2022 ANNUAL REPORT

Remedy Implementation
Crownhill Elementary School Site

Prepared for: Bremerton School District

Project No. 100094-I-010 • February 22, 2023 FINAL

Aspect CONSULTING

earth + water

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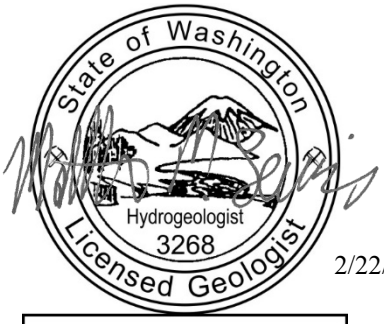

2/22/2023

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1 Introduction

1.1 General

Historical landfill activities at the Bremerton School District (BSD) Crownhill Elementary School site (Site) have resulted in soil and groundwater contamination, including the presence of light nonaqueous-phase liquid (LNAPL) floating on the water table. The Washington State Department of Ecology (Ecology) and BSD entered into two Agreed Orders (AOs) to provide for remedial action at the Site. The first AO (No. DE7916) required BSD to conduct a Remedial Investigation (RI) and Feasibility Study (FS) in accordance with the Washington State Model Toxics Control Act (MTCA) Cleanup Regulation (Washington Administrative Code [WAC] 173-340). Upon completion of those activities in 2014, Ecology selected a cleanup remedy and prepared a Cleanup Action Plan (CAP) for the Site (Ecology, 2014). As documented in the CAP, requirements of the selected remedy include the following:

- Periodic monitoring of groundwater quality and LNAPL layer thickness
- Periodic removal and off-Site recycling/disposal of LNAPL from existing wells
- Periodic inspection and maintenance of the existing cover system to prevent direct contact exposures to landfilled materials and impacted soils
- Running the HVAC system in the main school building continuously during the school day (to address the soil vapor intrusion pathway)
- Periodic subslab soil vapor and/or indoor air sampling to reconfirm that vapor intrusion is not a concern[1]
- Defining requirements for performing invasive work in soil[2]

The second AO (No. DE11107) required BSD to develop Site-specific work plans addressing the above requirements, and to implement the cleanup remedy in accordance with those work plans. The following remedy implementation work plans were prepared by BSD and approved by Ecology in 2015:

- "Groundwater/LNAPL Monitoring and Contingency Plan" (Plan; Aspect, 2015a)
- "LNAPL Removal Work Plan" (Aspect, 2015b)

[1] Requirements for sampling subslab soil vapor are specified in the Cover System Inspection and Maintenance Plan (Aspect, 2015c). Subslab soil vapor sampling was last conducted in November 2020 and is next required in November 2025. If subslab sampling indicates a potential vapor intrusion concern, then follow-up indoor air sampling may be warranted.

[2] Requirements for performing invasive work in soil are specified in Appendix A of the Cover System Inspection and Maintenance Plan (Aspect, 2015c).

- "Cover System Inspection and Maintenance Plan" (Aspect, 2015c)

In October 2018, Ecology provided a letter to BSD (Ecology, 2018) stating that *no further remedial action is necessary to clean up contamination at the Site, other than further operation and maintenance of the final remedy (including removal of LNAPL, continuous operation of the HVAC system during school hours, and institutional controls and monitoring), and periodically reviewing conditions at the Site*.

Annual reports documenting remedy implementation activities completed by BSD for the calendar year are submitted to Ecology in January of the following year. Annual reports for 2015 through 2021 (Aspect, 2016 through Aspect, 2022b) are referenced in Section 6 of this report. This report documents activities completed in 2022.

1.2 Project Background

Located in Bremerton, Washington, the Site includes both the Crownhill Elementary School (School) property at 1500 Rocky Point Road and the northern portion of the Bremerton United Methodist Church (BUMC) property at 1150 Marine Drive. A Site Plan is provided as Figure 1. The Site was used for sand and gravel mining up to the 1930s, and the mined area was backfilled with municipal and industrial wastes in the 1930s and 1940s. The original school building was constructed in 1956, and partially burned down in 1993. A series of environmental investigations were conducted during the period between that fire and construction of the current school building, which was completed in 1996. Additional investigations were conducted beginning in 2009, culminating in preparation of the "Remedial Investigation Report" (Aspect, 2014a; herein referred to as the RI report).

The purpose of the RI was to collect data necessary to adequately characterize the nature and extent of Site contamination. Using multiple lines of evidence (e.g., historical photographs, Site assessment activity, construction observations), the RI identified two generalized areas of landfill accumulation, designated the 'north' and 'south' landfill areas. Figure 1 shows the interpreted boundaries of these two areas. Landfilled materials were found at up to 40-foot depth in the north landfill area, and at up to 20-foot depth in the south landfill area. Extensive sampling identified the following constituents of potential concern (COPCs) in Site soils:

- Total petroleum hydrocarbon (TPH) in the diesel and motor-oil ranges
- Trichloroethene (TCE)
- Carcinogenic polycyclic aromatic hydrocarbons (cPAHs)
- The metals/metalloids antimony, arsenic, chromium III, copper, lead, and zinc

Three monitoring wells (MW-1 through MW-3) were installed at the Site in December 1994/January 1995, and another 13 wells (MW-4 through MW-16) during the RI (between March 2011 and October 2012; refer to Figure 1 for well locations). This network of 2-inch-diameter wells was used to periodically monitor groundwater, which is encountered beneath the Site at roughly 110-foot depth, for a wide range of contaminants. Monitoring identified TPH in the diesel and motor oil ranges, TCE, arsenic, and lead as COPCs dissolved in groundwater in the northern portion of the Site.

In addition to dissolved contaminants, separate-phase oil was observed floating on the groundwater table (as LNAPL) in well MW-8, which is installed in the north landfill area.

The primary reason for installing the last five RI monitoring wells (MW-12 through MW-16) was to investigate the areal extent and thickness of the LNAPL accumulation. LNAPL was observed in three of these wells (MW-13, MW-14, and MW-16), and periodic removal of LNAPL via bailing began in November 2012. At the recommendation of Ecology, a 4-inch-diameter well designed specifically for LNAPL extraction (EW-17) was installed in October 2015.

Site cleanup alternatives were developed and comparatively evaluated with respect to MTCA-specified criteria in the "Feasibility Study" report (FS; Aspect, 2014b). Based on the information provided in the RI report and on the FS evaluation, the CAP (Ecology, 2014) then established Site-specific cleanup levels (CULs) for constituents of concern (COCs) in Site soil, groundwater, and air, and selected a cleanup remedy for implementation. Figure 1 shows the estimated TPH, TCE, and arsenic plumes[3] (i.e., areas where concentrations in groundwater exceed the respective groundwater cleanup levels) as depicted in the CAP. Refer to the CAP for a full description of the selected cleanup remedy for the Site.

In April 2022, the total arsenic threshold of 40 micrograms per liter (µg/L) was exceeded at MW-6, triggering a response memo (Aspect, 2022c) detailing how BSD would address the arsenic exceedance. As a result of this response, Aspect submitted an addendum to the Groundwater/LNAPL Monitoring and Contingency Plan (Aspect, 2022d) adding turbidity to the list of required field parameters to be collected during sampling procedures, additional analytes to the project list of COCs (Table 1), and procedures for conducting a soil-gas survey, if warranted. These additional measures will better support potential arsenic clean up activities in the future. Although total arsenic concentrations in groundwater have not exceeded the threshold since April 2022, the observed groundwater chemistry and trends in total arsenic concentrations at MW-6 support completing the investigation as described.

2 Routine Activities Completed in 2022

This section documents routine cleanup-related activities completed by BSD during the 2022 calendar year. Periodic monitoring of groundwater and LNAPL thickness is documented in Section 2.1, LNAPL removal in Section 2.2, and Site inspections in Section 2.3.

2.1 Periodic Monitoring Activities

The Plan (Aspect, 2015b) requires periodic monitoring activities during the second and fourth quarters of the year. Locations of groundwater monitoring wells and LNAPL monitoring/recovery wells are shown on Figure 1. Table 1 lists which Site wells are included in the monitoring program, which of those wells contain LNAPL, and the updated COCs analyzed in groundwater samples collected from the wells that do not contain LNAPL.

[3] Lead is also a COC in groundwater. However, as discussed in the *Groundwater/LNAPL Monitoring and Contingency Plan* (Aspect, 2015a), compliance with the groundwater cleanup level for lead has been demonstrated. Therefore, lead is not included in the groundwater monitoring program.

2.1.1 Groundwater Sampling Results and Interpretation

Semiannual groundwater monitoring was conducted by Aspect on April 27, 2022, and October 11, 2022. Samples were collected in laboratory-supplied containers and submitted for analysis to Friedman and Bruya Laboratory under chain-of-custody procedures. Results for the groundwater monitoring wells from December 2013 through 2022 are summarized in Table 2. Refer to the RI report for results prior to December 2013 and for information on Site wells not included in the monitoring program. Laboratory reports for groundwater samples submitted for analysis in April and October 2022 are provided in Appendix C.

Diesel-range TPHs were detected in groundwater at concentrations above the Site CUL of 500 micrograms per liter (µg/L) at monitoring wells MW-5 (1,000 µg/L) and MW-12 (1,600 µg/L). Diesel-range TPHs were detected at concentrations below the Site CUL at MW-15 (50 µg/L in April and 87 µg/L in October) and were not detected at MW-10 (50 MG/L). The laboratory qualified all diesel-range TPH detections with "sample chromatographic pattern does not resemble the fuel standard used for quantitation."

MW-15 is located immediately downgradient of the LNAPL area, is the conditional point of compliance for LNAPL migration, and serves as a sentinel well for TPH plume migration[4]. Diesel-range TPH was detected at this well in both 2022 monitoring rounds, however they remain well below the CULs and no indication of LNAPL was observed on the water level indicator. The October 2022 round marks the sixth time diesel-range TPH has been detected at MW-15; see Table 2 for a summary of historical detections.

Motor Oil-range TPHs were not detected in groundwater at a concentration above the Site CUL of 500 µg/L, however, they were detected at concentrations below the Site CUL at MW-5 (310 µg/L) and MW-12 (430 µg/L). Motor oil-range TPHs were not detected at the reporting limit at MW-10 (250 µg/L), and MW-15 (250 µg/L). The laboratory qualified all diesel-range TPH detections with "sample chromatographic pattern does not resemble the fuel standard used for quantitation."

Consistent with previous years, motor oil-range TPH was not detected at the reporting limit (250 µg/L) at MW-15 in 2022.

TCE was detected in groundwater at a concentration above the Site CUL of 5 µg/L at monitoring well MW-9 (11 µg/L in April and 8.2 µg/L in October). TCE was not detected at the reporting limit (0.5 µg/L) at MW-10 or the McKinney domestic well.

MW-9 is the only well with TCE CUL exceedances. TCE concentrations measured at this well increased marginally from 2021 to 2022 but remained within the range of previous measurements.

Water samples collected from the McKinney domestic well (sampled in both 2022 monitoring rounds) are analyzed for TCE only. As shown in Table 2, TCE has never been detected in any of the water samples collected from the McKinney well.

[4] Well MW-15 is also the conditional point of compliance for LNAPL migration.

Total Arsenic was detected in groundwater at a concentration above the Site cleanup level of 5 µg/L at monitoring well MW-6[5] (40.6 µg/L in April, 24.2 µg/L in July, 23.6 µg/L in October, and 20.0 µg/L in January 2023). Total arsenic was detected in groundwater below the Site CUL at MW-10 (2.0 µg/L in April and July, 1.9 µg/L in October, and 1.8 µg/L in January 2023) and MW-12 (2.0 µg/L in October) and was not detected within reporting limits (1.0 µg/L) at MW-9 or MW-15.

Well MW-6 is located approximately 130 feet upgradient of MW-10 and serves as a sentinel well for dissolved contaminant plume migration. The Plan specifies contingency actions that will be taken if arsenic is detected above 40 µg/L at MW-6 or above 4.5 µg/L at MW-10 and the total arsenic concentration at MW-6 exceeded this threshold in April (40.6 µg/L). In response, Aspect issued a report (Aspect, 2022c) discussing potential causes for the exceedance and outlined potential actions that would inform potential mitigation actions in the future, groundwater sampling at MW-6 and MW-10 were increased to quarterly events, and analytes were added to the project list of COCs (Aspect, 2022d).

Figure 2 shows arsenic concentrations measured at MW-6 and MW-10 since those wells were installed. Concentrations at MW-6 have exhibited an increasing and fluctuating trend, and the cause is thought to be caused by complex geochemical mechanisms mobilizing naturally occurring arsenic in aquifer materials. Arsenic concentrations have been significantly below the threshold in subsequent sampling rounds. However, given how variable historical concentrations have been, we cannot confidently predict future arsenic trends. Therefore, we recommend conducting a soil gas survey, discussed below. The downward trend at MW-10 had continued since it was installed and shows no sign of arsenic migration off Site.

2.1.2 LNAPL Thickness Monitoring

LNAPL thickness monitoring was conducted on April 27, 2022, and October 11, 2022. Consistent with previous monitoring rounds, LNAPL was detected in five wells (MW-8, MW-13, MW-14, MW-16, and EW-17). Table 3 summarizes LNAPL thicknesses measured in these wells since they were installed. Thicknesses measured in 2022 ranged from 0.4 feet in MW-13 to 2.9 feet in MW-16.

2.2 LNAPL Removal

Bottom-filling bailers are used to periodically remove LNAPL from Site wells. LNAPL removal is attempted whenever an LNAPL layer thickness of at least 0.3 foot is measured in a well (prior to bailing). In 2022, LNAPL removal was conducted concurrent with the two LNAPL thickness/groundwater monitoring rounds discussed above, in general accordance with the requirements of the LNAPL Removal Work Plan. Bailing was attempted from all five LNAPL-containing wells (MW-8, MW-13, MW-14, MW-16, and EW-17) in both the April and October rounds; however, bailing could not be performed at MW-13 in April due

[5] Due to the exceedance of the 40 µg/L arsenic threshold, MW-6 and MW-10 were sampled on a quarterly basis in 2022 in accordance with the Groundwater/LNAPL Monitoring and Contingency Plan (Aspect, 2015a).

to the bailer getting repeatedly stuck about 35 feet bgs[6]. Table 3 shows estimated LNAPL volumes bailed from each well during each removal event, and Figure 3 plots cumulative LNAPL removal on an annual basis. An estimated total of 8.4 liters of LNAPL was bailed in 2022. Since bailing began in 2012, an estimated total of about 40 liters of LNAPL have been removed.

2.3 Site Inspections

Semiannual Site inspections were conducted on June 24 and December 22, 2022, in accordance with the requirements of the Cover System Inspection and Maintenance Plan. The completed inspection records are provided in Appendices A and B, along with photos taken during the inspections. The photos were taken from four specific vantage points, identified on Figure 1, to provide photo-documentation of the following cover features:

- **Photo Location 1 –** Pavement in the parking area along Bertha Avenue NW, where an RI soil sample collected from beneath the pavement (composite sample to 3-foot depth) contained lead at a concentration exceeding the cleanup level.
- **Photo Locations 2 and 4 –** Soil/sod covers next to the portable classroom building and in the southeast corner of the School property, where lead cleanup level exceedances were identified in soil samples collected from the 1- to 3-foot depth range. In summer 2013, these two areas were covered with a geotextile fabric (placed directly on the undisturbed ground surface) and an additional 1-foot thickness of fill soil was imported and hydroseeded to supplement the pre-existing clean soil cover layer.
- **Photo Location 3 –** A soil/sod cover in the northwest corner of the BUMC property (and extending approximately 10 feet onto the School property), where an interim action was completed in spring 2012 in which contaminated surface soils were removed to a 1-foot depth, a geotextile fabric was placed on remaining contaminated soils, and a 1-foot thickness of fill soil was imported and hydroseeded.

In July 2018, asphalt repairs were completed at three locations in the Bertha Ave NW parking area (Photo Location 1) after potholes were observed (documented in Aspect, 2019). The parking area appeared to be in excellent condition and the soil/sod cover at Photo Locations 2 through 4 appeared to be in good condition during both 2022 inspection events. The 2022 inspections did not identify any cover system deficiencies in other areas of the Site or other action items.

[6] No obstruction was observed at MW-13 in October, so we presume the problem was the product of the top edge of the bailer catching a seam where the well casing was threaded in conjunction with the highly viscous nature of the weathered LNAPL.

3 Nonroutine Activities Completed in 2022

3.1 Arsenic Response Activities

Results from the April 2022 sampling event show total arsenic concentrations in MW-6 exceeded the 40 µg/L limit (40.6 µg/L) established by the Plan (Aspect, 2015a) and discussed in the Arsenic Response Memo (Aspect, 2022c). In response, Aspect performed the following services:

- Submitted the Arsenic Exceedance Response memo to Ecology as required in the Plan.
- Performed quarterly sampling events as MW-6 and MW-10 as required in the Plan in July and scheduled for January 2023.
- Submitted an Addendum to the Plan, adding alkalinity and dissolved arsenic, iron, and manganese to the list of COCs, adding turbidity to the required field parameters list, and providing methodology for conducting a soil gas survey in the existing wells.

3.1.1 Results of Additional Analytes

The Addendum (Aspect, 2022d) added diagnostic analytes to the project list of COCs. Results for groundwater samples submitted for analysis in April, July, and October 2022 are tabulated in Table 2 and laboratory reports are provided in Appendix C.

- **Dissolved Arsenic** was detected above clean up levels in MW-6 (between 10.0 and 28.0 µg/L), below cleanup levels in MW-10 (between 1.4 and 1.7 µg/L), and slightly above the reporting limit in MW-15 (1.2 µg/L in the October round only). Dissolved arsenic concentrations are similar to or below the total arsenic concentrations at each respective well. This indicates that sample turbidity may contribute to elevated arsenic results, reinforcing the low-flow sampling protocols.
- **Dissolved Iron** was detected above secondary groundwater standards[7] in MW-5 (October), MW-6 (April, July, October, and January 2023), MW-10 (April, July, October, and January 2023) and MW-12 (October). Dissolved Iron was detected below secondary groundwater standards at MW-9 and MW-15 in April but was not detected above reporting limits (100 µg/L) in October.
- **Dissolved Manganese** was detected above secondary groundwater standards in MW-5 (October), MW-6 (April, July, October, and January 2023), MW-10 (April, July, October, and January 2023), and MW-12 (October). Dissolved manganese was detected below secondary groundwater standards at MW-9 in April but was not detected above reporting limits (100 µg/L) in October. See Table 2 for specific concentration values.

[7] The limits for secondary contaminants are defined according to WAC 173-200-040 and are applicable to total metals concentrations only. Dissolved iron and manganese are considered approximate proxies for the purposes of this report.

- **Alkalinity** was detected at elevated levels in several wells: 794 mg/L in MW-5, 725 mg/L in MW-12, between 315 and 342 mg/L in MW-6, and 307 in MW-15. The lowest concentrations were detected in MW-9 (113 and 137 mg/L), upgradient of the LNAPL plume and the wells showing exceedances of dissolved metals.

The above data further support that arsenic trends are the result of geochemical processes associated with LNAPL contamination plumes. Decomposition of the LNAPL and/or other waste is likely a source of CO_2 in the soil's vadose zone, producing acidic conditions that mobilizes naturally occurring arsenic from the soil into groundwater. Field parameters collected during sampling show a general trend of decreasing pH over time in the affected wells. There also appears to be a lag between the front end of the LNAPL plume, where groundwater is first exposed to CO_2, and just downgradient of the LNAPL plume, where conditions are met to mobilize arsenic.

Under the present conditions and decreasing pH levels, we expect to see more arsenic exceedances at MW-6 in the future. Thankfully, monitoring results at MW-10 remain stable and show no signs that arsenic is currently leaving the Site. We recommend completing the soil gas survey to confirm the presence and distribution of CO_2 near the water table. If the survey confirms elevated levels of CO_2 are present, removing it from the subsurface may be an efficient method to reverse the rising arsenic trends at MW-6. However, no mitigation measures are being recommended at this time.

4 Statement of Compliance

On behalf of BSD, Aspect certifies that the remedy implementation activities completed at the Site in 2022 complied with the requirements of the CAP, Agreed Order No. DE11107, and the remedy implementation work plans approved by Ecology.

5 Plans for 2023

The following remedy implementation activities are planned for 2023:

- Conduct semiannual rounds of groundwater/LNAPL monitoring and LNAPL removal (scheduled for April and October 2023)[8]
- Conduct semiannual Site inspections (scheduled for June and December 2023)
- Continue sampling MW-6 and MW-10 on a quarterly basis.
- Perform the Soil Gas Survey as described in the Addendum to confirm the presence of elevated CO_2 levels in the subsurface soil. This task is expected to take up to two

[8] If an LNAPL thickness greater than 4 feet is measured in the April monitoring round, an LNAPL removal round will also be required in July 2023.

days and should be scheduled during a school break to minimize impacts to school operations.

In addition to the above activities, Aspect recommends moving forward with the 5-year periodic review that was scheduled for 2020 but delayed due to COVID-19 impacts. This is addressed in the section below.

Other activities, as specified in the remedy implementation work plans, may also be required based on monitoring and/or inspection results.

6 Periodic Review

At least every 5 years after the initiation of a cleanup action, Ecology conducts a review of post-cleanup site conditions and monitoring data to assure that human health and the environment are being protected. Ecology determined that the Crownhill cleanup action was initiated with the filing of the environmental covenants in April 2015 and plans to conduct the first periodic review in 2023. Paragraph R in Section VIII of Agreed Order No. DE11107 states:

> ***At least ninety (90) days prior to each periodic review, BSD shall submit a report to Ecology that documents whether human health and the environment are being protected based on the factors set forth in WAC 173-340-420(4).***

Those factors are listed below in italics along with Aspect's responses on behalf of BSD:

(a) The effectiveness of ongoing or completed cleanup actions, including the effectiveness of engineered controls and institutional controls limiting exposure to hazardous substances remaining at the site.

Based on the results of periodic inspections, the existing cover over landfilled materials and near-surface impacted soils has been effective at preventing direct contact exposures. No repair, maintenance, or contingency actions are required at this time.

Periodic bailing has removed small volumes of LNAPL from the water table beneath the north landfill area. Based on the results of periodic LNAPL monitoring, there is no evidence of an increase in LNAPL layer thickness or lateral migration of the LNAPL plume. LNAPL has not been detected at monitoring well MW-6, the conditional point of compliance for LNAPL migration.

Based on the results of periodic groundwater monitoring, there is no evidence of significant expansion or downgradient migration of the dissolved contaminant plumes, with the exception of arsenic discussed above (Figure 1). Arsenic concentrations exceeded the contingency action trigger of 40 µg/L at MW-6 once in April 2022 and BSD's response is discussed in the sections above. This arsenic migration is interpreted to be localized near the LNAPL plume with no signs of it observed downgradient at MW-10. Groundwater cleanup levels for arsenic, lead, TCE, and TPH continue to be met at well MW-10, the conditional point of compliance for dissolved contamination. TCE has never been detected in any of the water samples collected from the McKinney domestic well.

The HVAC system in the main school building continues to be run during the school day to minimize the potential for soil vapor intrusion. Compliance with air cleanup standards was demonstrated by subslab vapor sampling conducted in November 2010, November 2015, and November 2020. The next subslab vapor sampling event is scheduled for November 2025.

Separate environmental covenants were recorded and remain active for the School and BUMC properties. Both environmental covenants prohibit or restrict activities that would interfere with the integrity of the existing cover. The environmental covenant on the School property also prohibits drinking water well installation or invasive activities that may result in exposure to LNAPL or groundwater contamination.

(b) New scientific information for individual hazardous substances or mixtures present at the site.

There is new relevant scientific information for hazardous substances remaining at the Site. Dissolved iron and dissolved manganese are present in groundwater at concentrations that exceed the Secondary Minimum Cleanup Levels. These naturally occurring substances are influenced by the same geochemical processes that affect naturally occurring arsenic. We do not propose modifying the CAP to address this new information because arsenic will remain the Indicator Hazardous Substance and the potential remedies currently considered to address arsenic in groundwater will also address iron and manganese.

(c) New applicable state and federal laws for hazardous substances present at the site.

MTCA cleanup levels for contaminants of concern at the Site have not changed since the No Further Action (NFA) determination was issued (Ecology, 2018).

(d) Current and projected site and resource uses.

The Site continues to be occupied by the School and BUMC (unchanged from when the NFA determination was issued). There are no projected changes in the Site use.

(e) The availability and practicality of more permanent remedies.

The implemented remedy, as described in the CAP, continues to be protective of human health and the environment. While higher preference cleanup technologies may be available, they are still not practicable at this Site.

The presence and distribution of carbon dioxide near the water table is planned for investigation. Based on a preliminary geochemical assessment, carbon dioxide appears to be mobilizing arsenic in groundwater. Results of this investigation may lead to a proposed remedy of soil gas venting provided emissions meet regulatory air quality standards and other considerations.

(f) The availability of improved analytical techniques to evaluate compliance with cleanup levels.

The analytical methods used at the time of the remedial actions were capable of detection below Site cleanup levels. The presence of improved analytical techniques would not affect decisions or recommendations made for the Site.

The above responses, along with the other information and data provided in this report, are intended to satisfy the BSD reporting requirement in Section VIII, Paragraph R of the Agreed Order.

7 References

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Washington State Department of Ecology (Ecology), 2018, Letter to D. Herrington, Bremerton School District, regarding Status of Agreed Order No. DE11107 and No Further Action to complete Cleanup of the Crownhill Elementary School Site, October 15, 2018.

8 Limitations

Work for this project was performed for the Bremerton School District (Client), and this report was prepared in accordance with generally accepted professional practices for the nature and conditions of work completed in the same or similar localities, at the time the work was performed. This report does not represent a legal opinion. No other warranty, expressed or implied, is made.

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Please refer to Appendix D titled "Report Limitations and Guidelines for Use" for additional information governing the use of this report.

TABLES

Table 1. 2022 Well Monitoring Program Summary

Project No. 100094-I-010, Crownhill Elementary, Bremerton, Washington

Well Included in Monitoring Program[1]	LNAPL Present in Well[3]	Groundwater Samples Collected for Analysis of COCs[1]			Additional Diagnostic Analytes[2]		Additional Notes
		TPH[4]	Total Arsenic[5]	TCE[6]	Dissolved As, Fe, Mn	Alkalinity	
MW-5		spring	spring		spring	spring	
MW-6			quarterly		quarterly	quarterly	7
MW-8	X						
MW-9			spring/fall	spring/fall	spring/fall	spring/fall	
MW-10		quarterly	quarterly	quarterly	quarterly	quarterly	8
MW-12		fall	fall		fall	fall	
MW-13	X						
MW-14	X						
MW-15		spring/fall	spring/fall		spring/fall	spring/fall	9
MW-16	X						
EW-17	X						
McKinney				spring/fall			10

COC	constituent of concern
LNAPL	light non-aqueous-phase liquid
TCE	trichloroethene
TPH	total petroleum hydrocarbon

Notes:

1) The *Groundwater/LNAPL Monitoring and Contingency Plan* (Aspect, 2015a) provides the rationale for including a well in the monitoring program, and for selecting well-specific COC analytes. Refer to Table 2 for groundwater monitoring results.

2) The *Addendum to the Groundwater/LNAPL Monitoring and Contingency Plan* (Aspect, 2022c) provides the rationale for adding these analytes to the list of project COCs.

3) All wells except McKinney are monitored for LNAPL. If LNAPL is detected, its thickness is measured (refer to Table 3) and groundwater samples are not collected for analysis.

4) TPH is analyzed for using Method NWTPH-Dx. Both diesel-range TPH and motor-oil-range TPH are COCs.

5) Analyzed for using EPA Method 6010.

6) TCE is analyzed for using EPA Method 8260.

7) Well MW-6 provides early warning of potential arsenic migration.

8) Well MW-10 is the conditional point of compliance for achieving groundwater cleanup levels.

9) Well MW-15 is the conditional point of compliance for LNAPL migration.

10) The McKinney domestic well water sample is collected from the outdoor faucet on the north side of the residence at 1724 Dora Ave NW.

Table 2. Groundwater Monitoring Data Summary

Project No. 100094-I-010, Crownhill Elementary, Bremerton, Washington

Well ID and Top-of-Casing Elevation[1,2]	Date	Depth to Water (feet below top-of-casing)	Groundwater Elevation (feet)[2]	Constituent of Concern/Concentration[3]				Additional Diagnostic Analytes			
				Diesel-Range TPH	Motor-Oil-Range TPH	TCE	Total Arsenic	Dissolved Arsenic	Dissolved Iron	Dissolved Manganese	Total Alkalinity (as CaCO3) in mg/L
MW-5 136.95 ft	12/18/13	117.36	19.59	**2,100 x**	**750 x**	1.8	1.0	na	na	na	na
	04/03/14	117.17	19.78	**2,400 x**	**770 x**	na	1.2	na	na	na	na
	07/01/14	116.23	20.72	**2,000 x**	490 x	na	1.0	na	na	na	na
	10/13/14	117.56	19.39	**1,300**	260 x	na	1.0	na	na	na	na
	04/07/15	116.49	20.46	**2,000**	430 x	na	na	na	na	na	na
	04/05/16	113.41	23.54	**1,800**	**600 x**	na	na	na	na	na	na
	04/04/17	112.13	24.82	**2,200 x**	**750 x**	na	na	na	na	na	na
	04/05/18	113.16	23.79	**2,600 x**	**1,100 x**	na	na	na	na	na	na
	04/04/19	116.24	20.71	**1,600 x**	**520 x**	na	na	na	na	na	na
	04/10/20	117.97	18.98	**2,400 x**	**660 x**	na	na	na	na	na	na
	04/14/21	116.92	20.03	**1,300 x**	490 x	na	na	na	na	na	na
	04/27/22	115.35	21.60	**1,000 x**	310 x	na	na	< 1.0 U	**487**	**4,090**	794
MW-6 133.87 ft	12/18/13	124.36	9.51	< 50 U	< 250 U	< 1.0 U	**16.6**	na	na	na	na
	04/03/14	124.70	9.17	< 50 U	< 250 U	na	**20.5**	na	na	na	na
	07/01/14	124.40	9.47	< 50 U	< 250 U	na	**19.9**	na	na	na	na
	10/13/14	124.54	9.33	< 50 U	< 250 U	na	**20.4**	na	na	na	na
	04/07/15	124.61	9.26	na	na	na	**26.7**	na	na	na	na
	10/28/15	124.84	9.03	na	na	na	**22.8**	na	na	na	na
	04/05/16	124.54	9.33	na	na	na	**29.1**	na	na	na	na
	10/28/16	123.70	10.17	na	na	na	**23.3**	na	na	na	na
	04/04/17	123.21	10.66	na	na	na	**12.5**	na	na	na	na
	10/27/17	122.79	11.08	na	na	na	**29.3**	na	na	na	na
	04/05/18	123.31	10.56	na	na	na	**29.7**	na	na	na	na
	10/26/18	123.71	10.16	na	na	na	**23.0**	na	na	na	na
	04/04/19	124.14	9.73	na	na	na	**19.4**	na	na	na	na
	10/14/19	124.77	9.10	na	na	na	**21.9**	na	na	na	na
	04/10/20	125.10	8.77	na	na	na	**28.5**	na	na	na	na
	10/15/20	125.45	8.42	na	na	na	**35.3**	na	na	na	na
	04/14/21	125.13	8.74	na	na	na	**28.6**	na	na	na	na
	11/22/21	125.15	8.72	na	na	na	**37.1**	na	na	na	na
	04/27/22	124.70	9.17	na	na	na	**40.6**	**28.0**	**10,400**	**1,760**	342
	07/25/22	124.22	9.65	na	na	na	**24.2**	**23.5**	**9,800**	**1,700**	322
	10/11/22	124.47	9.40	na	na	na	**23.6**	**10.0**	**2,730**	**459**	315
	01/30/23	124.47	9.40	na	na	na	**20.0**	**19.4**	**7,580**	**2,030**	350
MW-9 134.39 ft	12/17/13	114.49	19.90	110 x	< 250 U	**11**	< 1.0 U	na	na	na	na
	04/03/14	114.35	20.04	210 x	280 x	**11**	< 1.0 U	na	na	na	na
	07/01/14	113.44	20.95	180 x	< 250 U	**12**	< 1.0 U	na	na	na	na
	10/13/14	114.71	19.68	180 x	< 250 U	**10**	< 1.0 U	na	na	na	na
	04/07/15	114.50	19.89	na	na	**11**	na	na	na	na	na
	10/28/15	115.30	19.09	na	na	**10**	na	na	na	na	na
	04/05/16	110.60	23.79	na	na	**11**	na	na	na	na	na
	10/28/16	112.35	22.04	na	na	**8.6**	na	na	na	na	na
	04/04/17	109.23	25.16	na	na	**9.5**	na	na	na	na	na
	10/27/17	110.58	23.81	na	na	**6.8**	na	na	na	na	na
	05/02/18	110.35	24.04	na	na	**7.1**	na	na	na	na	na
	10/26/18	112.98	21.41	na	na	**7.9**	na	na	na	na	na
	04/04/19	113.39	21.00	na	na	**9.7**	na	na	na	na	na
	10/14/19	nm[4]	--	na	na	**8.0**	na	na	na	na	na
	04/10/20	nm[4]	--	na	na	**7.1**	na	na	na	na	na
	10/15/20	nm[4]	--	na	na	**5.0**	na	na	na	na	na
	04/21/21	114.00	20.39	na	na	**7.2**	na	na	na	na	na
	11/11/21	nm[4]	--	na	na	**5.4**	na	na	na	na	na
	04/27/22	112.50	21.89	na	na	**11**	na	< 1.0 U	95	3.1	113
	10/11/22	112.50	21.89	na	na	**8.2**	< 1.0 U	< 1.0 U	< 100 U	< 1.8 U	137
MW-10 132.33 ft	12/18/13	120.87	11.46	< 50 U	< 250 U	< 1.0 U	3.3	na	na	na	na
	04/03/14	121.21	11.12	< 50 U	< 250 U	< 1.0 U	3.9	na	na	na	na
	07/01/14	120.55	11.78	< 50 U	< 250 U	< 1.0 U	3.0	na	na	na	na
	10/13/14	121.48	10.85	< 50 U	< 250 U	< 1.0 U	3.0	na	na	na	na
	04/07/15	120.60	11.73	< 50 U	< 250 U	< 1.0 U	2.8	na	na	na	na
	10/28/15	121.30	11.03	< 80 U	< 400 U	< 1.0 U	2.7	na	na	na	na
	04/05/16	119.33	13.00	< 50 U	< 250 U	< 1.0 U	2.6	na	na	na	na
	10/28/16	120.35	11.98	< 50 U	< 250 U	< 1.0 U	2.6	na	na	na	na
	04/04/17	118.58	13.75	< 50 U	< 250 U	< 1.0 U	2.2	na	na	na	na
	10/27/17	119.30	13.03	< 50 U	< 250 U	< 1.0 U	2.1	na	na	na	na
	04/05/18	122.04	10.29	< 50 U	< 250 U	< 1.0 U	1.9	na	na	na	na
	10/26/18	120.62	11.71	< 50 U	< 250 U	< 1.0 U	1.8	na	na	na	na
	04/04/19	120.85	11.48	< 50 U	< 250 U	< 1.0 U	2.0	na	na	na	na
	10/14/19	121.79	10.54	< 50 U	< 250 U	< 1.0 U	2.1	na	na	na	na
	04/10/20	121.68	10.65	< 50 U	< 250 U	< 1.0 U	2.0	na	na	na	na
	10/15/20	121.66	10.67	< 50 U	< 250 U	< 1.0 U	2.4	na	na	na	na
	04/14/21	120.80	11.53	< 50 U	< 250 U	< 1.0 U	2.0	na	na	na	na
	11/11/21	121.20	11.13	55 x	< 250 U	< 0.5 U	1.9	na	na	na	na
	04/27/22	120.07	12.26	< 50 U	< 250 U	< 0.5 U	1.3	1.7	**1,850**	**1,080**	196
	07/25/22	120.15	12.18	< 50 U	< 250 U	< 0.5 U	1.5	1.4	**2,280**	**1,230**	241
	10/11/22	120.15	12.18	< 50 U	< 250 U	< 0.5 U	2.0	1.7	**1,990**	**1,280**	218
	01/30/23	120.15	12.18	< 50 U	< 250 U	< 0.5 U	1.8	1.7	**2,420**	**1,430**	253
MW-12 133.87 ft	12/17/13	114.24	19.63	**2,000 x**	**800 x**	1.0 U	1.5	na	na	na	na
	04/03/14	114.11	19.76	**2,800 x**	**850 x**	na	1.4	na	na	na	na
	07/01/14	113.17	20.70	**1,800 x**	420 x	na	1.7	na	na	na	na
	10/13/14	114.45	19.42	**1,600**	250 U	na	1.7	na	na	na	na
	10/28/15	115.02	18.85	**2,400 x**	**620 x**	na	na	na	na	na	na
	10/28/16	112.19	21.68	**1,500 x**	**680 x**	na	na	na	na	na	na
	10/27/17	110.40	23.47	**1,700 x**	**570 x**	na	na	na	na	na	na
	10/26/18	112.76	21.11	**2,200 x**	**510 x**	na	na	na	na	na	na
	10/14/19	115.37	18.50	**1,900 x**	**1,200 x**	na	na	na	na	na	na
	10/15/20	116.54	17.33	**1,600 x**	**1,400 x**	na	na	na	na	na	na
	11/11/21	115.60	18.27	**1,900 x**	**990 x**	na	na	na	na	na	na
	10/11/22	113.33	20.54	**1,600 x**	430 x	na	2.0	2.2	**309**	**5,340**	725
MW-15 133.37 ft	12/17/13	nm[4]	--	< 50 U	< 250 U	< 1.0 U	4.6	na	na	na	na
	04/03/14	nm[4]	--	< 50 U	< 250 U	na	1.2	na	na	na	na
	07/01/14	nm[4]	--	< 50 U	< 250 U	na	< 1.0 U	na	na	na	na
	10/13/14	nm[4]	--	< 50 U	< 250 U	na	1.1	na	na	na	na
	04/07/15	nm[4]	--	< 50 U	< 250 U	na	na	na	na	na	na
	10/28/15	nm[4]	--	< 50 U	< 250 U	na	na	na	na	na	na
	04/05/16	109.88	23.49	< 50 U	< 250 U	na	na	na	na	na	na
	10/28/16	111.65	21.72	< 50 U	< 250 U	na	na	na	na	na	na
	04/04/17	109.61	23.76	< 50 U	< 250 U	na	na	na	na	na	na
	10/27/17	109.90	23.47	< 50 U	< 250 U	na	na	na	na	na	na
	04/05/18	109.65	23.72	53 x	< 250 U	na	na	na	na	na	na
	10/26/18	nm[4]	--	<60 U	< 300 U	na	na	na	na	na	na
	04/04/19	nm[4]	--	61 x	< 250 U	na	na	na	na	na	na
	10/14/19	nm[4]	--	< 50 U	< 250 U	na	na	na	na	na	na
	04/10/20	nm[4]	--	64 x	< 260 U	na	na	na	na	na	na
	10/15/20	nm[4]	--	nm[6]	nm[6]	na	na	na	na	na	na
	04/14/21	nm[4]	--	50 x	< 250 U	na	na	na	na	na	na
	11/11/21	nm[4]	--	< 95 U	< 480 U	na	na	na	na	na	na
	04/27/22	110.70	22.67	53 x	< 250 U	na	na	< 1.0 U	126	< 1.0 U	307
	10/11/22	nm[4]	--	87 x	< 250 U	na	< 1.0 U	1.2	<100 U	< 1.8 U	308
McKinney (domestic well)	10/6/14[5]	nm	--	< 100 U	< 200 U	< 0.2 U	0.4	na	na	na	na
	2/19/15[5]	nm	--	< 100 U	< 200 U	< 0.2 U	0.4	na	na	na	na
	6/1/2015[5]	nm	--	< 100 U	< 200 U	< 0.2 U	0.3	na	na	na	na
	10/28/15	nm	--	na	na	< 1.0 U	na	na	na	na	na
	04/05/16	nm	--	na	na	< 1.0 U	na	na	na	na	na
	10/28/16	nm	--	na	na	< 1.0 U	na	na	na	na	na
	04/04/17	nm	--	na	na	< 1.0 U	na	na	na	na	na
	10/27/17	nm	--	na	na	< 1.0 U	na	na	na	na	na
	04/04/18	nm	--	na	na	< 1.0 U	na	na	na	na	na
	10/26/18	nm	--	na	na	< 1.0 U	na	na	na	na	na
	04/04/19	nm	--	na	na	< 1.0 U	na	na	na	na	na
	10/14/19	nm	--	na	na	< 1.0 U	na	na	na	na	na
	04/10/20	nm	--	na	na	< 1.0 U	na	na	na	na	na
	10/15/20	nm	--	na	na	< 1.0 U	na	na	na	na	na
	04/14/21	nm	--	na	na	< 1.0 U	na	na	na	na	na
	11/11/21	nm	--	na	na	< 0.5 U	na	na	na	na	na
	04/27/22	nm	--	na	na	< 0.5 U	na	na	na	na	na
	10/11/22	nm	--	na	na	< 0.5 U	na	na	na	na	na

na not analyzed
nm not measured
TCE trichloroethene
TPH total petroleum hydrocarbons
U analyte not detected at or above the reported result
x sample chromatographic pattern does not resemble the fuel standard used for quantitation

Notes:

1) Only wells included in the current monitoring program that do not contain LNAPL are shown in this table. Refer to Table 3 for wells containing LNAPL. Refer to the *Remedial Investigation Report* (Aspect, 2014a) for data prior to December 2013 and for information on other wells.

2) Elevations are based on NAVD88 vertical datum.

3) All concentrations are in micrograms per liter (µg/L) unless otherwise noted. Cleanup levels are 500 µg/L for diesel- and motor-oil-range TPH, and 5 µg/L for TCE and total arsenic. Cleanup level exceedances are bolded.

4) Water level was below top of pump and could not be measured.

5) Samples from McKinney well were initially collected for analysis by the Kitsap Public Health District and analyzed by Analytical Resources, Inc.

6) Water level was below pump intake and sample could not be collected.

Table 3. LNAPL Thickness Measurements and Removal Summary

Project No. 100094-006-01, Crownhill Elementary, Bremerton, Washington

Well ID	Date	Initial Thickness in ft[1]	LNAPL Removal in Liters[2]	Notes
MW-8	10/26/12	0.20		Well installed on 12/20/11.
	11/21/12	nm		
	01/31/13	0.10		
	05/03/13	0.03		
	08/07/13	0.23		
	12/17/13	0.86		
	04/02/14	0.39	0.18	(Note 5)
	05/23/14	0.38	0.11	(Note 4)
	07/01/14	0.23		
	10/13/14	0.28		
	04/07/15	0.27		Not bailed because initial thickness was <0.3 feet.
	10/28/15	0.90	0.36	(Note 4)
	01/18/16	0.10		Not bailed because initial thickness was <0.3 feet.
	04/05/16	0.01		Not bailed because initial thickness was <0.3 feet.
	10/28/16	0.40	0.01	(Note 4)
	04/04/17	0.13		Not bailed because initial thickness was <0.3 feet.
	10/27/17	0.15		Not bailed because initial thickness was <0.3 feet.
	04/03/18	(Note 6)	0.02	(Note 4)
	10/26/18	1.70	0.75	(Note 4)
	04/04/19	0.40	0.23	(Note 4)
	10/14/19	1.15	0.18	(Note 4)
	04/10/20	0.95	0.38	(Note 4)
	10/15/20	1.08	0.16	(Note 4)
	04/15/21	1.20	0.19	(Note 4)
	11/11/21	1.20	0.34	(Note 4)
	04/27/22	1.00	0.57	(Note 4)
	10/11/22	1.70	1.78	(Note 4)
Cumulative LNAPL Removal			5.26	
MW-13	11/01/12	1.46		Well installed on 10/25/12.
	11/21/12	0.99	0.90	(Note 4)
	01/31/13	0.10		
	05/03/13	0.31		
	08/07/13	0.49		
	12/17/13	4.90		
	04/02/14	1.35	0.02	Water detected above LNAPL. (Note 4)
	05/23/14	2.08	0.18	Water detected above LNAPL. (Note 4)
	07/01/14	0.84		
	10/13/14	3.39		
	04/07/15	1.00	0.17	(Note 4)
	10/28/15	4.15	0.02	(Note 4)
	01/18/16	1.39	0.52	(Note 4)
	04/05/16	1.31	0.26	(Note 4)
	10/28/16	0.05		Not bailed because initial thickness was <0.3 feet.
	04/04/17	0.20		Not bailed because initial thickness was <0.3 feet.
	10/27/17	0.04		Not bailed because initial thickness was <0.3 feet.
	04/03/18	1.70	0.35	(Note 4)
	10/26/18	2.00	1.05	(Note 4)
	04/04/19	1.70	0.22	(Note 4)
	10/14/19	1.10	0.10	(Note 4)
	04/10/20	2.95	0.13	(Note 4)
	10/15/20	1.22	0.38	(Note 4)
	04/15/21	1.00	0.33	(Note 4)
	11/11/21	1.80	0.37	(Note 4)
	04/27/22	1.76	0.00	Bailing attempt abandoned, obstruction in well.
	10/11/22	0.42	0.40	(Note 4)
Cumulative LNAPL Removal			5.38	
MW-14	11/01/12	nd		Well installed on 10/26/12.
	01/31/13	nd		
	05/03/13	nd		
	08/07/13	0.12		
	12/17/13	0.10		
	04/02/14	0.08		Not bailed because initial thickness was <0.1 feet.
	05/23/14	0.09		Not bailed because initial thickness was <0.1 feet.
	07/01/14	0.46		
	10/13/14	0.71		
	04/07/15	0.23		Not bailed because initial thickness was <0.3 feet.
	10/28/15	1.48	0.35	(Note 4)
	01/18/16	0.32	0.20	(Note 4)
	04/05/16	0.01	0.00	Not bailed because initial thickness was <0.3 feet.
	10/28/16	0.37	0.03	(Note 5)
	04/04/17	0.77	0.32	(Note 4)
	10/27/17	0.60	0.64	(Note 5)
	04/03/18	0.70	0.06	(Note 5)
	10/26/18	2.40	1.65	(Note 5)
	04/04/19	1.20	0.71	(Note 4)
	10/14/19	2.90	0.27	(Note 4)
	04/10/20	0.15	0.00	Not bailed because initial thickness was <0.3 feet.
	10/15/20	0.45	0.24	(Note 4)
	04/15/21	0.90	0.39	(Note 4)
	11/11/21	0.80	0.34	(Note 4)
	04/27/22	1.30	0.70	(Note 4)
	10/11/22	1.78	0.85	(Note 4)
Cumulative LNAPL Removal			6.73	
MW-16	11/01/12	nd		Well installed on 10/26/12.
	01/31/13	0.50		
	05/03/13	0.48		
	08/07/13	2.61		
	12/17/13	2.83		
	04/02/14	3.02	0.85	(Note 5)
	05/23/14	4.25	2.06	(Note 5)
	07/01/14	3.79		
	10/13/14	3.25		
	04/07/15	2.64	1.19	(Note 5)
	10/28/15	2.18	0.35	(Note 4)
	01/18/16	0.45	0.17	Bailing was stopped after measuring <0.01 foot LNAPL thickness.
	04/05/16	0.39	0.00	Four bailing attempts recovered only a trace of LNAPL.
	10/28/16	0.87	0.10	Third bailing attempt recovered only 20 ml of LNAPL.
	04/04/17	0.24		Not bailed because initial thickness was <0.3 feet.
	10/27/17	2.15	1.35	(Note 4)
	04/03/18	(Note 6)	0.30	(Note 4)
	10/26/18	3.25	1.55	(Note 5)
	04/04/19	2.30	0.27	(Note 4)
	10/14/19	1.10	0.15	(Note 4)
	04/10/20	2.30	0.16	(Note 4)
	10/15/20	2.46	0.40	(Note 4)
	04/15/21	0.80	0.60	(Note 4)
	11/11/21	0.80	0.40	(Note 4)
	04/27/22	0.69	0.85	(Note 4)
	10/11/22	2.92	0.27	(Note 4)
Cumulative LNAPL Removal			11.02	
EW-17	10/28/15	0.45	0.03	Well installed on 10/13/15.
	01/18/16	0.40	0.21	LNAPL observed to be much more viscous (sludge-like) than in other wells. (Note 4)
	04/05/16	0.44	1.66	LNAPL appears to be less viscous than in previous rounds. (Note 4)
	10/28/16	0.47	0.11	Fourth bailing attempt recovered only 5 ml of LNAPL.
	04/04/17	1.95	0.52	Initial thickness measurements ranged from 0.23 to 3.45 ft. (Note 4)
	10/27/17	0.85	0.12	(Note 4)
	04/03/18	(Note 6)	0.60	(Note 4)
	10/26/18	1.90	1.11	(Note 5)
	04/04/19	3.00	0.18	(Note 4)
	10/14/19	1.30	0.14	(Note 4)
	04/10/20	0.40	0.13	(Note 4)
	10/15/20	0.60	0.32	(Note 4)
	04/15/21	0.50	0.25	(Note 4)
	11/11/21	0.60	0.23	(Note 4)
	04/27/22	1.60	0.50	(Note 4)
	10/11/22	4.08	2.45	(Note 4)
Cumulative LNAPL Removal			8.55	
TOTAL LNAPL REMOVED			**36.9**	**(ALL WELLS)**

LNAPL = light non-aqueous-phase liquid nd = no detectable LNAPL thickness nm = not measured

Notes:

1) The viscous, sticky nature of the LNAPL results in inconsistent readings of the interface probe (used to measure depth-to-LNAPL and depth-to-water). Therefore, the reported LNAPL thicknesses can only be regarded as estimates.
2) Water has been observed to separate out from LNAPL samples over a period of months. Therefore, actual volumes of non-aqueous-phase liquid removed from the subsurface are likely less than the LNAPL volumes reported in this table.
3) Well EW-17 (4-inch ID) has a unit volume of approximately 2.5 liters per vertical foot of well casing. All other wells are 2-inch ID and have unit volumes of approximately 0.62 liter per vertical foot of well casing.
4) Bailing was stopped after bailer retrieved a relatively large volume of water with little or no LNAPL.
5) Bailing was stopped because bailer would no longer go down well due to LNAPL buildup on inside well casing.
6) Unable to determine initial thickness of LNAPL. Bailing was attempted.

FIGURES

1724 Dora Avenue NW (Note 2)

North Landfill Area

MW-2

Estimated Extent of TPH Cleanup Level Exceedance

Fe: 95
Mn: 3.1

MW-9

Estimated Extent of TCE Cleanup Level Exceedance

BERTHA AVE NW

MW-16 (Note 1) MW-14

EW-17 MW-13

Fe: 309
Mn: 5,340

MW-12

Geotextile at 1 Foot Below Ground Surface
(Summer 2013 Interim Action)

Fe: 126
Mn: <1.8

MW-8

MW-15

MW-5

Fe: 487
Mn: 4,090

Bertha Ave NW Parking Area

ROCKY POINT RD

Estimated Extent of Arsenic Cleanup Level Exceedance

PORTABLE CLASSROOM BUILDING

MW-4

MW-6

Fe: 2,040
Mn: 1,197

Fe: 7,643
Mn: 1,306

MW-10

MAIN SCHOOL BUILDING

MW-3

South Landfill Area

MW-1

Geotextile at 1 Foot Below Ground Surface
(Summer 2013 Interim Action)

MW-7

Geotextile at 1 Foot Below Ground Surface
(Spring 2012 Interim Action)

MW-11

MARINE DR

DORA AVE

0 100 200
Feet

Well Locations:

- Extraction Well Included in Monitoring Program
- Monitoring Well Included in Monitoring Program
- Monitoring Well Not Included in Monitoring Program
- McKinney Domestic Well (Note 2)
- Approximate photo location & orientation for semiannual cover system inspections

Other Site Features and Interpretation:

- Interpreted Extent of Landfill Activity
- Estimated Extent of Groundwater Cleanup Level Exceedances in 2014 (Ecology, 2014)
- Bremerton School District Property Boundary
- Bremerton United Methodist Church Property Boundary
- Inferred Direction of Groundwater Flow

Notes:

(1) LNAPL has been observed in Wells EW-17, MW-8, MW-13, MW-14, and MW-16.
(2) The McKinney well water sample is collected from the outdoor faucet on the north side of the residence at 1724 Dora Avenue NW.
(3) All values are for averaged dissolved fractions in ug/L.

Site Plan

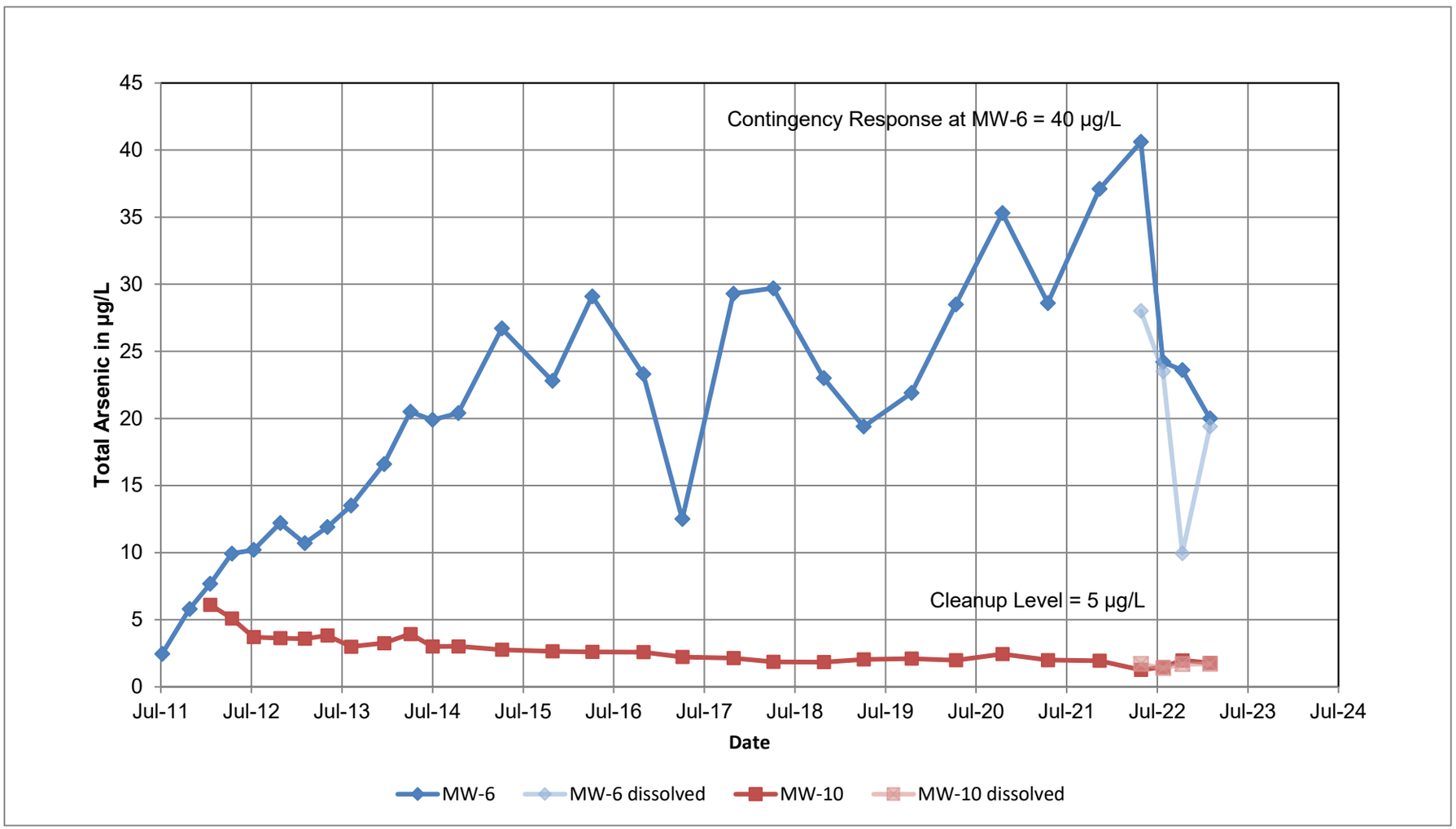
2022 Annual Report
Crownhill Elementary
Bremerton, Washington

Aspect Consulting	JAN-2023	BY: DLH / PPW	FIGURE NO. 1
	PROJECT NO. 100094	REVISED BY: MML / SCC	

GIS Path: T:\projects_8\CrownHillElementary\Delivered\Annual Report 2022\01-Site Plan.mxd || Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet || Date Saved: 1/20/2023 || User: scudd || Print Date: 1/20/2023

Figure 2. Arsenic in Wells MW-6 and MW-10

Crownhill Elementary, Bremerton, Washington

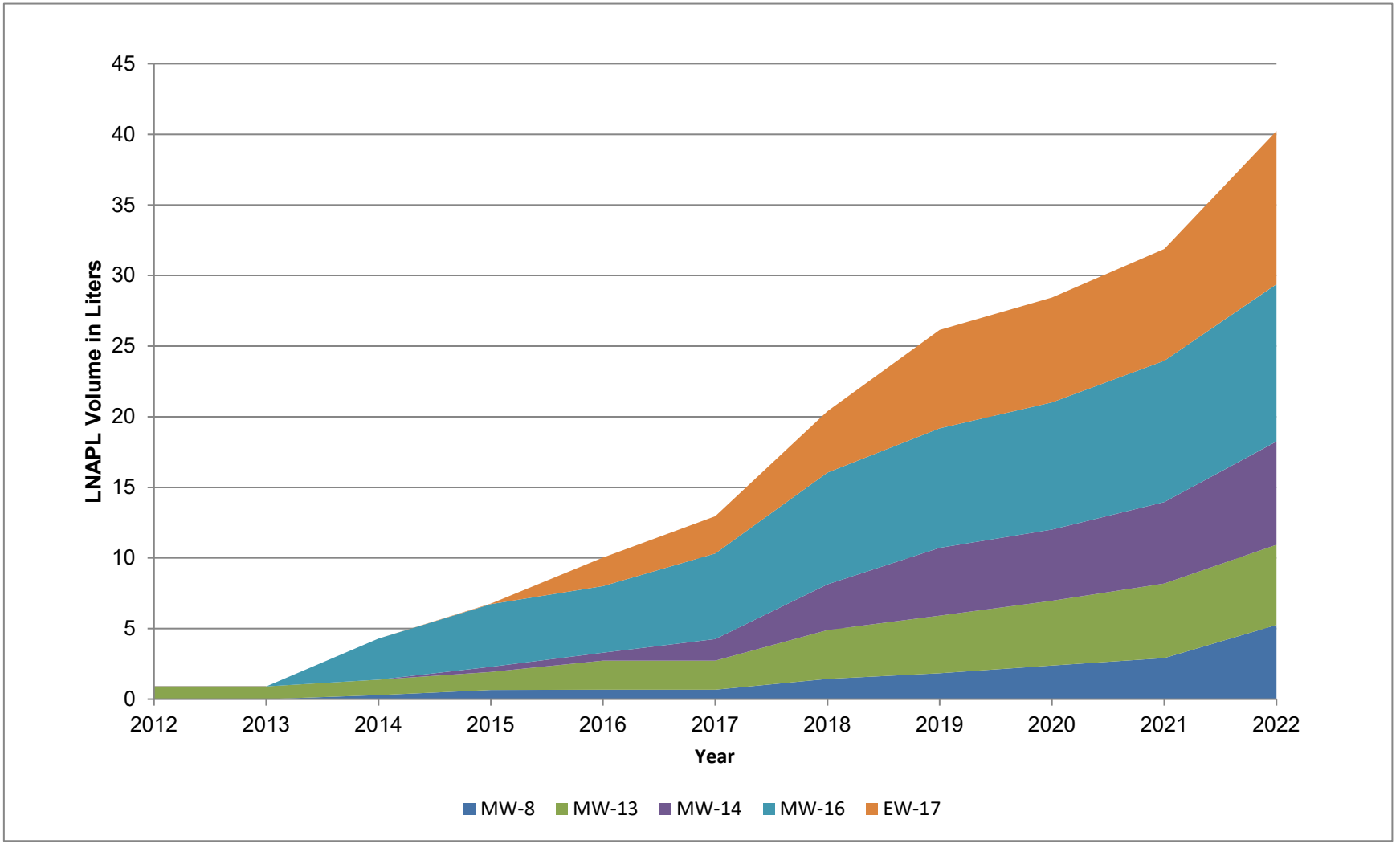


Notes:

1) Well MW-6, installed in March 2011, provides early warning of potential arsenic migration.

2) Well MW-10, installed in December 2011, is the conditional point of compliance for arsenic in groundwater.

3) Dissolved Arsenic was added to the constituents of concern in 2022 in response to the April 2022 arsenic exceedance in MW-6.



Aspect Consulting

12/16/2022

S:\Bremerton School District\Remedy Implementation\2022 Activities\Working Tbls 1-3 and Figs 2-3_2022

Figure 3. Cumulative LNAPL Removal Over Time

APPENDIX A

June 2022 Inspection Record and Photos

Aspect CONSULTING

Project Name: **Crownhill Elementary School**
Project No.: 100094
Weather Conditions: Sunny, warm

Date: 6/24/2022
Inspector's Name: Matthew M. Lewis
Inspector's Signature: Matthew M. Lewis
Inspector's Title/Affiliation: Project Hydrogeologist

FORM 1 - INSPECTION RECORD

INSPECTION ITEM	YES	NO	COMMENTS/NOTES
1. North Environmental Covenant Area			
a. Building or pavement modifications since last inspection?		X	
b. Pavement deterioration/damage along Bertha Ave NW?[1]		X	
c. Evidence of soil disturbance?		X	
d. Geotextile fabric visible in interim action area?		X	
2. South Environmental Covenant Area			
a. Building or pavement modifications since last inspection?		X	
b. Evidence of soil disturbance?		X	
c. Geotextile fabric visible in interim action areas?		X	
3. Other Inspection Items			
a. Are all wells (MW-1 through EW-17) accessible?	X		
b. Evidence of well monument damage/tampering?		X	
c. HVAC system operates continuously during school day?[2]	X		System is always circulating air, heating/cooling as needed.

Deficient Action Items & Other Comments:

The HVAC system operation was confirmed w/ front desk staff on 6/24/2022.

Notes
1. Item 1b refers to the paved parking area described in Section 1.3.
2. The inspector should describe under COMMENTS/NOTES how the determination is made regarding HVAC system operation.

Revision: December 2015

Photo Location 1. 6/24/2022 site inspection

Photo Location 2. 6/24/2022 site inspection

Photo Location 3. 6/24/2022 site inspection

Photo Location 4. 6/24/2022 site inspection

APPENDIX B

December 2022 Inspection Record and Photos

Aspect CONSULTING

Project Name: **Crownhill Elementary School**

Project No.: 100914

Date: 12/22/2022

Inspector's Name: Matthew M. Lewis

Inspector's Signature: Matthew M. Lewis

Weather Conditions: Cloudy, 20°Fs

Inspector's Title/Affiliation: Project Hydrogeologist

FORM 1 - INSPECTION RECORD

INSPECTION ITEM	YES	NO	COMMENTS/NOTES
1. North Environmental Covenant Area			
a. Building or pavement modifications since last inspection?		X	Ground covered by snow. Observations made
b. Pavement deterioration/damage along Bertha Ave NW?[1]		X	to the best of my abilities.
c. Evidence of soil disturbance?		X	
d. Geotextile fabric visible in interim action area?		X	
2. South Environmental Covenant Area			
a. Building or pavement modifications since last inspection?		X	
b. Evidence of soil disturbance?		X	
c. Geotextile fabric visible in interim action areas?		X	
3. Other Inspection Items			
a. Are all wells (MW-1 through EW-17) accessible?	X		
b. Evidence of well monument damage/tampering?		X	
c. HVAC system operates continuously during school day?[2]	X		System is always circulating air, heating/cooling as needed.

Deficient Action Items & Other Comments:

HVAC system operation confirmed on 12/22/22.

Notes

1. Item 1b refers to the paved parking area described in Section 1.3.
2. The inspector should describe under COMMENTS/NOTES how the determination is made regarding HVAC system operation.

Revision: December 2015

Photo Location 1. 12/22/2022 site inspection

Photo Location 2. 12/22/2022 site inspection

Photo Location 3. 12/22/2022 site inspection

Photo Location 4. 12/22/2022 site inspection

APPENDIX C

Laboratory Reports,
2022 Groundwater Sampling

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Vineta Mills, M.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

May 9, 2022

Matthew Lewis, Project Manager
Aspect Consulting, LLC
710 2nd Ave S, Suite 550
Seattle, WA 98104

Dear Mr Lewis:

Included are the results from the testing of material submitted on April 29, 2022 from the Crown Hill Elementary, F&BI 204517 project. There are 23 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Aspect Data
ASP0509R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on April 29, 2022 by Friedman & Bruya, Inc. from the Aspect Consulting, LLC Crown Hill Elementary, F&BI 204517 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Aspect Consulting, LLC
204517 -01	MW-5-220427
204517 -02	MW-6-220427
204517 -03	MW-9-220427
204517 -04	MW-10-220427
204517 -05	MW-15-220427
204517 -06	McKinney-220427

Samples MW-5-220427, MW-6-220427, MW-9-220427, MW-10-220427, and MW-15-220427 were sent to Fremont Analytical for alkalinity analysis. The report is enclosed.

All quality control requirements were acceptable.

Date of Report: 05/09/22
Date Received: 04/29/22
Project: Crown Hill Elementary, F&BI 204517
Date Extracted: 05/02/22
Date Analyzed: 05/02/22

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 41-152)
MW-5-220427 204517-01	1,000 x	310 x	106
MW-10-220427 204517-04	<50	<250	93
MW-15-220427 204517-05	53 x	<250	82
Method Blank 02-1051 MB	<50	<250	118

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MW-5-220427	Client:	Aspect Consulting, LLC
Date Received:	04/29/22	Project:	Crown Hill Elementary, F&BI 204517
Date Extracted:	05/03/22	Lab ID:	204517-01
Date Analyzed:	05/03/22	Data File:	204517-01.125
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Iron	487

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MW-5-220427	Client:	Aspect Consulting, LLC
Date Received:	04/29/22	Project:	Crown Hill Elementary, F&BI 204517
Date Extracted:	05/03/22	Lab ID:	204517-01 x100
Date Analyzed:	05/04/22	Data File:	204517-01 x100.068
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Manganese	4,090

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MW-6-220427	Client:	Aspect Consulting, LLC
Date Received:	04/29/22	Project:	Crown Hill Elementary, F&BI 204517
Date Extracted:	05/03/22	Lab ID:	204517-02
Date Analyzed:	05/03/22	Data File:	204517-02.126
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	28.0

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MW-6-220427	Client:	Aspect Consulting, LLC
Date Received:	04/29/22	Project:	Crown Hill Elementary, F&BI 204517
Date Extracted:	05/03/22	Lab ID:	204517-02 x100
Date Analyzed:	05/04/22	Data File:	204517-02 x100.069
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Iron	10,400
Manganese	1,760

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MW-9-220427	Client:	Aspect Consulting, LLC
Date Received:	04/29/22	Project:	Crown Hill Elementary, F&BI 204517
Date Extracted:	05/03/22	Lab ID:	204517-03
Date Analyzed:	05/03/22	Data File:	204517-03.127
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Iron	95.4
Manganese	3.11

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MW-10-220427	Client:	Aspect Consulting, LLC
Date Received:	04/29/22	Project:	Crown Hill Elementary, F&BI 204517
Date Extracted:	05/03/22	Lab ID:	204517-04
Date Analyzed:	05/03/22	Data File:	204517-04.132
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	1.68

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MW-10-220427	Client:	Aspect Consulting, LLC
Date Received:	04/29/22	Project:	Crown Hill Elementary, F&BI 204517
Date Extracted:	05/03/22	Lab ID:	204517-04 x20
Date Analyzed:	05/04/22	Data File:	204517-04 x20.071
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Iron	1,850
Manganese	1,080

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MW-15-220427	Client:	Aspect Consulting, LLC
Date Received:	04/29/22	Project:	Crown Hill Elementary, F&BI 204517
Date Extracted:	05/03/22	Lab ID:	204517-05
Date Analyzed:	05/03/22	Data File:	204517-05.133
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Iron	126
Manganese	<1

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	NA	Project:	Crown Hill Elementary, F&BI 204517
Date Extracted:	05/03/22	Lab ID:	I2-328 mb
Date Analyzed:	05/03/22	Data File:	I2-328 mb.105
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Iron	<50
Manganese	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-6-220427	Client:	Aspect Consulting, LLC
Date Received:	04/29/22	Project:	Crown Hill Elementary, F&BI 204517
Date Extracted:	05/03/22	Lab ID:	204517-02
Date Analyzed:	05/03/22	Data File:	204517-02.120
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	40.6

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-10-220427	Client:	Aspect Consulting, LLC
Date Received:	04/29/22	Project:	Crown Hill Elementary, F&BI 204517
Date Extracted:	05/03/22	Lab ID:	204517-04
Date Analyzed:	05/03/22	Data File:	204517-04.121
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	1.26

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	NA	Project:	Crown Hill Elementary, F&BI 204517
Date Extracted:	05/03/22	Lab ID:	I2-328 mb
Date Analyzed:	05/03/22	Data File:	I2-328 mb.105
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	MW-9-220427	Client:	Aspect Consulting, LLC
Date Received:	04/29/22	Project:	Crown Hill Elementary, F&BI 204517
Date Extracted:	04/29/22	Lab ID:	204517-03
Date Analyzed:	05/02/22	Data File:	050214.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	105	85	117
Toluene-d8	96	88	112
4-Bromofluorobenzene	94	90	111

Compounds:	Concentration ug/L (ppb)
Trichloroethene	11

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	MW-10-220427	Client:	Aspect Consulting, LLC
Date Received:	04/29/22	Project:	Crown Hill Elementary, F&BI 204517
Date Extracted:	04/29/22	Lab ID:	204517-04
Date Analyzed:	05/02/22	Data File:	050215.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	97	85	117
Toluene-d8	96	88	112
4-Bromofluorobenzene	96	90	111

Compounds:	Concentration ug/L (ppb)
Trichloroethene	<0.5

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	McKinney-220427	Client:	Aspect Consulting, LLC
Date Received:	04/29/22	Project:	Crown Hill Elementary, F&BI 204517
Date Extracted:	04/29/22	Lab ID:	204517-06
Date Analyzed:	05/02/22	Data File:	050216.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	105	85	117
Toluene-d8	99	88	112
4-Bromofluorobenzene	98	90	111

Compounds:	Concentration ug/L (ppb)
Trichloroethene	<0.5

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	Not Applicable	Project:	Crown Hill Elementary, F&BI 204517
Date Extracted:	04/29/22	Lab ID:	02-996 mb
Date Analyzed:	04/29/22	Data File:	042907.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	RF

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	94	78	126
Toluene-d8	104	84	115
4-Bromofluorobenzene	103	72	130

Compounds:	Concentration ug/L (ppb)
Trichloroethene	<0.5

Date of Report: 05/09/22
Date Received: 04/29/22
Project: Crown Hill Elementary, F&BI 204517

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	80	96	63-142	18

Date of Report: 05/09/22
Date Received: 04/29/22
Project: Crown Hill Elementary, F&BI 204517

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR DISSOLVED METALS USING EPA METHOD 6020B

Laboratory Code: 204517-04 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	ug/L (ppb)	10	1.26	96	98	75-125	2
Iron	ug/L (ppb)	100	1,490	67 b	84	75-125	23 b
Manganese	ug/L (ppb)	20	580	66 b	46 b	75-125	36 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	95	80-120
Iron	ug/L (ppb)	100	97	80-120
Manganese	ug/L (ppb)	20	92	80-120

Date of Report: 05/09/22
Date Received: 04/29/22
Project: Crown Hill Elementary, F&BI 204517

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 6020B

Laboratory Code: 204517-04 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	ug/L (ppb)	10	1.26	96	98	75-125	2

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	95	80-120

Date of Report: 05/09/22
Date Received: 04/29/22
Project: Crown Hill Elementary, F&BI 204517

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 204479-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Trichloroethene	ug/L (ppb)	10	<0.5	92	50-150

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Trichloroethene	ug/L (ppb)	10	93	94	70-130	1

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

204517

SAMPLE CHAIN OF CUSTODY 04-29-22 [redacted]

Page # 1 of 1 E03/A14/VW1

Report To Matthew Lewis

Company Aspect Consulting

Address 710 2nd Ave NE #550

City, State, ZIP Seattle WA 98104

Phone 206 550 4617 Email mlewis@aspectconsulting.com

SAMPLERS (signature) [signature]

PROJECT NAME Crown Hill Elementary

PO #

REMARKS

INVOICE TO

Project specific RLs? - Yes / No

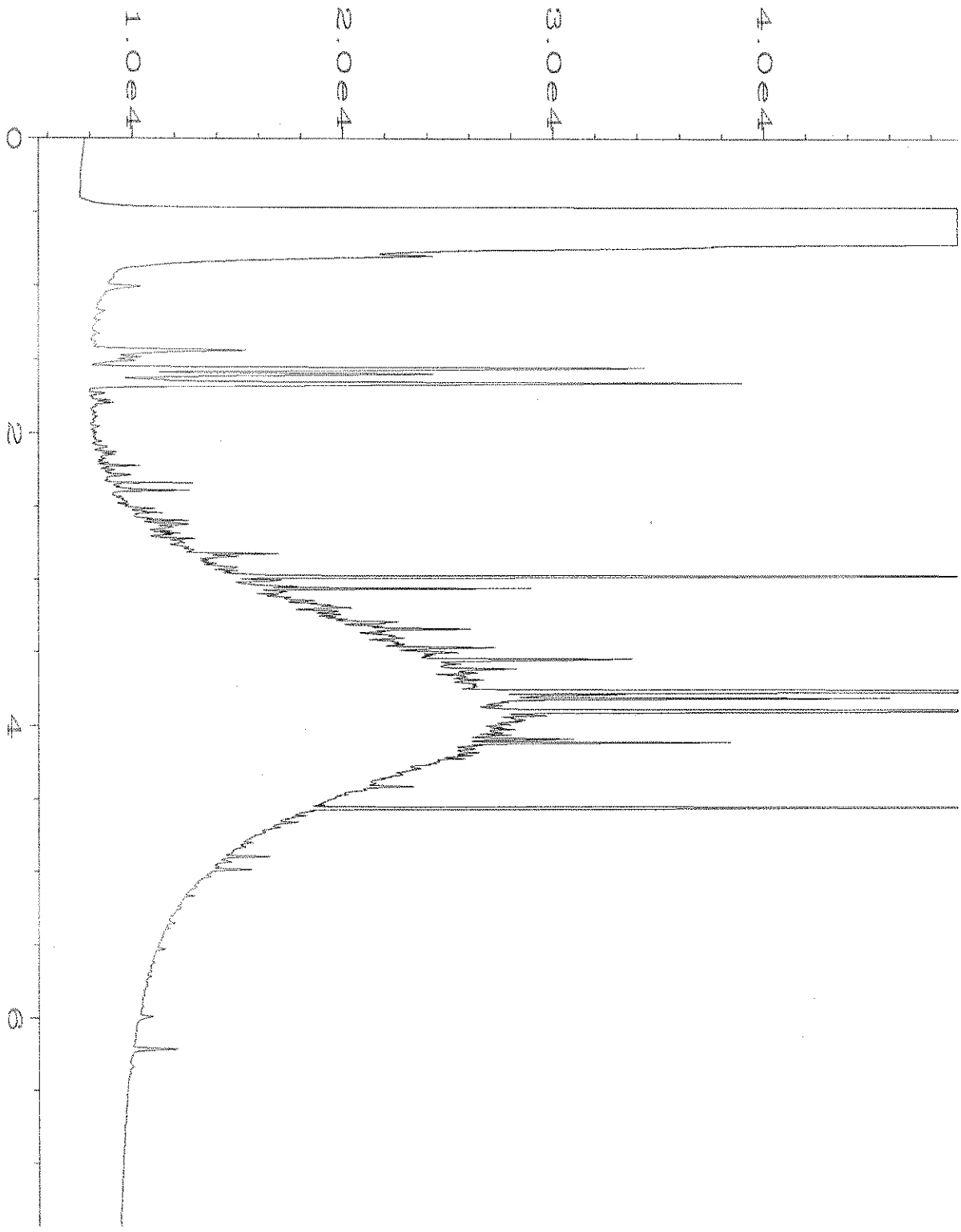
TURNAROUND TIME
☑ Standard turnaround
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☐ Archive samples
☐ Other
Default: Dispose after 30 days

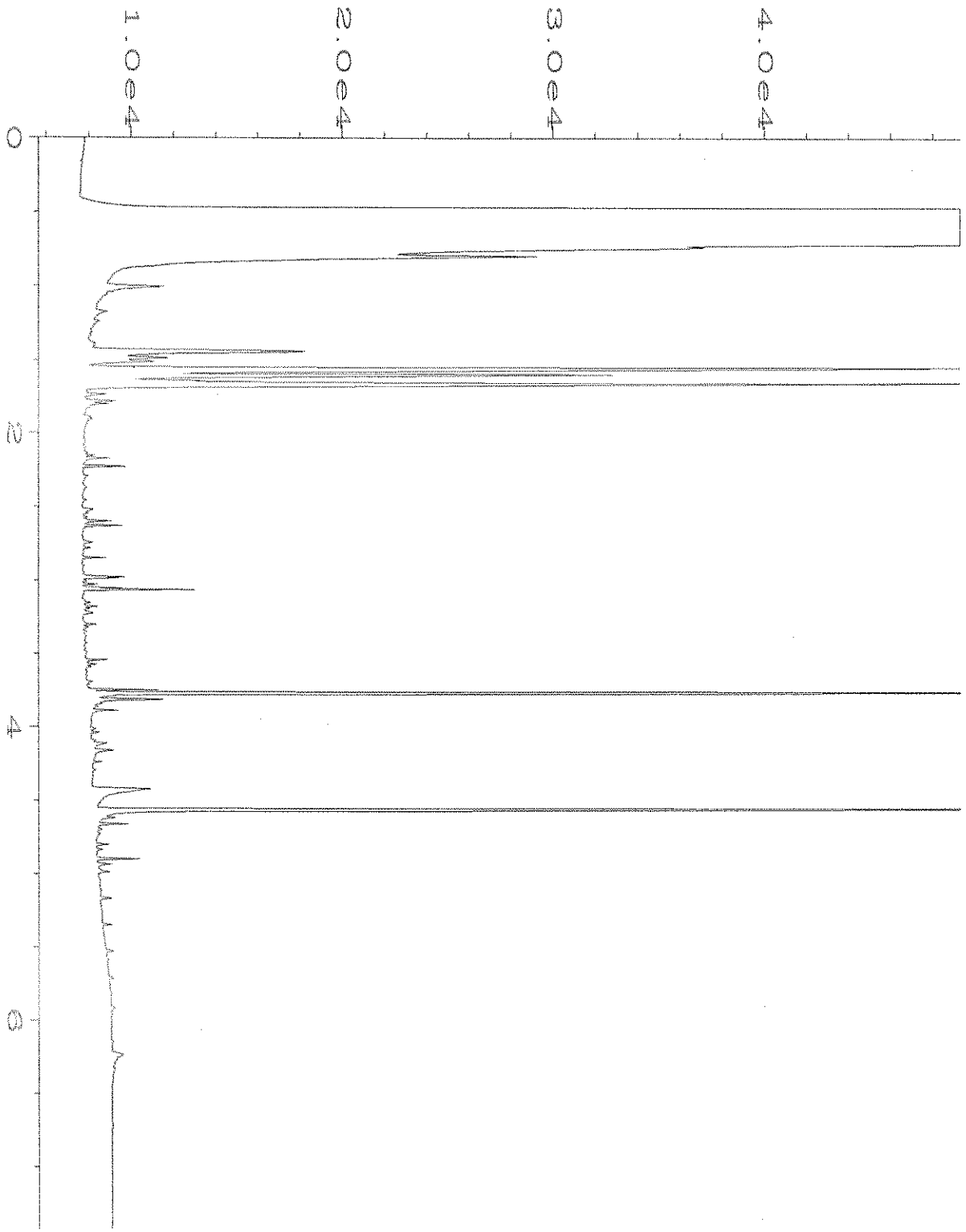
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	TPH-Dx	TCE	Total Arsenic	Alkalinity	Dissolved Arsenic, Iron, Manganese*	Notes
MW-5-220427	01A-C	4/27/22	1410	W	3								X			X	X	* Field Filtered
MW-6-220427	02 ↓	↓	1605	↓	3										X	X	X	
MW-9-220427	03A-E		1455		5									X		X	X	
MW-10-220427	04A-G		1705		7								X	X	X	X	X	
MW-15-220427	05A-C		1310		3								X			X	X	
McKinney-220427	06 ↓		1720		3									X				

Friedman & Bruya, Inc.
Ph. (206) 285-8282

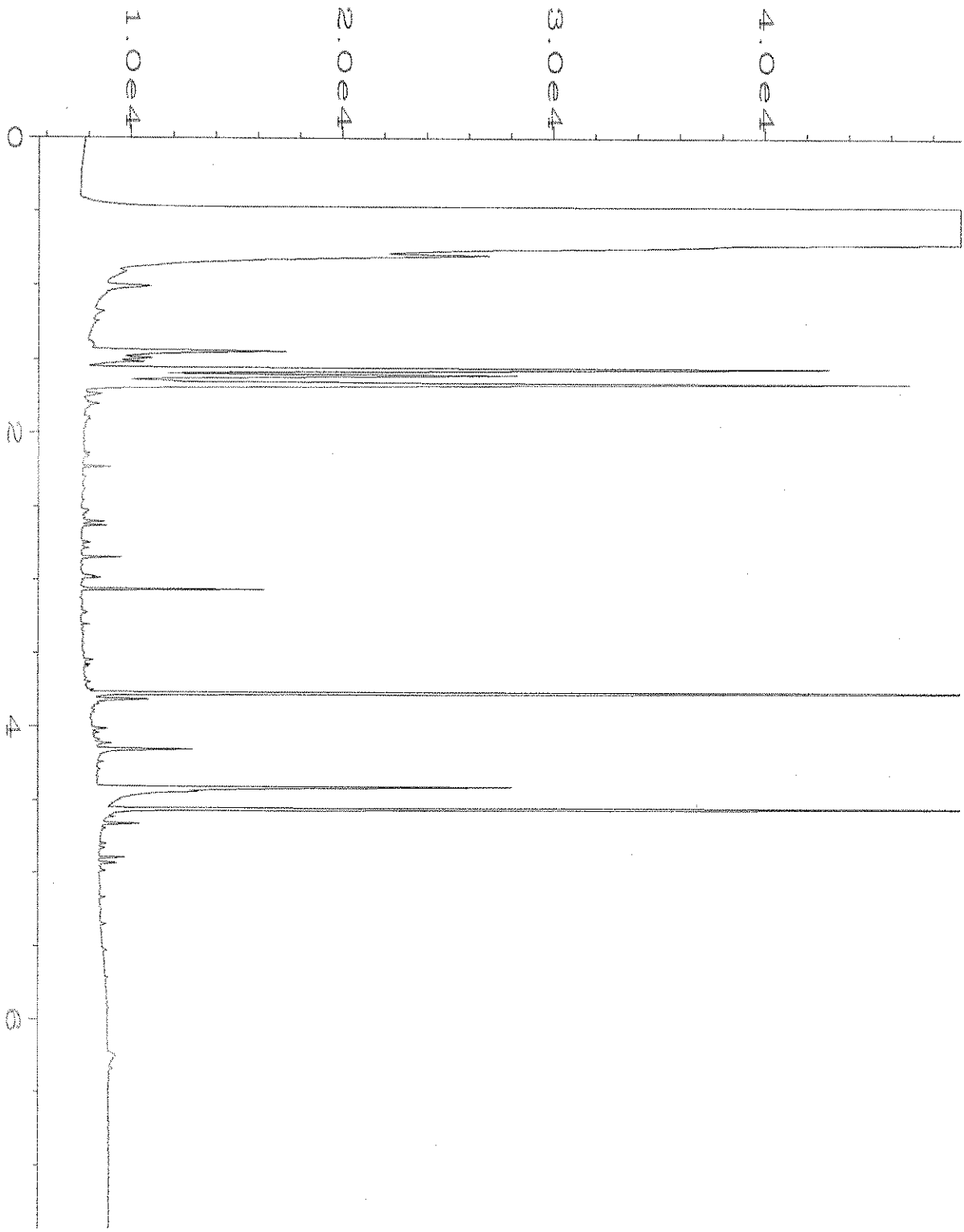
SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: [signature]	Carmen Tappero	Aspect Consulting	4/29/22	1227
Received by: [signature]	Liz Webber-Bruya	F&B	4/29/22	1227
Relinquished by:				
Received by:		Samples received at 4 °C		



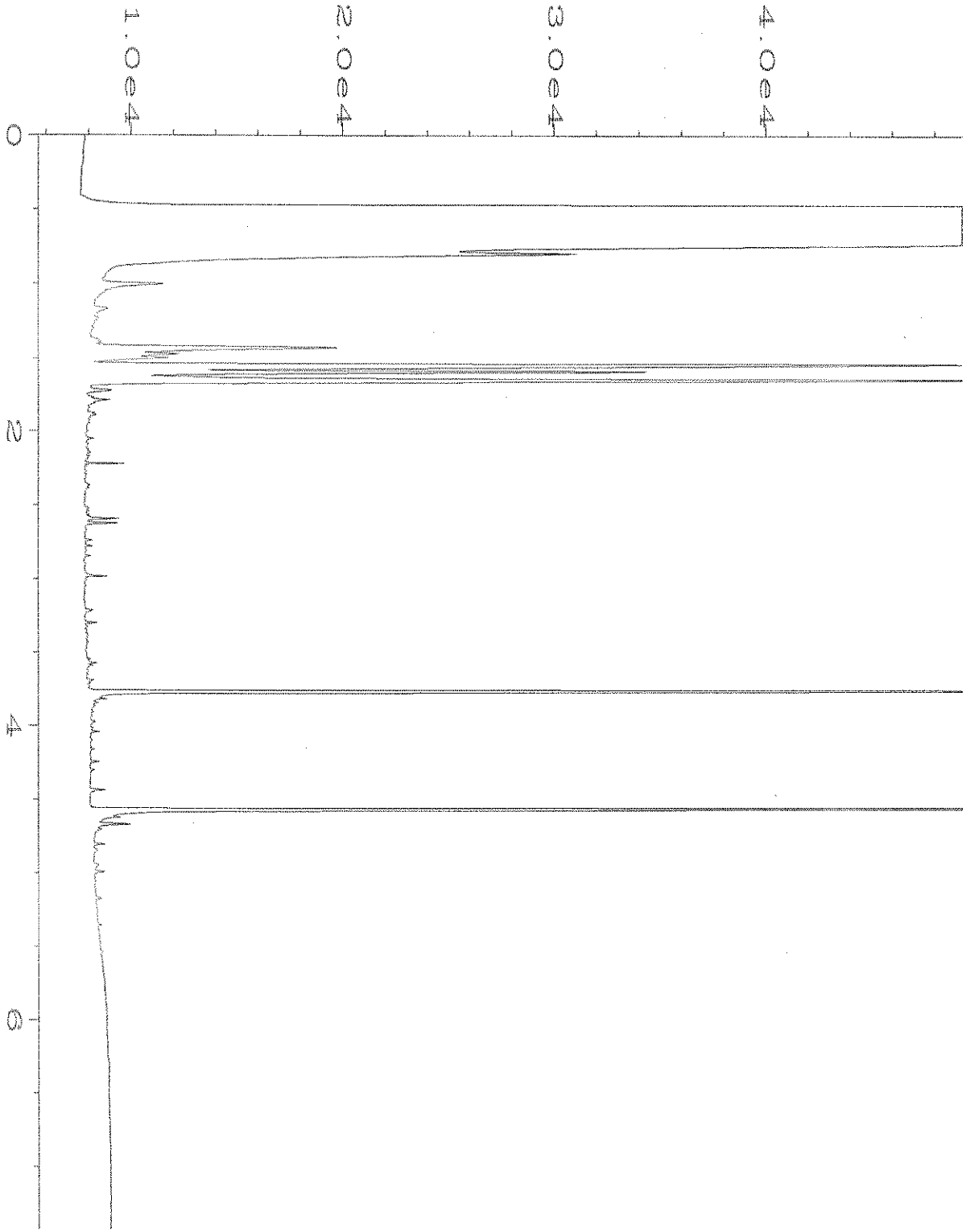
Data File Name	: C:\HPCHEM\1\DATA\05-02-22\031F0701.D		
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 31
Sample Name	: 204517-01	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 7
Acquired on	: 02 May 22 04:37 PM	Instrument Method	: DX.MTH
Report Created on	: 03 May 22 07:42 AM	Analysis Method	: DEFAULT.MTH



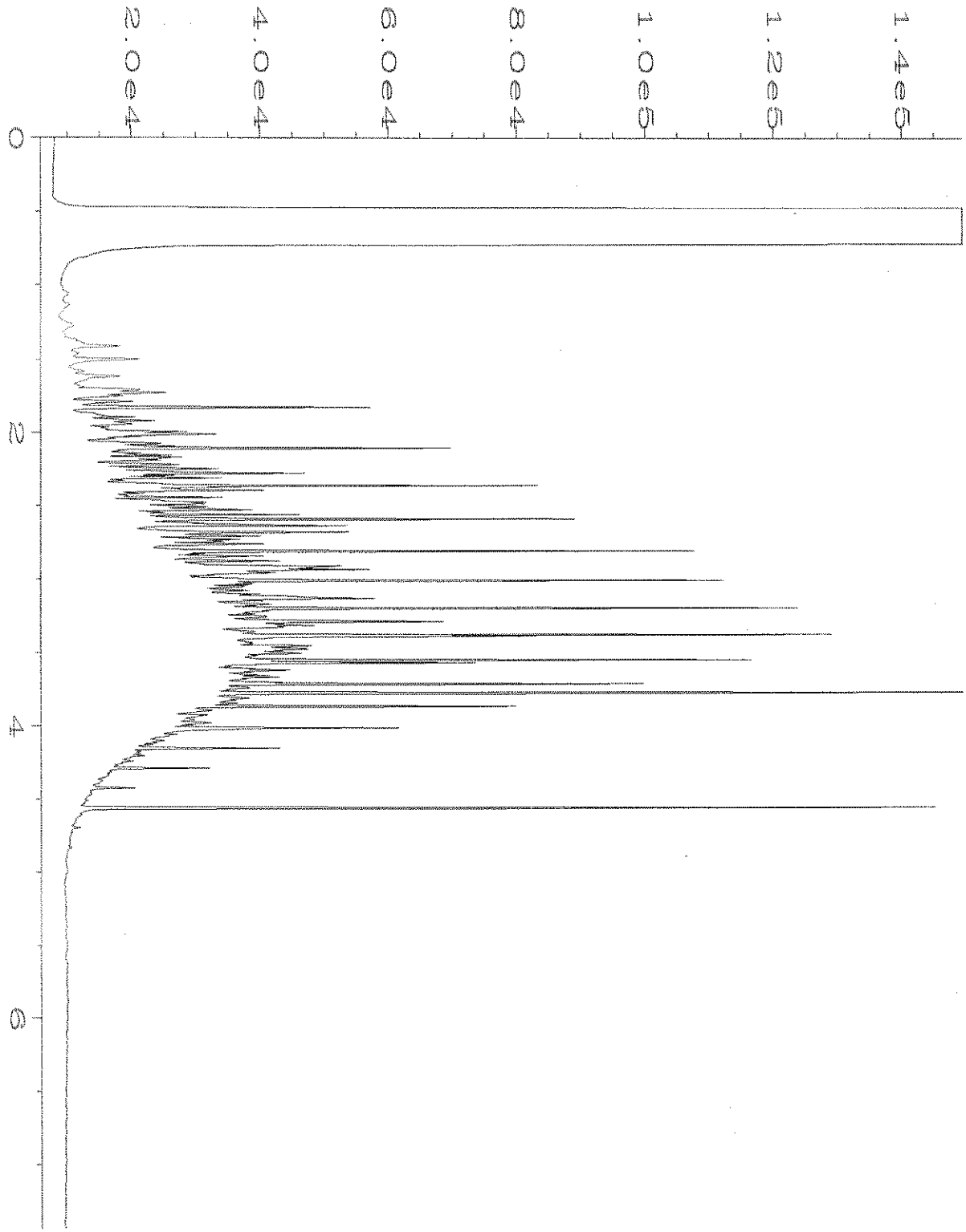
Data File Name	: C:\HPCHEM\1\DATA\05-02-22\032F0701.D		
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 32
Sample Name	: 204517-04	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 7
Acquired on	: 02 May 22 04:46 PM	Instrument Method	: DX.MTH
Report Created on	: 03 May 22 07:42 AM	Analysis Method	: DEFAULT.MTH



Data File Name	: C:\HPCHEM\1\DATA\05-02-22\033F0701.D		
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 33
Sample Name	: 204517-05	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 7
Acquired on	: 02 May 22 05:01 PM	Instrument Method	: DX.MTH
Report Created on	: 03 May 22 07:42 AM	Analysis Method	: DEFAULT.MTH



Data File Name	: C:\HPCHEM\1\DATA\05-02-22\018F0301.D		
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 18
Sample Name	: 02-1051 mb	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 3
Acquired on	: 02 May 22 11:52 AM	Instrument Method	: DX.MTH
Report Created on	: 03 May 22 07:42 AM	Analysis Method	: DEFAULT.MTH



Data File Name	: C:\HPCHEM\1\DATA\05-02-22\003F0201.D		
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 3
Sample Name	: 500 Dx 65-122D	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 2
Acquired on	: 02 May 22 06:07 AM	Instrument Method	: DX.MTH
Report Created on	: 03 May 22 07:42 AM	Analysis Method	: DEFAULT.MTH

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

Friedman & Bruya
Michael Erdahl
3012 16th Ave. W.
Seattle, WA 98119

RE: 204517
Work Order Number: 2204537

May 06, 2022

Attention Michael Erdahl:

Fremont Analytical, Inc. received 5 sample(s) on 4/29/2022 for the analyses presented in the following report.

Total Alkalinity by SM 2320B

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: *05/06/2022*

CLIENT: Friedman & Bruya
Project: 204517
Work Order: 2204537

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2204537-001	MW-5-220427	04/27/2022 2:10 PM	04/29/2022 2:54 PM
2204537-002	MW-6-220427	04/27/2022 4:05 PM	04/29/2022 2:54 PM
2204537-003	MW-9-220427	04/27/2022 2:55 PM	04/29/2022 2:54 PM
2204537-004	MW-10-220427	04/27/2022 2:05 PM	04/29/2022 2:54 PM
2204537-005	MW-15-220427	04/27/2022 1:10 PM	04/29/2022 2:54 PM

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

Case Narrative

WO#: **2204537**
Date: **5/6/2022**

CLIENT: Friedman & Bruya
Project: 204517

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

CLIENT: Friedman & Bruya
Project: 204517

Lab ID: 2204537-001 **Collection Date:** 4/27/2022 2:10:00 PM
Client Sample ID: **MW-5-220427** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Total Alkalinity by SM 2320B				Batch ID: R75131		Analyst: SS
Alkalinity, Total (As CaCO3)	794	2.50		mg/L	1	5/3/2022 9:43:04 AM

Lab ID: 2204537-002 **Collection Date:** 4/27/2022 4:05:00 PM
Client Sample ID: **MW-6-220427** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Total Alkalinity by SM 2320B				Batch ID: R75131		Analyst: SS
Alkalinity, Total (As CaCO3)	342	2.50		mg/L	1	5/3/2022 9:43:04 AM

Lab ID: 2204537-003 **Collection Date:** 4/27/2022 2:55:00 PM
Client Sample ID: **MW-9-220427** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Total Alkalinity by SM 2320B				Batch ID: R75131		Analyst: SS
Alkalinity, Total (As CaCO3)	113	2.50		mg/L	1	5/3/2022 9:43:04 AM

Lab ID: 2204537-004 **Collection Date:** 4/27/2022 2:05:00 PM
Client Sample ID: **MW-10-220427** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Total Alkalinity by SM 2320B				Batch ID: R75131		Analyst: SS
Alkalinity, Total (As CaCO3)	196	2.50		mg/L	1	5/3/2022 9:43:04 AM

Analytical Report

Work Order: **2204537**
Date Reported: **5/6/2022**

CLIENT: Friedman & Bruya
Project: 204517

Lab ID: 2204537-005 **Collection Date:** 4/27/2022 1:10:00 PM
Client Sample ID: **MW-15-220427** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Total Alkalinity by SM 2320B				Batch ID: R75131		Analyst: SS
Alkalinity, Total (As CaCO3)	307	2.50		mg/L	1	5/3/2022 9:43:04 AM

Work Order: 2204537
CLIENT: Friedman & Bruya
Project: 204517

QC SUMMARY REPORT

Total Alkalinity by SM 2320B

Sample ID: **MB-R75131**	SampType: **MBLK**	Units: **mg/L**	Prep Date: **5/3/2022**	RunNo: **75131**
Client ID: **MBLKW**	Batch ID: **R75131**		Analysis Date: **5/3/2022**	SeqNo: **1541193**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	ND	2.50									

Sample ID: **LCS-R75131**	SampType: **LCS**	Units: **mg/L**	Prep Date: **5/3/2022**	RunNo: **75131**
Client ID: **LCSW**	Batch ID: **R75131**		Analysis Date: **5/3/2022**	SeqNo: **1541194**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	95.3	2.50	100.0	0	95.3	84	121				

Sample ID: **2204538-001ADUP**	SampType: **DUP**	Units: **mg/L**	Prep Date: **5/3/2022**	RunNo: **75131**
Client ID: **BATCH**	Batch ID: **R75131**		Analysis Date: **5/3/2022**	SeqNo: **1541196**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	68.7	2.50						69.78	1.55	20	

Sample Log-In Check List

Client Name:	FB	Work Order Number:	2204537
Logged by:	Clare Griggs	Date Received:	4/29/2022 2:54:00 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:	Eric Young	Date:	4/29/2022
By Whom:	Clare Griggs	Via:	☑ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding:	Confirm COC/samples.		
Client Instructions:	See revised COC.		

19. Additional remarks:

Item Information

Item #	Temp ºC
Sample	0.8

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

SUBCONTRACT SAMPLE CHAIN OF CUSTODY

2204537

Page # 1 of 1

Send Report To Michael Erdahl

Company Friedman and Bruya, Inc.

Address 3012 16th Ave W

City, State, ZIP Seattle, WA 98119

Phone # (206) 285-8282 merdahl@friedmanandbruya.com

SUBCONTRACTER Fremont

PROJECT NAME/NO.	PO #
204517	C-157

REMARKS

Please Email Results Aspect EDD

TURNAROUND TIME

☒ Standard TAT

☐ RUSH

Rush charges authorized by:

SAMPLE DISPOSAL

☐ Dispose after 30 days

☐ Return samples

☐ Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Matrix	# of jars	ANALYSES REQUESTED: Dioxins/Furans	EPH	VPH	Alkalinity							Notes
MW-5-220427		4/22/22	1410	water	1				x							
MW-6-220427			1605		1				x							
MW-9-220427			1455		1				x							
MW-10-220427			1705		1				x							
MW-15-220427			1310		1				x							
McKinney-220427			1720		1				x							

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Michael Erdahl	Friedman & Bruya	4/29/22	1351
Received by:		Elizabeth Sweeney	FAI	4/29/22	14:54
Relinquished by:					
Received by:					

SUBCONTRACT SAMPLE CHAIN OF CUSTODY

2204537, 1

Page # 1 of 1

Send Report To Michael Erdahl

Company Friedman and Bruya, Inc.

Address 3012 16th Ave W

City, State, ZIP Seattle, WA 98119

Phone # (206) 285-8282 merdahl@friedmanandbruya.com

SUBCONTRACTER Fremont

PROJECT NAME/NO. 204517

PO # C-157

REMARKS

Please Email Results Aspect EDD

TURNAROUND TIME

☒ Standard TAT

☐ RUSH

Rush charges authorized by:

SAMPLE DISPOSAL

☐ Dispose after 30 days

☐ Return samples

☐ Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Matrix	# of jars	ANALYSES REQUESTED: Dioxins/Furans	EPH	VPH	Alkalinity							Notes
MW-5-220427		4/27/22	1410	water	1				x							edits per EY 4/29/22 -cg
MW-6-220427			1605		1				x							
MW-9-220427			1455		1				x							
MW-10-220427			1405		1				x							
MW-15-220427			1310		1				x							
~~McKinley-220427~~			1720		1				x							

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Michael Erdahl	Friedman & Bruya	4/29/22	1351
Received by:		Elizabeth Saucedo	FAI	4/29/22	14:54
Relinquished by:					
Received by:					

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Vineta Mills, M.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

August 4, 2022

Matthew Lewis, Project Manager
Aspect Consulting, LLC
350 Madison Ave. N.
Bainbridge Island, WA 98110-1810

Dear Mr Lewis:

Included are the results from the testing of material submitted on July 26, 2022 from the Crownhill Elementary 100094, F&BI 207421 project. There are 17 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Aspect Data
ASP0804R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on July 26, 2022 by Friedman & Bruya, Inc. from the Aspect Consulting, LLC Crownhill Elementary 100094, F&BI 207421 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Aspect Consulting, LLC
207421 -01	MW-6-220725
207421 -02	MW-10-220725

The samples were sent to Fremont Analytical for alkalinity analysis. The report is enclosed.

All quality control requirements were acceptable.

Date of Report: 08/04/22
Date Received: 07/26/22
Project: Crownhill Elementary 100094, F&BI 207421
Date Extracted: 07/28/22
Date Analyzed: 07/29/22

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 41-152)
MW-10-220725 207421-02	<50	<250	113
Method Blank 02-1851 MB	<50	<250	146

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MW-6-220725	Client:	Aspect Consulting, LLC
Date Received:	07/26/22	Project:	Crownhill Elementary 100094
Date Extracted:	08/01/22	Lab ID:	207421-01 x10
Date Analyzed:	08/01/22	Data File:	207421-01 x10.163
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	23.5
Manganese	1,700

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MW-6-220725	Client:	Aspect Consulting, LLC
Date Received:	07/26/22	Project:	Crownhill Elementary 100094
Date Extracted:	08/01/22	Lab ID:	207421-01 x100
Date Analyzed:	08/02/22	Data File:	207421-01 x100.120
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Iron	9,800

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MW-10-220725	Client:	Aspect Consulting, LLC
Date Received:	07/26/22	Project:	Crownhill Elementary 100094
Date Extracted:	08/01/22	Lab ID:	207421-02
Date Analyzed:	08/01/22	Data File:	207421-02.166
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	1.39

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MW-10-220725	Client:	Aspect Consulting, LLC
Date Received:	07/26/22	Project:	Crownhill Elementary 100094
Date Extracted:	08/01/22	Lab ID:	207421-02 x10
Date Analyzed:	08/01/22	Data File:	207421-02 x10.164
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Iron	2,280
Manganese	1,230

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	NA	Project:	Crownhill Elementary 100094
Date Extracted:	08/01/22	Lab ID:	I2-519 mb
Date Analyzed:	08/01/22	Data File:	I2-519 mb.141
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Iron	<50
Manganese	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-6-220725	Client:	Aspect Consulting, LLC
Date Received:	07/26/22	Project:	Crownhill Elementary 100094
Date Extracted:	07/26/22	Lab ID:	207421-01
Date Analyzed:	07/26/22	Data File:	207421-01.137
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	WE

Analyte:	Concentration ug/L (ppb)
Arsenic	24.2

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-10-220725	Client:	Aspect Consulting, LLC
Date Received:	07/26/22	Project:	Crownhill Elementary 100094
Date Extracted:	07/26/22	Lab ID:	207421-02
Date Analyzed:	07/26/22	Data File:	207421-02.134
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	WE

Analyte:	Concentration ug/L (ppb)
Arsenic	1.47

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	NA	Project:	Crownhill Elementary 100094
Date Extracted:	07/26/22	Lab ID:	I2-507 mb
Date Analyzed:	07/26/22	Data File:	I2-507 mb.132
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	WE

Analyte:	Concentration ug/L (ppb)
Arsenic	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	MW-10-220725	Client:	Aspect Consulting, LLC
Date Received:	07/26/22	Project:	Crownhill Elementary 100094
Date Extracted:	07/26/22	Lab ID:	207421-02
Date Analyzed:	07/28/22	Data File:	072809.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	RF

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	78	126
Toluene-d8	103	84	115
4-Bromofluorobenzene	98	72	130

Compounds:	Concentration ug/L (ppb)
Trichloroethene	<0.5

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	Not Applicable	Project:	Crownhill Elementary 100094
Date Extracted:	07/26/22	Lab ID:	02-1774 mb
Date Analyzed:	07/26/22	Data File:	072610.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	RF

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	78	126
Toluene-d8	99	84	115
4-Bromofluorobenzene	95	72	130

Compounds:	Concentration ug/L (ppb)
Trichloroethene	<0.5

Date of Report: 08/04/22
Date Received: 07/26/22
Project: Crownhill Elementary 100094, F&BI 207421

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	112	111	63-142	1

Date of Report: 08/04/22
Date Received: 07/26/22
Project: Crownhill Elementary 100094, F&BI 207421

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR DISSOLVED METALS USING EPA METHOD 6020B

Laboratory Code: 207416-01 x10 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	ug/L (ppb)	10	10.6	85	84	75-125	1
Iron	ug/L (ppb)	100	5,270	93	79	75-125	16
Manganese	ug/L (ppb)	20	11,300	163 b	0 b	75-125	200 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	97	80-120
Iron	ug/L (ppb)	100	103	80-120
Manganese	ug/L (ppb)	20	105	80-120

Date of Report: 08/04/22
Date Received: 07/26/22
Project: Crownhill Elementary 100094, F&BI 207421

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 6020B

Laboratory Code: 207421-02 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	ug/L (ppb)	10	1.47	95	98	75-125	3

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	92	80-120

Date of Report: 08/04/22
Date Received: 07/26/22
Project: Crownhill Elementary 100094, F&BI 207421

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 207383-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Trichloroethene	ug/L (ppb)	10	<0.5	86	50-150

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Trichloroethene	ug/L (ppb)	10	91	91	70-130	0

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

SAMPLE CHAIN OF CUSTODY

07-26-22

E03/A15/VW1

Page # ____ of ____

207421

Report To Matthew Lewis

Company Aspect Consulting

Address 710 2nd Ave #550

City, State, ZIP Seattle, WA, 98104

Phone 206 812-4795 Email mlewis@aspectconsulting.com

SAMPLERS (signature) Carmen Tappero

PROJECT NAME Crownhill Elementary

PO # 100094

REMARKS

Project specific RLs? - Yes / No

INVOICE TO

TURNAROUND TIME

☑ Standard turnaround

☐ RUSH ____

Rush charges authorized by:

SAMPLE DISPOSAL

☐ Archive samples

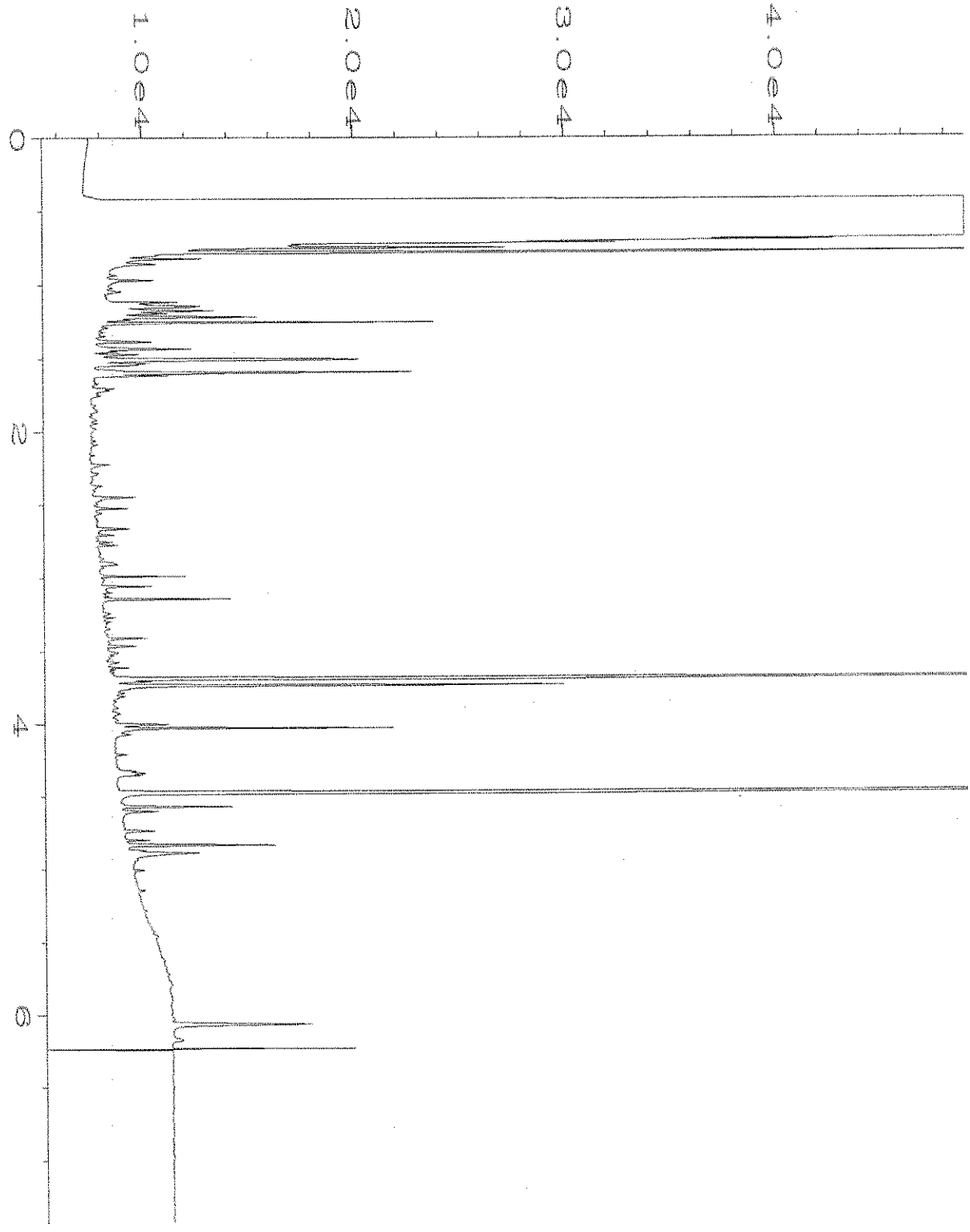
☐ Other ____

Default: Dispose after 30 days

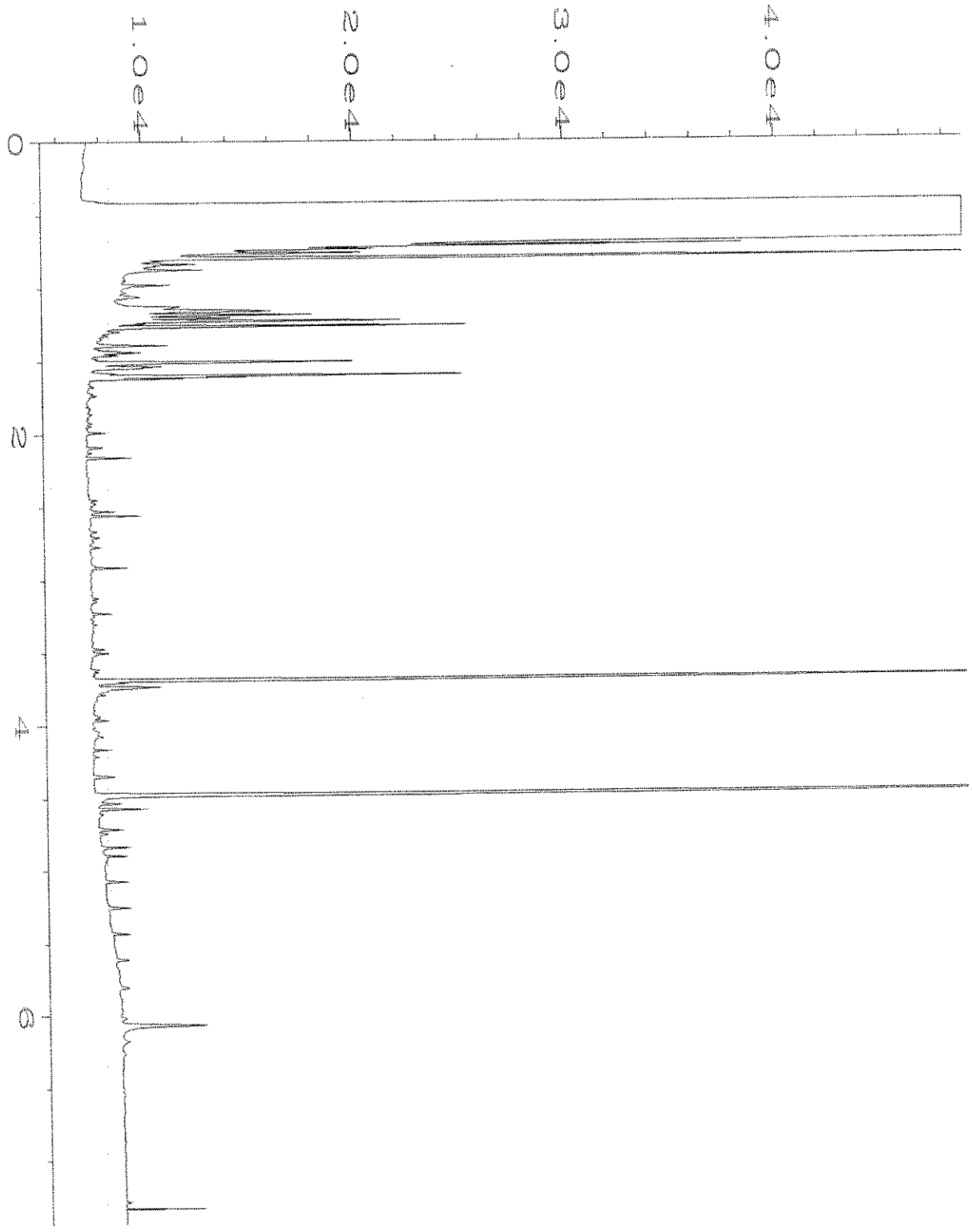
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	TCE	Total arsenic	Dissolved As, Fe, Mn	Alkalinity	Notes
						ANALYSES REQUESTED											
MW-6-220725	01A-C	7/25/22	1245	W	3									X	X	X	
MW-10-220725	02A-C	7/25/22	1415	W	6?	X							X	X	X	X	

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Carmen Tappero	Carmen Tappero	Aspect Consulting	7/26/22	0803
Received by:	Anne Bruya	FXB	7/26/22	0803
Relinquished by:				
Received by:		Samples received at 3 °C		

Friedman & Bruya, Inc.
Ph. (206) 285-8282

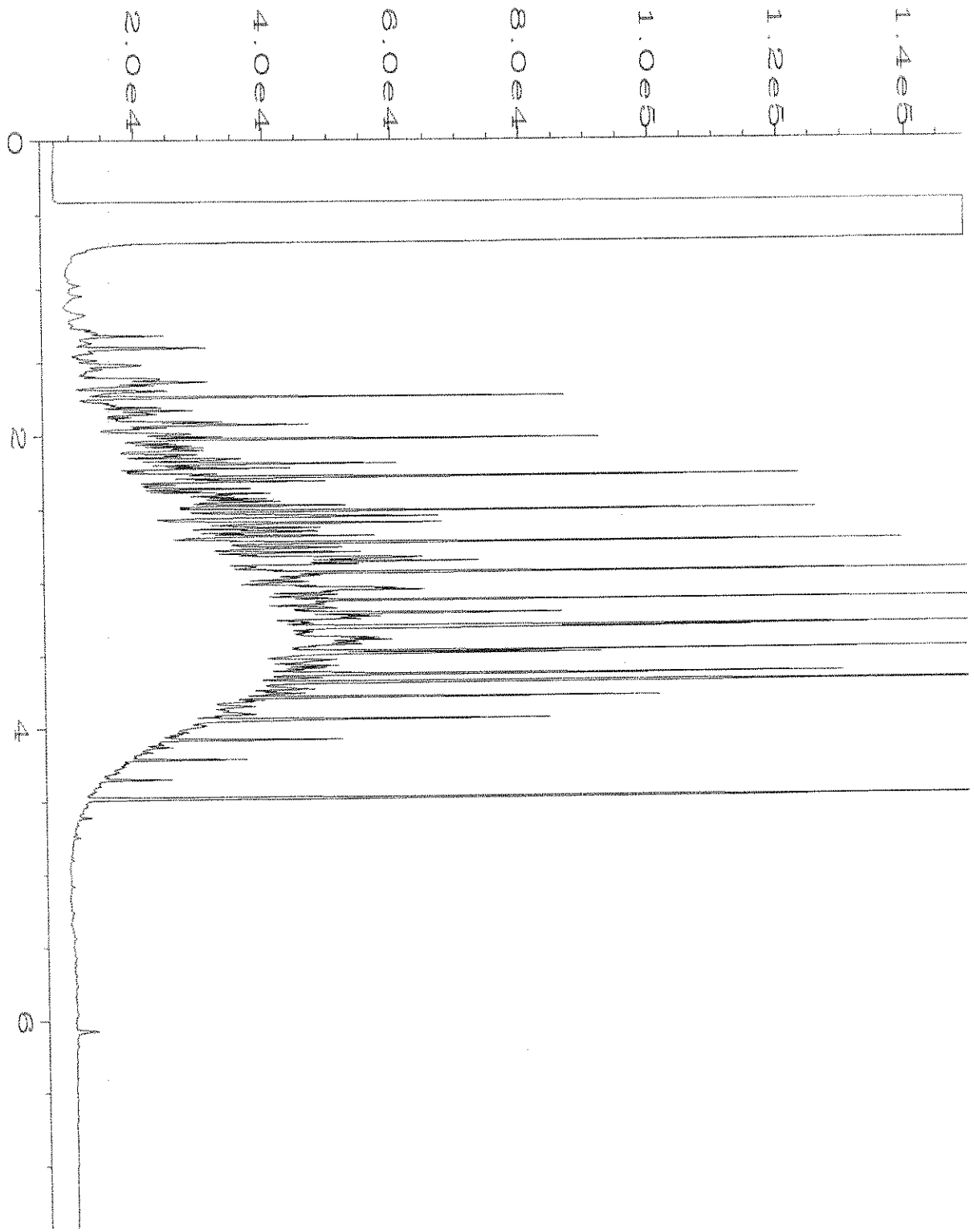


Data File Name	: C:\HPCHEM\1\DATA\07-28-22\045F1401.D		
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 45
Sample Name	: 207421-02	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 14
Acquired on	: 29 Jul 22 00:33 AM	Instrument Method	: DX.MTH
Report Created on	: 29 Jul 22 09:23 AM	Analysis Method	: DEFAULT.MTH



Data File Name : C:\HPCHEM\1\DATA\07-28-22\024F1001.D
Operator : TL
Instrument : GC1
Sample Name : 02-1851 mb
Run Time Bar Code:
Acquired on : 28 Jul 22 06:04 PM
Report Created on: 29 Jul 22 09:24 AM

Page Number : 1
Vial Number : 24
Injection Number : 1
Sequence Line : 10
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH



Data File Name : C:\HPCHEM\1\DATA\07-28-22\003F0201.D
Operator : TL
Instrument : GC1
Sample Name : 500 Dx 65-122F
Run Time Bar Code:
Acquired on : 28 Jul 22 07:18 AM
Report Created on: 29 Jul 22 09:24 AM

Page Number : 1
Vial Number : 3
Injection Number : 1
Sequence Line : 2
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH

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

Friedman & Bruya
Michael Erdahl
3012 16th Ave. W.
Seattle, WA 98119

RE: 207421
Work Order Number: 2207362

August 01, 2022

Attention Michael Erdahl:

Fremont Analytical, Inc. received 2 sample(s) on 7/26/2022 for the analyses presented in the following report.

Total Alkalinity by SM 2320B

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: *08/01/2022*

CLIENT: Friedman & Bruya
Project: 207421
Work Order: 2207362

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2207362-001	MW-6-220725	07/25/2022 12:45 PM	07/26/2022 2:39 PM
2207362-002	MW-10-220725	07/25/2022 2:15 PM	07/26/2022 2:39 PM

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

Original

Case Narrative

WO#: **2207362**
Date: **8/1/2022**

CLIENT: Friedman & Bruya
Project: 207421

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: **2207362**
Date Reported: **8/1/2022**

CLIENT: Friedman & Bruya
Project: 207421

Lab ID: 2207362-001 **Collection Date:** 7/25/2022 12:45:00 PM
Client Sample ID: **MW-6-220725** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Total Alkalinity by SM 2320B				Batch ID: R77208		Analyst: CB
Alkalinity, Total (As CaCO3)	322	2.50		mg/L	1	8/1/2022 8:17:11 AM

Lab ID: 2207362-002 **Collection Date:** 7/25/2022 2:15:00 PM
Client Sample ID: **MW-10-220725** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Total Alkalinity by SM 2320B				Batch ID: R77208		Analyst: CB
Alkalinity, Total (As CaCO3)	241	2.50		mg/L	1	8/1/2022 8:17:11 AM

Work Order: 2207362
CLIENT: Friedman & Bruya
Project: 207421

QC SUMMARY REPORT

Total Alkalinity by SM 2320B

Sample ID: **MB-R77208**	SampType: **MBLK**			Units: **mg/L**		Prep Date: **8/1/2022**		RunNo: **77208**		
Client ID: **MBLKW**	Batch ID: **R77208**					Analysis Date: **8/1/2022**		SeqNo: **1585982**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	ND	2.50									

Sample ID: **LCS-R77208**	SampType: **LCS**			Units: **mg/L**		Prep Date: **8/1/2022**		RunNo: **77208**		
Client ID: **LCSW**	Batch ID: **R77208**					Analysis Date: **8/1/2022**		SeqNo: **1585983**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	113	2.50	100.0	0	113	84	121				

Sample ID: **2207362-001ADUP**	SampType: **DUP**			Units: **mg/L**		Prep Date: **8/1/2022**		RunNo: **77208**		
Client ID: **MW-6-220725**	Batch ID: **R77208**					Analysis Date: **8/1/2022**		SeqNo: **1585986**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	323	2.50						321.9	0.402	20	

Sample ID: **2207401-010DDUP**	SampType: **DUP**			Units: **mg/L**		Prep Date: **8/1/2022**		RunNo: **77208**		
Client ID: **BATCH**	Batch ID: **R77208**					Analysis Date: **8/1/2022**		SeqNo: **1585996**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	231	2.50						233.0	0.701	20	

Sample Log-In Check List

Client Name:	FB	Work Order Number:	2207362
Logged by:	Clare Griggs	Date Received:	7/26/2022 2:39:00 PM

Chain of Custody

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

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

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

SUBCONTRACT SAMPLE CHAIN OF CUSTODY

2207362

Page # 1 of 1

Send Report To Michael Erdahl

Company Friedman and Bruya, Inc.

Address 3012 16th Ave W

City, State, ZIP Seattle, WA 98119

Phone # (206) 285-8282 merdahl@friedmanandbruya.com

SUBCONTRACTER Fremont

PROJECT NAME/NO.	PO #
207421	C-265

REMARKS

Aspect EDD

TURNAROUND TIME

☒ Standard TAT

☐ RUSH

Rush charges authorized by:

SAMPLE DISPOSAL

☐ Dispose after 30 days

☐ Return samples

☐ Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Matrix	# of jars	ANALYSES REQUESTED: Dioxins/Furans	EPH	VPH	Alkalinity							Notes
MW-6-220725		7/25/22	1245	water	1				x							
MW-10-220725		↓	1415	↓	1				x							

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Michael Erdahl	Friedman & Bruya	7/26/22	0855
Received by:		Lauren Curee	FAI	7/26/22	1439
Relinquished by:					
Received by:					

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Vineta Mills, M.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

October 20, 2022

Matthew Lewis, Project Manager
Aspect Consulting, LLC
710 2nd Ave S, Suite 550
Seattle, WA 98104

Dear Mr Lewis:

Included are the results from the testing of material submitted on October 12, 2022 from the Crownhill Elementary 100094, F&BI 210165 project. There are 9 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Aspect Data
ASP1020R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on October 12, 2022 by Friedman & Bruya, Inc. from the Aspect Consulting, LLC Crownhill Elementary 100094, F&BI 210165 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Aspect Consulting, LLC
210165 -01	MW-12-101122
210165 -02	MW-15-101122
210165 -03	MW-6-101122
210165 -04	MW-10-101122
210165 -05	MW-9-101122
210165 -06	McKinney-101122

Samples MW-12-101122, MW-15-101122, MW-6-101122, MW-10-101122, and MW-9-101122 were sent to Fremont Analytical for total arsenic, dissolved arsenic, dissolved iron, dissolved manganese, and alkalinity analyses. The report is enclosed.

All quality control requirements were acceptable.

Date of Report: 10/20/22
Date Received: 10/12/22
Project: Crownhill Elementary 100094, F&BI 210165
Date Extracted: 10/13/22
Date Analyzed: 10/13/22

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 41-152)
MW-12-101122 210165-01	1,600 x	430 x	110
MW-15-101122 210165-02	87 x	<250	120
MW-10-101122 210165-04	<50	<250	122
Method Blank 02-2521 MB	<50	<250	100

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	MW-10-101122	Client:	Aspect Consulting, LLC
Date Received:	10/12/22	Project:	Crownhill Elementary 100094
Date Extracted:	10/12/22	Lab ID:	210165-04
Date Analyzed:	10/13/22	Data File:	101313.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	105	78	126
Toluene-d8	96	84	115
4-Bromofluorobenzene	93	72	130

Compounds:	Concentration ug/L (ppb)
Trichloroethene	<0.5

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	MW-9-101122	Client:	Aspect Consulting, LLC
Date Received:	10/12/22	Project:	Crownhill Elementary 100094
Date Extracted:	10/12/22	Lab ID:	210165-05
Date Analyzed:	10/13/22	Data File:	101314.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	78	126
Toluene-d8	97	84	115
4-Bromofluorobenzene	99	72	130

Compounds:	Concentration ug/L (ppb)
Trichloroethene	8.2

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	McKinney-101122	Client:	Aspect Consulting, LLC
Date Received:	10/12/22	Project:	Crownhill Elementary 100094
Date Extracted:	10/12/22	Lab ID:	210165-06
Date Analyzed:	10/13/22	Data File:	101315.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	78	126
Toluene-d8	97	84	115
4-Bromofluorobenzene	97	72	130

Compounds:	Concentration ug/L (ppb)
Trichloroethene	<0.5

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	Not Applicable	Project:	Crownhill Elementary 100094
Date Extracted:	10/12/22	Lab ID:	02-2329 mb
Date Analyzed:	10/12/22	Data File:	101207.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	LM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	78	126
Toluene-d8	94	84	115
4-Bromofluorobenzene	96	72	130

Compounds:	Concentration ug/L (ppb)
Trichloroethene	<0.5

Date of Report: 10/20/22
Date Received: 10/12/22
Project: Crownhill Elementary 100094, F&BI 210165

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	64	68	63-142	6

Date of Report: 10/20/22
Date Received: 10/12/22
Project: Crownhill Elementary 100094, F&BI 210165

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 210138-07 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Trichloroethene	ug/L (ppb)	10	<0.5	87	50-150

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Trichloroethene	ug/L (ppb)	10	94	92	70-130	2

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

210165

SAMPLE CHAIN OF CUSTODY 10/12/22

EO3/AI2/VW1

Page # 1 of

Report To Matthew Lewis

Company Aspect Consulting

Address

City, State, ZIP

Phone 316.617.0499 Email mLewis@aspectconsulting.com

SAMPLERS (*signature*)	
PROJECT NAME: Crownhill Elementary	PO#: 100094
REMARKS: Project specific RLs? - Yes / No	INVOICE TO

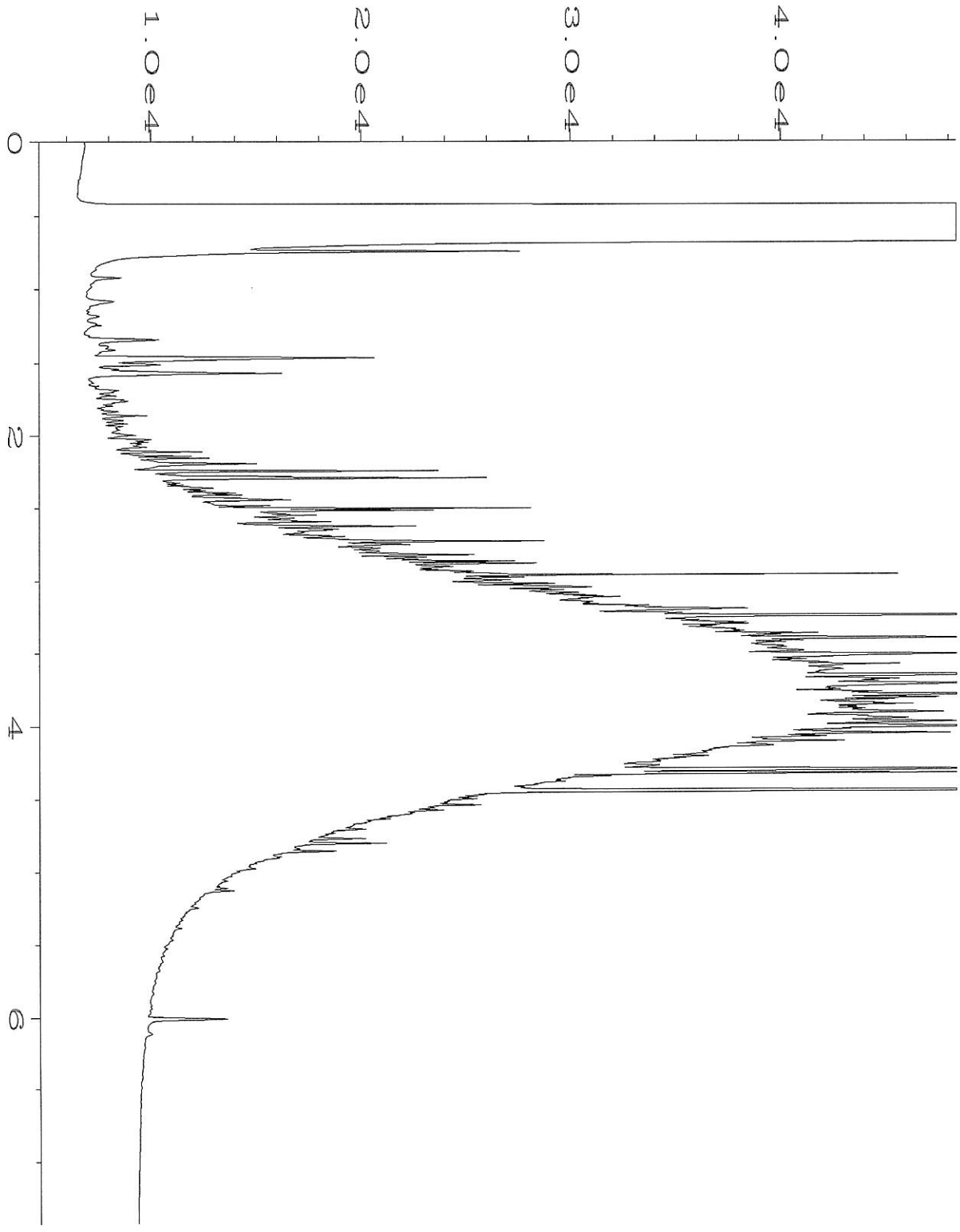
TURNAROUND TIME
- ☒ Standard turnaround
- ☐ RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- ☐ Archive samples
- ☐ Other
- Default: Dispose after 30 days

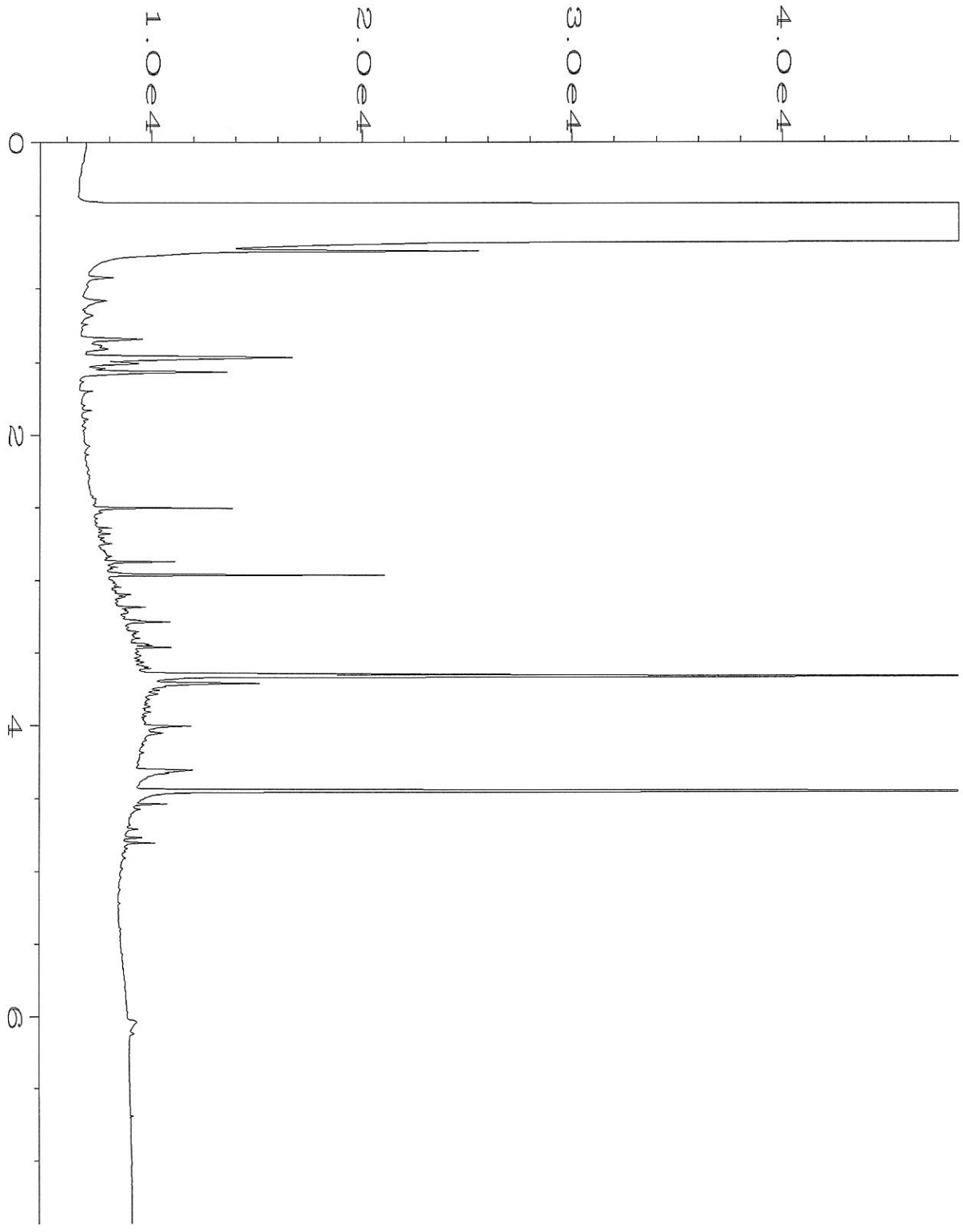
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Total As	Dissolved As, Fe, Mn	Alkalinity	TCLP by 8260	Notes
MW-12-101122	01 A-D	10/11/22	1100	Water	4	X							X	X	X		
MW-15-101122	02		1205		4	X											
MW-6-101122	03 A-C		1305		3												
MW-10-101121	04 A-G		1410		7	X										X	
MW-9-101122	05 A-F		1540		6											X	
McKinney-101122	06 A-C		1610		3								TRB			X	

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Daniel Babcock	Aspect	10/12/22	1340
Received by:	ANH PHAN	FSB	10/12/22	13:40
Relinquished by:				
Received by:		Samples received at 0 °C		

Friedman & Bruya, Inc.
Ph. (206) 285-8282

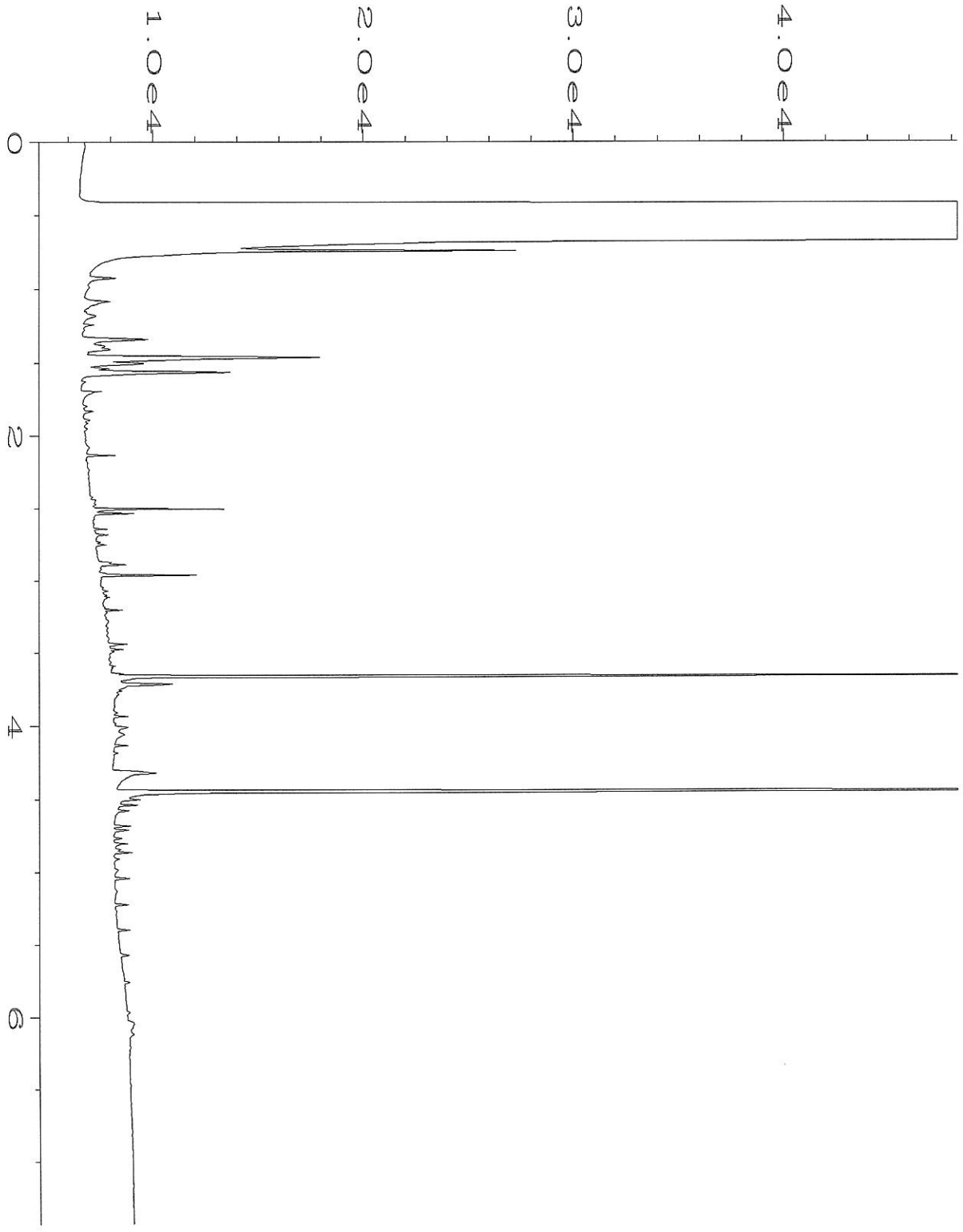


Data File Name	: C:\HPCHEM\1\DATA\10-13-22\030F1701.D		
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 30
Sample Name	: 210165-01	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 17
Acquired on	: 13 Oct 22 06:58 PM	Instrument Method	: DX.MTH
Report Created on	: 14 Oct 22 10:09 AM	Analysis Method	: DEFAULT.MTH



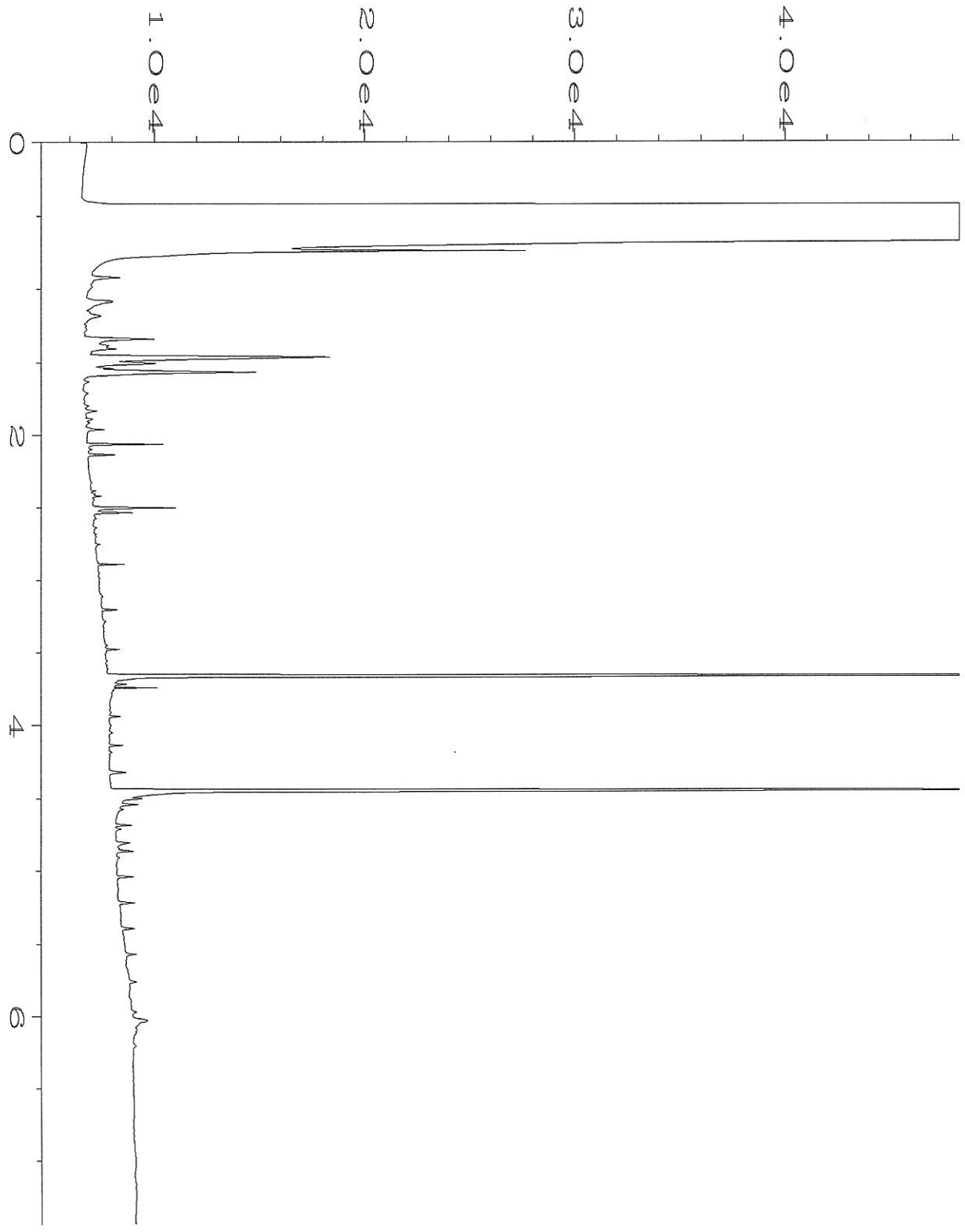
Data File Name : C:\HPCHEM\1\DATA\10-13-22\031F1701.D
Operator : TL
Instrument : GC1
Sample Name : 210165-02
Run Time Bar Code:
Acquired on : 13 Oct 22 07:12 PM
Report Created on: 14 Oct 22 10:09 AM

Page Number : 1
Vial Number : 31
Injection Number : 1
Sequence Line : 17
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH

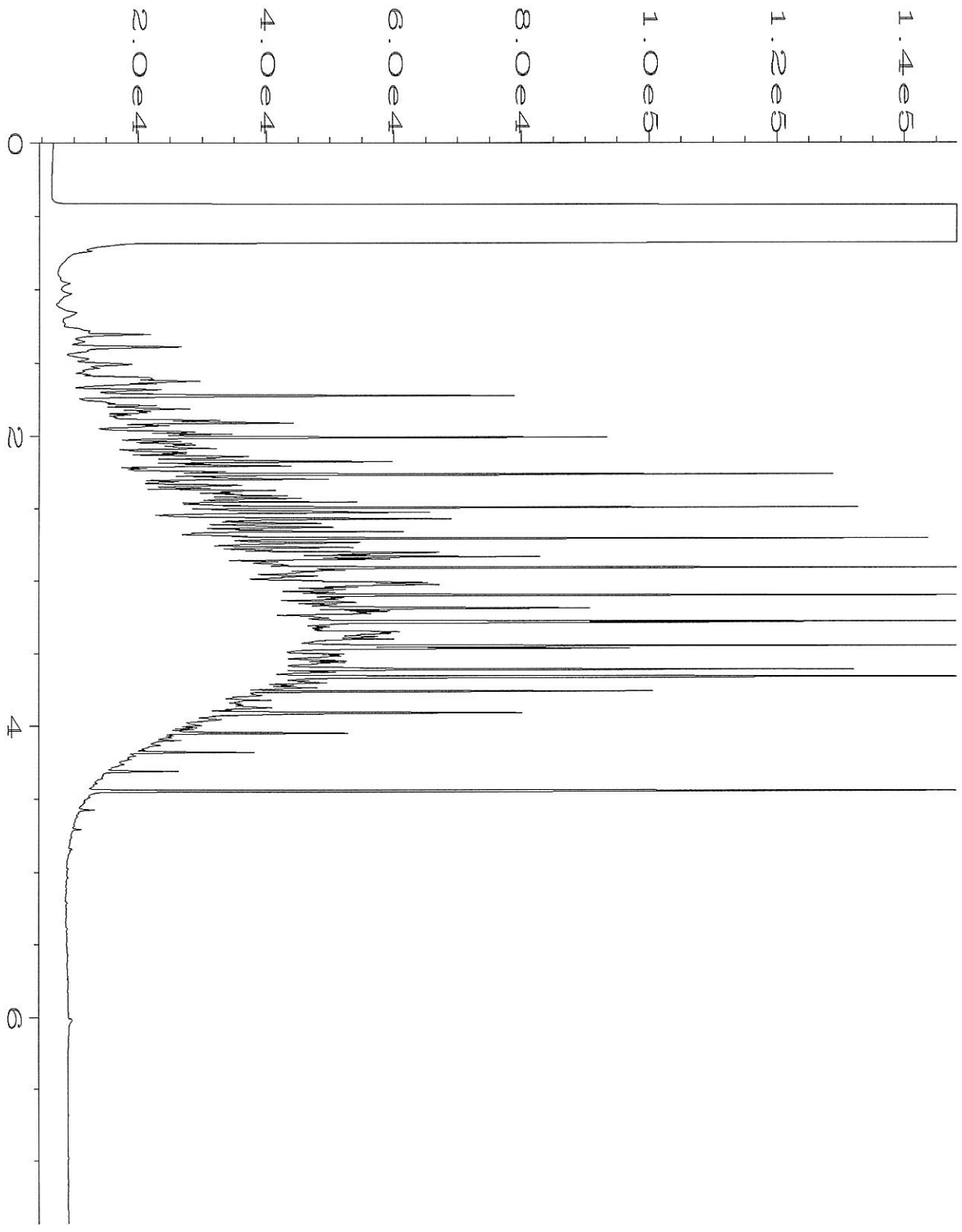


Data File Name : C:\HPCHEM\1\DATA\10-13-22\032F1701.D
Operator : TL
Instrument : GC1
Sample Name : 210165-04
Run Time Bar Code:
Acquired on : 13 Oct 22 07:27 PM
Report Created on: 14 Oct 22 10:09 AM

Page Number : 1
Vial Number : 32
Injection Number : 1
Sequence Line : 17
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH



Data File Name	: C:\HPCHEM\1\DATA\10-13-22\086F0901.D		
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 86
Sample Name	: 02-2521 mb	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 9
Acquired on	: 13 Oct 22 01:01 PM	Instrument Method	: DX.MTH
Report Created on	: 14 Oct 22 10:00 AM	Analysis Method	: DEFAULT.MTH



Data File Name	: C:\HPCHEM\1\DATA\10-13-22\003F1501.D		
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 3
Sample Name	: 500 Dx 66-186F	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 15
Acquired on	: 13 Oct 22 04:18 PM	Instrument Method	: DX.MTH
Report Created on	: 14 Oct 22 10:00 AM	Analysis Method	: DEFAULT.MTH

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

Friedman & Bruya
Michael Erdahl
3012 16th Ave. W.
Seattle, WA 98119

RE: 210165
Work Order Number: 2210213

October 19, 2022

Attention Michael Erdahl:

Fremont Analytical, Inc. received 5 sample(s) on 10/13/2022 for the analyses presented in the following report.

Dissolved Metals by EPA Method 200.8
Total Metals by EPA Method 200.8
Total Alkalinity by SM 2320B

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: *10/19/2022*

CLIENT: Friedman & Bruya
Project: 210165
Work Order: 2210213

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2210213-001	MW-12-101122	10/11/2022 11:00 AM	10/13/2022 9:57 AM
2210213-002	MW-15-101122	10/11/2022 12:05 PM	10/13/2022 9:57 AM
2210213-003	MW-6-101122	10/11/2022 1:05 PM	10/13/2022 9:57 AM
2210213-004	MW-10-101122	10/11/2022 2:10 PM	10/13/2022 9:57 AM
2210213-005	MW-9-101122	10/11/2022 3:40 PM	10/13/2022 9:57 AM

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

Case Narrative

WO#: **2210213**
Date: **10/19/2022**

CLIENT: Friedman & Bruya
Project: 210165

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: **2210213**
Date Reported: **10/19/2022**

CLIENT: Friedman & Bruya
Project: 210165

Lab ID: 2210213-001 **Collection Date:** 10/11/2022 11:00:00 AM
Client Sample ID: **MW-12-101122** **Matrix:** Water

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 38177		Analyst: EH
Arsenic	2.17	1.00		µg/L	1	10/18/2022 12:27:06 PM
Iron	309	100		µg/L	1	10/18/2022 12:27:06 PM
Manganese	5,340	1.80		µg/L	1	10/18/2022 12:27:06 PM
Total Metals by EPA Method 200.8				Batch ID: 38146		Analyst: EH
Arsenic	2.04	1.00		µg/L	1	10/17/2022 4:39:57 PM
Total Alkalinity by SM 2320B				Batch ID: R79050		Analyst: CB
Alkalinity, Total (As CaCO3)	725	2.50		mg/L	1	10/17/2022 7:50:19 AM

Lab ID: 2210213-002 **Collection Date:** 10/11/2022 12:05:00 PM
Client Sample ID: **MW-15-101122** **Matrix:** Water

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 38177		Analyst: EH
Arsenic	1.15	1.00		µg/L	1	10/18/2022 12:16:11 PM
Iron	ND	100		µg/L	1	10/18/2022 12:16:11 PM
Manganese	ND	1.80		µg/L	1	10/18/2022 12:16:11 PM
Total Metals by EPA Method 200.8				Batch ID: 38146		Analyst: EH
Arsenic	ND	1.00		µg/L	1	10/17/2022 4:42:41 PM
Total Alkalinity by SM 2320B				Batch ID: R79050		Analyst: CB
Alkalinity, Total (As CaCO3)	308	2.50		mg/L	1	10/17/2022 7:50:19 AM

CLIENT: Friedman & Bruya
Project: 210165

Lab ID: 2210213-003 **Collection Date:** 10/11/2022 1:05:00 PM
Client Sample ID: **MW-6-101122** **Matrix:** Water

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 38177		Analyst: EH
Arsenic	9.95	1.00		µg/L	1	10/18/2022 12:29:49 PM
Iron	2,730	100		µg/L	1	10/18/2022 12:29:49 PM
Manganese	459	1.80		µg/L	1	10/18/2022 12:29:49 PM
Total Metals by EPA Method 200.8				Batch ID: 38146		Analyst: EH
Arsenic	23.6	1.00		µg/L	1	10/17/2022 4:53:36 PM
Total Alkalinity by SM 2320B				Batch ID: R79050		Analyst: CB
Alkalinity, Total (As CaCO3)	315	2.50		mg/L	1	10/17/2022 7:50:19 AM

Lab ID: 2210213-004 **Collection Date:** 10/11/2022 2:10:00 PM
Client Sample ID: **MW-10-101122** **Matrix:** Water

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 38177		Analyst: EH
Arsenic	1.68	1.00		µg/L	1	10/18/2022 12:32:32 PM
Iron	1,990	100		µg/L	1	10/18/2022 12:32:32 PM
Manganese	1,280	1.80		µg/L	1	10/18/2022 12:32:32 PM
Total Metals by EPA Method 200.8				Batch ID: 38146		Analyst: EH
Arsenic	1.97	1.00		µg/L	1	10/17/2022 4:56:19 PM
Total Alkalinity by SM 2320B				Batch ID: R79050		Analyst: CB
Alkalinity, Total (As CaCO3)	218	2.50		mg/L	1	10/17/2022 7:50:19 AM

Analytical Report

Work Order: **2210213**
Date Reported: **10/19/2022**

CLIENT: Friedman & Bruya
Project: 210165

Lab ID: 2210213-005 **Collection Date:** 10/11/2022 3:40:00 PM
Client Sample ID: **MW-9-101122** **Matrix:** Water

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 38177		Analyst: EH
Arsenic	ND	1.00		µg/L	1	10/18/2022 12:44:22 PM
Iron	ND	100		µg/L	1	10/18/2022 12:44:22 PM
Manganese	ND	1.80		µg/L	1	10/18/2022 12:44:22 PM
Total Metals by EPA Method 200.8				Batch ID: 38146		Analyst: EH
Arsenic	ND	1.00		µg/L	1	10/17/2022 4:59:02 PM
Total Alkalinity by SM 2320B				Batch ID: R79050		Analyst: CB
Alkalinity, Total (As CaCO3)	137	2.50		mg/L	1	10/17/2022 7:50:19 AM

Work Order: 2210213
CLIENT: Friedman & Bruya
Project: 210165

QC SUMMARY REPORT

Total Alkalinity by SM 2320B

Sample ID: **MB-R79050**	SampType: **MBLK**	Units: **mg/L**	Prep Date: **10/17/2022**	RunNo: **79050**
Client ID: **MBLKW**	Batch ID: **R79050**		Analysis Date: **10/17/2022**	SeqNo: **1627627**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	ND	2.50									

Sample ID: **LCS-R79050**	SampType: **LCS**	Units: **mg/L**	Prep Date: **10/17/2022**	RunNo: **79050**
Client ID: **LCSW**	Batch ID: **R79050**		Analysis Date: **10/17/2022**	SeqNo: **1627628**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	101	2.50	100.0	0	101	81.3	118				

Sample ID: **2210213-001CDUP**	SampType: **DUP**	Units: **mg/L**	Prep Date: **10/17/2022**	RunNo: **79050**
Client ID: **MW-12-101122**	Batch ID: **R79050**		Analysis Date: **10/17/2022**	SeqNo: **1627631**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	722	2.50						724.7	0.408	20	

Work Order: 2210213
CLIENT: Friedman & Bruya
Project: 210165

QC SUMMARY REPORT

Dissolved Metals by EPA Method 200.8

Sample ID: **MB-38177** SampType: **MBLK** Units: **µg/L** Prep Date: **10/18/2022** RunNo: **79112**
Client ID: **MBLKW** Batch ID: **38177** Analysis Date: **10/18/2022** SeqNo: **1629007**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	1.00									
Iron	ND	100									
Manganese	ND	1.80									

Sample ID: **MB-38178FB** SampType: **MBLK** Units: **µg/L** Prep Date: **10/18/2022** RunNo: **79112**
Client ID: **MBLKW** Batch ID: **38177** Analysis Date: **10/18/2022** SeqNo: **1629008**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	1.00									
Iron	ND	100									
Manganese	ND	1.80									

Sample ID: **LCS-38177** SampType: **LCS** Units: **µg/L** Prep Date: **10/18/2022** RunNo: **79112**
Client ID: **LCSW** Batch ID: **38177** Analysis Date: **10/18/2022** SeqNo: **1629009**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	507	1.00	500.0	0	101	85	115				
Iron	4,990	100	5,000	0	99.8	85	115				
Manganese	490	1.80	500.0	0	98.0	85	115				

Sample ID: **2210213-002BDUP** SampType: **DUP** Units: **µg/L** Prep Date: **10/18/2022** RunNo: **79112**
Client ID: **MW-15-101122** Batch ID: **38177** Analysis Date: **10/18/2022** SeqNo: **1629011**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	1.00						1.146	17.7	30	
Iron	ND	100						0		30	
Manganese	ND	1.80						0		30	

Work Order: 2210213
CLIENT: Friedman & Bruya
Project: 210165

QC SUMMARY REPORT

Dissolved Metals by EPA Method 200.8

Sample ID: **2210213-002BMS** SampType: **MS** Units: **µg/L** Prep Date: **10/18/2022** RunNo: **79112**
Client ID: **MW-15-101122** Batch ID: **38177** Analysis Date: **10/18/2022** SeqNo: **1629012**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	536	1.00	500.0	1.146	107	70	130				
Iron	4,860	100	5,000	0	97.2	50	150				
Manganese	484	1.80	500.0	0	96.8	70	130				

Sample ID: **2210231-003AMS** SampType: **MS** Units: **µg/L** Prep Date: **10/18/2022** RunNo: **79112**
Client ID: **BATCH** Batch ID: **38177** Analysis Date: **10/18/2022** SeqNo: **1629023**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	546	1.00	500.0	18.90	105	70	130				
Iron	9,220	100	5,000	4,309	98.2	50	150				
Manganese	4,320	1.80	500.0	3,708	123	70	130				

Work Order: 2210213
CLIENT: Friedman & Bruya
Project: 210165

QC SUMMARY REPORT

Total Metals by EPA Method 200.8

Sample ID: **MB-38146**	SampType: **MBLK**			Units: **µg/L**		Prep Date: **10/14/2022**		RunNo: **79087**		
Client ID: **MBLKW**	Batch ID: **38146**					Analysis Date: **10/17/2022**		SeqNo: **1628445**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	1.00									

Sample ID: **LCS-38146**	SampType: **LCS**			Units: **µg/L**		Prep Date: **10/14/2022**		RunNo: **79087**		
Client ID: **LCSW**	Batch ID: **38146**					Analysis Date: **10/17/2022**		SeqNo: **1628446**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	107	1.00	100.0	0	107	85	115				

Sample ID: **2210168-001ADUP**	SampType: **DUP**			Units: **µg/L**		Prep Date: **10/14/2022**		RunNo: **79087**		
Client ID: **BATCH**	Batch ID: **38146**					Analysis Date: **10/17/2022**		SeqNo: **1628448**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	2.75	1.00						2.604	5.36	30	

Sample ID: **2210168-001AMS**	SampType: **MS**			Units: **µg/L**		Prep Date: **10/14/2022**		RunNo: **79087**		
Client ID: **BATCH**	Batch ID: **38146**					Analysis Date: **10/17/2022**		SeqNo: **1628449**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	111	1.00	100.0	2.604	108	70	130				

Sample ID: **2210213-002AMS**	SampType: **MS**			Units: **µg/L**		Prep Date: **10/14/2022**		RunNo: **79087**		
Client ID: **MW-15-101122**	Batch ID: **38146**					Analysis Date: **10/17/2022**		SeqNo: **1628457**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	110	1.00	100.0	0.9630	109	70	130				

Sample Log-In Check List

Client Name:	FB	Work Order Number:	2210213
Logged by:	Clare Griggs	Date Received:	10/13/2022 9:57:00 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	2.4

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

SUBCONTRACT SAMPLE CHAIN OF CUSTODY

2210213

Page 13 of 13

Page # 1 of 1

Send Report To Michael Erdahl

Company Friedman and Bruya, Inc.

Address 3012 16th Ave W

City, State, ZIP Seattle, WA 98119

Phone # (206) 285-8282 merdahl@friedmanandbruya.com

SUBCONTRACTER Fremont

PROJECT NAME/NO.	PO #
210165	C-400

REMARKS

Aspect EDD

TURNAROUND TIME

☒ Standard TAT

☐ RUSH

Rush charges authorized by:

SAMPLE DISPOSAL

☐ Dispose after 30 days

☐ Return samples

☐ Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Matrix	# of jars	ANALYSES REQUESTED: Dioxins/Furans	EPH	VPH	Total As	Dissolved As, Fe, Mn	Alkalinity					Notes
MW-12-101122		10/11/22	1100	H_2O	2				x	x	x					
MW-15-101122			1205		2				x	x	x					
MW-6-101122			1305		2				x	x	x					
MW-10-101122			1410		2				x	x	x					
MW-9-101122			1540		2				x	x	x					

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Michael Erdahl	Friedman & Bruya	10/13/22	0800
Received by:		Katherine Porter	FAI	10/13/22	9:57
Relinquished by:					
Received by:					

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Vineta Mills, M.S.
Eric Young, B.S.

5500 4th Avenue South
Seattle, WA 98108
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

February 10, 2023

Matthew Lewis, Project Manager
Aspect Consulting, LLC
710 2nd Ave S, Suite 550
Seattle, WA 98104

Dear Mr Lewis:

Included are the results from the testing of material submitted on January 31, 2023 from the Crownhill Elementary 100094, F&BI 301462 project. There are 17 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Aspect Data
ASP0210R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on January 31, 2023 by Friedman & Bruya, Inc. from the Aspect Consulting, LLC Crownhill Elementary 100094, F&BI 301462 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Aspect Consulting, LLC
301462 -01	MW-6-230130
301462 -02	MW-10-230130

The samples were sent to Fremont Analytical for alkalinity analysis. The report is enclosed.

All quality control requirements were acceptable.

Date of Report: 02/10/23
Date Received: 01/31/23
Project: Crownhill Elementary 100094, F&BI 301462
Date Extracted: 02/01/23
Date Analyzed: 02/01/23

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 41-152)
MW-10-230130 301462-02	<50	<250	110
Method Blank 03-295 MB2	<50	<250	126

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MW-6-230130	Client:	Aspect Consulting, LLC
Date Received:	01/31/23	Project:	Crownhill Elementary 100094
Date Extracted:	02/01/23	Lab ID:	301462-01
Date Analyzed:	02/02/23	Data File:	301462-01.119
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	MG

Analyte:	Concentration ug/L (ppb)
Arsenic	19.4

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MW-6-230130	Client:	Aspect Consulting, LLC
Date Received:	01/31/23	Project:	Crownhill Elementary 100094
Date Extracted:	02/01/23	Lab ID:	301462-01 x20
Date Analyzed:	02/07/23	Data File:	301462-01 x20.222
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Iron	7,580
Manganese	2,030

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MW-10-230130	Client:	Aspect Consulting, LLC
Date Received:	01/31/23	Project:	Crownhill Elementary 100094
Date Extracted:	02/01/23	Lab ID:	301462-02
Date Analyzed:	02/02/23	Data File:	301462-02.120
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	MG

Analyte:	Concentration ug/L (ppb)
Arsenic	1.70
Iron	2,420

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MW-10-230130	Client:	Aspect Consulting, LLC
Date Received:	01/31/23	Project:	Crownhill Elementary 100094
Date Extracted:	02/01/23	Lab ID:	301462-02 x20
Date Analyzed:	02/07/23	Data File:	301462-02 x20.223
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Manganese	1,430

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	NA	Project:	Crownhill Elementary 100094
Date Extracted:	02/01/23	Lab ID:	I3-72 mb
Date Analyzed:	02/02/23	Data File:	I3-72 mb.035
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	MG

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Iron	<50
Manganese	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-6-230130	Client:	Aspect Consulting, LLC
Date Received:	01/31/23	Project:	Crownhill Elementary 100094
Date Extracted:	02/01/23	Lab ID:	301462-01
Date Analyzed:	02/02/23	Data File:	301462-01.115
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	MG

Analyte:	Concentration ug/L (ppb)
Arsenic	20.0

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-10-230130	Client:	Aspect Consulting, LLC
Date Received:	01/31/23	Project:	Crownhill Elementary 100094
Date Extracted:	02/01/23	Lab ID:	301462-02
Date Analyzed:	02/02/23	Data File:	301462-02.116
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	MG

Analyte:	Concentration ug/L (ppb)
Arsenic	1.78

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	NA	Project:	Crownhill Elementary 100094
Date Extracted:	02/01/23	Lab ID:	I3-72 mb
Date Analyzed:	02/02/23	Data File:	I3-72 mb.035
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	MG

Analyte:	Concentration ug/L (ppb)
Arsenic	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	MW-10-230130	Client:	Aspect Consulting, LLC
Date Received:	01/31/23	Project:	Crownhill Elementary 100094
Date Extracted:	02/01/23	Lab ID:	301462-02
Date Analyzed:	02/01/23	Data File:	020136.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	LM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	93	71	132
Toluene-d8	91	68	139
4-Bromofluorobenzene	98	62	136

Compounds:	Concentration ug/L (ppb)
Trichloroethene	<0.5

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	Method Blank	Client:	Aspect Consulting, LLC
Date Received:	Not Applicable	Project:	Crownhill Elementary 100094
Date Extracted:	02/01/23	Lab ID:	03-0257 mb
Date Analyzed:	02/01/23	Data File:	020107.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	LM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	95	71	132
Toluene-d8	93	68	139
4-Bromofluorobenzene	95	62	136

Compounds:	Concentration ug/L (ppb)
Trichloroethene	<0.5

Date of Report: 02/10/23
Date Received: 01/31/23
Project: Crownhill Elementary 100094, F&BI 301462

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	132	120	70-130	10

Date of Report: 02/10/23
Date Received: 01/31/23
Project: Crownhill Elementary 100094, F&BI 301462

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR DISSOLVED METALS USING EPA METHOD 6020B

Laboratory Code: 301238-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	ug/L (ppb)	10	2.06	83	79	75-125	5
Iron	ug/L (ppb)	100	1,630	74	54 b	75-125	31 b
Manganese	ug/L (ppb)	20	949	59 b	25 b	75-125	81 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	89	80-120
Iron	ug/L (ppb)	100	99	80-120
Manganese	ug/L (ppb)	20	95	80-120

Date of Report: 02/10/23
Date Received: 01/31/23
Project: Crownhill Elementary 100094, F&BI 301462

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 6020B

Laboratory Code: 301238-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	ug/L (ppb)	10	2.06	83	79	75-125	5

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	89	80-120

Date of Report: 02/10/23
Date Received: 01/31/23
Project: Crownhill Elementary 100094, F&BI 301462

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 301465-14 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Trichloroethene	ug/L (ppb)	10	<0.5	95	43-133

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Trichloroethene	ug/L (ppb)	10	95	93	70-130	2

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

SAMPLE CHAIN OF CUSTODY

01/31/23 C2/J3/VW1

Page # 1 of 1

301462

Report To Matthew Lewis

Company Aspect Consulting

Address 710 2nd Ave #550

City, State, ZIP Seattle, WA, 98104

Phone 404-210-6437 Email mlewis@aspectconsulting.com

SAMPLERS (signature) Carmen Tappero

PROJECT NAME Crownhill Elementary

PO # 100094

REMARKS

Project specific RLs? - Yes / No

INVOICE TO

TURNAROUND TIME
- ☑ Standard turnaround
- ☐ RUSH
- Rush charges authorized by:

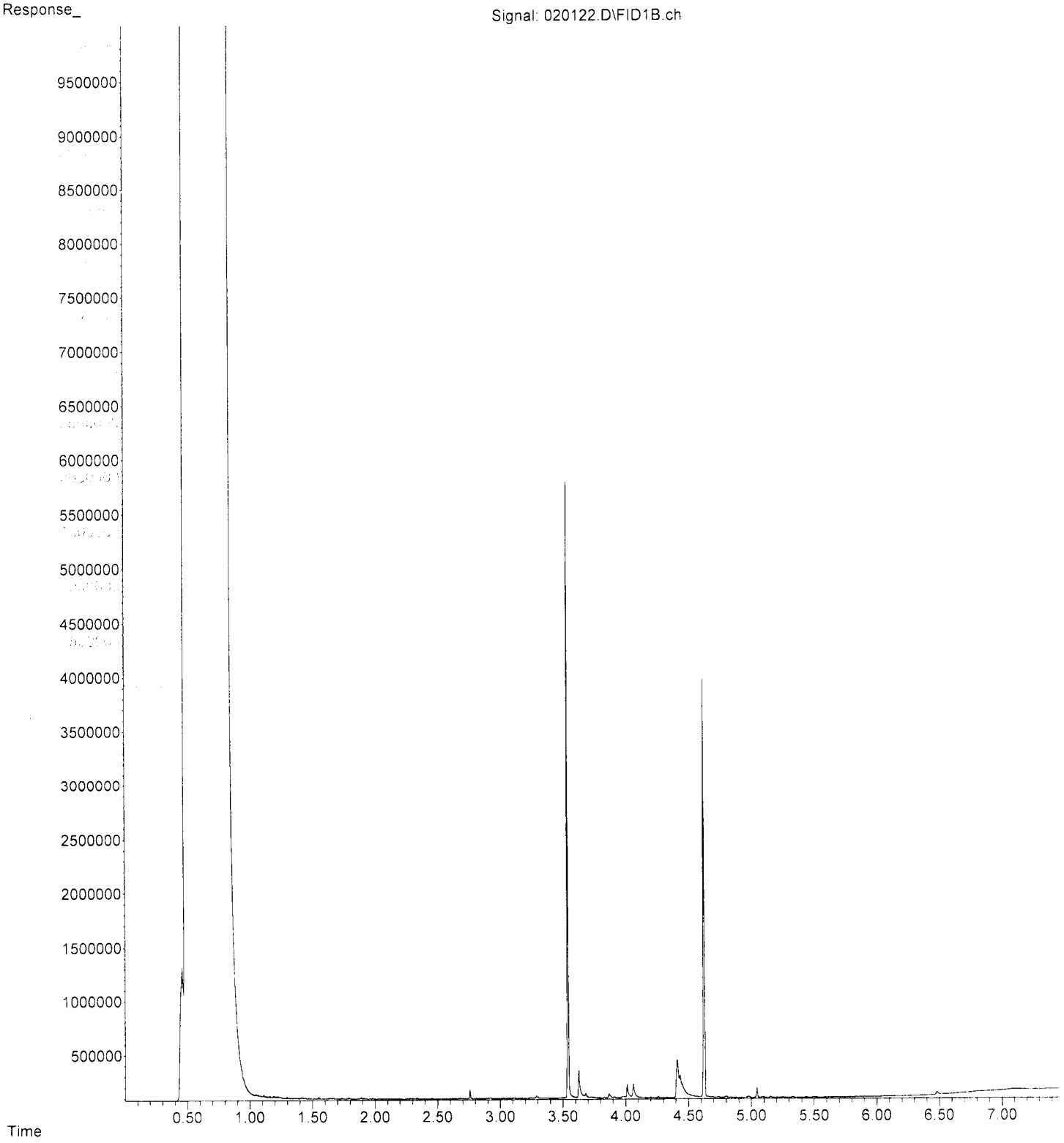
SAMPLE DISPOSAL
- ☐ Archive samples
- ☐ Other
- Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	TCE	Total Arsenic	Dissolved As, Fe, Mn	Alkalinity	Notes
MW-6-230130	01 A-F	1/30/23	1220	W	~~7~~ 6									X	X	X	
MW-10-230130	02 A-G	↓	1315	↓	7	X							X	X	X	X	
													Samples received at 0 °C				

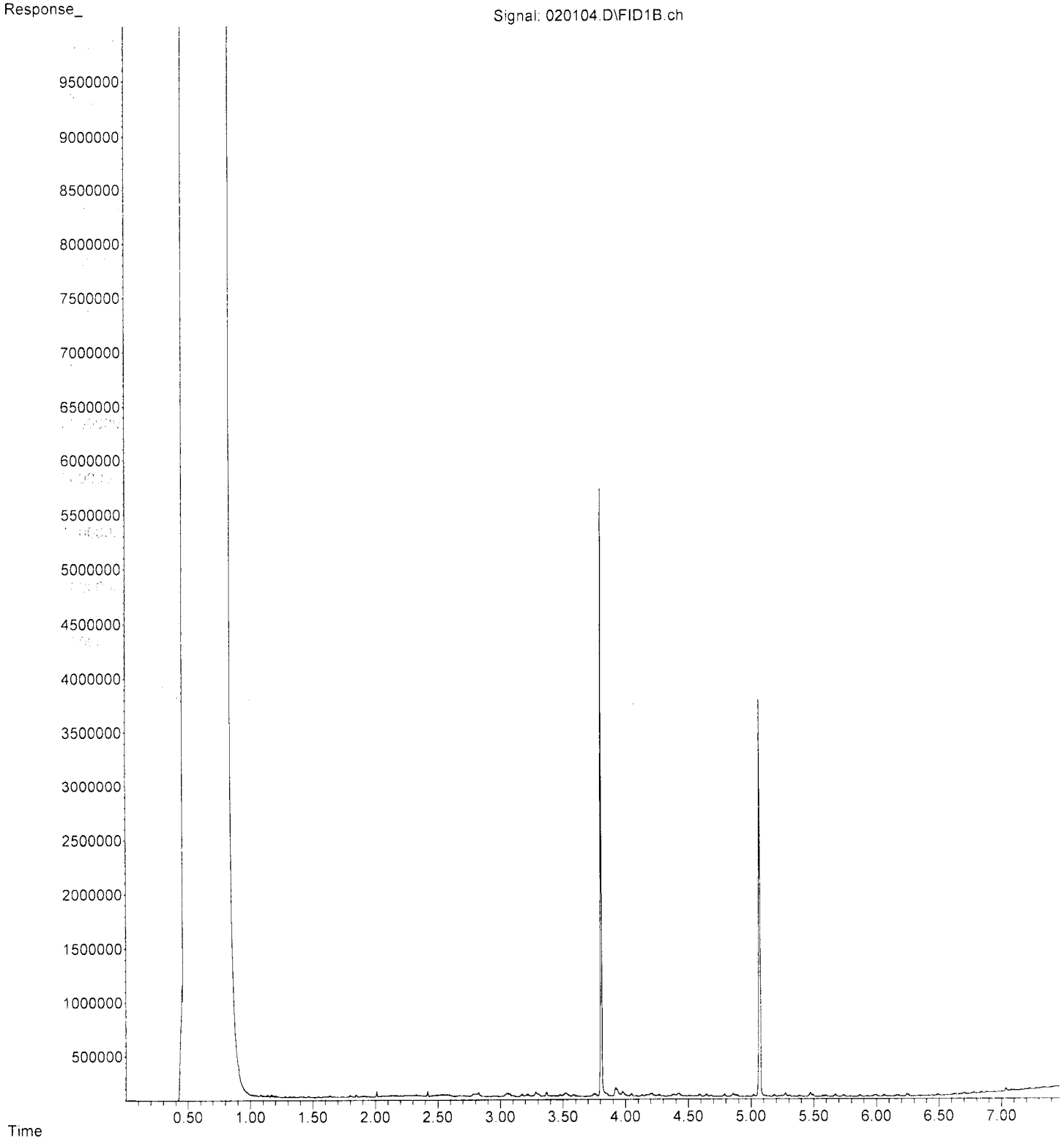
SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Carmen Tappero	Carmen Tappero	Aspect Consulting	1/31/23	15:30
Received by:	ARNHPHAN	F&B	01/31/23	15:30
Relinquished by:			AP	
Received by:		Samples received at 20 °C		

Friedman & Bruya, Inc.
Ph. (206) 285-8282

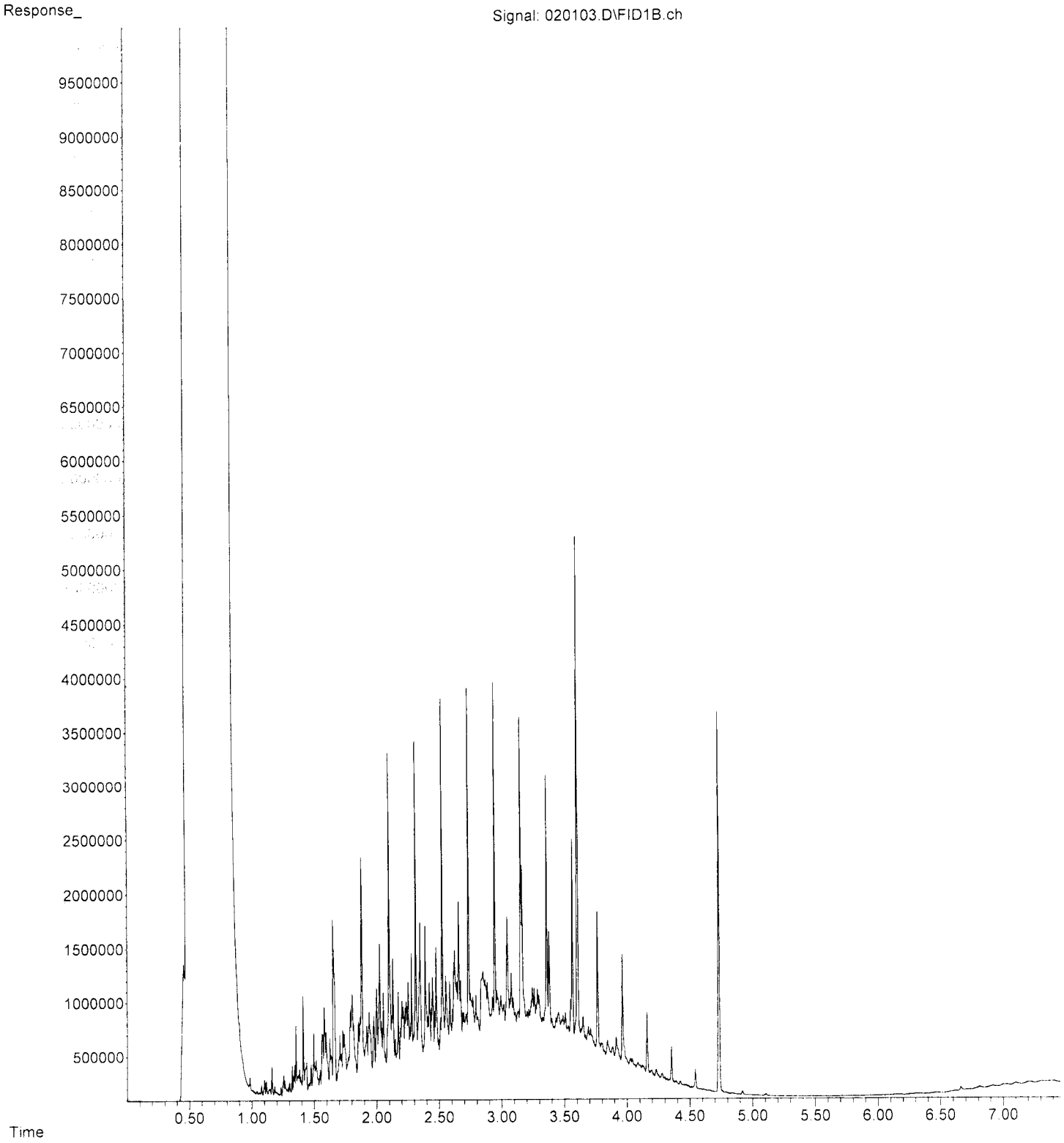
File : P:\Proc_GC10\02-01-23\020122.D
Operator : TL
Acquired : 01 Feb 2023 02:43 pm using AcqMethod DX.M
Instrument : GC10
Sample Name: 301462-02
Misc Info :
Vial Number: 45



File :P:\Proc_GC10\02-01-23\020104.D
Operator : TL
Acquired : 01 Feb 2023 09:52 am using AcqMethod DX.M
Instrument : GC10
Sample Name: 03-295 mb2
Misc Info :
Vial Number: 6



File : P:\Proc_GC10\02-01-23\020103.D
Operator : TL
Acquired : 01 Feb 2023 08:08 am using AcqMethod DX.M
Instrument : GC10
Sample Name: 500 DX 67-143B
Misc Info :
Vial Number: 3



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

Friedman & Bruya
Michael Erdahl
5500 4th Ave S
Seattle, WA 98108

RE: 301462
Work Order Number: 2302019

February 09, 2023

Attention Michael Erdahl:

Fremont Analytical, Inc. received 2 sample(s) on 2/1/2023 for the analyses presented in the following report.

Total Alkalinity by SM 2320B

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: *02/09/2023*

CLIENT: Friedman & Bruya
Project: 301462
Work Order: 2302019

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2302019-001	MW-6-230130	01/30/2023 12:20 PM	02/01/2023 2:30 PM
2302019-002	MW-10-230130	01/30/2023 1:15 PM	02/01/2023 2:30 PM

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

Case Narrative

WO#: **2302019**
Date: **2/9/2023**

CLIENT: Friedman & Bruya
Project: 301462

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").

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 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: **2302019**
Date Reported: **2/9/2023**

CLIENT: Friedman & Bruya
Project: 301462

Lab ID: 2302019-001 **Collection Date:** 1/30/2023 12:20:00 PM
Client Sample ID: **MW-6-230130** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Total Alkalinity by SM 2320B				Batch ID: R81713		Analyst: SS
Alkalinity, Total (As CaCO3)	350	2.50		mg/L	1	2/8/2023 10:48:59 AM

Lab ID: 2302019-002 **Collection Date:** 1/30/2023 1:15:00 PM
Client Sample ID: **MW-10-230130** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Total Alkalinity by SM 2320B				Batch ID: R81713		Analyst: SS
Alkalinity, Total (As CaCO3)	253	2.50		mg/L	1	2/8/2023 10:48:59 AM

Work Order: 2302019
CLIENT: Friedman & Bruya
Project: 301462

QC SUMMARY REPORT

Total Alkalinity by SM 2320B

Sample ID: MB-R81713	SampType: MBLK			Units: mg/L		Prep Date: 2/8/2023			RunNo: 81713		
Client ID: MBLKW	Batch ID: R81713					Analysis Date: 2/8/2023			SeqNo: 1693671		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	ND	2.50									

Sample ID: LCS-R81713	SampType: LCS			Units: mg/L		Prep Date: 2/8/2023			RunNo: 81713		
Client ID: LCSW	Batch ID: R81713					Analysis Date: 2/8/2023			SeqNo: 1693672		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	105	2.50	100.0	0	105	81.3	118				

Sample ID: 2302019-001ADUP	SampType: DUP			Units: mg/L		Prep Date: 2/8/2023			RunNo: 81713		
Client ID: MW-6-230130	Batch ID: R81713					Analysis Date: 2/8/2023			SeqNo: 1693674		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	350	2.50						350.5	0.195	20	

Fremont Analytical

Sample Log-In Check List

Client Name:	FB	Work Order Number:	2302019
Logged by:	Kate Porter	Date Received:	2/1/2023 2:30:00 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

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

SUBCONTRACT SAMPLE CHAIN OF CUSTODY

2302019

Page # 1 of 1

Send Report To Michael Erdahl

Company Friedman and Bruya, Inc.

Address 3012 16th Ave W

City, State, ZIP Seattle, WA 98119

Phone # (206) 285-8282 merdahl@friedmanandbruya.com

SUBCONTRACTER Fremont

PROJECT NAME/NO. 301462

PO # 135 D-~~B5~~

REMARKS

Please Email Results Aspect EDD

TURNAROUND TIME

✓ Standard TAT

RUSH

Rush charges authorized by:

SAMPLE DISPOSAL

Dispose after 30 days

Return samples

Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Matrix	# of jars	Dioxins/Furans	EPH	VPH	Alkalinity							Notes
						ANALYSES REQUESTED										
MW-6-230130		1/30/23	1220	Water	1				X							
MW-10-230130		1/30/23	1315	Water	1				X							

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Michael Erdahl	Friedman & Bruya	2/1/23	0940
Received by:		Emma Tuck	Fremont Analytical	2/1/23	1433
Relinquished by:					
Received by:					

APPENDIX D

Report Limitations and Guidelines for Use

REPORT LIMITATIONS AND USE GUIDELINES

Reliance Conditions for Third Parties

This report was prepared for the exclusive use of the Client. No other party may rely on this report or the product of our services without the express written consent of Aspect Consulting, LLC (Aspect). This limitation is to provide our firm with reasonable protection against liability claims by third parties with whom there would otherwise be no contractual conditions or limitations and guidelines governing their use of the report. Within the limitations of scope, schedule and budget, our services have been executed in accordance with our Agreement with the Client and recognized standards of professionals in the same locality and involving similar conditions.

Services for Specific Purposes, Persons and Projects

Aspect has performed the services in general accordance with the scope and limitations of our Agreement. This report has been prepared for the exclusive use of the Client and their authorized third parties, approved in writing by Aspect. This report is not intended for use by others, and the information contained herein is not applicable to other properties.

This report is not, and should not, be construed as a warranty or guarantee regarding the presence or absence of hazardous substances or petroleum products that may affect the subject property. The report is not intended to make any representation concerning title or ownership to the subject property. If real property records were reviewed, they were reviewed for the sole purpose of determining the subject property's historical uses. All findings, conclusions, and recommendations stated in this report are based on the data and information provided to Aspect, current use of the subject property, and observations and conditions that existed on the date and time of the report.

Aspect structures its services to meet the specific needs of our clients. Because each environmental study is unique, each environmental report is unique, prepared solely for the specific client and subject property. This report should not be applied for any purpose or project except the purpose described in the Agreement.

This Report Is Project-Specific

Aspect considered a number of unique, project-specific factors when establishing the Scope of Work for this project and report. You should not rely on this report if it was:

- Not prepared for you
- Not prepared for the specific purpose identified in the Agreement
- Not prepared for the specific real property assessed
- Completed before important changes occurred concerning the subject property, project or governmental regulatory actions

If changes are made to the project or subject property after the date of this report, Aspect should be retained to assess the impact of the changes with respect to the conclusions contained in the report.

Geoscience Interpretations

The geoscience practices (geotechnical engineering, geology, and environmental science) require interpretation of spatial information that can make them less exact than other engineering and natural science disciplines. It is important to recognize this limitation in evaluating the content of the report. If you are unclear how these "Report Limitations and Use Guidelines" apply to your project or site, you should contact Aspect.

Discipline-Specific Reports Are Not Interchangeable

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

Environmental Regulations Are Not Static

Some hazardous substances or petroleum products may be present near the subject property in quantities or under conditions that may have led, or may lead, to contamination of the subject property, but are not included in current local, state or federal regulatory definitions of hazardous substances or petroleum products or do not otherwise present potential liability. Changes may occur in the standards for appropriate inquiry or regulatory definitions of hazardous substance and petroleum products; therefore, this report has a limited useful life.

Property Conditions Change Over Time

This report is based on conditions that existed at the time the study was performed. The findings and conclusions of this report may be affected by the passage of time (for example, Phase I ESA reports are applicable for 180 days), by events such as a change in property use or occupancy, or by natural events, such as floods, earthquakes, slope failure or groundwater fluctuations. If more than six months have passed since issuance of our report, or if any of the described events may have occurred following the issuance of the report, you should contact Aspect so that we may evaluate whether changed conditions affect the continued reliability or applicability of our conclusions and recommendations.

Phase I ESAs – Uncertainty Remains After Completion

Aspect has performed the services in general accordance with the scope and limitations of our Agreement and the current version of the “Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process”, ASTM E1527, and U.S. Environmental Protection Agency (EPA)'s Federal Standard 40 CFR Part 312 "Innocent Landowners, Standards for Conducting All Appropriate Inquiries".

No ESA can wholly eliminate uncertainty regarding the potential for recognized environmental conditions in connection with subject property. Performance of an ESA study is intended to reduce, but not eliminate, uncertainty regarding the potential for environmental conditions affecting the subject property. There is always a potential that areas with contamination that were not identified during this ESA exist at the subject property or in the study area. Further evaluation of such potential would require additional research, subsurface exploration, sampling and/or testing.

Historical Information Provided by Others

Aspect has relied upon information provided by others in our description of historical conditions and in our review of regulatory databases and files. The available data does not provide definitive information with regard to all past uses, operations or incidents affecting the subject property or adjacent properties. Aspect makes no warranties or guarantees regarding the accuracy or completeness of information provided or compiled by others.

Exclusion of Mold, Fungus, Radon, Lead, and HBM

Aspect’s services do not include the investigation, detection, prevention or assessment of the presence of molds, fungi, spores, bacteria, and viruses, and/or any of their byproducts. Accordingly, this report does not include any interpretations, recommendations, findings, or conclusions regarding the detection, assessment, prevention or abatement of molds, fungi, spores, bacteria, and viruses, and/or any of their byproducts. Aspect’s services also do not include the investigation or assessment of hazardous building materials (HBM) such as asbestos, polychlorinated biphenyls (PCBs) in light ballasts, lead based paint, asbestos-containing building materials, urea-formaldehyde insulation in on-site structures or debris or any other HBMs. Aspect’s services do not include an evaluation of radon or lead in drinking water, unless specifically requested.