERATOR	LABORER
Jesse	

Customer Atlas Geo Job Phone 281-813-4876

Job Address 10805 E. Marginal Way S C, S, Z Seattle, WA

TRAVEL TO SITE		ON SITE		DUMP OUT COMPLETED	RETURN TO SHOP	TRUCK #
START	STOP	IN	OUT			
600	745	745	1100			219

QUANTITY	JOB DESCRIPTION	RATE	TOTAL
550g	pump ground water from monitor wells		
	0% solids		
1	Vac truck & driver		
1	Energy compliance fee		

DISPOSAL:	☐ ON SITE	☒ OFF SITE	SUBTOTAL
LOCATION:	Mar Vac		TAX
			TOTAL

SIGNATURE BELOW ACKNOWLEDGES PAYMENT TERMS ON REVERSE:

CUSTOMER NAME: On behalf of Remediator SIGNATURE: [signature]

December 2022

34 01-040-R Task 3, BFC 12/19/22

Injection Event #3

Personelle: Chris Smith (CS)

December 19-20th, 2022

1040 CS onsite, check-in with store staff and clear project area of cars

1055 CS delineates project area with cones, removes well monument lids, sets up decontamination station

1100 CS is informed Advanced Underground Utility locating is behind schedule

~~1130 CS begins water level measurements~~ CS

~~1144 with interface~~ CS

relevant

1136 CS opens ~~all~~ well castings

1140 Cascade arrives, stages offsite while property owner relocates cars on site, CS begins GW/product level measurements

1145 Advanced locating arrives, begins screening project area with metal detector and ground penetrating radar

1220 Advanced clears project area for potential obstructions, heads offsite

1300 All wells measured and closed, Cascade begins onsite staging and expansion of bermed area

~~1500 Cascade set up complete, take delivery of water~~

Scale: 1 square = _____

01-040-R Task 3, BFC 12/19/22

1305 CS ~~to~~ decontaminates all equipment

1500 Cascade takes delivery of water for project

1505 CS offsite for day

Scale: 1 square = _____

Groundwater Monitoring Well Sample Form

Project Name: Boeing Field Chevron

Project Number: 01-0410-R Task 3

Address: 10805 East Marginal Way, Tukwila, WA

Date: 12/19/2022

g-logics ATLAS

Sampler: Chris Smith

Well Identification	Time Opened	Time Measured	Total Depth (feet)	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Sheen Y/N	Observations/Notes
Lower Saturated Zone								
AS-1	1144	1202	16'	/	9.78	/	N	Pressurized
IP-4	1136	1148	14'	/	9.47	/	Y	Platy sheen on probe when pulled
SVE-1	1137	1210		/	8.68	/	N	Solid waxy material on probe tip
TW-1	1138	1227	10.18	/	8.62	/	N	
TW-2	1138	1233	10.2	/	8.54	/	N	
TW-3	1139	1240	10.17	/	8.46	/	N	
TW-4	1139	1243	15'	/	9.34	/	N	
TW-5	1139	1246	12'	/	9.32	/	N	
Upper Saturated Zone								
IP-3	1140	1250	24'	/	13.05	/	N	
IP-5	1140	1252	24'	/	13.64	/	N	
IP-7	1149	1257	23'	12.13	13.10	0.17	Y	
Additional Wells								
MW-23			15.5					
MW-25			14					
MW-27S			12					
MW-27D			?					
MW-29			25					MW-29D?

Comments: Total depths taken from previous phase of work

Interface probe used on all wells prior to, during, and after extraction event

Groundwater Monitoring Well Sample Form

Project Name: Boeing Field Chevron

Project Number: 01-0410-R Task 3

Address: 10805 East Marginal Way, Tukwila, WA

Date: 12/19/2022

g-logics ATLAS

Sampler: Chris Smith

Well Identification	Time Opened	Time Measured	Total Depth (feet)	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Sheen Y/N	Observations/Notes
Lower Saturated Zone								
AS-1	1144	1202	16'	/	9.78	/	N	Pressurized
IP-4	1136	1148	14'	/	9.47	/	Y	Platy sheen on probe when pulled
SVE-1	1137	1210		/	8.68	/	N	Solid waxy material on probe tip
TW-1	1138	1227	10.18	/	8.62	/	N	
TW-2	1138	1233	10.2	/	8.54	/	N	
TW-3	1139	1240	10.17	/	8.46	/	N	
TW-4	1139	1243	15'	/	9.34	/	N	
TW-5	1139	1246	12'	/	9.32	/	N	
Upper Saturated Zone								
IP-3	1140	1250	24'	/	13.05	/	N	
IP-5	1140	1252	24'	/	13.64	/	N	
IP-7	1149	1257	23'	12.13	13.10	0.17	Y	
Additional Wells								
MW-23			15.5					
MW-25			14					
MW-27S			12					
MW-27D			?					
MW-29			25					MW-29D?

Comments: Total depths taken from previous phase of work

Interface probe used on all wells prior to, during, and after extraction event

Injection Event # 3 (continued)

0700 Cascade onsite for final setup
0745 CS onsite, temp 33°F and raining
0800 Drillers start coring activities,
0830 Site owner informs CS of concerns with delivery access
0920 coring complete, CS call project manager to discuss monitoring
0935 Rain intensified, Extended safety meeting
0948 Advance probe at injection point TIP3-1
1010 Snowfall starts, temperature drops to 30°F
1018 TIP3-1 complete to 13' bgs and temporary injection point installed
1030 Driller set up heating unit to combat cold, following conversations with Glacier technical director unit removed due to concern with open flume
1045 TIP3-2 advanced to 13', finished as injection
1048 Start TIP3-3
1105 TIP3-3 advanced to 13' bgs, finished
1110 Prep for injection, mix injectate (petroclense) with water

Scale: 1 square = _____

1130 Tighten select well caps, start injection at TIP3-1
1151 Injection of TIP3-1 complete, 375 gallons at 20 PSI with 25 gal flush
1200 Snow becomes mixed rain
1215 Injection of TIP3-2 start
1240 Injection of TIP3-2 complete, 375 gal at 20-25 psi and 25 gal flush
1250 Injection of TIP3-3 start
1258 Injection paused after bubbling of surface water around IP-4 monument opened, no leak/injectate present, left open for monitoring
1313 Injection TIP3-3 complete, 375 gal at 20-24 psi, with 25 gal flush
1320 Begin demob and site restoration.
1330 Cascade completes demob and site restoration. CS document site condition
1545 CS check out with store personell
1555 CS offsite

Scale: 1 square = _____

Rite in the Rain

01-0410-R' Task 3, BFC 12/16/22 31
Extraction Event #2
December 16, 2022

0745 Chris Smith (CS) of Atlas onsite with Northern Environmental
0805 Check in with store staff, clear project area of cars, delineate with safety cones
0820 Safety discussion
0830 CS opens relevant ~~all~~ wells, except AS-1/-2, which can not be accessed at this time. North assists in draining runoff from well vaults before casings are unsealed
0835 CS unseals relevant well casings
0850 Northern stages beside IP-7 for extraction
0910 CS begins ground water level and product level measures, see groundwater monitoring well Sample form for detail, IP-7 measured first
0915 Northern begins extraction from IP-7
~~0920~~ 0930 CS resumes measurement of remaining water/product levels (cont →)

Scale: 1 square = _____ Rite in the Rain

0930 CS decontaminates ~~groundwater (GW)~~ CS ~~Product~~ CS Interface Probe between each well with isopropyl alcohol, distilled water, and a alkinox solution.

1000 Northern pauses extraction as well IP-7 level has dropped below accessible depth,

~~1022~~ CS approx 250 gallons purged

1022 CS measures IP-7 water/product depth again, water level recovered but no free product apparent, project manager updated

1025 Northern resumes evacuating IP-7

1050 Northern completes ~~extra~~ CS extraction of ~500 gallons from IP-7.

1100 Northern relocates truck to allow measure of AS-1/AS-2. Both wells unlabled so measure of both taken

1139 GW and Product measures completed, no further product (outside IP-7) evidenced

1145 Northern completes paperwork and de mobs

1200 CS decontaminated all well measuring equipment, prepares to ~~for~~ following scope

1225 CS offsite

Groundwater Monitoring Well Sample Form

Project Name: Boeing Field Chevron

Project Number: 01-0410-R Task 3

Address: 10805 East Marginal Way, Tukwila, WA

Date: 12-16-2022

Sampler: Chris Smith

g-logics ATLAS

Well Identification	Time Opened	Time Measured	Total Depth (feet)	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Sheen Y/N	Observations/Notes
Lower Saturated Zone					9.87/13.33	/	N	AS-1 and AS-2 gauged
AS-1 (AS-2)	1100	1134	16'	~~13.27~~	~~15.41~~	2.14	N	~~Sheen in water around casing~~
IP-4	0835	1013	14'	/	9.43	/	N	
SVE-1	0835	1043		/	8.66	/	N	
TW-1	0835	0948	10.18	/	8.51	/	N	
TW-2	0835	0943	10.2	/	8.42	/	N	
TW-3	0835	1040	10.17	/	8.46	/	N	
TW-4	0835	0954	15'	/	9.12	/	N	Well cap loose
TW-5	0835	1048	12'	/	9.27	/	N	
Upper Saturated Zone								
IP-3	0835	1013	24'	/	13.33	/	~~N~~	
IP-5	0835	1017	24'	/	14.27	/	N	
IP-7	0835	0910	23'	13.27	15.41	2.14	LNAPL	Sheen in water around casing
Additional Wells IP-7		1022		/	13.28	/	N	Final DW @ 13.27
MW-23			15.5					
MW-25			14					
MW-27S			12					
MW-27D			?					
MW-29			25					MW-29D?

Comments: Total depths taken from previous phase of work

Interface probe used on all wells prior to, during, and after extraction event

Groundwater Monitoring Well Sample Form

Project Name: Boeing Field Chevron

Project Number: 01-0410-R Task 3

Address: 10805 East Marginal Way, Tukwila, WA

Date: 12-16-2022

Sampler: Chris Smith

g-logics ATLAS

Well Identification	Time Opened	Time Measured	Total Depth (feet)	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Sheen Y/N	Observations/Notes
Lower Saturated Zone					9.87/13.33	/	N	AS-1 and AS-2 gauged
AS-1 (AS-2)	1100	1134	16'	~~13.27~~	~~15.41~~	2.14	N	~~Sheen in water around casing~~
IP-4	0835	1013	14'	/	9.43	/	N	
SVE-1	0835	1043		/	8.66	/	N	
TW-1	0835	0948	10.18	/	8.51	/	N	
TW-2	0835	0943	10.2	/	8.42	/	N	
TW-3	0835	1040	10.17	/	8.46	/	N	
TW-4	0835	0954	15'	/	9.12	/	N	Well cap loose
TW-5	0835	1048	12'	/	9.27	/	N	
Upper Saturated Zone								
IP-3	0835	1013	24'	/	13.33	/	~~N~~	
IP-5	0835	1017	24'	/	14.27	/	N	
IP-7	0835	0910	23'	13.27	15.41	2.14	LNAPL	Sheen in water around casing
Additional Wells IP-7		1022		/	13.28	/	N	Final DW @ 13.27
MW-23			15.5					
MW-25			14					
MW-27S			12					
MW-27D			?					
MW-29			25					MW-29D?

Comments: Total depths taken from previous phase of work

Interface probe used on all wells prior to, during, and after extraction event

Groundwater Monitoring Well Sample Form

Project Name: Boeing Field Chevron

Project Number: 01-0410-R Task 3

Address: 10805 East Marginal Way, Tukwila, WA

Date: 12/19/2022

g-logics ATLAS

Sampler: Chris Smith

Well Identification	Time Opened	Time Measured	Total Depth (feet)	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Sheen Y/N	Observations/Notes
Lower Saturated Zone								
AS-1	1144	1202	16'	/	9.78	/	N	Pressurized
IP-4	1136	1148	14'	/	9.47	/	Y	Platy sheen on probe when pulled
SVE-1	1137	1210		/	8.68	/	N	Solid waxy material on probe tip
TW-1	1138	1227	10.18	/	8.62	/	N	
TW-2	1138	1233	10.2	/	8.54	/	N	
TW-3	1139	1240	10.17	/	8.46	/	N	
TW-4	1139	1243	15'	/	9.34	/	N	
TW-5	1139	1246	12'	/	9.32	/	N	
Upper Saturated Zone								
IP-3	1140	1250	24'	/	13.05	/	N	
IP-5	1140	1252	24'	/	13.64	/	N	
IP-7	1149	1257	23'	12.13	13.10	0.17	Y	
Additional Wells								
MW-23			15.5					
MW-25			14					
MW-27S			12					
MW-27D			?					
MW-29			25					MW-29D?

Comments: Total depths taken from previous phase of work

Interface probe used on all wells prior to, during, and after extraction event

Northern ENVIRONMENTAL
EPAID# WAH000039211
USDOT# 2133996
253.503.3096

B.O.L. # 11667

SHIPPING PAPER

DATE 12/16/22	WO # 69546
SHIPPER / CUSTOMER ATLAS GEO - Boeing Field Chevron	CONTACT NAME Tom
ADDRESS 10805 East Marginal WAY S	PHONE # (206) 261-8046
CITY, STATE, ZIP Seattle WA 98108	
CONSIGNEE / FACILITY Mar-Vac	CONTACT NAME
ADDRESS 1516 S Graham St	PHONE #
CITY, STATE, ZIP Seattle, WA 98108	

HM	US DOT Description *(Including Proper Shipping Name, Hazard Class, and ID Number)*	Containers No.	Containers Type	Total Quantity	UOM	CHLOR	pH
A	**MATERIAL NOT REGULATED BY DOT** Water With trace fuel	001	TT	500	G		
B							
C							
D							
E							
F							

Special Handling Instruction and Additional Information:

A) Profile # Northern 100722

SHIPPER'S CERTIFICATION: "I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packaged, marked and labelled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations." I also certify that all times listed above are true and correct.

		MONTH	DAY	YEAR
(SHIPPER) PRINT OR TYPE NAME X	SIGNATURE X			
(CARRIER/TRANSPORTER) PRINT OR TYPE NAME X Justin Pratt	SIGNATURE X	12	16	22
(CONSIGNEE/FACILITY) PRINT OR TYPE NAME X	SIGNATURE X			

Northern ENVIRONMENTAL

2661 North Pearl St. #145
Tacoma, WA 98407
253.503.3096

DATE	WORK ORDER #	TICKET #
12/16/22	69546	37011

OPERATOR	LABORER
Justin	P Aaron

Customer Atlas Geo- Boeing field (Charm) Job Phone (206) 261-8046

Job Address 10805 East Marginal WAY S C, S, Z Seattle, WA 98108

TRAVEL TO SITE START	TRAVEL TO SITE STOP	ON SITE IN	ON SITE OUT	DUMP OUT COMPLETED	RETURN TO SHOP	TRUCK #
5:30	7:00	7:00	11:45			

QUANTITY	JOB DESCRIPTION	RATE	TOTAL
1x	1 Duravac driver and laborer		
1x	Pumped 500 gallons of water with trace fuel from monitoring well		
1	Energy compliance fee		

DISPOSAL: ☐ ON SITE ☒ OFF SITE

LOCATION: Mar-Vac 1516 S Graham St Seattle, WA 98108

SUBTOTAL	
TAX	
TOTAL	

SIGNATURE BELOW ACKNOWLEDGES PAYMENT TERMS ON REVERSE:

CUSTOMER NAME: SIGNATURE:

January 2023

Pre-Extraction
Pre / During-Extraction

g-logics ATLAS

Groundwater Monitoring Well Sample Form

Project Name: Boeing Field Chevron
Project Number: 01-0410-R Task 3
Address: 10805 East Marginal Way, Tukwila, WA
Date: 1/20/23
Sampler: Hannah Spear

Well Identification	Time Opened	Time Measured	Total Depth (feet)	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Sheen Y/N	Observations/Notes
Lower Saturated Zone								
AS-1	0725	0844	16'	—	8.81	—	N	sheen in water in casing, screws loose, cap needs wrench
IP-4	0750	[illegible]	0931 14'	—	[illegible]8.54	—	N	well cap loose, no seal or screws
SVE-1	0751	0937		—	8.11	—	N	no screws
TW-1	0754	0941	10.18	—	7.76	—	N	no screws
TW-2	0757	0947	10.2	—	7.69	—	N	no screws
TW-3	0740	0838	10.17	—	7.73	—	N	filled w/water, no seal or screws
TW-4	0807	[illegible]	0832 15'	—	[illegible]8.55	—	N	
TW-5	0742	0923	12'	—	8.39	—	N	
Upper Saturated Zone								
IP-3	0746	0927	24'	—	12.42	—	Y	no screws, sheen in water around casing, no seal
IP-5	0808	0951	24'	—	13.34	—	Y	~~no screws, sheen in wa~~ no screws, sheen in water around casing, petro odor
IP-7	0805	0912	23'	12.23	12.58	0.35	Y	Strong petro odor, sheen in casing
Additional Wells								
MW-23			15.5					
MW-25			14					
MW-27S			12					
MW-27D			?					
MW-29			25					MW-29D?

Comments: Total depths taken from previous phase of work

Interface probe used on all wells prior to, during, and after extraction event

~1600

Post-Extraction

Groundwater Monitoring Well Sample Form

Project Name: Boeing Field Chevron
Project Number: 01-0410-R Task 3
Address: 10805 East Marginal Way, Tukwila, WA
Date: 1/20/23

g-logics ATLAS

Sampler: Hannah Spear

Well Identification	Time Opened	Time Measured	Total Depth (feet)	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Sheen Y/N	Well Condition Observations/Notes
Lower Saturated Zone								
AS-1		1039	16'	—	8.80	—	N	OK
IP-4		1047	14'	—	8.55	—	N	no screws, old well cap, no seal
SVE-1		1051		—	8.10	—	N	no screws, lid doesn't sit right
TW-1		1056	10.18	—	7.76	—	N	No screws, loose well cap
TW-2		1100	10.2	—	7.68	—	N	No seal, no screws, broken well cap
TW-3		1024	10.17	—	7.72	—	N	no screws
TW-4		1034	15'	—	8.14	—	N	2 screws, but don't fit into rusted well monument
TW-5		1026	12'	—	8.38	—	N	~~only 1 screw, loose~~ OK
Upper Saturated Zone								
IP-3		1030	24'	—	12.49	—	N	no screws, no seal, loose well cap
IP-5		1105	24'	—	13.35	—	N	only 1 screw, loose
IP-7		1110	23'	—	12.45	—	N	No seal, no screws, old well cap
Additional Wells								
MW-23			15.5					
MW-25			14					
MW-27S			12					
MW-27D			?					
MW-29			25					MW-29D?

Comments: Total depths taken from previous phase of work

Interface probe used on all wells prior to, during, and after extraction event

01/18/23 Cannon Property 02-0095-A
0843 Hannah onsite, texted Lannie
0927 Finished taking all pictures, called Lannie to go over site, got OK to head out once all photos taken
0930 Hannah offsite to Tacoma 84th St Property

Scale: 1 square = _____

01/20/23 Boeing Field Chevron 01-0410-P
0705 Hannah Spear (HS) onsite, check in with store clerk, move a car
0726 All traffic management put up, everything unpacked, going to start opening wells
0825 All wells opened after removing water from casings
0830 BS Set up decon station and begin measurements
0845 Northern Environmental on site, taking IP-7 measurement
0915 Give Northern go ahead to start extracting IP-7
0952 Northern done extracting and all well measurements complete, told Northern we need estimate of product gallons, calling boss to discuss
1003 Northern ~10% fuel
1015 Northern offsite, begin taking after measurements
1041 Check in w/ Tom, continuing to take water level measurements
1112 All water level measurements

Scale: 1 square = _____

post-extraction completed (decon btwn each well), now closing and taking inventory of missing parts on each well

1130 All wells closed & sealed, final decon of ~~water~~ interface probe

1200 Everything packed up, HS offsite to Issaquah office to drop off equipment

AK

Scale: 1 square = _____

Scale: 1 square = _____

Pre-Extraction
Pre / During-Extraction

g-logics ATLAS

Groundwater Monitoring Well Sample Form

Project Name: Boeing Field Chevron
Project Number: 01-0410-R Task 3
Address: 10805 East Marginal Way, Tukwila, WA
Date: 1/20/23
Sampler: Hannah Spear

Well Identification	Time Opened	Time Measured	Total Depth (feet)	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Sheen Y/N	Observations/Notes
Lower Saturated Zone								
AS-1	0725	0844	16'	—	8.81	—	N	sheen in water in casing, screws loose, cap needs wrench
IP-4	0750	[illegible]	0931 14'	—	[illegible]8.54	—	N	well cap loose, no seal or screws
SVE-1	0751	0937		—	8.11	—	N	no screws
TW-1	0754	0941	10.18	—	7.76	—	N	no screws
TW-2	0757	0947	10.2	—	7.69	—	N	no screws
TW-3	0740	0838	10.17	—	7.73	—	N	filled w/water, no seal or screws
TW-4	0807	[illegible]	0832 15'	—	[illegible]8.55	—	N	
TW-5	0742	0923	12'	—	8.39	—	N	
Upper Saturated Zone								
IP-3	0746	0927	24'	—	12.42	—	Y	no screws, sheen in water around casing, no seal
IP-5	0808	0951	24'	—	13.34	—	Y	~~no screws, sheen in wa~~ no screws, sheen in water around casing, petro odor
IP-7	0805	0912	23'	12.23	12.58	0.35	Y	Strong petro odor, sheen in casing
Additional Wells								
MW-23			15.5					
MW-25			14					
MW-27S			12					
MW-27D			?					
MW-29			25					MW-29D?

Comments: Total depths taken from previous phase of work

Interface probe used on all wells prior to, during, and after extraction event

~1600

Post-Extraction

Groundwater Monitoring Well Sample Form

Project Name: Boeing Field Chevron
Project Number: 01-0410-R Task 3
Address: 10805 East Marginal Way, Tukwila, WA
Date: 1/20/23

g-logics ATLAS

Sampler: Hannah Spear

Well Identification	Time Opened	Time Measured	Total Depth (feet)	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Sheen Y/N	Well Condition Observations/Notes
Lower Saturated Zone								
AS-1		1039	16'	—	8.80	—	N	OK
IP-4		1047	14'	—	8.55	—	N	no screws, old well cap, no seal
SVE-1		1051		—	8.10	—	N	no screws, lid doesn't sit right
TW-1		1056	10.18	—	7.76	—	N	No screws, loose well cap
TW-2		1100	10.2	—	7.68	—	N	No seal, no screws, broken well cap
TW-3		1024	10.17	—	7.72	—	N	no screws
TW-4		1034	15'	—	8.14	—	N	2 screws, but don't fit into rusted well monument
TW-5		1026	12'	—	8.38	—	N	~~only 1 screw, loose~~ OK
Upper Saturated Zone								
IP-3		1030	24'	—	12.49	—	N	no screws, no seal, loose well cap
IP-5		1105	24'	—	13.35	—	N	only 1 screw, loose
IP-7		1110	23'	—	12.45	—	N	No seal, no screws, old well cap
Additional Wells								
MW-23			15.5					
MW-25			14					
MW-27S			12					
MW-27D			?					
MW-29			25					MW-29D?

Comments: Total depths taken from previous phase of work

Interface probe used on all wells prior to, during, and after extraction event

Northern ENVIRONMENTAL
EPAID# WAH000039211
USDOT# 2133996
253.503.3096

B.O.L. # 12227

SHIPPING PAPER

DATE 1/20/23	WO # 70687
SHIPPER / CUSTOMER Atlas Geo	CONTACT NAME Jessica
ADDRESS 10805 East Marginal Way S	PHONE # 281-813-4876
CITY, STATE, ZIP Seattle WA 98168	
CONSIGNEE / FACILITY Marrac	CONTACT NAME
ADDRESS 1516 S Graham	PHONE # 206-762-0240
CITY, STATE, ZIP Seattle, WA 98108	

HM	US DOT Description *(Including Proper Shipping Name, Hazard Class, and ID Number)*	Containers No.	Containers Type	Total Quantity	UOM	CHLOR	pH
A	**MATERIAL NOT REGULATED BY DOT** Ground water w/ Traces of gasoline	001	TT	00600	G		
B							
C							
D							
E							
F							

Special Handling Instruction and Additional Information:

A) Profile #
from sampling event

SHIPPER'S CERTIFICATION: "I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packaged, marked and labelled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations." I also certify that all times listed above are true and correct.

		MONTH	DAY	YEAR
(SHIPPER) PRINT OR TYPE NAME X Hannah Spear	SIGNATURE X	1	20	23
(CARRIER/TRANSPORTER) PRINT OR TYPE NAME X Karl Berger	SIGNATURE X	1	20	23
(CONSIGNEE/FACILITY) PRINT OR TYPE NAME X	SIGNATURE X			

Northern ENVIRONMENTAL

2661 North Pearl St. #145
Tacoma, WA 98407
253.503.3096

DATE	WORK ORDER #	TICKET #
1/20/23	70667	37165

OPERATOR	LABORER
Karl	Aaron

Customer Atlas Geo **Job Phone** 281-813-4876

Job Address 10805 East Marginal Way S. **C, S, Z** Seattle WA

TRAVEL TO SITE START	TRAVEL TO SITE STOP	ON SITE IN	ON SITE OUT	DUMP OUT COMPLETED	RETURN TO SHOP	TRUCK #
7:00	8:45	8:45	10:15			57

QUANTITY	JOB DESCRIPTION	RATE	TOTAL
500 gallons	pump out ground water from		
	monitoring well		
1	Vacum truck / operator / laborer		
	energy compliance 18%		

DISPOSAL: ☐ ON SITE ☒ OFF SITE

LOCATION: Marvac

SUBTOTAL	
TAX	
TOTAL	

SIGNATURE BELOW ACKNOWLEDGES PAYMENT TERMS ON REVERSE:

CUSTOMER NAME: Hannah Spear, Atlas Geo SIGNATURE: [signature]

February 2023

2/22/23 Boeing Field Chevron 01-0410-R

0700 Hannah onsite, check in w/ gas station staff and set up traffic management

0730 Opened relevant well monuments, begin removing water from casings and open wells, set up decon

0750 Begin taking water level measurements

0900 Completed all water level measurements, thorough decon before setting up for sampling

0923 All set up at TW-2, starting purge

1006 Done sampling TW-2, moving to TW-1

1030 Begin purging TW-1

1117 Done sampling TW-1, moving to TW-3

1212 TW-3 ran dry while filling first amber, will move to next well and come back after

1224 Begin pumping TW-5

1320 TW-5 sampled, moving back to TW-3 to finish sampling

Scale: 1 square = _____

2/22/23 Boeing Field Chevron 01-0410-R

1330 Able to get a little more from TW-3, but ran dry again, moving to TW-4 and will try again later

1342 Begin pumping TW-4

1433 Done sampling TW-4, moving back to TW-3

1445 Able to get 1/2 Amber from TW-3, call w/ Tom, will try to get it tomorrow

1450 Moving to ~~[illegible]~~ IP-5

1503 Begin purging IP-5

1537 IP-5 sampled, packing up

1547 All wells closed and unpicked up minus cones, taking cones down now

1100 Hannah offsite to Issaquah

Scale: 1 square = _____

Rite in the Rain

(1)

ATLAS GEOSCIENCES NW

Groundwater Sampling Information

Well ID : TW-2	**Project Number: 01-0410-R**	**Sampling Date:** 2/22/23
Total Depth (ft): 10.2'	Water Volume in Casing (gal): 0.28	Sampler: **HVS**
Well Screen Interval (ft):	Purge Method: **Peri Pump/Low Flow**	Equipment: **YSI, peri-pump, interface probe**
Well Diameter (in):	End Depth to Water (ft):	
Tubing Intake Depth: ~10'	Calculated Purge Volume (gal): 0.84	Well Conditions:
Starting Depth to Water (ft): 8.49	Total Volume Purged (gal):	

Groundwater Parameter Monitoring

Time	TEMP	pH	ORP	COND	TURB	DO	DTW	Volume	Notes
	°C	SU	mV	mS/cm	NTU	mg/L	feet	gallons	(Appearance, Odors, Etc.)
	± 3%	± 0.1	± 10	± 3%	± 10%	± 10%	<0.33	---	---
0930	7.7	8.73	59.9	1.571	276.7	13.82	8.51	—	cloudy
0932	8.0	8.60	62.9	1.577	262.54	14.19	8.95	—	cloudy
0934	8.1	8.36	68.5	1.559	145.70	14.54	8.99	—	cloudy
0936	7.9	8.11	73.7	1.534	117.44	14.84	9.05	—	cloudy
0938	8.2	7.99	77.8	1.531	107.82	15.13	9.05	—	cloudy
0940	8.1	7.85	83.0	1.518	50.70	15.44	9.25	—	cloudy
0942	8.3	7.79	86.9	1.514	25.48	15.75	9.35	0.3	cleaning up
0944	8.4	7.79	88.3	1.520	21.90	15.88	9.40	—	clear
0946	8.3	7.82	89.7	1.517	26.96	16.09	9.45	0.4	clear

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft

Sample Collection Information

Sample Number	Sample Time	Analytes	Sample Containers	Preservatives	Duplicate (Y/N)
TW-2	0955		5 VOAs, 2 Ambers	HCl	

Total Number of Sample Containers Collected: 7

Collection Method: Bailer / Peristaltic / Submersible / Other:

Purge Water Disposal Method: Drum

Additional Comments:

(2)

ATLAS GEOSCIENCES NW

Groundwater Sampling Information

Well ID : TW-1	**Project Number: 01-0410-R**	**Sampling Date:**
Total Depth (ft): 10.18'	Water Volume in Casing (gal): 0.47	Sampler: **HVS**
Well Screen Interval (ft):	Purge Method: **Peri Pump/Low Flow**	Equipment: **YSI, peri-pump, interface probe**
Well Diameter (in):	End Depth to Water (ft):	
Tubing Intake Depth:	Calculated Purge Volume (gal): 1.4	Well Conditions:
Starting Depth to Water (ft): 7.31	Total Volume Purged (gal):	missing bolts (2)

Groundwater Parameter Monitoring

Time	TEMP	pH	ORP	COND	TURB	DO	DTW	Volume	Notes
	°C	SU	mV	mS/cm	NTU	mg/L	feet	gallons	(Appearance, Odors, Etc.)
	± 3%	± 0.1	± 10	± 3%	± 10%	± 10%	<0.33	---	---
1035	9.1	10.45	3.0	2.655	808.167	12.82	—	—	brown cloudy
1037	8.7	10.52	3.1	2.332	767.60	13.08	8.60	—	"
1039	9.2	10.29	6.0	2.034	427.38	13.33	8.60	—	"
1041	8.9	10.08	9.9	2.460	296.72	13.59	8.55	—	brown, cloudy
1043	8.7	9.84	15.0	2.073	225.67	13.87	8.55	—	clearing up
1045	8.9	9.58	21.2	1.327	146.47	14.02	8.55	0.25	bit slightly cloudy
1047	9.0	9.48	25.9	1.286	128.84	14.19	8.55	—	"
1049	9.1	9.34	30.6	1.272	117.21	14.31	8.55	—	"
1051	8.8	9.27	33.5	1.245	139.37	14.50	8.55	—	clear
1053	8.8	9.30	35.3	1.243	122.86	14.60	8.55	—	"
1055	9.0	9.32	37.0	1.252	131.84	14.60	8.55	0.5	"
1057	8.9	9.31	37.7	1.259	135.34	14.73	8.55	—	clear

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft

Sample Collection Information

Sample Number	Sample Time	Analytes	Sample Containers	Preservatives	Duplicate (Y/N)
TW-1	1105		5 VOAs, 2 Ambers	HCl	

Total Number of Sample Containers Collected: 7

Collection Method: Bailer / (Peristaltic) / Submersible / Other:

Purge Water Disposal Method: Drum

Additional Comments:

(4)

ATLAS GEOSCIENCES NW

Groundwater Sampling Information

Well ID : TW-5	**Project Number: 01-0410-R**	**Sampling Date:** 2/22/23
Total Depth (ft): 12'	Water Volume in Casing (gal): 0.49	Sampler: **HVS**
Well Screen Interval (ft):	Purge Method: **Peri Pump/Low Flow**	Equipment: **YSI, peri-pump, interface probe**
Well Diameter (in):	End Depth to Water (ft):	
Tubing Intake Depth: 11.5'	Calculated Purge Volume (gal): 1.48	Well Conditions: OK
Starting Depth to Water (ft): 8.98	Total Volume Purged (gal):	

Groundwater Parameter Monitoring

Time	TEMP	pH	ORP	COND	TURB	DO	DTW	Volume	Notes
	° C	SU	mV	mS/cm	NTU	mg/L	feet	gallons	(Appearance, Odors, Etc.)
	± 3%	± 0.1	± 10	± 3%	± 10%	± 10%	<0.33	---	---
1228	10.6	10.53	-240.6	12.396	15.12	9.46	9.14	—	cloudy/brownish-red
1230	10.7	10.42	-276.8	12.280	16.87	8.93	9.31	—	"
1232	10.4	10.35	-306.8	11.965	32.02	8.51	9.35	—	"
1234	10.2	10.28	-330.4	11.568	33.07	8.11	9.34	0.25	dark amber color
1236	10.1	10.22	-350.8	11.131	39.38	7.77	9.35	—	" petro odor
1238	10.1	10.10	-379.2	10.226	63.92	7.50	9.35	—	" " "
1240	10.0	10.05	-391.9	9.547	107.50	7.30	9.35	—	" "
1242	10.4	9.95	-403.0	9.062	136.00	7.04	9.40	—	" "
1244	10.7	9.86	-410.1	8.699	155.16	6.81	9.43	—	" "
1246	10.8	9.81	-414.4	8.474	166.76	6.67	9.45	—	" "
1248	10.7	9.79	-422.1	8.202	172.35	6.43	9.45	—	" "
1250	10.3	9.77	-408.1	8.017	277.90	6.03	9.35	0.6	" "
1254	10.4	9.76	-404.6	7.765	286.75	5.92	9.35	—	" "
1256	10.2	9.75	-409.3	7.643	263.74	5.84	9.35	—	" "
1258	10.2	9.77	-418.7	7.682	234.63	5.68	9.35	—	" "
1300	10.3	9.77	-425.8	7.753	190.69	5.57	9.35	—	
1302	10.3	9.78	-428.6	7.786	213.89	5.47	9.35	1.0	

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft

Sample Collection Information

Sample Number	Sample Time	Analytes	Sample Containers	Preservatives	Duplicate (Y/N)
TW-5	1310		5 VOAs, 2 Ambers	HCl	

Total Number of Sample Containers Collected: 7

Collection Method: Bailer / Peristaltic / Submersible / Other:

Purge Water Disposal Method: Drum

Additional Comments: pump on lowest setting to still get water

(3)

ATLAS GEOSCIENCES NW

Groundwater Sampling Information

Well ID : TW-3	**Project Number: 01-0410-R**	**Sampling Date:** 2/22/23
Total Depth (ft): 10.17	Water Volume in Casing (gal): 0.35	Sampler: **HVS**
Well Screen Interval (ft):	Purge Method: **Peri Pump/Low Flow**	Equipment: **YSI, peri-pump, interface probe**
Well Diameter (in):	End Depth to Water (ft):	
Tubing Intake Depth: 10	Calculated Purge Volume (gal): 1.04	Well Conditions: missing bolts (2) and gasket
Starting Depth to Water (ft): 8.05	Total Volume Purged (gal): 0.5	

Groundwater Parameter Monitoring

Time	TEMP	pH	ORP	COND	TURB	DO	DTW	Volume	Notes
	° C	SU	mV	mS/cm	NTU	mg/L	feet	gallons	(Appearance, Odors, Etc.)
	± 3%	± 0.1	± 10	± 3%	± 10%	± 10%	<0.33	---	---
1146	9.7	6.95	-179.0	0.961	6.85	10.97	8.59	—	clear
1148	10.1	6.84	-161.8	0.968	4.83	10.34	8.69	—	clear
1150	10.0	6.82	-151.4	0.968	4.40	9.87	8.80	—	clear, petro odor
1152	9.9	6.81	-145.2	0.960	4.12	9.46	8.97	—	"
1154	9.7	6.81	-141.1	0.956	4.82	9.09	9.15	0.25	"
1156	9.6	6.81	-137.9	0.953	3.61	8.81	9.30	—	"
1158	9.8	6.81	-135.8	0.952	3.37	8.52	9.45	—	"
1200	9.8	6.82	-134.1	0.954	3.55	8.25	9.60	—	"

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft

Sample Collection Information

Sample Number	Sample Time	Analytes	Sample Containers	Preservatives	Duplicate (Y/N)
TW-3	1210		5 VOAs, ~~2 Ambers~~ 1/2 Amber	HCl	
			Total Number of Sample Containers Collected:		7

Collection Method: Bailer / Peristaltic / Submersible / Other:

Purge Water Disposal Method: Drum

Additional Comments: Pump on lowest setting to still get water
only able to get 5 VOAs and 1/2 amber

(5)

ATLAS GEOSCIENCES NW

Groundwater Sampling Information

Well ID : TW-4	**Project Number: 01-0410-R**	**Sampling Date:** 2/22/23
Total Depth (ft): 15'	Water Volume in Casing (gal): 0.98	Sampler: **HVS**
Well Screen Interval (ft):	Purge Method: **Peri Pump/Low Flow**	Equipment: **YSI, peri-pump, interface probe**
Well Diameter (in):	End Depth to Water (ft):	
Tubing Intake Depth: 14.75'	Calculated Purge Volume (gal): 2.93	Well Conditions: missing 1 of 3 bolts
Starting Depth to Water (ft): 9.00	Total Volume Purged (gal): 1.0	

Groundwater Parameter Monitoring

Time	TEMP	pH	ORP	COND	TURB	DO	DTW	Volume	Notes
	° C	SU	mV	mS/cm	NTU	mg/L	feet	gallons	(Appearance, Odors, Etc.)
	± 3%	± 0.1	± 10	± 3%	± 10%	± 10%	<0.33	---	---
1347	10.1	10.47	-70.7	3.036	152.58	8.96	9.45	—	cloudy
1349	10.4	10.40	-63.2	2.840	139.70	8.96	9.50	—	cloudy
1351	10.2	10.37	-59.1	2.565	116.35	9.00	9.60	—	cloudy
1353	10.5	10.28	-53.9	2.398	100.50	8.99	9.65	—	slightly cloudy
1355	10.3	10.18	-48.4	2.181	92.32	9.05	9.74	0.3	"
1357	10.1	10.12	-43.8	2.022	81.84	9.09	9.80	—	"
1359	10.3	10.11	-40.5	2.085	255.66	9.13	9.86	—	cloudy
1401	10.1	9.86	-33.4	1.792	134.37	9.13	9.90	—	cloudy
1403	10.2	9.73	-27.4	1.661	130.38	9.14	9.96	0.5	slightly cloudy
1405	10.2	9.63	-21.5	1.598	108.09	9.15	10.00	—	"
1407	10.3	9.81	-21.4	1.666	462.95	9.16	10.05	—	cloudy, brown
1409	10.2	9.66	-17.3	1.573	266.41	9.20	10.05	—	"
1410	10.0	9.60	-14.7	1.539	297.25	9.30	10.06	—	"
1412	10.0	9.63	-11.3	1.467	215.14	9.20	10.08	—	"
1414	10.0	9.52	-7.3	1.441	166.40	9.17	10.10	1.0	slightly cloudy

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft

Sample Collection Information

Sample Number	Sample Time	Analytes	Sample Containers	Preservatives	Duplicate (Y/N)
TW-4	1420		5 VOAs, 2 Ambers	HCl	

Total Number of Sample Containers Collected: 7

Collection Method: Bailer / (Peristaltic) / Submersible / Other:

Purge Water Disposal Method: Drum

Additional Comments: on lowest pump setting to get water

(6)

ATLAS GEOSCIENCES NW

Groundwater Sampling Information

Well ID : IP-5	**Project Number: 01-0410-R**	**Sampling Date:** 2/22/23
Total Depth (ft): 24'	Water Volume in Casing (gal): 1.42	Sampler: **HVS**
Well Screen Interval (ft):	Purge Method: **Peri Pump/Low Flow**	Equipment: **YSI, peri-pump, interface probe**
Well Diameter (in):	End Depth to Water (ft):	
Tubing Intake Depth:	Calculated Purge Volume (gal): 4.25	Well Conditions:
Starting Depth to Water (ft): 15.31	Total Volume Purged (gal): 0.5	

Groundwater Parameter Monitoring

Time	TEMP	pH	ORP	COND	TURB	DO	DTW	Volume	Notes
	° C	SU	mV	mS/cm	NTU	mg/L	feet	gallons	(Appearance, Odors, Etc.)
	± 3%	± 0.1	± 10	± 3%	± 10%	± 10%	<0.33	---	---
1510	11.6	10.39	-66.8	4.846	487.47	8.90	15.36	—	grey cloudy
1512	11.4	10.39	-100.9	4.698	330.39	8.40	15.31	—	"
1514	11.7	10.38	-120.3	4.666	207.51	8.00	15.30	—	"
1515	11.7	10.38	-127.8	4.658	170.26	7.81	15.30	—	"
1516	11.8	10.38	-134.0	4.644	128.52	7.63	15.31	—	"
1517	11.8	10.38	-139.3	4.650	99.25	7.47	15.31	—	"
1518	11.9	10.38	-142.1	4.669	91.62	7.35	15.31	—	grey, cloudy
1519	11.8	10.38	-147.9	4.682	76.67	7.20	15.31	0.5	amber petrol or sheen

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft

Sample Collection Information

Sample Number	Sample Time	Analytes	Sample Containers	Preservatives	Duplicate (Y/N)
IP-5	1525		5 VOAs, 2 Ambers	HCl	
			Total Number of Sample Containers Collected:		7

Collection Method: Bailer / Peristaltic / Submersible / Other:

Purge Water Disposal Method: Drum

Additional Comments:

Groundwater Monitoring Well Sample Form

Project Name: Boeing Field Chevron

Project Number: 01-0410-R

Address: 10805 East Marginal Way, Tukwila, WA

Date: 2/22/2023

Sampler: Hannah Spear

Well Identification	Time Opened	Time Measured	Total Depth (feet)	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Sheen Y/N	Observations/Notes
Lower Saturated Zone								
(7) AS-1	743	0837	16'	N/A	9.33			
(10) IP-4	748	0856	14'	N/A	9.12			
(8) SVE-1	746	0850	~~~	N/A	DRY			
(2) TW-1	736	810	10.18	N/A	7.31			
(1) TW-2	734	801	10.2	N/A	8.49			
(3) TW-3	738	818	10.17	N/A	8.05			
(5) TW-4	740	0830	15'	N/A	9.00			
(4) TW-5	739	0826	12'	N/A	8.98	0.84		
Upper Saturated Zone								
(9) IP-3	747	0859	24'	N/A	12.81			
(6) IP-5	742	0833	24'	N/A	13.63			
(11) IP-7	0750	0901	23'	12.62	13.46			

Comments: Total depths taken from previous phase of work

Interface probe used on all wells prior to, during, and after extraction event

3/23/23 Boeing Field Chevron 01-0410-R

0655 Hannah onsite, setting up traffic management ; checkin w/ staff
0713 Begin to unpack and open relevant wells
0737 Begin pumping AS-1
0840 Still sampling AS-1 and Dup-1 having getting bubbles out of VOAs
0855 Done collecting AS-1 and Dup-1, packing up and moving to IP-3
0920 Start pumping IP-3
1000 Done sampling IP-3, moving to IP-4
1035 Begin pumping IP-4
1112 Done sampling IP-4, moving to TW-3 to see if I can get a full amber
1130 Message Tom about TW-3, only ~ 6 inches of water in well
1144 Moved to IP-7, to bail free product from well before setting up tubing to sample
1202 Start pumping IP-7
1243 Done sampling IP-7, packing up and checking to see if SVE-1

Scale: 1 square = ______

2/23/23 Boeing Field Chevron CONT 01-0410-R

is still dry
1301 SVE-1 dry, packing up van and taking drum inventory
1315 Close wells ; drums and take down cones
1330 Hannah offsite

HH

Scale: 1 square = ______

(7)

ATLAS GEOSCIENCES NW

Groundwater Sampling Information

Well ID : AS-1	**Project Number: 01-0410-R**	**Sampling Date:** 2/23/22
Total Depth (ft): 16'	Water Volume in Casing (gal): 1.09	Sampler: **HVS**
Well Screen Interval (ft):	Purge Method: **Peri Pump/Low Flow**	Equipment: **YSI, peri-pump, interface probe**
Well Diameter (in):	End Depth to Water (ft):	
Tubing Intake Depth: 15.75	Calculated Purge Volume (gal): 3.24	Well Conditions:
Starting Depth to Water (ft): 9.33	Total Volume Purged (gal): 1 gal	missing 2 of 2 bolts

Groundwater Parameter Monitoring

Time	TEMP	pH	ORP	COND	TURB	DO	DTW	Volume	Notes
	°C	SU	mV	mS/cm	NTU	mg/L	feet	gallons	(Appearance, Odors, Etc.)
	± 3%	± 0.1	± 10	± 3%	± 10%	± 10%	<0.33	---	---
0744	9.2	9.41	-174.2	4.905	575.15	11.36	10.05	—	light gray, cloudy
0746	9.1	9.42	-201.6	4.955	503.63	10.62	10.2	—	"
0748	9.2	9.42	-207.0	4.946	430.79	10.31	10.28	—	"
0750	9.5	9.33	-212.2	4.675	277.04	9.86	10.4	—	organic odor
0752	9.4	9.13	-222.3	4.020	235.57	9.58	10.48	0.4	gray, cloudy, org. odor
0754	9.5	8.74	-258.4	3.472	255.86	9.20	10.55	—	"
0756	9.4	7.94	-234.7	2.458	342.47	9.12	10.60	—	"
0758	9.5	7.54	-201.8	2.346	583.60	8.90	10.64	—	"
0800	9.6	7.51	-201.3	2.366	680.51	8.65	10.67	0.7	"
0802	9.8	7.57	-208.3	2.440	648.53	8.46	10.7	—	"
0804	10.1	7.74	-224.7	2.586	542.98	8.23	10.73	0.9	grayish brown, organic odor
0806	10.1	7.78	-235.6	2.676	497.93	8.15	10.75	—	"
0808	10.0	7.85	-258.9	2.679	378.75	8.09	10.80	—	"

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft

Sample Collection Information

Sample Number	Sample Time	Analytes	Sample Containers	Preservatives	Duplicate (Y/N)
AS-1	0815		5 VOAs, 2 Ambers	HCl	
Dup-1	0800		"	"	Y

Total Number of Sample Containers Collected: 7

Collection Method: Bailer / Peristaltic / Submersible / Other:

Purge Water Disposal Method: Drum

Additional Comments: pump on lowest setting to get water

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ATLAS GEOSCIENCES NW

Groundwater Sampling Information

Well ID : IP-3	**Project Number: 01-0410-R**	**Sampling Date:** 2/23/23
Total Depth (ft): 24'	Water Volume in Casing (gal): 1.8	Sampler: **HVS**
Well Screen Interval (ft):	Purge Method: **Peri Pump/Low Flow**	Equipment: **YSI, peri-pump, interface probe**
Well Diameter (in):	End Depth to Water (ft):	
Tubing Intake Depth: 23.75	Calculated Purge Volume (gal): 5.4	Well Conditions: Missing 2 of 2 bolts
Starting Depth to Water (ft): 12.94	Total Volume Purged (gal): 1 gal	

Groundwater Parameter Monitoring

Time	TEMP	pH	ORP	COND	TURB	DO	DTW	Volume	Notes
	° C	SU	mV	mS/cm	NTU	mg/L	feet	gallons	(Appearance, Odors, Etc.)
	± 3%	± 0.1	± 10	± 3%	± 10%	± 10%	<0.33	---	---
925	9.2	9.36	-112.8	3.307	405.78	10.46	13.00	—	grey cloudy, petro odor
927	9.2	9.37	-162.8	3.326	328.75	9.99	13.00	—	"
929	9.2	9.37	-205.9	3.328	217.11	9.64	13.00	—	greyish brown cloudy, petro
931	9.4	9.37	-234.0	3.361	152.38	9.23	13.00	0.3	clearing up
933	9.9	9.36	-254.4	3.400	113.49	8.93	13.01	—	slightly cloudy grey/brown petro odor
935	9.9	9.37	-270.5	3.386	94.99	8.64	13.00	0.5	"
937	9.8	9.38	-282.6	3.368	93.25	8.46	13.02	—	slight petro odor
939	10.0	9.38	-293.5	3.354	77.45	8.25	13.02	—	"
941	10.0	9.39	-303.2	3.351	60.17	8.04	13.03	0.75	"
943	10.3	9.39	-311.1	3.355	105.14	7.85	13.04	—	"
945	10.2	9.39	-315.3	3.348	47.08	7.74	13.05	—	"
947	10.4	9.39	-319.4	3.353	59.60	7.64	13.05	0.1	"

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft

Sample Collection Information

Sample Number	Sample Time	Analytes	Sample Containers	Preservatives	Duplicate (Y/N)
IP-3	0955		5 VOAs, 2 Ambers	HCl	
			Total Number of Sample Containers Collected:		7

Collection Method: Bailer / (Peristaltic) / Submersible / Other:

Purge Water Disposal Method: Drum

Additional Comments:

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ATLAS GEOSCIENCES NW

Groundwater Sampling Information

Well ID : IP-4	**Project Number: 01-0410-R**	**Sampling Date:** 2/23/23
Total Depth (ft): 14'	Water Volume in Casing (gal): 0.79	Sampler: **HVS**
Well Screen Interval (ft):	Purge Method: **Peri Pump/Low Flow**	Equipment: **YSI, peri-pump, interface probe**
Well Diameter (in):	End Depth to Water (ft):	
Tubing Intake Depth:	Calculated Purge Volume (gal): 2.37	Well Conditions: Missing 2 of 2 bolts + gasket
Starting Depth to Water (ft): 9.15	Total Volume Purged (gal): 0.5	

Groundwater Parameter Monitoring

Time	TEMP	pH	ORP	COND	TURB	DO	DTW	Volume	Notes
	° C	SU	mV	mS/cm	NTU	mg/L	feet	gallons	(Appearance, Odors, Etc.)
	± 3%	± 0.1	± 10	± 3%	± 10%	± 10%	<0.33	---	---
1043	6.6	7.70	-61.2	1.055	57.68	9.72	9.29	—	Slightly cloudy
1045	7.9	7.56	-64.5	1.074	48.71	9.35	9.33	—	"
1047	8.5	7.48	-74.1	1.083	44.28	9.03	9.34	—	"
1049	8.5	7.44	-82.6	1.080	38.45	8.80	9.35	0.2	clear
1051	8.6	7.40	-89.7	1.081	35.15	8.55	9.35	—	"
1053	8.6	7.38	-93.3	1.081	35.11	8.38	9.35	0.3	"
1055	8.4	7.36	-96.5	1.081	33.65	8.24	9.35	0.35	clear, pebbles
1057	8.4	7.35	-97.8	1.070	33.81	8.18	9.34	—	clear, pebbles
1059	8.5	7.34	-98.5	1.071	33.44	8.06	9.34	—	clear, pebbles

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft

Sample Collection Information

Sample Number	Sample Time	Analytes	Sample Containers	Preservatives	Duplicate (Y/N)
IP-4	1105		5 VOAs, 2 Ambers	HCl	
			Total Number of Sample Containers Collected:		7

Collection Method: Bailer / Peristaltic / Submersible / Other:

Purge Water Disposal Method: Drum

Additional Comments:

(11)

ATLAS GEOSCIENCES NW

Groundwater Sampling Information

Well ID : IP-7	**Project Number: 01-0410-R**	**Sampling Date:** 2/23/23
Total Depth (ft): 23'	Water Volume in Casing (gal): N/A ; 1.40	Sampler: **HVS**
Well Screen Interval (ft):	Purge Method: **Peri Pump/Low Flow**	Equipment: **YSI, peri-pump, interface probe**
Well Diameter (in):	End Depth to Water (ft):	
Tubing Intake Depth:	Calculated Purge Volume (gal): 4.4	Well Conditions: Missing 3 of 3 bolts, ~~Casing stretch~~ monument broken, nothing to bolt into
Starting Depth to Water (ft): 14.00	Total Volume Purged (gal): 1 gal	

Groundwater Parameter Monitoring

Time	TEMP	pH	ORP	COND	TURB	DO	DTW	Volume	Notes
	°C	SU	mV	mS/cm	NTU	mg/L	feet	gallons	(Appearance, Odors, Etc.)
	± 3%	± 0.1	± 10	± 3%	± 10%	± 10%	<0.33	---	---
1207	10.5	6.83	-90.3	0.506	13.56	9.57	14.00	—	clear w/ free product
1209	10.9	6.71	-94.1	0.502	32.65	9.20	14.03	—	"
1211	11.1	6.64	-97.8	0.495	66.21	8.81	14.03	—	clear, free product, slight odor
1213	11.6	6.60	-100.2	0.499	86.90	8.40	14.04	—	"
1215	11.8	6.59	-102.4	0.505	86.75	8.00	14.05	0.5	"
1217	11.7	6.59	-103.2	0.504	107.92	7.79	14.05	—	"
1219	11.4	6.58	-103.7	0.502	115.45	7.59	14.10	—	clear w/ product, slight odor
1221	11.4	6.58	-103.7	0.501	119.23	7.40	14.13	0.75	"
1223	11.4	6.58	-103.9	0.501	118.75	7.20	14.14	—	"

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft

Sample Collection Information

Sample Number	Sample Time	Analytes	Sample Containers	Preservatives	Duplicate (Y/N)
IP-7	1235		5 VOAs, 2 Ambers	HCl	

Total Number of Sample Containers Collected: 7

Collection Method: Bailer / Peristaltic / Submersible / Other:

Purge Water Disposal Method: Drum

Additional Comments:
Free product in well, bailed out before setting up for sampling, but some still present

April 2023

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4/24/23 Boeing Field Chevron (BFC) 01-0410-K

710 Hannah arrives on site, check-in with store staff and set up traffic management

727 Decon setup, begin opening wells in order of sampling

0805 All wells open after reinouting water in well monument and setting up new drum for disposal, now will begin taking water level measurements

0854 Done taking water level msmts, now going to set up at first well for sampling, TW-2

0912 Begin purging TW-2

0932 Parameters stable, sampling TW-2

0950 Deconning & moving to next well, TW-1

0959 Begin purging TW-1

1022 TW-1 parameters stable, sampling TW-1

1051 Done sampling TW-1 and taking duplicate, moving to next well, TW-3

1110 Begin purging TW-3

1128 TW-3 parameters stabilized, sampling TW-3

Scale: 1 square = _____

7

4/24/23 BFC Continued 01-0410-K

1147 Well running dry while sampling, have all 5 VOAs and 1 full amber, the second amber is ~1/4 full, stopped pump to wait for recharge and will try to get a little more water

1201 Got a little bit more water, well ran dry very quickly again

1215 Begin purging TW-5

1242 TW-5 parameters stable, sampling now

1308 Done sampling TW-5, moving to next well, TW-4

1309 Will check TW-3 after next well for recharge

1318 Begin purging TW-4

1346 TW-4 parameters stable, sampling TW-4

1406 Done sampling TW-4, moved back to TW-3 to see if I can fill amber

1412 Able to get 1/3 amber before well went dry again, now moving to next well, IP-5

1500 IP-5 parameters have stabilized

Scale: 1 square = _____

Rite in the Rain

4/24/23 BFC Cont 01-0410-R
Sampling IP-5
1523 Done sampling IP-5, packing up equipment
1536 Close and label drum
1542 Closing all wells
1550 All traffic management down, sample management / COC before leaving
1555 Hannah offsite to Issaquah office

Scale: 1 square = _____

Scale: 1 square = _____

Rite in the Rain

(1)

ATLAS GEOSCIENCES NW

Groundwater Sampling Information

Well ID : TW-2	**Project Number: 01-0410-R**	**Sampling Date:** 4/24/23
Total Depth (ft): **10.2**	Water Volume in Casing (gal): 0.32	Sampler: **HVS**
Well Screen Interval (ft):	Purge Method: Low Flow	Equipment: **YSI, peri-pump, interface probe**
Well Diameter (in): 2	End Depth to Water (ft):	
Tubing Intake Depth: 10'	Calculated Purge Volume (gal): 0.95	Well Conditions: Missing seal, 3 of 3 bolts
Starting Depth to Water (ft): 8.26	Total Volume Purged (gal): ~0.45	

Groundwater Parameter Monitoring

Time	TEMP	pH	ORP	COND	TURB	DO	DTW	Volume	Notes
	°C	SU	mV	mS/cm	NTU	mg/L	feet	gallons	(Appearance, Odors, Etc.)
	± 3%	± 0.1	± 10	± 3%	± 10%	± 10%	<0.33	---	---
0915	11.2	7.15	71.5	1.673	51.25	6.48	8.55	—	clear
0917	11.3	7.13	74.8	1.666	42.29	6.07	8.57	—	clear
0919	11.3	7.13	80.1	1.665	37.55	5.93	8.62	—	clear
0921	11.3	7.10	85.6	1.663	27.07	5.89	8.68	0.1	clear
0923	11.4	7.04	92.1	1.672	20.66	5.95	8.72	—	"
0925	11.4	7.04	96.9	1.674	18.44	6.33	8.75	—	"
0927	11.3	7.03	101.4	1.674	17.93	6.62	8.76	0.2	"
0929	11.3	7.04	104.3	1.673	18.45	6.71	8.78	—	"
0931	11.3	7.05	106.9	1.667	18.32	6.56	8.80	0.3	clear, no odor or sheen

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft

Sample Collection Information

Sample Number	Sample Time	Analytes	Sample Containers	Preservatives	Duplicate (Y/N)
TW-2	0940		5 VOAs 2 Ambers	HCl	

Total Number of Sample Containers Collected: 7

Collection Method: Bailer / (Peristaltic) / Submersible / Other:

Purge Water Disposal Method: Drum

Additional Comments:
Peri-Pump on lowest setting possible to still get water

(2)

ATLAS GEOSCIENCES NW

Groundwater Sampling Information

Well ID : TW-1	**Project Number: 01-0410-R**	**Sampling Date:** 2/24/23
Total Depth (ft): **10.18**	Water Volume in Casing (gal): 0.30	Sampler: **HVS**
Well Screen Interval (ft):	Purge Method: Low-Flow	Equipment: **YSI, peri-pump, interface probe**
Well Diameter (in):	End Depth to Water (ft):	
Tubing Intake Depth: 10	Calculated Purge Volume (gal): 0.90	Well Conditions: Missing 2 of 2 bolts
Starting Depth to Water (ft): 8.34	Total Volume Purged (gal): ~0.75	

Groundwater Parameter Monitoring

Time	TEMP	pH	ORP	COND	TURB	DO	DTW	Volume	Notes
	°C	SU	mV	mS/cm	NTU	mg/L	feet	gallons	(Appearance, Odors, Etc.)
	± 3%	± 0.1	± 10	± 3%	± 10%	± 10%	<0.33	---	---
1002	11.5	9.51	82.6	2.448	279.36	4.91	8.35	—	cloudy, orangey-brown
1004	11.5	9.17	81.1	2.033	190.77	4.30	8.36	—	cloudy, orangey-brown
1006	11.5	8.78	82.1	1.772	72.01	3.99	8.36	—	clearing up
1008	11.5	8.56	83.6	1.600	53.81	3.70	8.36	—	"
1010	11.5	8.44	84.4	1.548	24.77	3.47	8.36	—	"
1012	11.4	8.38	84.3	1.519	19.66	3.34	8.36	0.25	"
1014	11.4	8.36	83.6	1.513	—	3.19	8.36	—	YSI fell, Turb going up
1016	11.4	8.37	82.9	1.512	18.38	3.15	8.36	—	clear, no sheen, no odor
1018	11.4	8.39	81.6	1.513	13.40	3.10	8.36	0.5	"
1020	11.4	8.40	80.6	1.511	6.45	3.08	8.36	—	"
1022	11.5	8.39	80.1	1.510	7.16	3.08	8.36	—	"

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft

Sample Collection Information

Sample Number	Sample Time	Analytes	Sample Containers	Preservatives	Duplicate (Y/N)	
TW-1	1030		5 VOAs 2 Ambers	HCl	Y	7
Dup-1	0800		"	"		7
				Total Number of Sample Containers Collected:	7+7	=14

Collection Method: Bailer / (Peristaltic) / Submersible / Other:

Purge Water Disposal Method: Drum

Additional Comments:

(3)

ATLAS GEOSCIENCES NW

Groundwater Sampling Information

Well ID : TW-3	**Project Number: 01-0410-R**	**Sampling Date:** @ 4/24/23
Total Depth (ft): **10.17**	Water Volume in Casing (gal): 0.35	Sampler: **HVS**
Well Screen Interval (ft):	Purge Method: Low-Flow	Equipment: **YSI, peri-pump, interface probe**
Well Diameter (in):	End Depth to Water (ft):	
Tubing Intake Depth: 10	Calculated Purge Volume (gal): 1.06	Well Conditions: Missing seal : 2 of 2 bolts
Starting Depth to Water (ft): 8.01	Total Volume Purged (gal): ~0.25	

Groundwater Parameter Monitoring

Time	TEMP	pH	ORP	COND	TURB	DO	DTW	Volume	Notes
	°C	SU	mV	mS/cm	NTU	mg/L	feet	gallons	(Appearance, Odors, Etc.)
	± 3%	± 0.1	± 10	± 3%	± 10%	± 10%	<0.33	---	---
1113	12.1	6.75	-44.3	1.355	10.79	2.36	8.54	—	clear
1115	12.1	6.57	-71.1	1.352	6.03	1.28	8.65	—	"
1117	12.1	6.53	-77.3	1.357	4.95	0.95	8.82	—	"
1119	12.0	6.52	-79.5	1.360	4.79	0.82	8.94	—	"
1121	12.0	6.52	-81.3	1.361	4.71	0.72	9.10	—	"
1123	12.1	6.52	-83.0	1.361	4.74	0.65	9.21	—	clear, no odor, no sheen
1125	12.1	6.52	-84.6	1.362	4.71	0.61	9.35	—	"
1127	12.1	6.52	-86.2	1.364	4.60	0.60	9.43	—	"

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft

Sample Collection Information

Sample Number	Sample Time	Analytes	Sample Containers	Preservatives	Duplicate (Y/N)
TW-3	1140		5 VOAs 2 Ambers	HCl	N

Total Number of Sample Containers Collected: 7

Collection Method: Bailer / (Peristaltic) / Submersible / Other:

Purge Water Disposal Method:

Additional Comments:

Peri-Pump on lowest setting possible to still get water

Well running dry @ 5 VOAs : 1 amber, second amber ~1/4 full, waiting for recharge to get more

- Only able to get 2nd amber 1/3 full

(4)

ATLAS GEOSCIENCES NW

Groundwater Sampling Information

Well ID : TW-5	**Project Number: 01-0410-R**	**Sampling Date:** 4/24/23
Total Depth (ft): **12**	Water Volume in Casing (gal): 0.51	Sampler: **HVS**
Well Screen Interval (ft):	Purge Method: Low-Flow	Equipment: **YSI, peri-pump, interface probe**
Well Diameter (in):	End Depth to Water (ft):	
Tubing Intake Depth: 11.8	Calculated Purge Volume (gal): 1.54	Well Conditions: OK
Starting Depth to Water (ft): 8.85	Total Volume Purged (gal): ~0.85	

Groundwater Parameter Monitoring

Time	TEMP	pH	ORP	COND	TURB	DO	DTW	Volume	Notes
	°C	SU	mV	mS/cm	NTU	mg/L	feet	gallons	(Appearance, Odors, Etc.)
	± 3%	± 0.1	± 10	± 3%	± 10%	± 10%	<0.33	---	---
1218	13.3	9.38	-168.2	12.897	191.01	0.98	9.15	—	dark brown cloudy, petro odor
1220	13.4	9.29	-261.4	12.448	133.34	0.55	9.15	—	"
1222	13.2	9.25	-279.1	12.193	81.45	0.46	9.17	—	"
1224	13.4	9.18	-295.5	11.722	47.65	0.39	9.24	—	"
1226	13.2	9.11	-303.8	10.941	33.74	0.35	9.30	—	clearing up
1228	13.1	9.00	-319.1	10.075	25.21	0.32	9.30	—	slightly cloudy
1230	13.1	8.88	-342.9	9.277	24.10	0.30	9.31	—	"
1232	13.1	8.80	-356.8	8.614	38.25	0.29	9.32	—	"
1234	12.9	8.75	-368.5	8.013	60.75	0.27	9.32	—	"
1236	12.9	8.73	-373.5	7.793	72.25	0.27	9.33	0.45	"
1238	12.9	8.73	-377.6	7.636	83.17	0.26	9.35	0.5	"
1240	12.8	8.73	-381.0	7.563	90.83	0.25	9.35	—	"
1242	12.8	8.74	-383.6	7.506	95.26	0.25	9.36	0.6	"

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft

Sample Collection Information

Sample Number	Sample Time	Analytes	Sample Containers	Preservatives	Duplicate (Y/N)
TW-5	1255		5 2 VOAs Ambers	HCl	N

Total Number of Sample Containers Collected: 7

Collection Method: Bailer / Peristaltic / Submersible / Other:

Purge Water Disposal Method: Drum

Additional Comments:

(5)

ATLAS GEOSCIENCES NW

Groundwater Sampling Information

Well ID : TW-4	**Project Number: 01-0410-R**	**Sampling Date:** 4/24/23
Total Depth (ft): **15**	Water Volume in Casing (gal): 1.03	Sampler: **HVS**
Well Screen Interval (ft):	Purge Method: Low-Flow	Equipment: **YSI, peri-pump, interface probe**
Well Diameter (in):	End Depth to Water (ft): 8.94	
Tubing Intake Depth: 14.75	Calculated Purge Volume (gal): 3.09	Well Conditions: Missing 2 of 3 bolts, threads rusted out, j-plug not tight
Starting Depth to Water (ft): 8.107	Total Volume Purged (gal): ~0.9	

Groundwater Parameter Monitoring

Time	TEMP	pH	ORP	COND	TURB	DO	DTW	Volume	Notes
	°C	SU	mV	mS/cm	NTU	mg/L	feet	gallons	(Appearance, Odors, Etc.)
	± 3%	± 0.1	± 10	± 3%	± 10%	± 10%	<0.33	---	---
1320	13.0	10.25	-155.8	5.713	1292.33	6.15	8.91	—	very brown, cloudy, petro odor
1322	12.9	9.93	-156.9	3.060	959.89	6.54	8.91	—	"
1324	12.8	9.55	-143.5	2120	533.76	6.93	8.90	—	clearing up slightly
1326	12.7	9.18	-129.0	1,750	282.37	7.14	8.90	—	"
1328	12.6	8.81	-114.0	1.582	159.11	7.26	8.90	—	clear -
1330	12.5	8.59	-97.4	1.496	87.48	7.32	8.90	—	"
1332	12.4	8.35	-85.1	1.461	60.35	7.34	8.90	—	"
1334	12.4	8.12	-71.6	1.432	44.47	7.35	8.90	—	"
1336	12.4	8.02	-63.5	1.425	39.12	7.37	8.90	—	"
1338	12.3	7.96	-55.8	1.415	27.92	7.37	8.90	0.45	"
1340	12.3	7.91	-49.2	1.411	26.81	7.37	8.90	—	"
1342	12.3	7.87	-43.7	1.409	19.31	7.35	8.92	—	"
1344	12.4	7.85	-38.6	1.405	19.85	7.35	8.94	0.6	"
1346	12.4	7.84	-35.2	1.406	19.01	7.34	8.94	—	"

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft

1

Sample Collection Information

Sample Number	Sample Time	Analytes	Sample Containers	Preservatives	Duplicate (Y/N)
TW-4	1355		5 voas 2 ambers	HCl	N

Total Number of Sample Containers Collected: 7

Collection Method: Bailer / (Peristaltic) / Submersible / Other:

Purge Water Disposal Method: Drum

Additional Comments:

~~1 full amber and 1/3 full amber also~~

(6)

ATLAS GEOSCIENCES NW

Groundwater Sampling Information

Well ID : IP-5	**Project Number: 01-0410-R**	**Sampling Date:**
Total Depth (ft): **24**	Water Volume in Casing (gal): 1.26	Sampler: **HVS**
Well Screen Interval (ft):	Purge Method: Low-Flow	Equipment: **YSI, peri-pump, interface probe**
Well Diameter (in):	End Depth to Water (ft):	
Tubing Intake Depth: 23.75	Calculated Purge Volume (gal): 3.77	Well Conditions: rusted out, bolts don't fit, seal brittle
Starting Depth to Water (ft): 16.29	Total Volume Purged (gal): ~0.9	

Groundwater Parameter Monitoring

Time	TEMP	pH	ORP	COND	TURB	DO	DTW	Volume	Notes
	°C	SU	mV	mS/cm	NTU	mg/L	feet	gallons	(Appearance, Odors, Etc.)
	± 3%	± 0.1	± 10	± 3%	± 10%	± 10%	<0.33	---	---
1433	15.0	9.18	-19.0	3.106	77.30	0.88	16.34	—	brown cloudy
1435	15.1	9.10	-34.4	3.107	49.51	0.66	16.35	—	"
1437	15.0	9.09	-88.5	3.099	37.81	0.52	16.35	—	"
1439	14.7	9.08	-144.5	3.083	23.82	0.46	16.36	—	clearing up
1441	14.5	9.08	-193.3	3.068	15.66	0.40	16.38	—	slightly reddish-brown cloudy petro? odor?
1443	14.4	9.07	-214.5	3.053	15.32	0.38	16.39	0.2	"
1445	14.5	9.07	-237.6	3.049	15.53	0.36	16.40	—	"
1447	14.6	9.07	-257.6	3.047	13.95	0.34	16.40	—	"
1449	14.7	9.06	-269.5	3.048	14.80	0.33	16.41	—	"
1451	14.8	9.06	-280.9	3.046	11.93	0.32	16.42	0.5	"
1453	14.6	9.06	-289.0	3.053	12.46	0.31	16.44	—	"
1455	14.5	9.06	-297.6	3.039	12.44	0.30	16.45	—	"
1457	14.5	9.06	-303.0	3.040	12.22	0.29	16.45	0.75	"
1459	14.4	9.06	-307.1	3.037	12.37	0.29	16.45	—	"
									/

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft

Sample Collection Information

Sample Number	Sample Time	Analytes	Sample Containers	Preservatives	Duplicate (Y/N)
IP-5	1515		5 VOAs 2 ambers	HCl	N

Total Number of Sample Containers Collected: 7

Collection Method: Bailer / (Peristaltic) / Submersible / Other:

Purge Water Disposal Method: Drum

Additional Comments:

Groundwater Monitoring Well Sample Form

Project Name: Boeing Field Chevron

Project Number: 01-0410-R Task 4

Address: 10805 East Marginal Way, Tukwila, WA

Date: 4/24/2023

Sampler: Hannah Spear

Well Identification	Time Opened	Time Measured	Total Depth (feet)	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Sheen Y/N	Observations/Notes
Lower Saturated Zone								
(7) AS-1	756	0831	16'	N/A	9.29	N/A		
(10) IP-4	0802	~~0837~~ 0840	14'	N/A	~~12.91~~ 9.01	N/A		
(8) SVE-1	758	0834		N/A	DRY	N/A		/
(2) TW-1	736	0814	10.18	N/A	8.34	N/A		
(1) TW-2	732	0808	10.2	N/A	8.26	N/A		
(3) TW-3	742	0818	10.17	N/A	8.01	N/A		
(5) TW-4	751	0825	15'	N/A	8.67	N/A		
(4) TW-5	746	0822	12'	N/A	8.85	N/A		
Upper Saturated Zone								
(9) IP-3	0800	0837	24'	N/A	12.91	N/A		
(6) IP-5	754	0828	24'	N/A	13.52	N/A		
(11) IP-7	0804	0850	23'	12.32	~~12.91~~ 14.55	2.23		

Comments: Total depths taken from previous phase of work

4/24/23 BFC Cont 01-0410-R

Sampling IP-5

1523 Done sampling IP-5, packing up equipment

1534 Close and label drum

1542 Closing all wells

1550 All traffic management down, sample management/COC before leaving

1555 Hannah offsite to Issaquah office

Scale: 1 square =_____

4/25/23 BFC 01-0410-R

0700 Hannah onsite, waiting for cars to leave gas pump so traffic management can be set up

0718 Traffic management set-up, setting up decon station and unpacking equipment

0732 Moving to AS-1 for sampling, setting up equipment

0733 First, opening all relevant wells

0751 Begin purging AS-1

0824 AS-1 parameters stable, sampling AS-1

0853 Done sampling AS-1, moving to next well, skipping SVE-1 because it is dry, next well is IP-3

0909 Begin purging IP-3

0940 IP-3 parameters stabilized, sampling IP-3

1000 Done sampling IP-3, packing up and moving to IP-4

1013 Begin purging IP-4

1040 IP-4 parameters stable, sampling IP-4

1100 Done sampling IP-4, moving to final well, IP-7

Scale: 1 square =_____

4/25/23 BFC Cont. 401-0410-R

1109 Bailing IP-7 free product before setting up for sampling

1128 Done bailing IP-7, setting up for sampling

1135 Begin purging IP-7

1205 IP-7 parameters stable, sampling IP-7

1222 Done sampling IP-7, starting to pack up

1247 Drum and wells closed

1257 Van packed up besides traffic management, breaking that down next

1310 Hannah offsite

AH

Scale: 1 square = _____

Scale: 1 square = _____

(7)

ATLAS GEOSCIENCES NW

Groundwater Sampling Information

Well ID : AS-1	**Project Number: 01-0410-R**	**Sampling Date:** 4/25/23
Total Depth (ft): **16**	Water Volume in Casing (gal): 1.11	Sampler: **HVS**
Well Screen Interval (ft):	Purge Method: Low-Flow	Equipment: **YSI, peri-pump, interface probe**
Well Diameter (in):	End Depth to Water (ft):	
Tubing Intake Depth: 15.75	Calculated Purge Volume (gal): 3.33	Well Conditions: missing 2 of 2 bolts
Starting Depth to Water (ft): 9.17	Total Volume Purged (gal): ~0.75	

Groundwater Parameter Monitoring

Time	TEMP	pH	ORP	COND	TURB	DO	DTW	Volume	Notes
	°C	SU	mV	mS/cm	NTU	mg/L	feet	gallons	(Appearance, Odors, Etc.)
	± 3%	± 0.1	± 10	± 3%	± 10%	± 10%	<0.33	---	---
0753	12.5	9.74	-4.4	9.339	509.18	4.58	10.01	—	dark brown, petro odor
0755	12.6	9.63	-7.1	9.505	439.61	2.36	10.10	—	"
0757	12.5	9.63	-10.9	9.482	478.79	2.02	10.15	—	"
0759	12.4	9.62	-15.7	9.471	434.31	1.64	10.21	—	very dark brown, petro odor
0801	12.4	9.61	-20.3	9.325	312.14	1.09	10.24	0.15	"
0803	12.4	9.52	-25.0	8.301	253.96	0.93	10.29	—	"
0805	12.3	9.26	-30.6	6.128	235.91	0.85	10.33	—	"
0807	12.3	8.83	-38.6	4.731	226.37	0.80	10.36	—	cleaning up slightly
0809	12.2	8.33	-53.1	3.961	158.59	0.78	10.38	0.25	"
0811	12.2	7.69	-64.9	3.535	110.42	0.79	10.41	—	"
0813	12.2	7.31	-66.7	3.322	70.08	0.77	10.45	—	"
0815	12.2	7.14	-65.9	3.268	63.52	0.76	10.44	—	"
0817	12.2	7.06	-66.4	3.247	49.22	0.73	10.44	0.4	reddish-brown, petro odor
0819	12.2	7.02	-68.0	3.258	43.65	0.71	10.44	—	"
0821	12.2	7.01	-70.2	3.286	37.36	0.68	10.44	0.5	"
0823	12.2	7.01	-73.3	3.343	37.90	0.68	10.43	—	"

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft

Sample Collection Information

Sample Number	Sample Time	Analytes	Sample Containers	Preservatives	Duplicate (Y/N)
AS-1	0835		5 VOAs 2 ambers	HCl	N

Total Number of Sample Containers Collected: 7

Collection Method: Bailer / (Peristaltic) / Submersible / Other:

Purge Water Disposal Method: Drum

Additional Comments: Slight rainbow sheen on bubbles in bucket

(9)

ATLAS GEOSCIENCES NW

Groundwater Sampling Information

Well ID : IP-3	**Project Number: 01-0410-R**	**Sampling Date:** 4/25/23
Total Depth (ft): **24**	Water Volume in Casing (gal): 1.75	Sampler: **HVS**
Well Screen Interval (ft):	Purge Method: Low Flow	Equipment: **YSI, peri-pump, interface probe**
Well Diameter (in):	End Depth to Water (ft):	
Tubing Intake Depth: 23.75	Calculated Purge Volume (gal): 5.24	Well Conditions: Missing seal ; 2 of 2 bolts
Starting Depth to Water (ft): 13.29	Total Volume Purged (gal): ~0.75	

Groundwater Parameter Monitoring

Time	TEMP	pH	ORP	COND	TURB	DO	DTW	Volume	Notes
	°C	SU	mV	mS/cm	NTU	mg/L	feet	gallons	(Appearance, Odors, Etc.)
	± 3%	± 0.1	± 10	± 3%	± 10%	± 10%	<0.33	---	---
0913	13.4	7.74	-20.9	3.660	82.71	1.14	13.31	—	clear, petro odor
0915	13.0	7.71	-23.8	3.647	34.17	0.95	13.32	—	"
0917	13.3	7.71	-30.2	3.636	23.21	0.74	13.32	—	"
0919	13.3	7.71	-40.6	3.641	13.98	0.62	13.33	0.1	"
0921	13.4	7.72	-52.4	3.641	10.58	0.55	13.32	—	"
0923	13.4	7.73	-65.8	3.633	8.95	0.50	13.33	—	"
0925	13.5	7.74	-76.8	3.625	8.67	0.46	13.33	0.2	"
0927	13.5	7.75	-88.0	3.605	8.59	0.44	13.33	—	"
0929	13.5	7.75	-97.9	3.597	9.44	0.42	13.32	—	"
0931	13.5	7.75	-106.6	3.579	8.50	0.40	13.33	0.3	"
0933	13.5	7.76	-114.6	3.562	8.39	0.38	13.33	—	"
0935	13.6	7.75	-124.6	3.543	8.36	0.37	13.33	—	"
0937	13.6	7.75	-127.8	3.537	8.53	0.36	13.33	0.5	"
0939	13.6	7.75	-133.5	3.526	8.37	0.35	13.33	—	"

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft

Sample Collection Information

Sample Number	Sample Time	Analytes	Sample Containers	Preservatives	Duplicate (Y/N)
IP-3	0950		5 VOAs 2 Ambers	HCl	N

Total Number of Sample Containers Collected: 7

Collection Method: Bailer / (Peristaltic) / Submersible / Other:

Purge Water Disposal Method: Drum

Additional Comments:

(10)

ATLAS GEOSCIENCES NW

Groundwater Sampling Information

Well ID : IP-4	**Project Number: 01-0410-R**	**Sampling Date:** 4/25/23
Total Depth (ft): **14**	Water Volume in Casing (gal): 0.82	Sampler: **HVS**
Well Screen Interval (ft):	Purge Method: Low-Flow	Equipment: **YSI, peri-pump, interface probe**
Well Diameter (in):	End Depth to Water (ft):	
Tubing Intake Depth: 13.75	Calculated Purge Volume (gal): 2.45	Well Conditions: Missing seal, 2 of 2 bolts
Starting Depth to Water (ft): 8.99	Total Volume Purged (gal): ~ 0.5	plug is ill-fitting

Groundwater Parameter Monitoring

Time	TEMP	pH	ORP	COND	TURB	DO	DTW	Volume	Notes
	°C	SU	mV	mS/cm	NTU	mg/L	feet	gallons	(Appearance, Odors, Etc.)
	± 3%	± 0.1	± 10	± 3%	± 10%	± 10%	<0.33	---	---
1016	12.4	7.30	-67.3	1.673	105.23	3.29	9.18	—	clear, petro-odor
1018	12.4	6.93	-47.8	1.645	74.87	1.72	9.20	—	"
1020	12.3	6.75	-38.6	1.583	58.39	1.20	9.23	—	"
1022	12.3	6.68	-35.7	1.554	40.93	0.93	9.25	0.1	"
1024	12.4	6.65	-34.7	1.556	38.30	0.79	9.26	—	"
1026	12.4	6.65	-35.6	1.562	37.16	0.70	9.20	—	"
1028	12.4	6.64	-37.2	1.572	32.07	0.63	9.22	—	"
1030	12.4	6.67	-39.4	1.675	20.65	0.59	9.24	0.2	clear, petro odor
1032	12.4	6.69	-41.5	1.701	26.18	0.54	9.26	—	"
1034	12.5	6.71	-44.9	1.720	33.90	0.50	9.28	—	"
1036	12.5	6.73	-49.0	1.762	31.67	0.47	9.29	0.3	"
1038	12.5	6.75	-52.8	1.785	29.54	0.45	9.29	—	"
1040	12.5	6.77	-56.1	1.838	27.73	0.43	9.30	—	"

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft

Sample Collection Information

Sample Number	Sample Time	Analytes	Sample Containers	Preservatives	Duplicate (Y/N)
IP-4	1050		5 VOAs 2 Ambers	HCl	N

Total Number of Sample Containers Collected:

Collection Method: Bailer / Peristaltic / Submersible / Other:

Purge Water Disposal Method: Drum

Additional Comments: Sheen in water in bucket

(11)

ATLAS GEOSCIENCES NW

Groundwater Sampling Information

Well ID : IP-7	**Project Number: 01-0410-R**	**Sampling Date:** 4/25/23
Total Depth (ft): **23**	Water Volume in Casing (gal): 1.45	Sampler: **HVS**
Well Screen Interval (ft):	Purge Method: Low-Flow	Equipment: **YSI, peri-pump, interface probe**
Well Diameter (in):	End Depth to Water (ft): 14.35	
Tubing Intake Depth: 22.75	Calculated Purge Volume (gal): 4.33	Well Conditions: Missing 3 of 3 bolts but casing has no holes, no seal
Starting Depth to Water (ft): 14.14	Total Volume Purged (gal): ~ 0.8	

Groundwater Parameter Monitoring

Time	TEMP	pH	ORP	COND	TURB	DO	DTW	Volume	Notes
	°C	SU	mV	mS/cm	NTU	mg/L	feet	gallons	(Appearance, Odors, Etc.)
	± 3%	± 0.1	± 10	± 3%	± 10%	± 10%	<0.33	---	---
1138	13.9	6.68	-9.4	0.723	27.91	2.14	14.15	—	clear, petro odor, sheen
1140	13.8	6.45	4.4	0.707	16.75	1.21	14.16	—	"
1142	13.8	6.39	7.6	0.698	11.42	0.87	14.18	—	"
1144	13.8	6.37	6.9	0.685	8.74	0.71	14.20	—	"
1146	13.8	6.36	5.4	0.684	6.90	0.63	14.20	—	"
1148	13.9	6.34	3.2	0.	—	—	—	—	peri pump disconnected
1150	—	—	—	—	—	—	—	—	peri pump stopped/disconnected
1152	13.4	6.35	-1.9	0.678	5.91	0.75	14.25	—	clear petro odor, sheen
1154	13.3	6.34	-3.4	0.678	6.73	0.65	14.26	0.3	"
1156	13.3	6.33	-5.1	0.678	5.98	0.57	14.27	—	"
1158	13.3	6.33	-7.5	0.678	5.07	0.53	14.30	—	"
1200	13.3	6.32	-10.3	0.678	5.38	0.49	1431	0.4	"
1202	13.3	6.32	-13.3	0.678	5.21	0.47	14.31	—	"
1204	13 3	6.32	-15.5	0.679	5 41	0.45	14.35	—	"

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft

Sample Collection Information

Sample Number	Sample Time	Analytes	Sample Containers	Preservatives	Duplicate (Y/N)
IP-7	1215		5 VOAs 2 Ambers	HCl	N

Total Number of Sample Containers Collected: 7

Collection Method: Bailer / Peristaltic / Submersible / Other:

Purge Water Disposal Method:

Additional Comments:
Bailed free product before purging

July 2023

A 7/19/23 Boeing Field Chevron 01-0410-R 31
0645 Hannah onsite
0654 Done checking in with store staff and setting up traffic management
0657 Begin setting up decon station # set up new drum
0710 Begin opening wells in specified order
0732 All wells open, going to begin gauging water levels w/ interface probe
0743 Troubleshooting interface probe
0752 Tried new battery, did not solve, probe is not sounding in any water, call to Mike, will call Pine when they open at 8 AM to rent interface probe, will go pick up if they cannot deliver ASAP
0757 Securing well lids
0805 Hannah offsite to Pine
0816 Hannah back on site with interface probe from Pine
0820 Reopen ; gauge wells
0855 Well gauging complete, decon between each well, product only in IP-7, SVE-1 dry
0856 Preparing for sampling

Scale: 1 square = _____

Rite in the Rain

7/19/23 Boeing Field Chevron 01-0410-K

0911 Begin purging TW-2

0920 TW-2 ran dry

0930 Call to Mike about dry well, says once well runs dry, wait for it to recover, then sample

0942 Only able to fill ~ 1/3 of amber, going to move to next well & return later

0949 Begin purging TW-1

1011 Done purging TW-1, prepping to sample, taking Duplicate

1038 Done sampling TW-1, packing up to go back to TW-2

1103 Able to get 3 VOAs and 1 amber from TW-2, will try one more time, moving to TW-3

1113 Begin purging TW-3

1125 TW-3 ran dry, waiting for it to recover before sampling

1146 Done Sampling TW-2, able to get 1.5 ambers + 5 VOAs

1152 Setting up at TW-5

1159 Begin purging TW-5

1235 ORP & turbidity not quite stabilized yet, but 3 well volumes

Scale: 1 square = _____

7/19/23 Boeing Field Chevron 01-0410

purged, so going to sample

1253 TW-5 sampled, moving to TW-3 to sample

1308 Not able to get any water from TW-3 after waiting 1.5 for it to recover

1316 Contact Mike about well

1331 Begin purging TW-4

1355 TW-4 parameters stable, to sample

1418 Begin purging IP-5

1450 Sampling IP-5

1507 Done sampling IP-5, pack up

1524 Drum closed, wells closed, equipment packed, now taking down traffic management

1540 Hannah offsite to Issaquah office

Scale: 1 square = _____

(1)

ATLAS GEOSCIENCES NW

Groundwater Sampling Information

Well ID : TW-2	**Project Number: 01-0410-R**	**Sampling Date:** 7/19/23
Total Depth (ft): **10.2**	Water Volume in Casing (gal): 0.11	Sampler: **HVS**
Well Screen Interval (ft):	Purge Method: Low Flow	Equipment: **YSI, Peri-Pump, interface probe**
Well Diameter (in): 2"	End Depth to Water (ft): DRY	
Tubing Intake Depth: 10	Calculated Purge Volume (gal):	Well Conditions:
Starting Depth to Water (ft): 9.54	Total Volume Purged (gal): 0.2	

Groundwater Parameter Monitoring

Time	TEMP	pH	ORP	COND	TURB	DO	DTW	Volume	Notes
	°C	SU	mV	mS/cm	NTU	mg/L	feet	gallons	(Appearance, Odors, Etc.)
	± 3%	± 0.1	± 10	± 3%	± 10%	± 10%	<0.33	---	---
0913	~~9~~19.6	6.98	509.9	1.439	28.39	2.30	9.90	—	
0915	19.7	6.95	506.8	1.428	18.42	2.11	9.95	—	
0917	20.0	6.92	502.0	1.430	15.77	1.82	10.10	—	clear
0919	20.2	6.90	497.3	1.428	19.63	1.72	DRY	0.2	clear, well ran dry

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft

Sample Collection Information

Sample Number	Sample Time	Analytes	Sample Containers	Preservatives	Duplicate (Y/N)
TW-2	1045		5 VOAs 2 Ambers 1-5	HCl	

Total Number of Sample Containers Collected: 7

Collection Method: Bailer / Peristaltic / Submersible / Other:

Purge Water Disposal Method: DRUM

Additional Comments:

Pump on lowest setting to still pump water
Ran dry, wait for well to recover, then sample.

(2)

ATLAS GEOSCIENCES NW

Groundwater Sampling Information

Well ID : TW-1	**Project Number: 01-0410-R**	**Sampling Date:** 7/19/23
Total Depth (ft): **10.18**	Water Volume in Casing (gal): 0.09	Sampler: **HVS**
Well Screen Interval (ft):	Purge Method: Low Flow	Equipment: **YSI, Peri-Pump, interface probe**
Well Diameter (in):	End Depth to Water (ft):	
Tubing Intake Depth: 10	Calculated Purge Volume (gal):	Well Conditions:
Starting Depth to Water (ft): 9.61	Total Volume Purged (gal):	

Groundwater Parameter Monitoring

Time	TEMP	pH	ORP	COND	TURB	DO	DTW	Volume	Notes
	°C	SU	mV	mS/cm	NTU	mg/L	feet	gallons	(Appearance, Odors, Etc.)
	± 3%	± 0.1	± 10	± 3%	± 10%	± 10%	<0.33	---	---
0951	19.0	8.93	436.6	1.508	513.69	2.00	9.65	—	brown cloudy
0953	18.7	8.39	445.9	1.501	345.40	1.50	9.82	—	"
0955	18.9	8.06	452.7	1.512	141.86	1.20	9.84	—	clearing up
0957	18.8	7.99	456.1	1.533	70.50	1.04	9.84	0.2	"
0959	18.7	7.96	457.8	1.549	26.17	0.95	9.84	—	clear, no odor
1001	18.7	7.99	457.0	1.561	5.91	0.90	9.84	—	"
1003	18.5	8.00	457.3	1.559	1.48	0.87	9.84	0.3	"
1005	18.5	8.04	455.9	1.570	0.69	0.80	9.84	—	clear, no odor
1007	18.5	8.08	454.0	1.577	0.77	0.74	9.84	—	"
1009	18.5	8.09	452.3	1.584	0.53	0.71	9.84	—	"
1011	18.5	8.13	450.16	1.593	0.29	0.69	9.84	0.5	clear, no odor

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft

Sample Collection Information

Sample Number	Sample Time	Analytes	Sample Containers	Preservatives	Duplicate (Y/N)
TW-1	1015		5 VOAs 2 Ambers	HCl	Y
Dup-1	0800		5 VOAs 2 Ambers	HCl	

Total Number of Sample Containers Collected: 14

Collection Method: Bailer / (Peristaltic) / Submersible / Other:

Purge Water Disposal Method: DRUM

Additional Comments: Pump on lowest setting to still get water

(3)

ATLAS GEOSCIENCES NW

Groundwater Sampling Information

Well ID : TW-3	**Project Number: 01-0410-R**	**Sampling Date:** 7/19/23
Total Depth (ft): **10.17**	Water Volume in Casing (gal): 0.17	Sampler: **HVS**
Well Screen Interval (ft):	Purge Method: Low-Flow	Equipment: **YSI, Peri-Pump, interface probe**
Well Diameter (in):	End Depth to Water (ft): DRY	
Tubing Intake Depth: 10	Calculated Purge Volume (gal):	Well Conditions:
Starting Depth to Water (ft): 9.15	Total Volume Purged (gal):	

Groundwater Parameter Monitoring

Time	TEMP	pH	ORP	COND	TURB	DO	DTW	Volume	Notes
	°C	SU	mV	mS/cm	NTU	mg/L	feet	gallons	(Appearance, Odors, Etc.)
	± 3%	± 0.1	± 10	± 3%	± 10%	± 10%	<0.33	---	---
1115	20.8	7.82	532.5	1.331	12.52	1.83	9.59	—	clear
1117	20.0	7.08	500.0	1.308	0.76	1.11	9.74	—	"
1119	20.2	6.84	441.5	1.310	0.50	0.84	9.89	0.1	"
1121	20.5	6.77	381.6	1.315	0.52	0.72	10.05	—	clear, no odor
1123	20.7	6.75	325.5	1.318	0.55	0.59	10.16	—	"
—	—	—	—	—	—	—	—	—	DRY

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft

Sample Collection Information

Sample Number	Sample Time	Analytes	Sample Containers	Preservatives	Duplicate (Y/N)
TW-3					
			Total Number of Sample Containers Collected:		

Collection Method: Bailer / (Peristaltic) / Submersible / Other:

Purge Water Disposal Method: DRUM

Additional Comments: Pump on lowest setting to still get water, well ran dry, waiting for recharge to sample
No recharge after 1.5 hrs, insufficient water to sample

(4)

ATLAS GEOSCIENCES NW

Groundwater Sampling Information

Well ID : TW-5	**Project Number: 01-0410-R**	**Sampling Date:** 7/19/23
Total Depth (ft): **12**	Water Volume in Casing (gal): 0.33	Sampler: **HVS**
Well Screen Interval (ft):	Purge Method: LOW FLOW	Equipment: **YSI, Peri-Pump, interface probe**
Well Diameter (in):	End Depth to Water (ft): 10.45	
Tubing Intake Depth: 11.75	Calculated Purge Volume (gal): 1.01 (3 well volumes)	Well Conditions:
Starting Depth to Water (ft): ~~10.93~~ 9.93	Total Volume Purged (gal): 1.25	

Groundwater Parameter Monitoring

Time	TEMP	pH	ORP	COND	TURB	DO	DTW	Volume	Notes
	°C	SU	mV	mS/cm	NTU	mg/L	feet	gallons	(Appearance, Odors, Etc.)
	± 3%	± 0.1	± 10	± 3%	± 10%	± 10%	<0.33	---	---
1204	17.7	9.33	400.3	7.818	85.94	1.43	10.23	—	slightly brown cloudy,
1206	17.3	9.12	429.4	7.520	47.74	0.70	10.27	—	slight odor, sheen
1208	17.1	9.03	380.8	7.058	26.28	0.51	10.33	—	"
1210	17.3	9.01	325.5	6.409	19.55	0.43	10.36	0.2	"
1212	17.2	8.99	272.1	5.436	13.71	0.38	10.39	—	clearing up
1214	17.2	8.93	204.8	4.673	9.74	0.35	10.40	—	"
1216	17.1	8.88	109.1	4.343	6.92	0.34	10.42	0.5	clear
1218	17.1	8.84	-18.8	4.133	5.32	0.32	10.43	—	"
1220	17.0	8.82	-64.8	4.049	4.08	0.31	10.43	—	"
1222	17.0	8.80	-122.1	3.992	2.78	0.30	10.44	0.7	"
1224	17.0	8.81	-169.6	3.962	2.63	0.29	10.45	—	clear
1226	16.8	8.82	-196.9	3.960	1.75	0.28	10.45	—	"
1228	16.7	8.84	-215.0	3.955	0.86	0.27	10.45	0.9	"
1230	16.8	8.84	-229.2	3.962	0.41	0.27	10.45	—	"
1232	16.8	8.85	-238.6	3.961	0.23	0.26	10.45	—	clear
1234	16.8	8.87	-246.3	3.958	0.14	0.26	10.45	1.1	"

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft

Sample Collection Information

Sample Number	Sample Time	Analytes	Sample Containers	Preservatives	Duplicate (Y/N)
TW-5	1240		5 VOAs, 2 Ambers	HCl	

Total Number of Sample Containers Collected: 7

Collection Method: Bailer / (Peristaltic) / Submersible / Other:

Purge Water Disposal Method: DRUM

Additional Comments:

Pump on lowest setting to still get water.

3 well volumes purged before sampling

(5)

ATLAS GEOSCIENCES NW

Groundwater Sampling Information

Well ID : TW-4	**Project Number: 01-0410-R**	**Sampling Date:** 7/19/23
Total Depth (ft): **15**	Water Volume in Casing (gal): 0.80	Sampler: **HVS**
Well Screen Interval (ft):	Purge Method: Low-Flow	Equipment: **YSI, Peri-Pump, interface probe**
Well Diameter (in):	End Depth to Water (ft): 11.51	
Tubing Intake Depth: 14.75	Calculated Purge Volume (gal): 4ish	Well Conditions:
Starting Depth to Water (ft): 10.09	Total Volume Purged (gal):	

Groundwater Parameter Monitoring

Time	TEMP	pH	ORP	COND	TURB	DO	DTW	Volume	Notes
	°C	SU	mV	mS/cm	NTU	mg/L	feet	gallons	(Appearance, Odors, Etc.)
	± 3%	± 0.1	± 10	± 3%	± 10%	± 10%	<0.33	---	---
1333	19.0	10.162	188.7	2.934	785.18	1.86	10.68	—	brown cloudy
1335	18.7	9.83	198.8	2.096	412.41	1.17	10.73	—	"
1337	19.5	9.27	210.7	1.909	190.79	0.89	10.84	—	"
1339	19.8	8.72	226.1	1.812	60.78	0.74	10.95	0.2	clearing up
1341	19.8	8.15	243.5	1.768	31.50	0.67	11.03	—	clear, no odor
1343	19.6	7.83	258.0	1.713	14.21	0.62	11.10	—	"
1345	19.3	7.66	270.1	1.686	4.57	0.56	11.18	—	"
1347	19.5	7.59	278.8	1.681	1.77	0.52	11.25	—	"
1349	19.5	7.56	285.0	1.660	1.57	0.50	11.34	0.45	clear, no odor
1351	19.6	7.53	291.1	1.653	0.76	0.48	11.40	—	"
1353	19.6	7.52	294.0	1.646	0.77	0.47	11.45	0.6	"
1355	19.6	7.50	299.2	1.640	0.78	0.47	11.51	—	"

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft

Sample Collection Information

Sample Number	Sample Time	Analytes	Sample Containers	Preservatives	Duplicate (Y/N)
TW-4	1405		5 Ambers 2 VOAs	HCl	

Total Number of Sample Containers Collected: 7

Collection Method: Bailer / Peristaltic / Submersible / Other:

Purge Water Disposal Method: DRUM

Additional Comments: Pump on lowest setting to still get water

(6)

ATLAS GEOSCIENCES NW

Groundwater Sampling Information

Well ID : IP-5	**Project Number: 01-0410-R**	**Sampling Date:** 7/19/23
Total Depth (ft): **24**	Water Volume in Casing (gal): 1.06	Sampler: **HVS**
Well Screen Interval (ft):	Purge Method: Low Flow	Equipment: **YSI, Peri-Pump, interface probe**
Well Diameter (in):	End Depth to Water (ft): 17.49	
Tubing Intake Depth: 23.75	Calculated Purge Volume (gal): 3.18	Well Conditions:
Starting Depth to Water (ft): 17.50	Total Volume Purged (gal): 1.5	

Groundwater Parameter Monitoring

Time	TEMP	pH	ORP	COND	TURB	DO	DTW	Volume	Notes
	° C	SU	mV	mS/cm	NTU	mg/L	feet	gallons	(Appearance, Odors, Etc.)
	± 3%	± 0.1	± 10	± 3%	± 10%	± 10%	<0.33	---	---
1420	17.7	8.27	685.8	3.340	351.92	1.46	17.55	—	dark brown cloudy, petro odor
1422	17.4	7.93	733.5	3.315	286.93	0.91	17.55	—	"
1424	17.7	7.77	735.0	3.330	150.78	0.63	17.55	0.2	"
1426	17.3	7.73	706.2	3.294	66.01	0.52	17.54	—	cleaning up, petro odor
1428	17.0	7.71	656.4	3.266	31.59	0.46	17.54	—	"
1430	16.9	7.70	561.4	3.260	23.00	0.42	17.53	0.5	"
1432	16.8	7.70	474.1	3.248	55.19	0.39	17.53	—	"
1434	16.7	7.69	411.2	3.202	44.04	0.37	17.52	—	"
1436	16.9	7.67	388.9	3.152	43.97	0.35	17.52	0.8	slightly cloudy
1438	16.9	7.66	360.9	3.066	79.65	0.34	17.52	—	"
1440	16.8	7.66	316.6	3.027	235.15	0.33	17.50	—	"
1442	16.8	7.65	281.3	3.006	297.22	0.32	17.50	1	"
1444	16.9	7.64	265.4	2.995	221.71	0.31	17.49	—	cloudy
1446	16.8	7.63	262.5	2.988	364.66	0.30	17.49	—	"
1448	16.8	7.62	268.9	2.975	240.66	0.30	17.49	1.25	slightly cloudy

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft

Sample Collection Information

Sample Number	Sample Time	Analytes	Sample Containers	Preservatives	Duplicate (Y/N)
IP-5	1500		5 VOAs 2 Ambers	HCl	

Total Number of Sample Containers Collected: 7

Collection Method: Bailer / (Peristaltic) / Submersible / Other:

Purge Water Disposal Method: DRUM

Additional Comments:

Groundwater Monitoring Well Sample Form

Project Name: Boeing Field Chevron

Project Number: 01-0410-R Task 4

Address: 10805 East Marginal Way, Tukwila, WA

Date: 7/19/2023

Sampler: Hannah Spear

Well Identification	Time Opened	Time Measured	Total Depth (feet)	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Sheen Y/N	Observations/Notes
Lower Saturated Zone								
(7) AS-1	0723	0839	16'	N/A	10.36	N/A		
(10) IP-4	0729	0845	14'	N/A	10.08	N/A		
(8) SVE-1	0726	0840		N/A	DRY	N/A		DRY WELL
(2) TW-1	0714	0825	10.18	N/A	9.61	N/A		
(1) TW-2	0712	0822	10.2	N/A	9.54	N/A		
(3) TW-3	0716	0828	10.17	N/A	9.15	N/A		
(5) TW-4	0720	0834	15'	N/A	10.09	N/A		
(4) TW-5	0718	0831	12'	N/A	~~10.93~~ 9.93	N/A		
Upper Saturated Zone								
(9) IP-3	0728	0843	24'	N/A	14.22	N/A		
(6) IP-5	0721	0836	24'	N/A	14.97	N/A		
(11) IP-7	0731	0849	23'	13.63	16.29	2.66		

Comments: Total depths taken from previous phase of work

7/20/23 Boeing Field Chevron (BFC) 01-0410-R

0642 Hannah onsite, trucks blocking wells, waiting for them to leave

0705 Traffic management and decon station set up, unpacking equipment, a truck is still blocking well AS-1

0713 Setting up at IP-3

0715 Driver of truck just returned, will start at AS-1 instead as planned

0718 Opened relevant wells

0729 Begin purging AS-1

0815 AS-1 parameters stabilized, prepping to sample

0838 Done sampling AS-1, setting up at IP-3

0845 Begin purging IP-3

0927 IP-3 parameters stable, prepping to sample

0945 Done sampling IP-3, moving to IP-4

0955 Begin purging IP-4

1015 IP-4 parameters stable, prepping to sample

1040 Setting up to bail IP-7 product before sampling

Scale: 1 square = _____

7/20/23 BFC 01-0410-R

1056 Done bailing IP-7, setting up purging/sampling equipment

1104 Begin purging IP-7

1135 IP-7 parameters stable, setting up to sample

1152 Done sampling IP-7, beginning to pack up for the day

1158 Wells closed

1223 Drum closed

1235 Hannah offsite to Pine to drop-off equipment, then to Issaquah office

Scale: 1 square = _____

(7)

ATLAS GEOSCIENCES NW

Groundwater Sampling Information

Well ID : AS-1	**Project Number: 01-0410-R**	**Sampling Date:** 7/20/23
Total Depth (ft): **16**	Water Volume in Casing (gal): 0.92	Sampler: **HVS**
Well Screen Interval (ft):	Purge Method: Low-Flow	Equipment: **YSI, Peri-Pump, interface probe**
Well Diameter (in): 2"	End Depth to Water (ft): 12.01	
Tubing Intake Depth: 15.75	Calculated Purge Volume (gal): 2.75	Well Conditions:
Starting Depth to Water (ft): 10.36	Total Volume Purged (gal): 1.75	

Groundwater Parameter Monitoring

Time	TEMP	pH	ORP	COND	TURB	DO	DTW	Volume	Notes
	°C	SU	mV	mS/cm	NTU	mg/L	feet	gallons	(Appearance, Odors, Etc.)
	± 3%	± 0.1	± 10	± 3%	± 10%	± 10%	<0.33	---	---
0731	16.6	8.85	540.6	4.123	249.30	2.37	11.02	—	greyish cloudy, odor
0733	16.7	8.67	508.4	4.036	347.79	1.65	11.15	—	"
0735	17.1	8.28	511.5	3.906	424.62	1.06	11.35	—	"
0737	17.4	8.15	6055	3.855	379.12	0.88	11.45	0.1	"
0739	17.6	8.01	561.4	3.673	293.51	0.77	11.54	—	"
0741	17.0	7.69	584.3	3.224	286.18	0.71	11.63	—	grey cloudy, clearing up odor
0743	17.1	7.47	602.2	2.787	358.21	0.64	11.71	—	"
0745	17.0	7.24	715.2	2.256	313.73	0.62	11.78	0.25	"
0747	16.6	7.18	690.8	1.893	283.66	0.59	11.84	—	"
0749	16.6	7.16	694.4	1.934	254.35	0.56	11.89	—	Slightly grey cloudy odor in tube
0751	16.6	7.15	626.4	1.997	238.76	0.54	11.92	0.5	"
0753	16.6	7.16	596.0	2.053	225.18	0.51	11.95	—	"
0755	16.6	7.16	689.1	2.101	194.13	0.50	11.96	—	"
0757	16.6	7.16	635.1	2.153	161.54	0.48	11.97	0.8	"
0759	16.6	7.18	596.7	2.235	152.86	0.47	11.99	—	"
0801	16.5	7.19	578.0	2.284	105.62	0.46	12.00	—	Slightly cloudy, odor
0803	16.5	7.19	562.1	2.353	103.62	0.45	12.00	1.0	

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft

Sample Collection Information

Sample Number	Sample Time	Analytes	Sample Containers	Preservatives	Duplicate (Y/N)
AS-1	0820		5 VOAs 2 Ambers	HCl	
			Total Number of Sample Containers Collected:		7

Collection Method: Bailer / (Peristaltic) / Submersible / Other:

Purge Water Disposal Method: DRUM

Additional Comments: Pump on lowest setting to still get water.

(7)

AS-1 continued

ATLAS GEOSCIENCES NW

Groundwater Sampling Information

Well ID : AS-1 CONT	**Project Number:** 01-0410-R	**Sampling Date:** 7/20/23
Total Depth (ft):	Water Volume in Casing (gal):	Sampler:
Well Screen Interval (ft):	Purge Method:	Equipment:
Well Diameter (in):	End Depth to Water (ft):	
Tubing Intake Depth:	Calculated Purge Volume (gal):	Well Conditions:
Starting Depth to Water (ft):	Total Volume Purged (gal):	

Groundwater Parameter Monitoring

Time	TEMP	pH	ORP	COND	TURB	DO	DTW	Volume	Notes
	°C	SU	mV	mS/cm	NTU	mg/L	feet	gallons	(Appearance, Odors, Etc.)
	± 3%	± 0.1	± 10	± 3%	± 10%	± 10%	<0.33	---	---
0805	16.4	7.20	548.9	2.403	83.04	0.44	12.00	—	Slightly grey cloudy
0807	16.4	7.21	538.9	2.463	71.45	0.45	12.01	1.25	"
0809	16.5	7.22	532.8	2.496	64.95	0.42	12.01	—	"
0810	16.5	7.22	528.9	2.510	61.74	0.42	12.01	—	"
0812	16.5	7.22	523.7	2.535	60.14	0.42	12.01	1.5	"
0815	16.5	7.23	520.9	2.554	55.71	0.41	12.01	—	"

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft

Sample Collection Information

Sample Number	Sample Time	Analytes	Sample Containers	Preservatives	Duplicate (Y/N)
				Total Number of Sample Containers Collected:	

Collection Method: Bailer / Peristaltic / Submersible / Other:

Purge Water Disposal Method:

Additional Comments:

(8)

DRY

ATLAS GEOSCIENCES NW

Groundwater Sampling Information

Well ID : SVE-1	**Project Number: 01-0410-R**	**Sampling Date:**
Total Depth (ft):	Water Volume in Casing (gal):	Sampler: **HVS**
Well Screen Interval (ft):	Purge Method:	Equipment: **YSI, Peri-Pump, interface probe**
Well Diameter (in):	End Depth to Water (ft):	
Tubing Intake Depth:	Calculated Purge Volume (gal):	Well Conditions:
Starting Depth to Water (ft):	Total Volume Purged (gal):	

Groundwater Parameter Monitoring

Time	TEMP	pH	ORP	COND	TURB	DO	DTW	Volume	Notes
	° C	SU	mV	mS/cm	NTU	mg/L	feet	gallons	(Appearance, Odors, Etc.)
	± 3%	± 0.1	± 10	± 3%	± 10%	± 10%	<0.33	---	---

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft

Sample Collection Information

Sample Number	Sample Time	Analytes	Sample Containers	Preservatives	Duplicate (Y/N)
				Total Number of Sample Containers Collected:	

Collection Method: Bailer / Peristaltic / Submersible / Other:

Purge Water Disposal Method: DRUM

Additional Comments:

(9)

ATLAS GEOSCIENCES NW

Groundwater Sampling Information

Well ID : IP-3	**Project Number:** 01-0410-R	**Sampling Date:** 7/20/23
Total Depth (ft): 24	Water Volume in Casing (gal): 1.62	Sampler: HVS
Well Screen Interval (ft):	Purge Method: Low-Flow	Equipment: YSI, peri pump, interface probe
Well Diameter (in): 2"	End Depth to Water (ft):	
Tubing Intake Depth: 23.75	Calculated Purge Volume (gal): 4.85	Well Conditions:
Starting Depth to Water (ft): 14.09	Total Volume Purged (gal): 1.75	

Groundwater Parameter Monitoring

Time	TEMP	pH	ORP	COND	TURB	DO	DTW	Volume	Notes
	°C	SU	mV	mS/cm	NTU	mg/L	feet	gallons	(Appearance, Odors, Etc.)
	± 3%	± 0.1	± 10	± 3%	± 10%	± 10%	<0.33	---	---
0848	16.1	7.56	453.9	~~452.8~~	51.91	4.40	14.12	—	clear, odor
0850	15.9	7.51	441.0	3.424	27.50	2.47	14.20	—	"
0852	15.7	7.48	430.6	3.411	13.47	1.73	14.21	—	"
0854	15.6	7.47	422.0	3.390	7.68	1.30	14.22	0.25	"
0856	15.5	7.46	413.2	3.375	4.73	1.08	14.23	—	"
0858	15.5	7.46	401.8	3.375	5.08	0.93	14.24	—	"
0900	15.5	7.45	391.4	3.376	7.82	0.86	14.25	—	"
0902	15.5	7.45	376.0	3.374	34.80	0.79	14.26	0.5	clear, petro odor
0904	15.4	7.45	361.7	3.368	33.57	0.74	14.27	—	"
0906	15.4	7.45	344.5	3.365	3580	0.70	14.28	—	"
0908	15.4	7.45	327.9	3.340	39.98	0.67	14.28	—	"
0910	15.4	7.45	300.9	3.356	45.33	0.63	14.29	0.75	clear, petro odor
0912	15.4	7.45	294.1	3.352	49.55	0.62	14.31	—	"
0914	15.4	7.45	283.6	3.347	84.75	0.61	14.31	—	"
0916	15.4	7.45	273.9	3.345	94.48	0.60	14.32	—	"
0918	15.4	7.45	265.0	3.344	101.68	0.59	14.32	1.0	"
0920	15.4	7.45	256.3	3.343	133.49	0.58	14.32	—	"

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft

Sample Collection Information

Sample Number	Sample Time	Analytes	Sample Containers	Preservatives	Duplicate (Y/N)
IP-3	0935		5 VOAs 3 Ambers	HCl	

Total Number of Sample Containers Collected: 7

Collection Method: Bailer / Peristaltic / Submersible / Other:

Water Disposal Method: Drum

Comments:
Pump on lowest setting to still get water.

(9)

~~IP-~~ IP-3

ATLAS GEOSCIENCES NW continued

Groundwater Sampling Information

Well ID : IP-3 cont	**Project Number:** 01-0410-R	**Sampling Date:** 7/20/23
Total Depth (ft):	Water Volume in Casing (gal):	Sampler:
Well Screen Interval (ft):	Purge Method:	Equipment:
Well Diameter (in):	End Depth to Water (ft):	
Tubing Intake Depth:	Calculated Purge Volume (gal):	Well Conditions:
Starting Depth to Water (ft):	Total Volume Purged (gal):	

Groundwater Parameter Monitoring

Time	TEMP	pH	ORP	COND	TURB	DO	DTW	Volume	Notes
	° C	SU	mV	mS/cm	NTU	mg/L	feet	gallons	(Appearance, Odors, Etc.)
	± 3%	± 0.1	± 10	± 3%	± 10%	± 10%	<0.33	---	---
0922	15.4	7.45	240.0	3.342	94.61	0.56	14.33	—	"
0924	15.4	7.45	240.1	3.342	118.82	0.56	14.33	—	
0926	15.4	7.44	237.2	3.342	121.39	0.55	14.34	—	"

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft

Sample Collection Information

Sample Number	Sample Time	Analytes	Sample Containers	Preservatives	Duplicate (Y/N)
			Total Number of Sample Containers Collected:		

Collection Method: Bailer / Peristaltic / Submersible / Other:

Purge Water Disposal Method:

Additional Comments:

(10)

ATLAS GEOSCIENCES NW

Groundwater Sampling Information

Well ID : IP-4	**Project Number: 01-0410-R**	**Sampling Date:** 7/20/23
Total Depth (ft): **14**	Water Volume in Casing (gal): 0.64	Sampler: **HVS**
Well Screen Interval (ft):	Purge Method: low-flow	Equipment: **YSI, Peri-Pump, interface probe**
Well Diameter (in):	End Depth to Water (ft):	
Tubing Intake Depth: 13.75	Calculated Purge Volume (gal): 1.92	Well Conditions:
Starting Depth to Water (ft): 10.08	Total Volume Purged (gal): 0.75	

Groundwater Parameter Monitoring

Time	TEMP	pH	ORP	COND	TURB	DO	DTW	Volume	Notes
	°C	SU	mV	mS/cm	NTU	mg/L	feet	gallons	(Appearance, Odors, Etc.)
	± 3%	± 0.1	± 10	± 3%	± 10%	± 10%	<0.33	---	---
0957	16.3	7.02	377.8	1.038	76.08	3.74	10.33	—	clear, odor
0959	16.0	6.82	380.5	1.001	23.04	2.32	10.35	—	"
1001	16.4	6.74	381.8	1.003	10.72	1.61	10.36	—	"
1003	16.5	6.71	380.2	1.005	12.07	1.25	10.38	0.2	"
1005	16.5	6.70	378.3	1.003	6.48	1.05	10.40	—	"
1007	16.5	6.70	375.7	1.000	5.32	0.91	10.40	—	clear, petro odor
1009	16.5	6.70	372.3	1.000	5.55	0.83	10.40	—	"
1011	16.6	6.70	369.2	1.000	3.70	0.76	10.40	0.4	"
1013	16.5	6.70	371.0	1.000	3.90	0.72	10.41	—	"
1015	16.4	6.70	368.4	1.000	2.94	0.70	10.42	—	slight sheen in bucket

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft

Sample Collection Information

Sample Number	Sample Time	Analytes	Sample Containers	Preservatives	Duplicate (Y/N)
IP-4	1025		5 VOAs + 2 Ambers	HCl	
			Total Number of Sample Containers Collected:		7

Collection Method: Bailer / (Peristaltic) / Submersible / Other:

Purge Water Disposal Method: DRUM

Additional Comments: Pump on lowest setting to still get water.

(11)

ATLAS GEOSCIENCES NW

Groundwater Sampling Information

Well ID : IP-7	**Project Number: 01-0410-R**	**Sampling Date:** 7/20/23
Total Depth (ft): **23**	Water Volume in Casing (gal): 1.03	Sampler: **HVS**
Well Screen Interval (ft):	Purge Method: Low-Flow	Equipment: **YSI, Peri-Pump, interface probe**
Well Diameter (in):	End Depth to Water (ft):	
Tubing Intake Depth: 22.75	Calculated Purge Volume (gal): 3.08	Well Conditions:
Starting Depth to Water (ft): 16.70	Total Volume Purged (gal): 1.2	

Groundwater Parameter Monitoring

Time	TEMP	pH	ORP	COND	TURB	DO	DTW	Volume	Notes
	°C	SU	mV	mS/cm	NTU	mg/L	feet	gallons	(Appearance, Odors, Etc.)
	± 3%	± 0.1	± 10	± 3%	± 10%	± 10%	<0.33	---	---
1112	21.3	6.75	390.0	0.651	83.95	4.40	15.91	—	clear, petro odor, sheen in bucket
1114	17.3	6.59	407.3	0.578	67.54	2.08	15.86	—	"
1116	17.3	6.57	407.6	0.578	67.11	1.60	15.88	—	"
1118	17.3	6.55	407.1	0.576	64.46	1.20	15.90	0.25	Clear, petro odor, sheen in bucket
1120	17.2	6.54	406.6	0.575	62.83	1.00	15.95	—	"
1122	17.3	6.54	405.7	0.575	66.44	0.86	15.99	—	"
1124	17.2	6.54	405.0	0.574	69.25	0.76	16.00	0.5	"
1126	17.2	6.53	404.5	0.574	69.28	0.69	15.99	—	"
1128	17.2	6.53	403.1	0.574	74.13	0.63	16.02	—	"
1130	17.2	6.53	402.0	0.574	84.06	0.59	16.05	0.75	"
1132	17.3	6.53	400.4	0.575	93.25	0.56	16.08	—	"
1134	17.3	6.52	398.6	0.574	86.24	0.54	16.09	—	"

Casing Volume in Gallons: 1" Diam = 0.041 gal/ft, 2" Diam = 0.163 gal/ft, 4" Diam = 0.653 gal/ft

Sample Collection Information

Sample Number	Sample Time	Analytes	Sample Containers	Preservatives	Duplicate (Y/N)
IP-7	1145		5 VOAs & Ambers	HCl	

Total Number of Sample Containers Collected: 7

Collection Method: Bailer / (Peristaltic) / Submersible / Other:

Purge Water Disposal Method: DRUM

Additional Comments:
Pump on lowest setting to still get water.

APPENDIX C

LABORATORY REPORTS

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

G-Logics
Tom Cammarata
40 Second Ave. SE
Issaquah, WA 98027

RE: Boeing Field Chevron
Work Order Number: 2208223

August 25, 2022

Attention Tom Cammarata:

Fremont Analytical, Inc. received 8 sample(s) on 8/16/2022 for the analyses presented in the following report.

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.
Gasoline by NWTPH-Gx
Total Organic Carbon by EPA Method 9060
Volatile Organic Compounds by EPA Method 8260D

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,

Brianna Barnes
Project Manager

Date: *08/31/2022*

CLIENT: G-Logics
Project: Boeing Field Chevron
Work Order: 2208223

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2208223-001	AS-1	08/15/2022 2:08 PM	08/16/2022 12:53 PM
2208223-002	IP-3	08/15/2022 4:17 PM	08/16/2022 12:53 PM
2208223-003	IP-4	08/15/2022 5:07 PM	08/16/2022 12:53 PM
2208223-004	IP-5	08/15/2022 3:31 PM	08/16/2022 12:53 PM
2208223-005	IP-7	08/16/2022 9:15 AM	08/16/2022 12:53 PM
2208223-006	TW-4	08/15/2022 2:44 PM	08/16/2022 12:53 PM
2208223-007	TW-5	08/15/2022 1:35 PM	08/16/2022 12:53 PM
2208223-008	DUP-01	08/15/2022 8:00 AM	08/16/2022 12:53 PM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

Case Narrative

WO#: **2208223**
Date: **8/25/2022**

CLIENT: G-Logics
Project: Boeing Field Chevron

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.

8/31/2022: Revision 1 includes correction to a sampling date.

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
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
DUP - Sample Duplicate
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MCL - Maximum Contaminant Level
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
REP - Sample Replicate
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Analytical Report

Work Order: **2208223**
Date Reported: **8/25/2022**

Client: G-Logics
Collection Date: 8/15/2022 2:08:00 PM
Project: Boeing Field Chevron
Lab ID: 2208223-001
Matrix: Water
Client Sample ID: AS-1

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.				Batch ID: 37453		Analyst: KJ
Diesel Range Organics	617	99.6		µg/L	1	8/18/2022 12:07:05 PM
Heavy Oil	478	99.6		µg/L	1	8/18/2022 12:07:05 PM
Surr: 2-Fluorobiphenyl	104	50 - 150		%Rec	1	8/18/2022 12:07:05 PM
Surr: o-Terphenyl	84.3	50 - 150		%Rec	1	8/18/2022 12:07:05 PM
Gasoline by NWTPH-Gx				Batch ID: 37495		Analyst: TN
Gasoline Range Organics	474	50.0		µg/L	1	8/20/2022 9:55:22 AM
Surr: Toluene-d8	100	65 - 135		%Rec	1	8/20/2022 9:55:22 AM
Surr: 4-Bromofluorobenzene	95.9	65 - 135		%Rec	1	8/20/2022 9:55:22 AM
Volatile Organic Compounds by EPA Method 8260D				Batch ID: 37495		Analyst: TN
Benzene	5.98	0.440		µg/L	1	8/20/2022 9:55:22 AM
Toluene	ND	0.750		µg/L	1	8/20/2022 9:55:22 AM
Ethylbenzene	31.8	0.400		µg/L	1	8/20/2022 9:55:22 AM
m,p-Xylene	26.0	1.00		µg/L	1	8/20/2022 9:55:22 AM
o-Xylene	0.675	0.500		µg/L	1	8/20/2022 9:55:22 AM
Surr: Dibromofluoromethane	100	80 - 120		%Rec	1	8/20/2022 9:55:22 AM
Surr: Toluene-d8	100	80 - 120		%Rec	1	8/20/2022 9:55:22 AM
Surr: 1-Bromo-4-fluorobenzene	98.0	80 - 120		%Rec	1	8/20/2022 9:55:22 AM

Analytical Report

Work Order: **2208223**
Date Reported: **8/25/2022**

Client: G-Logics
Collection Date: 8/15/2022 4:17:00 PM
Project: Boeing Field Chevron
Lab ID: 2208223-002
Matrix: Water
Client Sample ID: IP-3

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.				Batch ID: 37453		Analyst: KJ
Diesel Range Organics	277	100		µg/L	1	8/18/2022 12:18:06 PM
Heavy Oil	612	100		µg/L	1	8/18/2022 12:18:06 PM
Surr: 2-Fluorobiphenyl	99.1	50 - 150		%Rec	1	8/18/2022 12:18:06 PM
Surr: o-Terphenyl	99.4	50 - 150		%Rec	1	8/18/2022 12:18:06 PM
Gasoline by NWTPH-Gx				Batch ID: 37495		Analyst: TN
Gasoline Range Organics	4,450	1,000	D	µg/L	20	8/23/2022 2:00:19 PM
Surr: Toluene-d8	99.4	65 - 135	D	%Rec	20	8/23/2022 2:00:19 PM
Surr: 4-Bromofluorobenzene	90.1	65 - 135	D	%Rec	20	8/23/2022 2:00:19 PM
Volatile Organic Compounds by EPA Method 8260D				Batch ID: 37495		Analyst: TN
Benzene	1,080	8.80	DE	µg/L	20	8/23/2022 2:00:19 PM
Toluene	21.9	0.750		µg/L	1	8/20/2022 10:25:29 AM
Ethylbenzene	43.1	8.00	D	µg/L	20	8/23/2022 2:00:19 PM
m,p-Xylene	88.5	20.0	D	µg/L	20	8/23/2022 2:00:19 PM
o-Xylene	3.65	0.500		µg/L	1	8/20/2022 10:25:29 AM
Surr: Dibromofluoromethane	102	80 - 120		%Rec	1	8/20/2022 10:25:29 AM
Surr: Toluene-d8	106	80 - 120		%Rec	1	8/20/2022 10:25:29 AM
Surr: 1-Bromo-4-fluorobenzene	108	80 - 120		%Rec	1	8/20/2022 10:25:29 AM
Total Organic Carbon by EPA Method 9060				Batch ID: R77748		Analyst: ALT
Total Organic Carbon	8.43	0.500		mg/L	1	8/23/2022 12:18:00 PM

Analytical Report

Work Order: **2208223**
Date Reported: **8/25/2022**

Client: G-Logics
Collection Date: 8/15/2022 5:07:00 PM
Project: Boeing Field Chevron
Lab ID: 2208223-003
Matrix: Water
Client Sample ID: IP-4

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.				Batch ID: 37513		Analyst: KJ
Diesel Range Organics	9,500	1,110		µg/L	1	8/23/2022 1:41:40 PM
Heavy Oil	ND	1,110		µg/L	1	8/23/2022 1:41:40 PM
Surr: 2-Fluorobiphenyl	78.7	50 - 150		%Rec	1	8/23/2022 1:41:40 PM
Surr: o-Terphenyl	81.1	50 - 150		%Rec	1	8/23/2022 1:41:40 PM
Gasoline by NWTPH-Gx				Batch ID: 37495		Analyst: TN
Gasoline Range Organics	126,000	2,500	DE	µg/L	50	8/23/2022 3:00:32 PM
Surr: Toluene-d8	98.9	65 - 135	D	%Rec	50	8/23/2022 3:00:32 PM
Surr: 4-Bromofluorobenzene	106	65 - 135	D	%Rec	50	8/23/2022 3:00:32 PM
Volatile Organic Compounds by EPA Method 8260D				Batch ID: 37495		Analyst: TN
Benzene	54.6	22.0	D	µg/L	50	8/23/2022 3:00:32 PM
Toluene	2,140	37.5	DE	µg/L	50	8/23/2022 3:00:32 PM
Ethylbenzene	5,100	20.0	DE	µg/L	50	8/23/2022 3:00:32 PM
m,p-Xylene	10,600	50.0	DE	µg/L	50	8/23/2022 3:00:32 PM
o-Xylene	3,930	25.0	DE	µg/L	50	8/23/2022 3:00:32 PM
Surr: Dibromofluoromethane	101	80 - 120	D	%Rec	50	8/23/2022 3:00:32 PM
Surr: Toluene-d8	99.5	80 - 120	D	%Rec	50	8/23/2022 3:00:32 PM
Surr: 1-Bromo-4-fluorobenzene	113	80 - 120	D	%Rec	50	8/23/2022 3:00:32 PM

Analytical Report

Work Order: **2208223**
Date Reported: **8/25/2022**

Client: G-Logics **Collection Date:** 8/15/2022 3:31:00 PM
Project: Boeing Field Chevron
Lab ID: 2208223-004 **Matrix:** Water
Client Sample ID: IP-5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.				Batch ID: 37453		Analyst: KJ
Diesel Range Organics	625	95.7		µg/L	1	8/18/2022 12:40:08 PM
Heavy Oil	ND	95.7		µg/L	1	8/18/2022 12:40:08 PM
Surr: 2-Fluorobiphenyl	79.7	50 - 150		%Rec	1	8/18/2022 12:40:08 PM
Surr: o-Terphenyl	83.4	50 - 150		%Rec	1	8/18/2022 12:40:08 PM
Gasoline by NWTPH-Gx				Batch ID: 37495		Analyst: TN
Gasoline Range Organics	13,200	2,500	D	µg/L	50	8/23/2022 3:30:40 PM
Surr: Toluene-d8	99.6	65 - 135	D	%Rec	50	8/23/2022 3:30:40 PM
Surr: 4-Bromofluorobenzene	92.2	65 - 135	D	%Rec	50	8/23/2022 3:30:40 PM
Volatile Organic Compounds by EPA Method 8260D				Batch ID: 37495		Analyst: TN
Benzene	1,940	22.0	D	µg/L	50	8/23/2022 3:30:40 PM
Toluene	346	37.5	D	µg/L	50	8/23/2022 3:30:40 PM
Ethylbenzene	358	20.0	D	µg/L	50	8/23/2022 3:30:40 PM
m,p-Xylene	846	50.0	D	µg/L	50	8/23/2022 3:30:40 PM
o-Xylene	69.8	25.0	D	µg/L	50	8/23/2022 3:30:40 PM
Surr: Dibromofluoromethane	104	80 - 120	D	%Rec	50	8/23/2022 3:30:40 PM
Surr: Toluene-d8	98.1	80 - 120	D	%Rec	50	8/23/2022 3:30:40 PM
Surr: 1-Bromo-4-fluorobenzene	98.3	80 - 120	D	%Rec	50	8/23/2022 3:30:40 PM
Total Organic Carbon by EPA Method 9060				Batch ID: R77748		Analyst: ALT
Total Organic Carbon	7.94	0.500		mg/L	1	8/23/2022 1:07:00 PM

Analytical Report

Work Order: **2208223**
Date Reported: **8/25/2022**

Client: G-Logics
Collection Date: 8/16/2022 9:15:00 AM
Project: Boeing Field Chevron
Lab ID: 2208223-005
Matrix: Water
Client Sample ID: IP-7

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.				Batch ID: 37453		Analyst: KJ
Diesel Range Organics	49,300	939	D	µg/L	10	8/19/2022 8:55:52 AM
Heavy Oil	ND	93.9		µg/L	1	8/18/2022 12:51:19 PM
Surr: 2-Fluorobiphenyl	2,240	50 - 150	S	%Rec	1	8/18/2022 12:51:19 PM
Surr: o-Terphenyl	71.7	50 - 150		%Rec	1	8/18/2022 12:51:19 PM
NOTES:						
S - Outlying surrogate recovery attributed to TPH interference. O-terphenyl indicates normal recovery.						
Gasoline by NWTPH-Gx				Batch ID: 37495		Analyst: TN
Gasoline Range Organics	111,000	10,000	D	µg/L	200	8/23/2022 5:31:21 PM
Surr: Toluene-d8	99.0	65 - 135	D	%Rec	200	8/23/2022 5:31:21 PM
Surr: 4-Bromofluorobenzene	97.7	65 - 135	D	%Rec	200	8/23/2022 5:31:21 PM
Volatile Organic Compounds by EPA Method 8260D				Batch ID: 37495		Analyst: TN
Benzene	1,040	88.0	D	µg/L	200	8/23/2022 5:31:21 PM
Toluene	3,620	150	D	µg/L	200	8/23/2022 5:31:21 PM
Ethylbenzene	2,920	80.0	D	µg/L	200	8/23/2022 5:31:21 PM
m,p-Xylene	11,400	200	D	µg/L	200	8/23/2022 5:31:21 PM
o-Xylene	3,920	100	D	µg/L	200	8/23/2022 5:31:21 PM
Surr: Dibromofluoromethane	104	80 - 120	D	%Rec	200	8/23/2022 5:31:21 PM
Surr: Toluene-d8	100	80 - 120	D	%Rec	200	8/23/2022 5:31:21 PM
Surr: 1-Bromo-4-fluorobenzene	104	80 - 120	D	%Rec	200	8/23/2022 5:31:21 PM
Total Organic Carbon by EPA Method 9060				Batch ID: R77748		Analyst: ALT
Total Organic Carbon	20.7	0.500		mg/L	1	8/23/2022 1:58:00 PM

Analytical Report

Work Order: **2208223**
Date Reported: **8/25/2022**

Client: G-Logics
Collection Date: 8/15/2022 2:44:00 PM
Project: Boeing Field Chevron
Lab ID: 2208223-006
Matrix: Water
Client Sample ID: TW-4

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.				Batch ID: 37453		Analyst: KJ
Diesel Range Organics	561	94.7		µg/L	1	8/18/2022 1:02:21 PM
Heavy Oil	ND	94.7		µg/L	1	8/18/2022 1:02:21 PM
Surr: 2-Fluorobiphenyl	90.2	50 - 150		%Rec	1	8/18/2022 1:02:21 PM
Surr: o-Terphenyl	94.8	50 - 150		%Rec	1	8/18/2022 1:02:21 PM
Gasoline by NWTPH-Gx				Batch ID: 37495		Analyst: TN
Gasoline Range Organics	139	50.0		µg/L	1	8/24/2022 3:03:58 AM
Surr: Toluene-d8	99.1	65 - 135		%Rec	1	8/24/2022 3:03:58 AM
Surr: 4-Bromofluorobenzene	90.0	65 - 135		%Rec	1	8/24/2022 3:03:58 AM
Volatile Organic Compounds by EPA Method 8260D				Batch ID: 37495		Analyst: TN
Benzene	ND	0.440		µg/L	1	8/24/2022 3:03:58 AM
Toluene	4.25	0.750		µg/L	1	8/24/2022 3:03:58 AM
Ethylbenzene	0.811	0.400		µg/L	1	8/24/2022 3:03:58 AM
m,p-Xylene	3.23	1.00		µg/L	1	8/24/2022 3:03:58 AM
o-Xylene	1.65	0.500		µg/L	1	8/24/2022 3:03:58 AM
Surr: Dibromofluoromethane	105	80 - 120		%Rec	1	8/24/2022 3:03:58 AM
Surr: Toluene-d8	99.2	80 - 120		%Rec	1	8/24/2022 3:03:58 AM
Surr: 1-Bromo-4-fluorobenzene	95.3	80 - 120		%Rec	1	8/24/2022 3:03:58 AM

Analytical Report

Work Order: **2208223**
Date Reported: **8/25/2022**

Client: G-Logics
Collection Date: 8/15/2022 1:35:00 PM
Project: Boeing Field Chevron
Lab ID: 2208223-007
Matrix: Water
Client Sample ID: TW-5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.				Batch ID: 37453		Analyst: KJ
Diesel Range Organics	8,850	94.2		µg/L	1	8/18/2022 1:13:24 PM
Heavy Oil	ND	94.2		µg/L	1	8/18/2022 1:13:24 PM
Surr: 2-Fluorobiphenyl	228	50 - 150	S	%Rec	1	8/18/2022 1:13:24 PM
Surr: o-Terphenyl	96.3	50 - 150		%Rec	1	8/18/2022 1:13:24 PM
NOTES:						
S - Outlying surrogate recovery attributed to TPH interference. O-terphenyl indicates normal recovery.						
Gasoline by NWTPH-Gx				Batch ID: 37495		Analyst: TN
Gasoline Range Organics	214,000	5,000	DE	µg/L	100	8/23/2022 5:01:14 PM
Surr: Toluene-d8	95.2	65 - 135	D	%Rec	100	8/23/2022 5:01:14 PM
Surr: 4-Bromofluorobenzene	102	65 - 135	D	%Rec	100	8/23/2022 5:01:14 PM
Volatile Organic Compounds by EPA Method 8260D				Batch ID: 37495		Analyst: TN
Benzene	351	44.0	D	µg/L	100	8/23/2022 5:01:14 PM
Toluene	38,400	75.0	DE	µg/L	100	8/23/2022 5:01:14 PM
Ethylbenzene	6,000	40.0	DE	µg/L	100	8/23/2022 5:01:14 PM
m,p-Xylene	16,400	100	DE	µg/L	100	8/23/2022 5:01:14 PM
o-Xylene	7,400	50.0	DE	µg/L	100	8/23/2022 5:01:14 PM
Surr: Dibromofluoromethane	102	80 - 120	D	%Rec	100	8/23/2022 5:01:14 PM
Surr: Toluene-d8	101	80 - 120	D	%Rec	100	8/23/2022 5:01:14 PM
Surr: 1-Bromo-4-fluorobenzene	108	80 - 120	D	%Rec	100	8/23/2022 5:01:14 PM

Analytical Report

Work Order: **2208223**
Date Reported: **8/25/2022**

Client: G-Logics
Collection Date: 8/15/2022 8:00:00 AM
Project: Boeing Field Chevron
Lab ID: 2208223-008
Matrix: Water
Client Sample ID: DUP-01

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.				Batch ID: 37453		Analyst: KJ
Diesel Range Organics	306	92.4		µg/L	1	8/18/2022 1:24:30 PM
Heavy Oil	ND	92.4		µg/L	1	8/18/2022 1:24:30 PM
Surr: 2-Fluorobiphenyl	105	50 - 150		%Rec	1	8/18/2022 1:24:30 PM
Surr: o-Terphenyl	102	50 - 150		%Rec	1	8/18/2022 1:24:30 PM
Gasoline by NWTPH-Gx				Batch ID: 37495		Analyst: TN
Gasoline Range Organics	4,540	1,000	D	µg/L	20	8/23/2022 2:30:25 PM
Surr: Toluene-d8	100	65 - 135	D	%Rec	20	8/23/2022 2:30:25 PM
Surr: 4-Bromofluorobenzene	90.2	65 - 135	D	%Rec	20	8/23/2022 2:30:25 PM
Volatile Organic Compounds by EPA Method 8260D				Batch ID: 37495		Analyst: TN
Benzene	1,070	8.80	DE	µg/L	20	8/23/2022 2:30:25 PM
Toluene	20.9	15.0	D	µg/L	20	8/23/2022 2:30:25 PM
Ethylbenzene	43.3	8.00	D	µg/L	20	8/23/2022 2:30:25 PM
m,p-Xylene	88.4	20.0	D	µg/L	20	8/23/2022 2:30:25 PM
o-Xylene	17.9	0.500		µg/L	1	8/20/2022 1:56:18 PM
Surr: Dibromofluoromethane	91.6	80 - 120		%Rec	1	8/20/2022 1:56:18 PM
Surr: Toluene-d8	86.8	80 - 120		%Rec	1	8/20/2022 1:56:18 PM
Surr: 1-Bromo-4-fluorobenzene	97.5	80 - 120		%Rec	1	8/20/2022 1:56:18 PM
Total Organic Carbon by EPA Method 9060				Batch ID: R77748		Analyst: ALT
Total Organic Carbon	9.56	0.500		mg/L	1	8/23/2022 2:48:00 PM

Work Order: 2208223
CLIENT: G-Logics
Project: Boeing Field Chevron

QC SUMMARY REPORT

Total Organic Carbon by EPA Method 9060

Sample ID: **MB-77748**	SampType: **MBLK**			Units: **mg/L**		Prep Date: **8/23/2022**		RunNo: **77748**		
Client ID: **MBLKW**	Batch ID: **R77748**					Analysis Date: **8/23/2022**		SeqNo: **1597156**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	ND	0.500									

Sample ID: **LCS-77748**	SampType: **LCS**			Units: **mg/L**		Prep Date: **8/23/2022**		RunNo: **77748**		
Client ID: **LCSW**	Batch ID: **R77748**					Analysis Date: **8/23/2022**		SeqNo: **1597157**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	4.93	0.500	5.000	0	98.5	90	110				

Sample ID: **2208223-008CDUP**	SampType: **DUP**			Units: **mg/L**		Prep Date: **8/23/2022**		RunNo: **77748**		
Client ID: **DUP-01**	Batch ID: **R77748**					Analysis Date: **8/23/2022**		SeqNo: **1597162**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	8.75	0.500						9.562	8.90	20	

Sample ID: **2208223-008CMS**	SampType: **MS**			Units: **mg/L**		Prep Date: **8/23/2022**		RunNo: **77748**		
Client ID: **DUP-01**	Batch ID: **R77748**					Analysis Date: **8/23/2022**		SeqNo: **1597163**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	13.3	0.500	5.000	9.562	74.7	68.3	120				

Sample ID: **2208223-008CMSD**	SampType: **MSD**			Units: **mg/L**		Prep Date: **8/23/2022**		RunNo: **77748**		
Client ID: **DUP-01**	Batch ID: **R77748**					Analysis Date: **8/23/2022**		SeqNo: **1597164**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	13.4	0.500	5.000	9.562	76.3	68.3	120	13.30	0.585	20	

Work Order: 2208223
CLIENT: G-Logics
Project: Boeing Field Chevron

QC SUMMARY REPORT

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

Sample ID: **MB-37453** SampType: **MBLK** Units: **µg/L** Prep Date: **8/16/2022** RunNo: **77633**
Client ID: **MBLKW** Batch ID: **37453** Analysis Date: **8/18/2022** SeqNo: **1594758**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel Range Organics	ND	95.0									
Heavy Oil	ND	95.0									
Total Petroleum Hydrocarbons	ND	190									
Surr: 2-Fluorobiphenyl	12.7		23.76		53.5	50	150				
Surr: o-Terphenyl	13.2		23.76		55.5	50	150				

Sample ID: **LCS-37453** SampType: **LCS** Units: **µg/L** Prep Date: **8/16/2022** RunNo: **77633**
Client ID: **LCSW** Batch ID: **37453** Analysis Date: **8/18/2022** SeqNo: **1594759**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Petroleum Hydrocarbons	1,010	190	1,189	0	85.2	40	123				
Surr: 2-Fluorobiphenyl	16.5		23.79		69.2	50	150				
Surr: o-Terphenyl	20.6		23.79		86.8	50	150				

Sample ID: **2208227-001BMS** SampType: **MS** Units: **µg/L** Prep Date: **8/16/2022** RunNo: **77633**
Client ID: **BATCH** Batch ID: **37453** Analysis Date: **8/18/2022** SeqNo: **1594761**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Petroleum Hydrocarbons	1,080	187	1,169	135.8	80.5	40.5	128				
Surr: 2-Fluorobiphenyl	15.6		23.39		66.8	50	150				
Surr: o-Terphenyl	18.6		23.39		79.7	50	150				

Sample ID: **2208227-002BDUP** SampType: **DUP** Units: **µg/L** Prep Date: **8/16/2022** RunNo: **77633**
Client ID: **BATCH** Batch ID: **37453** Analysis Date: **8/18/2022** SeqNo: **1594763**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel Range Organics	ND	95.4						0		30	
Heavy Oil	ND	95.4						0		30	
Total Petroleum Hydrocarbons	ND	191						0		30	
Surr: 2-Fluorobiphenyl	16.6		23.84		69.8	50	150		0		

Work Order: 2208223
CLIENT: G-Logics
Project: Boeing Field Chevron

QC SUMMARY REPORT

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

Sample ID: **2208227-002BDUP** SampType: **DUP** Units: **µg/L** Prep Date: **8/16/2022** RunNo: **77633**
Client ID: **BATCH** Batch ID: **37453** Analysis Date: **8/18/2022** SeqNo: **1594763**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: o-Terphenyl	17.6		23.84		73.9	50	150		0		

Sample ID: **2208227-003BDUP** SampType: **DUP** Units: **µg/L** Prep Date: **8/16/2022** RunNo: **77633**
Client ID: **BATCH** Batch ID: **37453** Analysis Date: **8/18/2022** SeqNo: **1594765**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel Range Organics	ND	94.0						0		30	
Heavy Oil	ND	94.0						0		30	
Total Petroleum Hydrocarbons	ND	188						0		30	
Surr: 2-Fluorobiphenyl	17.3		23.50		73.4	50	150		0		
Surr: o-Terphenyl	18.0		23.50		76.4	50	150		0		

Sample ID: **MB-37513** SampType: **MBLK** Units: **µg/L** Prep Date: **8/22/2022** RunNo: **77731**
Client ID: **MBLKW** Batch ID: **37513** Analysis Date: **8/23/2022** SeqNo: **1596936**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel Range Organics	ND	93.1									
Heavy Oil	ND	93.1									
Total Petroleum Hydrocarbons	ND	186									
Surr: 2-Fluorobiphenyl	17.7		23.27		76.1	50	150				
Surr: o-Terphenyl	17.5		23.27		75.1	50	150				

Sample ID: **LCS-37513** SampType: **LCS** Units: **µg/L** Prep Date: **8/22/2022** RunNo: **77731**
Client ID: **LCSW** Batch ID: **37513** Analysis Date: **8/23/2022** SeqNo: **1596937**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Petroleum Hydrocarbons	778	186	1,160	0	67.1	40	123				
Surr: 2-Fluorobiphenyl	16.3		23.19		70.2	50	150				
Surr: o-Terphenyl	21.0		23.19		90.5	50	150				

Work Order: 2208223
CLIENT: G-Logics
Project: Boeing Field Chevron

QC SUMMARY REPORT

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

Sample ID: **2208308-003BDUP** SampType: **DUP** Units: **µg/L** Prep Date: **8/22/2022** RunNo: **77731**
Client ID: **BATCH** Batch ID: **37513** Analysis Date: **8/23/2022** SeqNo: **1596940**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel Range Organics	ND	77.3						0		30	
Heavy Oil	ND	77.3						0		30	
Total Petroleum Hydrocarbons	ND	155						0		30	
Surr: 2-Fluorobiphenyl	14.9		19.33		77.3	50	150		0		
Surr: o-Terphenyl	15.4		19.33		79.9	50	150		0		

Sample ID: **2208308-002BMS** SampType: **MS** Units: **µg/L** Prep Date: **8/22/2022** RunNo: **77731**
Client ID: **BATCH** Batch ID: **37513** Analysis Date: **8/23/2022** SeqNo: **1597374**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Petroleum Hydrocarbons	818	163	1,022	133.0	67.1	40.5	128				
Surr: 2-Fluorobiphenyl	16.2		20.43		79.4	50	150				
Surr: o-Terphenyl	18.2		20.43		89.2	50	150				

Work Order: 2208223
CLIENT: G-Logics
Project: Boeing Field Chevron

QC SUMMARY REPORT

Gasoline by NWTPH-Gx

Sample ID: **LCS-37495**	SampType: **LCS**	Units: **µg/L**	Prep Date: **8/19/2022**	RunNo: **77719**
Client ID: **LCSW**	Batch ID: **37495**		Analysis Date: **8/20/2022**	SeqNo: **1596638**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline Range Organics	486	50.0	500.0	0	97.1	65	135				
Surr: Toluene-d8	25.5		25.00		102	65	135				
Surr: 4-Bromofluorobenzene	24.5		25.00		97.9	65	135				

Sample ID: **MB-37495**	SampType: **MBLK**	Units: **µg/L**	Prep Date: **8/19/2022**	RunNo: **77719**
Client ID: **MBLKW**	Batch ID: **37495**		Analysis Date: **8/20/2022**	SeqNo: **1596637**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline Range Organics	ND	50.0									
Surr: Toluene-d8	23.9		25.00		95.6	65	135				
Surr: 4-Bromofluorobenzene	20.8		25.00		83.3	65	135				

Sample ID: **2208223-002ADUP**	SampType: **DUP**	Units: **µg/L**	Prep Date: **8/19/2022**	RunNo: **77719**
Client ID: **IP-3**	Batch ID: **37495**		Analysis Date: **8/20/2022**	SeqNo: **1596626**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline Range Organics	3,590	50.0						3,428	4.52	30	E
Surr: Toluene-d8	26.2		25.00		105	65	135		0		
Surr: 4-Bromofluorobenzene	25.4		25.00		102	65	135		0		

Sample ID: **2208245-001AMS**	SampType: **MS**	Units: **µg/L**	Prep Date: **8/19/2022**	RunNo: **77719**
Client ID: **BATCH**	Batch ID: **37495**		Analysis Date: **8/20/2022**	SeqNo: **1596634**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline Range Organics	804	50.0	500.0	175.5	126	65	135				
Surr: Toluene-d8	24.9		25.00		99.4	65	135				
Surr: 4-Bromofluorobenzene	23.9		25.00		95.5	65	135				

Work Order: 2208223
CLIENT: G-Logics
Project: Boeing Field Chevron

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260D

Sample ID: **LCS-37495** SampType: **LCS** Units: **µg/L** Prep Date: **8/19/2022** RunNo: **77718**
Client ID: **LCSW** Batch ID: **37495** Analysis Date: **8/20/2022** SeqNo: **1596607**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	21.1	0.440	20.00	0	106	80	120				
Toluene	20.4	0.750	20.00	0	102	80	120				
Ethylbenzene	20.1	0.400	20.00	0	101	80	120				
m,p-Xylene	40.5	1.00	40.00	0	101	80	120				
o-Xylene	19.6	0.500	20.00	0	98.0	80	120				
Surr: Dibromofluoromethane	26.7		25.00		107	80	120				
Surr: Toluene-d8	26.3		25.00		105	80	120				
Surr: 1-Bromo-4-fluorobenzene	26.6		25.00		106	80	120				

Sample ID: **MB-37495** SampType: **MBLK** Units: **µg/L** Prep Date: **8/19/2022** RunNo: **77718**
Client ID: **MBLKW** Batch ID: **37495** Analysis Date: **8/20/2022** SeqNo: **1596606**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	ND	0.440									
Toluene	ND	0.750									
Ethylbenzene	ND	0.400									
m,p-Xylene	ND	1.00									
o-Xylene	ND	0.500									
Surr: Dibromofluoromethane	27.5		25.00		110	80	120				
Surr: Toluene-d8	25.5		25.00		102	80	120				
Surr: 1-Bromo-4-fluorobenzene	22.2		25.00		88.7	80	120				

Sample ID: **2208223-002ADUP** SampType: **DUP** Units: **µg/L** Prep Date: **8/19/2022** RunNo: **77718**
Client ID: **IP-3** Batch ID: **37495** Analysis Date: **8/20/2022** SeqNo: **1596595**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	466	0.440						491.8	5.36	30	E
Toluene	21.8	0.750						21.87	0.218	30	
Ethylbenzene	48.6	0.400						48.41	0.374	30	E
m,p-Xylene	82.4	1.00						81.71	0.843	30	E
o-Xylene	3.71	0.500						3.655	1.41	30	

Work Order: 2208223
CLIENT: G-Logics
Project: Boeing Field Chevron

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260D

Sample ID: **2208223-002ADUP** SampType: **DUP** Units: **µg/L** Prep Date: **8/19/2022** RunNo: **77718**
Client ID: **IP-3** Batch ID: **37495** Analysis Date: **8/20/2022** SeqNo: **1596595**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Dibromofluoromethane	24.6		25.00		98.5	80	120		0		
Surr: Toluene-d8	26.0		25.00		104	80	120		0		
Surr: 1-Bromo-4-fluorobenzene	26.1		25.00		104	80	120		0		

Sample Log-In Check List

Client Name:	GL	Work Order Number:	2208223
Logged by:	Gabrielle Coeuille	Date Received:	8/16/2022 12:53:00 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 Present	☐
6.	Was an attempt made to cool the samples?	Yes	☑	No ☐	NA	☐
7.	Were all items received at a temperature of >2°C to 6°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 ºC
Sample 1	5.0

* 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: 8/15/2022 Page: 1 of: 1

Laboratory Project No (internal): 2208223

Client: G-Logics

Project Name: Boeing Field Chevron

Project No: 01-0410-R Task 2B

Special Remarks:

Address: 40 2nd Ave SE

Collected by: Jessica Soliz

City, State, Zip: Issaquah WA 98027

Location: Tukwila, WA

Telephone: 425-391-6874

Report To (PM): Tom Cammarata

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

Fax:

PM Email: ThomasC@atlasgeonw.com cc: mikea@g-logics.com

	Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	# of Cont.	VOCs (EPA 8260 / 624)	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)	TOC	FPA9060A		Comments
						8260C														
1	AS-1	8/15/22	1408	W			X	X		X										
2	IP-3	8/15/22	1617	W			X	X		X										
3	IP-4	8/15/22	1707	W			X	X		X							X			
4	IP-5	8/15/22	1531	W			X	X		X										
5	IP-7	8/16/22	0915	W			X	X		X							X			
6	TW-4	8/15/22	1444	W			X	X		X							X			
7	TW-5	8/15/22	1335	W			X	X		X										
8	DUP-01	8/15/22	0800	W			X	X		X										
9																	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 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, that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

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

Relinquished (Signature)	Print Name	Date/Time	Received (Signature)	Print Name	Date/Time
x Jessica Soliz	Jessica Soliz	8/16/22 @1130	x Melanie Esparza	Melanie Esparza	8/16/22 12:53
Relinquished (Signature) x	Print Name	Date/Time	Received (Signature) x	Print Name	Date/Time

COC 1.3 - 11.06.20

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

G-Logics
Mike Arnold
40 Second Ave. SE
Issaquah, WA 98027

RE: Boeing Field Chevron
Work Order Number: 2208193

August 23, 2022

Attention Mike Arnold:

Fremont Analytical, Inc. received 8 sample(s) on 8/12/2022 for the analyses presented in the following report.

Total Organic Carbon by EPA 9060

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,

Brianna Barnes
Project Manager

CC:
Tom Cammarata

Date: *08/23/2022*

CLIENT: G-Logics
Project: Boeing Field Chevron
Work Order: 2208193

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2208193-001	TW-4:5.5-6	08/12/2022 11:58 AM	08/12/2022 3:50 PM
2208193-002	TW-4:8-8.5	08/12/2022 11:59 AM	08/12/2022 3:50 PM
2208193-003	TW-4:10-10.5	08/12/2022 12:00 PM	08/12/2022 3:50 PM
2208193-004	TW-4:14.5-15	08/12/2022 12:01 PM	08/12/2022 3:50 PM
2208193-005	TW-5:5.5-6	08/12/2022 11:20 AM	08/12/2022 3:50 PM
2208193-006	TW-5:8-8.5	08/12/2022 11:25 AM	08/12/2022 3:50 PM
2208193-007	TW-5:10-10.5	08/12/2022 11:26 AM	08/12/2022 3:50 PM
2208193-008	TW-5:11.5-12	08/12/2022 11:30 AM	08/12/2022 3:50 PM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

Original

Case Narrative

WO#: **2208193**
Date: **8/23/2022**

CLIENT: G-Logics
Project: Boeing Field Chevron

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
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
DUP - Sample Duplicate
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MCL - Maximum Contaminant Level
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
REP - Sample Replicate
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Analytical Report

Work Order: **2208193**
Date Reported: **8/23/2022**

CLIENT: G-Logics
Project: Boeing Field Chevron

Lab ID: 2208193-003 **Collection Date:** 8/12/2022 12:00:00 PM
Client Sample ID: **TW-4:10-10.5** **Matrix:** Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Total Organic Carbon by EPA 9060				Batch ID: 37461		Analyst: SS
Total Organic Carbon	0.377	0.150		%-dry	1	8/22/2022 2:31:00 PM

Lab ID: 2208193-007 **Collection Date:** 8/12/2022 11:26:00 AM
Client Sample ID: **TW-5:10-10.5** **Matrix:** Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Total Organic Carbon by EPA 9060				Batch ID: 37461		Analyst: SS
Total Organic Carbon	ND	0.150		%-dry	1	8/22/2022 2:45:00 PM

Work Order: 2208193
CLIENT: G-Logics
Project: Boeing Field Chevron

QC SUMMARY REPORT

Total Organic Carbon by EPA 9060

Sample ID: **LCS-37461**	SampType: **LCS**			Units: **%-dry**		Prep Date: **8/17/2022**		RunNo: **77711**		
Client ID: **LCSS**	Batch ID: **37461**					Analysis Date: **8/22/2022**		SeqNo: **1596572**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	1.01	0.150	1.000	0	101	80	120				

Sample ID: **MB-37461**	SampType: **MBLK**			Units: **%-dry**		Prep Date: **8/17/2022**		RunNo: **77711**		
Client ID: **MBLKS**	Batch ID: **37461**					Analysis Date: **8/22/2022**		SeqNo: **1596574**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	ND	0.150									

Sample ID: **2208193-007ADUP**	SampType: **DUP**			Units: **%-dry**		Prep Date: **8/17/2022**		RunNo: **77711**		
Client ID: **TW-5:10-10.5**	Batch ID: **37461**					Analysis Date: **8/22/2022**		SeqNo: **1596577**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	ND	0.150						0		20	

Sample ID: **2208193-007AMS**	SampType: **MS**			Units: **%-dry**		Prep Date: **8/17/2022**		RunNo: **77711**		
Client ID: **TW-5:10-10.5**	Batch ID: **37461**					Analysis Date: **8/22/2022**		SeqNo: **1596578**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	0.976	0.150	1.000	0.05830	91.8	75	125				

Sample ID: **2208193-007AMSD**	SampType: **MSD**			Units: **%-dry**		Prep Date: **8/17/2022**		RunNo: **77711**		
Client ID: **TW-5:10-10.5**	Batch ID: **37461**					Analysis Date: **8/22/2022**		SeqNo: **1596579**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	1.04	0.150	1.000	0.05830	98.0	75	125	0.9763	6.16	20	

Sample Log-In Check List

Client Name:	GL	Work Order Number:	2208193
Logged by:	Clare Griggs	Date Received:	8/12/2022 3:50:00 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 Present ☐
6.	Was an attempt made to cool the samples?	Yes	☑	No	☐	NA ☐
7.	Were all items received at a temperature of >2°C to 6°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 ºC
Sample	5.7

* 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: 8/12/2022 Page: 1 of: 1
Laboratory Project No (internal): 220893
Project Name: Boeing Field Chevron
Special Remarks:
Client: G-Logics
Project No: 01-0410-R Task 2A
Address: 40 2nd Ave SE
Collected by: Jessica Soliz
City, State, Zip: Issaquah WA 98027
Location: Tukwila, WA
Telephone: 425 395 4764
Report To (PM): Tom Cammarata
Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)
Fax:
PM Email: thomasc@atlasgeonw.com cc: mikea@g-logics.com

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	# of Cont.	VOCs (EPA 8260 / 624)	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)	TOC	EPA 9060			Comments
1 TW-4:5.5-6	8/12/22	1158	S	1																	
2 TW-4:8-8.5	8/12/22	1159	S	1																	
3 TW-4:10-10.5	8/12/22	1200	S	1													X				
4 TW-4:14.5-15	8/12/22	1201	S	1																	
5 TW-5:5.5-6	8/12/22	1120	S	1																	
6 TW-5:8-8.5	8/12/22	1125	S	1																	
7 TW-5:10-10.5	8/12/22	1126	S	1													X				
8 TW-5:11.5-12	8/12/22	1130	S	1																	
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 Ti Tl V Zn

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

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

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

Relinquished (Signature)	Print Name	Date/Time	Received (Signature)	Print Name	Date/Time
x	Jessica Soliz	8/12/22 @ 1550	x		8/12/22 @ 1550
Relinquished (Signature)	Print Name	Date/Time	Received (Signature)	Print Name	Date/Time
x			x		

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

G-Logics
Tom Cammarata
40 Second Ave. SE
Issaquah, WA 98027

RE: Boeing Field Chevron
Work Order Number: 2209377

October 05, 2022

Attention Tom Cammarata:

Fremont Analytical, Inc. received 6 sample(s) on 9/28/2022 for the analyses presented in the following report.

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

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,

Brianna Barnes
Project Manager

CC:
Mike Arnold

Date: *10/05/2022*

CLIENT: G-Logics
Project: Boeing Field Chevron
Work Order: 2209377

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2209377-001	AS-1	09/27/2022 1:19 PM	09/28/2022 8:35 AM
2209377-002	IP-4	09/27/2022 2:12 PM	09/28/2022 8:35 AM
2209377-003	TW-4	09/27/2022 11:48 AM	09/28/2022 8:35 AM
2209377-004	TW-5	09/27/2022 10:41 AM	09/28/2022 8:35 AM
2209377-005	DUP-1	09/27/2022 8:00 AM	09/28/2022 8:35 AM
2209377-006	Trip Blank	09/22/2022 9:05 AM	09/28/2022 8:35 AM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

Case Narrative

WO#: **2209377**
Date: **10/5/2022**

CLIENT: G-Logics
Project: Boeing Field Chevron

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
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
DUP - Sample Duplicate
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MCL - Maximum Contaminant Level
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
REP - Sample Replicate
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Analytical Report

Work Order: **2209377**
Date Reported: **10/5/2022**

Client: G-Logics **Collection Date:** 9/27/2022 1:19:00 PM
Project: Boeing Field Chevron
Lab ID: 2209377-001 **Matrix:** Water
Client Sample ID: AS-1

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.				Batch ID: 37974		Analyst: KJ
Diesel Range Organics	3,610	93.0		µg/L	1	9/30/2022 5:42:09 PM
Heavy Oil	ND	93.0		µg/L	1	9/30/2022 5:42:09 PM
Surr: 2-Fluorobiphenyl	320	50 - 150	S	%Rec	1	9/30/2022 5:42:09 PM
Surr: o-Terphenyl	72.6	50 - 150		%Rec	1	9/30/2022 5:42:09 PM
NOTES:						
S - Outlying surrogate recovery attributed to TPH interference.						
Detection is biased high by overlap with gasoline-range material						
Gasoline by NWTPH-Gx				Batch ID: 37972		Analyst: SG
Gasoline Range Organics	5,780	500	D	µg/L	10	10/5/2022 6:22:01 AM
Surr: Toluene-d8	92.0	65 - 135		%Rec	1	9/30/2022 5:10:30 PM
Surr: 4-Bromofluorobenzene	101	65 - 135		%Rec	1	9/30/2022 5:10:30 PM
Volatile Organic Compounds by EPA Method 8260D				Batch ID: 37972		Analyst: LAC
Benzene	104	4.40	D	µg/L	10	10/5/2022 6:22:01 AM
Toluene	14.8	7.50	D	µg/L	10	10/5/2022 6:22:01 AM
Ethylbenzene	464	4.00	D	µg/L	10	10/5/2022 6:22:01 AM
m,p-Xylene	177	10.0	D	µg/L	10	10/5/2022 6:22:01 AM
o-Xylene	63.3	5.00	D	µg/L	10	10/5/2022 6:22:01 AM
Surr: Dibromofluoromethane	100	80 - 120		%Rec	1	9/30/2022 5:10:30 PM
Surr: Toluene-d8	96.7	80 - 120		%Rec	1	9/30/2022 5:10:30 PM
Surr: 1-Bromo-4-fluorobenzene	108	80 - 120		%Rec	1	9/30/2022 5:10:30 PM

Analytical Report

Work Order: **2209377**
Date Reported: **10/5/2022**

Client: G-Logics **Collection Date:** 9/27/2022 2:12:00 PM
Project: Boeing Field Chevron
Lab ID: 2209377-002 **Matrix:** Water
Client Sample ID: IP-4

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.				Batch ID: 37974		Analyst: KJ
Diesel Range Organics	17,300	92.7		µg/L	1	9/30/2022 6:03:55 PM
Heavy Oil	ND	92.7		µg/L	1	9/30/2022 6:03:55 PM
Surr: 2-Fluorobiphenyl	351	50 - 150	S	%Rec	1	9/30/2022 6:03:55 PM
Surr: o-Terphenyl	86.0	50 - 150		%Rec	1	9/30/2022 6:03:55 PM
NOTES:						
S - Outlying surrogate recovery attributed to TPH interference. Detection is due to overlap with gasoline-range material						
Gasoline by NWTPH-Gx				Batch ID: 37972		Analyst: SG
Gasoline Range Organics	114,000	10,000	D	µg/L	200	10/5/2022 6:52:58 AM
Surr: Toluene-d8	101	65 - 135	D	%Rec	200	10/5/2022 6:52:58 AM
Surr: 4-Bromofluorobenzene	102	65 - 135	D	%Rec	200	10/5/2022 6:52:58 AM
Volatile Organic Compounds by EPA Method 8260D				Batch ID: 37972		Analyst: LAC
Benzene	47.2	88.0	JD	µg/L	200	10/5/2022 6:52:58 AM
Toluene	2,420	150	D	µg/L	200	10/5/2022 6:52:58 AM
Ethylbenzene	4,110	80.0	D	µg/L	200	10/5/2022 6:52:58 AM
m,p-Xylene	13,800	200	D	µg/L	200	10/5/2022 6:52:58 AM
o-Xylene	3,830	100	D	µg/L	200	10/5/2022 6:52:58 AM
Surr: Dibromofluoromethane	95.3	80 - 120		%Rec	1	9/30/2022 6:10:54 PM
Surr: Toluene-d8	96.4	80 - 120		%Rec	1	9/30/2022 6:10:54 PM
Surr: 1-Bromo-4-fluorobenzene	120	80 - 120		%Rec	1	9/30/2022 6:10:54 PM

Analytical Report

Work Order: **2209377**
Date Reported: **10/5/2022**

Client: G-Logics
Collection Date: 9/27/2022 11:48:00 AM
Project: Boeing Field Chevron
Lab ID: 2209377-003
Matrix: Water
Client Sample ID: TW-4

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.				Batch ID: 37974		Analyst: KJ
Diesel Range Organics	381	91.9		µg/L	1	9/30/2022 6:25:53 PM
Heavy Oil	ND	91.9		µg/L	1	9/30/2022 6:25:53 PM
Surr: 2-Fluorobiphenyl	83.5	50 - 150		%Rec	1	9/30/2022 6:25:53 PM
Surr: o-Terphenyl	90.0	50 - 150		%Rec	1	9/30/2022 6:25:53 PM
NOTES: Detection is biased high by overlap with gasoline-range material						
Gasoline by NWTPH-Gx				Batch ID: 37972		Analyst: SG
Gasoline Range Organics	133	50.0		µg/L	1	10/5/2022 4:49:06 AM
Surr: Toluene-d8	99.9	65 - 135		%Rec	1	10/5/2022 4:49:06 AM
Surr: 4-Bromofluorobenzene	104	65 - 135		%Rec	1	10/5/2022 4:49:06 AM
Volatile Organic Compounds by EPA Method 8260D				Batch ID: 37972		Analyst: LAC
Benzene	ND	0.440		µg/L	1	10/5/2022 4:49:06 AM
Toluene	6.35	0.750		µg/L	1	10/5/2022 4:49:06 AM
Ethylbenzene	0.978	0.400		µg/L	1	10/5/2022 4:49:06 AM
m,p-Xylene	2.95	1.00		µg/L	1	10/5/2022 4:49:06 AM
o-Xylene	1.25	0.500		µg/L	1	10/5/2022 4:49:06 AM
Surr: Dibromofluoromethane	101	80 - 120		%Rec	1	9/30/2022 6:41:06 PM
Surr: Toluene-d8	102	80 - 120		%Rec	1	9/30/2022 6:41:06 PM
Surr: 1-Bromo-4-fluorobenzene	105	80 - 120		%Rec	1	9/30/2022 6:41:06 PM

Analytical Report

Work Order: **2209377**
Date Reported: **10/5/2022**

Client: G-Logics **Collection Date:** 9/27/2022 10:41:00 AM
Project: Boeing Field Chevron
Lab ID: 2209377-004 **Matrix:** Water
Client Sample ID: TW-5

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.				Batch ID: 37974		Analyst: KJ
Diesel Range Organics	8,520	94.2		µg/L	1	9/30/2022 6:36:47 PM
Heavy Oil	ND	94.2		µg/L	1	9/30/2022 6:36:47 PM
Surr: 2-Fluorobiphenyl	370	50 - 150	S	%Rec	1	9/30/2022 6:36:47 PM
Surr: o-Terphenyl	94.8	50 - 150		%Rec	1	9/30/2022 6:36:47 PM
NOTES:						
S - Outlying surrogate recovery attributed to TPH interference. Detection is due to overlap with gasoline-range material						
Gasoline by NWTPH-Gx				Batch ID: 37972		Analyst: SG
Gasoline Range Organics	178,000	50,000	D	µg/L	1000	10/5/2022 7:55:02 AM
Surr: Toluene-d8	101	65 - 135	D	%Rec	1000	10/5/2022 7:55:02 AM
Surr: 4-Bromofluorobenzene	103	65 - 135	D	%Rec	1000	10/5/2022 7:55:02 AM
Volatile Organic Compounds by EPA Method 8260D				Batch ID: 37972		Analyst: LAC
Benzene	258	440	JD	µg/L	1000	10/5/2022 7:55:02 AM
Toluene	30,600	750	D	µg/L	1000	10/5/2022 7:55:02 AM
Ethylbenzene	3,890	400	D	µg/L	1000	10/5/2022 7:55:02 AM
m,p-Xylene	14,600	1,000	D	µg/L	1000	10/5/2022 7:55:02 AM
o-Xylene	6,270	500	D	µg/L	1000	10/5/2022 7:55:02 AM
Surr: Dibromofluoromethane	88.0	80 - 120		%Rec	1	9/30/2022 7:11:12 PM
Surr: Toluene-d8	102	80 - 120	D	%Rec	1000	10/5/2022 7:55:02 AM
Surr: 1-Bromo-4-fluorobenzene	102	80 - 120	D	%Rec	1000	10/5/2022 7:55:02 AM

Analytical Report

Work Order: **2209377**
Date Reported: **10/5/2022**

Client: G-Logics **Collection Date:** 9/27/2022 8:00:00 AM
Project: Boeing Field Chevron
Lab ID: 2209377-005 **Matrix:** Water
Client Sample ID: DUP-1

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.				Batch ID: 37974		Analyst: KJ
Diesel Range Organics	3,990	92.6		µg/L	1	9/30/2022 6:47:41 PM
Heavy Oil	ND	92.6		µg/L	1	9/30/2022 6:47:41 PM
Surr: 2-Fluorobiphenyl	322	50 - 150	S	%Rec	1	9/30/2022 6:47:41 PM
Surr: o-Terphenyl	71.3	50 - 150		%Rec	1	9/30/2022 6:47:41 PM
NOTES:						
S - Outlying surrogate recovery attributed to TPH interference. Detection is biased high by overlap with gasoline-range material						
Gasoline by NWTPH-Gx				Batch ID: 37972		Analyst: SG
Gasoline Range Organics	5,960	500	D	µg/L	10	10/5/2022 8:57:00 AM
Surr: Toluene-d8	100	65 - 135	D	%Rec	10	10/5/2022 8:57:00 AM
Surr: 4-Bromofluorobenzene	102	65 - 135	D	%Rec	10	10/5/2022 8:57:00 AM
Volatile Organic Compounds by EPA Method 8260D				Batch ID: 37972		Analyst: LAC
Benzene	109	4.40	D	µg/L	10	10/5/2022 8:57:00 AM
Toluene	15.1	7.50	D	µg/L	10	10/5/2022 8:57:00 AM
Ethylbenzene	486	4.00	DE	µg/L	10	10/5/2022 8:57:00 AM
m,p-Xylene	184	10.0	D	µg/L	10	10/5/2022 8:57:00 AM
o-Xylene	65.9	5.00	D	µg/L	10	10/5/2022 8:57:00 AM
Surr: Dibromofluoromethane	105	80 - 120	D	%Rec	10	10/5/2022 8:57:00 AM
Surr: Toluene-d8	101	80 - 120	D	%Rec	10	10/5/2022 8:57:00 AM
Surr: 1-Bromo-4-fluorobenzene	102	80 - 120	D	%Rec	10	10/5/2022 8:57:00 AM

Work Order: 2209377
CLIENT: G-Logics
Project: Boeing Field Chevron

QC SUMMARY REPORT

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

Sample ID: **MB-37974**	SampType: **MBLK**	Units: **µg/L**	Prep Date: **9/29/2022**	RunNo: **78683**
Client ID: **MBLKW**	Batch ID: **37974**		Analysis Date: **9/30/2022**	SeqNo: **1618900**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel Range Organics	ND	94.2									
Heavy Oil	ND	94.2									
Total Petroleum Hydrocarbons	ND	188									
Surr: 2-Fluorobiphenyl	18.4		23.56		77.9	50	150				
Surr: o-Terphenyl	20.6		23.56		87.4	50	150				

Sample ID: **LCS-37974**	SampType: **LCS**	Units: **µg/L**	Prep Date: **9/29/2022**	RunNo: **78683**
Client ID: **LCSW**	Batch ID: **37974**		Analysis Date: **9/30/2022**	SeqNo: **1618901**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Petroleum Hydrocarbons	998	191	1,193	0	83.6	44.4	125				
Surr: 2-Fluorobiphenyl	18.6		23.85		77.9	50	150				
Surr: o-Terphenyl	25.4		23.85		106	50	150				

Sample ID: **LCSD-37974**	SampType: **LCSD**	Units: **µg/L**	Prep Date: **9/29/2022**	RunNo: **78683**
Client ID: **LCSW02**	Batch ID: **37974**		Analysis Date: **9/30/2022**	SeqNo: **1618902**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Petroleum Hydrocarbons	955	189	1,184	0	80.6	44.4	125	997.5	4.40	30	
Surr: 2-Fluorobiphenyl	17.4		23.67		73.5	50	150		0		
Surr: o-Terphenyl	23.0		23.67		97.1	50	150		0		

Sample ID: **2209375-004BDUP**	SampType: **DUP**	Units: **µg/L**	Prep Date: **9/29/2022**	RunNo: **78683**
Client ID: **BATCH**	Batch ID: **37974**		Analysis Date: **9/30/2022**	SeqNo: **1618908**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel Range Organics	ND	96.5						0		30	
Heavy Oil	ND	96.5						0		30	
Total Petroleum Hydrocarbons	ND	193						0		30	
Surr: 2-Fluorobiphenyl	22.2		24.12		92.2	50	150		0		

Work Order: 2209377
CLIENT: G-Logics
Project: Boeing Field Chevron

QC SUMMARY REPORT

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

Sample ID: **2209375-004BDUP** SampType: **DUP** Units: **µg/L** Prep Date: **9/29/2022** RunNo: **78683**
Client ID: **BATCH** Batch ID: **37974** Analysis Date: **9/30/2022** SeqNo: **1618908**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: o-Terphenyl	23.8		24.12		98.5	50	150		0		

Work Order: 2209377
CLIENT: G-Logics
Project: Boeing Field Chevron

QC SUMMARY REPORT

Gasoline by NWTPH-Gx

Sample ID: **LCS-37972** SampType: **LCS** Units: **µg/L** Prep Date: **9/29/2022** RunNo: **78698**
Client ID: **LCSW** Batch ID: **37972** Analysis Date: **9/29/2022** SeqNo: **1619309**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline Range Organics	474	50.0	500.0	0	94.9	65	135				
Surr: Toluene-d8	26.1		25.00		105	65	135				
Surr: 4-Bromofluorobenzene	23.8		25.00		95.1	65	135				

Sample ID: **MB-37972** SampType: **MBLK** Units: **µg/L** Prep Date: **9/29/2022** RunNo: **78698**
Client ID: **MBLKW** Batch ID: **37972** Analysis Date: **9/29/2022** SeqNo: **1620359**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline Range Organics	ND	50.0									
Surr: Toluene-d8	26.0		25.00		104	65	135				
Surr: 4-Bromofluorobenzene	24.1		25.00		96.5	65	135				

Sample ID: **2209377-001ADUP** SampType: **DUP** Units: **µg/L** Prep Date: **9/29/2022** RunNo: **78698**
Client ID: **AS-1** Batch ID: **37972** Analysis Date: **9/30/2022** SeqNo: **1620353**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline Range Organics	4,160	50.0						4,197	0.929	30	E
Surr: Toluene-d8	25.8		25.00		103	65	135		0		
Surr: 4-Bromofluorobenzene	24.3		25.00		97.2	65	135		0		

Sample ID: **LCS-37972** SampType: **LCS** Units: **µg/L** Prep Date: **9/29/2022** RunNo: **78765**
Client ID: **LCSW** Batch ID: **37972** Analysis Date: **10/4/2022** SeqNo: **1620477**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline Range Organics	563	50.0	500.0	0	113	65	135				
Surr: Toluene-d8	24.9		25.00		99.7	65	135				
Surr: 4-Bromofluorobenzene	25.4		25.00		102	65	135				

Work Order: 2209377
CLIENT: G-Logics
Project: Boeing Field Chevron

QC SUMMARY REPORT

Gasoline by NWTPH-Gx

Sample ID: **MB-37972** SampType: **MBLK** Units: **µg/L** Prep Date: **9/29/2022** RunNo: **78765**
Client ID: **MBLKW** Batch ID: **37972** Analysis Date: **10/4/2022** SeqNo: **1620476**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline Range Organics	ND	50.0									
Surr: Toluene-d8	24.8		25.00		99.3	65	135				
Surr: 4-Bromofluorobenzene	25.5		25.00		102	65	135				

Sample ID: **2209375-004AMS** SampType: **MS** Units: **µg/L** Prep Date: **9/29/2022** RunNo: **78765**
Client ID: **BATCH** Batch ID: **37972** Analysis Date: **10/4/2022** SeqNo: **1620472**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline Range Organics	459	50.0	500.0	35.39	84.7	65	135				
Surr: Toluene-d8	25.1		25.00		100	65	135				
Surr: 4-Bromofluorobenzene	25.8		25.00		103	65	135				

Sample ID: **MB-37972** SampType: **mblk** Units: **µg/L** Prep Date: **9/29/2022** RunNo: **78698**
Client ID: **MBLKW** Batch ID: **37972** Analysis Date: **10/4/2022** SeqNo: **1620800**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline Range Organics	ND	50.0									
Surr: Toluene-d8	25.1		25.00		100	65	135				
Surr: 4-Bromofluorobenzene	25.8		25.00		103	65	135				

Work Order: 2209377
CLIENT: G-Logics
Project: Boeing Field Chevron

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260D

Sample ID: **LCS-37972** SampType: **LCS** Units: **µg/L** Prep Date: **9/29/2022** RunNo: **78654**
Client ID: **LCSW** Batch ID: **37972** Analysis Date: **9/29/2022** SeqNo: **1618328**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	20.5	0.440	20.00	0	103	80	120				
Toluene	21.6	0.750	20.00	0	108	80	120				
Ethylbenzene	19.9	0.400	20.00	0	99.4	80	120				
m,p-Xylene	40.5	1.00	40.00	0	101	80	120				
o-Xylene	20.2	0.500	20.00	0	101	80	120				
Surr: Dibromofluoromethane	25.6		25.00		102	80	120				
Surr: Toluene-d8	26.9		25.00		107	80	120				
Surr: 1-Bromo-4-fluorobenzene	26.7		25.00		107	80	120				

Sample ID: **MB-37972** SampType: **MBLK** Units: **µg/L** Prep Date: **9/29/2022** RunNo: **78654**
Client ID: **MBLKW** Batch ID: **37972** Analysis Date: **9/29/2022** SeqNo: **1618315**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	ND	0.440									
Toluene	ND	0.750									
Ethylbenzene	ND	0.400									
m,p-Xylene	ND	1.00									
o-Xylene	ND	0.500									
Surr: Dibromofluoromethane	25.5		25.00		102	80	120				
Surr: Toluene-d8	25.9		25.00		103	80	120				
Surr: 1-Bromo-4-fluorobenzene	25.0		25.00		100	80	120				

Sample ID: **2209393-001AMS** SampType: **MS** Units: **µg/L** Prep Date: **9/29/2022** RunNo: **78654**
Client ID: **BATCH** Batch ID: **37972** Analysis Date: **9/29/2022** SeqNo: **1618312**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	99.2	0.440	20.00	63.57	178	78.5	133				S
Toluene	1,120	0.750	20.00	866.3	1,280	77	133				S
Ethylbenzene	375	0.400	20.00	283.4	459	77.9	133				S
m,p-Xylene	587	1.00	40.00	487.7	249	74.8	133				S
o-Xylene	364	0.500	20.00	304.9	296	81.2	126				S

Work Order: 2209377
CLIENT: G-Logics
Project: Boeing Field Chevron

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method 8260D

Sample ID: **2209393-001AMS** SampType: **MS** Units: **µg/L** Prep Date: **9/29/2022** RunNo: **78654**
Client ID: **BATCH** Batch ID: **37972** Analysis Date: **9/29/2022** SeqNo: **1618312**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Dibromofluoromethane	24.2		25.00		96.9	80	120				
Surr: Toluene-d8	25.7		25.00		103	80	120				
Surr: 1-Bromo-4-fluorobenzene	30.9		25.00		124	80	120				S

NOTES:
S - Spiked amount was low relative to sample concentration. Outlying spike recoveries may be expected.

Sample ID: **2209377-001ADUP** SampType: **DUP** Units: **µg/L** Prep Date: **9/29/2022** RunNo: **78654**
Client ID: **AS-1** Batch ID: **37972** Analysis Date: **9/30/2022** SeqNo: **1619160**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	85.0	0.440						86.80	2.13	30	E
Toluene	13.4	0.750						12.51	7.15	30	
Ethylbenzene	307	0.400						311.5	1.55	30	E
m,p-Xylene	138	1.00						141.5	2.35	30	E
o-Xylene	53.2	0.500						54.48	2.43	30	E
Surr: Dibromofluoromethane	24.0		25.00		95.9	80	120		0		
Surr: Toluene-d8	25.8		25.00		103	80	120		0		
Surr: 1-Bromo-4-fluorobenzene	25.9		25.00		104	80	120		0		

Sample Log-In Check List

Client Name:	GL	Work Order Number:	2209377
Logged by:	Elisabeth Samoray	Date Received:	9/28/2022 8:35:00 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 Present ☐
6.	Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
7.	Were all items received at a temperature of >2°C to 6°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 ºC
Sample 1	3.6

* 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: 9/27/2022 Page: of:

Laboratory Project No (internal): 2209377

Project Name: Boeing Field Chevron

Special Remarks:

Project No: 01-0410-R Task 4A

Collected by: Jessica Soliz

Client: G-Logics

Address: 40 2nd Ave SE

City, State, Zip: Issaquah, WA 98027

Location: Tukwila, WA

Telephone: 425-391-4876

Report To (PM): Tom Cammarata cc: Mike Arnold

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

Fax: 425-313-3074

PM Email: thomasc@atlasgeo.com mikea@g-logics.com

	Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	# of Cont.	VOCs (EPA 8260 / 624)	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	AS-1	9/27/22	1319	W	4		X	X		X							All: GRO, DRO, and BTEX
2	IP-4	9/27/22	1412	W	4		X	X		X							
3	TW-4	9/27/22	1148	W	8		X	X		X							
4	TW-5	9/27/22	1041	W	4		X	X		X							
5	DUP-1	9/27/22	0800	W	4		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 Ti Tl V Zn

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

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

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

Relinquished (Signature)	Print Name	Date/Time	Received (Signature)	Print Name	Date/Time
x Jessica Soliz	Jessica Soliz	9/28/2022 @ 0700	x Clare O'Connor	Clare O'Connor	9/28/22 8:35
Relinquished (Signature)	Print Name	Date/Time	Received (Signature)	Print Name	Date/Time
x			x		

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

March 3, 2023

Tom Commarata
G-Logics an Atlas Geoscience NW Company
40 2nd Avenue SE
Issaquah, WA 98027-3452

Re: Analytical Data for Project 01-0410-R
Laboratory Reference No. 2302-283

Dear Tom:

Enclosed are the analytical results and associated quality control data for samples submitted on February 24, 2023.

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

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

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: March 3, 2023
Samples Submitted: February 24, 2023
Laboratory Reference: 2302-283
Project: 01-0410-R

Case Narrative

Samples were collected on February 22 and 23, 2023 and received by the laboratory on February 24, 2023. They were maintained at the laboratory at a temperature of 2°C to 6°C.

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

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

NWTPH-Dx Analysis

The surrogate percent recovery (43%) for sample TW-5 was below the control limit of 50% due to matrix effects. The sample was re-extracted with the same result.

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

Date of Report: March 3, 2023
Samples Submitted: February 24, 2023
Laboratory Reference: 2302-283
Project: 01-0410-R

GASOLINE RANGE ORGANICS
NWTPH-Gx

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**TW-1**					
Laboratory ID:	02-283-01					
Gasoline	**ND**	100	NWTPH-Gx	2-28-23	2-28-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*103*	*65-122*				
Client ID:	**TW-2**					
Laboratory ID:	02-283-02					
Gasoline	**100**	100	NWTPH-Gx	2-28-23	2-28-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*99*	*65-122*				
Client ID:	**TW-5**					
Laboratory ID:	02-283-03					
Gasoline	**140000**	5000	NWTPH-Gx	2-28-23	2-28-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*108*	*65-122*				
Client ID:	**TW-4**					
Laboratory ID:	02-283-04					
Gasoline	**ND**	100	NWTPH-Gx	2-28-23	2-28-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*101*	*65-122*				
Client ID:	**IP-5**					
Laboratory ID:	02-283-05					
Gasoline	**21000**	5000	NWTPH-Gx	2-28-23	2-28-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*105*	*65-122*				
Client ID:	**TW-3**					
Laboratory ID:	02-283-06					
Gasoline	**14000**	5000	NWTPH-Gx	2-28-23	2-28-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*107*	*65-122*				
Client ID:	**AS-1**					
Laboratory ID:	02-283-07					
Gasoline	**6000**	500	NWTPH-Gx	3-1-23	3-1-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*93*	*65-122*				

Date of Report: March 3, 2023
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GASOLINE RANGE ORGANICS
NWTPH-Gx

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**IP-3**					
Laboratory ID:	02-283-08					
Gasoline	**29000**	5000	NWTPH-Gx	2-28-23	2-28-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*108*	*65-122*				
Client ID:	**IP-4**					
Laboratory ID:	02-283-09					
Gasoline	**63000**	5000	NWTPH-Gx	2-28-23	2-28-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*99*	*65-122*				
Client ID:	**IP-7**					
Laboratory ID:	02-283-10					
Gasoline	**82000**	5000	NWTPH-Gx	2-28-23	2-28-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*105*	*65-122*				
Client ID:	**Dup-1**					
Laboratory ID:	02-283-11					
Gasoline	**9200**	5000	NWTPH-Gx	2-28-23	2-28-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*104*	*65-122*				

Date of Report: March 3, 2023
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Laboratory Reference: 2302-283
Project: 01-0410-R

GASOLINE RANGE ORGANICS
NWTPH-Gx
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0228W1					
Gasoline	**ND**	100	NWTPH-Gx	2-28-23	2-28-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*97*	*65-122*				
Laboratory ID:	MB0228W2					
Gasoline	**ND**	100	NWTPH-Gx	2-28-23	2-28-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*97*	*65-122*				
Laboratory ID:	MB0301W1					
Gasoline	**ND**	100	NWTPH-Gx	3-1-23	3-1-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*95*	*65-122*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	02-266-01										
	ORIG	DUP									
Gasoline	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Surrogate:											
Fluorobenzene						*98*	*97*	*65-122*			
Laboratory ID:	02-266-02										
	ORIG	DUP									
Gasoline	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Surrogate:											
Fluorobenzene						*104*	*98*	*65-122*			

Date of Report: March 3, 2023
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Laboratory Reference: 2302-283
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DIESEL AND HEAVY OIL RANGE ORGANICS
NWTPH-Dx

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**TW-1**					
Laboratory ID:	02-283-01					
Diesel Range Organics	**130**	110	NWTPH-Dx	2-28-23	2-28-23	
Lube Oil Range Organics	**350**	210	NWTPH-Dx	2-28-23	2-28-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*84*	*50-150*				
Client ID:	**TW-2**					
Laboratory ID:	02-283-02					
Diesel Range Organics	**110**	110	NWTPH-Dx	2-28-23	2-28-23	M
Lube Oil Range Organics	**310**	210	NWTPH-Dx	2-28-23	2-28-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*89*	*50-150*				
Client ID:	**TW-5**					
Laboratory ID:	02-283-03					
Diesel Range Organics	**9200**	110	NWTPH-Dx	2-28-23	2-28-23	M
Lube Oil Range Organics	**540**	220	NWTPH-Dx	2-28-23	2-28-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*43*	*50-150*				Q
Client ID:	**TW-4**					
Laboratory ID:	02-283-04					
Diesel Range Organics	**ND**	120	NWTPH-Dx	2-28-23	3-1-23	
Lube Oil Range Organics	**310**	230	NWTPH-Dx	2-28-23	3-1-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*93*	*50-150*				
Client ID:	**IP-5**					
Laboratory ID:	02-283-05					
Diesel Range Organics	**3400**	110	NWTPH-Dx	2-28-23	2-28-23	M
Lube Oil Range Organics	**550**	210	NWTPH-Dx	2-28-23	2-28-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*55*	*50-150*				
Client ID:	**TW-3**					
Laboratory ID:	02-283-06					
Diesel Range Organics	**4800**	150	NWTPH-Dx	2-28-23	2-28-23	M
Lube Oil Range Organics	**620**	300	NWTPH-Dx	2-28-23	2-28-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*94*	*50-150*				

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DIESEL AND HEAVY OIL RANGE ORGANICS
NWTPH-Dx

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**AS-1**					
Laboratory ID:	02-283-07					
Diesel Range Organics	**2900**	100	NWTPH-Dx	2-28-23	2-28-23	M
Lube Oil Range Organics	**620**	200	NWTPH-Dx	2-28-23	2-28-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*63*	*50-150*				
Client ID:	**IP-3**					
Laboratory ID:	02-283-08					
Diesel Range Organics	**2100**	110	NWTPH-Dx	2-28-23	2-28-23	M
Lube Oil Range Organics	**480**	220	NWTPH-Dx	2-28-23	2-28-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*74*	*50-150*				
Client ID:	**IP-4**					
Laboratory ID:	02-283-09					
Diesel Range Organics	**3300**	110	NWTPH-Dx	2-28-23	3-1-23	M
Lube Oil Range Organics	**530**	220	NWTPH-Dx	2-28-23	3-1-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*79*	*50-150*				
Client ID:	**IP-7**					
Laboratory ID:	02-283-10					
Diesel Range Organics	**16000**	110	NWTPH-Dx	2-28-23	3-1-23	M
Lube Oil Range Organics	**680**	210	NWTPH-Dx	2-28-23	3-1-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*93*	*50-150*				
Client ID:	**Dup-1**					
Laboratory ID:	02-283-11					
Diesel Range Organics	**4400**	120	NWTPH-Dx	2-28-23	3-1-23	M
Lube Oil Range Organics	**740**	230	NWTPH-Dx	2-28-23	3-1-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*74*	*50-150*				

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DIESEL AND HEAVY OIL RANGE ORGANICS
NWTPH-Dx
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0228W1					
Diesel Range Organics	**ND**	67	NWTPH-Dx	2-28-23	2-28-23	
Lube Oil Range Organics	**ND**	130	NWTPH-Dx	2-28-23	2-28-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*93*	*50-150*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	02-283-01										
	ORIG	DUP									
Diesel Range Organics	**129**	**138**	NA	NA		NA		NA	7	NA	
Lube Oil Range Organics	**352**	**341**	NA	NA		NA		NA	3	NA	
Surrogate:											
o-Terphenyl						*84*	*90*	*50-150*			
Laboratory ID:	SB0228W1										
	ORIG	DUP									
Diesel Fuel #2	**448**	**439**	NA	NA		NA		NA	2	NA	
Surrogate:											
o-Terphenyl						*99*	*95*	*50-150*			

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Project: 01-0410-R

VOLATILE ORGANICS EPA 8260D

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**TW-1**					
Laboratory ID:	02-283-01					
Benzene	ND	0.20	EPA 8260D	2-27-23	2-27-23	
Toluene	ND	1.0	EPA 8260D	2-27-23	2-27-23	
Ethylbenzene	ND	0.20	EPA 8260D	2-27-23	2-27-23	
m,p-Xylene	ND	0.40	EPA 8260D	2-27-23	2-27-23	
o-Xylene	ND	0.20	EPA 8260D	2-27-23	2-27-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*105*	*75-127*				
Toluene-d8	*103*	*80-127*				
4-Bromofluorobenzene	*100*	*78-125*				
Client ID:	**TW-2**					
Laboratory ID:	02-283-02					
Benzene	0.24	0.20	EPA 8260D	2-27-23	2-27-23	
Toluene	9.3	1.0	EPA 8260D	2-27-23	2-27-23	
Ethylbenzene	7.5	0.20	EPA 8260D	2-27-23	2-27-23	
m,p-Xylene	30	0.40	EPA 8260D	2-27-23	2-27-23	
o-Xylene	12	0.20	EPA 8260D	2-27-23	2-27-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*105*	*75-127*				
Toluene-d8	*105*	*80-127*				
4-Bromofluorobenzene	*102*	*78-125*				
Client ID:	**TW-5**					
Laboratory ID:	02-283-03					
Benzene	220	100	EPA 8260D	2-27-23	2-27-23	
Toluene	24000	500	EPA 8260D	2-27-23	2-27-23	
Ethylbenzene	4200	100	EPA 8260D	2-27-23	2-27-23	
m,p-Xylene	15000	200	EPA 8260D	2-27-23	2-27-23	
o-Xylene	6000	100	EPA 8260D	2-27-23	2-27-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*105*	*75-127*				
Toluene-d8	*103*	*80-127*				
4-Bromofluorobenzene	*102*	*78-125*				

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VOLATILE ORGANICS EPA 8260D

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**TW-4**					
Laboratory ID:	02-283-04					
Benzene	ND	0.20	EPA 8260D	2-27-23	2-27-23	
Toluene	1.1	1.0	EPA 8260D	2-27-23	2-27-23	
Ethylbenzene	0.30	0.20	EPA 8260D	2-27-23	2-27-23	
m,p-Xylene	0.95	0.40	EPA 8260D	2-27-23	2-27-23	
o-Xylene	0.33	0.20	EPA 8260D	2-27-23	2-27-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*105*	*75-127*				
Toluene-d8	*103*	*80-127*				
4-Bromofluorobenzene	*102*	*78-125*				
Client ID:	**IP-5**					
Laboratory ID:	02-283-05					
Benzene	3000	20	EPA 8260D	2-27-23	2-27-23	
Toluene	350	100	EPA 8260D	2-27-23	2-27-23	
Ethylbenzene	1100	20	EPA 8260D	2-27-23	2-27-23	
m,p-Xylene	2700	40	EPA 8260D	2-27-23	2-27-23	
o-Xylene	290	20	EPA 8260D	2-27-23	2-27-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*107*	*75-127*				
Toluene-d8	*102*	*80-127*				
4-Bromofluorobenzene	*101*	*78-125*				
Client ID:	**TW-3**					
Laboratory ID:	02-283-06					
Benzene	2800	20	EPA 8260D	2-27-23	2-27-23	
Toluene	ND	100	EPA 8260D	2-27-23	2-27-23	
Ethylbenzene	1500	20	EPA 8260D	2-27-23	2-27-23	
m,p-Xylene	1100	40	EPA 8260D	2-27-23	2-27-23	
o-Xylene	100	20	EPA 8260D	2-27-23	2-27-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*107*	*75-127*				
Toluene-d8	*102*	*80-127*				
4-Bromofluorobenzene	*102*	*78-125*				

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Samples Submitted: February 24, 2023
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Project: 01-0410-R

VOLATILE ORGANICS EPA 8260D

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**AS-1**					
Laboratory ID:	02-283-07					
Benzene	32	4.0	EPA 8260D	2-27-23	2-27-23	
Toluene	36	20	EPA 8260D	2-27-23	2-27-23	
Ethylbenzene	310	4.0	EPA 8260D	2-27-23	2-27-23	
m,p-Xylene	480	8.0	EPA 8260D	2-27-23	2-27-23	
o-Xylene	230	4.0	EPA 8260D	2-27-23	2-27-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*105*	*75-127*				
Toluene-d8	*103*	*80-127*				
4-Bromofluorobenzene	*101*	*78-125*				
Client ID:	**IP-3**					
Laboratory ID:	02-283-08					
Benzene	3100	40	EPA 8260D	2-27-23	2-27-23	
Toluene	4700	200	EPA 8260D	2-27-23	2-27-23	
Ethylbenzene	1200	40	EPA 8260D	2-27-23	2-27-23	
m,p-Xylene	2600	80	EPA 8260D	2-27-23	2-27-23	
o-Xylene	810	40	EPA 8260D	2-27-23	2-27-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*106*	*75-127*				
Toluene-d8	*101*	*80-127*				
4-Bromofluorobenzene	*102*	*78-125*				
Client ID:	**IP-4**					
Laboratory ID:	02-283-09					
Benzene	27	10	EPA 8260D	3-2-23	3-2-23	
Toluene	81	50	EPA 8260D	3-2-23	3-2-23	
Ethylbenzene	1600	40	EPA 8260D	2-27-23	2-27-23	
m,p-Xylene	4300	80	EPA 8260D	2-27-23	2-27-23	
o-Xylene	2300	10	EPA 8260D	3-2-23	3-2-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*98*	*75-127*				
Toluene-d8	*103*	*80-127*				
4-Bromofluorobenzene	*103*	*78-125*				

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VOLATILE ORGANICS EPA 8260D

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**IP-7**					
Laboratory ID:	02-283-10					
Benzene	850	100	EPA 8260D	2-27-23	2-27-23	
Toluene	6700	500	EPA 8260D	2-27-23	2-27-23	
Ethylbenzene	2600	100	EPA 8260D	2-27-23	2-27-23	
m,p-Xylene	9900	200	EPA 8260D	2-27-23	2-27-23	
o-Xylene	3700	100	EPA 8260D	2-27-23	2-27-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*104*	*75-127*				
Toluene-d8	*102*	*80-127*				
4-Bromofluorobenzene	*102*	*78-125*				
Client ID:	**Dup-1**					
Laboratory ID:	02-283-11					
Benzene	43	4.0	EPA 8260D	2-27-23	2-27-23	
Toluene	44	20	EPA 8260D	2-27-23	2-27-23	
Ethylbenzene	390	4.0	EPA 8260D	2-27-23	2-27-23	
m,p-Xylene	590	8.0	EPA 8260D	2-27-23	2-27-23	
o-Xylene	280	4.0	EPA 8260D	2-27-23	2-27-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*105*	*75-127*				
Toluene-d8	*104*	*80-127*				
4-Bromofluorobenzene	*101*	*78-125*				

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VOLATILE ORGANICS EPA 8260D
QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0227W1					
Benzene	ND	0.20	EPA 8260D	2-27-23	2-27-23	
Toluene	ND	1.0	EPA 8260D	2-27-23	2-27-23	
Ethylbenzene	ND	0.20	EPA 8260D	2-27-23	2-27-23	
m,p-Xylene	ND	0.40	EPA 8260D	2-27-23	2-27-23	
o-Xylene	ND	0.20	EPA 8260D	2-27-23	2-27-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*103*	*75-127*				
Toluene-d8	*104*	*80-127*				
4-Bromofluorobenzene	*101*	*78-125*				
Laboratory ID:	MB0302W1					
Benzene	ND	0.20	EPA 8260D	3-2-23	3-2-23	
Toluene	ND	1.0	EPA 8260D	3-2-23	3-2-23	
Ethylbenzene	ND	0.20	EPA 8260D	3-2-23	3-2-23	
m,p-Xylene	ND	0.40	EPA 8260D	3-2-23	3-2-23	
o-Xylene	ND	0.20	EPA 8260D	3-2-23	3-2-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*101*	*75-127*				
Toluene-d8	*101*	*80-127*				
4-Bromofluorobenzene	*101*	*78-125*				

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VOLATILE ORGANICS EPA 8260D
QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB0227W1									
	SB	SBD	SB	SBD	SB	SBD				
Benzene	**9.34**	**9.51**	10.0	10.0	93	95	80-121	2	16	
Toluene	**9.07**	**9.26**	10.0	10.0	91	93	80-120	2	18	
Ethylbenzene	**8.95**	**9.05**	10.0	10.0	90	91	80-125	1	18	
m,p-Xylene	**17.8**	**18.0**	20.0	20.0	89	90	80-127	1	18	
o-Xylene	**8.94**	**9.06**	10.0	10.0	89	91	80-126	1	18	
1,2,3-Trichlorobenzene	**8.95**	**8.92**	10.0	10.0	90	89	75-146	0	28	
Surrogate:										
Dibromofluoromethane					*101*	*101*	*75-127*			
Toluene-d8					*103*	*103*	*80-127*			
4-Bromofluorobenzene					*105*	*104*	*78-125*			
Laboratory ID:	SB0302W1									
	SB	SBD	SB	SBD	SB	SBD				
Benzene	**10.5**	**10.9**	10.0	10.0	105	109	80-121	4	16	
Toluene	**10.0**	**10.1**	10.0	10.0	100	101	80-120	1	18	
Ethylbenzene	**9.73**	**9.76**	10.0	10.0	97	98	80-125	0	18	
m,p-Xylene	**19.0**	**18.9**	20.0	20.0	95	95	80-127	1	18	
o-Xylene	**9.34**	**9.47**	10.0	10.0	93	95	80-126	1	18	
1,2,3-Trichlorobenzene	**8.87**	**9.80**	10.0	10.0	89	98	75-146	10	28	
Surrogate:										
Dibromofluoromethane					*101*	*106*	*75-127*			
Toluene-d8					*102*	*104*	*80-127*			
4-Bromofluorobenzene					*104*	*106*	*78-125*			

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

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

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

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

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

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

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

I - Compound recovery is outside of the control limits.

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

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

L - The RPD is outside of the control limits.

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

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

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

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

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

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

Q - Surrogate recovery is outside of the control limits.

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

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

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

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

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

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

X - Sample extract treated with a mercury cleanup procedure.

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

X2 - Sample extract treated with a silica gel cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in methods 8260 & 8270, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Y1 - Negative effects of the matrix from this sample on the instrument caused values for this analyte in the bracketing continuing calibration verification standard (CCVs) to be outside of 20% acceptance criteria. Because of this, quantitation limits and sample concentrations should be considered estimates.

Z -

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

Chain of Custody

Page 1 of 2

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

Company: Atlas Geo NW / G-Logics
Project Number: 01-0410-R
Project Name: Boeing Field Chevron
Project Manager: Tom Cammarata
Sampled by: HVS

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

Laboratory Number: 02-283

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX (8021 ☐ 8260 ☒)	NWTPH-Gx	NWTPH-Dx (Acid / SG Clean-up ☐)	Volatiles 8260	Halogenated Volatiles 8260	EDB EPA 8011 (Waters Only)	Semivolatiles 8270/SIM (with low-level PAHs)	PAHs 8270/SIM (low-level)	PCBs 8082	Organochlorine Pesticides 8081	Organophosphorus Pesticides 8270/SIM	Chlorinated Acid Herbicides 8151	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664					% Moisture
1	TW-1	2/22/23	1105	GW	7		X		X																		
2	TW-2	2/22/23	0955	GW	7		X		X																		
3	TW-5	2/22/23	1310	GW	7		X		X																		
4	~~TW-5~~ TW-4 DS	2/22/23	1420	GW	7		X		X																		
5	IP-5	2/22/23	1525	GW	7		X		X																		
6	TW-3	2/22/23	1210	GW	6		X		X																		
7	AS-1	2/23/23	0815	GW	7		X		X																		
8	IP-3	2/23/23	0955	GW	7		X		X																		
9	IP-4	2/23/23	1105	GW	7		X		X																		
10	IP-7	2/23/23	1235	GW	7		X		X																		

	Signature	Company	Date	Time	Comments/Special Instructions
Relinquished	Hannah Spear	Atlas Geo	2/24/23	950	
Received	Van	Spdy	2/24/23	950	
Relinquished	Van	Spdy	2/24/23	1040	
Received		OSE	2/24/23	1040	
Relinquished					
Received					Data Package: Standard ☐ Level III ☐ Level IV ☐
Reviewed/Date		Reviewed/Date			Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☐

Chain of Custody

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

Company: Atlas GeoNW/G-Logics
Project Number: 01-0410-R
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Turnaround Request (in working days)
(Check One)
☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☒ Standard ~~(7 Days)~~ 5 days
☐ _____ (other)

Laboratory Number: 02-283

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX (8021☐ 8260☒)	NWTPH-Gx	NWTPH-Dx (Acid / SG Clean-up☐)	Volatiles 8260	Halogenated Volatiles 8260	EDB EPA 8011 (Waters Only)	Semivolatiles 8270/SIM (with low-level PAHs)	PAHs 8270/SIM (low-level)	PCBs 8082	Organochlorine Pesticides 8081	Organophosphorus Pesticides 8270/SIM	Chlorinated Acid Herbicides 8151	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664					% Moisture
11	[redacted] Dup-1	2/23/23	0800	GW	7		X		X																	

	Signature	Company	Date	Time
Relinquished	Hannah Speer	Atlas Geo	2/24/23	950
Received	Van	Spky	2/24/23	950
Relinquished	Van	Spky	2/24/23	1040
Received	[signature]	OSE	2/24/23	1040
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions

Data Package: Standard ☐ Level III ☐ Level IV ☐

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

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

May 3, 2023

Tom Cammarata
Atlas GeoSciences NW
PO Box 1009
Sumner, WA 98390

Re: Analytical Data for Project 01-0410-R
Laboratory Reference No. 2304-287

Dear Tom:

Enclosed are the analytical results and associated quality control data for samples submitted on April 26, 2023.

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

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

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: May 3, 2023
Samples Submitted: April 26, 2023
Laboratory Reference: 2304-287
Project: 01-0410-R

Case Narrative

Samples were collected on April 24 and 25, 2023 and received by the laboratory on April 26, 2023. They were maintained at the laboratory at a temperature of 2°C to 6°C.

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

NWTPH-Dx

In samples AS-1 and IP-3, the surrogate percent recovery was below the control limit of 50% due to matrix effects.

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

Date of Report: May 3, 2023
Samples Submitted: April 26, 2023
Laboratory Reference: 2304-287
Project: 01-0410-R

GASOLINE RANGE ORGANICS
NWTPH-Gx

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**TW-2**					
Laboratory ID:	04-287-01					
Gasoline	**330**	100	NWTPH-Gx	5-2-23	5-2-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*85*	*65-122*				
Client ID:	**TW-1**					
Laboratory ID:	04-287-02					
Gasoline	**ND**	100	NWTPH-Gx	4-28-23	4-28-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*89*	*65-122*				
Client ID:	**TW-3**					
Laboratory ID:	04-287-03					
Gasoline	**13000**	500	NWTPH-Gx	5-2-23	5-2-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*99*	*65-122*				
Client ID:	**TW-5**					
Laboratory ID:	04-287-04					
Gasoline	**150000**	10000	NWTPH-Gx	4-28-23	4-28-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*88*	*65-122*				
Client ID:	**TW-4**					
Laboratory ID:	04-287-05					
Gasoline	**ND**	100	NWTPH-Gx	5-2-23	5-2-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*86*	*65-122*				
Client ID:	**IP-5**					
Laboratory ID:	04-287-06					
Gasoline	**14000**	500	NWTPH-Gx	5-2-23	5-2-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*103*	*65-122*				
Client ID:	**Dup-1**					
Laboratory ID:	04-287-07					
Gasoline	**ND**	100	NWTPH-Gx	4-28-23	4-28-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*86*	*65-122*				

Date of Report: May 3, 2023
Samples Submitted: April 26, 2023
Laboratory Reference: 2304-287
Project: 01-0410-R

GASOLINE RANGE ORGANICS
NWTPH-Gx

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**AS-1**					
Laboratory ID:	04-287-08					
Gasoline	**3000**	500	NWTPH-Gx	4-28-23	4-28-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*87*	*65-122*				
Client ID:	**IP-3**					
Laboratory ID:	04-287-09					
Gasoline	**21000**	5000	NWTPH-Gx	4-28-23	4-28-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*91*	*65-122*				
Client ID:	**IP-4**					
Laboratory ID:	04-287-10					
Gasoline	**57000**	5000	NWTPH-Gx	4-28-23	4-28-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*89*	*65-122*				
Client ID:	**IP-7**					
Laboratory ID:	04-287-11					
Gasoline	**53000**	5000	NWTPH-Gx	4-28-23	4-28-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*89*	*65-122*				

Date of Report: May 3, 2023
Samples Submitted: April 26, 2023
Laboratory Reference: 2304-287
Project: 01-0410-R

GASOLINE RANGE ORGANICS
NWTPH-Gx
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0502W1					
Gasoline	**ND**	100	NWTPH-Gx	5-2-23	5-2-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*86*	*65-122*				
Laboratory ID:	MB0428W2					
Gasoline	**ND**	100	NWTPH-Gx	4-28-23	4-28-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*88*	*65-122*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	04-316-02										
	ORIG	DUP									
Gasoline	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Surrogate:											
Fluorobenzene						*85*	*78*	*65-122*			
Laboratory ID:	05-012-02										
	ORIG	DUP									
Gasoline	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Surrogate:											
Fluorobenzene						*83*	*84*	*65-122*			

Date of Report: May 3, 2023
Samples Submitted: April 26, 2023
Laboratory Reference: 2304-287
Project: 01-0410-R

VOLATILE ORGANICS EPA 8260D

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**TW-2**					
Laboratory ID:	04-287-01					
Benzene	ND	0.40	EPA 8260D	4-27-23	4-27-23	
Toluene	7.1	2.0	EPA 8260D	4-27-23	4-27-23	
Ethylbenzene	5.6	0.40	EPA 8260D	4-27-23	4-27-23	
m,p-Xylene	22	0.80	EPA 8260D	4-27-23	4-27-23	
o-Xylene	8.7	0.40	EPA 8260D	4-27-23	4-27-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*90*	*75-127*				
Toluene-d8	*96*	*80-127*				
4-Bromofluorobenzene	*91*	*78-125*				
Client ID:	**TW-1**					
Laboratory ID:	04-287-02					
Benzene	ND	0.20	EPA 8260D	4-27-23	4-27-23	
Toluene	ND	1.0	EPA 8260D	4-27-23	4-27-23	
Ethylbenzene	ND	0.20	EPA 8260D	4-27-23	4-27-23	
m,p-Xylene	ND	0.40	EPA 8260D	4-27-23	4-27-23	
o-Xylene	ND	0.20	EPA 8260D	4-27-23	4-27-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*91*	*75-127*				
Toluene-d8	*95*	*80-127*				
4-Bromofluorobenzene	*90*	*78-125*				
Client ID:	**TW-3**					
Laboratory ID:	04-287-03					
Benzene	2400	10	EPA 8260D	4-27-23	4-27-23	
Toluene	96	50	EPA 8260D	4-27-23	4-27-23	
Ethylbenzene	1600	10	EPA 8260D	4-27-23	4-27-23	
m,p-Xylene	1500	20	EPA 8260D	4-27-23	4-27-23	
o-Xylene	400	10	EPA 8260D	4-27-23	4-27-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*79*	*75-127*				
Toluene-d8	*93*	*80-127*				
4-Bromofluorobenzene	*88*	*78-125*				

Date of Report: May 3, 2023
Samples Submitted: April 26, 2023
Laboratory Reference: 2304-287
Project: 01-0410-R

VOLATILE ORGANICS EPA 8260D

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**TW-5**					
Laboratory ID:	04-287-04					
Benzene	220	100	EPA 8260D	4-27-23	4-27-23	
Toluene	25000	1000	EPA 8260D	4-27-23	4-27-23	
Ethylbenzene	5400	100	EPA 8260D	4-27-23	4-27-23	
m,p-Xylene	19000	200	EPA 8260D	4-27-23	4-27-23	
o-Xylene	7700	100	EPA 8260D	4-27-23	4-27-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*82*	*75-127*				
Toluene-d8	*94*	*80-127*				
4-Bromofluorobenzene	*90*	*78-125*				
Client ID:	**TW-4**					
Laboratory ID:	04-287-05					
Benzene	ND	0.40	EPA 8260D	4-27-23	4-27-23	
Toluene	ND	2.0	EPA 8260D	4-27-23	4-27-23	
Ethylbenzene	0.86	0.40	EPA 8260D	4-27-23	4-27-23	
m,p-Xylene	3.1	0.80	EPA 8260D	4-27-23	4-27-23	
o-Xylene	1.3	0.40	EPA 8260D	4-27-23	4-27-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*89*	*75-127*				
Toluene-d8	*95*	*80-127*				
4-Bromofluorobenzene	*89*	*78-125*				
Client ID:	**IP-5**					
Laboratory ID:	04-287-06					
Benzene	1700	10	EPA 8260D	4-27-23	4-27-23	
Toluene	190	50	EPA 8260D	4-27-23	4-27-23	
Ethylbenzene	860	10	EPA 8260D	4-27-23	4-27-23	
m,p-Xylene	1800	20	EPA 8260D	4-27-23	4-27-23	
o-Xylene	250	10	EPA 8260D	4-27-23	4-27-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*82*	*75-127*				
Toluene-d8	*94*	*80-127*				
4-Bromofluorobenzene	*90*	*78-125*				

Date of Report: May 3, 2023
Samples Submitted: April 26, 2023
Laboratory Reference: 2304-287
Project: 01-0410-R

VOLATILE ORGANICS EPA 8260D

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**Dup-1**					
Laboratory ID:	04-287-07					
Benzene	ND	0.20	EPA 8260D	4-27-23	4-27-23	
Toluene	ND	1.0	EPA 8260D	4-27-23	4-27-23	
Ethylbenzene	ND	0.20	EPA 8260D	4-27-23	4-27-23	
m,p-Xylene	ND	0.40	EPA 8260D	4-27-23	4-27-23	
o-Xylene	ND	0.20	EPA 8260D	4-27-23	4-27-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*91*	*75-127*				
Toluene-d8	*96*	*80-127*				
4-Bromofluorobenzene	*87*	*78-125*				
Client ID:	**AS-1**					
Laboratory ID:	04-287-08					
Benzene	16	1.0	EPA 8260D	4-27-23	4-27-23	
Toluene	15	5.0	EPA 8260D	4-27-23	4-27-23	
Ethylbenzene	150	1.0	EPA 8260D	4-27-23	4-27-23	
m,p-Xylene	240	2.0	EPA 8260D	4-27-23	4-27-23	
o-Xylene	110	1.0	EPA 8260D	4-27-23	4-27-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*81*	*75-127*				
Toluene-d8	*94*	*80-127*				
4-Bromofluorobenzene	*91*	*78-125*				
Client ID:	**IP-3**					
Laboratory ID:	04-287-09					
Benzene	2100	20	EPA 8260D	4-27-23	4-27-23	
Toluene	3700	100	EPA 8260D	4-27-23	4-27-23	
Ethylbenzene	1200	20	EPA 8260D	4-27-23	4-27-23	
m,p-Xylene	2800	40	EPA 8260D	4-27-23	4-27-23	
o-Xylene	920	20	EPA 8260D	4-27-23	4-27-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*80*	*75-127*				
Toluene-d8	*93*	*80-127*				
4-Bromofluorobenzene	*89*	*78-125*				

Date of Report: May 3, 2023
Samples Submitted: April 26, 2023
Laboratory Reference: 2304-287
Project: 01-0410-R

VOLATILE ORGANICS EPA 8260D

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**IP-4**					
Laboratory ID:	04-287-10					
Benzene	26	20	EPA 8260D	4-27-23	4-27-23	
Toluene	110	100	EPA 8260D	4-27-23	4-27-23	
Ethylbenzene	3100	20	EPA 8260D	4-27-23	4-27-23	
m,p-Xylene	8100	40	EPA 8260D	4-27-23	4-27-23	
o-Xylene	2700	20	EPA 8260D	4-27-23	4-27-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*79*	*75-127*				
Toluene-d8	*93*	*80-127*				
4-Bromofluorobenzene	*91*	*78-125*				
Client ID:	**IP-7**					
Laboratory ID:	04-287-11					
Benzene	450	30	EPA 8260D	4-27-23	4-27-23	
Toluene	4400	150	EPA 8260D	4-27-23	4-27-23	
Ethylbenzene	2300	30	EPA 8260D	4-27-23	4-27-23	
m,p-Xylene	8700	60	EPA 8260D	4-27-23	4-27-23	
o-Xylene	3200	30	EPA 8260D	4-27-23	4-27-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*79*	*75-127*				
Toluene-d8	*93*	*80-127*				
4-Bromofluorobenzene	*90*	*78-125*				

Date of Report: May 3, 2023
Samples Submitted: April 26, 2023
Laboratory Reference: 2304-287
Project: 01-0410-R

VOLATILE ORGANICS EPA 8260D
QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0427W1					
Benzene	ND	0.20	EPA 8260D	4-27-23	4-27-23	
Toluene	ND	1.0	EPA 8260D	4-27-23	4-27-23	
Ethylbenzene	ND	0.20	EPA 8260D	4-27-23	4-27-23	
m,p-Xylene	ND	0.40	EPA 8260D	4-27-23	4-27-23	
o-Xylene	ND	0.20	EPA 8260D	4-27-23	4-27-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*91*	*75-127*				
Toluene-d8	*96*	*80-127*				
4-Bromofluorobenzene	*89*	*78-125*				

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB0427W1									
	SB	SBD	SB	SBD	SB	SBD				
Benzene	**9.96**	**10.0**	10.0	10.0	100	100	80-121	0	16	
Toluene	**9.82**	**9.81**	10.0	10.0	98	98	80-120	0	18	
Ethylbenzene	**11.1**	**11.2**	10.0	10.0	111	112	80-125	1	18	
m,p-Xylene	**22.2**	**22.4**	20.0	20.0	111	112	80-127	1	18	
o-Xylene	**11.1**	**11.2**	10.0	10.0	111	112	80-126	1	18	
Surrogate:										
Dibromofluoromethane					*89*	*90*	*75-127*			
Toluene-d8					*97*	*97*	*80-127*			
4-Bromofluorobenzene					*95*	*95*	*78-125*			

Date of Report: May 3, 2023
Samples Submitted: April 26, 2023
Laboratory Reference: 2304-287
Project: 01-0410-R

DIESEL AND HEAVY OIL RANGE ORGANICS
NWTPH-Dx

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**TW-2**					
Laboratory ID:	04-287-01					
Diesel Range Organics	**ND**	210	NWTPH-Dx	4-27-23	4-27-23	
Lube Oil Range Organics	**ND**	220	NWTPH-Dx	4-27-23	4-27-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*92*	*50-150*				
Client ID:	**TW-1**					
Laboratory ID:	04-287-02					
Diesel Range Organics	**ND**	210	NWTPH-Dx	4-27-23	4-27-23	
Lube Oil Range Organics	**ND**	220	NWTPH-Dx	4-27-23	4-27-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*80*	*50-150*				
Client ID:	**TW-3**					
Laboratory ID:	04-287-03					
Diesel Range Organics	**ND**	3700	NWTPH-Dx	4-27-23	4-27-23	M1,U1
Lube Oil Range Organics	**350**	220	NWTPH-Dx	4-27-23	4-27-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*87*	*50-150*				
Client ID:	**TW-5**					
Laboratory ID:	04-287-04					
Diesel Range Organics	**ND**	4400	NWTPH-Dx	4-27-23	4-27-23	M1,U1
Lube Oil Range Organics	**330**	220	NWTPH-Dx	4-27-23	4-27-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*62*	*50-150*				
Client ID:	**TW-4**					
Laboratory ID:	04-287-05					
Diesel Range Organics	**ND**	230	NWTPH-Dx	4-27-23	4-27-23	
Lube Oil Range Organics	**ND**	230	NWTPH-Dx	4-27-23	4-27-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*69*	*50-150*				
Client ID:	**IP-5**					
Laboratory ID:	04-287-06					
Diesel Range Organics	**ND**	2000	NWTPH-Dx	4-27-23	4-27-23	M1,U1
Lube Oil Range Organics	**460**	220	NWTPH-Dx	4-27-23	4-27-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*59*	*50-150*				

Date of Report: May 3, 2023
Samples Submitted: April 26, 2023
Laboratory Reference: 2304-287
Project: 01-0410-R

DIESEL AND HEAVY OIL RANGE ORGANICS
NWTPH-Dx

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**Dup-1**					
Laboratory ID:	04-287-07					
Diesel Range Organics	**ND**	210	NWTPH-Dx	4-27-23	4-27-23	
Lube Oil Range Organics	**ND**	220	NWTPH-Dx	4-27-23	4-27-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*72*	*50-150*				
Client ID:	**AS-1**					
Laboratory ID:	04-287-08					
Diesel Range Organics	**ND**	450	NWTPH-Dx	4-27-23	4-27-23	M1,U1
Lube Oil Range Organics	**ND**	220	NWTPH-Dx	4-27-23	4-27-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*26*	*50-150*				Q
Client ID:	**IP-3**					
Laboratory ID:	04-287-09					
Diesel Range Organics	**ND**	930	NWTPH-Dx	4-27-23	4-27-23	M1,U1
Lube Oil Range Organics	**ND**	210	NWTPH-Dx	4-27-23	4-27-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*48*	*50-150*				Q
Client ID:	**IP-4**					
Laboratory ID:	04-287-10					
Diesel Range Organics	**ND**	4500	NWTPH-Dx	4-27-23	4-27-23	M1,U1
Lube Oil Range Organics	**320**	220	NWTPH-Dx	4-27-23	4-27-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*75*	*50-150*				
Client ID:	**IP-7**					
Laboratory ID:	04-287-11					
Diesel Range Organics	**ND**	2200	NWTPH-Dx	4-27-23	4-27-23	M1,U1
Lube Oil Range Organics	**260**	210	NWTPH-Dx	4-27-23	4-27-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*69*	*50-150*				

Date of Report: May 3, 2023
Samples Submitted: April 26, 2023
Laboratory Reference: 2304-287
Project: 01-0410-R

DIESEL AND HEAVY OIL RANGE ORGANICS
NWTPH-Dx
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0427W1					
Diesel Range Organics	**ND**	160	NWTPH-Dx	4-27-23	4-27-23	
Lube Oil Range Organics	**ND**	160	NWTPH-Dx	4-27-23	4-27-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*108*	*50-150*				

Analyte	Result		Spike Level		Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE										
Laboratory ID:	04-287-01									
	ORIG	DUP								
Diesel Range	**ND**	**ND**	NA	NA		NA	NA	NA	NA	
Lube Oil Range	**ND**	**ND**	NA	NA		NA	NA	NA	NA	
Surrogate:										
o-Terphenyl						*92* *74*	*50-150*			

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

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

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

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

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

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

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

I - Compound recovery is outside of the control limits.

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

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

L - The RPD is outside of the control limits.

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

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

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

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

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

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

Q - Surrogate recovery is outside of the control limits.

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

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

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

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

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

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

X - Sample extract treated with a mercury cleanup procedure.

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

X2 - Sample extract treated with a silica gel cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in methods 8260 & 8270, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Y1 - Negative effects of the matrix from this sample on the instrument caused values for this analyte in the bracketing continuing calibration verification standard (CCVs) to be outside of 20% acceptance criteria. Because of this, quantitation limits and sample concentrations should be considered estimates.

Z -

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

Chain of Custody

Page 1 of 2

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

Company: Atlas Geosciences NW
Project Number: 01-0410-R
Project Name: Boeing Field Chevron
Project Manager: Tom Caminavatta
Sampled by: HVS

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

Laboratory Number: 04-287

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX (8021☐ 8260☒)	NWTPH-Gx	NWTPH-Dx (SG Clean-up☐)	Volatiles 8260	Halogenated Volatiles 8260	EDB EPA 8011 (Waters Only)	Semivolatiles 8270/SIM (with low-level PAHs)	PAHs 8270/SIM (low-level)	PCBs 8082	Organochlorine Pesticides 8081	Organophosphorus Pesticides 8270/SIM	Chlorinated Acid Herbicides 8151	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664	% Moisture
1	TW-2	4/24/23	0940	GW	7		X		X														
2	TW-1	4/24/23	1030	GW	7		X		X														
3	TW-3	4/24/23	1140	GW	7		X		X														
4	TW-5	4/24/23	1255	GW	7		X		X														
5	TW-4	4/24/23	1355	GW	7		X		X														
6	IP-5	4/24/23	1515	GW	7		X		X														
7	Dup-1	4/24/23	0800	GW	7		X		X														
8	AS-1	4/25/23	0835	GW	7		X		X														
9	IP-3	4/25/23	0950	GW	7		X		X														
10	IP-4	4/25/23	1050	GW	7		X		X														

	Signature	Company	Date	Time
Relinquished		Atlas Geo NW	4/26/23	1200
Received	Tom Vann	spdy	4/26/23	1200
Relinquished		spdy	4/26/23	1325
Received		OSE	4/26/23	1325
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions

Data Package: Standard ☐ Level III ☐ Level IV ☐

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

Chain of Custody

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

Company: Atlas Geosciences NW
Project Number: 01-0410-R
Project Name: Boeing Field Chevron
Project Manager: Tom Cammaratta
Sampled by: HVS

Turnaround Request (in working days)

(Check One)

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

Laboratory Number: 04-287

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX (8021☐ 8260☒)	NWTPH-Gx	NWTPH-Dx (SG Clean-up ☐)	Volatiles 8260	Halogenated Volatiles 8260	EDB EPA 8011 (Waters Only)	Semivolatiles 8270/SIM (with low-level PAHs)	PAHs 8270/SIM (low-level)	PCBs 8082	Organochlorine Pesticides 8081	Organophosphorus Pesticides 8270/SIM	Chlorinated Acid Herbicides 8151	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664	% Moisture
11	IP-7	4/25/23	1215	GW	7		X		X														

	Signature	Company	Date	Time
Relinquished		Atlas Geo NW	4/26/23	1200
Received	Vam	SpSey	4/26/23	1200
Relinquished	Vam	SpSey	4/26/23	1325
Received		OSE	4/26/23	1325
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions

Data Package: Standard ☐ Level III ☐ Level IV ☐

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

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

July 28, 2023

Tom Commarata
G-Logics an Atlas Geoscience NW Company
40 2nd Avenue SE
Issaquah, WA 98027-3452

Re: Analytical Data for Project 01-0410-R
Laboratory Reference No. 2307-174

Dear Tom:

Enclosed are the analytical results and associated quality control data for samples submitted on July 21, 2023.

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

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

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: July 28, 2023
Samples Submitted: July 21, 2023
Laboratory Reference: 2307-174
Project: 01-0410-R

Case Narrative

Samples were collected on July 19 and 20, 2023 and received by the laboratory on July 21, 2023. They were maintained at the laboratory at a temperature of 2°C to 6°C.

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

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

NWTPH-Dx Analysis

The surrogate percent recovery in samples TW-5 and AS-1 were below the control limit of 50% due to matrix effects.

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

Date of Report: July 28, 2023
Samples Submitted: July 21, 2023
Laboratory Reference: 2307-174
Project: 01-0410-R

GASOLINE RANGE ORGANICS
NWTPH-Gx

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**DUP-1**					
Laboratory ID:	07-174-01					
Gasoline	**ND**	100	NWTPH-Gx	7-24-23	7-24-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*89*	*65-122*				
Client ID:	**TW-1**					
Laboratory ID:	07-174-02					
Gasoline	**ND**	100	NWTPH-Gx	7-24-23	7-24-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*83*	*65-122*				
Client ID:	**TW-2**					
Laboratory ID:	07-174-03					
Gasoline	**7400**	1000	NWTPH-Gx	7-25-23	7-25-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*83*	*65-122*				
Client ID:	**TW-5**					
Laboratory ID:	07-174-04					
Gasoline	**150000**	5000	NWTPH-Gx	7-24-23	7-24-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*86*	*65-122*				
Client ID:	**TW-4**					
Laboratory ID:	07-174-05					
Gasoline	**ND**	100	NWTPH-Gx	7-24-23	7-24-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*84*	*65-122*				
Client ID:	**IP-5**					
Laboratory ID:	07-174-06					
Gasoline	**25000**	5000	NWTPH-Gx	7-24-23	7-24-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*90*	*65-122*				
Client ID:	**AS-1**					
Laboratory ID:	07-174-07					
Gasoline	**2900**	500	NWTPH-Gx	7-24-23	7-24-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*85*	*65-122*				

Date of Report: July 28, 2023
Samples Submitted: July 21, 2023
Laboratory Reference: 2307-174
Project: 01-0410-R

GASOLINE RANGE ORGANICS
NWTPH-Gx

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**IP-3**					
Laboratory ID:	07-174-08					
Gasoline	**20000**	1000	NWTPH-Gx	7-24-23	7-24-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*92*	*65-122*				
Client ID:	**IP-4**					
Laboratory ID:	07-174-09					
Gasoline	**66000**	5000	NWTPH-Gx	7-24-23	7-24-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*86*	*65-122*				
Client ID:	**IP-7**					
Laboratory ID:	07-174-10					
Gasoline	**54000**	5000	NWTPH-Gx	7-24-23	7-24-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*86*	*65-122*				

Date of Report: July 28, 2023
Samples Submitted: July 21, 2023
Laboratory Reference: 2307-174
Project: 01-0410-R

GASOLINE RANGE ORGANICS
NWTPH-Gx
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0724W3					
Gasoline	**ND**	100	NWTPH-Gx	7-24-23	7-24-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*83*	*65-122*				
Laboratory ID:	MB0725W1					
Gasoline	**ND**	100	NWTPH-Gx	7-25-23	7-25-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*83*	*65-122*				

Analyte	Result		Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE									
Laboratory ID:	07-174-02								
	ORIG	DUP							
Gasoline	**ND**	**ND**	NA	NA	NA	NA	NA	30	
Surrogate:									
Fluorobenzene					*83*	*77*	*65-122*		
Laboratory ID:	07-174-03								
	ORIG	DUP							
Gasoline	**741**	**699**	NA	NA	NA	NA	6	30	
Surrogate:									
Fluorobenzene					*83*	*79*	*65-122*		

Date of Report: July 28, 2023
Samples Submitted: July 21, 2023
Laboratory Reference: 2307-174
Project: 01-0410-R

VOLATILE ORGANICS EPA 8260D

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**Dup-1**					
Laboratory ID:	07-174-01					
Benzene	0.33	0.20	EPA 8260D	7-24-23	7-24-23	
Toluene	1.2	1.0	EPA 8260D	7-24-23	7-24-23	
Ethylbenzene	0.99	0.20	EPA 8260D	7-24-23	7-24-23	
m,p-Xylene	3.9	0.40	EPA 8260D	7-24-23	7-24-23	
o-Xylene	1.6	0.20	EPA 8260D	7-24-23	7-24-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*97*	*75-127*				
Toluene-d8	*102*	*80-127*				
4-Bromofluorobenzene	*99*	*78-125*				
Client ID:	**TW-1**					
Laboratory ID:	07-174-02					
Benzene	0.30	0.20	EPA 8260D	7-24-23	7-24-23	
Toluene	1.1	1.0	EPA 8260D	7-24-23	7-24-23	
Ethylbenzene	0.89	0.20	EPA 8260D	7-24-23	7-24-23	
m,p-Xylene	3.5	0.40	EPA 8260D	7-24-23	7-24-23	
o-Xylene	1.4	0.20	EPA 8260D	7-24-23	7-24-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*95*	*75-127*				
Toluene-d8	*101*	*80-127*				
4-Bromofluorobenzene	*98*	*78-125*				
Client ID:	**TW-2**					
Laboratory ID:	07-174-03					
Benzene	1.3	1.0	EPA 8260D	7-24-23	7-24-23	
Toluene	28	5.0	EPA 8260D	7-24-23	7-24-23	
Ethylbenzene	18	1.0	EPA 8260D	7-24-23	7-24-23	
m,p-Xylene	66	2.0	EPA 8260D	7-24-23	7-24-23	
o-Xylene	24	1.0	EPA 8260D	7-24-23	7-24-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*99*	*75-127*				
Toluene-d8	*100*	*80-127*				
4-Bromofluorobenzene	*99*	*78-125*				

Date of Report: July 28, 2023
Samples Submitted: July 21, 2023
Laboratory Reference: 2307-174
Project: 01-0410-R

VOLATILE ORGANICS EPA 8260D

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**TW-5**					
Laboratory ID:	07-174-04					
Benzene	340	200	EPA 8260D	7-25-23	7-25-23	
Toluene	41000	1000	EPA 8260D	7-25-23	7-25-23	
Ethylbenzene	5800	200	EPA 8260D	7-25-23	7-25-23	
m,p-Xylene	20000	400	EPA 8260D	7-25-23	7-25-23	
o-Xylene	9000	200	EPA 8260D	7-25-23	7-25-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*110*	*75-127*				
Toluene-d8	*107*	*80-127*				
4-Bromofluorobenzene	*97*	*78-125*				
Client ID:	**TW-4**					
Laboratory ID:	07-174-05					
Benzene	ND	0.20	EPA 8260D	7-24-23	7-24-23	
Toluene	ND	1.0	EPA 8260D	7-24-23	7-24-23	
Ethylbenzene	ND	0.20	EPA 8260D	7-24-23	7-24-23	
m,p-Xylene	0.41	0.40	EPA 8260D	7-24-23	7-24-23	
o-Xylene	ND	0.20	EPA 8260D	7-24-23	7-24-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*99*	*75-127*				
Toluene-d8	*103*	*80-127*				
4-Bromofluorobenzene	*99*	*78-125*				
Client ID:	**IP-5**					
Laboratory ID:	07-174-06					
Benzene	4900	50	EPA 8260D	7-24-23	7-24-23	
Toluene	3000	250	EPA 8260D	7-24-23	7-24-23	
Ethylbenzene	1400	50	EPA 8260D	7-24-23	7-24-23	
m,p-Xylene	2700	100	EPA 8260D	7-24-23	7-24-23	
o-Xylene	540	50	EPA 8260D	7-24-23	7-24-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*102*	*75-127*				
Toluene-d8	*102*	*80-127*				
4-Bromofluorobenzene	*101*	*78-125*				

Date of Report: July 28, 2023
Samples Submitted: July 21, 2023
Laboratory Reference: 2307-174
Project: 01-0410-R

VOLATILE ORGANICS EPA 8260D

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**AS-1**					
Laboratory ID:	07-174-07					
Benzene	25	2.0	EPA 8260D	7-24-23	7-24-23	
Toluene	18	10	EPA 8260D	7-24-23	7-24-23	
Ethylbenzene	150	2.0	EPA 8260D	7-24-23	7-24-23	
m,p-Xylene	270	4.0	EPA 8260D	7-24-23	7-24-23	
o-Xylene	110	2.0	EPA 8260D	7-24-23	7-24-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*98*	*75-127*				
Toluene-d8	*101*	*80-127*				
4-Bromofluorobenzene	*102*	*78-125*				
Client ID:	**IP-3**					
Laboratory ID:	07-174-08					
Benzene	1100	20	EPA 8260D	7-24-23	7-24-23	
Toluene	1600	100	EPA 8260D	7-24-23	7-24-23	
Ethylbenzene	1300	20	EPA 8260D	7-24-23	7-24-23	
m,p-Xylene	2800	40	EPA 8260D	7-24-23	7-24-23	
o-Xylene	400	20	EPA 8260D	7-24-23	7-24-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*102*	*75-127*				
Toluene-d8	*103*	*80-127*				
4-Bromofluorobenzene	*100*	*78-125*				
Client ID:	**IP-4**					
Laboratory ID:	07-174-09					
Benzene	41	20	EPA 8260D	7-25-23	7-25-23	
Toluene	340	100	EPA 8260D	7-25-23	7-25-23	
Ethylbenzene	4800	20	EPA 8260D	7-25-23	7-25-23	
m,p-Xylene	8900	200	EPA 8260D	7-24-23	7-24-23	
o-Xylene	3200	20	EPA 8260D	7-25-23	7-25-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*116*	*75-127*				
Toluene-d8	*109*	*80-127*				
4-Bromofluorobenzene	*104*	*78-125*				

Date of Report: July 28, 2023
Samples Submitted: July 21, 2023
Laboratory Reference: 2307-174
Project: 01-0410-R

VOLATILE ORGANICS EPA 8260D

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**IP-7**					
Laboratory ID:	07-174-10					
Benzene	840	100	EPA 8260D	7-24-23	7-24-23	
Toluene	5300	500	EPA 8260D	7-24-23	7-24-23	
Ethylbenzene	2500	100	EPA 8260D	7-24-23	7-24-23	
m,p-Xylene	9200	200	EPA 8260D	7-24-23	7-24-23	
o-Xylene	3300	100	EPA 8260D	7-24-23	7-24-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*100*	*75-127*				
Toluene-d8	*102*	*80-127*				
4-Bromofluorobenzene	*101*	*78-125*				

Date of Report: July 28, 2023
Samples Submitted: July 21, 2023
Laboratory Reference: 2307-174
Project: 01-0410-R

VOLATILE ORGANICS EPA 8260D
QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0724W1					
Benzene	ND	0.20	EPA 8260D	7-24-23	7-24-23	
Toluene	ND	1.0	EPA 8260D	7-24-23	7-24-23	
Ethylbenzene	ND	0.20	EPA 8260D	7-24-23	7-24-23	
m,p-Xylene	ND	0.40	EPA 8260D	7-24-23	7-24-23	
o-Xylene	ND	0.20	EPA 8260D	7-24-23	7-24-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*96*	*75-127*				
Toluene-d8	*100*	*80-127*				
4-Bromofluorobenzene	*98*	*78-125*				
Laboratory ID:	MB0725W2					
Benzene	ND	0.20	EPA 8260D	7-25-23	7-25-23	
Toluene	ND	1.0	EPA 8260D	7-25-23	7-25-23	
Ethylbenzene	ND	0.20	EPA 8260D	7-25-23	7-25-23	
m,p-Xylene	ND	0.40	EPA 8260D	7-25-23	7-25-23	
o-Xylene	ND	0.20	EPA 8260D	7-25-23	7-25-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*112*	*75-127*				
Toluene-d8	*107*	*80-127*				
4-Bromofluorobenzene	*98*	*78-125*				

Date of Report: July 28, 2023
Samples Submitted: July 21, 2023
Laboratory Reference: 2307-174
Project: 01-0410-R

VOLATILE ORGANICS EPA 8260D
QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB0724W1									
	SB	SBD	SB	SBD	SB	SBD				
Benzene	**9.66**	**9.59**	10.0	10.0	97	96	80-121	1	16	
Toluene	**9.36**	**9.28**	10.0	10.0	94	93	80-120	1	18	
Ethylbenzene	**9.54**	**9.55**	10.0	10.0	95	96	80-125	0	18	
m,p-Xylene	**19.4**	**19.4**	20.0	20.0	97	97	80-127	0	18	
o-Xylene	**9.36**	**9.42**	10.0	10.0	94	94	80-126	1	18	
Surrogate:										
Dibromofluoromethane					*96*	*95*	*75-127*			
Toluene-d8					*100*	*100*	*80-127*			
4-Bromofluorobenzene					*101*	*100*	*78-125*			
Laboratory ID:	SB0725W2									
	SB	SBD	SB	SBD	SB	SBD				
Benzene	**11.5**	**10.7**	10.0	10.0	115	107	80-121	7	16	
Toluene	**10.7**	**10.2**	10.0	10.0	107	102	80-120	5	18	
Ethylbenzene	**10.8**	**10.8**	10.0	10.0	108	108	80-125	0	18	
m,p-Xylene	**21.8**	**21.9**	20.0	20.0	109	110	80-127	0	18	
o-Xylene	**11.1**	**11.1**	10.0	10.0	111	111	80-126	0	18	
Surrogate:										
Dibromofluoromethane					*122*	*112*	*75-127*			
Toluene-d8					*107*	*105*	*80-127*			
4-Bromofluorobenzene					*100*	*98*	*78-125*			

Date of Report: July 28, 2023
Samples Submitted: July 21, 2023
Laboratory Reference: 2307-174
Project: 01-0410-R

DIESEL AND HEAVY OIL RANGE ORGANICS
NWTPH-Dx

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**DUP-1**					
Laboratory ID:	07-174-01					
Diesel Range Organics	**230**	110	NWTPH-Dx	7-25-23	7-25-23	
Lube Oil Range Organics	**570**	210	NWTPH-Dx	7-25-23	7-25-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*92*	*50-150*				
Client ID:	**TW-1**					
Laboratory ID:	07-174-02					
Diesel Range Organics	**170.00**	110.00	NWTPH-Dx	7-25-23	7-25-23	
Lube Oil Range Organics	**300.00**	210.00	NWTPH-Dx	7-25-23	7-25-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*77*	*50-150*				
Client ID:	**TW-2**					
Laboratory ID:	07-174-03					
Diesel Range Organics	**170**	140	NWTPH-Dx	7-25-23	7-25-23	
Lube Oil Range Organics	**600**	280	NWTPH-Dx	7-25-23	7-25-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*74*	*50-150*				
Client ID:	**TW-5**					
Laboratory ID:	07-174-04					
Diesel Range Organics	**3400**	10	NWTPH-Dx	7-25-23	7-25-23	M
Lube Oil Range Organics	**440**	210	NWTPH-Dx	7-25-23	7-25-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*36*	*50-150*				Q
Client ID:	**TW-4**					
Laboratory ID:	07-174-05					
Diesel Range Organics	**120**	110	NWTPH-Dx	7-25-23	7-25-23	
Lube Oil Range Organics	**300**	220	NWTPH-Dx	7-25-23	7-25-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*74*	*50-150*				
Client ID:	**IP-5**					
Laboratory ID:	07-174-06					
Diesel Range Organics	**2600**	110	NWTPH-Dx	7-25-23	7-25-23	M
Lube Oil Range Organics	**430**	220	NWTPH-Dx	7-25-23	7-25-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*51*	*50-150*				

Date of Report: July 28, 2023
Samples Submitted: July 21, 2023
Laboratory Reference: 2307-174
Project: 01-0410-R

DIESEL AND HEAVY OIL RANGE ORGANICS
NWTPH-Dx

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**AS-1**					
Laboratory ID:	07-174-07					
Diesel Range Organics	**720**	110	NWTPH-Dx	7-25-23	7-25-23	M
Lube Oil Range Organics	**ND**	220	NWTPH-Dx	7-25-23	7-25-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*44*	*50-150*				Q
Client ID:	**IP-3**					
Laboratory ID:	07-174-08					
Diesel Range Organics	**1600**	100	NWTPH-Dx	7-25-23	7-25-23	M
Lube Oil Range Organics	**400**	210	NWTPH-Dx	7-25-23	7-25-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*65*	*50-150*				
Client ID:	**IP-4**					
Laboratory ID:	07-174-09					
Diesel Range Organics	**6300**	110	NWTPH-Dx	7-25-23	7-25-23	M
Lube Oil Range Organics	**570**	210	NWTPH-Dx	7-25-23	7-25-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*83*	*50-150*				
Client ID:	**IP-7**					
Laboratory ID:	07-174-10					
Diesel Range Organics	**4000**	110	NWTPH-Dx	7-25-23	7-25-23	M
Lube Oil Range Organics	**380**	210	NWTPH-Dx	7-25-23	7-25-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*80*	*50-150*				

Date of Report: July 28, 2023
Samples Submitted: July 21, 2023
Laboratory Reference: 2307-174
Project: 01-0410-R

DIESEL AND HEAVY OIL RANGE ORGANICS
NWTPH-Dx
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0725W1					
Diesel Range Organics	**ND**	80	NWTPH-Dx	7-25-23	7-25-23	
Lube Oil Range Organics	**ND**	160	NWTPH-Dx	7-25-23	7-25-23	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*95*	*50-150*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	07-174-01										
	ORIG	DUP									
Diesel Range Organics	**226**	**195**	NA	NA		NA		NA	15	40	
Lube Oil Range Organics	**573**	**545**	NA	NA		NA		NA	5	40	
Surrogate:											
o-Terphenyl						*92*	*91*	*50-150*			

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

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

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

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

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

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

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

I - Compound recovery is outside of the control limits.

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

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

L - The RPD is outside of the control limits.

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

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

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

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

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

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

Q - Surrogate recovery is outside of the control limits.

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

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

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

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

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

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

X - Sample extract treated with a mercury cleanup procedure.

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

X2 - Sample extract treated with a silica gel cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in methods 8260 & 8270, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Y1 - Negative effects of the matrix from this sample on the instrument caused values for this analyte in the bracketing continuing calibration verification standard (CCVs) to be outside of 20% acceptance criteria. Because of this, quantitation limits and sample concentrations should be considered estimates.

Z -

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

Chain of Custody

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

Company: Atlas Geosciences NW
Project Number: 01-0410-R
Project Name: Boeing Field Chevron
Project Manager: Tom Cammarratta / Mike Arnold
Sampled by: HVS

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

Laboratory Number: 07-174

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX (8021☐ 8260☒)	NWTPH-Gx	NWTPH-Dx (SG Clean-up ☐)	Volatiles 8260	Halogenated Volatiles 8260	EDB EPA 8011 (Waters Only)	Semivolatiles 8270/SIM (with low-level PAHs)	PAHs 8270/SIM (low-level)	PCBs 8082	Organochlorine Pesticides 8081	Organophosphorus Pesticides 8270/SIM	Chlorinated Acid Herbicides 8151	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664					% Moisture
1	Dup-1	7/19/23	0800	GW	7		X		X																		
2	TW-1		1015	GW	7		X		X																		
3	TW-2		1045	GW	7		X		X																		
4	TW-5		1240	GW	7		X		X																		
5	TW-4		1405	GW	7		X		X																		
6	IP-5	↓	1500	GW	7		X		X																		
7	~~X~~ AS-1	7/20/23	0820	GW	7		X		X																		
8	IP-3		0935	GW	7		X		X																		
9	IP-4		1025	GW	7		X		X																		
10	IP-7	↓	1145	GW	7		X		X																		

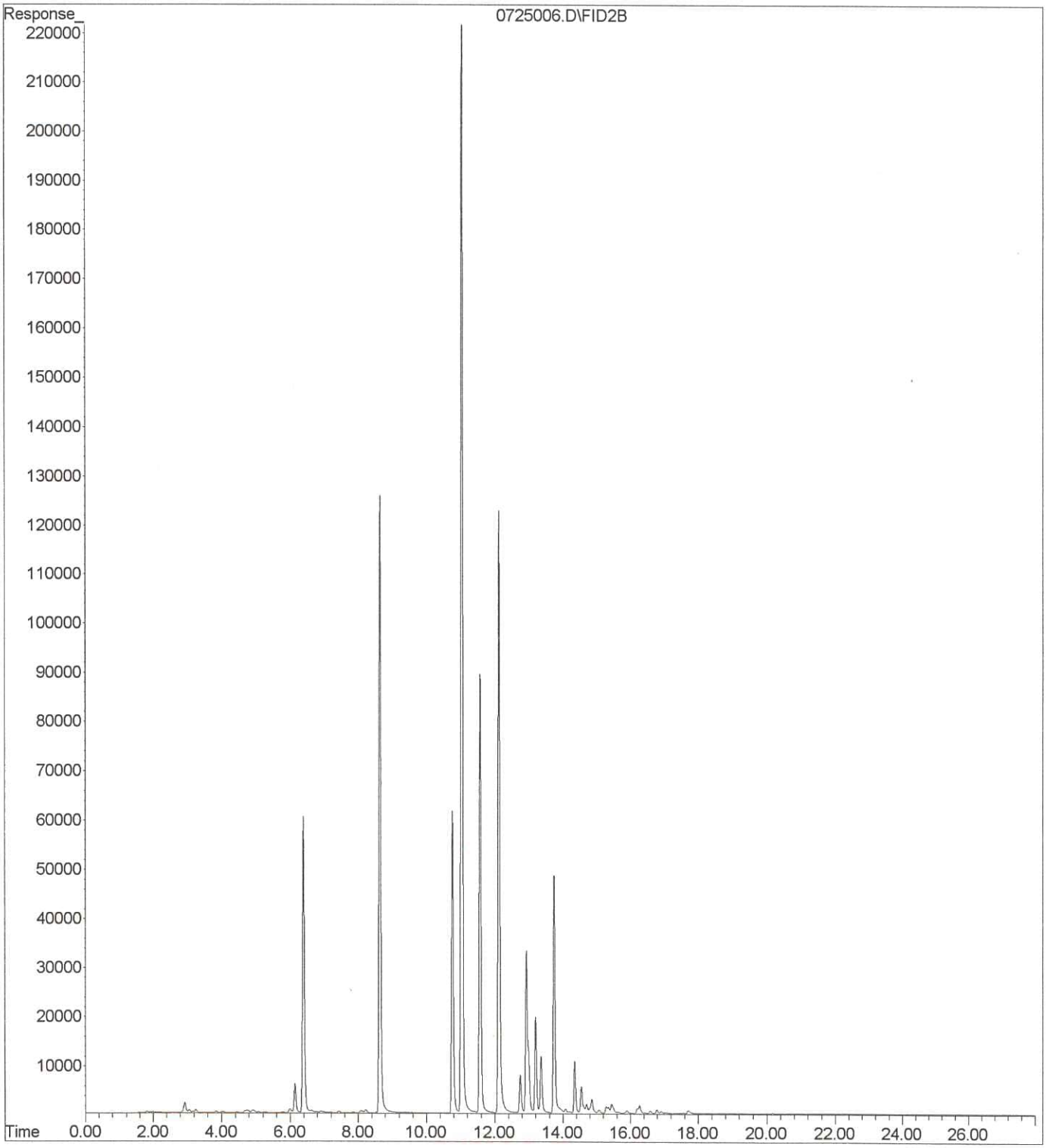
	Signature	Company	Date	Time
Relinquished	Hannah Spoor	Atlas Geo NW	7/21/23	1130
Received	Van	Spdy	7/21/23	1130
Relinquished	Van	Spdy	7/21/23	1205
Received		OSE	7/21/23	1205
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions

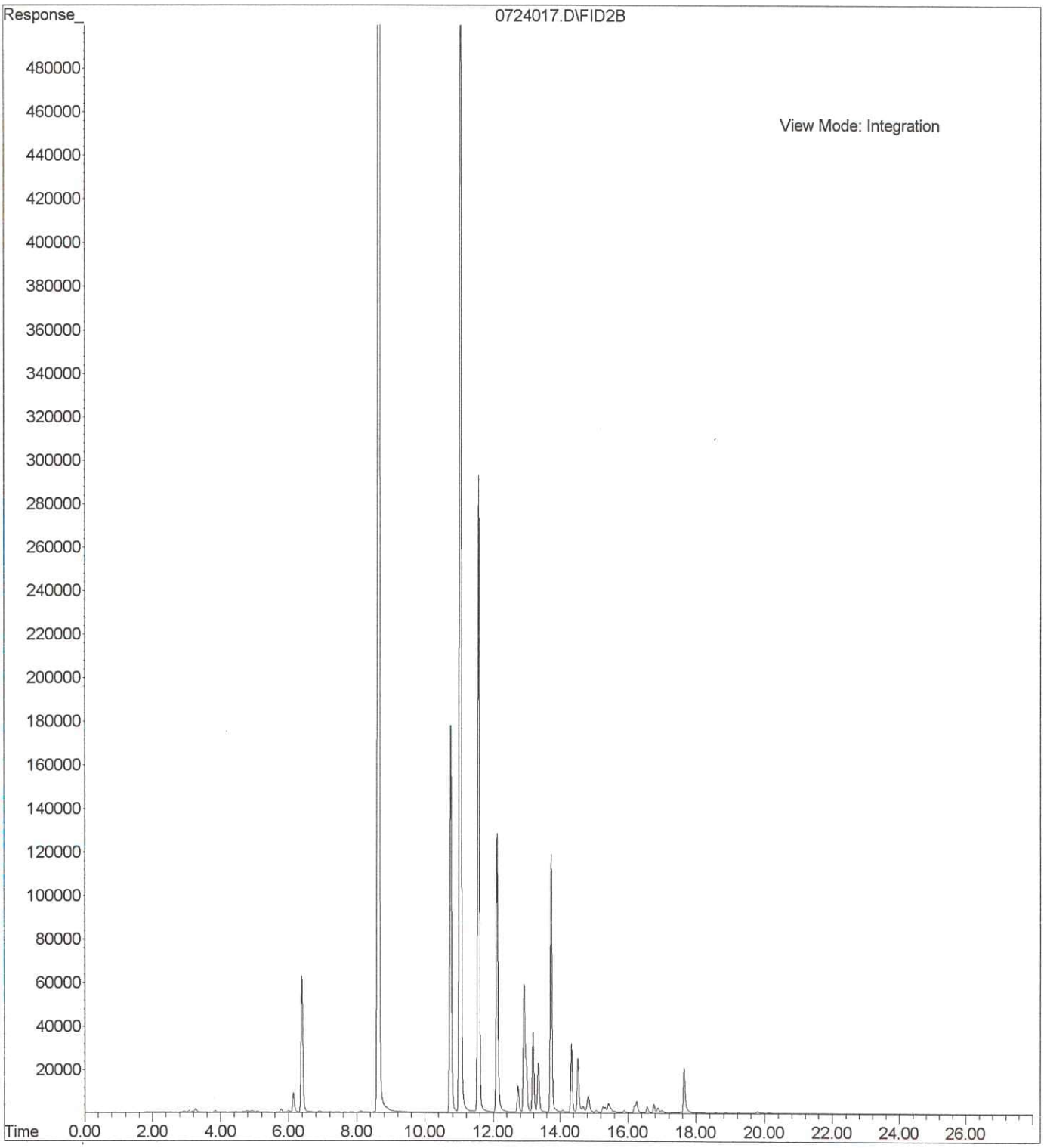
Data Package: Standard ☐ Level III ☐ Level IV ☐

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

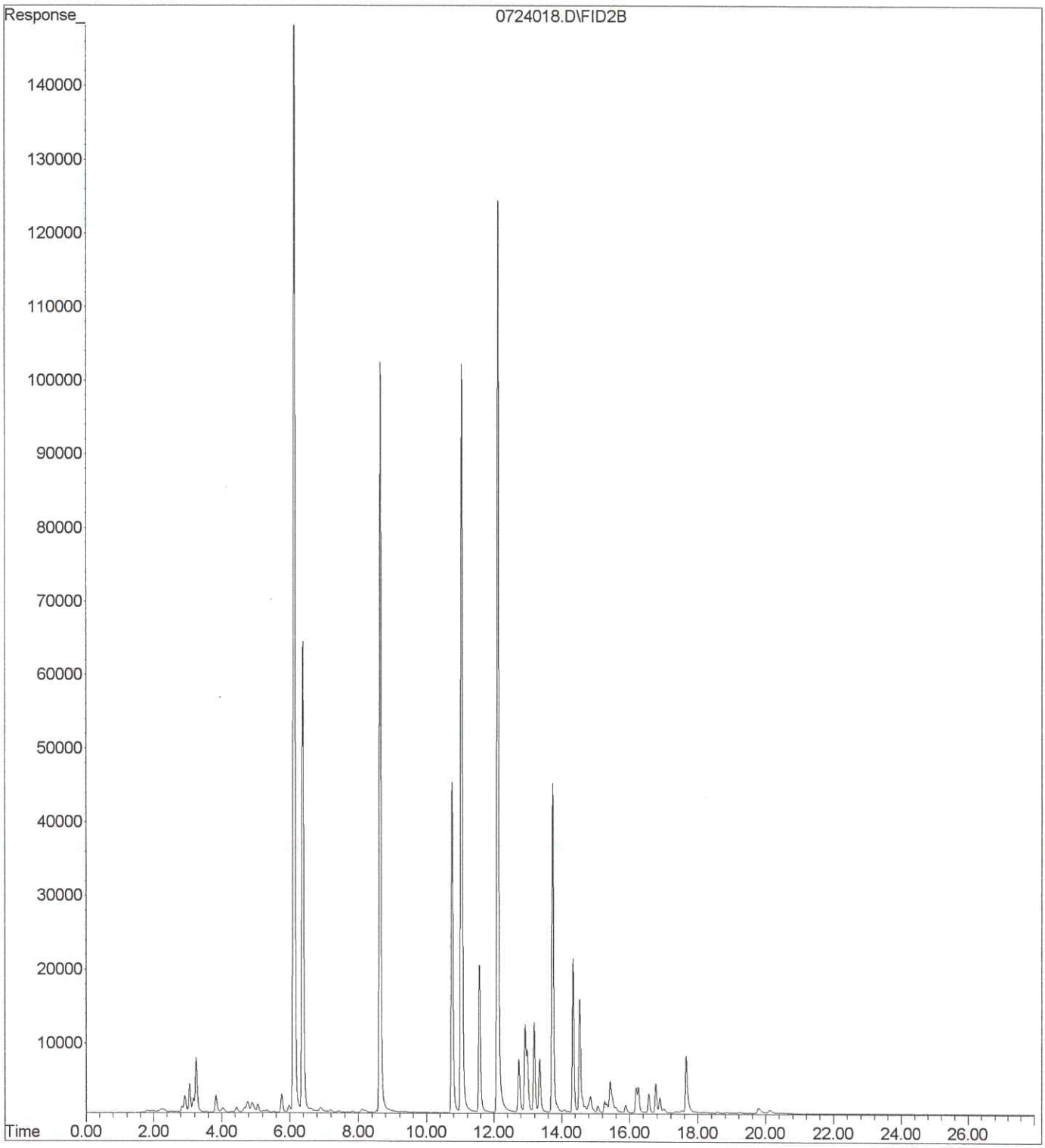
File : X:\BTEX\HOPE\DATA\H230725\0725006.D
Operator :
Acquired : 25 Jul 2023 13:56 using AcqMethod 230606G.M
Instrument : Hope
Sample Name: 07-174-03f RR
Misc Info :
Vial Number: 6



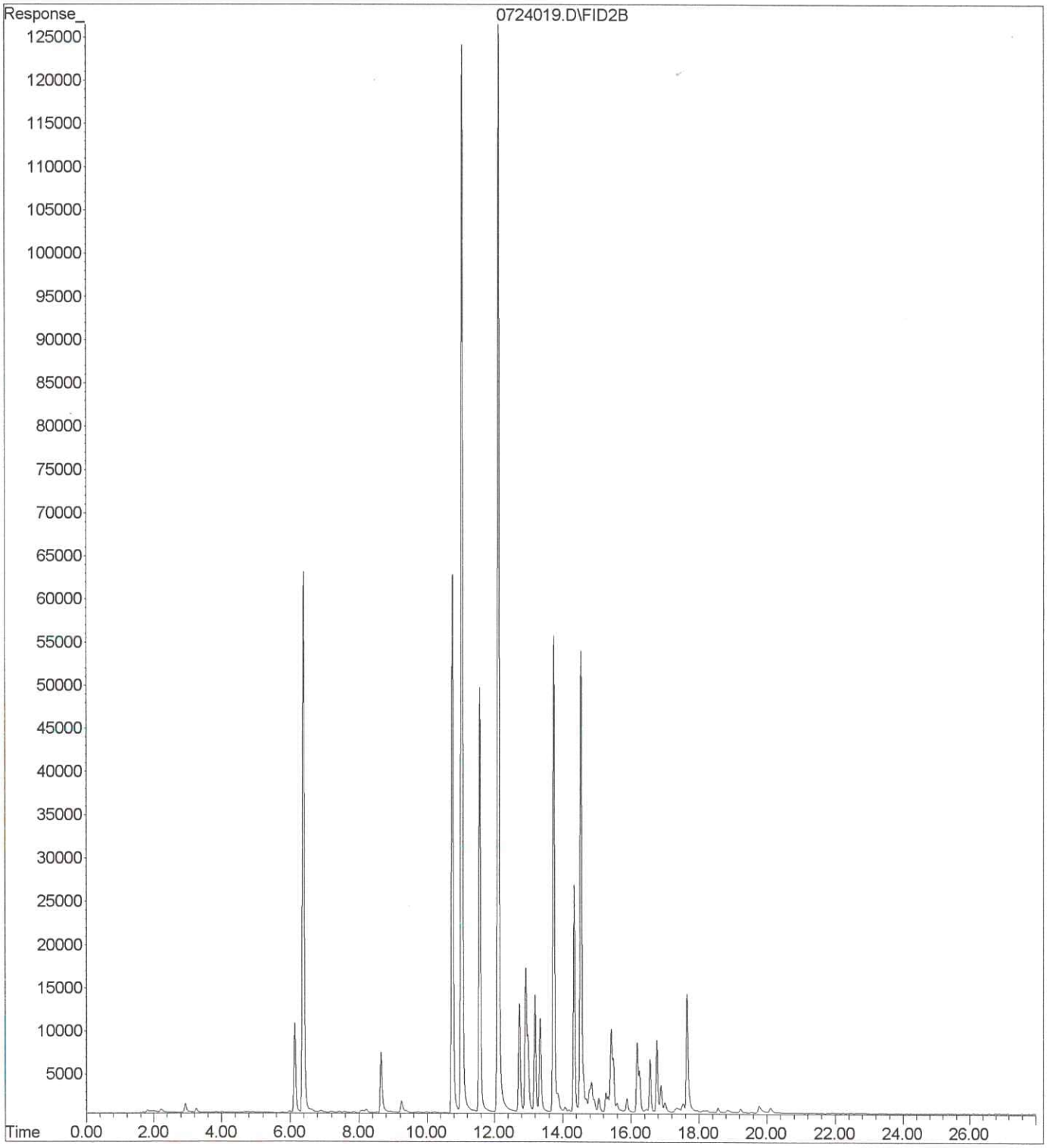
File : X:\BTEX\HOPE\DATA\H230724\0724017.D
Operator :
Acquired : 24 Jul 2023 21:49 using AcqMethod 230606G.M
Instrument : Hope
Sample Name: 07-174-04g 1:50
Misc Info :
Vial Number: 17



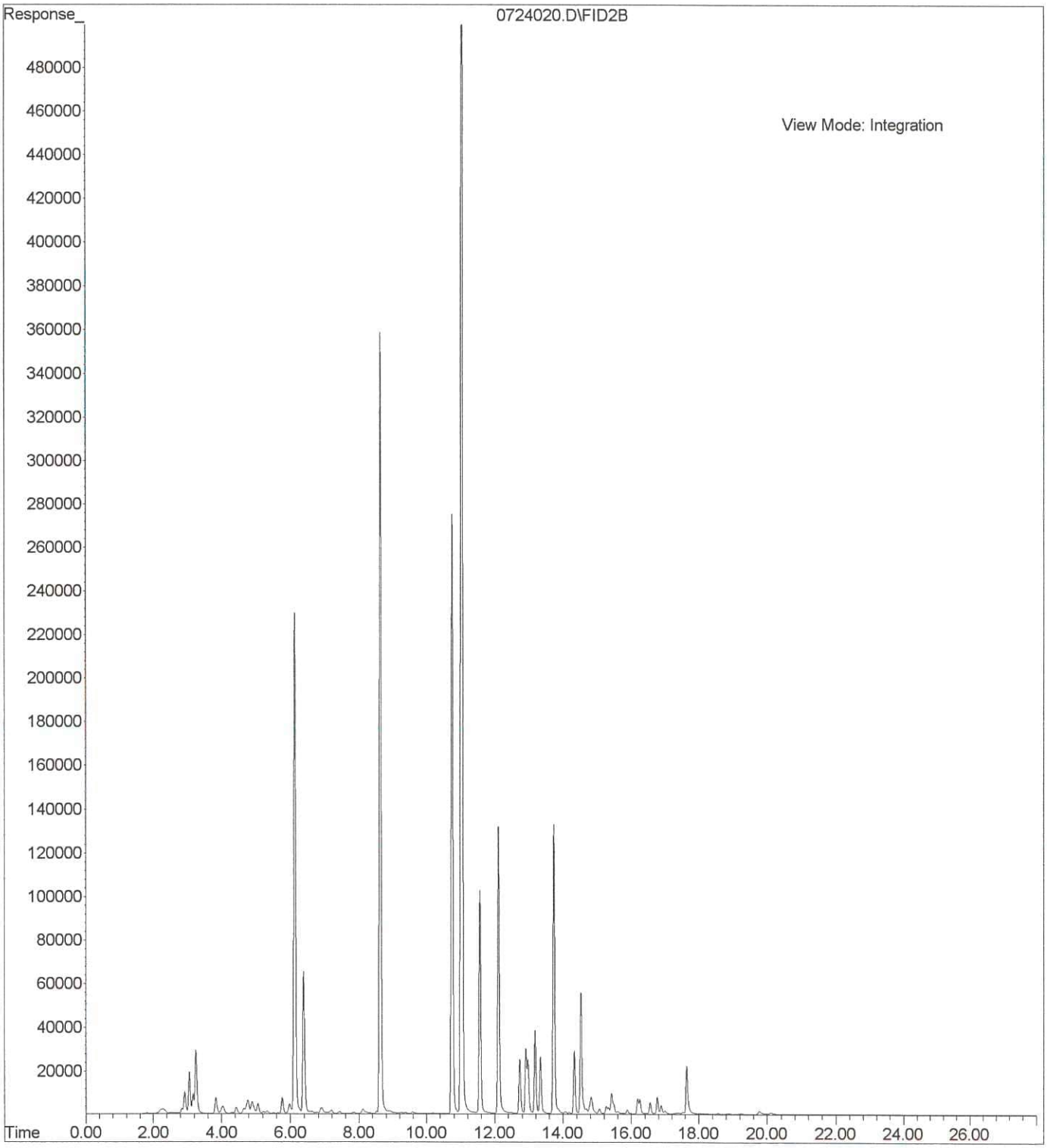
File : X:\BTEX\HOPE\DATA\H230724\0724018.D
Operator :
Acquired : 24 Jul 2023 22:19 using AcqMethod 230606G.M
Instrument : Hope
Sample Name: 07-174-06g 1:50
Misc Info :
Vial Number: 18



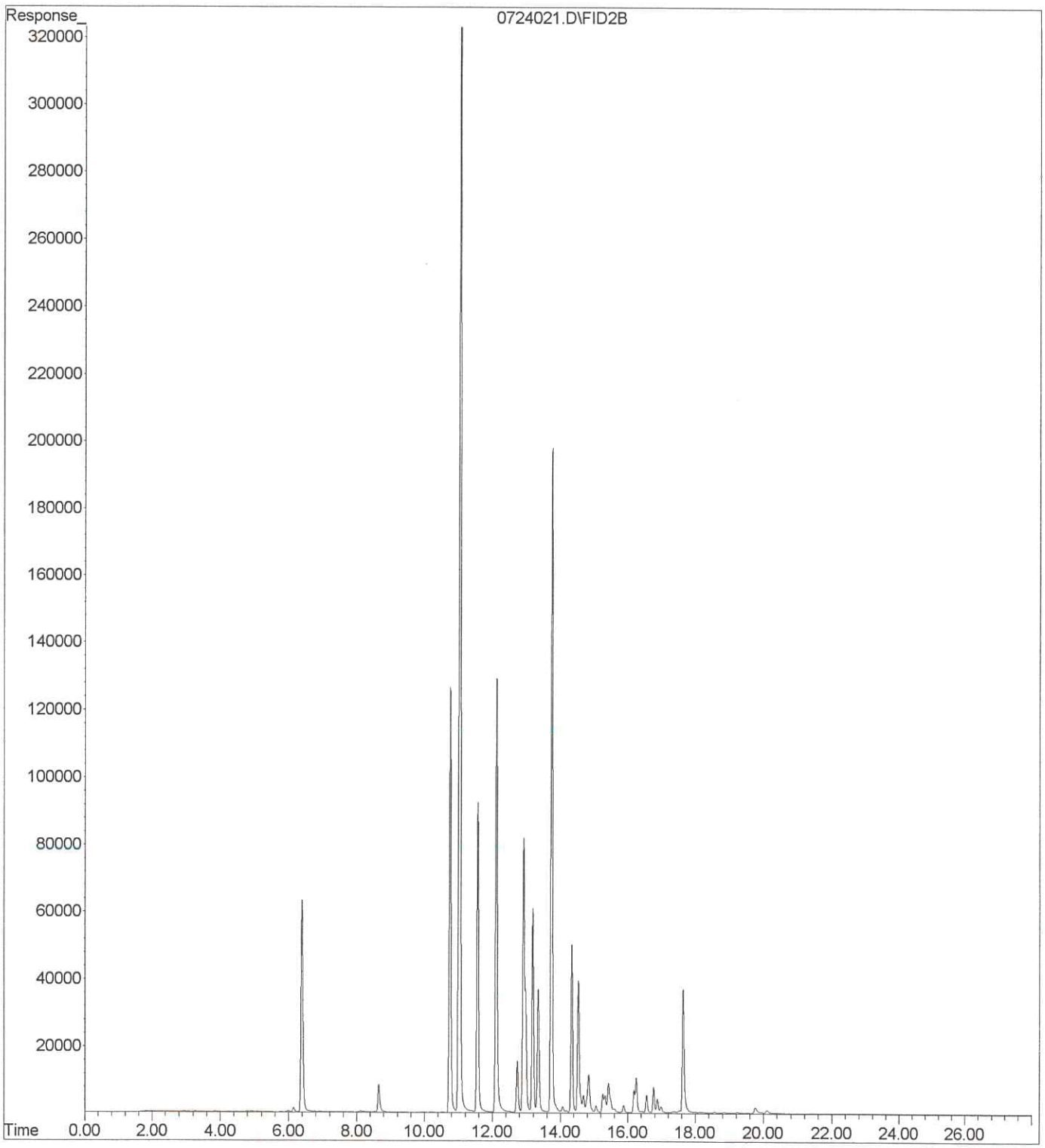
File : X:\BTEX\HOPE\DATA\H230724\0724019.D
Operator :
Acquired : 24 Jul 2023 22:50 using AcqMethod 230606G.M
Instrument : Hope
Sample Name: 07-174-07g 1:5
Misc Info :
Vial Number: 19



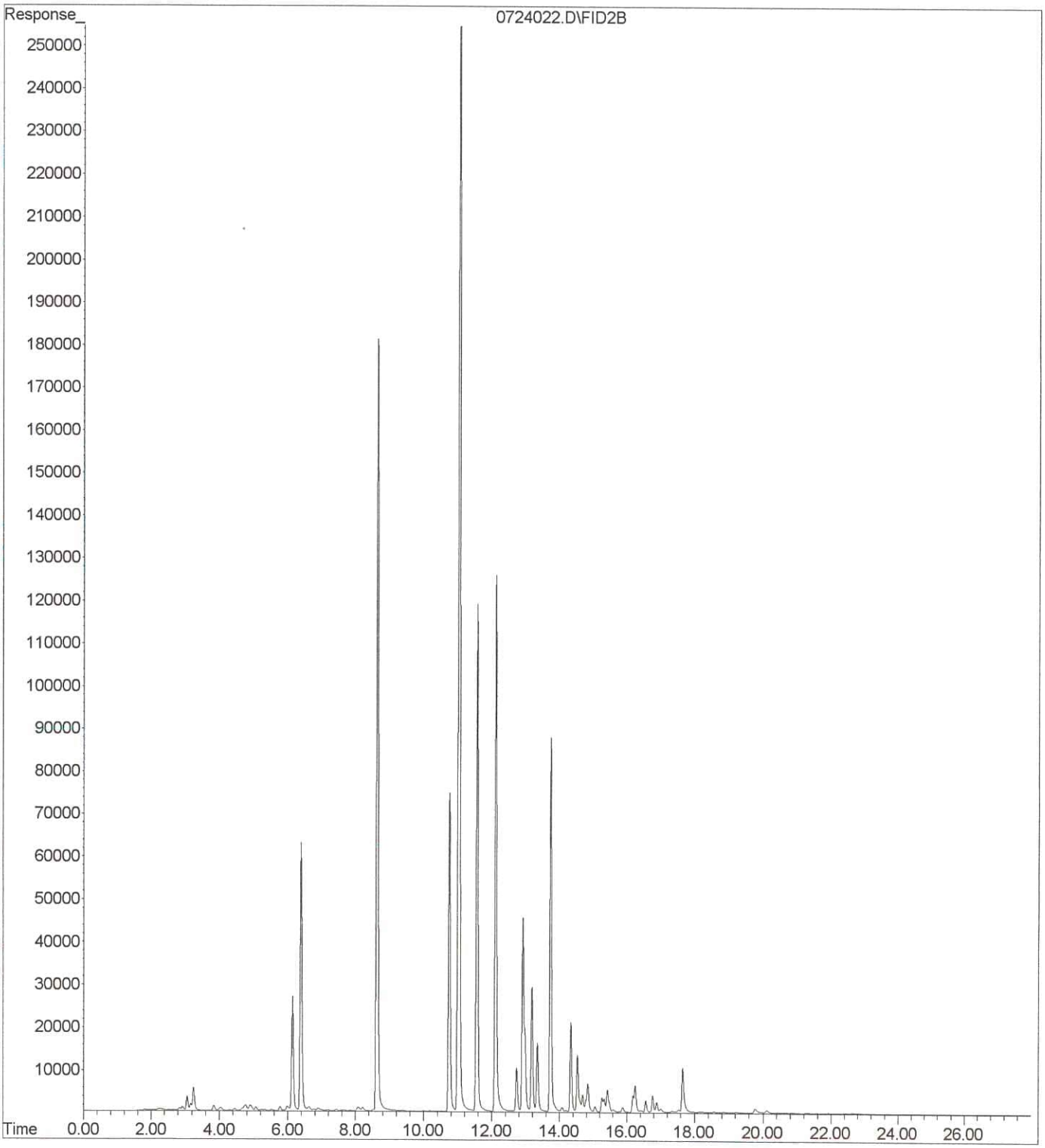
File : X:\BTEX\HOPE\DATA\H230724\0724020.D
Operator :
Acquired : 24 Jul 2023 23:20 using AcqMethod 230606G.M
Instrument : Hope
Sample Name: 07-174-08g 1:10
Misc Info :
Vial Number: 20



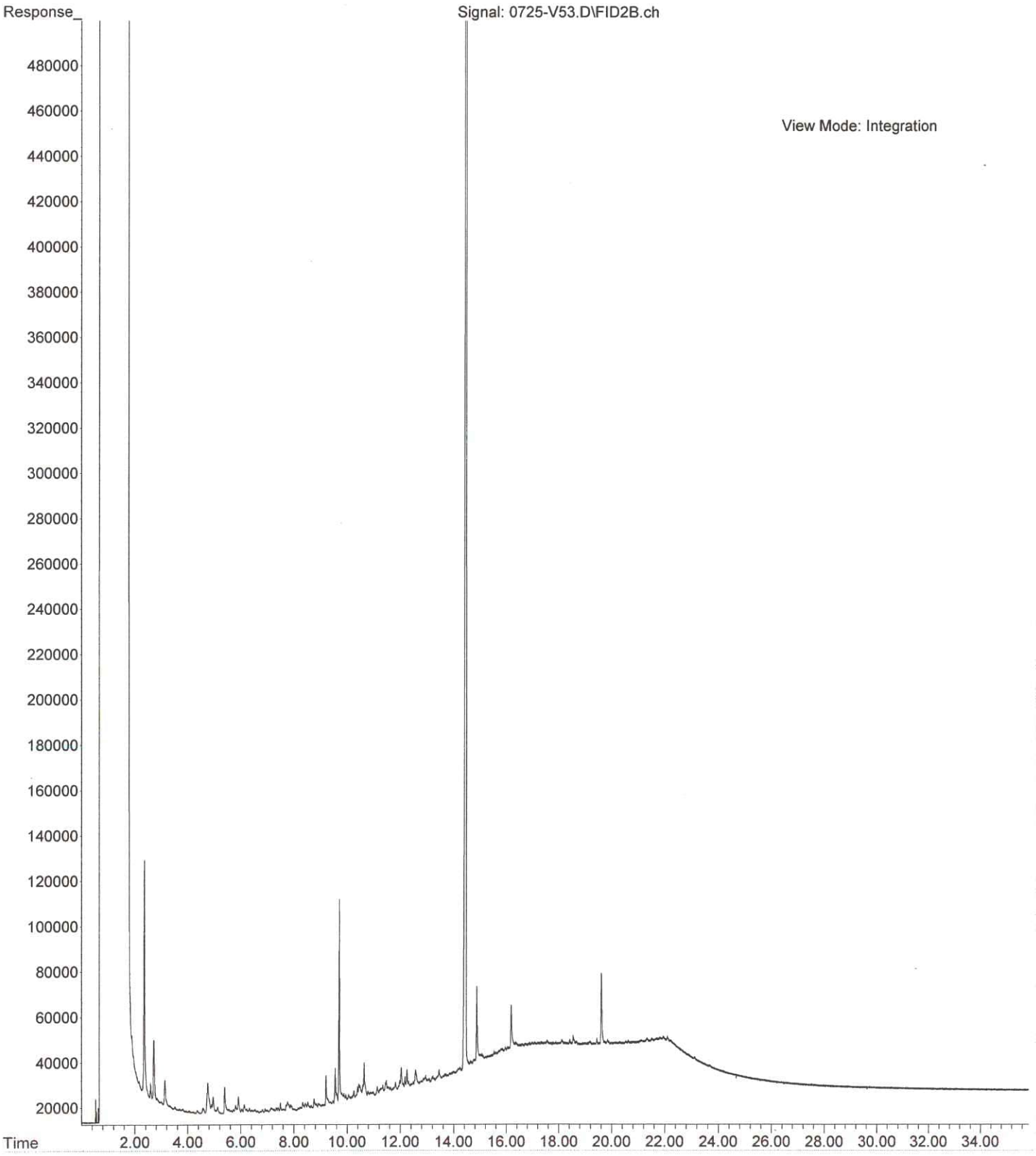
File : X:\BTEX\HOPE\DATA\H230724\0724021.D
Operator :
Acquired : 24 Jul 2023 23:50 using AcqMethod 230606G.M
Instrument : Hope
Sample Name: 07-174-09g 1:50
Misc Info :
Vial Number: 21



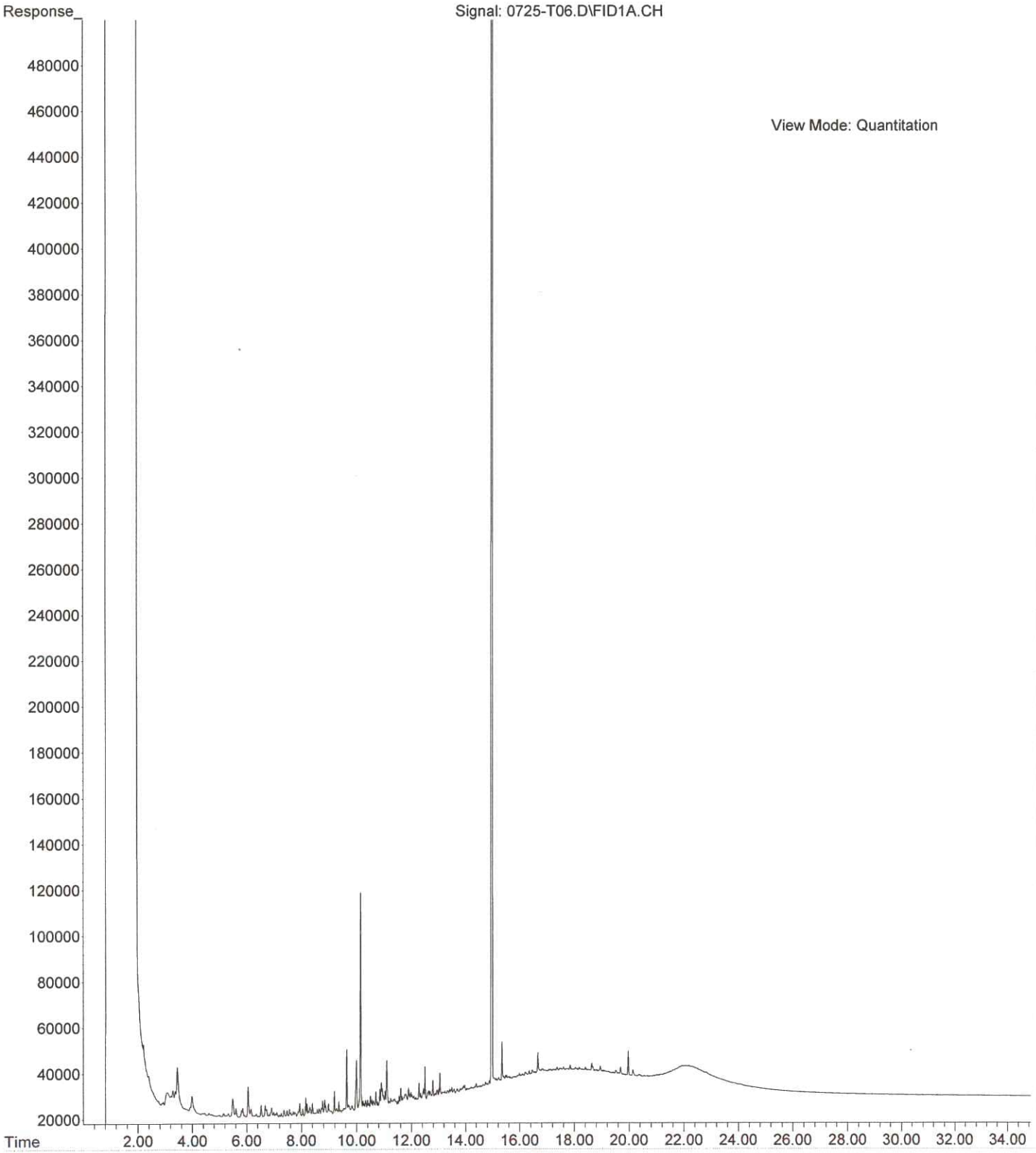
File : X:\BTEX\HOPE\DATA\H230724\0724022.D
Operator :
Acquired : 25 Jul 2023 00:35 using AcqMethod 230606G.M
Instrument : Hope
Sample Name: 07-174-10g 1:50
Misc Info :
Vial Number: 22



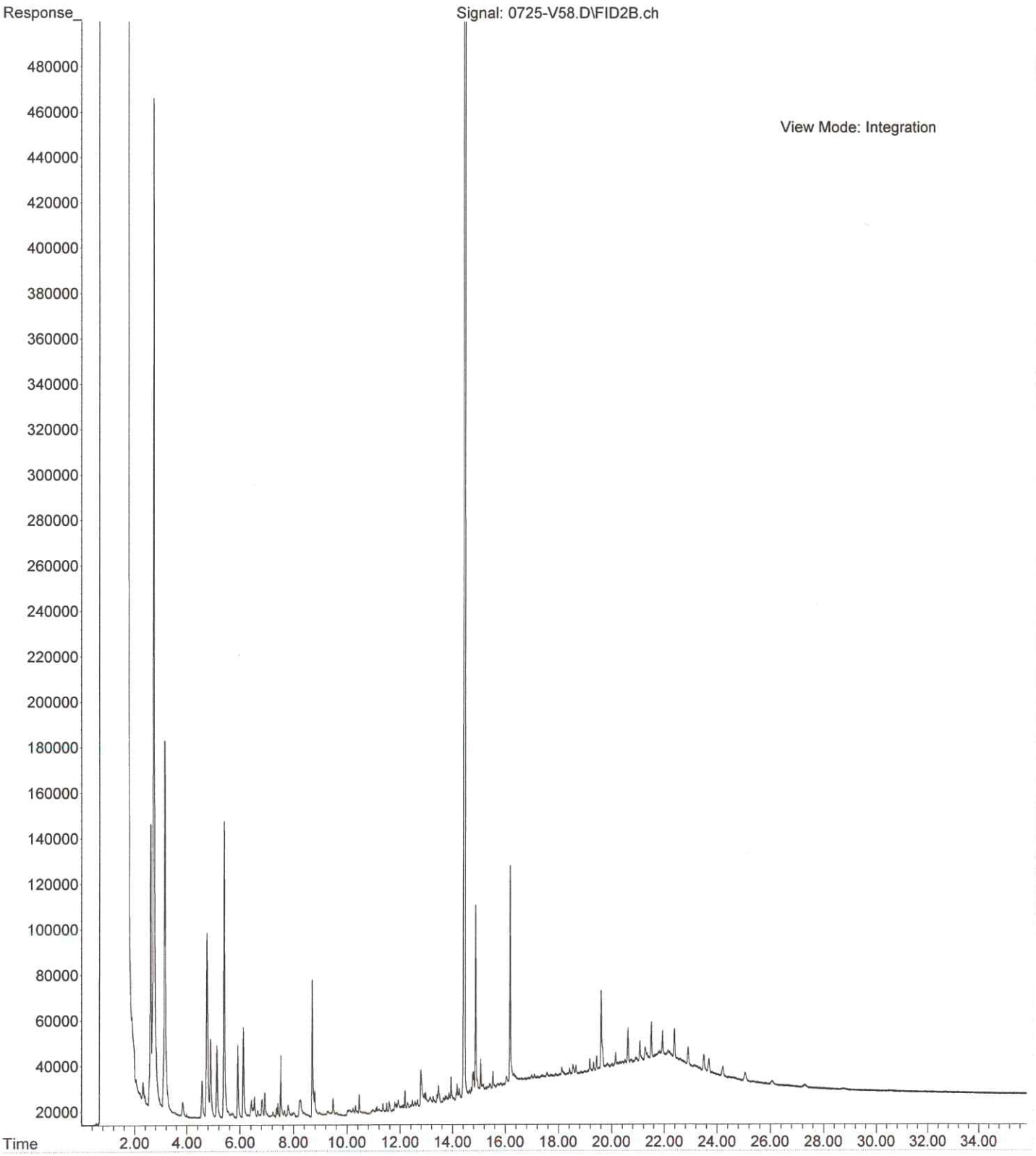
File :C:\msdchem\2\data\V230725.SEC\0725-V53.D
Operator : LW
Acquired : 25 Jul 2023 11:06 using AcqMethod V230113F.M
Instrument : Vigo
Sample Name: 07-174-01 DUP
Misc Info : RearSamp
Vial Number: 53



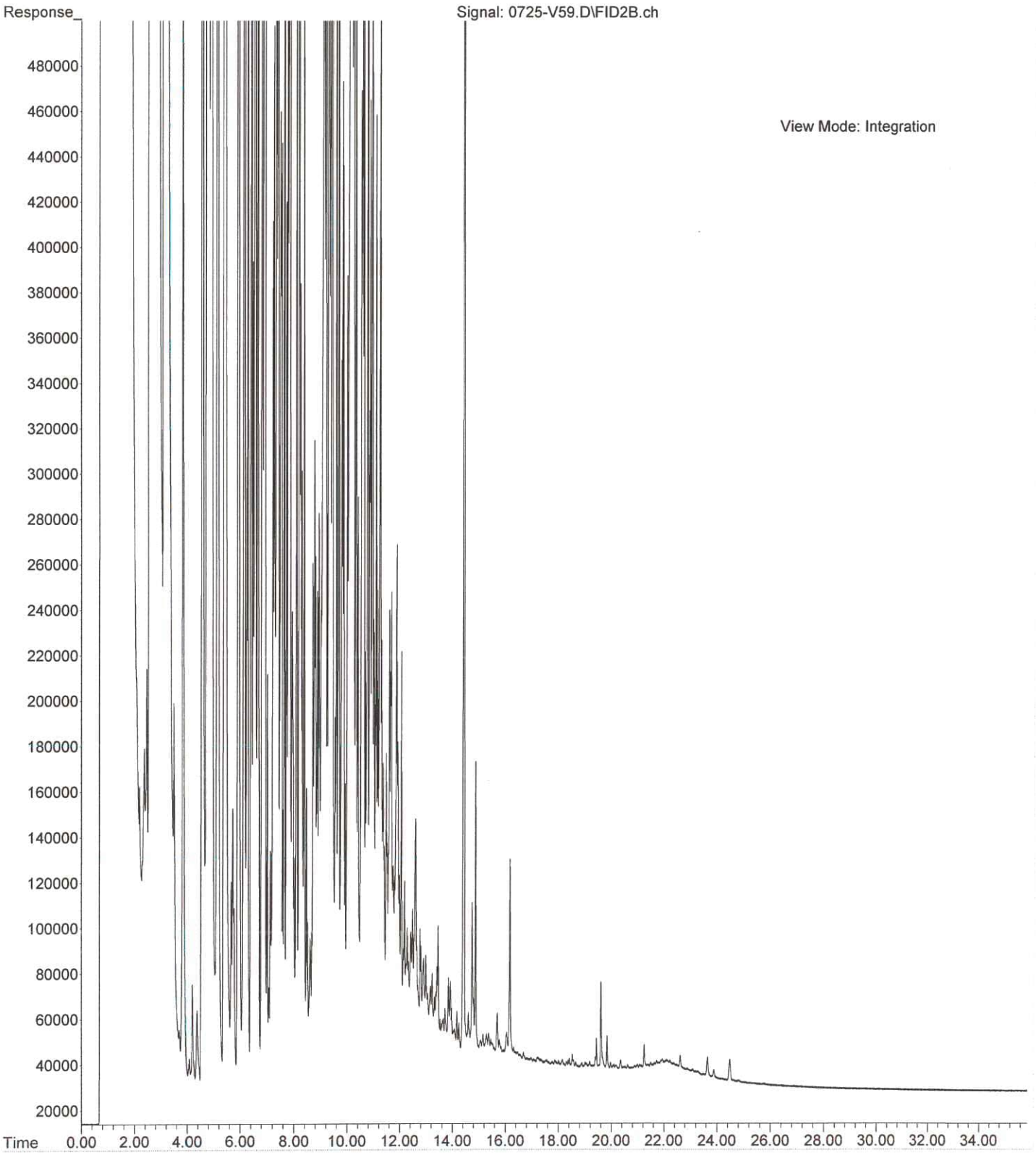
File :C:\msdchem\1\data\T230725\0725-T06.D
Operator : LW
Acquired : 25 Jul 2023 14:57 using AcqMethod T230712F.M
Instrument : Teri
Sample Name: 07-174-02
Misc Info : Sample
Vial Number: 6



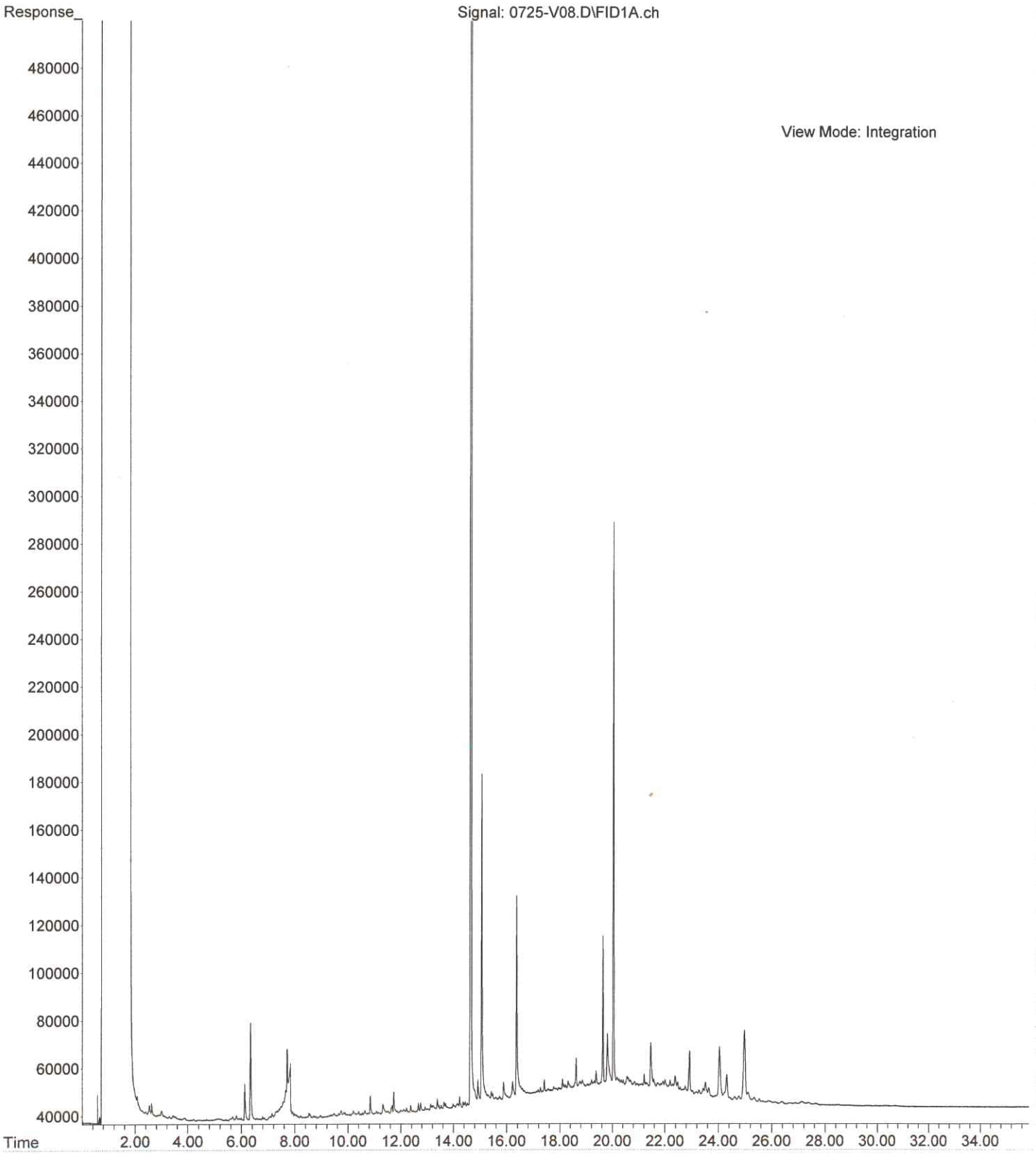
File :C:\msdchem\2\data\V230725.SEC\0725-V58.D
Operator : LW
Acquired : 25 Jul 2023 14:58 using AcqMethod V230113F.M
Instrument : Vigo
Sample Name: 07-174-03
Misc Info : RearSamp
Vial Number: 58



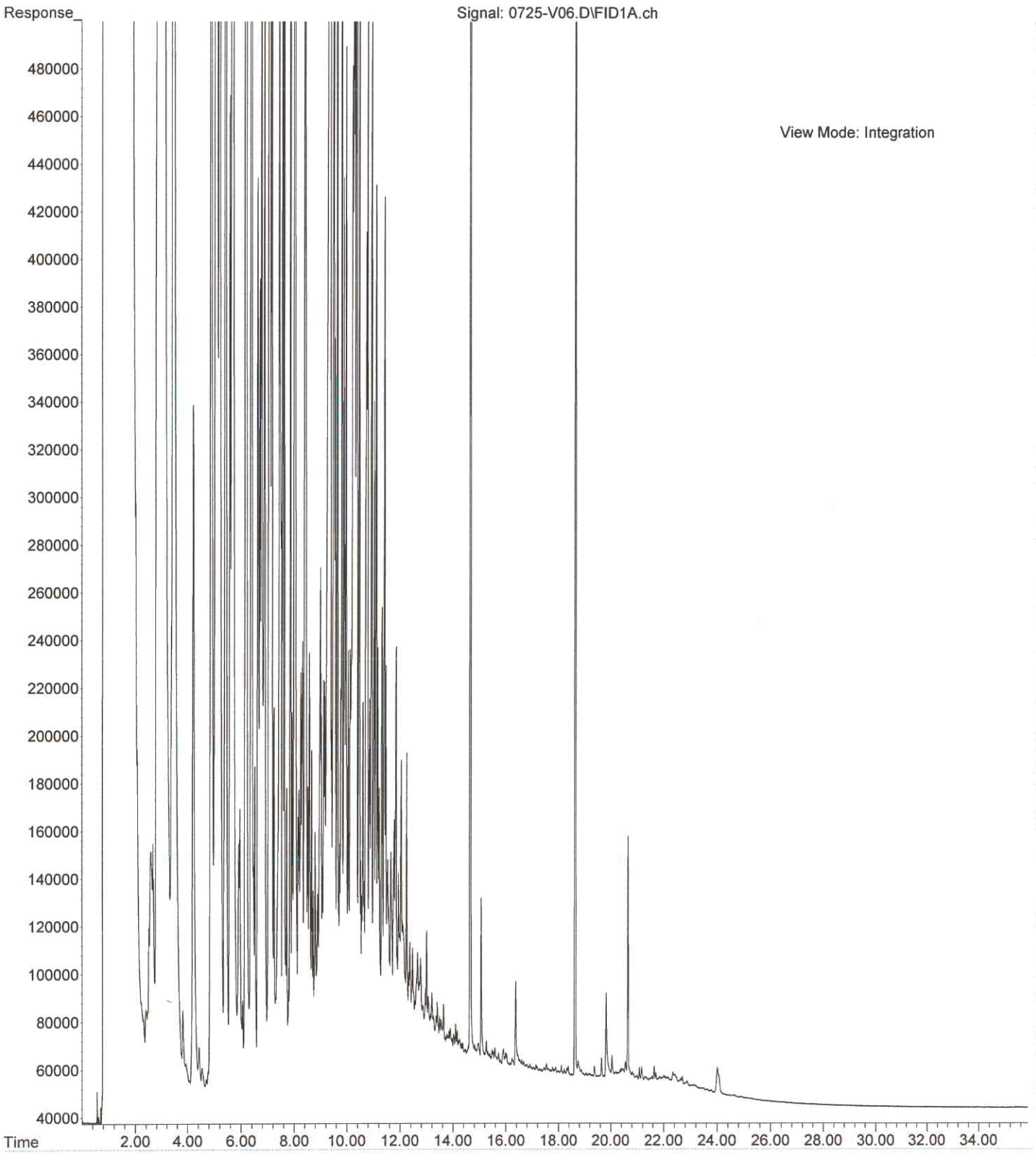
File :C:\msdchem\2\data\V230725.SEC\0725-V59.D
Operator : LW
Acquired : 25 Jul 2023 15:38 using AcqMethod V230113F.M
Instrument : Vigo
Sample Name: 07-174-04
Misc Info : RearSamp
Vial Number: 59



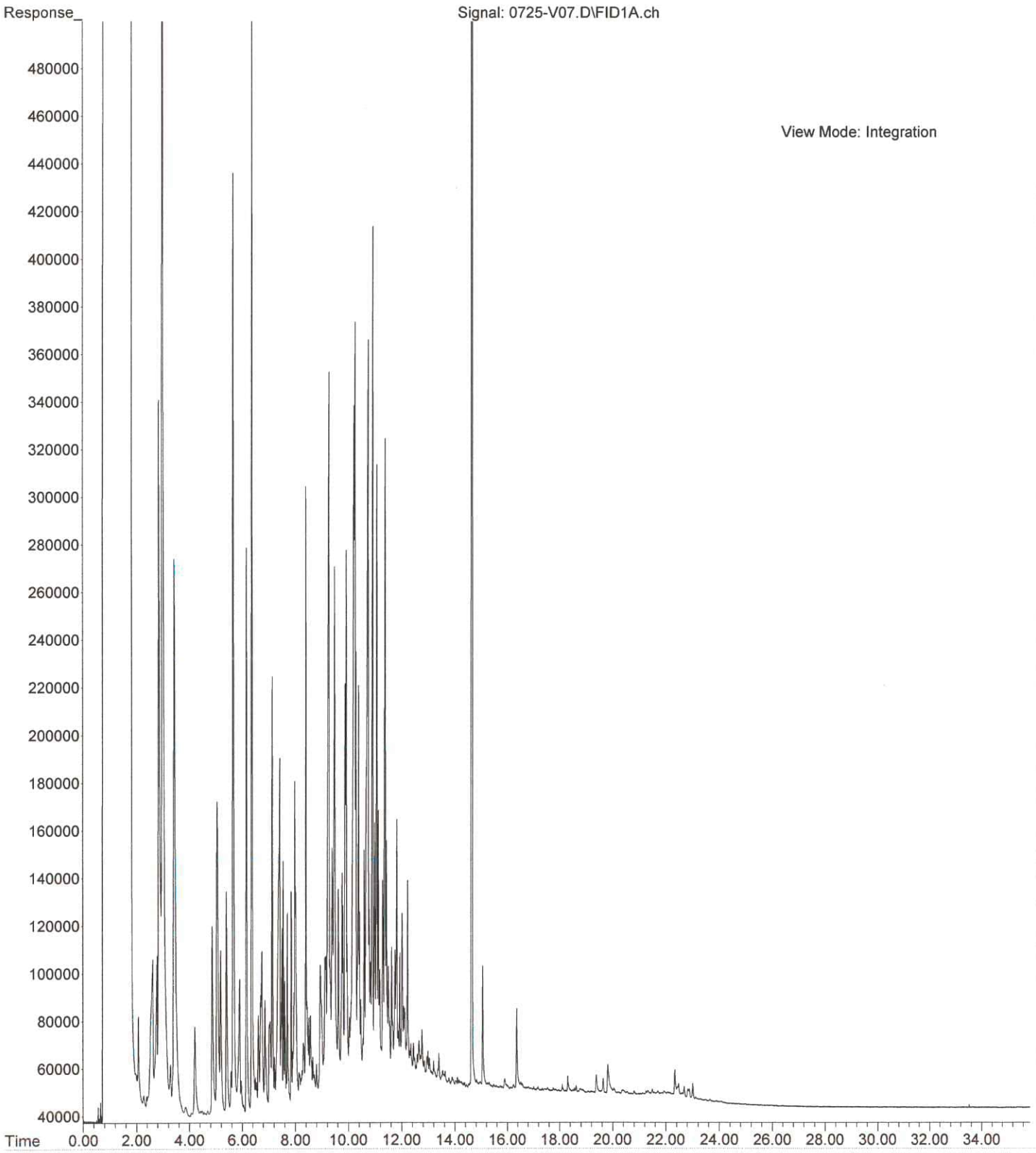
File :C:\msdchem\2\data\V230725\0725-V08.D
Operator : LW
Acquired : 25 Jul 2023 14:58 using AcqMethod V230113F.M
Instrument : Vigo
Sample Name: 07-174-05~~DUP~~
Misc Info : Sample
Vial Number: 8



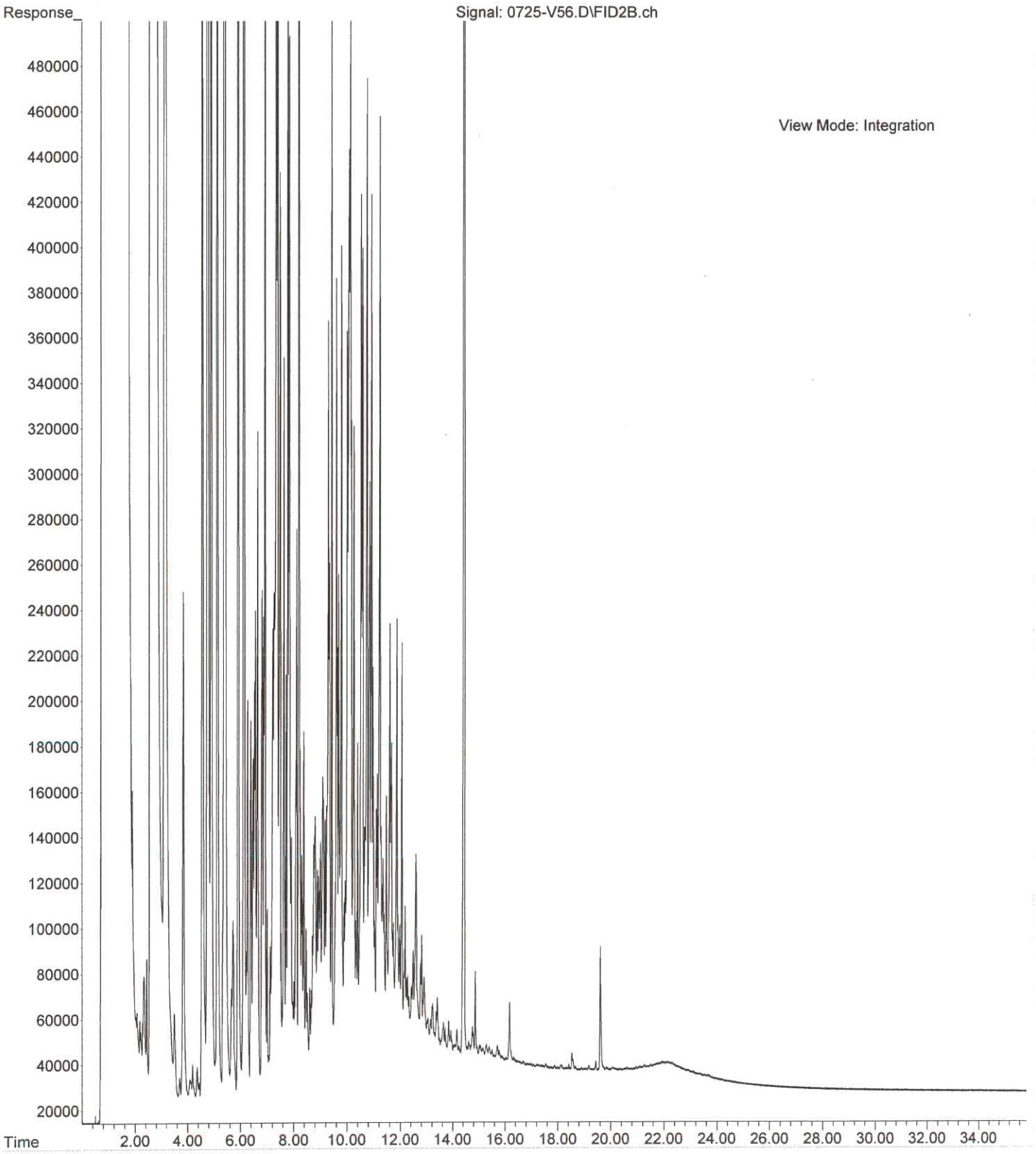
File :C:\msdchem\2\data\V230725\0725-V06.D
Operator : LW
Acquired : 25 Jul 2023 13:35 using AcqMethod V230113F.M
Instrument : Vigo
Sample Name: 07-174-06
Misc Info : Sample
Vial Number: 6



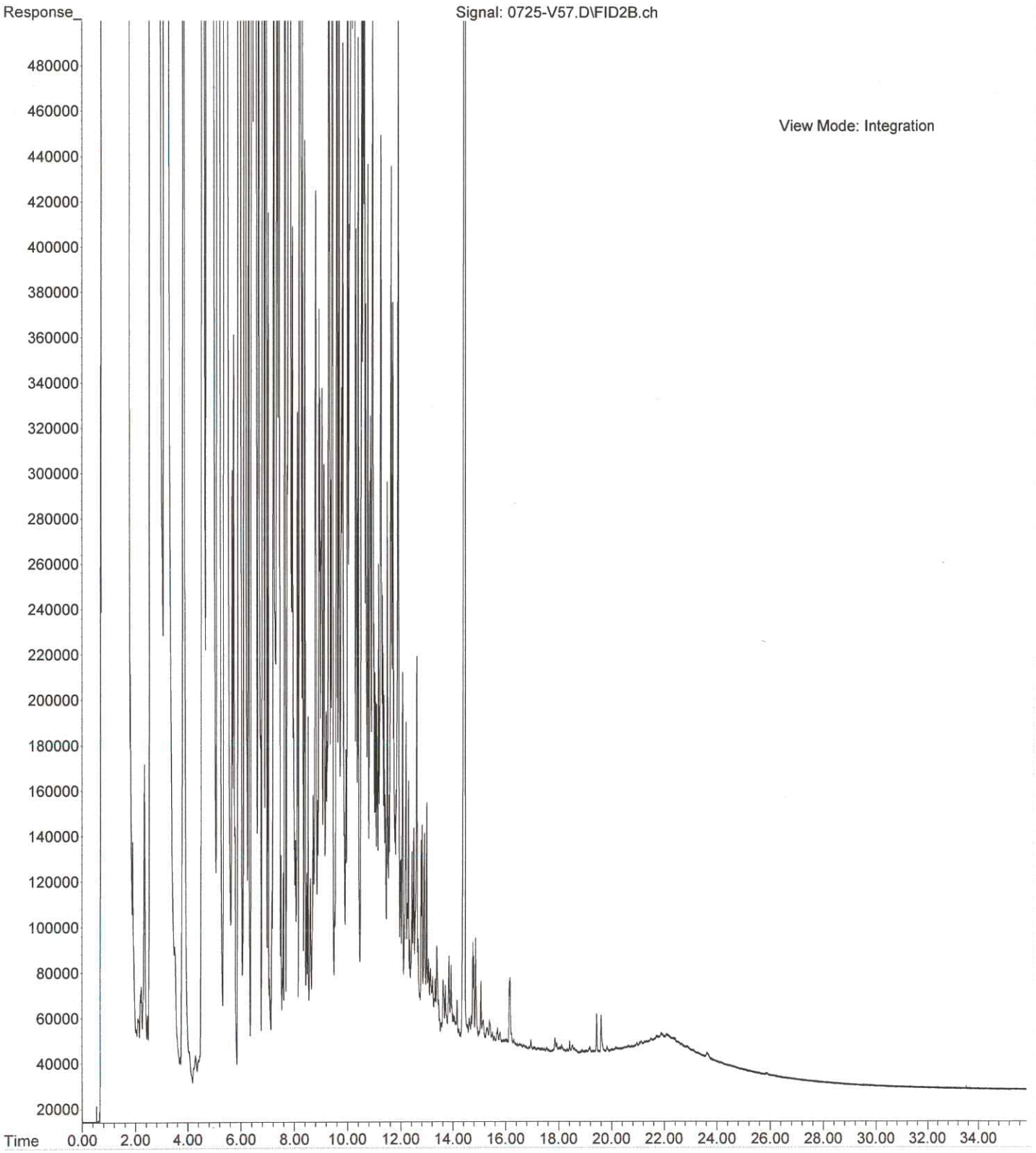
File :C:\msdchem\2\data\V230725\0725-V07.D
Operator : LW
Acquired : 25 Jul 2023 14:16 using AcqMethod V230113F.M
Instrument : Vigo
Sample Name: 07-174-07
Misc Info : Sample
Vial Number: 7



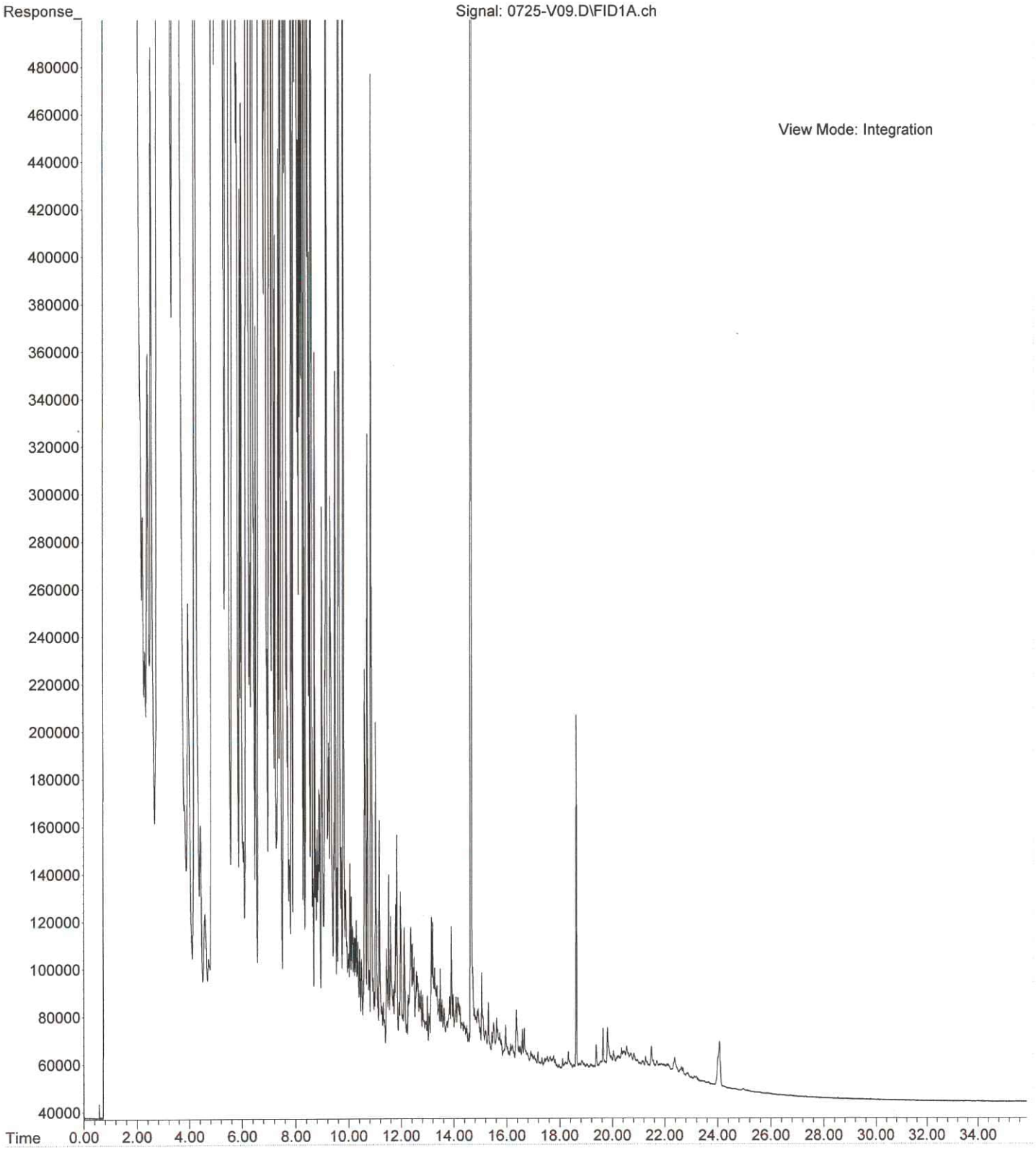
File :C:\msdchem\2\data\V230725.SEC\0725-V56.D
Operator : LW
Acquired : 25 Jul 2023 13:35 using AcqMethod V230113F.M
Instrument : Vigo
Sample Name: 07-174-08
Misc Info : RearSamp
Vial Number: 56



File :C:\msdchem\2\data\V230725.SEC\0725-V57.D
Operator : LW
Acquired : 25 Jul 2023 14:16 using AcqMethod V230113F.M
Instrument : Vigo
Sample Name: 07-174-09
Misc Info : RearSamp
Vial Number: 57



File :C:\msdchem\2\data\V230725\0725-V09.D
Operator : LW
Acquired : 25 Jul 2023 15:38 using AcqMethod V230113F.M
Instrument : Vigo
Sample Name: 07-174-10
Misc Info : Sample
Vial Number: 9



APPENDIX D

PETROLEUM HYDROCARBON AND FIELD PARAMETER CHARTS

ACRONYMS AND ABBREVIATIONS FOR

PETROLEUM HYDROCARBON AND FIELD PARAMETER CHARTS

µg/L	micrograms per liter
Avg	average
DRO	diesel range organics
GRO	gasoline range organics
GW	groundwater
GWL	groundwater level
LSZ	Lower Saturated Zone
USZ	Upper Saturated Zone

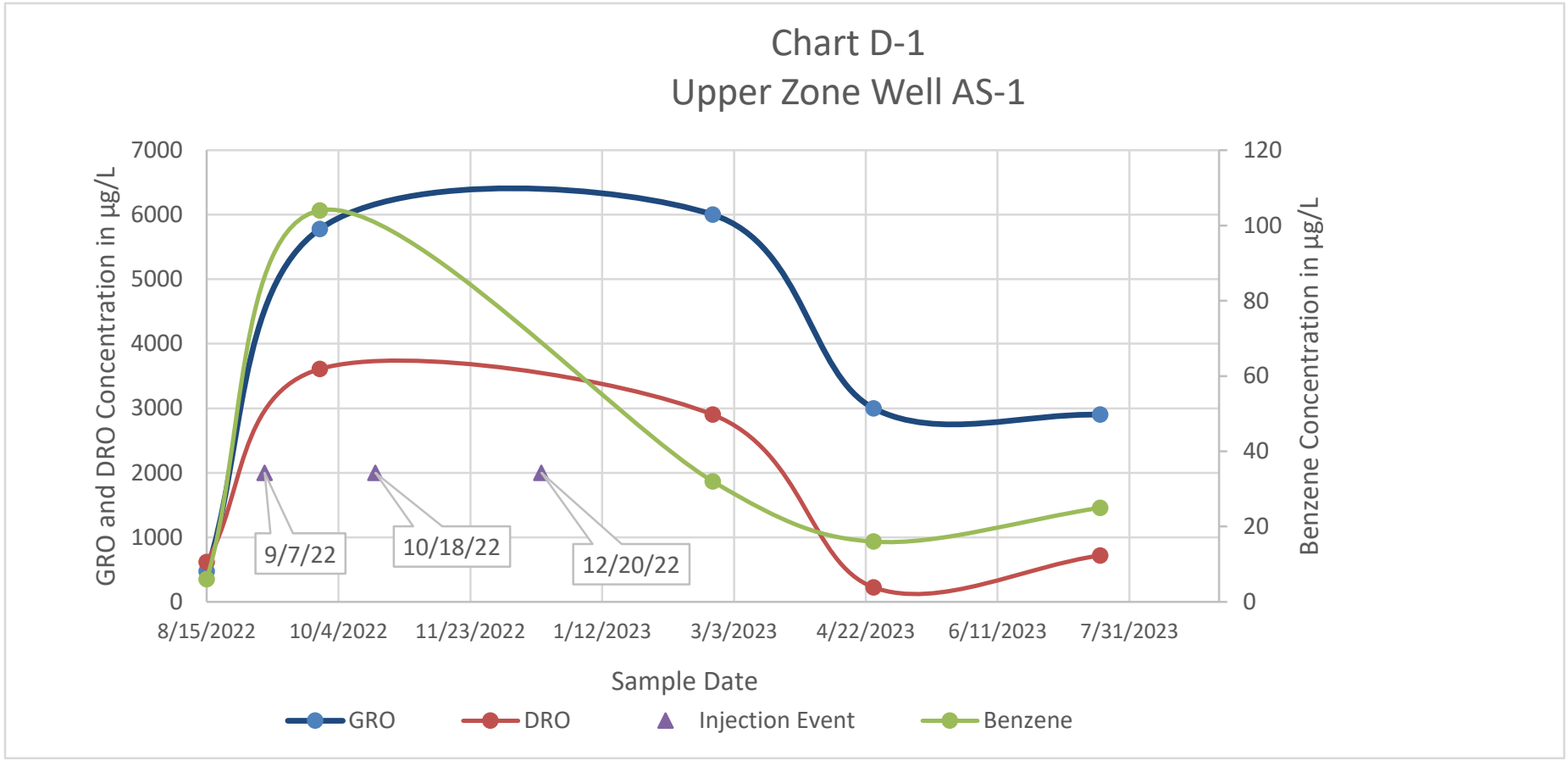


Chart D-1
Upper Zone Well AS-1
GRO and DRO Concentration in µg/L
Benzene Concentration in µg/L
7000
6000
5000
4000
3000
2000
1000
0
120
100
80
60
40
20
0
9/7/22
10/18/22
12/20/22
8/15/2022
10/4/2022
11/23/2022
1/12/2023
3/3/2023
4/22/2023
6/11/2023
7/31/2023
Sample Date
GRO
DRO
Injection Event
Benzene

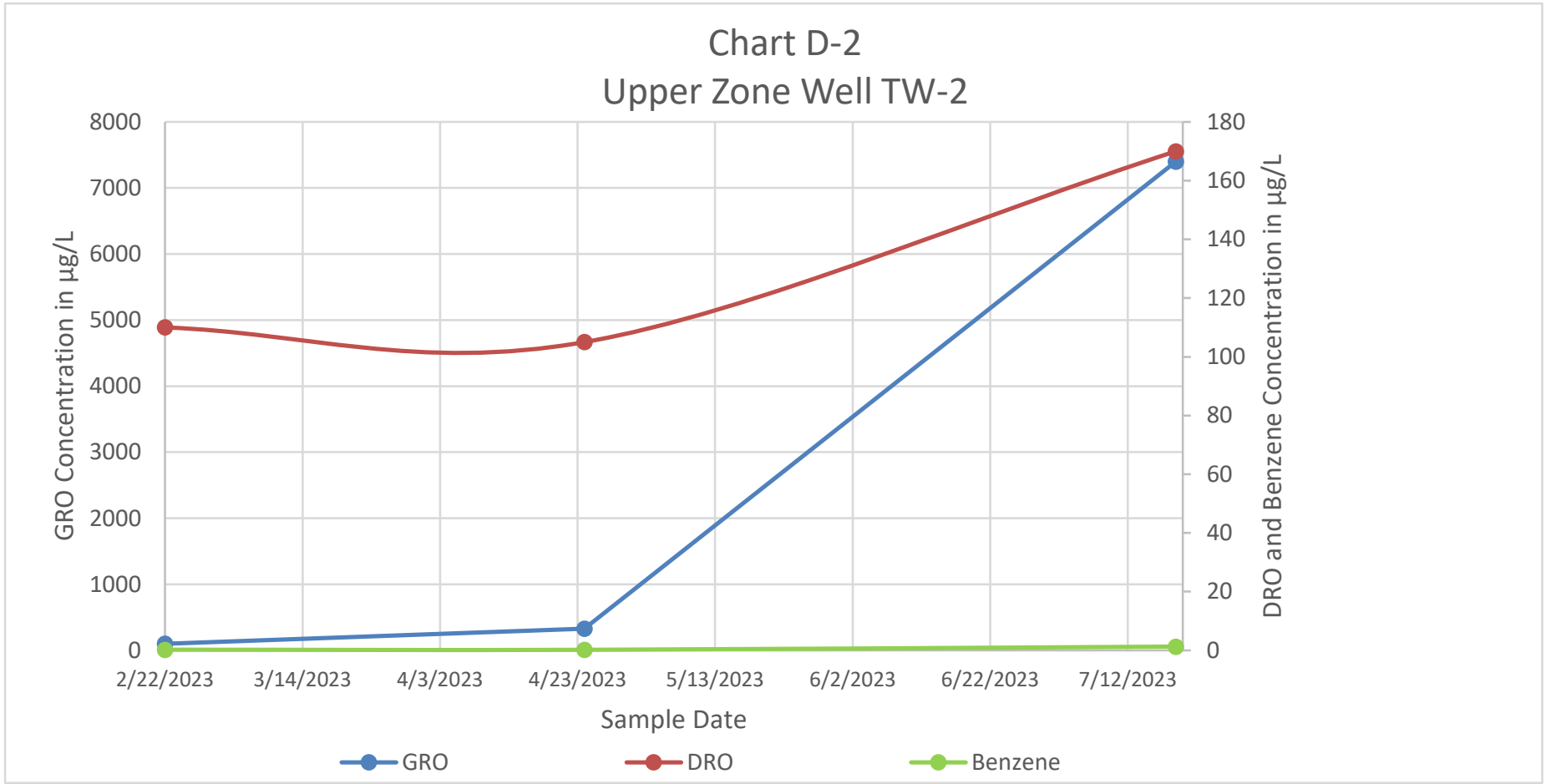


Chart D-2
Upper Zone Well TW-2
GRO Concentration in µg/L
DRO and Benzene Concentration in µg/L
8000
7000
6000
5000
4000
3000
2000
1000
0
180
160
140
120
100
80
60
40
20
0
2/22/2023
3/14/2023
4/3/2023
4/23/2023
5/13/2023
6/2/2023
6/22/2023
7/12/2023
Sample Date
GRO
DRO
Benzene

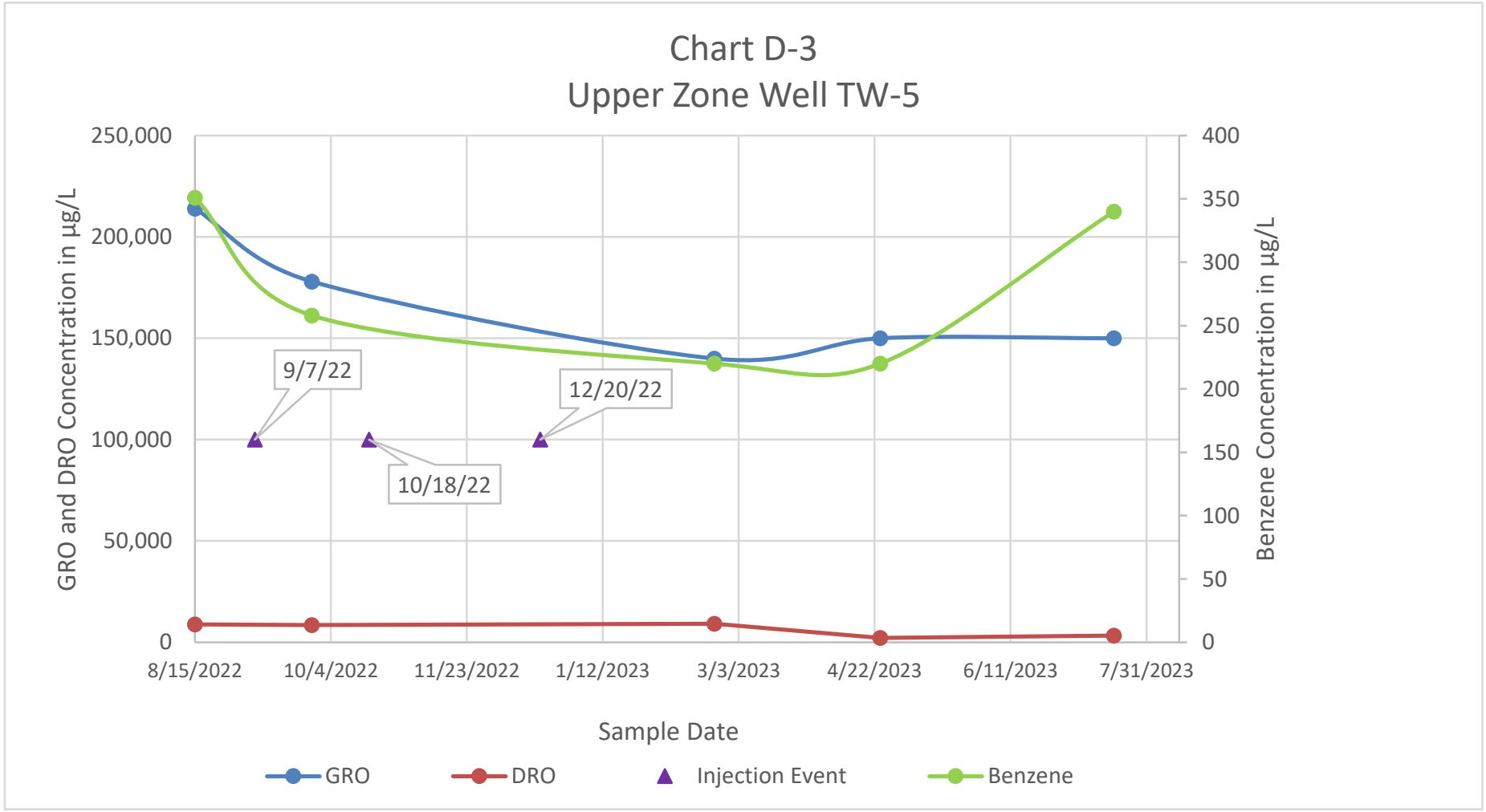


Chart D-3
Upper Zone Well TW-5
GRO and DRO Concentration in µg/L
Benzene Concentration in µg/L
250,000
200,000
150,000
100,000
50,000
0
400
350
300
250
200
150
100
50
0
9/7/22
10/18/22
12/20/22
8/15/2022
10/4/2022
11/23/2022
1/12/2023
3/3/2023
4/22/2023
6/11/2023
7/31/2023
Sample Date
GRO
DRO
Injection Event
Benzene

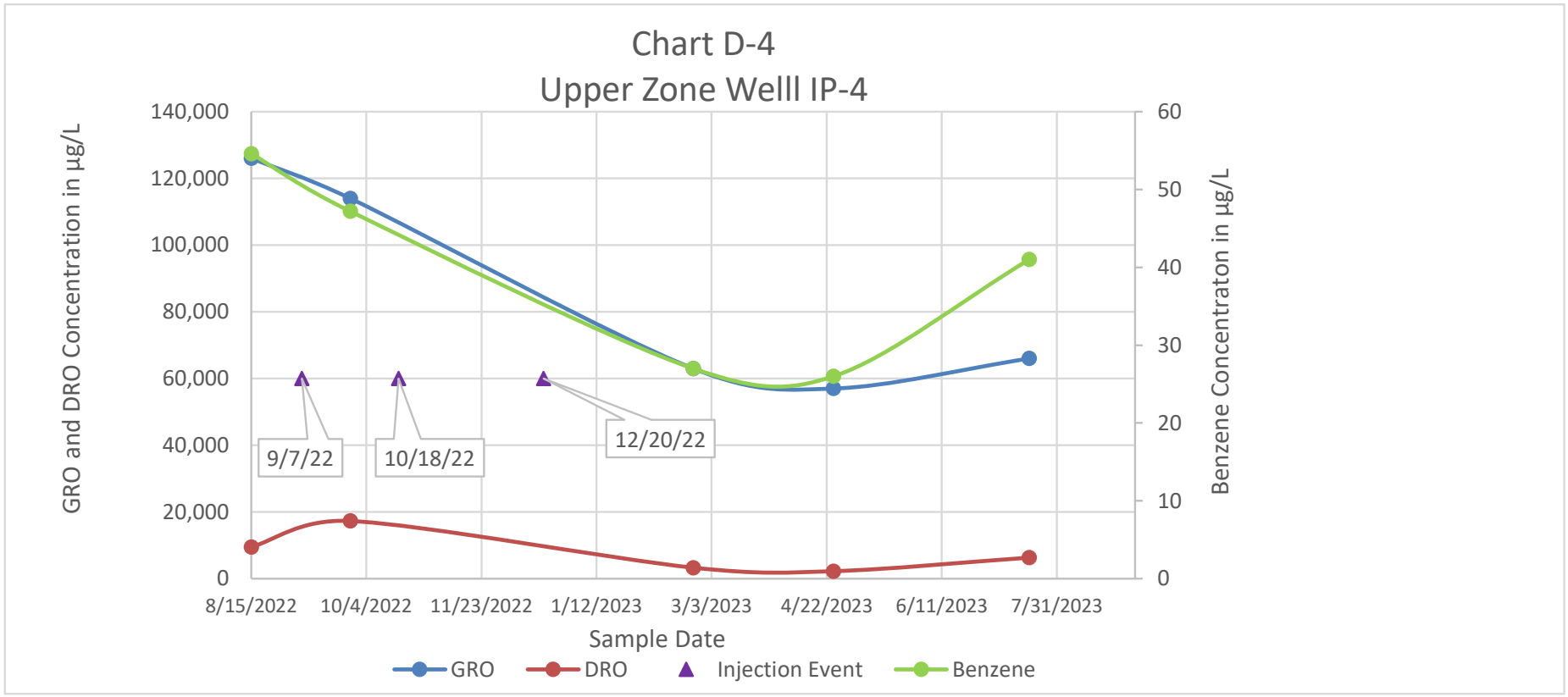


Chart D-4
Upper Zone Welll IP-4
GRO and DRO Concentration in µg/L
Benzene Concentraton in µg/L
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
60
50
40
30
20
10
0
9/7/22
10/18/22
12/20/22
8/15/2022
10/4/2022
11/23/2022
1/12/2023
3/3/2023
4/22/2023
6/11/2023
7/31/2023
Sample Date
GRO
DRO
Injection Event
Benzene

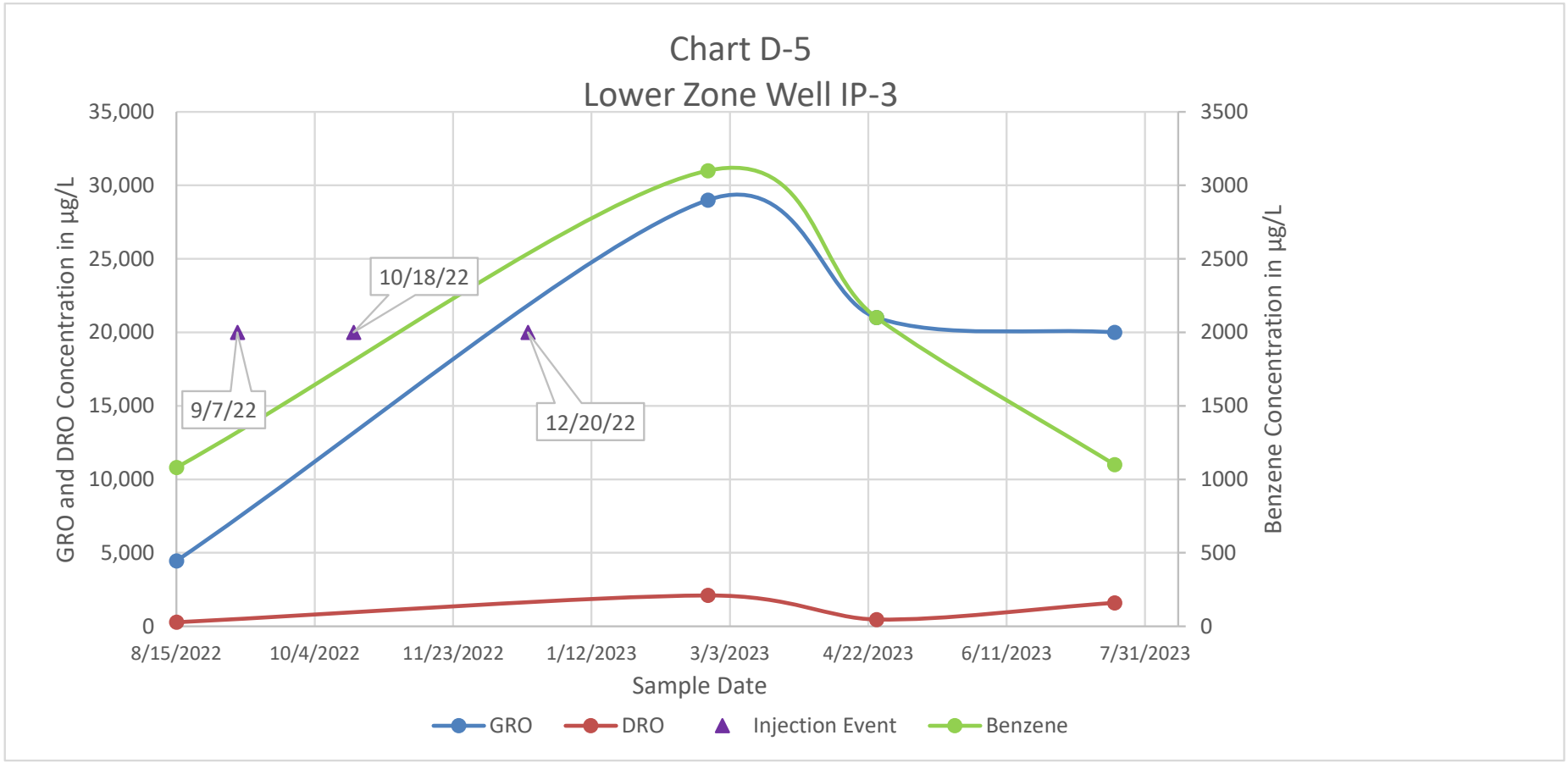


Chart D-5
Lower Zone Well IP-3
GRO and DRO Concentration in µg/L
Benzene Concentration in µg/L
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
3500
3000
2500
2000
1500
1000
500
0
9/7/22
10/18/22
12/20/22
8/15/2022
10/4/2022
11/23/2022
1/12/2023
3/3/2023
4/22/2023
6/11/2023
7/31/2023
Sample Date
GRO
DRO
Injection Event
Benzene

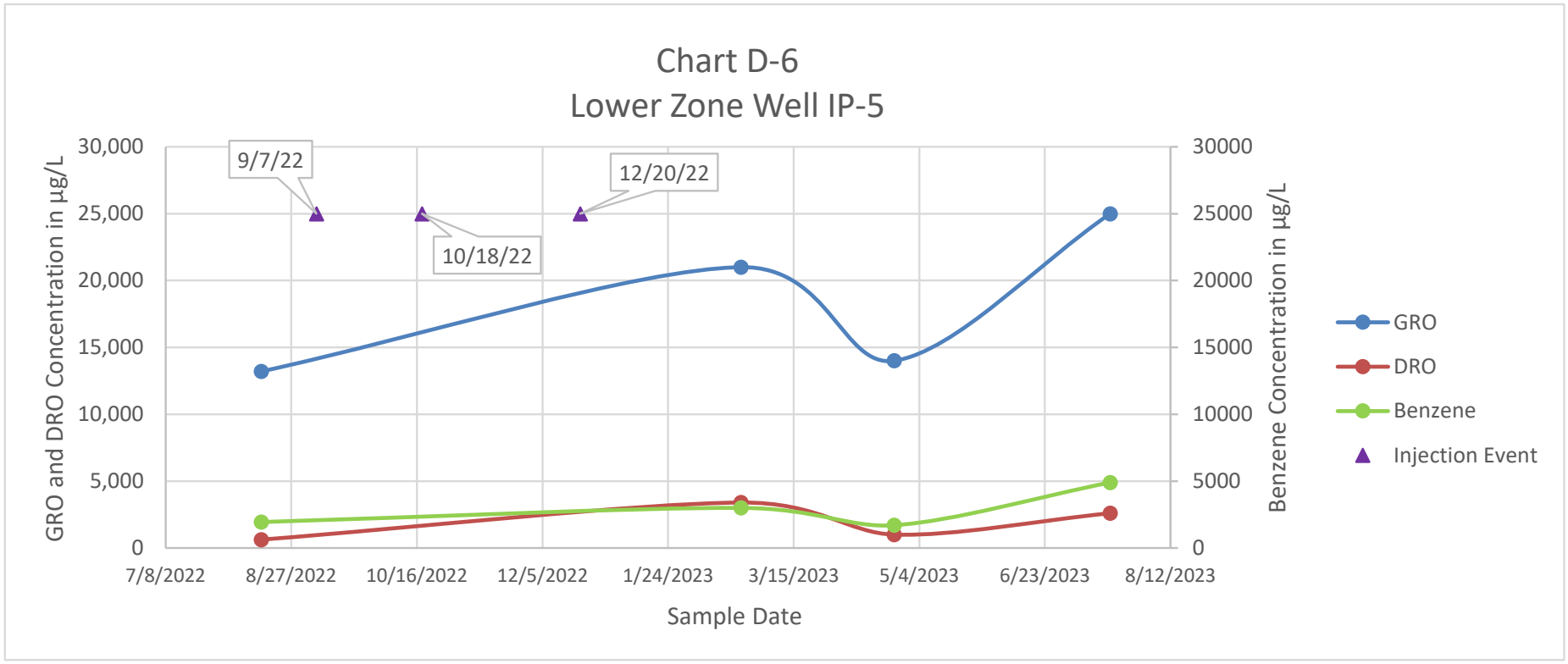


Chart D-6
Lower Zone Well IP-5
GRO and DRO Concentration in µg/L
Benzene Concentration in µg/L
30,000
25,000
20,000
15,000
10,000
5,000
0
30000
25000
20000
15000
10000
5000
0
9/7/22
10/18/22
12/20/22
7/8/2022
8/27/2022
10/16/2022
12/5/2022
1/24/2023
3/15/2023
5/4/2023
6/23/2023
8/12/2023
Sample Date
GRO
DRO
Benzene
Injection Event

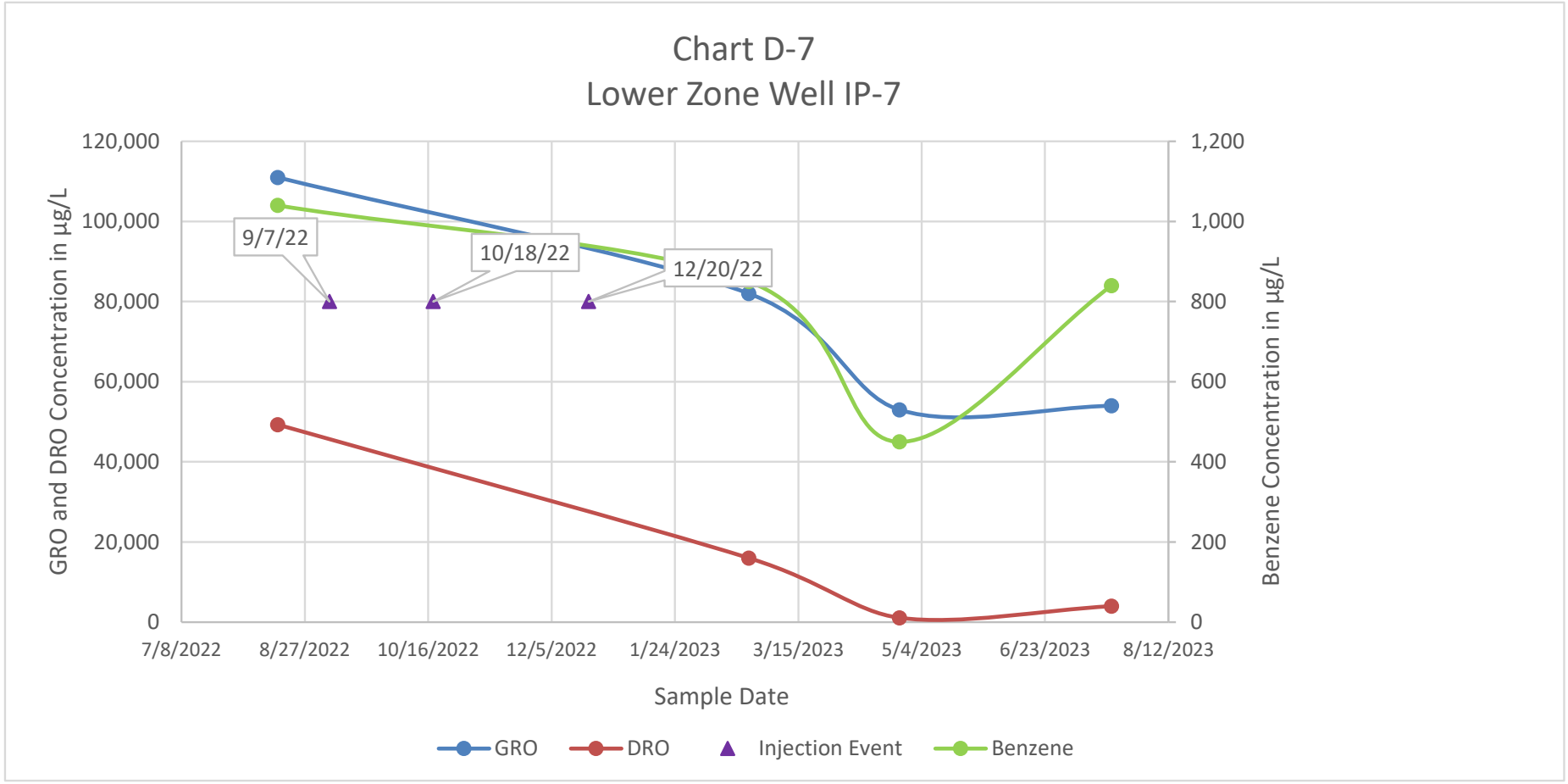
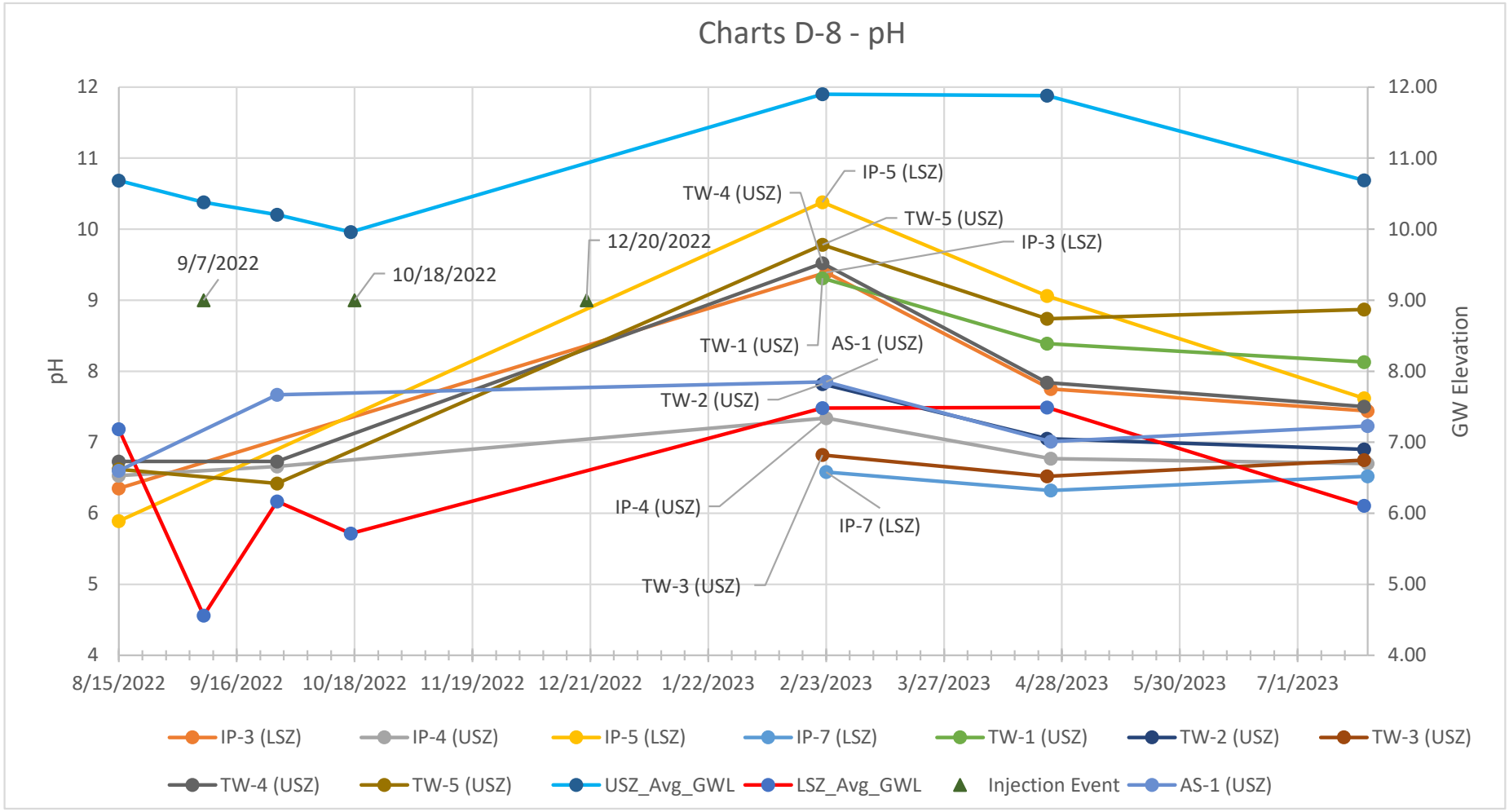


Chart D-7
Lower Zone Well IP-7
GRO and DRO Concentration in µg/L
Benzene Concentration in µg/L
120,000
100,000
80,000
60,000
40,000
20,000
0
1,200
1,000
800
600
400
200
0
9/7/22
10/18/22
12/20/22
7/8/2022
8/27/2022
10/16/2022
12/5/2022
1/24/2023
3/15/2023
5/4/2023
6/23/2023
8/12/2023
Sample Date
GRO
DRO
Injection Event
Benzene


Charts D-8 - pH
pH
GW Elevation
12
11
10
9
8
7
6
5
4
12.00
11.00
10.00
9.00
8.00
7.00
6.00
5.00
4.00
8/15/2022
9/16/2022
10/18/2022
11/19/2022
12/21/2022
1/22/2023
2/23/2023
3/27/2023
4/28/2023
5/30/2023
7/1/2023
9/7/2022
10/18/2022
12/20/2022
IP-5 (LSZ)
TW-4 (USZ)
TW-5 (USZ)
IP-3 (LSZ)
TW-1 (USZ)
AS-1 (USZ)
TW-2 (USZ)
IP-4 (USZ)
IP-7 (LSZ)
TW-3 (USZ)
IP-3 (LSZ)
IP-4 (USZ)
IP-5 (LSZ)
IP-7 (LSZ)
TW-1 (USZ)
TW-2 (USZ)
TW-3 (USZ)
TW-4 (USZ)
TW-5 (USZ)
USZ_Avg_GWL
LSZ_Avg_GWL
Injection Event
AS-1 (USZ)

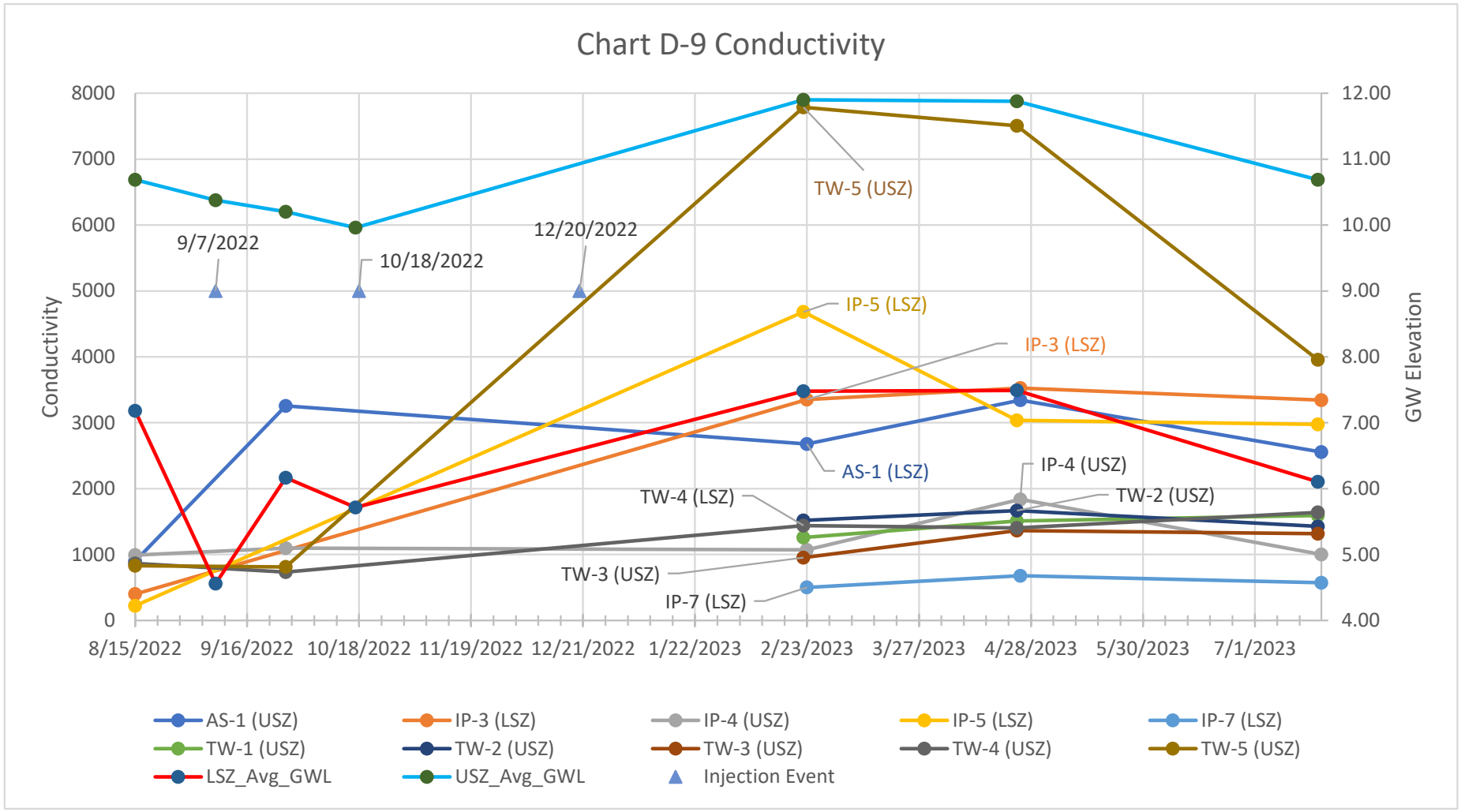


Chart D-9 Conductivity
Conductivity
GW Elevation
8000
7000
6000
5000
4000
3000
2000
1000
0
12.00
11.00
10.00
9.00
8.00
7.00
6.00
5.00
4.00
8/15/2022
9/16/2022
10/18/2022
11/19/2022
12/21/2022
1/22/2023
2/23/2023
3/27/2023
4/28/2023
5/30/2023
7/1/2023
9/7/2022
10/18/2022
12/20/2022
TW-5 (USZ)
IP-5 (LSZ)
IP-3 (LSZ)
AS-1 (LSZ)
IP-4 (USZ)
TW-4 (LSZ)
TW-2 (USZ)
TW-3 (USZ)
IP-7 (LSZ)
AS-1 (USZ)
IP-3 (LSZ)
IP-4 (USZ)
IP-5 (LSZ)
IP-7 (LSZ)
TW-1 (USZ)
TW-2 (USZ)
TW-3 (USZ)
TW-4 (USZ)
TW-5 (USZ)
LSZ_Avg_GWL
USZ_Avg_GWL
Injection Event

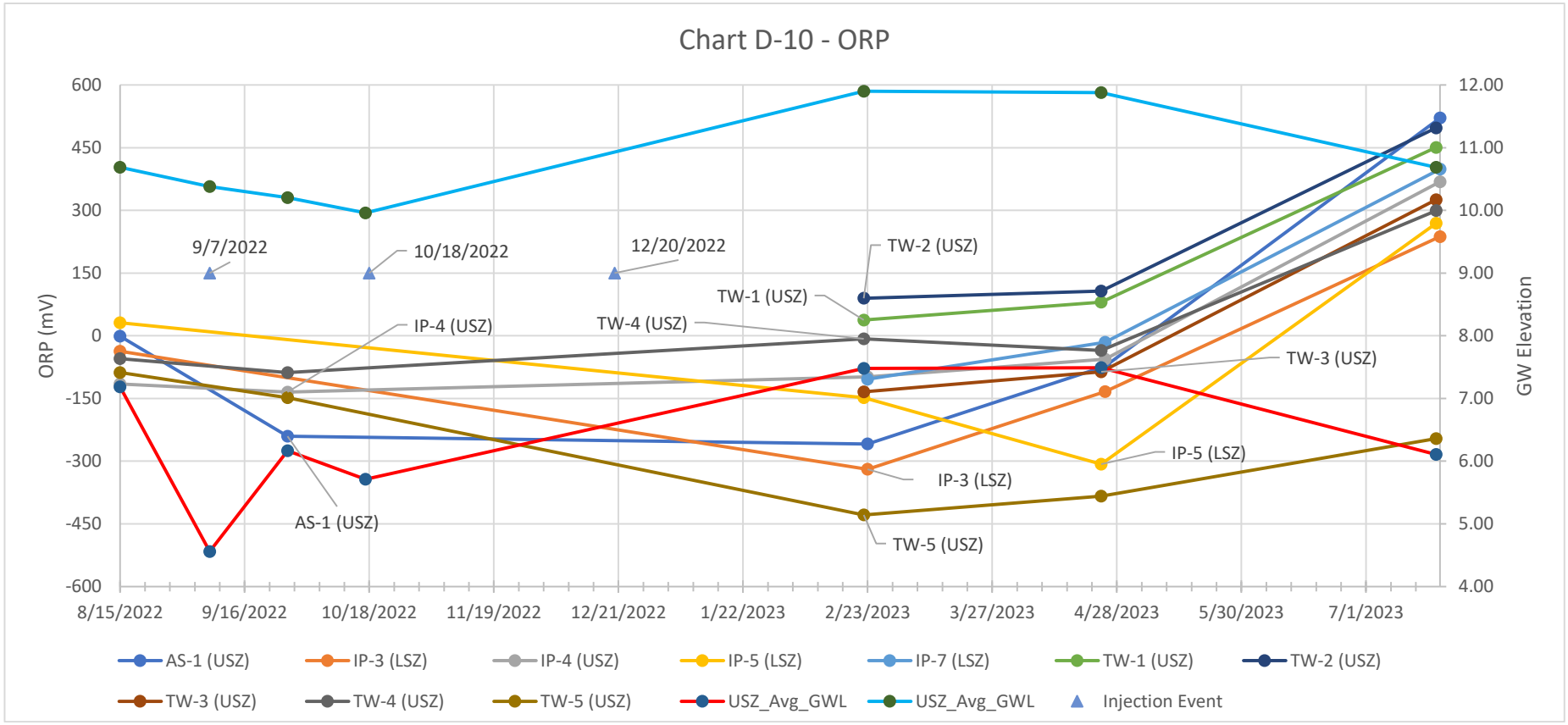


Chart D-10 - ORP
ORP (mV)
GW Elevation
600
450
300
150
0
-150
-300
-450
-600
12.00
11.00
10.00
9.00
8.00
7.00
6.00
5.00
4.00
8/15/2022
9/16/2022
10/18/2022
11/19/2022
12/21/2022
1/22/2023
2/23/2023
3/27/2023
4/28/2023
5/30/2023
7/1/2023
9/7/2022
10/18/2022
12/20/2022
TW-2 (USZ)
TW-1 (USZ)
TW-4 (USZ)
IP-4 (USZ)
TW-3 (USZ)
IP-5 (LSZ)
IP-3 (LSZ)
AS-1 (USZ)
TW-5 (USZ)
AS-1 (USZ)
IP-3 (LSZ)
IP-4 (USZ)
IP-5 (LSZ)
IP-7 (LSZ)
TW-1 (USZ)
TW-2 (USZ)
TW-3 (USZ)
TW-4 (USZ)
TW-5 (USZ)
USZ_Avg_GWL
USZ_Avg_GWL
Injection Event

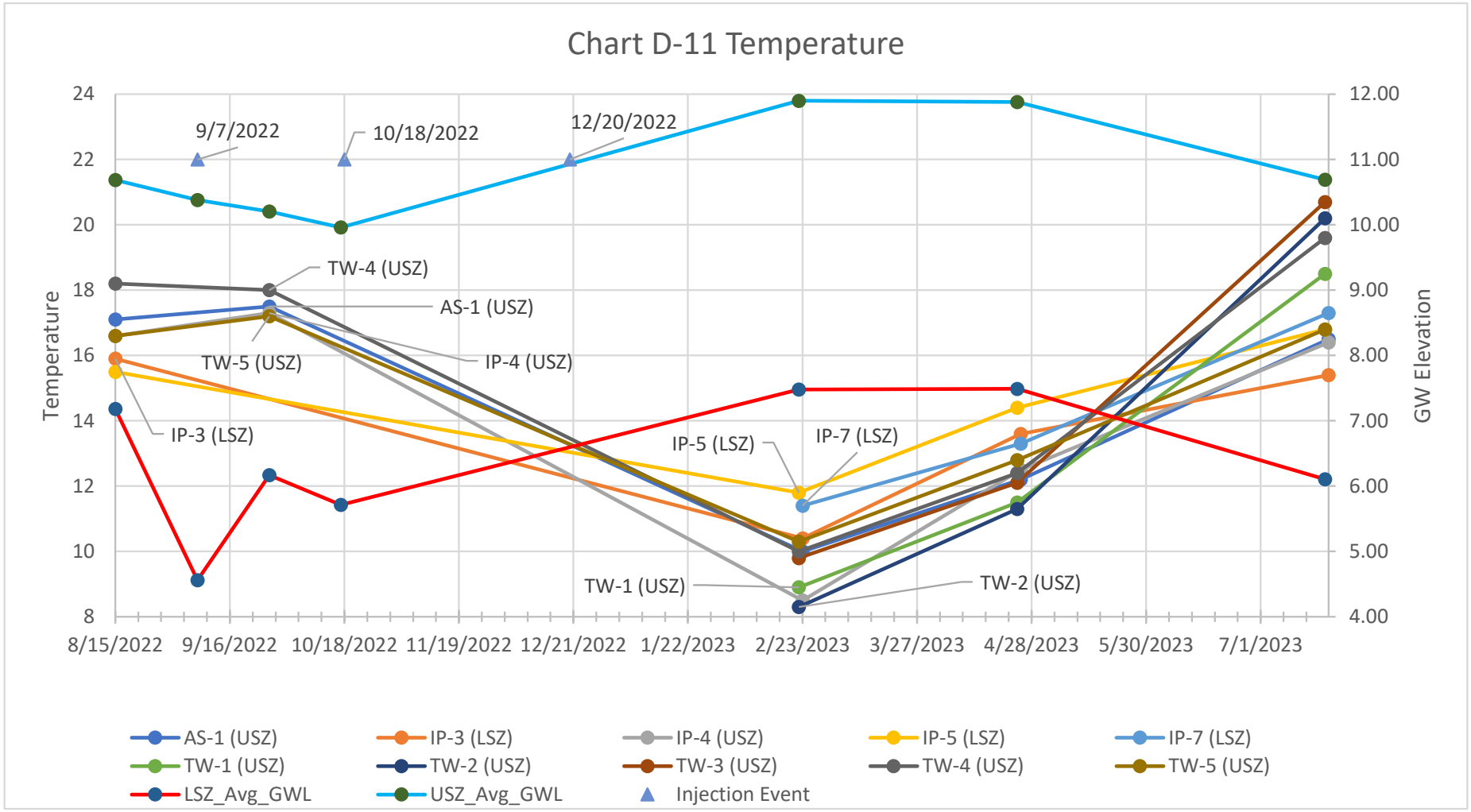


Chart D-11 Temperature
Temperature
GW Elevation
24
22
20
18
16
14
12
10
8
12.00
11.00
10.00
9.00
8.00
7.00
6.00
5.00
4.00
8/15/2022
9/16/2022
10/18/2022
11/19/2022
12/21/2022
1/22/2023
2/23/2023
3/27/2023
4/28/2023
5/30/2023
7/1/2023
9/7/2022
10/18/2022
12/20/2022
TW-4 (USZ)
AS-1 (USZ)
TW-5 (USZ)
IP-4 (USZ)
IP-3 (LSZ)
IP-5 (LSZ)
IP-7 (LSZ)
TW-1 (USZ)
TW-2 (USZ)
AS-1 (USZ)
IP-3 (LSZ)
IP-4 (USZ)
IP-5 (LSZ)
IP-7 (LSZ)
TW-1 (USZ)
TW-2 (USZ)
TW-3 (USZ)
TW-4 (USZ)
TW-5 (USZ)
LSZ_Avg_GWL
USZ_Avg_GWL
Injection Event

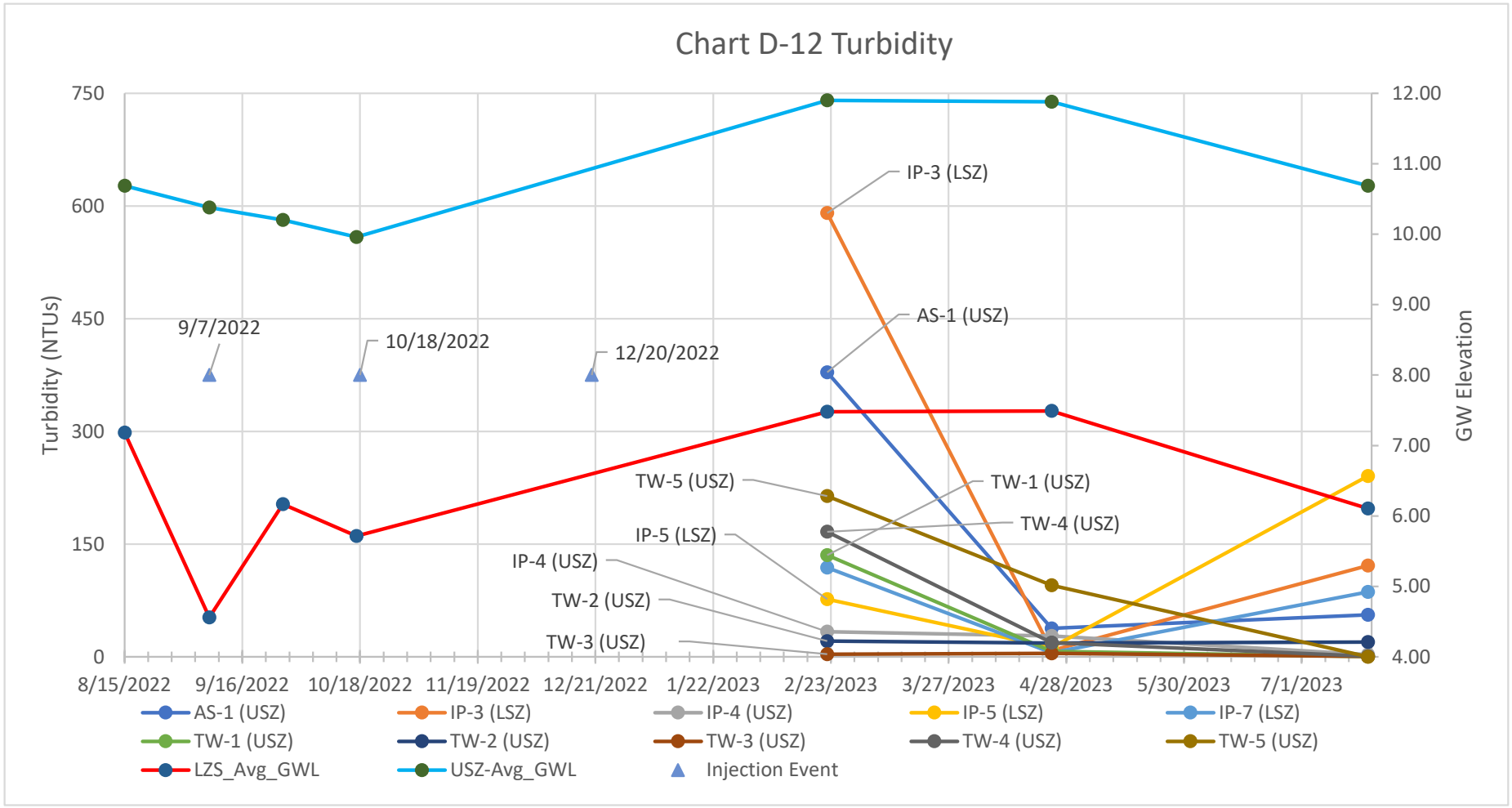


Chart D-12 Turbidity
Turbidity (NTUs)
GW Elevation
750
600
450
300
150
0
12.00
11.00
10.00
9.00
8.00
7.00
6.00
5.00
4.00
8/15/2022
9/16/2022
10/18/2022
11/19/2022
12/21/2022
1/22/2023
2/23/2023
3/27/2023
4/28/2023
5/30/2023
7/1/2023
9/7/2022
10/18/2022
12/20/2022
IP-3 (LSZ)
AS-1 (USZ)
TW-5 (USZ)
TW-1 (USZ)
TW-4 (USZ)
IP-5 (LSZ)
IP-4 (USZ)
TW-2 (USZ)
TW-3 (USZ)
AS-1 (USZ)
IP-3 (LSZ)
IP-4 (USZ)
IP-5 (LSZ)
IP-7 (LSZ)
TW-1 (USZ)
TW-2 (USZ)
TW-3 (USZ)
TW-4 (USZ)
TW-5 (USZ)
LZS_Avg_GWL
USZ-Avg_GWL
Injection Event

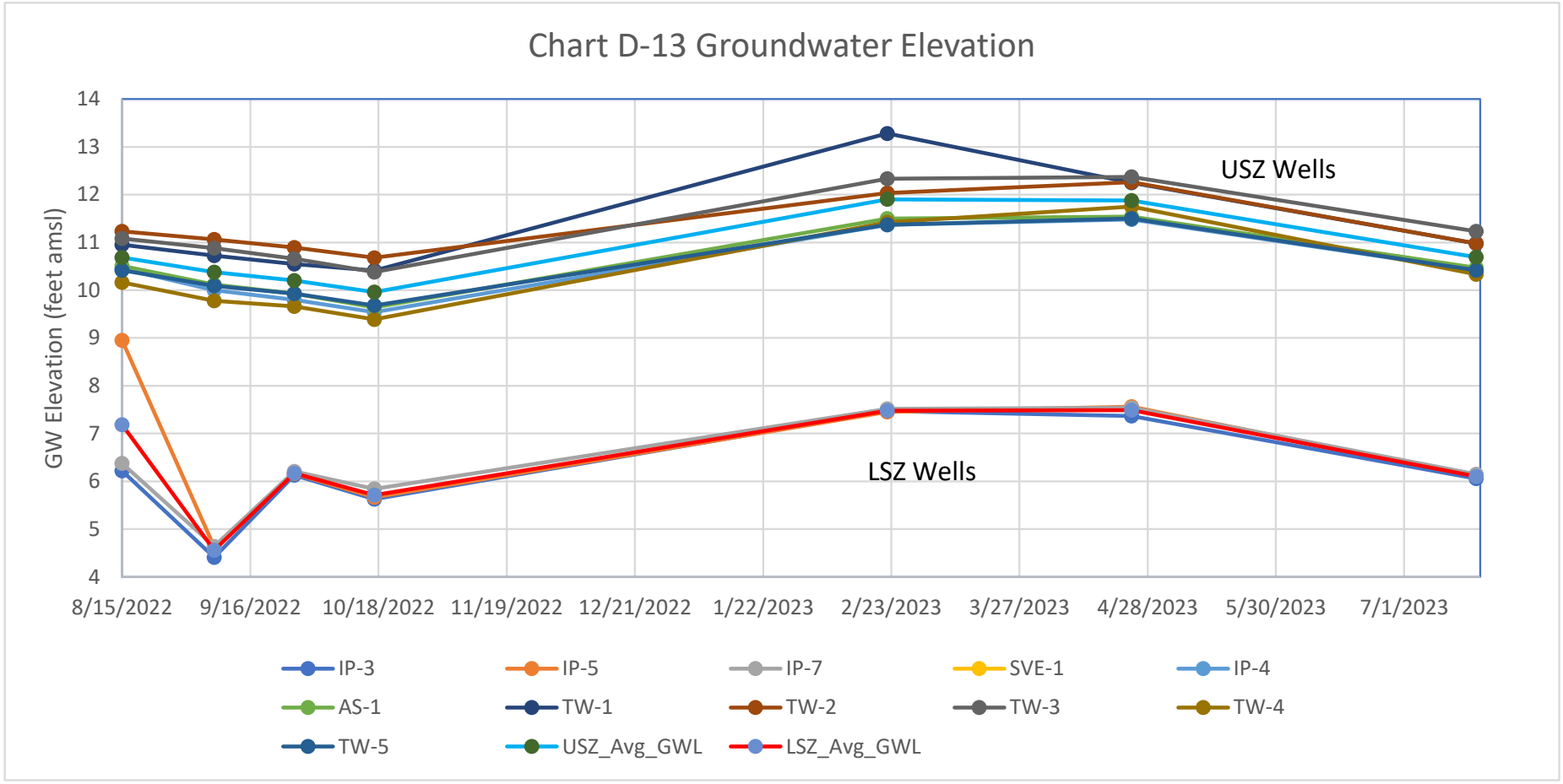


Chart D-13 Groundwater Elevation
GW Elevation (feet amsl)
14
13
12
11
10
9
8
7
6
5
4
8/15/2022
9/16/2022
10/18/2022
11/19/2022
12/21/2022
1/22/2023
2/23/2023
3/27/2023
4/28/2023
5/30/2023
7/1/2023
USZ Wells
LSZ Wells
IP-3
IP-5
IP-7
SVE-1
IP-4
AS-1
TW-1
TW-2
TW-3
TW-4
TW-5
USZ_Avg_GWL
LSZ_Avg_GWL

APPENDIX E

STATISTICAL TREND ANALYSES

Statistical Trend Analysis for Pilot Test Groundwater Performance Monitoring 8/22 to 7/23
Boeing Field Chevron Site
10805 East Marginal Way South
Tukwila, Washington

Well Number	GRO	DRO	Benzene	Last Sample Date	GRO	DRO	Benzene	Comments
Plume Stability				µg/L				
Upper Saturated Zone								
AS-1 [1]	Stable	Undetermined	Undetermined [3]	07/20/23	2,900	720	25	Well located outside of ISCO treatment and suspected LNAPL areas.
IP-4 [2]	Shinking	Stable	Shrinking	07/20/23	66,000	6,300	41	Well located inside ISCO treatment and suspected LNAPL areas.
SVE-1	NS	NS	NS	---	---	---	---	Well dry at each sampling event.
TW-1	NA	Expanding	Stable	07/19/23	< 100	800	0.33	All results over three sampling events not detected above the lab reporting limit and/or cleanup level. Well located outside of the ISCO treatment area.
TW-2 [1]	Expanding	Stable	Undetermined	07/19/23	7,400	170	1.3	Well located outside of the ISCO treatment area.
TW-3	NA	NA	NA	04/24/23	13,000	< 3,700/350	96	Trend analysis not applicable with two only two results during the pilot test. Well located outside ISCO treatment area.
TW-4	NA	NA	NA	07/19/23	< 100	420	< 0.20	All results over three sampling events not detected above the lab reporting limit and/or cleanup level.
TW-5[1]	Stable	Stable	Stable	07/19/23	150,000	3,400	340	Well located in the ISCO treatment area.
Lower Saturated Zone								
IP-3 [1]	Stable	Stable	Stable	07/20/23	20,000	1,600	1,100	Well located inside the ISCO treatment and suspected LNAPL areas.
IP-5 [1]	Stable	Stable	Stable	07/20/23	25,000	2,600	4,900	Well located in the ISCO treatment area.
IP-7 [1]	Stable	Stable	Stable	07/20/23	54,000	3,840	840	Well contained LNAPL during each sampling event. Well located outside plume at the time the pilot test was implemented.

Notes
GRO = Gasoline Range Petroleum Hydrocarbons
DRO = Diesel Range Petroleum Hydrocarbons
ug/L = micrograms per liter
NA = Concentration of analyte not detected above the laboratory reporting limit or did not exceed the cleanup level, or a trend analysis was not performed if there was insufficient data to perform analysis (i.e., there were less than three sample results).
NS = Not Sampled
LNAPL = Light Non Aqueous Phase Liquid
ISCO = In-Situ Chemical Oxidation
(1) = Trend analysis performed using Mann-Kendell nonparametric test
(2) = Trend Analysis performed using linear regression because Mann-Kendall an N =/> 4
(3) = Undetermined is defined as insufficient evidence to identify a significant trend at the specified level of significance

Module1: Mann-Kendall Trend Test for Plume Stability (Non-parametric Statistical Test)

Site Name:	*Boeing Field Chevron*
Site Address:	*10805 East Marginal Way South, Tukila, WA*
Additional Description:	*Commerical Gasoline Service Station*

Well (Sampling) Location?	**AS-1**
Level of Confidence (Decision Criteria)?	**85%**

1. Monitoring Well Information: Contaminant Concentration at a well: Quarterly sampling recommended.

		Hazardous Substances (unit is ug/L)					
Sampling Event	Date Sampled	GRO	DRO	Benzene			
#1	8/15/22	474	617	5.98			
#2	9/27/22	5930	3990	104			
#3	2/23/23	9200	4400	32			
#4	4/25/23	3000	225	16			
#5	7/20/23	2900	720	25			
#6							
#7							
#8							
#9							
#10							
#11							
#12							
#13							
#14							
#15							
#16							

2. Mann-Kendall Non-parametric Statistical Test Results

Hazardous Substance?	**GRO**	**DRO**	**Benzene**			
Confidence Level Calculated?	40.80%	40.80%	40.80%	NA	NA	NA
Plume Stability?	Stable	Undetermined	Undetermined	NA	NA	NA
Coefficient of Variation?	CV <= 1	CV > 1	CV > 1	n<4	n<4	n<4
Mann-Kendall Statistic "S" value?	0	0	0	0	0	0
Number of Sampling Rounds?	5	5	5	0	0	0
Average Concentration?	4300.80	1990.40	36.60	NA	NA	NA
Standard Deviation?	3352.43	2026.16	38.92	NA	NA	NA
Coefficient of Variation?	0.78	1.02	1.06	NA	NA	NA
Blank if No Errors found				n<4	n<4	n<4

3. Temporal Trend: Plot of Concentration vs. Sampling Time

Hazardous substance? **GRPH**

Plume Stability? **#VALUE!**

Module1: Mann-Kendall Trend Test for Plume Stability (Non-parametric Statistical Test)

Site Name:	*Boeing Field Chevron*
Site Address:	*10805 East Marginal Way South, Tukila, WA*
Additional Description:	*Commerical Gasoline Service Station*

Well (Sampling) Location?	**IP-4**
Level of Confidence (Decision Criteria)?	**85%**

1. Monitoring Well Information: Contaminant Concentration at a well: Quarterly sampling recommended.

		Hazardous Substances (unit is ug/L)					
Sampling Event	Date Sampled	GRO	DRO	Benzene			
#1	8/15/2022	126000	9500	54.6			
#2	9/27/2022	114000	17303	47.2			
#3	2/23/2023	63000	3300	27			
#4	4/25/2023	57000	2,250	26			
#5	7/20/2023	66000	6300	41			
#6							
#7							
#8							
#9							
#10							
#11							
#12							
#13							
#14							
#15							
#16							

2. Mann-Kendall Non-parametric Statistical Test Results

Hazardous Substance?	**GRO**	**DRO**	**Benzene**			
Confidence Level Calculated?	88.30%	75.80%	88.30%	NA	NA	NA
Plume Stability?	Shrinking	Stable	Shrinking	NA	NA	NA
Coefficient of Variation?		CV <= 1		n<4	n<4	n<4
Mann-Kendall Statistic "S" value?	-6	-4	-6	0	0	0
Number of Sampling Rounds?	5	5	5	0	0	0
Average Concentration?	85200.00	7730.60	39.16	NA	NA	NA
Standard Deviation?	32213.35	6051.35	12.52	NA	NA	NA
Coefficient of Variation?	0.38	0.78	0.32	NA	NA	NA
Blank if No Errors found				n<4	n<4	n<4

3. Temporal Trend: Plot of Concentration vs. Sampling Time

Hazardous substance? **GRPH**

Plume Stability? **#VALUE!**

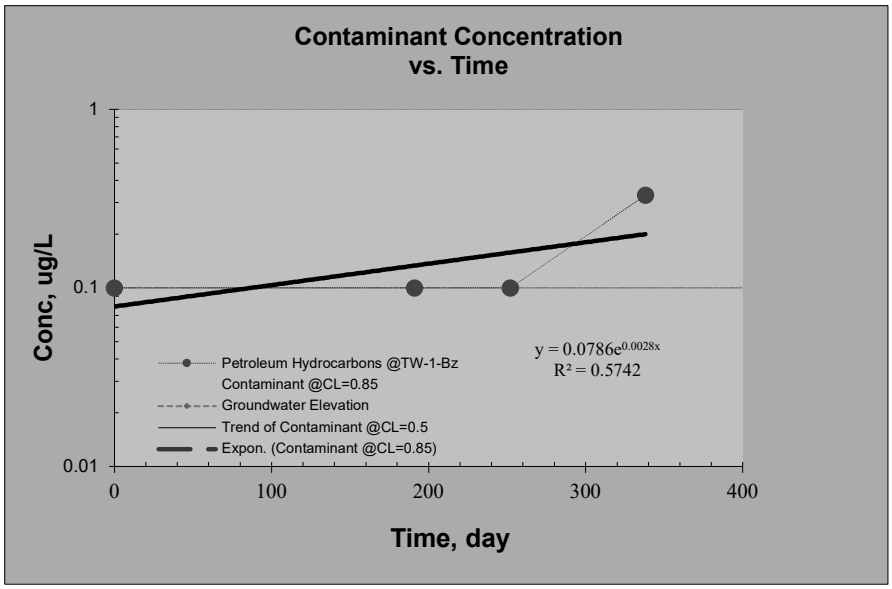
Module 2: Graphical Presentation of Historical Ground Water Data: (Well to Well Analysis)

Site Name: *Boeing Field Chevron*
Site Address: *10805 East Marginal Way South, Tukwila, Washingotn*
Additional Description: *Comerical gasoline station*
Hazardous Substance *Petroleum Hydrocarbons*

1. Temporal Trend at a Well (Concentration vs. Time & Groundwater Elevation : well-to-well analysis)

Name of Sampling Well?	**TW-1-Bz**	Confidence Level (Decision Criteria)?	85.0%

Confidence Level calculated with log-linear regression is?	*66.339%*		
Plume Stability?	Stable	; Decision Criteria is 85%.	
Slope: Point decay rate constant (k_{point}), yr^{-1}	*1.008* @50% C.L.;	*0.003*	@85% C.L.
Half Life for k_{point}, yr	*0.688* @50% C.L.;	*215.860*	@85% C.L.



2. Spatial and Temporal Trend along Overall Plume Length for Multiple Wells:

Plot #1:	Sampling date #1	
Plot #2:	Sampling date #2	
Plot #3:	Sampling date #3	
Plot #4:	Sampling date #4	
Plot #5:	Sampling date #5	
Plot #6:	Sampling date #6	

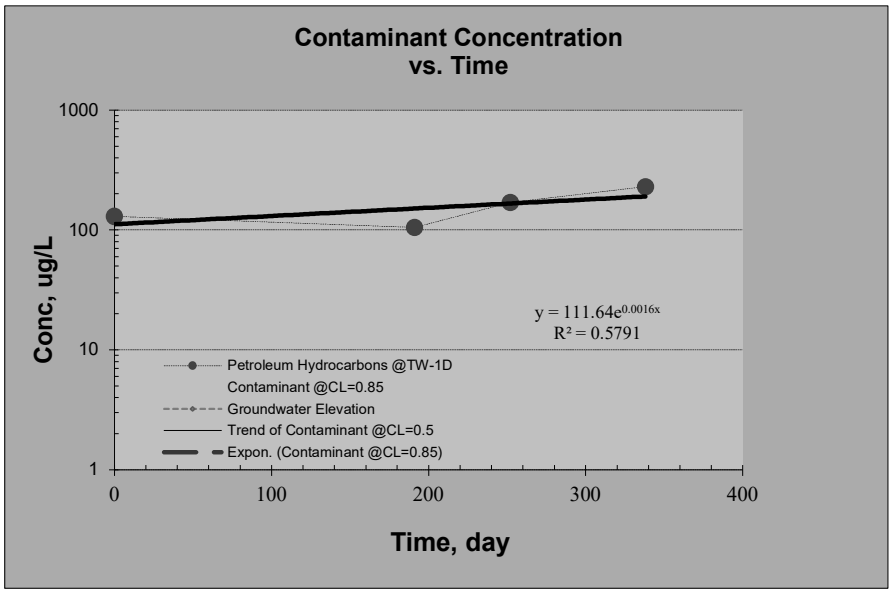
Module 2: Graphical Presentation of Historical Ground Water Data: (Well to Well Analysis)

Site Name: *Boeing Field Chevron*
Site Address: *10805 East Marginal Way South, Tukwila, Washingotn*
Additional Description: *Comerical gasoline station*
Hazardous Substance *Petroleum Hydrocarbons*

1. Temporal Trend at a Well (Concentration vs. Time & Groundwater Elevation : well-to-well analysis)

Name of Sampling Well?	**TW-1D**	Confidence Level (Decision Criteria)?	85.0%

Confidence Level calculated with log-linear regression is?	*66.823%*	
Plume Stability?	Stable	; Decision Criteria is 85%.
Slope: Point decay rate constant (k_{point}), yr^{-1}	*0.577* @50% C.L.;	*0.009* @85% C.L.
Half Life for k_{point}, yr	*1.202* @50% C.L.;	*74.514* @85% C.L.



2. Spatial and Temporal Trend along Overall Plume Length for Multiple Wells:

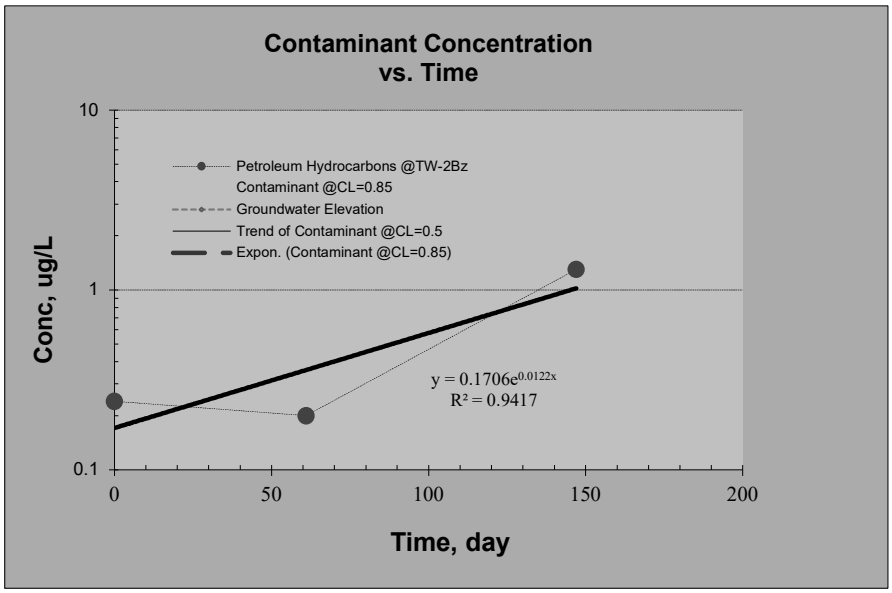
Plot #1:	Sampling date #1	
Plot #2:	Sampling date #2	
Plot #3:	Sampling date #3	
Plot #4:	Sampling date #4	
Plot #5:	Sampling date #5	
Plot #6:	Sampling date #6	

Module 2: Graphical Presentation of Historical Ground Water Data: (Well to Well Analysis)

Site Name: *Boeing Field Chevron*
Site Address: *10805 East Marginal Way South, Tukwila, Washingotn*
Additional Description: *Comerical gasoline station*
Hazardous Substance *Petroleum Hydrocarbons*

1. Temporal Trend at a Well (Concentration vs. Time & Groundwater Elevation : well-to-well analysis)

Name of Sampling Well?	**TW-2Bz**	Confidence Level (Decision Criteria)?	85.0%
Confidence Level calculated with log-linear regression is?	*67.267%*		
Plume Stability?	UD	; Decision Criteria is 85%.	
Slope: Point decay rate constant (k_{point}), yr^{-1}	*NA* @50% C.L.;	*NA* @85% C.L.	
Half Life for k_{point}, yr	*NA* @50% C.L.;	*NA* @85% C.L.	



2. Spatial and Temporal Trend along Overall Plume Length for Multiple Wells:

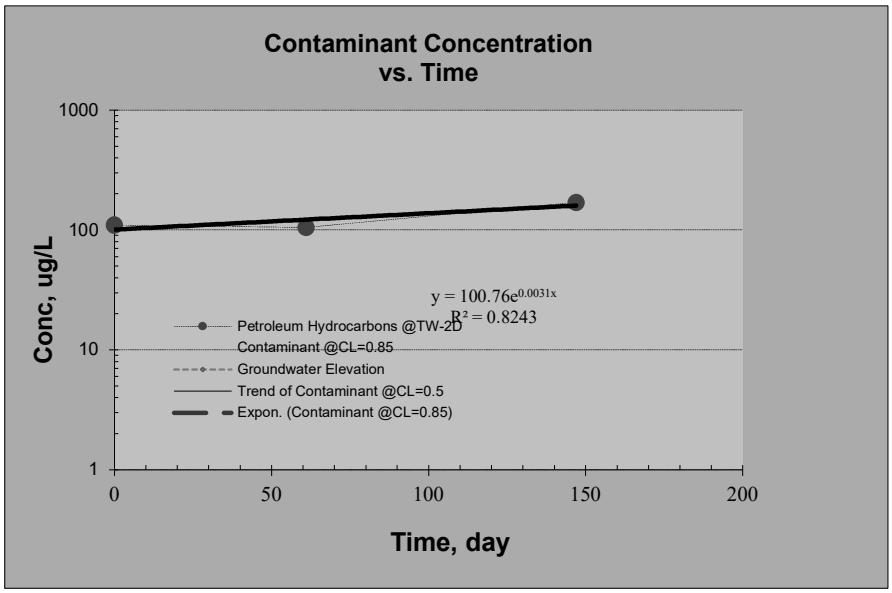
Plot #1:	Sampling date #1	
Plot #2:	Sampling date #2	
Plot #3:	Sampling date #3	
Plot #4:	Sampling date #4	
Plot #5:	Sampling date #5	
Plot #6:	Sampling date #6	

Module 2: Graphical Presentation of Historical Ground Water Data: (Well to Well Analysis)

Site Name: *Boeing Field Chevron*
Site Address: *10805 East Marginal Way South, Tukwila, Washingotn*
Additional Description: *Comerical gasoline station*
Hazardous Substance *Petroleum Hydrocarbons*

1. Temporal Trend at a Well (Concentration vs. Time & Groundwater Elevation : well-to-well analysis)

Name of Sampling Well?	**TW-2D**	Confidence Level (Decision Criteria)?	85.0%
Confidence Level calculated with log-linear regression is?	*67.319%*		
Plume Stability?	Stable	; Decision Criteria is 85%.	
Slope: Point decay rate constant (k_{point}), yr^{-1}	*1.144* @50% C.L.;	*0.250* @85% C.L.	
Half Life for k_{point}, yr	*0.606* @50% C.L.;	*2.772* @85% C.L.	



2. Spatial and Temporal Trend along Overall Plume Length for Multiple Wells:

Plot #1:	Sampling date #1	
Plot #2:	Sampling date #2	
Plot #3:	Sampling date #3	
Plot #4:	Sampling date #4	
Plot #5:	Sampling date #5	
Plot #6:	Sampling date #6	

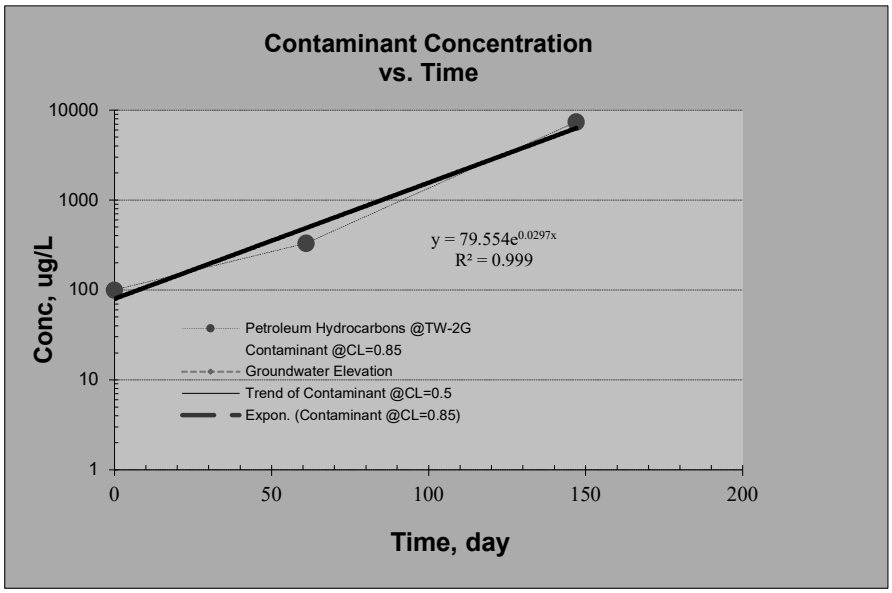
Module 2: Graphical Presentation of Historical Ground Water Data: (Well to Well Analysis)

Site Name: *Boeing Field Chevron*
Site Address: *10805 East Marginal Way South, Tukwila, Washingotn*
Additional Description: *Comerical gasoline station*
Hazardous Substance *Petroleum Hydrocarbons*

1. Temporal Trend at a Well (Concentration vs. Time & Groundwater Elevation : well-to-well analysis)

Name of Sampling Well?	**TW-2G**	Confidence Level (Decision Criteria)?	85.0%

Confidence Level calculated with log-linear regression is?	*90.214%*	
Plume Stability?	Expanding	; Decision Criteria is 85%.
Slope: Point decay rate constant (k_{point}), yr^{-1}	*NA* @50% C.L.;	*NA* @85% C.L.
Half Life for k_{point}, yr	*NA* @50% C.L.;	*NA* @85% C.L.



2. Spatial and Temporal Trend along Overall Plume Length for Multiple Wells:

Plot #1:	Sampling date #1	
Plot #2:	Sampling date #2	
Plot #3:	Sampling date #3	
Plot #4:	Sampling date #4	
Plot #5:	Sampling date #5	
Plot #6:	Sampling date #6	

Module1: Mann-Kendall Trend Test for Plume Stability (Non-parametric Statistical Test)

Site Name:	*Boeing Field Chevron*
Site Address:	*10805 East Marginal Way South, Tukila, WA*
Additional Description:	*Commerical Gasoline Service Station*

Well (Sampling) Location?	**TW-5**
Level of Confidence (Decision Criteria)?	**85%**

1. Monitoring Well Information: Contaminant Concentration at a well: Quarterly sampling recommended.

		Hazardous Substances (unit is ug/L)					
Sampling Event	Date Sampled	GRO	DRO	Benzene			
#1	8/15/2022	214000	8850	351			
#2	9/27/2022	178000	8520	258			
#3	2/22/2023	140000	9200	220			
#4	4/24/2023	150000	2200	220			
#5	7/19/2023	150000	3400	340			
#6							
#7							
#8							
#9							
#10							
#11							
#12							
#13							
#14							
#15							
#16							

2. Mann-Kendall Non-parametric Statistical Test Results

Hazardous Substance?	**GRO**	**DRO**	**Benzene**			
Confidence Level Calculated?	75.80%	75.80%	59.20%	NA	NA	NA
Plume Stability?	Stable	Stable	Stable	NA	NA	NA
Coefficient of Variation?	CV <= 1	CV <= 1	CV <= 1	n<4	n<4	n<4
Mann-Kendall Statistic "S" value?	-5	-4	-3	0	0	0
Number of Sampling Rounds?	5	5	5	0	0	0
Average Concentration?	166400.00	6434.00	277.80	NA	NA	NA
Standard Deviation?	30146.31	3353.03	63.84	NA	NA	NA
Coefficient of Variation?	0.18	0.52	0.23	NA	NA	NA
Blank if No Errors found				n<4	n<4	n<4

3. Temporal Trend: Plot of Concentration vs. Sampling Time

Hazardous substance? **GRPH**

Plume Stability? **#VALUE!**

Module1: Mann-Kendall Trend Test for Plume Stability (Non-parametric Statistical Test)

Site Name:	*Boeing Field Chevron*
Site Address:	*10805 East Marginal Way South, Tukila, WA*
Additional Description:	*Commerical Gasoline Service Station*

Well (Sampling) Location?	**IP-3**
Level of Confidence (Decision Criteria)?	**85%**

1. Monitoring Well Information: Contaminant Concentration at a well: Quarterly sampling recommended.

		Hazardous Substances (unit is ug/L)					
Sampling Event	Date Sampled	GRO	DRO	Benzene			
#1	8/15/2022	4540	306	1080			
#2	2/23/2023	29000	2100	3100			
#3	4/25/2023	21000	465	2100			
#4	7/20/2023	20000	1,600	1100			
#5							
#6							
#7							
#8							
#9							
#10							
#11							
#12							
#13							
#14							
#15							
#16							

2. Mann-Kendall Non-parametric Statistical Test Results

Hazardous Substance?	**GRO**	**DRO**	**Benzene**			
Confidence Level Calculated?	37.50%	62.50%	37.50%	NA	NA	NA
Plume Stability?	Stable	Stable	Stable	NA	NA	NA
Coefficient of Variation?	CV <= 1	CV <= 1	CV <= 1	n<4	n<4	n<4
Mann-Kendall Statistic "S" value?	0	2	0	0	0	0
Number of Sampling Rounds?	4	4	4	0	0	0
Average Concentration?	18635.00	1117.75	1845.00	NA	NA	NA
Standard Deviation?	10223.48	872.24	962.69	NA	NA	NA
Coefficient of Variation?	0.55	0.78	0.52	NA	NA	NA
Blank if No Errors found				n<4	n<4	n<4

3. Temporal Trend: Plot of Concentration vs. Sampling Time

Hazardous substance? **GRPH**

Plume Stability? **#VALUE!**

Module1: Mann-Kendall Trend Test for Plume Stability (Non-parametric Statistical Test)

Site Name:	*Boeing Field Chevron*
Site Address:	*10805 East Marginal Way South, Tukila, WA*
Additional Description:	*Commerical Gasoline Service Station*

Well (Sampling) Location?	**IP-5**
Level of Confidence (Decision Criteria)?	**85%**

1. Monitoring Well Information: Contaminant Concentration at a well: Quarterly sampling recommended.

		Hazardous Substances (unit is ug/L)					
Sampling Event	Date Sampled	GRO	DRO	Benzene			
#1	8/15/2022	13200	625	1940			
#2	2/22/2023	21000	3400	3000			
#3	4/24/2023	14000	1000	1700			
#4	7/19/2023	25000	2600	4900			
#5							
#6							
#7							
#8							
#9							
#10							
#11							
#12							
#13							
#14							
#15							
#16							

2. Mann-Kendall Non-parametric Statistical Test Results

Hazardous Substance?	**GRO**	**DRO**	**Benzene**			
Confidence Level Calculated?	83.30%	62.50%	62.50%	NA	NA	NA
Plume Stability?	Stable	Stable	Stable	NA	NA	NA
Coefficient of Variation?	CV <= 1	CV <= 1	CV <= 1	n<4	n<4	n<4
Mann-Kendall Statistic "S" value?	4	2	2	0	0	0
Number of Sampling Rounds?	4	4	4	0	0	0
Average Concentration?	18300.00	1906.25	2885.00	NA	NA	NA
Standard Deviation?	5676.85	1313.45	1457.25	NA	NA	NA
Coefficient of Variation?	0.31	0.69	0.51	NA	NA	NA
Blank if No Errors found				n<4	n<4	n<4

3. Temporal Trend: Plot of Concentration vs. Sampling Time

Hazardous substance? **GRPH**

Plume Stability? **#VALUE!**

Module1: Mann-Kendall Trend Test for Plume Stability (Non-parametric Statistical Test)

Site Name:	*Boeing Field Chevron*
Site Address:	*10805 East Marginal Way South, Tukila, WA*
Additional Description:	*Commerical Gasoline Service Station*

Well (Sampling) Location?	**IP-7**
Level of Confidence (Decision Criteria)?	**85%**

1. Monitoring Well Information: Contaminant Concentration at a well: Quarterly sampling recommended.

		Hazardous Substances (unit is ug/L)					
Sampling Event	Date Sampled	GRO	DRO	Benzene			
#1	8/15/2022	111000	49300	1040			
#2	2/23/2023	82000	16000	850			
#3	4/25/2023	53000	1100	450			
#4	7/20/2023	54000	4000	840			
#5							
#6							
#7							
#8							
#9							
#10							
#11							
#12							
#13							
#14							
#15							
#16							

2. Mann-Kendall Non-parametric Statistical Test Results

Hazardous Substance?	**GRO**	**DRO**	**Benzene**			
Confidence Level Calculated?	83.30%	83.30%	83.30%	NA	NA	NA
Plume Stability?	Stable	Undetermined	Stable	NA	NA	NA
Coefficient of Variation?	CV <= 1	CV > 1	CV <= 1	n<4	n<4	n<4
Mann-Kendall Statistic "S" value?	-4	-4	-4	0	0	0
Number of Sampling Rounds?	4	4	4	0	0	0
Average Concentration?	75000.00	17600.00	795.00	NA	NA	NA
Standard Deviation?	27507.57	22095.70	247.72	NA	NA	NA
Coefficient of Variation?	0.37	1.26	0.31	NA	NA	NA
Blank if No Errors found				n<4	n<4	n<4

3. Temporal Trend: Plot of Concentration vs. Sampling Time

Hazardous substance? **GRPH**

Plume Stability? **#VALUE!**

APPENDIX F

TABLE 5-1: REMEDIAL INVESTIGATION REPORT

TABLE 5-1
Groundwater Sample Analyses, Active Monitoring Wells (1)
Boeing Field Chevron
Tukwila, Washington

Exploration Location	Sample Name	Sample Date	Water Depth (ft)	Gasoline Range Organics	Diesel Range Organics	Heavy Oils	Benzene	Toluene	Ethylbenzene	Xylenes	Methyl Tert-Butyl Ether (MTBE)	1,2-Dibromoethane (EDB)	1,2-Dichloroethane (EDC)	Hexane	Naphthalene	2-Methylnaphthalene	1-Methylnaphthalene	Lead (Total)	Lead (Dissolved)
MTCA Cleanup Level (2, 3)				800(a)/1,000(b)	500	500	1.6	130	31	1,000	20	0.01	5	**	1.4	32*	1.51*	15	15
(units in µg/L)																			
ACTIVE WELLS																			
IP-3	IP-3	5/8/2006	NR**	**28**	---	---	**1,800**	**13,000**	**1,400**	**8,300**	---	---	---	---	---	---	---	---	---
	IP-3	3/27/2008	NR**	**62,900**	---	---	**6,120**	**8,850**	**968**	**4,420**	---	---	---	---	---	---	---	---	---
	IP-3 GW-L	7/17/2015	17.44	**4,200**	**460 X**	<250	**1,200**	**11**	**70**	**38.5**	**1.2**	**0.10**	<1	**38**	**28**	**13**	**8.7**	<1	<1
	IP-3 GW-H	7/23/2015	14.97	**4,700**	**510 X**	<250	**1,300**	**13**	**71**	**41.0**	<10	**0.04**	<5	**35**	**3.1**	**7.7**	**5.5**	<1	<1
	IP-3-3232017	3/23/2017	12.96	**4,840 D**	<49.9	<99.8	**783 D**	**105 D**	**127 D**	**139 D**	<1.00	<0.00976	<1.00	---	**2.52**	**6.09**	**3.30**	<0.500	<0.500
	IP-3-7272017	7/27/2017	14.16	**5,800 D**	<50.2	<100	**862 D**	**20.5**	**136 D**	**61.6 D**	<1.00	<0.00952	<1.00		**0.789**	**6.10**	**3.56**	<0.500	<0.500
	IP-3-1042017	10/4/2017	15.32	**3,740 D**	<50.3	<101	**1,270 D**	**80.7**	**214 D**	**458.3 D**	<1.00	<0.0100	<1.00	**72.7 D**	**1.37**	**6.5**	**4.13**	<0.500	<0.500
	DUP	1/12/2018	12.01	**4,980 D**	**77.7**	<99.9	**950 D**	**45.7 D**	**100 D**	**91.62 D**	<1.00	<0.250	<1.00	---	**8.77**	---	---	---	<0.500
	IP-3	1/12/2018	12.01	**4,610 D**	**74.3**	<99.6	**895 D**	**42.9 D**	**94.3 D**	**88.93 D**	<1.00	<0.250	<1.00	---	**15.7**	---	---	---	---
	MW-B (dup)	5/29/2018	14.55	**4,520 D**	<49.8	<99.6	**832 D**	**31.4 D**	**101 D**	**114.21 D**	---	<0.00981	---	---	**2.56**	**9.79**	**5.38**	---	---
	IP-3	5/29/2018	14.55	**4,870 D**	<49.9	<99.8	**971 D**	**34.5 D**	**106 D**	**107.29 D**	---	<0.00984	---	---	**2.37**	**9.85 D**	**5.57**	---	---
	IP-3	8/24/2018	16.23	**6,160 D**	**111**	**101**	**1,390 D**	**27.1**	**125 D**	**141.33 D**	---	<0.00987	---	---	**8.19 Q**	---	---	<0.500	---
	MW-A	8/24/2018	16.23	**5,750 D**	**113**	<99.9	**1,300 D**	**29.4**	**129 D**	**154.98 D**	---	<0.00979	---	---	**6.70**	---	---	**0.551**	---
	IP-3	11/28/2018	12.53	**3,710 D**	**63.9**	<99.7	**865 D**	**18.8**	**53.0 D**	**52.4**	---	<0.00997	---	---	**1.95**	---	---	**1.92**	---
IP-4	IP-4	5/8/2006	NR**	**110**	---	---	**15,000**	**48,000**	**3,700**	**23,000**	---	---	---	---	---	---	---	---	---
	IP-4	3/27/2008	NR**	**84,400**	---	---	**14,600**	**22,100**	**4,920**	**17,600**	---	---	---	---	---	---	---	---	---
	IP-4 GW-L	7/17/2015	11.41	**170,000**	**6,800 X**	<250	**4,100**	**29,000**	**4,800**	**26,900**	**1.4**	**0.12**	<1	**87**	**550**	**96**	**56**	<1	<1
	IP-4 GW-H	7/24/2015	11.46	**150,000**	**8,700 X**	<250	**4,200**	**27,000**	**4,300**	**24,400**	<10	**0.04**	<5	**64**	**440**	**82**	**47**	<1	<1
	IP-4	11/30/2016	10.10	**93,400D**	**1,410**	<99.6	**1,070 D**	**15,600 D**	**3,300 D**	**19,950 D**	<1.00	<0.00986	<1.00	**127 EQ**	**504 D**	**85.2 D**	**47.3 D**	**0.974**	<0.500
	IP-4-3232017	3/23/2017	8.01	**209,000 D**	**1,570**	<99.6	**1,360 D**	**16,200 D**	**5,090 D**	**30,440 D**	<1.00	<0.00953	<1.00	---	**757 D**	**119 D**	**66.6 D**	<0.500	<0.500
	IP-4-7272017	7/27/2017	9.96	**213,000 D**	**1,180**	<99.4	**1,170 D**	**19,600 D**	**5,500 D**	**19,200 D**	<1.00	<0.00971	<1.00	---	**447 D**	**80.8 D**	**37.6 D**	<0.500	<0.500
	IP-4-1042017	10/4/2017	10.75	**212,000 D**	**1,110**	<101	**2,030 D**	**18,400 D**	**5,320 D**	**25,190 D**	<1.00	<0.00960	<1.00	**48.0**	**604 D**	**89.9 D**	**71.3 D**	**0.546**	<0.500
	IP-4	1/12/2018	9.23	**162,000 D**	**1,250**	<99.9	**939 D**	**18,600 D**	**5,180 D**	**27,980 D**	<1.00	<0.250	<1.00	---	**1,150 D**	---	---	---	---
	IP-4	5/29/2018	9.67	**199,000 D**	**1,250**	**138**	**687 D**	**17,200 D**	**6,090 D**	**32,200 D**	---	<0.00998	---	---	**661 D**	**101 D**	<0.0999	---	---
	IP-4	8/24/2018	9.98	**131,000 D**	**584**	<99.9	**421 D**	**11,400 D**	**5,550 D**	**29,340 D**	---	---	---	---	**748 D**	---	---	---	---
	IP-4	11/28/2018	10.00	**123,000 D**	**471**	<99.9	**246 D**	**7,380 D**	**5,170 D**	**27,120 D**	---	<0.00962	---	---	**867 D**	---	---	<0.500	---

TABLE 5-1
Groundwater Sample Analyses, Active Monitoring Wells (1)
Boeing Field Chevron
Tukwila, Washington

Exploration Location	Sample Name	Sample Date	Water Depth (ft)	Gasoline Range Organics	Diesel Range Organics	Heavy Oils	Benzene	Toluene	Ethylbenzene	Xylenes	Methyl Tert-Butyl Ether (MTBE)	1,2-Dibromoethane (EDB)	1,2-Dichloroethane (EDC)	Hexane	Naphthalene	2-Methylnaphthalene	1-Methylnaphthalene	Lead (Total)	Lead (Dissolved)
MTCA Cleanup Level (2, 3)				800(a)/1,000(b)	500	500	1.6	130	31	1,000	20	0.01	5	**	1.4	32*	1.51*	15	15
(units in µg/L)																			
IP-5	IP-5	5/9/2006	NR**	**48**	---	---	**2,100**	**18,000**	**3,500**	**20,000**	---	---	---	---	---	---	---	---	---
	IP-5	3/27/2008	NR**	**13,300**	---	---	**711**	**1,260**	**363**	**1,370**	---	---	---	---	---	---	---	---	---
	IP-5 GW-L	7/20/2015	16.58	**35,000**	**3,900 X**	<250	**5,200**	**1,400**	**2,400**	**2,800**	<10	**0.32**	<5	**160**	**90**	**15**	**15.0**	**1.02**	<1
	IP-5 GW-H	7/24/2015	15.50	**27,000**	**2,700 X**	<250	**4,500**	**1,100**	**2,200**	**2,580**	<10	**0.24**	<5	**170**	**86**	**18**	**13.0**	<1	<1
	IP-5	11/30/2016	13.00	**15,200 D**	**321**	<99.1	**3,450 DE**	**212 D**	**774 D**	**1,789 D**	<1.00	<0.00987	<1.00	**57.1 DQ**	**108 D**	**33.7 D**	**19.5 D**	<0.500	<0.500
	MW-B (IP-5 Dup)	11/30/2016	13.00	**15,400 D**	**313**	<99.1	**3,440 DE**	**256 D**	**795 D**	**1,824 D**	<1.00	<0.00996	<1.00	**63.1 DQ**	**104 D**	**31.6 D**	**18.4 D**	<0.500	<0.500
	IP-5-3232017	3/23/2017	13.80	**18,400 D**	**209**	<99.2	**1,740 D**	**141 D**	**665 D**	**1,637 D**	<1.00	<0.00980	<1.00	---	**60.4 D**	**25.1 D**	**15.1 D**	<0.500	<0.500
	FD-1 (IP-5 Dup)	3/23/2017	13.80	**15,700 D**	**273**	<99.9	**1,420 D**	**136 D**	**670 D**	**1,634 D**	<1.00	<0.00981	<1.00	---	**73.4 D**	**27.6 D**	**18.4 D**	**0.785**	<0.500
	IP5-7272017	7/27/2017	13.76	**15,800 D**	**102**	<99.9	**1,660 D**	**164 D**	**491 D**	**936 D**	<1.00	<0.00993	<1.00	---	**38.0 D**	**28.4 D**	**12.0 D**	<0.500	<0.500
	FD-2-7272017	7/27/2017	13.76	**11,900**	**207**	<99.9	**1,610 D**	**148 D**	**499 D**	**1032 D**	<1.00	<0.00984	<1.00	---	**36.9 D**	**27.2 D**	**9.25 D**	**0.660**	<0.500
	IP-5-1042017	10/4/2017	16.17	**30,700 D**	**175**	<100	**4,360 D**	**583 D**	**1,060 D**	**2,792 D**	<1.00	<0.00971	<1.00	**137**	**81.4 D**	**20.7 D**	**31.2 D**	<0.500	<0.500
	IP-5	1/12/2018	13.42	**13,000 D**	**222**	<100	**1,500 D**	**240 D**	**462 D**	**1,195 D**	<1.00	<0.250	<1.00	---	**61.1 D**	---	---	---	---
	IP-5	5/29/2018	16.82	**10,900 D**	**161**	<100	**1,270 D**	**149 D**	**415 D**	**806.6 D**	---	<0.00981	---	---	**31.6 D**	**20.3 D**	**4.57**	---	---
	IP-5	8/24/2018	17.08	**36,200 D**	**471**	<99.9	**5,670 D**	**2,200 D**	**1,190 D**	**2,773 D**	---	---	---	---	**74.4 DQ**	---	---	---	---
	IP-5	11/28/2018	13.29	**16,500 D**	**251**	<101	**2,590 D**	**490 D**	**633 D**	**1,105 D**	---	<0.00994	---	---	**48.1 JD**	---	---	<0.500	---
MW-18	MW-18	4/18/2008	NR**	<100	---	---	<1	<2	<1	<3	---	---	---	---	---	---	---	---	---
	MW-18 GW-L	7/15/2015	12.38	<100	<50	<250	<0.35	<1	<1	<3	<1	<0.01	<1	<1	<0.05	<0.05	<0.05	<1	<1
	MW-18 GW-H	7/21/2015	12.57	<100	**66 X**	<250	<0.35	<1	<1	<3	<1	<0.01	<1	<1	<0.1	<0.1	<0.1	<1	<1
	MW-18	11/30/2016	7.88	<50.0	<49.6	<99.3	**1.01**	<1.00	**1.19**	<1.00	<1.00	<0.00970	<1.00	<1.00	<0.0994	<0.0994	<0.0994	<0.500	<0.500
	MW-18-3232017	3/23/2017	6.96	<50.0	<50.0	<100	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00979	<1.00	---	<0.0998	<0.0998	<0.0998	<0.500	<0.500
	MW-18-7272017	7/27/2017	8.96	<50.0	<50.0	<100	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00955	<1.00	---	<0.0999	<0.0999	<0.0999	**0.501**	<0.500
	MW-18-1052017	10/5/2017	9.80	<50.0	<49.8	<99.6	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00950	<1.00	<1.00	<0.0997	<0.0997	<0.0997	<0.500	<0.500
	MW-18	1/16/2018	7.79	<50.0	---	---	<1.00	<1.00	<1.00	<1.00	---	---	---	---	---	---	---	---	---
	MW-18	5/25/2018	8.62	<50.0	---	---	<1.00	<1.00	<1.00	<1.00	---	<0.00975	---	---	---	---	---	---	---
	MW-18	8/23/2018	10.40	<50.0	---	---	<1.00	<1.00	<1.00	<1.00	---	---	---	---	---	---	---	---	---
	MW-18	11/28/2018	9.12	<50.0	<49.9	**138**	<1.00	<1.00	<1.00	<1.00	---	---	---	---	---	---	---	**0.656**	---
MW-19	MW-19	4/18/2008	NR**	<100	---	---	<1	<2	<1	<3	---	---	---	---	---	---	---	---	---
	MW-19 GW-L	7/15/2015	17.95	<100	**74 X**	<350	<0.35	<1	<1	<3	<1	<0.01	<1	<1	<0.1	<0.1	<0.1	**2.31**	<1
	MW-19 GW-H	7/21/2015	12.57	<100	**74 X**	<250	<0.35	<1	<1	<3	<1	<0.01	<1	<1	<0.1	<0.1	<0.1	<1	<1
	MW-19	11/30/2016	11.50	<50.0	<49.9	<99.7	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00983	<1.00	<1.00	<0.0994	<0.0994	<0.0994	<0.500	<0.500
	MW-19-3232017	3/23/2017	10.31	<50.0	<49.6	<99.2	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00961	<1.00	---	<0.0998	<0.0998	<0.0998	<0.500	<0.500
	MW-19-7272017	7/27/2017	10.64	<50.0	<50.1	<100	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00977	<1.00	---	<0.0998	<0.0998	<0.0998	<0.500	<0.500
	MW-19-1052017	10/5/2017	13.58	<50.0	<49.7	<99.4	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00985	<1.00	<1.00	<0.0988	<0.0988	<0.0988	**1.33**	<0.500
	MW-19	8/23/2018	15.80	<50.0	---	---	<1.00	<1.00	<1.00	<1.00	---	---	---	---	---	---	---	---	---
	MW-19	11/27/2018	8.50	<50.0	<50.2	**111**	<1.00	<1.00	<1.00	<1.00	---	---	---	---	---	---	---	<0.500	---
MW-20	MW-20	4/18/2008	NR**	<100	---	---	<1	<2	<1	<3	---	---	---	---	---	---	---	---	---
	MW-20 GW-L	7/15/2015	18.36	<100	<50	<250	<0.35	<1	<1	<3	**1.4**	<0.01	<1	<1	<0.05	<0.05	<0.05	<1	<1
	MW-20 GW-H	7/21/2015	14.88	<100	**92 X**	<250	<0.35	<1	<1	<3	**1.6**	<0.01	<1	<1	<0.1	<0.1	<0.1	<1	<1

TABLE 5-1
Groundwater Sample Analyses, Active Monitoring Wells (1)
Boeing Field Chevron
Tukwila, Washington

Exploration Location	Sample Name	Sample Date	Water Depth (ft)	Gasoline Range Organics	Diesel Range Organics	Heavy Oils	Benzene	Toluene	Ethylbenzene	Xylenes	Methyl Tert-Butyl Ether (MTBE)	1,2-Dibromoethane (EDB)	1,2-Dichloroethane (EDC)	Hexane	Naphthalene	2-Methylnaphthalene	1-Methylnaphthalene	Lead (Total)	Lead (Dissolved)
MTCA Cleanup Level (2, 3)				800(a)/1,000(b)	500	500	1.6	130	31	1,000	20	0.01	5	**	1.4	32*	1.51*	15	15
(units in µg/L)																			
	MW-20	11/30/2016	11.43	<50.0	<49.8	<99.8	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00973	<1.00	<1.00	<0.0995	<0.0995	<0.0995	<0.500	<0.500
	MW-20-3232017	3/23/2017	11.89	<50.0	<49.7	<99.4	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00969	<1.00	---	<0.0998	<0.0998	<0.0998	<0.500	<0.500
	MW-20-7272017	7/27/2017	12.35	<50.0	<50.1	<100	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00993	<1.00	---	<0.0998	<0.0998	<0.0998	<0.500	<0.500
	MW-20-1042017	10/4/2017	14.16	<50.0	<49.7	<99.4	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00991	<1.00	<1.00	**0.119**	<0.0998	<0.0998	<0.500	<0.500
	MW-20	8/23/2018	15.53	**117**	---	---	<1.00	<1.00	**3.6**	**10.4**	---	---	---	---	<1.00 Q	---	---	---	---
	MW-20	11/27/2018	10.21	**94.6**	<49.9	<99.8	<1.00	<1.00	**5.18**	**16.1**	---	---	---	---	---	---	---	<0.500	---
MW-21	MW-21	4/18/2008	NR**	<100	---	---	<1	<2	<1	<3	---	---	---	---	---	---	---	---	---
	MW-21 Dup	4/18/2008	NR**	<100	---	---	<1	<2	<1	<3	---	---	---	---	---	---	---	---	---
	MW-21 GW-L	7/15/2015	21.27	<100	**220 X**	<250	<0.35	<1	<1	<3	<1	<0.01	<1	<1	<0.05	<0.05	<0.05	<1	<1
	MW-21 GW-H	7/21/2015	14.47	<100	**260 X**	<250	<0.35	<1	<1	<3	<1	<0.01	<1	<1	<0.1	<0.1	<0.1	**1.14**	<1
	MW-21 GW-H Dup	7/21/2015	14.47	<100	**260 X**	<250	<0.35	<1	<1	<3	<1	<0.01	<1	<1	<0.1	<0.1	<0.1	<1	<1
	MW-21	11/30/2016	12.00	<50.0	<49.8	**210**	**2.61**	<1.00	<1.00	<1.00	<1.00	0.00973	<1.00	<1.00	<0.0992	<0.0992	<0.0992	**0.986**	<0.500
	MW-21-3232017	3/23/2017	12.67	<50.0	<49.9	<99.9	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00980	<1.00	---	<0.0996	<0.0996	<0.0996	**4.96**	<0.500
	MW-21-7272017	7/27/2017	12.35	<50.0	<50.1	**331**	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00983	<1.00	---	<1.00	<1.00	<1.00	<0.500	<0.500
	MW-21-1052017	10/5/2017	13.65	<50.0	<49.3	<98.7	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00993	<1.00	<1.00	<0.0993	<0.0993	<0.0993	<0.500	<0.500
	MW-21	1/16/2018	11.80	<50.0	<49.8	<99.7	<1.00	<1.00	<1.00	<1.00	---	---	---	---	---	---	---	---	---
	MW-21	5/25/2018	14.04	<50.0	<49.5	<98.9	<1.00	<1.00	<1.00	<1.00	---	<0.00993	---	---	---	---	---	---	---
	MW-21	8/23/2018	17.48	<50.0	<49.9	**228**	<1.00	<1.00	<1.00	<1.00	---	---	---	---	---	---	---	---	---
	MW-21	11/28/2018	8.52	<50.0	<49.9	**316**	<1.00	<1.00	<1.00	<1.00	---	---	---	---	---	---	---	<0.500	---
MW-22	MW-22	12/6/2016	7.09	<50.0	<50.4	**197**	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00981	<1.00	<1.00	<0.0996	<0.0996	<0.0996	<0.500	<0.500
	MW-22-3232017	3/23/2017	8.92	<50.0	<49.8	<99.8	<1.00	<1.00	<1.00	<1.00	<1.00	<0.0100	<1.00	---	<0.0996	<0.0996	<0.0996	<0.500	<0.500
	MW-22-7262017	7/26/2017	10.55	<50.0	<50.2	<100	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00978	<1.00	---	<0.0997	<0.0997	<0.0997	**0.761**	<0.500
	MW-22-1052017	10/5/2017	11.16	<50.0	<49.6	<99.3	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00983	<1.00	<1.00	<0.0986	<0.0986	<0.0986	<0.500	<0.500
	MW-22	1/12/2018	9.56	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	MW-22	8/23/2018	11.06	<50.0	<49.9	**131**	<1.00	<1.00	<1.00	<1.00	---	---	---	---	---	---	---	---	---
	MW-22	11/27/2018	11.98	<50.0	**62.7**	**243**	<1.00	**2.26**	**1.39**	**7.02**	---	---	---	---	---	---	---	**0.515**	---
MW-23	MW-23	12/6/2016	10.30	**848**	**94.2**	<100	**19.8**	<1.00	<1.00	**133.5 D**	<1.00	<0.00999	<1.00	<1.00	**30.6 E**	**0.615 Q**	**0.653**	<0.500	<0.500
	MW-C (MW-23 Dup)	12/6/2016	10.30	**1,080**	**87.3**	<100	**25.1**	<1.00	<1.00	**165.8 D**	<1.00	<0.00979	<1.00	<1.00	**27.1 E**	**0.531 Q**	**0.564**	<0.500	<0.500
	MW-23-3232017	3/23/2017	8.63	<50.0	<49.9	<99.8	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00983	<1.00	---	<0.0999	<0.0999	<0.0999	<0.500	<0.500
	MW-23-7262017	7/26/2017	10.36	<50.0	<49.7	<99.5	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00995	<1.00	---	<0.0996	<0.0996	<0.0996	**0.686**	<0.500
	MW-23-1052017	10/5/2017	11.08	<50.0	**<49.5 FLAG**	<99.0	<1.00	<1.00	<1.00	**1.27**	<1.00	<0.00997	<1.00	<1.00	**0.169**	<0.0997	<0.0997	<0.500	<0.500
	MW-23	1/12/2018	9.38	<50.0	<50.0	<100	<1.00	<1.00	<1.00	<1.00	<1.00	<0.250	<1.00	---	<1.00	---	---	---	<0.500
	MW-23	5/25/2018	10.04	<50.0	<50.0	<99.9	<1.00	<1.00	<1.00	<1.00	---	<0.00970	---	---	<0.0991	<0.0991	<0.0991	**0.688**	<0.500
	MW-23	8/23/2018	10.73	<50.0	<49.7	<99.5	<1.00	<1.00	<1.00	<1.00	---	---	---	---	<1.00	---	---	**0.964**	---
	MW-23	11/27/2018	10.49	<50.0	<49.9	<99.8	<1.00	<1.00	<1.00	<1.00	---	---	---	---	---	---	---	**5.69**	---
MW-24	MW-24	12/6/2016	10.34	<50.0	<50.2	**328**	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00993	<1.00	<1.00	<0.0996	<0.0996	<0.0996	**0.606**	<0.500
	MW-24-3232017	3/23/2017	8.73	<50.0	<49.7	**307**	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00965	<1.00	---	<0.0999	<0.0999	<0.0999	**0.956**	<0.500
	MW-24-7272017	7/27/2017	10.71	<50.0	**73.6**	**313**	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00986	<1.00	---	---	---	---	**2.55**	<0.500

TABLE 5-1
Groundwater Sample Analyses, Active Monitoring Wells (1)
Boeing Field Chevron
Tukwila, Washington

Exploration Location	Sample Name	Sample Date	Water Depth (ft)	Gasoline Range Organics	Diesel Range Organics	Heavy Oils	Benzene	Toluene	Ethylbenzene	Xylenes	Methyl Tert-Butyl Ether (MTBE)	1,2-Dibromoethane (EDB)	1,2-Dichloroethane (EDC)	Hexane	Naphthalene	2-Methylnaphthalene	1-Methylnaphthalene	Lead (Total)	Lead (Dissolved)
MTCA Cleanup Level (2, 3)				800(a)/1,000(b)	500	500	1.6	130	31	1,000	20	0.01	5	**	1.4	32*	1.51*	15	15
(units in µg/L)																			
	MW-24-1052017	10/5/2017	11.69	<50.0	**63.6 FLAG**	<122	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00945	<1.00	<1.00	<0.100	<0.100	<0.100	---	---
	MW-24	1/11/2018	8.89	<50.0	<49.9	**117**	<1.00	<1.00	<1.00	<1.00	<1.00	<0.250	<1.00	---	<0.100	---	---	---	---
	MW-24	5/25/2018	11.99	<50.0	---	---	<1.00	<1.00	<1.00	<1.00	---	<0.00995	---	---	---	---	---	---	---
	MW-24	8/23/2018	11.35	---	**57.4**	**324**	---	---	---	---	---	---	---	---	---	---	---	---	---
	MW-24	11/27/2018	9.19	<50.0	<50.3	**306**	<1.00	<1.00	<1.00	<1.00	---	---	---	---	---	---	---	---	---
MW-24D	MW-24D	1/12/2018	10.34	**841**	<50.0	<99.9	**9.29**	**1.37**	<1.00	**6.15**	<1.00	<0.250	<1.00	---	**1.42**	---	---	<0.500	---
	MW-24D	5/25/2018	15.15	**481**	<50.0	<99.9	**33.5**	**1.38**	<1.00	**4.22**	---	<0.00991	---	---	<0.0998	<0.0998	**0.110**	<0.500	<0.500
	MW-24D	8/23/2018	15.97	**97.2**	<50.4	<101	<1.00	<1.00	<1.00	**1.17**	---	---	---	---	<0.100	---	---	**0.930**	---
	MW-24D	11/27/2018	12.20	<50.0	<49.7	<99.4	<1.00	<1.00	<1.00	<1.00	---	<0.0100	---	---	<0.100	---	---	<0.500	---
MW-25	MW-25	12/6/2016	8.94	<50.0	<49.8	**128**	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00984	<1.00	<1.00	<0.0994	<0.0944	<0.0944	**2.21**	<0.500
	MW-25-3232017	3/23/2017	7.38	<50.0	<49.9	<99.7	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00967	<1.00	---	<0.0998	<0.0998	<0.0998	**0.568**	<0.500
	MW-25-7262017	7/26/2017	9.31	<50.0	<50.3	<101	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00993	<1.00	---	<0.0999	<0.0999	<0.0999	**0.573**	<0.500
	MW-25-1052017	10/5/2017	10.33	<50.0	<49.9	<99.8	<1.00	<1.00	<1.00	<1.00	<1.00	<0.009987	<1.00	---	<0.0998	<0.0998	<0.0998	<0.500	<0.500
	MW-25	1/12/2018	8.32	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	MW-25	8/23/2018	9.93	<50.0	<49.9	<99.9	<1.00	<1.00	<1.00	<1.00	---	---	---	---	---	---	---	---	---
	MW-25	11/27/2018	9.68	<50.0	<49.9	<99.9	<1.00	<1.00	<1.00	<1.00	---	---	---	---	---	---	---	<0.500	---
MW-26S	MW-26	11/30/2016	8.09	<50.0	<49.8	<99.6	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00996	<1.00	<1.00	<0.0993	<0.0993	<0.0993	**2.15**	<0.500
	MW-26S-3242017	3/24/2017	6.92	<50.0	<49.9	<99.8	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00989	<1.00	---	<0.0995	<0.0995	<0.0995	**1.48**	<0.500
	MW-26S-7262017	7/26/2017	8.98	<50.0	<50.2	<100	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00976	<1.00	---	<0.0997	<0.0997	<0.0997	**0.800**	<0.500
	MW-26S-1042017	10/4/2017	9.57	<50.0	<49.6	<99.2	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00971	<1.00	<1.00	<0.0999	<0.0999	<0.0999	<0.500	<0.500
	MW-26S	1/11/2018	7.27	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	MW-26S	8/24/2018	8.80	<50.0	<49.7	<99.4	<1.00	<1.00	<1.00	<1.00	---	---	---	---	<1.00 Q	---	---	---	---
	MW-26S	11/28/2018	7.85	<50.0	<50.1	<100	<1.00	<1.00	<1.00	<1.00	---	---	---	---	---	---	---	<0.500	---
MW-26D	MW-26D	11/30/2016	12.19	<50.0	<49.9	<99.8	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00997	<1.00	<1.00	<0.0997	<0.0997	<0.0997	**0.0633**	<0.500
	MW-26D-3242017	3/24/2017	12.24	<50.0	<49.6	<99.1	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00952	<1.00	---	<0.0998	<0.0998	<0.0998	**4.48**	<0.500
	MW-26D-7262017	7/26/2017	13.49	<50.0	<49.9	<99.8	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00976	<1.00	---	<0.0997	<0.0997	<0.0997	**0.800**	<0.500
	MW-26D-1042017	10/4/2017	14.66	<50.0	<50.0	<100	<1.00	<1.00	<1.00	<1.00	<1.00	<0.0100	<1.00	<1.00	<0.0989	<0.0989	<0.0989	**0.729**	<0.500
	MW-26D	1/11/2018	11.46	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	MW-26D	8/24/2018	15.65	<50.0	<49.7	<99.5	<1.00	<1.00	<1.00	<1.00	---	---	---	---	<1.00 Q	---	---	---	---
	MW-26D	11/28/2018	12.07	<50.0	<49.8	<99.7	<1.00	<1.00	<1.00	<1.00	---	---	---	---	---	---	---	**0.785**	---
MW-27S	MW-27S	11/28/2016	8.25	<50.0	<50.1	<100	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00987	<1.00	<1.00	<0.0997	<0.0997	<0.0997	<0.500	<0.500
	MW-27S-3242017	3/24/2017	7.23	<50.0	<49.9	<99.8	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00994	<1.00	---	<0.0996	<0.0996	<0.0996	**10.4**	<0.500
	MW-27S-7262017	7/26/2017	9.08	<50.0	<50.2	<100	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00971	<1.00	---	<0.0993	<0.0993	<0.0993	**0.535**	<0.500
	MW-27S-1042017	10/4/2017	9.68	<50.0	<49.9	<99.8	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00997	<1.00	<1.00	<0.0995	<0.0995	<0.0995	**1.38**	<0.500
	MW-27S	1/16/2018	8.05	<50.0	<49.9	<99.9	<1.00	<1.00	<1.00	<1.00	---	---	---	---	---	---	---	---	---
	MW-27S	5/25/2018	8.27	<50.0	<49.8	<99.6	<1.00	<1.00	<1.00	<1.00	---	<0.00989	---	---	---	---	---	---	---
	MW-27S	8/23/2018	7.50	<50.0	<49.7	<99.5	<1.00	<1.00	<1.00	<1.00	---	---	---	---	---	---	---	---	---

TABLE 5-1
Groundwater Sample Analyses, Active Monitoring Wells (1)
Boeing Field Chevron
Tukwila, Washington

Exploration Location	Sample Name	Sample Date	Water Depth (ft)	Gasoline Range Organics	Diesel Range Organics	Heavy Oils	Benzene	Toluene	Ethylbenzene	Xylenes	Methyl Tert-Butyl Ether (MTBE)	1,2-Dibromoethane (EDB)	1,2-Dichloroethane (EDC)	Hexane	Naphthalene	2-Methylnaphthalene	1-Methylnaphthalene	Lead (Total)	Lead (Dissolved)
MTCA Cleanup Level (2, 3)				800(a)/1,000(b)	500	500	1.6	130	31	1,000	20	0.01	5	**	1.4	32*	1.51*	15	15
(units in µg/L)																			
	MW-27S	11/28/2018	8.92	<50.0	<49.6	<99.2	<1.00	<1.00	<1.00	<1.00	---	---	---	---	---	---	---	<0.500	---
MW-27D	MW-27D	11/28/2016	11.48	<50.0	<50.0	<100	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00990	<1.00	<1.00	<0.0998	<0.0998	<0.0998	<0.500	<0.500
	MW-27D-3242017	3/24/2017	11.94	**165**	<50.0	<100	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00993	<1.00	---	<0.0998	<0.0998	<0.0998	<0.500	<0.500
	MW-27D-7262017	7/26/2017	13.44	**384**	<50.4	<101	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00988	<1.00	---	<0.0993	<0.0993	<0.0993	**0.589**	<0.500
	FD-1-7262017	7/26/2017	13.34	**266**	<49.9	<99.9	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00949	<1.00	---	<0.0998	<0.0998	<0.0998	**0.610**	<0.500
	MW-27D-1042017	10/4/2017	15.39	**268**	<49.8	<99.6	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00997	<1.00	**32.3**	<0.0985	<0.0985	<0.0985	<0.500	<0.500
	DUP-2	1/16/2018	12.04	**696**	<49.9	<99.8	<1.00	<1.00	<1.00	<1.00	<1.00	<0.250	<1.00	---	<1.00	---	---	---	<0.500
	MW-27D	1/16/2018	12.04	**723**	<49.8	<99.5	<1.00	<1.00	<1.00	<1.00	---	---	---	---	---	---	---	---	---
	MW-A (dup)	5/25/2018	13.98	**499**	<49.8	<99.6	<1.00	<1.00	<1.00	<1.00	---	<0.00976	---	---	---	---	---	---	---
	MW-27D	5/25/2018	13.98	**663**	<50.0	<100	<1.00	<1.00	<1.00	<1.00	---	<0.00967	---	---	---	---	---	---	---
	MW-27D	8/24/2018	16.12	**1,360**	**441**	**608**	<1.00	<1.00	<1.00	<1.00	---	---	---	---	---	---	---	---	---
	MW-27D	11/28/2018	12.07	**425**	<49.7	<99.3	<1.00	<1.00	<1.00	<1.00	---	---	---	---	---	---	---	**0.522**	---
MW-28S	MW-28S	11/28/2016	8.14	<50.0	<49.9	<99.8	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00978	<1.00	<1.00	<0.100	<0.100	<0.100	<0.500	<0.500
	MW-28S-3242017	3/24/2017	6.66	<50.0	<49.9	<99.9	<1.00	<1.00	<1.00	<1.00	<1.00	<0.0100	<1.00	---	<0.0999	<0.0999	<0.0999	<0.500	<0.500
	MW-28S-7262017	7/26/2017	8.54	<50.0	<50.3	<101	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00925	<1.00	---	<0.0999	<0.0999	<0.0999	<0.500	<0.500
	MW-28S-1042017	10/4/2017	9.51	<50.0	<49.3	<98.6	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00997	<1.00	<1.00	<0.0985	<0.0985	<0.0985	<0.500	<0.500
	MW-28S	1/11/2018	7.91	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	MW-28S	8/23/2018	9.03	<50.0	<49.8	<99.6	<1.00	<1.00	<1.00	<1.00	---	---	---	---	<1.00 Q	---	---	---	---
	MW-28S	11/27/2018	8.75	<50.0	<49.8	<99.6	<1.00	<1.00	<1.00	<1.00	---	---	---	---	<1.00 Q	---	---	---	---
MW-28D	MW-28D	11/28/2016	12.00	<50.0	<49.5	<99.1	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00995	<1.00	<1.00	<0.100	<0.100	<0.100	<0.500	<0.500
	MW-28D-3242017	3/24/2017	11.93	<50.0	<49.7	<99.4	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00989	<1.00	---	<0.0993	<0.0993	<0.0993	<0.500	<0.500
	FD-2 (MW-28D Dup)	3/24/2017	11.93	<50.0	<49.7	<99.5	<1.00	<1.00	<1.00	**2.19**	<1.00	<0.00984	<1.00	---	<0.0995	<0.0995	<0.0995	<0.500	<0.500
	MW-28D-7262017	7/26/2017	13.34	<50.0	<49.9	<99.8	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00982	<1.00	---	<0.0998	<0.0998	<0.0998	<0.500	<0.500
	MW-28D-1042017	10/4/2017	15.44	<50.0	<49.6	<99.1	<1.00	<1.00	<1.00	<1.00	<1.00	<0.00993	<1.00	<1.00	<0.0996	<0.0996	<0.0996	**0.872**	<0.500
	MW-28D	1/11/2018	12.29	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	MW-28D	8/23/2018	15.65	<50.0	<49.8	<99.7	<1.00	<1.00	<1.00	<1.00	---	---	---	---	<1.00 Q	---	---	---	---
	MW-28D	11/27/2018	11.96	<50.0	<49.6	<99.1	<1.00	<1.00	<1.00	<1.00	---	---	---	---	---	---	---	<0.500	---
MW-29S	MW-29S	1/16/2018	9.78	**113**	<49.9	<99.8	<1.00	<1.00	<1.00	**13.8**	<1.00	<0.250	<1.00	---	**1.67**	---	---	---	<0.500
	MW-29S	5/29/2018	10.60	**130**	<49.9	<99.7	<1.00	<1.00	<1.00	**8.80**	---	<0.00990	---	---	**0.576**	<0.0996	<0.0996	<0.500	<0.500
	MW-29S	8/24/2018	---	**201**	**106**	<99.6	<1.00	<1.00	<1.00	**15.20**	---	<0.00992	---	---	**1.66**	---	---	**1.02**	---
	MW-29S	11/28/2018	10.73	**73.3**	<50.1	<100	<1.00	<1.00	<1.00	**4.10**	---	<0.00888	---	---	<1.00	---	---	<0.500	---
MW-29D	MW-29D	1/12/2018	13.42	<50.0	<50.0	<100	<1.00	<1.00	<1.00	<1.00	<1.00	<0.250	<1.00	---	<1.00	---	---	<0.500	---
	MW-29D	5/29/2018	16.73	<50.0	<50.0	<100	<1.00	<1.00	<1.00	<1.00	---	<0.00992	---	---	<0.0991	<0.0991	<0.0991	**2.48**	<0.500
	MW-DUP2	8/24/2018	17.85	<50.0	---	---	<1.00	<1.00	<1.00	<1.00	---	<0.00985	---	---	<1.00	---	---	**0.781**	---
	MW-29D	8/24/2018	17.85	<50.0	<49.9	<99.8	<1.00	<1.00	<1.00	<1.00	---	<0.0100	---	---	<1.00	---	---	**0.780**	---
	MW-29D	11//28/2018	13.54	<50.0	<49.9	<99.7	<1.00	<1.00	<1.00	<1.00	---	<0.00948	---	---	<1.00	---	---	<0.500	---

TABLE 5-1
Groundwater Sample Analyses, Active Monitoring Wells (1)
Boeing Field Chevron
Tukwila, Washington

Exploration Location	Sample Name	Sample Date	Water Depth (ft)	Gasoline Range Organics	Diesel Range Organics	Heavy Oils	Benzene	Toluene	Ethylbenzene	Xylenes	Methyl Tert-Butyl Ether (MTBE)	1,2-Dibromoethane (EDB)	1,2-Dichloroethane (EDC)	Hexane	Naphthalene	2-Methylnaphthalene	1-Methylnaphthalene	Lead (Total)	Lead (Dissolved)
MTCA Cleanup Level (2, 3)				800(a)/1,000(b)	500	500	1.6	130	31	1,000	20	0.01	5	**	1.4	32*	1.51*	15	15
(units in µg/L)																			
MW-30	MW-30	1/12/2018	13.09	**719**	<49.9	<99.9	**53.6**	**1.87**	<1.00	**12.1**	<1.00	<0.250	<1.00	---	<1.00	---	---	<0.500	---
	MW-30	5/25/2018	16.94	**311**	<49.9	<99.7	**55.5 D**	**1.41**	<1.00	**7.53**	---	<0.00999	---	---	<0.0996	<0.0996	<0.0996	**0.687**	<0.500
	MW-30	8/23/2018	17.31	**161**	<49.7	**115**	<1.00	<1.00	<1.00	**4.89**	---	<0.0100	---	---	<1.00	---	---	**0.752**	---
	MW-30	11/27/2018	13.06	**150**	<49.8	<99.6	**1.90**	<1.00	<1.00	**5.13**	---	<0.00988	---	---	<1.00	---	---	**5.71**	---
AS-1	AS-1	4/17/2019	9.60	**4,150**	**270**	<101	**702**	**224**	**138**	**141.9**	<1.00	<0.0100	<1.00	---	---	---	---	<0.500	---
AS-2	AS-2	4/17/2019	15.03	**1,560**	<50.0	<100	**20.8**	**78.4**	**22.4**	**128.4**	<1.00	<0.00994	<1.00	---	---	---	---	**0.804**	<0.500
	DUP	4/17/2019	15.03	**1,500**	<50.0	<99.9	**19.6**	**85.3D**	**22.3**	**130.7D**	<1.00	<0.00989	<1.00	---	---	---	---	<0.500	<0.500

Notes:

(1) Refer to site diagram(s) for sampling locations. Refer to laboratory reports for analytical methods.

(2) Method A groundwater cleanup levels used as surface water cleanup levels per WAC 173-340-730(3)(b)(iii)(C).

(3) Gasoline Analyses by Method NWTPH-Gx, Diesel and Heavy Oil by NWTPH-Dx/Dx Ext., Lead by EPA 200.8, EDB by EPA 8011, PAH by 8270 (SIM), VOCs by 8260C.

a	Benzene present in groundwater/site.
b	Benzene not present in groundwater/site.
*	Method B Cleanup Level.
**	Not researched, no available data.
---	Sample not analyzed.
nd	Not Detected (Data gathered from historical reports, lab analysis reporting limits not available).
NS	Sample not collected (Undefined datum from Terracon's 2015 report).
NA	Not Applicable (Undefined datum from Terracon's 2015 report).
NR**	Water Level not reported, no available data.
Dup	Duplicate Sample for QA/QC.
D	The Sample was diluted. Detection Limits were raised nad surrogate recoveries my not be meaningful.
E	Value above quantitation range.
J	Analyte detected below reporting limit.
Q	Analyte with an initial calibration that does not meet established acceptance criteria.
X	The sample chromatographic pattern does not resemble the fuel standard used for quantification.
<50.0	Sample concentration below laboratory reporting limit.
27	Bold number(s) indicates contaminant detected, below cleanup level.
160	Bold number(s) and yellow shading indicates concentration exceeds MTCA Cleanup Level.
<250	Reporting limits exceeds cleanup level.
	Peach shading indicates most recent sampling event data.
FLAG	Sample result flagged, see validation report for further information.