December 2023 – January 2024 Groundwater Data Analysis Report

TAYLOR WAY AND ALEXANDER AVENUE FILL AREA SITE
TACOMA, WASHINGTON

Cleanup Site ID: 4692

April 8, 2024

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Prepared for:

GENERAL METALS OF TACOMA
GLENN SPRINGS HOLDINGS
BURLINGTON ENVIRONMENTAL

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April 8, 2024

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1.0 Introduction

Dalton, Olmsted, and Fuglevand, Inc. (DOF) prepared this Groundwater Data Analysis Report for the Taylor Way and Alexander Avenue Fill Area (TWAAFA) Site (Figure 1) on behalf of Glenn Springs Holdings, Inc. (Occidental Chemical Corporation), General Metals of Tacoma (GMT), and Burlington Environmental (Burlington). These parties are among those identified in Agreed Order (AO) Number 14260 (issued December 4, 2020) by the Washington State Department of Ecology (Ecology) as potentially liable parties at the TWAAFA Site (each a "PLP", collectively, the "PLPs" or "AO parties"). The Port of Tacoma (Port) is also a PLP to the TWAAFA Site, identified by Ecology in Enforcement Order (EO) Number DE 19410 (issued December 4, 2020).

This Report was prepared to summarize the data collected and activities performed by AO and EO PLPs with respect to the TWAAFA Site groundwater monitoring program during December 2023 and January 2024, in accordance with the Revised Groundwater Monitoring Plan (GWMP) (DOF, 2022a) and PFAS Sampling and Analysis Plan and Quality Assurance Project Plan (SAP/QAPP) (DOF, 2023). On September 6, 2023, the AO and EO Parties received a letter from Ecology that included comments on the Fourth Quarter 2022 Groundwater Data Analysis Report requesting additional groundwater sampling for dissolved metals and PFAS.

The AO parties responded to Ecology via letter dated October 23, 2023, and Ecology responded to the AO and EO parties via letter dated December 4, 2023, providing conditional agreement for additional metals sampling. In addition, the AO Parties submitted a PFAS specific SAP/QAPP to support the request for PFAS sampling. The draft SAP/QAPP was submitted by the AO Parties on November 4, 2023 to Ecology. Ecology emailed comments to the AO and EO Parties on November 21, 2023. A revised SAP/QAPP was submitted by the AO Parties on December 18, 2023 and approved by Ecology via email on December 22, 2023.

1.1 TWAAFA Site Description

As shown in Figure 2, the TWAAFA Site is composed of multiple parcels under ownership by different parties – the Port, Burlington, and Pierce County (owner of the former CleanCare parcels). During the groundwater monitoring events, wells located on Port parcels were monitored by the Port's consultant, Maul, Foster, and Alongi (MFA), and all other wells were monitored by DOF. MFA and DOF coordinated the metals monitoring event simultaneously and utilized the same laboratories.

2.0 Methodology

DOF and MFA completed the following work related to groundwater monitoring in accordance with the GWMP:

- Collected groundwater samples from the groundwater monitoring network wells within the TWAAFA Site for analysis of total and dissolved metals and PFAS;
- Submitted groundwater samples to independent laboratories for analysis; and
- Reviewed laboratory analytical reports for data quality validation.

2.1 Groundwater Quality Sample Collection and Analysis - Metals

Groundwater samples were collected from all scheduled monitoring wells (Table 1) between December 11 to 19, 2023. Samples were collected in accordance with the GWMP and the letters described in Section 1.

Prior to sampling, groundwater purging was conducted at each well. During groundwater purging, water quality parameters were recorded, and once stabilization criteria were met, a groundwater sample was collected. Field forms documenting data collected during monitoring well sampling are included in Appendix A. Groundwater parameters measured as part of sampling via field meter are summarized in Table 2.

Groundwater samples were analyzed for the following constituents as shown on Table 1:

- Total and dissolved metals including aluminum, arsenic, chromium, copper, iron, lead, mercury, nickel, zinc, and manganese.

Groundwater samples collected by DOF and MFA were submitted to Friedman and Bruya, Inc. (FBI) for chemical analysis. Laboratory analytical reports produced by FBI for the groundwater samples collected by DOF were submitted to data validation reviewers, QA/QC Solutions, LLC. MFA conducted an in-house independent review of the laboratory analytical reports on groundwater samples collected for the Port. Data validation reports are included along with the laboratory data reports in Appendix B.

2.2 Groundwater Quality Sample Collection and Analysis - PFAS

Groundwater samples were collected from all scheduled monitoring wells (Table 1) on December 12, 2023 or January 11, 2024. Samples were collected in accordance with the PFAS SAP/QAPP described in Section 1.

Eight monitoring wells were sampled for PFAS analysis, located within the source area and distal wells across the TWAAFA Site. The table below details the monitoring well location and rationale for sampling. Sample locations are shown on Figure 3.

Location	Reasoning
CCW-2A	Source area well in shallow aquifer (upper zone)
CCW-2B	Source area well in shallow aquifer (lower zone)
CCW-2C	Source area well in intermediate aquifer (upper zone)
CCW-3A	Source area well in shallow aquifer (upper zone)
CCW-3B	Source area well in shallow aquifer (lower zone)
CTMW-17	Source area well in shallow aquifer
SB-2A	Shallow aquifer distal well
TWA-3	Shallow aquifer distal well

Field event preparation and execution followed Appendix B of the PFAS SAP/QAPP. Prior to sampling, groundwater purging was conducted at each well. During groundwater purging, water quality parameters were recorded, and once stabilization criteria were met, a groundwater sample was collected. Field forms documenting data collected during monitoring well sampling are included in Appendix A.

Groundwater samples collected by DOF and MFA were submitted to Eurofins Sacramento (Eurofins) for chemical analysis. Laboratory analytical reports produced by Eurofins for the groundwater samples collected by DOF were submitted to data validation reviewers, QA/QC Solutions, LLC. MFA conducted an in-house independent review of the laboratory analytical reports on groundwater samples collected for the Port. Data validations reports are included along with the laboratory data reports in Appendix B.

2.3 Investigation-Derived Waste

The primary waste stream generated during the monitoring event was purged groundwater, which was containerized as it was generated. Groundwater was containerized in separate 55-gallon drums based on the parcel ownership and characterized. The Port manages purged groundwater generated from wells on Port-owned parcels whereas Clean Earth manages purged groundwater generated from wells on Burlington-owned parcels. DOF coordinates disposal of purged groundwater with Pierce County and Ecology for purged groundwater generated from wells on the former CleanCare parcels.

3.0 Results

This section presents the results of data collected during the groundwater monitoring events.

3.1 Quality Assurance/Quality Control (QA/QC) Discussion

Analytical data quality review was conducted on all groundwater samples collected during this monitoring event as specified in the QAPPs (DOF, 2020 and 2023). The data validation reports were completed by QA/QC solutions for DOF-collected samples on Burlington and former CleanCare parcels and by MFA for MFA-collected samples on Port parcels. Analytical reports and associated data validation reports are included in Appendix B.

Hold times, initial and continuing calibrations, method blanks, surrogate recoveries, laboratory duplicate results, field duplicate results, matrix spike/matrix spike duplicate results, and reporting limits were reviewed to assess compliance with applicable methods and project requirements. Qualified data were deemed to be of acceptable quality for their intended use, with the appropriate final data qualifiers assigned, except for results that were rejected due to insufficient surrogate recovery. Final data qualifiers represent qualifiers originating from the laboratory and accepted by the reviewer, as well as data qualifiers assigned by the reviewer during validation.

Overall, the data reported are of good quality and no results were rejected.

3.2 Groundwater Chemistry Analytical Results - Metals

Validated analytical results of groundwater samples collected for metals during the monitoring event are included in Table 3.

Screening levels used in this report for comparison of dissolved metals results were those identified in the 2020 Data Gaps Work Plan (DGWP) (DOF, 2020). These screening levels were based on levels developed in the 2005 Burlington RI Report and also applied in the Port's 2006 1514 Taylor Way RI. These screening levels were site-specific screening levels developed under Ecology's Model Toxics Control Act (MTCA) in consideration of the conceptual model identifying non-potable groundwater and industrial/commercial use. After Ecology's review of the Draft DGWP, Ecology requested that several screening levels be revised to default table values available in Ecology's Cleanup Levels and Risk

Calculation (CLARC) tables. Ecology's requested changes to the screening levels were implemented in the Final 2020 DGWP. In addition, Ecology's lowest current MTCA Method A or B Groundwater Screening Levels are included in Table 3 as a reference for analytes that did not have a screening level included in the DGWP.

Analytical results from the groundwater monitoring event are summarized below and select frequently detected constituents are shown on Figures 4 through 9.

- Metals detected above their respective DGWP screening levels included arsenic, chromium, copper, lead, manganese, mercury, nickel, and zinc. Concentrations of three of the most widely detected metals (arsenic, copper, and manganese) are illustrated on Figures 4 through 9.
- Where detected, dissolved arsenic concentrations ranged from not detected to 1,200 µg/L (CCW-5B). Of the 51 wells sampled, 12 sample locations recorded concentrations that exceeded the screening level of 8 µg/L for arsenic. Arsenic concentrations were highest on the former CleanCare parcels in samples collected in the shallow aquifer. Total arsenic concentrations were similar in concentration, ranging from not detected to 1,470 µg/L (CCW-5B).
- Chromium was selectively tested at four locations. Dissolved chromium concentrations ranged from 9.01 (CTMW-17) to 21 µg/L (TWA-6D).
- Where sampled, dissolved copper concentrations ranged from not detected to 163 µg/L (CTMW-5). Of the 48 wells sampled, results from ten sample locations exceeded the DGWP screening level of 2.4 µg/L for dissolved copper. Copper concentrations were highest in the shallow aquifer and were detected primarily on the former CleanCare parcels. Total copper concentrations were similar in concentration, ranging from not detected to 382 µg/L (CTMW-17).
- Dissolved iron concentrations ranged from 156 µg/L (CTMW-14) to 44,800 µg/L (PZ-8). The highest levels were detected primarily in the former Clean Care and Parcel A parcel (south of Clean Care). Total iron concentrations were similar. Ferrous iron was also analyzed at most locations, ranging from not detected to 41,700 ug/L (PZ-7).
- Lead was selectively tested at seven locations. Dissolved lead concentrations ranged from not detected to 68.7 µg/L (CCW-5B).
- Dissolved manganese was detected throughout the TWAAFA Site at concentrations ranging from not detected (CTMW-8 and CTMW-11R) to 3,090 µg/L (PZ-9). Of the 51 wells sampled, most sample results (both dissolved and total) exceeded the DGWP screening level of 100 µg/L for manganese. Manganese was detected in shallow and deep aquifer wells with concentrations highest in the central (both north and south central) area of the TWAAFA Site.
- Mercury was tested at one location (CTMW-17). The dissolved mercury result was not detected (below 0.02 µg/L), while the total concentration was 0.13 µg/L.
- Nickel was selectively tested at six locations. Dissolved nickel concentrations ranged from not detected to 148 µg/L (CCW-3A). Total nickel concentrations were similar and slightly higher.
- Zinc was selectively tested at six locations (plus one duplicate). Dissolved zinc concentrations ranged from not detected to 556 µg/L (CTMW-5). Total zinc concentrations were similar and slightly higher.

3.3 Groundwater Chemistry Analytical Results - PFAS

Groundwater samples were analyzed for the standard list of 40 PFAS constituents under EPA draft Method 1633. Analytical results of detected PFAS during the monitoring event are included in Table 4. The highest concentrations were detected at CTMW-17 in the center of the site near the property boundary between Burlington and the former Clean Care parcels. However, no results were above the MTCA Method C Groundwater or Marine Surface Water Protection Based Concentrations listed in the 2023 Ecology Guidance for Investigation and Remediating PFAS Contamination in Washington State.

4.0 Conclusions

The required groundwater monitoring events at the TWAAFA Site were completed successfully following the objectives set forth in the DGWP (DOF, 2020), subsequent correspondence with Ecology, and procedures outlined in the GWMP and PFAS SAP/QAPP. The data set provides useful information for inclusion in the RI/FS.

5.0 Upcoming Schedule

As of the date of this report, all required groundwater monitoring events have been completed and no additional groundwater monitoring events are scheduled at this time. DOF anticipates discussion of the data gaps work conducted to date under the AO with Ecology during spring 2024 with respect to data gaps fulfillment in preparation for the RI/FS.

6.0 References

DOF, 2020. Final Data Gaps Work Plan, TWAAFA Site, Tacoma, Washington. July.

DOF, 2022a. Revised Groundwater Monitoring Plan, TWAAFA Site, Tacoma, Washington. April.

DOF, 2023. PFAS Sampling and Analysis Plan and Quality Assurance Project Plan, Taylor Way and Alexander Avenue Fill Area Site, Tacoma, Washington. December.

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Tables

TABLE 1
GROUNDWATER MONITORING SCHEDULE
December 2023 - January 2024 Groundwater Data Analysis Report
TWAAFA Site
Tacoma, Washington

Well ID	PFAS	Analyses- Metals[2]									
		Arsenic	Copper	Manganese	Lead	Mercury	Chromium	Nickel	Zinc	Aluminum	Iron[3]
CCW-1A	--	X	X	X	--	--	--	--	--	X	X
CCW-1B	--	X	X	X	--	--	--	--	--	X	X
CCW-1C	--	X	X	X	--	--	--	--	--	X	X
CCW-2A	X	X	X	X	--	--	--	--	--	X	X
CCW-2B	X	X	X	X	--	--	--	--	--	X	X
CCW-2C	X	X	X	X	--	--	--	--	--	X	X
CCW-3A	X	X	X	X	X	--	--	X	X	X	X
CCW-3B	X	X	X	X	--	--	--	--	--	X	X
CCW-3C	--	X	X	X	--	--	--	--	--	X	X
CCW-4C	--	X	X	X	--	--	--	--	--	X	X
CCW-5B	--	X	X	X	X	--	--	--	--	X	X
CCW-5C	--	X	X	X	--	--	--	--	--	X	X
CCW-6B	--	X	X	X	X	--	--	--	X	X	X
CCW-6C	--	X	X	X	--	--	X	--	--	X	X
CCW-7B	--	X	X	X	--	--	--	--	--	X	X
CCW-7C	--	X	X	X	--	--	--	--	--	X	X
CCW-8B	--	X	X	X	--	--	--	--	--	X	X
MW-1 (Potter)[1]	--	X	X	X	--	--	--	--	--	X	X
MW-4	--	X	X	X	--	--	--	--	--	X	X
SB-1A	--	X	X	X	--	--	--	--	--	X	X
SB-2A	X	X	X	X	--	--	--	--	--	X	X
SB-3A	--	X	X	X	--	--	--	--	--	X	X
CTMW-1	--	--	--	--	--	--	--	--	--	--	--
CTMW-5	--	X	X	X	--	--	--	X	X	X	X
CTMW-7	--	X	X	X	--	--	--	--	--	X	X
CTMW-8	--	X	X	X	--	--	--	--	--	X	X
CTMW-9	--	X	X	X	--	--	--	--	--	X	X
CTMW-10[1]	--	--	--	--	--	--	--	--	--	--	--
CTMW-11R2	--	X	X	X	--	--	--	--	--	X	X
CTMW-12	--	X	X	X	--	--	--	--	--	X	X
CTMW-14	--	X	X	X	--	--	--	--	--	X	X
CTMW-15	--	X	X	X	--	--	--	--	--	X	X
CTMW-17	X	X	X	X	--	X	X	--	--	X	X
CTMW-17D	--	X	X	X	--	--	--	--	--	X	X
CTMW-18	--	X	X	X	--	--	--	--	--	X	X
CTMW-20	--	X	X	X	--	--	--	--	--	X	X
CTMW-23R2	--	X	X	X	--	--	--	--	--	X	X
CTMW-24	--	X	X	X	--	--	--	--	--	X	X
CTMW-24D	--	X	X	X	--	--	--	--	--	X	X
CTMW-25D	--	X	X	X	--	--	X	--	--	X	X
PZ-5	--	--	--	--	--	--	--	--	--	--	--
PZ-7	--	X	--	X	X	--	--	X	X	X	X
PZ-8	--	X	--	X	X	--	--	X	X	X	X
PZ-9	--	X	--	X	X	--	--	X	X	X	X
TWA-1	--	X	X	X	--	--	--	--	--	X	X
TWA-2	--	X	X	X	--	--	--	--	--	X	X
TWA-3	X	X	X	X	--	--	--	X	--	X	X
TWA-4D	--	X	X	X	--	--	--	--	--	X	X
TWA-5D	--	X	X	X	--	--	--	--	--	X	X
TWA-6D	--	X	X	X	--	--	X	--	--	X	X
TWA-7D	--	X	X	X	--	--	--	--	--	X	X
TWA-8D	--	X	X	X	--	--	--	--	--	X	X
TWA-9D	--	X	X	X	--	--	--	--	--	X	X
TWA-10D	--	X	X	X	--	--	--	--	--	X	X

Notes
1. Wells that historically had LNAPL.
2. Total (unfiltered) and Dissolved (field filtered) Metals
3. Ferrous and Ferric Iron concentrations reported

Shading indicates wells on the Port of Tacoma property and monitored by the Port's consultant

Abbreviations:
-- = not sampled.

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TABLE 2

DECEMBER 2023 GROUNDWATER FIELD PARAMETERS

December 2023 - January 2024 Groundwater Data Analysis Report

TWAAFA Site

Tacoma, Washington

Location	pH	Dissolved Oxygen	E Cond	ORP	Temp	Eh Corrected	Eh Corrected	Turbidity
Units	-	mg/L	µS/cm	mV	deg C	mV	V	NTU
CCW-1A	6.83	0.29	1252	51.7	11.6	266.0	0.266	2.7
CCW-1B	6.94	0.18	970	61.8	13.8	274.5	0.274	4.4
CCW-1C	7.03	0.44	2080	45.1	14.7	257.1	0.257	3.9
CCW-2A	6.53	0.12	1034	81.9	11.6	296.2	0.296	2.8
CCW-2B	7.08	0.09	1928	95.4	13.8	308.1	0.308	0.6
CCW-2C	6.94	0.31	1707	91.6	13.9	304.2	0.304	3.0
CCW-3A	6.76	0.36	1376	137.4	12.2	351.2	0.351	11.5
CCW-3B	6.84	0.38	1257	110.5	14.3	322.8	0.323	3.2
CCW-3C	6.74	0.19	1436	136.7	14.1	349.1	0.349	1.7
CCW-4C	6.91	0.1	2116	33.1	14.9	245.0	0.245	2.1
CCW-5B	6.4	0.1	1253	73.7	13.4	286.7	0.287	4.6
CCW-5C	6.54	0.17	1738	79.2	14.6	291.3	0.291	4.4
CCW-6B	6.29	0	1135	77.7	12.7	291.2	0.291	4.3
CCW-6C	6.57	0	4121	95.2	13.9	307.8	0.308	3.8
CCW-7B	6.27	0.14	1038	60.1	12.9	273.4	0.273	4.2
CCW-7C	6.8	0.36	2040	77.8	13.8	290.5	0.290	4.7
CCW-8B	6.82	0.13	1117	69	14.1	281.4	0.281	3.7
CTMW-5	6.32	0.05	254.1	90.6	10.8	305.5	0.305	5.8
CTMW-7	6.82	0.18	2226	135	15.5	346.4	0.346	2.9
CTMW-8	12.74	0.19	6273	-354.9	14.6	-142.8	-0.143	6.4
CTMW-9	6.97	0.11	3397	19.5	15.6	230.8	0.231	10.9
CTMW-11R2	12.86	0.15	7908	-112.3	12.3	101.5	0.101	3.7
CTMW-12	6.91	0.26	1956	31.3	15.3	242.9	0.243	3.5
CTMW-14	8.33	2.11	284.4	25.1	12.3	238.9	0.239	11.0
CTMW-15	6.94	0.15	660.4	-97.3	12	116.7	0.117	1.8
CTMW-17	6.79	0	1161	44.3	11.6	258.6	0.259	22.9
CTMW-17D	6.87	0	1825	48.1	14.4	260.3	0.260	4.5
CTMW-18	6.61	0.31	935	80.8	15.3	292.4	0.292	16.3
CTMW-20	6.86	0.34	1584	-118.9	11.7	95.3	0.095	3.4
CTMW-23R2	7.17	0.1	733	81.8	13.3	294.8	0.295	8.0
CTMW-24	6.27	0.18	264.4	153.3	11.5	367.7	0.368	1.4
CTMW-24D	6.85	0.19	2637	140.6	13.8	353.3	0.353	1.9
CTMW-25D	7.13	0.08	2809	-131.6	13.6	81.2	0.081	3.0
MW-1	6.34	0.3	226.4	-60.6	10.2	154.7	0.155	26.7

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TABLE 2

DECEMBER 2023 GROUNDWATER FIELD PARAMETERS

December 2023 - January 2024 Groundwater Data Analysis Report

TWAAFA Site

Tacoma, Washington

Location	pH	Dissolved Oxygen	E Cond	ORP	Temp	Eh Corrected	Eh Corrected	Turbidity
Units	-	mg/L	µS/cm	mV	deg C	mV	V	NTU
MW-4	7.19	0	2709	18.6	12.6	232.2	0.232	4.7
PZ-7	6.25	0.06	1765	151.4	15.5	362.8	0.363	2.6
PZ-8	6.23	0.4	461.4	132.3	11.6	346.6	0.347	49.0
PZ-9	6.53	0.2	1485	13	14.8	224.9	0.225	12.3
SB-1A	7.4	0.47	454.5	-87.6	11.7	126.6	0.127	4.1
SB-1B	6.94	0.22	587	-35.3	12.3	178.5	0.178	3.8
SB-3A	7.5	0.07	653.7	-141.3	12.6	72.3	0.072	4.0
TWA-1	6.82	3.54	846	70.2	10.3	285.4	0.285	6.6
TWA-2	7.13	0.5	1112	91.4	11	306.1	0.306	3.3
TWA-3	6.7	0.31	2074	138.9	10.8	353.8	0.354	1.6
TWA-4D	7.79	0.04	8151	-115.6	13.8	97.1	0.097	4.4
TWA-5D	7.49	0.1	3739	-144.3	12.9	69.0	0.069	0.7
TWA-6D	6.88	0.22	3893	-70.9	11.7	143.3	0.143	1.2
TWA-7D	7.84	0.05	4092	-93.1	15.6	118.2	0.118	1.1
TWA-8D	7.79	0.72	10753	141.4	13.5	354.3	0.354	0.0
TWA-9D	8.05	0.07	8977	-60.6	13.8	152.1	0.152	0.0
TWA-10D	8.21	0.08	7782	-222.1	12.5	-8.5	-0.008	3.5

Notes:

1) Equipment YSI Pro Plus- ORP electrodes use platinum Ag/AgCl reference of 3.5 M KCL (confirmed with manufacturer)

2) Temperature Correction Formula Eh (mv) = -0.7357 * (Temp degrees C) + 222.82

3) Redox Potential (Eh) = (Potential correction factor, in millivolts [mV]) + (field ORP measurement [mV])

4) U.S. Environmental Protection Agency (EPA), 2023, *Operating Procedure: Field Measurement of Oxidation-Reduction Potential* , LSASDPROC-113-R4, Laboratory Services & Applied Science Division, Athens, Georgia, Effective Date April 22.

Abbreviations:

E Cond = electrical conductivity
ORP = oxidation-reduction potential
Temp = Temperature
Eh = Redox potential
mg/L = milligrams per liter
µS/cm = microsiemens per centimeter
deg C = degrees Celius
mV = millivolts
V = volts
NTU = nephelometric turbidity unit

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TABLE 3
DECEMBER 2023 METALS CONCENTRATIONS IN GROUNDWATER
December 2023 - January 2024 Groundwater Data Analysis Report
TWAAFA Site
Tacoma, Washington

Location	Date	Fraction	Aluminum	Arsenic	Chromium	Copper	Iron	Ferrous Iron	Lead	Manganese	Mercury	Nickel	Zinc
Units			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
DGWP Screening Level			--	8*	11	2.4	--	--	8.1	100	0.025	10	81
CCW-1A	12/18/2023	Dissolved	10 U	6.26	--	2.65	528	--	--	371	--	--	--
CCW-1B	12/18/2023	Dissolved	10 U	1 U	--	2 U	1850	--	--	574	--	--	--
CCW-1C	12/18/2023	Dissolved	10 U	2.39	--	2 U	4350	--	--	299	--	--	--
CCW-2A	12/14/2023	Dissolved	35.3	2.09	--	0.669	12100	--	--	836	--	--	--
CCW-2B	12/14/2023	Dissolved	10 U	1150	--	0.6 U	4180	--	--	200	--	--	--
CCW-2C	12/14/2023	Dissolved	10 U	2.95	--	0.576	7420	--	--	145	--	--	--
CCW-3A	12/14/2023	Dissolved	10 U	67.9	--	0.913	15000	--	1 U	81.6	--	148	433
CCW-3B	12/14/2023	Dissolved	10 U	3.08	--	0.48 U	4990	--	--	959	--	--	--
CCW-3C	12/14/2023	Dissolved	10 U	1.56	--	0.484	8180	--	--	868	--	--	--
CCW-4C	12/18/2023	Dissolved	10 U	1.7	--	2 U	9480	--	--	463	--	--	--
CCW-5B	12/19/2023	Dissolved	154	1200	--	2.4 U	15200	--	11	989	--	--	--
CCW-5C	12/19/2023	Dissolved	11.7	2 U	--	2.4 U	15300	--	--	878	--	--	--
CCW-6B	12/19/2023	Dissolved	992	6.29	--	3.53	22300	--	17.6	892	--	--	167
CCW-6B DUP	12/19/2023	Dissolved	998	5.36	--	3.67	19300	--	17.5	866	--	--	137
CCW-6C	12/19/2023	Dissolved	64.8	5.98	19.8	2.4 U	15100	--	--	220	--	--	--
CCW-7B	12/19/2023	Dissolved	1020	2.06	--	2.4 U	18200	--	--	802	--	--	--
CCW-7B DUP	12/19/2023	Dissolved	1020	2.08	--	2.4 U	19300	--	--	799	--	--	--
CCW-7C	12/19/2023	Dissolved	10 U	2.13	--	2.4 U	6340	--	--	217	--	--	--
CCW-8B	12/18/2023	Dissolved	10 U	2.07	--	2 U	30300	--	--	563	--	--	--
CTMW-11R2	12/15/2023	Dissolved	394	5 U	--	2.4 U	4260	--	--	5 U	--	--	--
CTMW-12	12/15/2023	Dissolved	10 U	5 U	--	2 U	9720	--	--	1180	--	--	--
CTMW-14	12/13/2023	Dissolved	21.4	3.78	--	5.62	156	--	--	3.53	--	--	--
CTMW-15	12/13/2023	Dissolved	10 U	1.82	--	2.4 U	8230	--	--	246	--	--	--
CTMW-17	12/15/2023	Dissolved	44.8	194	9.01	65.6	571	--	--	316	0.02 U	--	--
CTMW-17D	12/15/2023	Dissolved	10 U	5 U	--	2 U	9280	--	--	337	--	--	--
CTMW-18	12/13/2023	Dissolved	29.1	5.08	--	8.11	1190	--	--	1540	--	--	--
CTMW-20	12/13/2023	Dissolved	10 U	6	--	2.4 U	19100	--	--	1280	--	--	--
CTMW-23R2	12/15/2023	Dissolved	22.8	3.59	--	0.607	660	--	--	493	--	--	--
CTMW-24	12/11/2023	Dissolved	23.1	1 U	--	1 U	999	--	--	94.2	--	--	--
CTMW-24D	12/11/2023	Dissolved	13	5 U	--	1 U	7370	--	--	211	--	--	--
CTMW-25D	12/13/2023	Dissolved	59.2 J+	5.71	12.6 J+	2.4 U	7560	--	--	263	--	--	--
CTMW-5	12/13/2023	Dissolved	392	49.5	--	163	1130	--	--	71.9	--	19	556
CTMW-7	12/13/2023	Dissolved	10 U	5 U	--	2.12	16700	--	--	558	--	--	--
CTMW-8	12/12/2023	Dissolved	212	5 U	--	1 U	4270	--	--	1 U	--	--	--
CTMW-9	12/12/2023	Dissolved	10 U	8.65	--	1 U	4460	--	--	373	--	--	--
MW-1	12/13/2023	Dissolved	16.6 U	3.88	--	2.4 U	6960	--	--	69.4	--	--	--
MW-4	12/18/2023	Dissolved	10 U	1.42	--	2 U	4590	--	--	282	--	--	--
PZ-7	12/11/2023	Dissolved	46.7	5 U	--	--	207	--	1 U	10.8	--	3.43	26.6

TABLE 3
DECEMBER 2023 METALS CONCENTRATIONS IN GROUNDWATER
December 2023 - January 2024 Groundwater Data Analysis Report
TWAAFA Site
Tacoma, Washington

Location	Date	Fraction	Aluminum	Arsenic	Chromium	Copper	Iron	Ferrous Iron	Lead	Manganese	Mercury	Nickel	Zinc
Units			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
DGWP Screening Level			--	8*	11	2.4	--	--	8.1	100	0.025	10	81
PZ-8	12/11/2023	Dissolved	**51.1**	5 U	--	--	**44800**	--	1 U	**1280**	--	**11.7**	25 U
PZ-9	12/12/2023	Dissolved	**19.3**	**8.57**	--	--	**34600**	--	1 U	**3090**	--	5 U	25 U
SB-1A	12/12/2023	Dissolved	10 U	**2.13**	--	2.4 U	**2220**	--	--	**141**	--	--	--
SB-2A	12/12/2023	Dissolved	11.1 U	**2.61**	--	2.4 U	**1770**	--	--	**510**	--	--	--
SB-3A	12/13/2023	Dissolved	10 U	**1.89**	--	2.4 U	**2600**	--	--	**118**	--	--	--
TWA-1	12/12/2023	Dissolved	10 U	1 U	--	**3.57 J+**	**568**	--	--	**3.57 J+**	--	--	--
TWA-2	12/12/2023	Dissolved	10 U	**28.6**	--	**10.2 J+**	**413**	--	--	**347**	--	--	--
TWA-3	12/12/2023	Dissolved	10 U	**2.26**	--	**4.21 J+**	**691**	--	--	**465**	--	**10.1**	--
TWA-3 DUP	12/12/2023	Dissolved	10 U	**2.26**	--	**3.76 J+**	**681**	--	--	**452**	--	9.66	--
TWA-4D	12/12/2023	Dissolved	10 U	**10.3**	--	**1.18**	**4040**	--	--	**106**	--	--	--
TWA-5D	12/13/2023	Dissolved	11.4 U	**5.26**	--	2.4 U	**1780**	--	--	**181**	--	--	--
TWA-6D	12/13/2023	Dissolved	**49.9 J+**	**6.68**	**21**	2.4 U	**2950**	--	--	**753**	--	--	--
TWA-7D	12/12/2023	Dissolved	10 U	**7.82**	--	1 U	**1510**	--	--	**118**	--	--	--
TWA-8D	12/13/2023	Dissolved	10 U	**15.9**	--	**3.57**	**2250**	--	--	**389**	--	--	--
TWA-9D	12/14/2023	Dissolved	10 U	**15.6**	--	**1.1**	**461**	--	--	**49.2**	--	--	--
TWA-10D	12/12/2023	Dissolved	14.3 U	**10.2**	--	2.4 U	**1030**	--	--	**42.2**	--	--	--
CCW-1A	12/18/2023	Total	10 U	**7.45**	--	**6.05**	**522**	**182 J**	--	**339**	--	--	--
CCW-1B	12/18/2023	Total	**34.2**	1 U	--	2 U	**2000**	**668**	--	**567**	--	--	--
CCW-1C	12/18/2023	Total	**21**	**2.64**	--	2 U	**4270**	**1320**	--	**290**	--	--	--
CCW-2A	12/14/2023	Total	**41.7**	**4.88**	--	**7.59**	**14000**	**10700**	--	**883**	--	--	--
CCW-2B	12/14/2023	Total	10 U	**1140**	--	**0.73**	**4430**	**747**	--	**211**	--	--	--
CCW-2C	12/14/2023	Total	**11.5**	**2.8**	--	2.4 U	**7620**	**1980**	--	**156**	--	--	--
CCW-3A	12/14/2023	Total	**49**	**94.3**	--	**4.78**	**19500**	**9080**	**33.4**	**87.5**	--	**175**	**583**
CCW-3B	12/14/2023	Total	**12.6**	**3.1**	--	2.4 U	**4490**	**2420**	--	**965**	--	--	--
CCW-3C	12/14/2023	Total	**34.8**	**1.5**	--	2.4 U	**8750**	**3240**	--	**978**	--	--	--
CCW-4C	12/18/2023	Total	10 U	**1.8**	--	2 U	**10900**	**2010**	--	**530**	--	--	--
CCW-5B	12/19/2023	Total	**170**	**1470**	--	**11.6**	**12200**	**10300 J**	**68.7**	**927**	--	--	--
CCW-5C	12/19/2023	Total	**28**	**4.47**	--	2.4 U	**12600**	**8020 J**	--	**957**	--	--	--
CCW-6B	12/19/2023	Total	**952**	**7.72**	--	**14.5**	**18700**	**19700 J**	**65.1**	**793**	--	--	**236**
CCW-6B DUP	12/19/2023	Total	**986**	**7.73**	--	**15.2**	**19300**	**20200 J**	**65.6**	**838**	--	--	**243**
CCW-6C	12/19/2023	Total	**85.3**	**6.06**	**20.6**	2.4 U	**16500**	**10500 J**	--	**221**	--	--	--
CCW-7B	12/19/2023	Total	**1030**	**2.55**	--	**3.74**	**16300**	**20300 J**	--	**753**	--	--	--
CCW-7B DUP	12/19/2023	Total	**1070**	**2.41**	--	**3.62**	**15500**	**16000 J**	--	**755**	--	--	--
CCW-7C	12/19/2023	Total	**25.9**	**1.86**	--	2.4 U	**5300**	**1160 J**	--	**197**	--	--	--
CCW-8B	12/18/2023	Total	**13.1**	**2.65**	--	2 U	**31200**	**13800 J**	--	**561**	--	--	--
CTMW-11R2	12/15/2023	Total	**397**	5 U	--	**1.67**	**3520**	150 U	--	2 U	--	--	--
CTMW-12	12/15/2023	Total	**20.7**	**2.51**	--	**0.502**	**8270**	**1410 J**	--	**844**	--	--	--
CTMW-14	12/13/2023	Total	**55.2**	5 U	--	**4.73**	**220**	150 U	--	5 U	--	--	--

TABLE 3
DECEMBER 2023 METALS CONCENTRATIONS IN GROUNDWATER
December 2023 - January 2024 Groundwater Data Analysis Report
TWAAFA Site
Tacoma, Washington

Location	Date	Fraction	Aluminum	Arsenic	Chromium	Copper	Iron	Ferrous Iron	Lead	Manganese	Mercury	Nickel	Zinc
Units			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
DGWP Screening Level			--	8*	11	2.4	--	--	8.1	100	0.025	10	81
CTMW-15	12/13/2023	Total	10 U	1.79		2.4 U	7710			272			
CTMW-17	12/15/2023	Total	169	230	36.3	382	768	372 J	--	300	0.13	--	--
CTMW-17D	12/15/2023	Total	27.4	2.29	--	2.25	9160	886 J	--	318	--	--	--
CTMW-18	12/13/2023	Total	189	6.04	--	20	1320	1000	--	1430	--	--	--
CTMW-20	12/13/2023	Total	10 U	5.86		2.4 U	17700			1130			
CTMW-23R2	12/15/2023	Total	77.2	3.45	--	1.92	780	272	--	542	--	--	--
CTMW-24	12/11/2023	Total	40.2	1 U	--	1 U	919	1190 J	--	79.8	--	--	--
CTMW-24D	12/11/2023	Total	13.6	5 U	--	1 U	7370	877 J	--	211	--	--	--
CTMW-25D	12/13/2023	Total	88 J+	6.33	15.9 J+	2.74 U	8210			299			
CTMW-5	12/13/2023	Total	425	55.7	--	200	1200	454	--	70.7	--	17.8	568
CTMW-7	12/13/2023	Total	10 U	5 U	--	1 U	16100	13500	--	552	--	--	--
CTMW-8	12/12/2023	Total	218	5 U	--	1.14	4300	150 U	--	2.45	--	--	--
CTMW-9	12/12/2023	Total	25.9	8.91	--	1.1	8430	889	--	398	--	--	--
MW-1	12/13/2023	Total	71.1 J+	4.22		6.59 J+	6840			70.1			
MW-4	12/18/2023	Total	12.5	2.28	--	6.81	5240	904	--	294	--	--	--
PZ-7	12/11/2023	Total	49.9	5.02	--	--	1660	41700	11.1	37.2	--	4.08	35.3
PZ-8	12/11/2023	Total	401	5.19	--	--	47400	266	1 U	1250	--	10.1	75.7
PZ-9	12/12/2023	Total	27.6	9.82	--	--	38700	35100 J	1 U	2970	--	5 U	25 U
SB-1A	12/12/2023	Total	10 U	2.41	--	2.57 U	2720	--	--	147	--	--	--
SB-2A	12/12/2023	Total	49.9 J+	2.47	--	2.4 U	2060	--	--	528	--	--	--
SB-3A	12/13/2023	Total	10 U	1.8	--	2.4 U	2940	--	--	121	--	--	--
TWA-1	12/12/2023	Total	14.8 J+	1.37	--	3.88 J+	1850	--	--	11.2 J+	--	--	--
TWA-2	12/12/2023	Total	34.1 J+	26.3	--	10.4 J+	530	--	--	338	--	--	--
TWA-3	12/12/2023	Total	10 U	2.72	--	4.5 J+	786	--	--	445	--	10.7	--
TWA-3 DUP	12/12/2023	Total	10 U	3.04	--	4.66 J+	832	--	--	467	--	10.2	--
TWA-4D	12/12/2023	Total	10.2	9.85	--	1.03	4080	831 J	--	105	--	--	--
TWA-5D	12/13/2023	Total	19.7 J+	5.16	--	2.4 U	2010	--	--	182	--	--	--
TWA-6D	12/13/2023	Total	75.6 J+	7.26	24.4	2.97 U	3030	--	--	749	--	--	--
TWA-7D	12/12/2023	Total	10 U	7.86	--	0.75	1590	381 J	--	113	--	--	--
TWA-8D	12/13/2023	Total	10 U	14.9	--	2 U	1980	408	--	348	--	--	--
TWA-9D	12/14/2023	Total	10 U	11.7	--	2.4 U	806	399	--	63.1	--	--	--
TWA-10D	12/12/2023	Total	46.4 J+	9.03	--	4.11 J+	1240	--	--	45.7	--	--	--

Notes:
Bold = Detection
DGWP screening level exceedance
* = Background level utilized per communication with Ecology

TABLE 3
DECEMBER 2023 METALS CONCENTRATIONS IN GROUNDWATER
December 2023 - January 2024 Groundwater Data Analysis Report
TWAAFA Site
Tacoma, Washington

Location	Date	Fraction	Aluminum	Arsenic	Chromium	Copper	Iron	Ferrous Iron	Lead	Manganese	Mercury	Nickel	Zinc
Units			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
DGWP Screening Level			--	8*	11	2.4	--	--	8.1	100	0.025	10	81

Abbreviations:
DGWP = Data Gaps Work Plan
-- = not available
mg/L = milligrams per liter
µg/L = micrograms per liter
DUP = field duplicate
U = the value was not detected above the laboratory provided limit.
J = the value was estimated.

TABLE 4
JANUARY 2024 PFAS GROUNDWATER RESULTS
TWAAFA Site
Tacoma, Washington

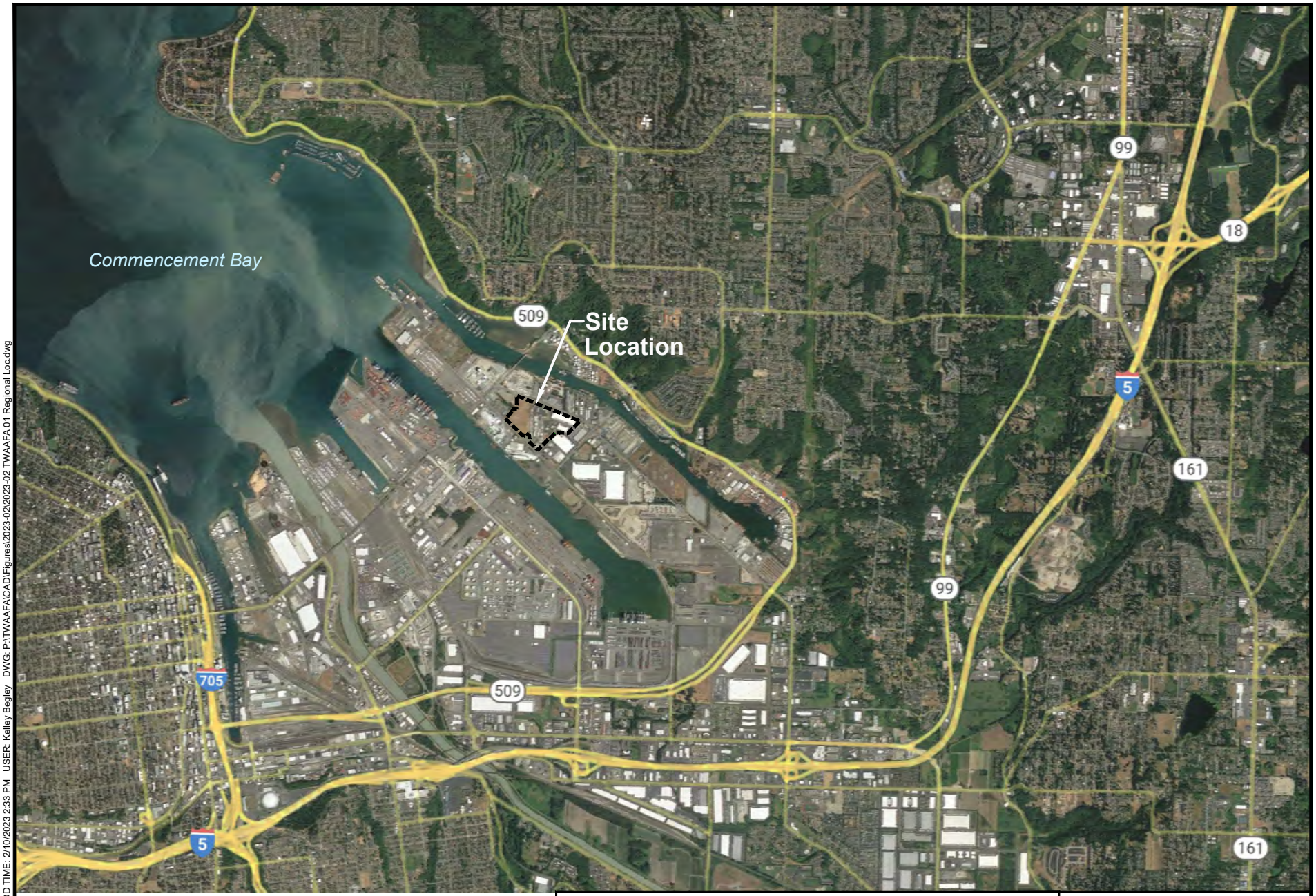
	All units provided in nanograms per liter (ng/L)								All units provided in nanograms per liter (ng/L)				MTCA Method B [1]	MTCA Method C [1]	Marine Surface Water Protection Based Concentrations[2]
Analyte	**CCW-2A**	**CCW-2B**	**CCW-2C**	**CCW-3A**	**CCW-3A DUP**	**CCW-3B**	**CTMW-17**	**Field Blank**	**TWA-3**	**TWA-3 DUP**	**SB-2A**	**Field Blank**			
	1/11/2024	1/11/2024	1/11/2024	1/11/2024	1/11/2024	1/11/2024	1/11/2024	1/11/2024	12/12/2023	12/12/2023	12/12/2023	12/12/2023			
Perfluorobutanoic acid (PFBA)	**13**	**35**	7.2 U	**31**	**35**	**70**	**1500**	8.4 U	**20**	**19**	**23**	8 U	8,000	18,000	--
Perfluoroundecanoic acid (PFUnA)	1.9 U	1.8 U	1.8 U	1.9 U	1.8 U	1.8 U	**11**	2.1 U	2 U	2.1 U	2 U	2 U	--	--	--
6:2 FTS	7.7 U	7.2 U	7.2 U	7.5 U	7.3 U	7.3 U	**86**	8.4 U	8.2 U	8.2 U	8.1 U	8 U	--	--	--
Perfluoropentanoic acid (PFPeA)	**7.1**	3.6 U	3.6 U	40 U	40 U	44	40 U	4.2 U	**43**	**43**	4.1 U	4 U	--	--	--
Perfluorohexanoic acid (PFHxA)	**6.6**	**4**	**5.2**	20 U	1.8 U	**32**	**39**	2.1 U	**32**	**29**	2 U	2 U	8,000	18,000	--
Perfluoroheptanoic acid (PFHpA)	**3.6**	**2.5**	**2.1**	**10**	**9.1**	**15**	**20**	2.1 U	**10**	**9.7**	2 U	2 U	--	--	--
Perfluorooctanoic acid (PFOA)	**6.4**	**17**	**12**	**96**	**93**	**61**	**54**	2.1 U	**25**	**25**	**4.1**	2 U	48	110	119,000
Perfluorononanoic acid (PFNA)	1.9 U	1.8 U	1.8 U	1.9 U	1.8 U	**4.1**	**44**	2.1 U	**2.1**	**2.6**	2 U	2 U	40	88	10,400
Perfluorobutanesulfonic acid (PFBS)	**1.9**	1.8 U	1.8 U	**3.5**	**2.9**	**6.5**	**2100**	2.1 U	**75**	**81**	2 U	2 U	4,800	11,000	127,000,000
Perfluorohexanesulfonic acid (PFHxS)	**5.3**	**7**	**5.7**	**9.4**	**9.5**	**23**	**38**	2.1 U	**6.3**	**6.3**	2 U	2 U	160	340	--
Perfluorooctanesulfonic acid (PFOS)	**12**	**27**	1.8 U	**19**	**22**	**20**	**110**	2.1 U	**16**	**18**	2 U	2 U	48	110	1,100
Perfluorooctanesulfonamide (FOSA)	1.9 U	**1.8**	1.8 U	1.9 U	1.8 U	1.8 U	20 U	2.1 U	2 U	2.1 U	2 U	2 U	--	--	--
NEtFOSAA	1.9 U	**2.2**	1.8 U	**10**	**9.6**	**2.4**	1.9 U	2.1 U	2 U	2.1 U	2 U	2 U	--	--	--
Perfluoropentanesulfonic acid (PFPeS)	1.9 U	1.8 U	1.8 U	1.9 U	**15 J**	**4.2**	20 U	2.1 U	2 U	2.1 U	2 U	2 U	--	--	--

Notes:
1. Source of values- Table 3, Ecology Guidance for Investigating and Remediating PFAS Contamination in Washington State. (Publication No. 22-09-058. June 2023) and CLARC database (accessed October 2023).
2. Source of values- Table B-1, Ecology Guidance for Investigating and Remediating PFAS Contamination in Washington State. (Publication No. 22-09-058. June 2023).

Abbreviations:
-- = not available
U = the value was not detected above the laboratory limit provided.
J = the value was estimated.
MTCA = Model Toxics Control Act
DUP = field duplicate
Bold = detected

DOF DALTON OLMSTED FUGLEVAND

Figures



Source: Aerial Photography-Google Earth Pro, 08/14/2020.

0 4500

Scale in Feet

TWAAFA Site
Tacoma, Washington

Regional Location Map

DALTON OLMSTED FUGLEVAND

FIGURE 1

11/22/2022

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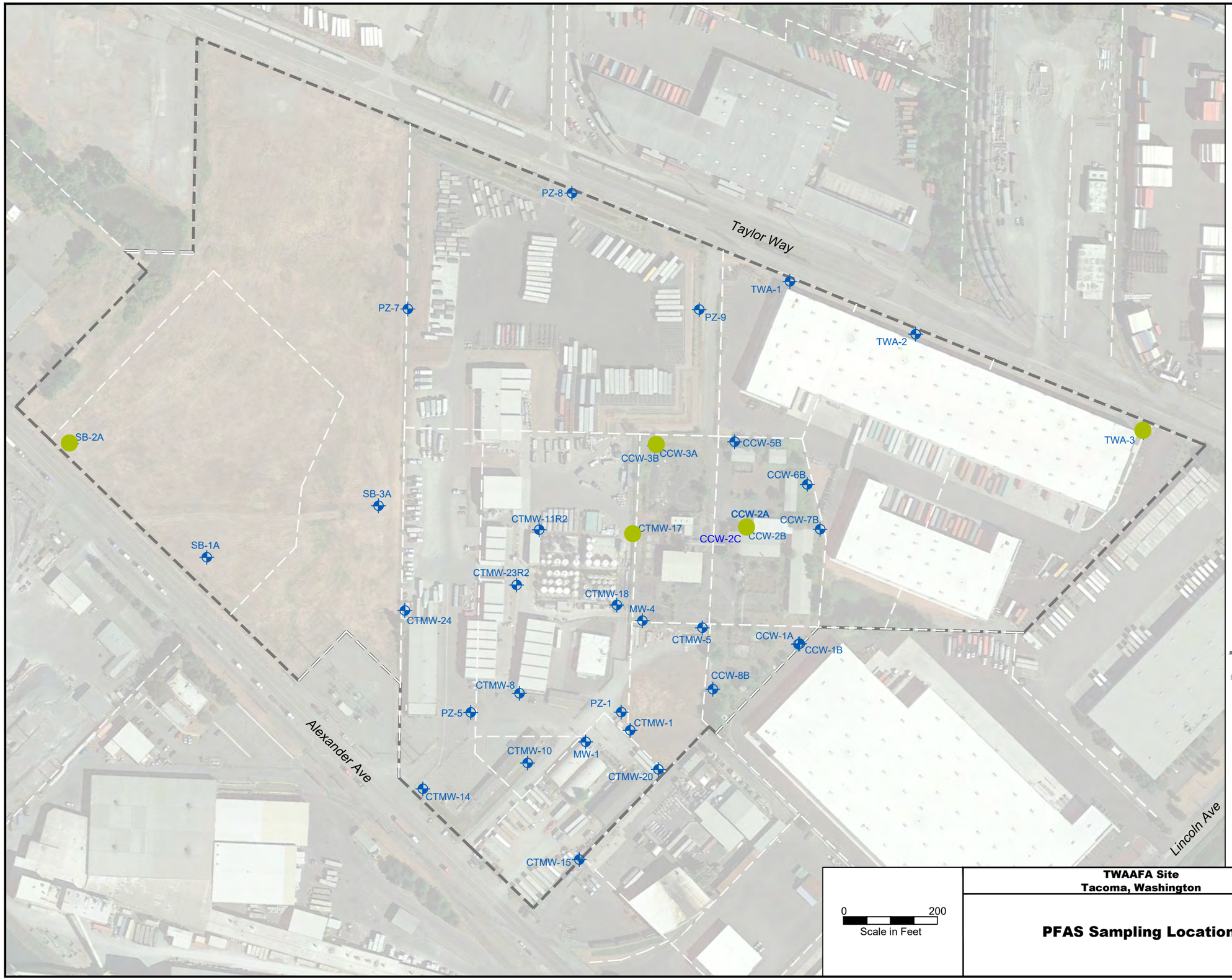
TWAAFA Site
Tacoma, Washington
Fourth Quarter 2022 Groundwater Data Analysis Report

Site Location Map

DALTON OLMSTED FUGLEVAND

FIGURE 2

11/22/2022



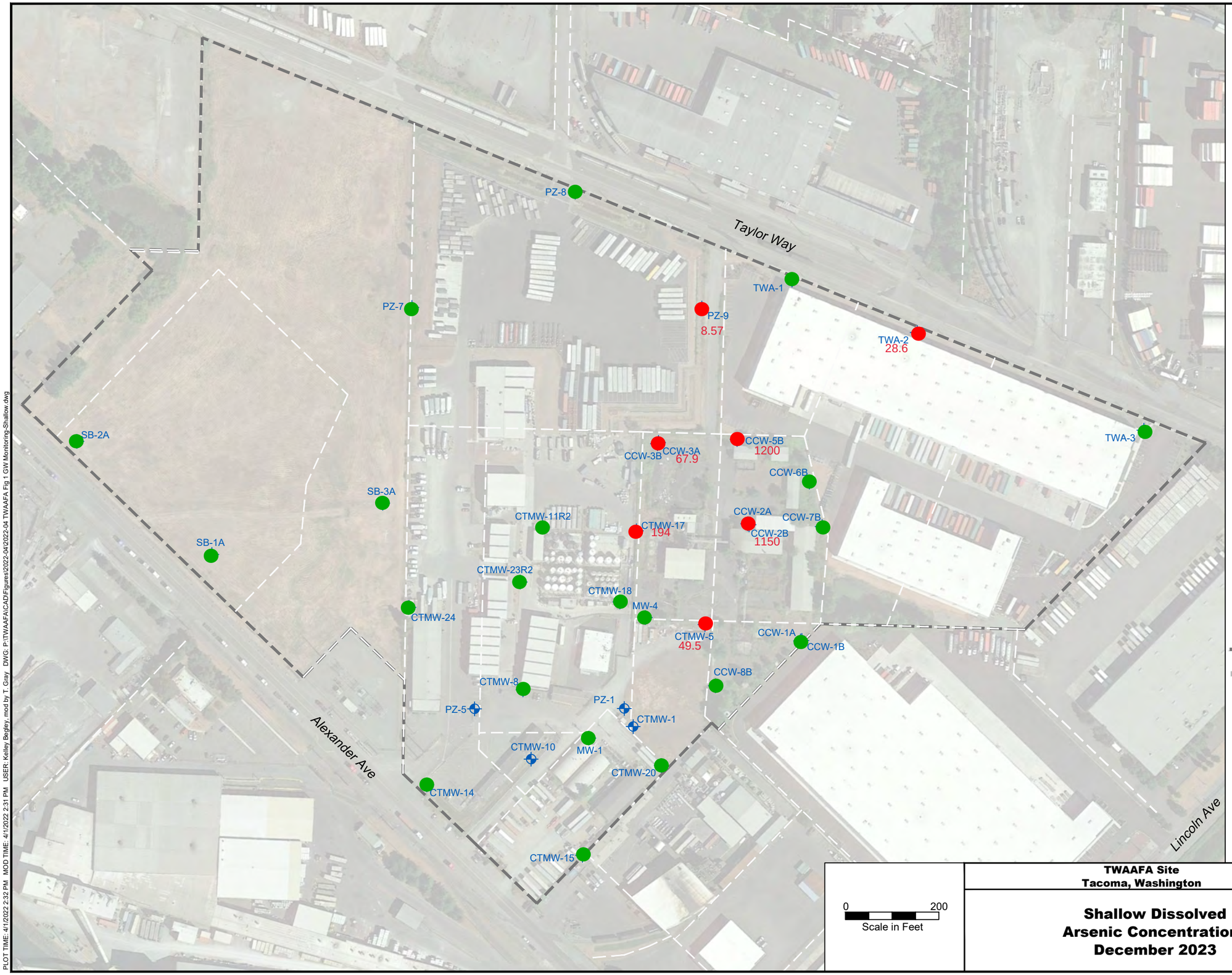
TWAAFA Site
Tacoma, Washington

PFAS Sampling Locations

DALTON OLMSTED FUGLEVAND

FIGURE 3

10/01/2023



Legend

- CTMW-17 — Groundwater Well/Piezometer
- TWAAFA Site Boundary
- Parcel Boundary
- Less than or equal to 8 ug/L
- Greater than 8 ug/L

0 200
Scale in Feet

TWAAFA Site
Tacoma, Washington

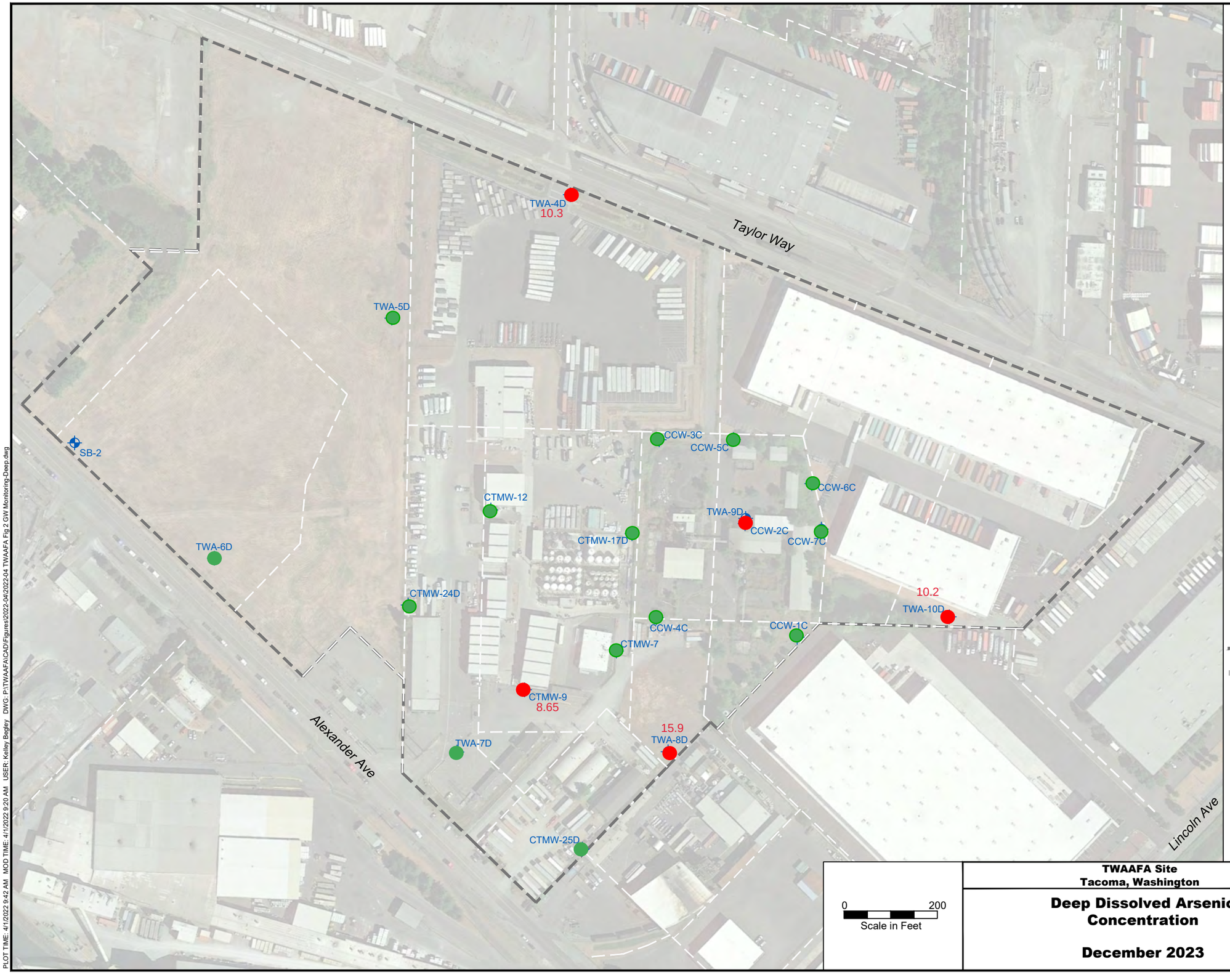
Shallow Dissolved Arsenic Concentrations December 2023

DALTON OLMSTED FUGLEVAND

FIGURE 4

3/11/2024

PLOT TIME: 4/1/2022 2:32 PM MOD TIME: 4/1/2022 2:31 PM USER: Kelley Begley, mod by T. Gray DWG: P:\TWAAFA\CAD\Figures\2022-04\2022-04 TWAAFA Fig 1 GW Monitoring-Shallow.dwg



Legend

- CTMW-17 — Groundwater Well/Piezometer
- TWAAFA Site Boundary
- Parcel Boundary
- Less than or equal to 8 ug/L
- Greater than 8 ug/L

0 200
Scale in Feet

TWAAFA Site
Tacoma, Washington

Deep Dissolved Arsenic Concentration

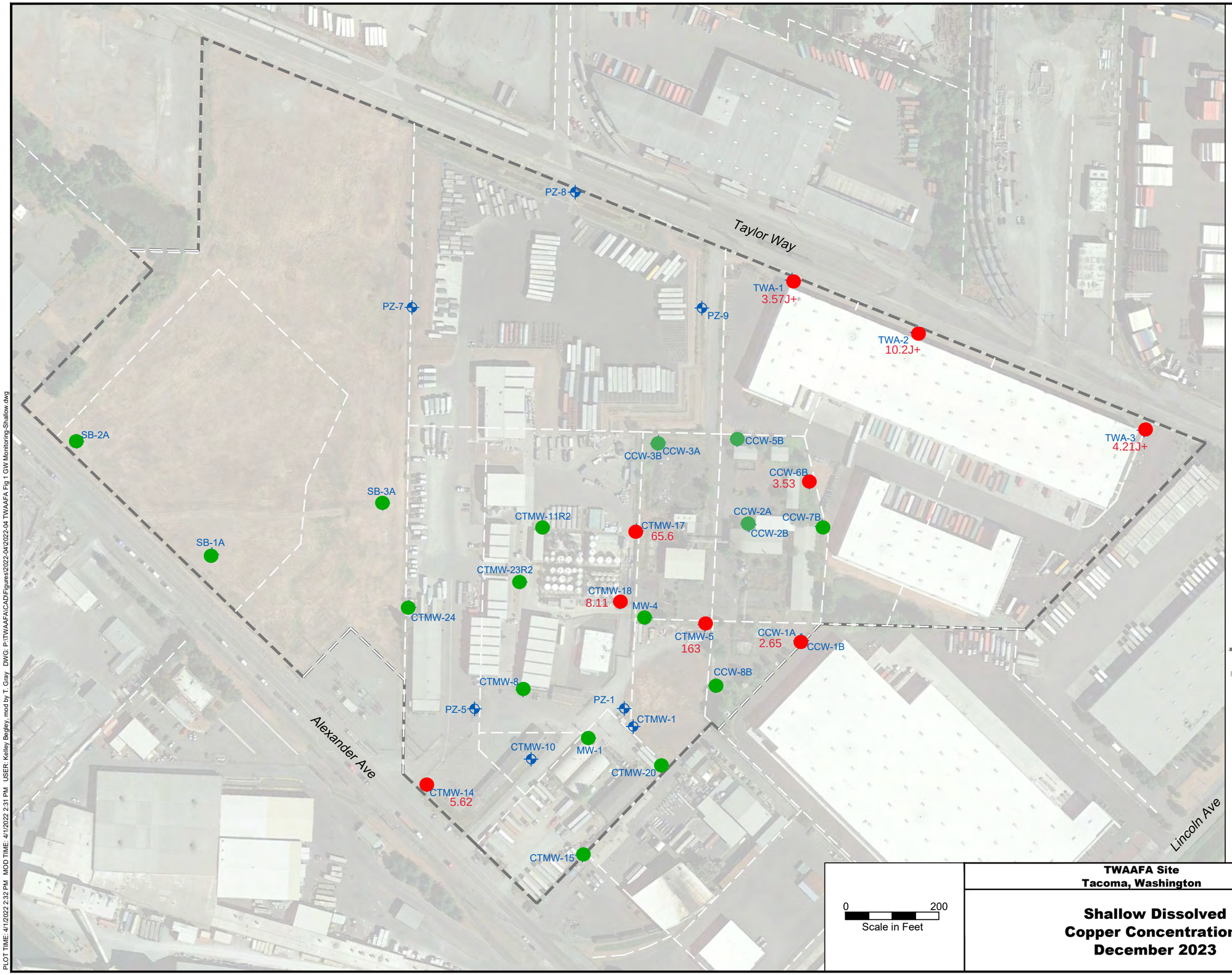
December 2023

DALTON OLMSTED FUGLEVAND

FIGURE 5

3/12/2024

PLOT TIME: 4/1/2022 9:42 AM MOD TIME: 4/1/2022 9:20 AM USER: Kelley Begley DWG: P:\TWAAFA\CAD\Figures\2022-04\2022-04 TWAAFA Fig 2 GW Monitoring-Deep.dwg



TWAAFA Site
Tacoma, Washington

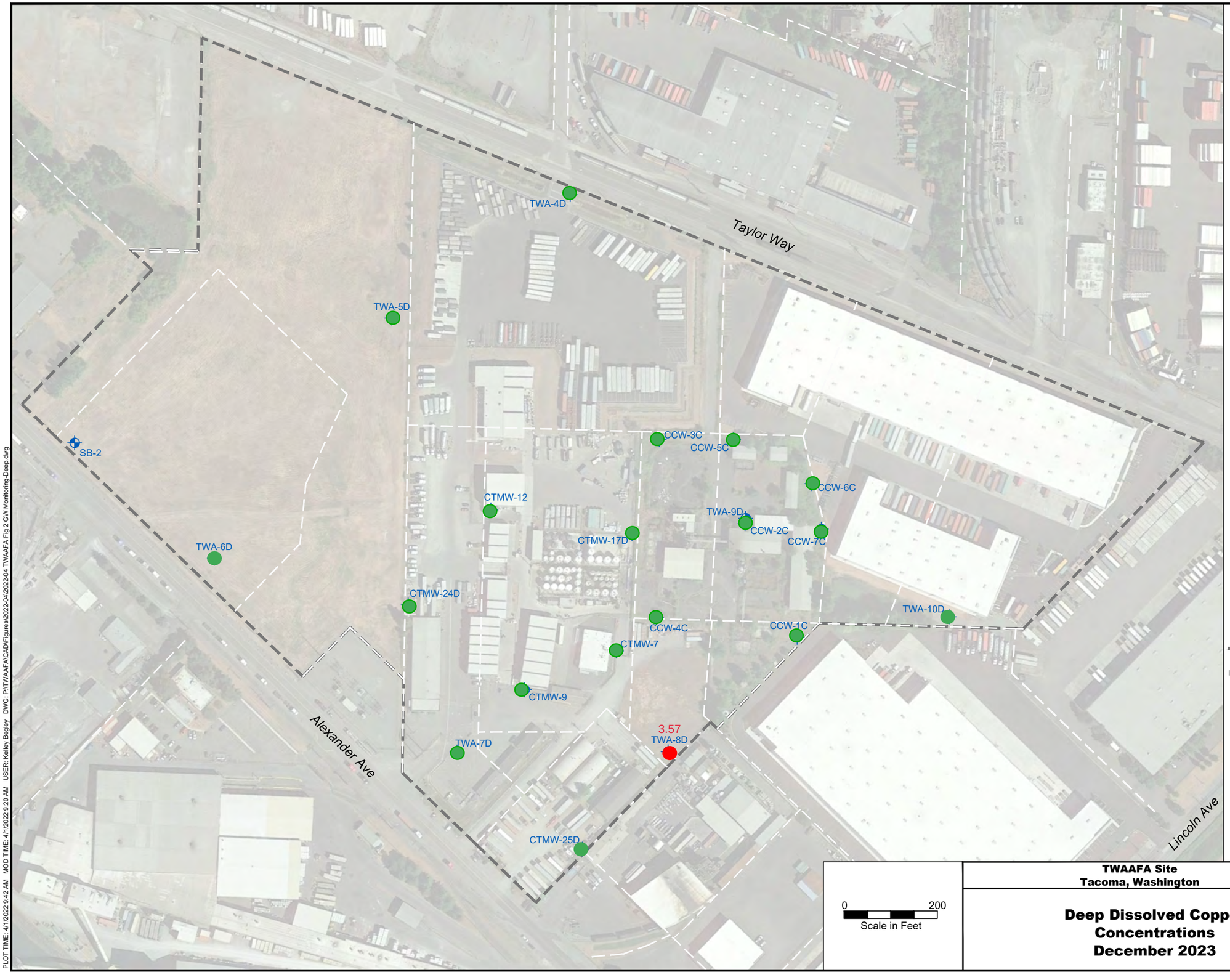
Shallow Dissolved Copper Concentrations December 2023

DALTON OLMSTED FUGLEVAND

FIGURE 6

3/11/2024

PLOT TIME: 4/1/2022 2:32 PM MOD TIME: 4/1/2022 2:31 PM USER: Kelley Begley, mod by T. Gray DWG: P:\TWAAFA\CAD\Figures\2022-04\2022-04 TWAAFA Fig 1 GW Monitoring-Shallow.dwg



Legend

- CTMW-17 — Groundwater Well/Piezometer
- TWAAFA Site Boundary
- Parcel Boundary
- Less than or equal to 2.4 ug/L
- Greater than 2.4 ug/L

0 200
Scale in Feet

TWAAFA Site
Tacoma, Washington

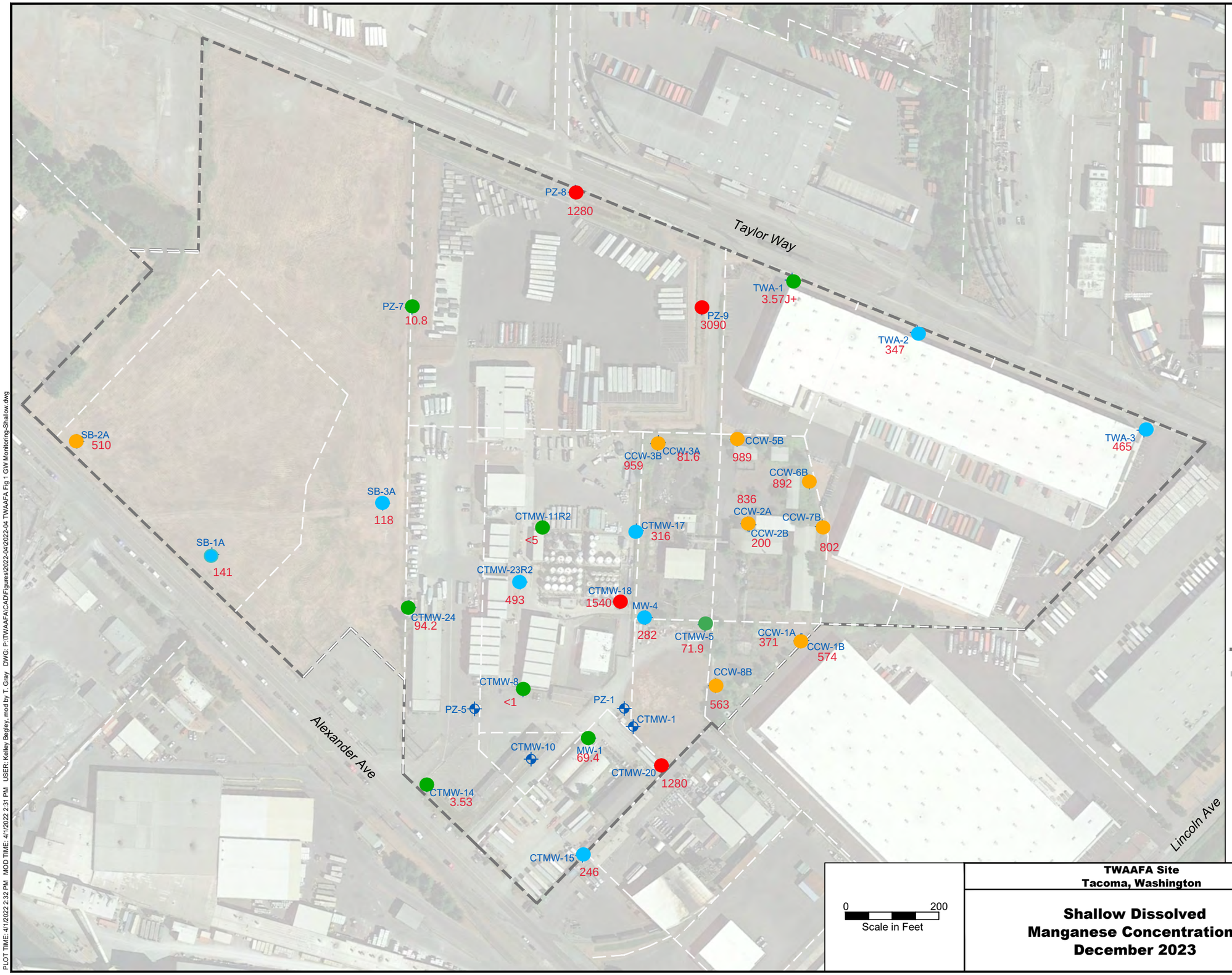
Deep Dissolved Copper Concentrations December 2023

DALTON OLMSTED FUGLEVAND

FIGURE 7

3/12/2024

PLOT TIME: 4/1/2022 9:42 AM MOD TIME: 4/1/2022 9:20 AM USER: Kelley Begley DWG: P:\TWAAFA\CAD\Figures\2022-04\2022-04 TWAAFA Fig 2 GW Monitoring-Deep.dwg



TWAAFA Site
Tacoma, Washington

Shallow Dissolved Manganese Concentrations December 2023

DALTON OLMSTED FUGLEVAND

FIGURE 8

3/11/2024

Legend

- CTMW-17 — Groundwater Well/Piezometer
- TWAAFA Site Boundary
- Parcel Boundary
- Less than 100 ug/L
- 100 to 500 ug/L
- 500 to 1000 ug/L
- Greater than 1000 ug/L

0 200
Scale in Feet

TWAAFA Site
Tacoma, Washington

Deep Dissolved Manganese Concentrations December 2023

DALTON OLMSTED FUGLEVAND

FIGURE 9

3/12/2024

PLOT TIME: 4/1/2022 9:42 AM MOD TIME: 4/1/2022 9:20 AM USER: Kelley Begley DWG: P:\TWAAFA\CAD\Figures\2022-04\2022-04 TWAAFA Fig 2 GW Monitoring-Deep.dwg

DOF DALTON OLMSTED FUGLEVAND

Appendix A

Groundwater Sampling Field Sheets

DOF DALTON OLMSTED FUGLEVAND	Monitoring Well Sampling Field Sheet	Well No. Field Blank #1 - 1223
		Facility/Project: TWAAFA
Date: 12/15/23	Sampling Personnel:	Initial Headspace (ppm)
Sampling Method:	ES/MW	Intial-Water Level before purge (ft. BTOC)
Equipment Used:	Well volume = 0.17 * (total well depth - water level)	End-Water Level post purge/sample with pump on (ft. BTOC):
WL - PID - WQ - Pump - Turb -	Well Volume =	Pump Intake Depth (ft.BTOC):

Purge start time:		Initial Flow Rate:		Flow cell disconnected prior to sampling : ☐
Purge stop time:		Final Flow Rate:		

Water Quality Measurements

Time	Water level	Purge Rate	pH	Conductivity	Temperature	Dissoved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL	< 0.1 unit	</= 3%	< 3%	</= 0.3 mg/L	< 10 mV	(3 readings) < 5 NTU or < 10% if >5 NTU

Project: TWAAFA 4Q23
Samplers: ES/MW
Sample ID: Field Blank#1-1223
Date: 12/15/23 Time: 1015
Analysis:
Preservative:

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode". Electrode calibrated in solution.

- Taken @ ~~2523~~ CTMW-2322 (middle site @ CE Tacoma)
- Paint fumes (1.0ppm @ peak, avg 0 ppm)

Bottles and Analyses: (collected in order below)

(1) 1 x ~~500~~ mL HDPE w/ HNO_3 6020 Total Metals (Al),(As),(Cr),(Cu),(Fe),(Mn),(Ni),(Pb),(Zn) and 1631E (Hg)

(1) 0 x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Dissolved Metals (Al, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg) ☐ Field Filtered (0.45µm)

(1) 1 x 250ml HDPE for Ferrous Iron

(2) 2 = Total Bottles

DOF DALTON OLMSTED FUGLEVAND

Monitoring Well Sampling Field Sheet

Date: 12/18/23	Sampling Personnel: ES/MW	Well No. Field Blank#2-1223
		Facility/Project: TWAAFA
		Initial Headspace (ppm)
Sampling Method:		Intial-Water Level before purge (ft. BTOC)
Equipment Used:	Well volume = 0.17 * (total well depth - water level)	End-Water Level post purge/sample with pump on (ft. BTOC):
WL - PID - WQ - Pump - Turb -	Well Volume =	Pump Intake Depth (ft.BTOC):

Purge start time:		Initial Flow Rate:		Flow cell disconnected prior to sampling : ☐
Purge stop time:		Final Flow Rate:		

Water Quality Measurements

Time	Water level	Purge Rate	pH	Conductivity	Temperature	Dissoved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL	< 0.1 unit	</= 3%	< 3%	</= 0.3 mg/L	< 10 mV	(3 readings) < 5 NTU or < 10% if >5 NTU

Project: TWAAFA 4Q23
Samplers: ES/MW
Sample ID: Field Blank#2-1223
Date: 12/18/23 Time: 1310
Analysis:
Preservative:

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode". Electrode calibrated in solution.

- Taken @ MW-4 (near CE tank farm)
- Spilled pres. bottle → thrown out

1st

Bottles and Analyses: (collected in order below)

(1) 1 x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Total Metals (Al) (As) (Cr) (Cu) (Fe) (Mn) (Ni) (Pb) (Zn) and 1631E (Hg)

(0) 0 x 500 mL HDPE w/ HNO_3 6020 Dissolved Metals (Al, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg) ☐ Field Filtered (0.45μm)

(1) 1 x 250 ml HDPE for Ferrous Iron

(2) 2 = Total Bottles

DOF DALTON OLMSTED FUGLEVAND

Monitoring Well Sampling Field Sheet

Well No. ~~CCW-1A~~ CCW-1A

Facility/Project: TWAAFA

Date: 12/18/23

Sampling Personnel: ES/MW

Sampling Method: low flow peri

Initial Headspace (ppm): 0.0 ppm

Intial-Water Level before purge (ft. BTOC): 4.12

Equipment Used: WL - geo #7068 PID - RKI-6000 WQ - ysi proquatro Pump - Masterflex E/S Turb - geo turb

Well volume = 0.17 * (total well depth - water level)

Well Volume = .17 (5.35 - 4.12) ≈ .17 (9.10 - 4.12) = 0.2 gal

End-Water Level post purge/sample with pump on (ft. BTOC): 4.19

Pump Intake Depth (ft.BTOC): ~1.0' off bottom → not pulling @ 1.5' off bottom

Purge start time: 1038 | Initial Flow Rate: 400 | Flow cell disconnected prior to sampling: ☑

Purge stop time: 1101 | Final Flow Rate: 200

Water Quality Measurements

Time	Water level	Purge Rate	pH	SPC Conductivity	Temperature	Dissoved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL	< 0.1 unit	</= 3%	< 3%	</= 0.3 mg/L	< 10 mV	(3 readings) < 5 NTU or < 10% if >5 NTU
1040	4.21	400	6.83	1129	11.5	0.27	60.1	4.37
1043	4.29	300	6.75	1196	11.6	0.19	59.6	4.62
1046	4.29	300	6.75	1214	11.5	0.16	58.2	4.68
* 1049	4.18	200	6.75	1230	11.6	0.40	51.1	3.17
1052	4.18	200	6.75	1252	11.6	0.29	51.7	2.66
	All parms Stable, d/c flow cell							
1055	Collect "CCW-1A-1223"							

Project: TWAAFA 4Q23
Samplers: ES/MW
Sample ID: CCW-1A-1223
Date: 12/18/23 Time: 1055
Analysis:
Preservative:

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode". Electrode calibrated in solution.

- YSI shut off, let values re-stab. for ~1 min
- Sample vol + 1 gal

Bottles and Analyses: (collected in order below)

(1) 1 x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Total Metals (Al, As, Cr, Co, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg)

(1) 1 x ~~500~~ mL HDPE w/ HNO_3 6020 Dissolved Metals (Al, As, Cr, Co, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg) ☑ Field Filtered (0.45µm)

(1) 1 x 250ml HDPE for Ferrous Iron

(3) 3 = Total Bottles

DOF DALTON OLMSTED FUGLEVAND

Monitoring Well Sampling Field Sheet

Well No. CCW-1B
Facility/Project: TWAAFA

Date: 12/18/23
Sampling Personnel: ES/MW
Initial Headspace (ppm) 0.6
Sampling Method: low flow peri
Intial-Water Level before purge (ft. BTOC) 3.72'
Equipment Used:
WL - geo #70608 PID - RKI-6000
WQ - ysi pro quatro Pump - Masterflex
Turb - geo. turb. EIS
Well volume = 0.17 * (total well depth - water level)
End-Water Level post purge/sample with pump on (ft. BTOC): 4.04
Well Volume = (17 (9.6 - 3.72')) x 1 gal
Pump Intake Depth (ft.BTOC): ~ 2.5' off bottom
Purge start time: 1112
Initial Flow Rate: 300
Flow cell disconnected prior to sampling: ☑
Purge stop time: 1147
Final Flow Rate: 400

Water Quality Measurements

Time	Water level	Purge Rate	pH	SPC Conductivity	Temperature	Dissoved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL	< 0.1 unit	</= 3%	< 3%	</= 0.3 mg/L	< 10 mV	{3 readings} < 5 NTU or < 10% if >5 NTU
1113	3.97'	300	6.81	582	12.7	0.31	66.2	26.1
1116	3.99	300	6.86	829	13.1	0.18	69.7	19.4
1119	3.99	300	6.90	883	13.3	0.16	69.8	17.9
1122	3.99	300	6.91	917	13.5	0.18	69.6	13.9
1125	3.96	300	6.92	936	13.5	0.25	68.0	11.7
1128	4.02	400	6.93	946	13.7	0.18	66.1	8.31
1131	4.04	400	6.94	958	13.7	0.17	65.1	4.50
1134	4.04	400	6.94	963	13.8	0.15	63.4	4.44
1137	4.04	400	6.94	970	13.8	0.15	61.8	4.37
	All parms stable d/c flow cell							
1140	Collect "CCW-1B-1223" w/ EXTRA VOL for MS/MSD!							

Project: TWAAFA 4Q23
Samplers: ES/MW
Sample ID: CCW-1B-1223
Date: 12/18/23 Time: 1140
Analysis: *MS/MSD
Preservative: *

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode". Electrode calibrated in solution.

- MS/MSD collected here!
- Sample Vol +2.5 gal

Bottles and Analyses: (collected in order below)

(3) 3 x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Total Metals (Al) As Cr, Cu Fe Mn, Ni, Pb, Zn) and 1631E (Hg)
(3) 3 x ~~500~~ mL HDPE w/ HNO_3 6020 Dissolved Metals (Al) As Cr, Cu, Fe Mn, Ni, Pb, Zn) and 1631E (Hg) ☑ Field Filtered (0.45µm)
(3) 3 x 250ml HDPE for Ferrous Iron

(9) 9 = Total Bottles (MS/MSD)

DOF DALTON OLMSTED FUGLEVAND

Monitoring Well Sampling Field Sheet

Well No. CCW-1C

Facility/Project: TWAAFA

Date: 12/18/23

Sampling Personnel: ES/MW

Initial Headspace (ppm) 0.0 ppm

Sampling Method: low flow per.

Intial-Water Level before purge (ft. BTOC) 9.56'

Equipment Used:
WL - Geo. #7068 PID - RKI - 6000
WQ - YSI pro quatro Pump - Masterflex
Turb - Geo. turb ES

Well volume = 0.17 * (total well depth - water level)

Well Volume = .17(23' - 9.56') ≈ 2.3 gal

End-Water Level post purge/sample with pump on (ft. BTOC): 9.61

Pump Intake Depth (ft.BTOC): ~2' off bottom

Purge start time:	1152	Initial Flow Rate:	400	Flow cell disconnected prior to sampling :	☑
Purge stop time:	1211	Final Flow Rate:	400		

Water Quality Measurements

Time	Water level	Purge Rate	pH	SPC Conductivity	Temperature	Dissoved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL	< 0.1 unit	</= 3%	< 3%	</= 0.3 mg/L	< 10 mV	(3 readings) < 5 NTU or < 10% if >5 NTU
1153	9.61	400	6.91	2222	14.16	0.15	77.2	10.2
1156	9.61	400	7.03	2160	14.7	0.43	63.8	8.71
1159	9.61	400	7.03	2100	14.7	0.62	55.0	4.15
1202	9.61	400	7.03	2084	14.7	0.53	49.7	3.21
1205	9.61	400	7.03	2080	14.7	0.44	45.1	3.91
	All parms stable, d/c flow cell							
1210	Collect "CCW-1C-1223"							

Project: TWAAFA 4Q23
Samplers: ES/MW
Sample ID: CCW-1C-1223
Date: 12/18/23 Time: 1210
Analysis:
Preservative:

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode". Electrode calibrated in solution.

- Sample vol + 1.25 gal

Bottles and Analyses: (collected in order below)

1st

(1) 1 x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Total Metals (Al, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg)

(1) 1 x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Dissolved Metals (Al, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg) ☑ Field Filtered (0.45µm)

(1) 1 x 250ml HDPE for Ferrous Iron

(3) 3 = Total Bottles

DOF DALTON OLMSTED FUGLEVAND

Monitoring Well Sampling Field Sheet

Well No. CCW-2A

Facility/Project: TWAAFA

Date: 12/14/23

Sampling Personnel: ES/MW

Sampling Method: low flow per.

Initial Headspace (ppm): ~46ppm → let dissapate

Intial-Water Level before purge (ft. BTOC): 2.13

Equipment Used:
WL - YSI #7068 PID - RKI - 6000
WQ - YSI pro quatro Pump - Masterflex ES
Turb - geo tub

Well volume = 0.17 * (total well depth - water level)

Well Volume = .17 (5.8' - 2.13') x 0.6 gal

End-Water Level post purge/sample with pump on (ft. BTOC): 2.17

Pump Intake Depth (ft.BTOC): ~1' off bottom

Purge start time: 1210

Purge stop time: 1249

Initial Flow Rate: 150

Final Flow Rate: 150

Flow cell disconnected prior to sampling: ☑

Water Quality Measurements

Time	Water level	Purge Rate	pH	SPC Conductivity	Temperature	Dissoved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL	< 0.1 unit	</= 3%	< 3%	</= 0.3 mg/L	< 10 mV	(3 readings) < 5 NTU or < 10% if >5 NTU
1212	2.17	150	6.64	1244	11.3	0.14	90.4	4.94
1215	2.17	150	6.54	1213	11.3	0.07	94.1	4.06
1218	2.17	150	6.54	1215	11.4	0.09	94.6	3.69
1221	2.17	150	6.54	1187	11.4	0.13	93.1	2.70
1224	2.17	150	6.54	1141	11.5	0.17	91.1	3.80
1227	2.17	150	6.54	1128	11.5	0.14	89.7	2.51
1230	2.17	150	6.54	1093	11.5	0.13	87.4	1.97
1233	2.17	150	6.54	1063	11.6	0.13	85.3	1.76
1236	2.17	150	6.53	1048	11.6	0.12	83.9	3.51
1239	2.17	150	6.53	1034	11.6	0.12	81.9	2.84
	All parms stable, d/c flow cell							
1245	Collect "CCW-2A-1223"							

Project: TWAAFA 4Q23
Samplers: ES/MW
Sample ID: CCW-2A-1223
Date: 12/14/23 Time: 1245
Analysis:
Preservative:

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode". Electrode calibrated in solution.

- GW has odor, dirty tubing (dark)
- sample vol + 1.75 gal

Bottles and Analyses: (collected in order below)

(1) 1 x 500 mL HDPE w/ HNO_3 6020 Total Metals (Al, As, Cr, Co, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg)

(1) 1 x 500 mL HDPE w/ HNO_3 6020 Dissolved Metals (Al, As, Cr, Co, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg) ☑ Field Filtered (0.45µm)

(1) 1 x 250 mL HDPE for ferrous iron

(2) 3 = Total Bottles

DOF DALTON OLMSTED FUGLEVAND

Monitoring Well Sampling Field Sheet

Well No. CCW-2B

Facility/Project: TWAAFA

Date: 12/14/23

Sampling Personnel: ES/MW

Sampling Method: low flow peri

Initial Headspace (ppm) 0.8 ppm

Intial-Water Level before purge (ft. BTOC) 2.83'

Equipment Used:
WL - geo #7068 PID - RKI-4000
WQ - ys: pro quatro Pump - Masterflex
Turb - geo turb ES

Well volume = 0.17 * (total well depth - water level)

Well Volume = .17(12.8' - 2.83') = 1.7 gal

End-Water Level post purge/sample with pump on (ft. BTOC): 3.18' ~~3.02'~~ ES

Pump Intake Depth (ft.BTOC): ~1' off bottom

Purge start time: 1337

Purge stop time: 1413

Initial Flow Rate: 150

Final Flow Rate: 150

Flow cell disconnected prior to sampling : ☑

Water Quality Measurements

Time	Water level	Purge Rate	pH	SPC Conductivity	Temperature	Dissoved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL	< 0.1 unit	</= 3%	< 3%	</= 0.3 mg/L	< 10 mV	{3 readings} < 5 NTU or < 10% if >5 NTU
1338	2.87	150	6.68	1953	13.6	0.20	114.9	1.23
1341	3.02	150	6.86	1933	13.8	0.14	108.4	0.19
1344	3.08	150	6.99	1934	13.8	0.11	103.2	0.78
1347	3.13	150	7.04	1931	13.8	0.10	99.9	1.50
1350	3.16	150	7.08	1928	13.8	0.09	95.4	0.60
	All parms Stable, d/c flow cell							
1355	Collect "CCW-2B-1223" w/ MS/MSD							

Project: TWAAFA 4Q23
Samplers: ES/MW
Sample ID: CCW-2B-1223
Date: 12/14/23 Time: 1355
Analysis: *MS/MSD
Preservative: Collected *

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode". Electrode calibrated in solution.

- Sample vol = 1 gal
- MS/MSD collected here!! 1x HNO3 250ml HDPE through out (forgot filter)

Bottles and Analyses: (collected in order below)

1ST
3 LT — 3 x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Total Metals (Al, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg)
3 LT — 3 x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Dissolved Metals (Al, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg) ☑ Field Filtered (0.45µm)
3 LT — 3 x 250 ml HDPE for Ferrous Iron

9 LT 9 = Total Bottles

DOF DALTON OLMSTED FUGLEVAND

Monitoring Well Sampling Field Sheet

Well No. CCW-2C

Facility/Project: TWAAFA

Date: 12/14/23

Sampling Personnel: ES/MW

Initial Headspace (ppm) 0.2 ppm

Sampling Method: low flow pur.

Intial-Water Level before purge (ft. BTOC) 8.68'

Equipment Used:
WL - Geo #7068 PID - RAE-6000
WQ - YSI Pro quatro Pump - Masterflex E13
Turb - Geo. turb

Well volume = 0.17 * (total well depth - water level)

End-Water Level post purge/sample with pump on (ft. BTOC): 8.73

Well Volume = .17(24' - 8.68') = 2.6 gal

Pump Intake Depth (ft.BTOC): ~2.5' off bottom

Purge start time:	1116	Initial Flow Rate:	400	Flow cell disconnected prior to sampling :	☑
Purge stop time:	1142	Final Flow Rate:	400		

Water Quality Measurements

Time	Water level	Purge Rate	pH	SPC Conductivity	Temperature	Dissoved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL	< 0.1 unit	</= 3%	< 3%	</= 0.3 mg/L	< 10 mV	(3 readings) < 5 NTU or < 10% if >5 NTU
1117	8.73	400	6.89	1749	13.8	0.33	137.0	6.07
1120	8.72	400	6.92	1723	13.8	0.15	123.7	1.82
1123	8.73	400	6.93	1707	13.9	0.16	114.8	2.36
1126	8.73	400	6.93	1718	13.9	0.22	108.9	2.81
1129	8.73	400	6.94	1702	14.2	0.40	92.5	3.13
1132	8.73	400	6.94	1720	14.0	0.36	93.4	1.25
1135	8.73	400	6.94	1707	13.9	0.31	91.6	2.99
	All parms stable, d/c flow cell							
1140	Collect = CCW-2C-1223"							

Project: TWAAFA 4Q23
Samplers: ES/MW
Sample ID: CCW-2C-1223
Date: 12/14/23 Time: 1140
Analysis:
Preservative:

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode". Electrode calibrated in solution.

- Sample @ 1 + 2.5 gal
- YSI turned off

Bottles and Analyses: (collected in order below)

(1) 1 x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Total Metals (Al, Fe, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg)

(1) 1 x ~~500~~ mL HDPE w/ HNO_3 6020 Dissolved Metals (Al, Fe, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg) ☑ Field Filtered (0.45µm)

(1) 1 x 250 ml HDPE for ferrous iron

(3) 3 = Total Bottles

DOF DALTON OLMSTED FUGLEVAND

Monitoring Well Sampling Field Sheet

Well No. CCW-3A

Facility/Project: TWAAFA

Date: 12/14/23

Sampling Personnel: ES/MW

Initial Headspace (ppm) 8.6 ppm

Sampling Method: low flow per.

Intial-Water Level before purge (ft. BTOC) 3.34' (static)

Equipment Used:
WL - Keitch #7068 PID - RKI-6000
WQ - YSI Pro Quatro Pump - Masterflex
Turb - Hach turb. E/S

Well volume = 0.17 * (total well depth - water level)

Well Volume = .17(7.6' - 3.34') ≈ 0.75 gal

End-Water Level post purge/sample with pump on (ft. BTOC): 3.38

Pump Intake Depth (ft.BTOC): ~1' off bottom

Purge start time:	0948	Initial Flow Rate:	300
Purge stop time:	1011	Final Flow Rate:	150

Flow cell disconnected prior to sampling : ☑

Water Quality Measurements

Time	Water level	Purge Rate	pH	Conductivity	Temperature	Dissoved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL	< 0.1 unit	</= 3%	< 3%	</= 0.3 mg/L	< 10 mV	(3 readings) < 5 NTU or < 10% if >5 NTU
0950	3.36	150	6.81	1334	12.5	0.53	119.1	13.4
0953	3.32	150	6.76	1357	11.8	0.53	131.2	11.38
0956	3.30	150	6.76	1365	11.9	0.43	134.2	11.9
0959	3.31	150	6.76	1377	11.8	0.42	136.5	10.7
1002	3.31	150	6.76	1376	12.2	0.36	137.4	11.5
	All parms stable, d/c flow cell							
1005	collect "CCW-3A-1223"							

Project: TWAAFA 4Q23
Samplers: ES/MW
Sample ID: CCW-3A-1223
Date: 12/14/23 Time: 1005
Analysis:
Preservative:

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode". Electrode calibrated in solution.

- Sample vol + 0.5gal

Bottles and Analyses: (collected in order below)

1st

(1) 1 x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Total Metals (Al), (As) Cr, (Ca), (Fe), (Mg), (Na), (Pb), (Zn) and 1631E (Hg)

(1) 1 x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Dissolved Metals (Al), (As), Cr, (Ca), (Fe), (Mg), (Na), (Pb), (Zn) and 1631E (Hg) ☑ Field Filtered (0.45µm)

(1) 1 x 250ml HDPE for ferrous iron

(~~2~~) 3 = Total Bottles

DOF DALTON OLMSTED FUGLEVAND

Monitoring Well Sampling Field Sheet

Well No. CCW-3B

Facility/Project: TWAAFA

Date: 12/14/23

Sampling Personnel: ES/MW

Initial Headspace (ppm) ~28.5 ppm

Sampling Method: low flow per.

Intial-Water Level before purge (ft. BTOC) 3.73' (stickup)

Equipment Used:
WL - geo. #7068 PID - RAE-6000
WQ - YSI ProQuatro Pump - Masterflex
Turb - geo. turb ES

Well volume = 0.17 * (total well depth - water level)

Well Volume = .17(10.8 - 3.73') ≈ 1.2 gal

End-Water Level post purge/sample with pump on (ft. BTOC): 4.17

Pump Intake Depth (ft.BTOC): ~1' off bottom

Purge start time: 1022

Purge stop time: 1044

Initial Flow Rate: ~~350~~ 300 350

Final Flow Rate: 350

Flow cell disconnected prior to sampling : ☑

Water Quality Measurements

Time	Water level	Purge Rate	pH	SPC Conductivity	Temperature	Dissoved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL	< 0.1 unit	</= 3%	< 3%	</= 0.3 mg/L	< 10 mV	{3 readings} < 5 NTU or < 10% if >5 NTU
1024	4.08	~~350~~	6.93	1207	13.9	0.51	123.6	7.65
1027	4.13	350	6.86	1221	14.1	0.57	119.0	7.15
1030	4.13	350	6.85	1238	14.1	0.53	114.7	4.91
1033	4.16	350	6.84	1250	14.2	0.44	112.5	4.19
1036	4.16	350	6.84	1257	14.3	0.38	110.5	3.23
	All parms stable, d/c flow cell							
1040	Collect - CCW-3B-1223"							

Project: TWAAFA 4Q23
Samplers: ES/MW
Sample ID: CCW-3B-1223
Date: 12/14/23 Time: 1040
Analysis:
Preservative:

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode". Electrode calibrated in solution.

- GW has odor
- Sample vol. ≈ 1.75 gal

Bottles and Analyses: (collected in order below)

(1) 1 x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Total Metals (Al), (As), Cr, (Cu), (Fe), (Mn), Ni, Pb, Zn) and 1631E (Hg)

(1) 1 x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Dissolved Metals (Al), (As), Cr, (Cu), (Fe), (Mn), Ni, Pb, Zn) and 1631E (Hg) ☑ Field Filtered (0.45µm)

(1) 1 x 250 ml HDPE for ferrous iron

1st

(2) 3 = Total Bottles

DOF DALTON OLMSTED FUGLEVAND

Monitoring Well Sampling Field Sheet

Well No. CCW-3C

Facility/Project: TWAAFA

Date: 12/14/23

Sampling Personnel: ES/MW

Initial Headspace (ppm) 0.7 ppm

Sampling Method: low flow peri.

Intial-Water Level before purge (ft. BTOC) 12.31' (stickup)

Equipment Used:
WL - geo #7068 PID - RKI-6000
WQ - ysi pro quatro Pump - Masterflex
Turb - geo. turb. ES

Well volume = 0.17 * (total well depth - water level)

Well Volume = .17 (23' - 12.31') ≈ 1.8 gal

End-Water Level post purge/sample with pump on (ft. BTOC): 12.32'

Pump Intake Depth (ft.BTOC): ~1' off bottom

Purge start time: 0909

Purge stop time: 0933

Initial Flow Rate: 400

Final Flow Rate: 300

Flow cell disconnected prior to sampling : ☑

Water Quality Measurements

Time	Water level	Purge Rate	pH	SPC Conductivity	Temperature	Dissoved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL	< 0.1 unit	</= 3%	< 3%	</= 0.3 mg/L	< 10 mV	{3 readings} < 5 NTU or < 10% if >5 NTU
0910	12.32	400	7.22	1336	14.0	2.89	181.3	5.95
0913	12.32	300	6.80	1341	14.0	2.91	167.2	4.48
0916	12.32	300	6.77	1361	14.1	2.95	160.6	4.10
0919	12.32	300	6.76	1387	14.0	2.95	152.4	4.41
0922	12.32	300	6.75	1408	14.1	0.20	145.3	3.83
0925	12.32	300	6.75	1424	14.1	0.19	140.6	1.31
0928	12.32	300	6.74	1436	14.1	0.19	136.7	1.73
	All parms stable, d/c flow cell							
0930	Collect "CCW-3C-1223"							

Project: TWAAFA 4Q23
Samplers: ES/MW
Sample ID: CCW-3C-1223
Date: 12/14/23 Time: 0930
Analysis:
Preservative:

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode". Electrode calibrated in solution.

- Sample vol + 2 gal
- bubble on DO probe cleared

Bottles and Analyses: (collected in order below)

(1) 1 x 500 (250) mL HDPE w/ HNO_3 6020 Total Metals (Al, Sb, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg)

(1) 1 x 500 mL HDPE w/ HNO_3 6020 Dissolved Metals (Al, Sb, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg) ☑ Field Filtered (0.45µm)

(1) 1 x 250 mL HDPE for Ferrous Iron

(3) 3 = Total Bottles

DOF DALTON OLMSTED FUGLEVAND

Monitoring Well Sampling Field Sheet

Well No. CCW-4C

Facility/Project: TWAAFA

Date: 12/18/23

Sampling Personnel: ES/MW

Initial Headspace (ppm) 0.0 ppm

Sampling Method: low flow pump

Intial-Water Level before purge (ft. BTOC) 10.18'

Equipment Used:
WL - geo #7068 PID - RKI-6000
WQ - YSI pro quatro Pump - Masterflex
Turb - geo turb. E/S

Well volume = 0.17 * (total well depth - water level)

Well Volume = .17(24' - 10.18') ≈ 2.3 gal

End-Water Level post purge/sample with pump on (ft. BTOC): 10.20

Pump Intake Depth (ft.BTOC): ~2.5' off bottom

Purge start time: 1328

Purge stop time: 1349

Initial Flow Rate: 350

Final Flow Rate: 400

Flow cell disconnected prior to sampling : ☑

Water Quality Measurements

Time	Water level	Purge Rate	pH	SPC Conductivity	Temperature	Dissoved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL	< 0.1 unit	</= 3%	< 3%	</= 0.3 mg/L	< 10 mV	(3 readings) < 5 NTU or < 10% if >5 NTU
1330	10.20	350	7.20	2159	14.7	0.41	28.2	7.53
1333	10.20	400	6.98	2139	14.8	0.07	36.9	4.74
1336	10.20	400	6.93	2122	14.9	0.20	34.0	3.25
1339	10.20	400	6.92	2116	14.8	0.14	35.1	3.93
1342	10.20	400	6.91	2116	14.9	0.10	33.1	~~3.93~~ 2.12
	All params stable, d/c flow cell							
1345	Collect "CCW-4C-1223"							

Project: TWAAFA 4Q23
Samplers: ES/MW
Sample ID: CCW-4C-1223
Date: 12/18/23 Time: 1345
Analysis:
Preservative:

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode". Electrode calibrated in solution.

- Sample vol + 1.75 gal

Bottles and Analyses: (collected in order below)

(1) 1 x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Total Metals (Al, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg)

(1) 1 x ~~500~~ mL HDPE w/ HNO_3 6020 Dissolved Metals (Al, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg) ☑ Field Filtered (0.45µm)

(1) 1 x 250ml HDPE for Ferrous Iron

(2) 3 = Total Bottles

DOF DALTON OLMSTED FUGLEVAND

Monitoring Well Sampling Field Sheet

Well No. CCW-5B

Facility/Project: TWAAFA

Date: 12/19/23

Sampling Personnel: ES/MW

Initial Headspace (ppm) 0.0 ppm

Sampling Method: low flow peri

Intial-Water Level before purge (ft. BTOC) 2.66

Equipment Used:
WL - geo #7068 PID - RKI-6000
WQ - YSI: proquatro pump - masterflex E/S
Turb - geo. turb

Well volume = 0.17 * (total well depth - water level)

Well Volume = .17 (10' - 2.66) ≈ 1.25 gal

End-Water Level post purge/sample with pump on (ft. BTOC): 2.68

Pump Intake Depth (ft.BTOC): ~2' off bottom

Purge start time:	1250	Initial Flow Rate:	400
Purge stop time:	1322	Final Flow Rate:	400

Flow cell disconnected prior to sampling : ☑

Water Quality Measurements

Time	Water level	Purge Rate	pH	SPC Conductivity	Temperature	Dissoved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL	< 0.1 unit	</= 3%	< 3%	</= 0.3 mg/L	< 10 mV	{3 readings} < 5 NTU or < 10% if >5 NTU
1253	2.68	400	6.40	1420	13.7	0*	88.5	21.2
1256	2.68	400	6.41	1390	13.6	0.35	88.7	17.6
1259	2.68	400	6.42	1370 DUP	13.5	0.14	84.9	16.5
1302	2.68	400	6.40	1447 1372	13.7	0.10	83.0	6.42
1305	2.68	400	6.42	1335	13.5	0.09	80.1	5.60
1308	2.68	400	6.42	1293	13.4	0.10	77.6	4.12
1311	2.68	400	6.41	1269	13.4	0.10	75.6	3.32
1314	2.68	400	6.40	1253	13.4	0.10	73.7	4.63
	All parms stable, d/c flow cell							
1315	Collect "CCW-5B-1223"							

Project: TWAAFA 4Q23
Samplers: ES/MW
Sample ID: CCW-5B-1223
Date: 12/19/23 Time: 1315
Analysis:
Preservative:

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode". Electrode calibrated in solution.

- Sample vol = 3 gal

★ (-) DO recorded as 0 mg/L, ★★ 1256: Flow cell full → DO working down; 1302: SPC spiked, quickly dropped & settled @ 1372 around 1303

Bottles and Analyses: (collected in order below)

(1) 1 x 500 (250) mL HDPE w/ HNO_3 6020 Total Metals (Al, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg)

(1) 1 x 500 mL HDPE w/ HNO_3 6020 Dissolved Metals (Al, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg) ☑ Field Filtered (0.45µm)

(1) 1 x 250ml HDPE for Ferrous Iron

(2) 3 = Total Bottles

DOF DALTON OLMSTED FUGLEVAND

Monitoring Well Sampling Field Sheet

Well No. CCW-5C

Facility/Project: TWAAFA

Date: 12/19/23

Sampling Personnel: ES/MW

Initial Headspace (ppm) 0.0ppm

Sampling Method: low flow

Intial-Water Level before purge (ft. BTOC) 8.63'

Equipment Used:
WL - geo. #7068 PID - RKI-6000
WQ - YSI pro quatro Pump - Masterflex E/S
Turb - geo. turb

Well volume = 0.17 * (total well depth - water level)

Well Volume = .17(24' - 8.63') = 2.6 gal

End-Water Level post purge/sample with pump on (ft. BTOC): 8.68'

Pump Intake Depth (ft.BTOC): ~2' off bottom

Purge start time: 1329

Purge stop time: 1356

Initial Flow Rate: 350

Final Flow Rate: 350

Flow cell disconnected prior to sampling : ☑

Water Quality Measurements

Time	Water level	Purge Rate	pH	SPC Conductivity	Temperature	Dissoved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL	< 0.1 unit	</= 3%	< 3%	</= 0.3 mg/L	< 10 mV	{3 readings} < 5 NTU or < 10% if >5 NTU
1332	8.68	350	6.48	1709	14.5	0.11	92.8	26.5
1335	8.68	350	6.52	1709	14.6	0.09	89.4	19.1
1338	8.68	350	6.53	1723	14.6	0.12	86.7	9.24
1341	8.68	350	6.53	1725	14.6	0.17	84.8	8.65
1344	8.68	350	6.54	1734	14.6	0.16	82.7	3.73
1347	8.68	350	6.54	1724	14.6	0.14	81.0	3.50
1350	8.68	350	6.54	1738	14.6	0.17	79.2	4.39
1355	Collect	"CCW-5C-1223"						
All	parms	stable, d/c flow cell						

Project: TWAAFA 4Q23
Samplers: ES/MW
Sample ID: CCW-5C-1223
Date: 12/19/23 Time: 1355
Analysis:
Preservative:

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode". Electrode calibrated in solution.

- Sample vol = 2.5 gal

1st

Bottles and Analyses: (collected in order below)

(1) 1 x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Total Metals (Al, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg)

(1) 1 x 500 mL HDPE w/ HNO_3 6020 Dissolved Metals (Al, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg) ☑ Field Filtered (0.45µm)

(1) 1 x 250mL HDPE for Ferrous Iron

(3) 3 = Total Bottles

DOF DALTON OLMSTED FUGLEVAND

Monitoring Well Sampling Field Sheet

Well No. CCW-6B

Facility/Project: TWAAFA

Date: 12/19/23

Sampling Personnel: ES/MW

Initial Headspace (ppm) 0.0ppm

Sampling Method: low flow peri

Intial-Water Level before purge (ft. BTOC) 1.98'

Equipment Used:
WL - geo. #70608 PID - RKI - 6000
WQ - ysi pro quatro Pump - Masterflex
Turb - geo. turb. E/S

Well volume = 0.17 * (total well depth - water level)

End-Water Level post purge/sample with pump on (ft. BTOC): 1.98

Well Volume = .17 (8.5' - 1.98') = 1.1 gal

Pump Intake Depth (ft.BTOC): ~2' off bottom

Purge start time: 0954

Purge stop time: 1032

Initial Flow Rate: 350

Final Flow Rate: 400

Flow cell disconnected prior to sampling: ☑

Water Quality Measurements

Time	Water level	Purge Rate	pH	SPC Conductivity	Temperature	Dissoved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL	< 0.1 unit	</= 3%	< 3%	</= 0.3 mg/L	< 10 mV	(3 readings) < 5 NTU or < 10% if >5 NTU
0956	1.98	350	7.68	814	12.6	2.28	29.8	63.2
0959	1.98	400	6.78	879	0*	12.7	58.3	27.6
1002	1.98	400	6.55	924	12.7	0	67.2	22.4
1005	1.98	400	6.42	973	12.7	0	70.4	16.4
1008	1.98	400	6.37	1015	12.6	0	71.4	11.5
1011	1.98	400	6.33	1050	12.7	0	74.3	12.0
1014	1.98	400	6.31	1076	12.7	0	74.8	4.19
1017	1.98	400	6.30	1103	12.6	0	76.5	4.09
1020	1.98	400	6.29	1120	12.6	0	77.3	4.43
1023	1.98	400	6.29	1135	12.7	0	77.7	4.29
	All parms stable, d/c flow cell							
1025	collect	"CCW-6B-1223"						
1030	collect	"CCW-9-6B-1223"						

Project: TWAAFA 4Q23
Samplers: ES/MW
Sample ID: CCW-6B-1223
Date: 12/19/23 Time: 1025
Analysis:
Preservative:

Project: TWAAFA 4Q23
Samplers: ES/MW
Sample ID: CCW-9-6B-1223
Date: 12/19/23 Time: 1030
Analysis: FIELD
Preservative: DUPE

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode". Electrode calibrated in solution.

- sample vol + 3 gal

* (-) DO recorded as 0 mg/L

Bottles and Analyses: (collected in order below)

(1) 2 x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Total Metals (Al, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg)

(1) 2 x ~~500~~ mL HDPE w/ HNO_3 6020 Dissolved Metals (Al, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg) ☑ Field Filtered (0.45µm)

(2) 2 x 250 ml HDPE for Ferrous Iron

~~6~~ 6 = Total Bottles

↳ DUPE (CCW-9-6B-1223)

DOF DALTON OLMSTED FUGLEVAND

Monitoring Well Sampling Field Sheet

Well No. CCW-6C

Facility/Project: TWAAFA

Date: 12/19/23

Sampling Personnel: ES/MW

Initial Headspace (ppm) 0.0 ppm

Sampling Method: low flow pur.

Intial-Water Level before purge (ft. BTOC) 8.27

Equipment Used:
WL - Geo. #7068 PID - RKI-6000
WQ - YSI Proquatro Pump - Masterflex E/S
Turb - Geo.turb

Well volume = 0.17 * (total well depth - water level)

Well Volume = .17(23' - 8.27') = 2.5 gal

End-Water Level post purge/sample with pump on (ft. BTOC): 8.59'

Pump Intake Depth (ft.BTOC): ~2" off bottom

Purge start time: 1039

Purge stop time: 1107

Initial Flow Rate: 400

Final Flow Rate: 400

Flow cell disconnected prior to sampling : ☑

Water Quality Measurements

Time	Water level	Purge Rate	pH	SPC Conductivity	Temperature	Dissoved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL	< 0.1 unit	</= 3%	< 3%	</= 0.3 mg/L	< 10 mV	{3 readings} < 5 NTU or < 10% if >5 NTU
1041	8.59	400	6.43	4369	13.8	0*	126.2	15.6
1044	8.59	400	6.51	4258	13.8	0	117.2	12.9
1047	8.59	400	6.53	4207	13.9	0	111.8	10.9
1050	8.59	400	6.55	4185	13.9	0	108.3	10.55
1053	8.59	400	6.56	4146	14.1	0	95.4	6.80
1056	8.59	400	6.56	4151	13.9	0	95.9	4.50
1059	8.59	400	6.57	4144	13.9	0	95.9	4.42
1102	8.59	400	6.57	4121	13.9	0	95.2	3.83
	All parms Stable, D/C flow cell							
1105	Collect "CCW-6C-1223"							

Project: TWAAFA 4Q23
Samplers: ES/MW
Sample ID: CCW-6C-1223
Date: 12/19/23 Time: 1105
Analysis:
Preservative:

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode". Electrode calibrated in solution.

- Sample vol = 3.25 gal

* DO recorded as 0 mg/L ** YSI shutoff @ 1053, let readings settledown for ~2min

Bottles and Analyses: (collected in order below)

(1) 1 x 500 ~~mL~~ 250 mL HDPE w/ HNO_3 6020 Total Metals (Al, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg)

(1) 1 x 500 mL HDPE w/ HNO_3 6020 Dissolved Metals (Al, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg) ☑ Field Filtered (0.45µm)

(1) 1 x 250mL HDPE for Ferrous Iron

(3) 3 = Total Bottles

DOF DALTON OLMSTED FUGLEVAND

Monitoring Well Sampling Field Sheet

Well No. CCW-7B

Facility/Project: TWAAFA

Date: 12/19/23

Sampling Personnel: ES/MW

Sampling Method: low flow peri

Initial Headspace (ppm) 0.9

Intial-Water Level before purge (ft. BTOC) 1.92'

Equipment Used:
WL - YSI #7268 PID - RKI-6000
WQ - YSI pro quatro Pump - Masterflex
Turb - YSI turb. E/S

Well volume = 0.17 * (total well depth - water level)

Well Volume = .17(9' - 1.92') ≈ 1.2 gal

End-Water Level post purge/sample with pump on (ft. BTOC): 1.92'

Pump Intake Depth (ft.BTOC): ~2' off bottom

Purge start time: 1152

Purge stop time: 1226

Initial Flow Rate: 400

Final Flow Rate: 400

Flow cell disconnected prior to sampling : ☑

Water Quality Measurements

Time	Water level	Purge Rate	pH	SPC Conductivity	Temperature	Dissoved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL	< 0.1 unit	</= 3%	< 3%	</= 0.3 mg/L	< 10 mV	(3 readings) < 5 NTU or < 10% if >5 NTU
1154	1.92	400	6.85	842	12.9	0.19	34.6	5.37
1157	1.92	400	6.41	894	12.9	0.14	53.4	4.03
1200	1.92	400	6.34	907	12.9	0.13	57.0	4.00
1203	1.92	400	6.31	925	12.8	0.14	58.7	4.42
1206	1.92	400	6.29	952	12.8	0.15	59.6	4.73
1209	1.92	400	6.28	969	12.8	0.16	59.8	4.73
1212	1.92	400	6.28	1007	12.8	0.17	60.1	3.77
1215	1.92	400	6.27	1017	12.9	0.16	60.0	3.74
1218	1.92	400	6.27	1038	12.9	0.14	60.1	4.23
	All parms stable, d/c flow cell							
1220	Collect "CCW-7B-1223"							
1225	Collect "CCW-9-7B-1223"							

Project: TWAAFA 4Q23
Samplers: ES/MW
Sample ID: CCW-7B-1223
Date: 12/19/23 Time: 1220
Analysis:
Preservative:

Project: TWAAFA 4Q23
Samplers: ES/MW
Sample ID: CCW-9-7B-1223
Date: 12/19/23 Time: 1225
Analysis: FIELD DUPE
Preservative:

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode". Electrode calibrated in solution.

- Sample vol + 2.5 gal

1224

Bottles and Analyses: (collected in order below)

(2) 2 x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Total Metals (Al, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg)

(2) 2 x 500 mL HDPE w/ HNO_3 6020 Dissolved Metals (Al, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg) ☑ Field Filtered (0.45µm)

(2) 2 x 250 mL HDPE for Ferrous Iron

(8) 6 = Total Bottles

+ (CCW-9-7B-1223) DUPE!

DOF DALTON OLMSTED FUGLEVAND

Monitoring Well Sampling Field Sheet

Well No. CCW-7C

Facility/Project: TWAAFA

Date: 12/19/23

Sampling Personnel: ES/MW

Initial Headspace (ppm) 0.0 ppm

Sampling Method: low flow peri.

Intial-Water Level before purge (ft. BTOC) 8.31'

Equipment Used:
WL - geo # 70168 PID - RKI-6000
WQ - YSI pro quatro Pump - Masterflex
Turb - geo. turb. E/S

Well volume = 0.17 * (total well depth - water level)

End-Water Level post purge/sample with pump on (ft. BTOC): 8.33'

Well Volume = .17(26' - 8.31') ≈ 3 gal

Pump Intake Depth (ft.BTOC): ~2' off bottom

Purge start time: 1128

Purge stop time: 1150

Initial Flow Rate: 450

Final Flow Rate: 400

Flow cell disconnected prior to sampling : ☑

Water Quality Measurements

Time	Water level	Purge Rate	pH	SPC Conductivity	Temperature	Dissoved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL	< 0.1 unit	</= 3%	< 3%	</= 0.3 mg/L	< 10 mV	{3 readings} < 5 NTU or < 10% if >5 NTU
1131	8.33	400	6.84	2073	13.8	0.35	74.2	4.38
1134	8.33	400	6.78	2115	13.8	0.27	78.2	3.74
1137	8.33	400	6.78	2100	13.8	0.28	78.7	3.94
1140	8.33	400	6.79	2067	13.8	0.31	78.4	2.66
1143	8.33	400	6.80	2040	13.8	0.36	77.8	4.66
	All parms stable, d/c flow cell							
1145	Collect "CCW-7C-1223"							

Project: TWAAFA 4Q23
Samplers: ES/MW
Sample ID: CCW-7C-1223
Date: 12/19/23 Time: 1145
Analysis:
Preservative:

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode". Electrode calibrated in solution.

- sample vol + 1.75 gal

1st

Bottles and Analyses: (collected in order below)

(1) 1 x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Total Metals (Al) As Cr, Cu Fe Mn, Ni, Pb, Zn) and 1631E (Hg)

(1) 1 x ~~500~~ mL HDPE w/ HNO_3 6020 Dissolved Metals (Al) As, Cr, Cu, Fe, Mn) Ni, Pb, Zn) and 1631E (Hg) ☑ Field Filtered (0.45µm)

(1) 1 x 250 ml HDPE for Ferrous Iron

(3) 3 = Total Bottles

DOF DALTON OLMSTED FUGLEVAND

Monitoring Well Sampling Field Sheet

Well No. CCW-8B

Facility/Project: TWAAFA

Date: 12/18/23

Sampling Personnel: ES/MW

Initial Headspace (ppm) 0.0 ppm

Sampling Method: low flow pur.

Intial-Water Level before purge (ft. BTOC) 3.38'

Equipment Used:
WL - geo. #7068 PID - RKI-6000
WQ - ysi proquatro Pump - Masterflex
Turb - geo. turb. FIS

Well volume = 0.17 * (total well depth - water level)

End-Water Level post purge/sample with pump on (ft. BTOC): 3.38'

Well Volume = .17(11' - 3.38') = 1.3 gal

Pump Intake Depth (ft.BTOC): ~2' off bottom

Purge start time:	0938	Initial Flow Rate:	400
Purge stop time:	1011	Final Flow Rate:	400

Flow cell disconnected prior to sampling : ☑

Water Quality Measurements

Time	Water level	Purge Rate	pH	SPC Conductivity	Temperature	Dissoved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL	< 0.1 unit	</= 3%	< 3%	</= 0.3 mg/L	< 10 mV	(3 readings) < 5 NTU or < 10% if >5 NTU
0941	3.38	400	6.84	881	14.1	0.08	93.1	10.5
0944	3.38	400	6.77	926	14.2	0.07	89.7	6.04
0947	3.38	400	6.78	967	14.2	0.06	84.7	3.11
0950	3.38	400	6.78	1005	14.1	0.07	81.2	3.92
0953	3.38	400	6.80	1039	14.1	0.07	77.8	4.31
0956	3.38	400	6.81	1064	14.0	0.15	75.5	4.31
0959	3.38	400	6.81	1090	14.1	0.26	72.8	4.14
1002	3.38	400	6.82	1103	14.0	0.16	71.0	3.14
1005	3.38	400	6.82	1117	14.1	0.13	69.0	3.68
	All parms stable, d/c flow cell							
1010	Collect "CCW-8B-1223"							

Project: TWAAFA 4Q23
Samplers: ES/MW
Sample ID: CCW-8B-1223
Date: 12/18/23 Time: 1010
Analysis:
Preservative:

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode". Electrode calibrated in solution.

- Sample vol +2.75 gal

Bottles and Analyses: (collected in order below)

(1) 1 X ~~500~~ 250 mL HDPE w/ HNO_3 6020 Total Metals (Al, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg)

(1) 1 X ~~500~~ mL HDPE w/ HNO_3 6020 Dissolved Metals (Al, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg) ☑ Field Filtered (0.45µm)

(1) 1 X 250ml HDPE for Ferrous Iron

(2) 3 = Total Bottles

DOF DALTON OLMSTED FUGLEVAND

Monitoring Well Sampling Field Sheet

Well No. CTMW-5

Facility/Project: TWAAFA

Date: 12/13/23

Sampling Personnel: ES/MW

Initial Headspace (ppm) 2.7 ppm

Sampling Method: Bladder Pump

Intial-Water Level before purge (ft. BTOC) 3.11' (Stickup)

Equipment Used:
WL - Geo #7068 PID - RKI-6000
WQ - YSI ProQuatro Pump - QED Well Wizard #3020
Turb - Geo. turb & QED MP-10 Controller

Well volume = 0.17 * (total well depth - water level)

End-Water Level post purge/sample with pump on (ft. BTOC): 3.13

Well Volume = .17(9.5' - 3.11') ≈ 1 gal

Pump Intake Depth (ft.BTOC): fixed due to bladder pump → I.D. on drive in post proc.

Purge start time:	1003	Initial Flow Rate:	~~300~~ ~~250~~ 250	Flow cell disconnected prior to sampling: ☑
Purge stop time:	1054	Final Flow Rate:	350	

Water Quality Measurements

Time	Water level	Purge Rate	pH	Conductivity	Temperature	Dissoved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL/min	< 0.1 unit	</= 3%	< 3%	</= 0.3 mg/L	< 10 mV	(3 readings) < 5 NTU or < 10% if >5 NTU
1006	3.15	~~300~~ ~~250~~	9.29	224.1	11.2	0.24	-41.7	11.1
1009	3.13	250	8.47	169.2	11.2	0.11	-14.2	9.56
1012	3.13	250	7.53	170.3	11.1	0.09	22.5	10.20
1015	3.13	250	7.09	172.2	11.0	0.07	45.6	8.45
1018	3.13	250	6.77	236.0	10.9	0.06	62.7	6.49
1021	3.13	250	6.60	244.9	10.9	0.05	74.9	~~6.59~~ 5.38
1024	3.13	250	6.47	251.3	11.0	0.05	82.4	5.55
1027	3.13	250	6.39	259.1	10.8	0.05	86.7	5.52
1030	3.13	250	6.36	261.6	10.9	0.05	88.8	5.80
1033	3.13	250	6.32	254.1	10.9	0.05	90.6	5.83
	All parms stable, d/c flow cell							
1040	Collect "CTMW-5-1223"							

Project: TWAAFA 4Q23
Samplers: ES/MW
Sample ID: CTMW-5-1223
Date: 12/13/23 Time: 1040
Analysis:
Preservative:

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode". Electrode calibrated in solution.

- Sample vol ≈ 2.25 gal

* Bladder Pump throttle increase req'd to push GW through filter

Bottles and Analyses: (collected in order below)

1st
(1) 1 x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Total Metals (Al, As, Cr, Co, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg)
(1) 1 x ~~500~~ mL HDPE w/ HNO_3 6020 Dissolved Metals (Al, As, Cr, Co, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg) ☑ Field Filtered (0.45µm)
(1) 1 x 250 ml HDPE for ferrous iron

(3) 3 = Total Bottles

DOF DALTON OLMSTED FUGLEVAND

Monitoring Well Sampling Field Sheet

Well No. CTMW-7

Facility/Project: TWAAFA

Date: 12/13/23

Sampling Personnel: ES/MW

Initial Headspace (ppm) 0.7

Sampling Method: Low flow per.

Intial-Water Level before purge (ft. BTOC) 11.29' (stick up)

Equipment Used:
WL - QED. #7008 PID - RKI-6000
WQ - YSI Pro Quatro Pump - MasterFlex
Turb - geo. turb. ES

Well volume = 0.17 * (total well depth - water level)

Well Volume = .17(28.5'-11.29') ≈ 3gal

End-Water Level post purge/sample with pump on (ft. BTOC): 11.37 ±

Pump Intake Depth (ft.BTOC): ~1' off bottom

Purge start time:	1145	Initial Flow Rate:	350	Flow cell disconnected prior to sampling :	☑
Purge stop time:	1206	Final Flow Rate:	350		

Water Quality Measurements

Time	Water level	Purge Rate	pH	SPC Conductivity	Temperature	Dissoved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL	< 0.1 unit	</= 3%	< 3%	</= 0.3 mg/L	< 10 mV	(3 readings) < 5 NTU or < 10% if >5 NTU
1147	11.33	350	6.77	2379	15.7	0.41	160.0	11.8
1150	11.37	350	6.83	2391	15.6	0.32	152.2	3.02
1153	11.37	350	6.81	2288	15.5	0.22	145.0	4.40
1156	11.37	350	6.81	2237	15.6	0.19	140.1	4.68
1159	11.37	350	6.82	2226	15.5	0.18	135.0	2.85
	All parms stable, d/c flow cell							
1200	Collect "CTMW-7-1223"							

Project: TWAAFA 4Q23
Samplers: ES/MW
Sample ID: CTMW-7-1223
Date: 12/13/23 Time: 1200
Analysis:
Preservative:

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode". Electrode calibrated in solution.

- Sample vol + 1.5 gal

Bottles and Analyses: (collected in order below)

(1) 1 x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Total Metals (A), (As), Cr, (Cu), (Fe), (Mn), Ni, Pb, Zn) and 1631E (Hg)

(1) 1 x ~~500~~ mL HDPE w/ HNO_3 6020 Dissolved Metals (A), (As), Cr, (Cu), (Fe), (Mn), Ni, Pb, Zn) and 1631E (Hg) ☑ Field Filtered (0.45µm)

(1) 1 x 250 ml HDPE for ferrous iron

(3) 3 = Total Bottles

DOF DALTON OLMSTED FUGLEVAND

Monitoring Well Sampling Field Sheet

Well No. CTMW-8

Facility/Project: TWAAFA

Date: 12/12/23

Sampling Personnel: ES/MW

Initial Headspace (ppm) 0.0 ppm

Sampling Method: low flow peri.

Intial-Water Level before purge (ft. BTOC) 5.41' BTOC (stick up)

Equipment Used:
WL - YSI #70058 PID - RKI-6000
WQ - YSI ProQuatro Pump - Masterflex
Turb - YSI. turb ES

Well volume = 0.17 * (total well depth - water level)

End-Water Level post purge/sample with pump on (ft. BTOC): 7.63' BTOC

Well Volume = .17 (11.5' - 5.41') ≈ 1 gal

Pump Intake Depth (ft.BTOC): ~1' off bottom

Purge start time:	1442	Initial Flow Rate:	250	Flow cell disconnected prior to sampling :	☑
Purge stop time:	1532	Final Flow Rate:	150		

Water Quality Measurements

Time	Water level	Purge Rate	pH	SPC Conductivity	Temperature	Dissoved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL	< 0.1 unit	</= 3%	< 3%	</= 0.3 mg/L	< 10 mV	(3 readings) < 5 NTU or < 10% if >5 NTU
1445	5.95'	250	12.30	5965	14.9	0.11	-265.8	110
1448	6.28'	250	12.60	6229	14.9	0.06	-311.6	28.5
1451	6.55	200	12.65	6270	14.8	0.13	-325.5	23.5
1454	6.65	150	12.67	6287	14.8	0.12	-335.6	24.1
1457	6.74	150	12.68	6327	14.7	0.16	-341.6	22.3
1500	6.81	150	12.71	6350	14.7	0.15	-345.6	15.8
1503	6.91	150	12.71	6378	14.5	0.16	-348.3	12.0
1506	6.97	150	12.72	6364	14.6	0.17	-350.4	9.45
1509	7.07	150	12.73	6350	14.6	0.16	-352.0	8.22
1512	7.18	150	12.73	6319	14.7	0.16	-353.1	7.02
1515	7.23	150	12.73	6304	14.6	0.16	-353.8	5.14
1518	7.38	150	12.74	6273	14.6	0.17	-354.9	6.35
~~1521~~	All parms Stable, but turb. ≥ 27%. >1 well vol purged + tot & diss (field filtered) metals collected.							
1525	Collect " CTMW-8-1223"							

Project: TWAAFA 4Q23
Samplers: ES/MW
Sample ID: CTMW-8-1223
Date: 12/12/23 Time: 1525
Analysis:
Preservative:

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode". Electrode calibrated in solution.

- Sample vol + 2gal

Bottles and Analyses: (collected in order below)

(1) 1 x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Total Metals (Al, Sb, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg)

(1) 1 x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Dissolved Metals (Al, Sb, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg) ☑ Field Filtered (0.45µm)

(1) 1 x 250ml HDPE for ferrous iron

(3) 3 = Total Bottles

DOF DALTON OLMSTED FUGLEVAND

Monitoring Well Sampling Field Sheet

Well No. CTMW-9

Facility/Project: TWAAFA

Date: 12/12/23

Sampling Personnel: ES/MW

Initial Headspace (ppm) 0.0ppm

Sampling Method: low flow peri

Intial-Water Level before purge (ft. BTOC) 10.84 (Stickup)

Equipment Used:
WL - geo #7068 PID - RKI-6000
WQ - YSI Pro Quatro Pump - Masterflex
Turb - geo. turb

Well volume = 0.17 * (total well depth - water level)

End-Water Level post purge/sample with pump on (ft. BTOC): 10.83' (Stickup)

Well Volume = .17(30.1 - 10.84) ≈ 3.25 gal

Pump Intake Depth (ft.BTOC): ~1' off bottom

Purge start time: 1406 ~~1358~~ EDS

Purge stop time: 1434

Initial Flow Rate: 350

Final Flow Rate: 350

Flow cell disconnected prior to sampling: ☑

Water Quality Measurements

Time	Water level	Purge Rate	pH	SPC Conductivity	Temperature	Dissoved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL	< 0.1 unit	</= 3%	< 3%	</= 0.3 mg/L	< 10 mV	(3 readings) < 5 NTU or < 10% if >5 NTU
1407	10.83	350	7.37	3540	15.2	7.10	-10.7	9.21
1410	10.83	350	7.06	3361	15.6	5.01	9.8	6.77
1413	10.83	350	7.02	3379	15.5	2.28	14.2	7.84
1416	10.83	350	6.99	3393	15.5	0.17	17.5	18.1
1419	10.83	350	6.98	3402	15.5	0.11	19.3	11.3
1422	10.83	350	6.97	3397	15.6	0.11	19.5	10.7
1425	10.83	350	6.97	3397	15.6	0.11	19.5	10.9
	All parameters stable, d/c flow cell							
1430	collect @ CTMW-9-1223"							

Project: TWAAFA 4Q23
Samplers: ES/MW
Sample ID: CTMW-9-1223
Date: 12/12/23 Time: 1430
Analysis:
Preservative:

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode". Electrode calibrated in solution.

- Sample vol + 2.5gal

Bottles and Analyses: (collected in order below)

(1) 1 x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Total Metals (Al, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg)

(1) 1 x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Dissolved Metals (Al, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg) ☑ Field Filtered (0.45µm)

(1) 1 x 250 ml HDPE for ferrous iron

(2) 3 = Total Bottles

DOF DALTON OLMSTED FUGLEVAND

Monitoring Well Sampling Field Sheet

Well No. CTMW-11R2

Facility/Project: TWAAFA

Date: 12/15/23

Sampling Personnel: ES/MW

Initial Headspace (ppm) 0.0

Sampling Method: low flow peri

Intial-Water Level before purge (ft. BTOC) 5.81

Equipment Used:
WL - Geo. #7068 PID - RKI-6000
WQ - YSI Pro quatro Pump - Masterflex E/S
Turb - Geo tub

Well volume = 0.17 * (total well depth - water level)

Well Volume = 0.17(13' - 5.81) = 1.2 gal

End-Water Level post purge/sample with pump on (ft. BTOC): 6.89'

Pump Intake Depth (ft.BTOC): ~3' off bottom

Purge start time:	1035	Initial Flow Rate:	100	Flow cell disconnected prior to sampling :	☑
Purge stop time:	1110	Final Flow Rate:	100		

Water Quality Measurements

Time	Water level	Purge Rate	pH	SPC Conductivity	Temperature	Dissoved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL	< 0.1 unit	</= 3%	< 3%	</= 0.3 mg/L	< 10 mV	{3 readings} < 5 NTU or < 10% if >5 NTU
1038	6.03	100	12.27	7590	13.5	2.25	-83.0	5.98
1041	6.09	100	12.26	7745	12.8	0.50	-96.3	3.84
1044	6.13	100	12.36	7896	12.9	0.19	-104.9	3.17
1047	6.09	100	12.84	7980	12.2	0.18	-107.9	4.10
1050	6.08	100	1285	7952	12.2	0.16	-110.8	3.04
1053	6.08	100	1286	7908	12.3	0.15	-112.3	3.73
1056	All Params Stable, d/c flow cell							
~~1059~~	1100 Collect = CTMW-11R2-1223"							
~~1102~~								

Project: TWAAFA 4Q23
Samplers: ES/MW
Sample ID: CTMW-11R2-1223
Date: 12/15/23 Time: 1100
Analysis:
Preservative:

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode". Electrode calibrated in solution.

- Sample Vol + 0.25 gal

Bottles and Analyses: (collected in order below)

(1) 1 X ~~500~~ 250 mL HDPE w/ HNO_3 6020 Total Metals (Al), (Sb), Cr, (Cu), (Fe), (Mn), Ni, Pb, Zn) and 1631E (Hg)

(1) 1 X ~~500~~ 250 mL HDPE w/ HNO_3 6020 Dissolved Metals (Al), (Sb), Cr, (Cu), (Fe), (Mn), Ni, Pb, Zn) and 1631E (Hg) ☑ Field Filtered (0.45µm)

(1) 1 ~250 ml HDPE for ferrous iron

(2) 3 = Total Bottles

DOF DALTON OLMSTED FUGLEVAND

Monitoring Well Sampling Field Sheet

Well No. CTMW-12

Facility/Project: TWAAFA

Date: 12/15/23

Sampling Personnel: ES/MW

Initial Headspace (ppm) 0.0

Sampling Method: low flow peri

Intial-Water Level before purge (ft. BTOC) 15.22'

Equipment Used:
WL - 320#7068 PID - RKI-6000
WQ - YSI pro quatro Pump - Masterflex ES
Turb - 2100 turb.

Well volume = 0.17 * (total well depth - water level)

Well Volume = .17(37' - 15.22') = 3.7 gal

End-Water Level post purge/sample with pump on (ft. BTOC): 15.24

Pump Intake Depth (ft.BTOC): ~10' off bottom (~27' BTOC)

Purge start time:	1140	Initial Flow Rate:	300
Purge stop time:	1207	Final Flow Rate:	400

Flow cell disconnected prior to sampling : ☑

Water Quality Measurements

Time	Water level	Purge Rate	pH	SPC Conductivity	Temperature	Dissoved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL	< 0.1 unit	</= 3%	< 3%	</= 0.3 mg/L	< 10 mV	{3 readings} < 5 NTU or < 10% if >5 NTU
1143	15.24	300	7.79	1697	14.6	0.33	-24.5	2.89
1146	15.24	400	8.54	1780	15.2	0.34	-28.2	2.49
1149	15.24	400	7.43	1823	15.3	0.29	-10.2	2.26
1152	15.24	400	7.13	1870	15.3	0.24	8.6	4.30
1155	15.24	400	7.00	1914	15.2	0.27	23.2	3.76
1158	15.24	400	6.93	1944	15.3	0.26	29.7	3.03
1201	15.24	400	6.91	1956	15.3	0.26	31.3	3.49
	All parms stable, d/c flow cell							
1205	Collect "CTMW-12-1223"							

Project: TWAAFA 4Q23
Samplers: ES/MW
Sample ID: CTMW-12-1223
Date: 12/15/23 Time: 1205
Analysis:
Preservative:

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode". Electrode calibrated in solution.

- Sample vol + 2 gal

Bottles and Analyses: (collected in order below)

(1) 1 x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Total Metals (Al, Sb, Cr, Co, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg)

(1) 1 x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Dissolved Metals (Al, Sb, Cr, Co, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg) ☑ Field Filtered (0.45µm)

(1) 1 x 250ml HDPE for Ferrous Iron

(3) 3 = Total Bottles

DOF DALTON OLMSTED FUGLEVAND

Monitoring Well Sampling Field Sheet

Well No. CTMW-14

Facility/Project: TWAAFA

Date: 12/13/23

Sampling Personnel: ES/MW

Initial Headspace (ppm) 0.0

Sampling Method: low flow pur.

Intial-Water Level before purge (ft. BTOC) 3.42' (Stickup)

Equipment Used:
WL - Geo. #7068 PID - RKI-6000
WQ - YSI Pro Quatro Pump - Masterflex E1S
Turb - Geo. turb.

Well volume = 0.17 * (total well depth - water level)

Well Volume = .17(11.17' - 3.42') = 1.3 gal

End-Water Level post purge/sample with pump on (ft. BTOC): 4.32'

Pump Intake Depth (ft.BTOC): ~1' off bottom

Purge start time: 1344

Purge stop time: 1420

Initial Flow Rate: 300

Final Flow Rate: 175

Flow cell disconnected prior to sampling: ☑

Water Quality Measurements

Time	Water level	Purge Rate	pH	Conductivity	Temperature	Dissoved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL	< 0.1 unit	</= 3%	< 3%	</= 0.3 mg/L	< 10 mV	{3 readings} < 5 NTU **or** < 10% if >5 NTU
1346	3.84	300	7.74	316.2	13.4	2.93	37.3	199
1349	4.02	175	7.94	314.6	13.2	2.77	32.9	143
1352	4.06	175	8.03	253.1	12.8	2.87	34.2	63.7
1355	4.15	175	8.17	260.7	12.6	2.48	30.6	18.1
1358	4.19	175	8.22	271.6	12.6	2.22	28.2	12.1
1401	4.22	175	8.26	276.6	12.5	2.15	26.3	10.3
1404	4.23	175	8.29	282.4	12.4	2.14	26.6	11.6
1407	4.27	175	8.31	285.0	12.3	2.10	25.5	10.73
1410	4.29	175	8.33	284.1	12.3	2.11	25.1	10.96
	All parms stable, d/c flow cell							
1415	Collect "CTMW-14-1223"							

Project: TWAAFA 4Q23
Samplers: ES/MW
Sample ID: CTMW-14-1223
Date: 12/13/23 Time: 1415
Analysis:
Preservative:

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode". Electrode calibrated in solution.

- Sample vol + 1.25 gal

* Working to reduce DO, call AC & he confirmed readings are expected.

Bottles and Analyses: (collected in order below)

(1) 1 x 500/250 mL HDPE w/ HNO_3 6020 Total Metals (Al) (As), Cr, (Cu) (Fe), (Mn), Ni, Pb, Zn) and 1631E (Hg)

(1) 1 x ~~500~~ mL HDPE w/ HNO_3 6020 Dissolved Metals (Al), (As), Cr, (Cu) (Fe) (Mn), Ni, Pb, Zn) and 1631E (Hg) ☑ Field Filtered (0.45µm)

(1) 1 x 250 ml HDPE for ferrous iron

(3) 3 = Total Bottles

DOF DALTON OLMSTED FUGLEVAND

Monitoring Well Sampling Field Sheet

Well No. CTMW-17

Facility/Project: TWAAFA

Date: 12/15/23

Sampling Personnel: ES/MW

Initial Headspace (ppm) 5.1

Sampling Method: low flow peri

Intial-Water Level before purge (ft. BTOC) 6.76' (stickup)

Equipment Used:
WL - Geotech 17068 PID - RAE - 6000
WQ - ysi proquatro Pump - Masterflex
Turb - 360 hach ES

Well volume = 0.17 * (total well depth - water level)

End-Water Level post purge/sample with pump on (ft. BTOC): 7.05'

Well Volume = .17(15.5' - 6.76') ≈ 1.5 gal

Pump Intake Depth (ft.BTOC): ~2.5' off bottom

Purge start time:	1310	Initial Flow Rate:	250	Flow cell disconnected prior to sampling :	☑
Purge stop time:	1349	Final Flow Rate:	250		

Water Quality Measurements

Time	Water level	Purge Rate	pH	SPC Conductivity	Temperature	Dissoved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL	< 0.1 unit	</= 3%	< 3%	</= 0.3 mg/L	< 10 mV	(3 readings) < 5 NTU or < 10% if >5 NTU
1315	7.03	250	7.39	960	12.5	-0.07 *	26.5	31.1
1318	7.03	250	6.88	972	12.2	-0.01 *	37.3	22.8
1321	7.03	250	6.75	1016	12.2	0	41.2	22.4
1324	7.03	250	6.73	1053	12.0	0	42.7	20.8
1327	7.03	250	6.72	1078	11.9	0	44.3	22.2
1330	7.05	250	6.73	1100	11.9	0	43.3	22.8
1333	7.05	250	6.74	1124	11.8	0	44.1	23.5
1336	7.05	250	6.76	1144	11.7	0	44.3	22.1
1339	7.05	250	6.79	1161	11.6	0	44.3	~~22.9~~ 3RDS 22.9
	All parms stable, d/c flow cell							
1345	Collect - CTMW-17-1223 -							

Project: TWAAFA 4Q23
Samplers: ES/MW
Sample ID: CTMW-17-1223
Date: 12/15/23 Time: 1345
Analysis:
Preservative:

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode". Electrode calibrated in solution.

*(-)DO will be recorded as 0 (1321 forward) per AC (remote)

- Sample vol +1.75 gal

Bottles and Analyses: (collected in order below)

(1) 1 x ~~500~~ 250 mL HDPE w/ HNO_3, 6020 Total Metals (Al, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg)

(1) 1 x ~~500~~ 250 mL HDPE w/ HNO_3, 6020 Dissolved Metals (Al, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg) ☑ Field Filtered (0.45µm)

(1) 1 x 250ml HDPE for Ferrous Iron

(2) 3 = Total Bottles

DOF DALTON OLMSTED FUGLEVAND

Monitoring Well Sampling Field Sheet

Well No. CTMW-17D

Facility/Project: TWAAFA

Date: 12/15/23

Sampling Personnel: ES/MW

Initial Headspace (ppm) 0.3

Sampling Method: low flow peri

Intial-Water Level before purge (ft. BTOC) 13.24'

Equipment Used:
WL - YSI #70108 PID - RKI-6000
WQ - YSI pro quatro Pump - Masterflex E/S
Turb - geo. turb

Well volume = 0.17 * (total well depth - water level)

Well Volume = .17(30.75' - 13.24') = 3 gal

End-Water Level post purge/sample with pump on (ft. BTOC): 13.24'

Pump Intake Depth (ft.BTOC): ~2.5' off bottom

Purge start time: 1400

Purge stop time: 1428

Initial Flow Rate: 300

Final Flow Rate: 300

Flow cell disconnected prior to sampling: ☑

Water Quality Measurements

Time	Water level	Purge Rate	pH	SPC Conductivity	Temperature	Dissoved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL	< 0.1 unit	</= 3%	< 3%	</= 0.3 mg/L	< 10 mV	(3 readings) < 5 NTU or < 10% if >5 NTU
1401	13.27	300	6.83	1804	14.3	0 *	56.8	15.3
1404	13.27	300	6.85	1823	14.5	0.42	53.8	10.5
1407	13.27	300	6.86	1822	14.5	0.28	52.6	6.39
1410	13.27	300	6.87	1826	14.5	0.22	51.5	5.96
1413	13.27	300	6.87	1817	14.4	0	50.4	4.71
1416	13.27	300	6.87	1819	14.4	0	49.3	4.86
1419	13.27	300	6.87	1825	14.4	0	48.1	4.53
	All parms stable, d/c flow							
1425	Collect "CTMW-17D-1223"							

Project: TWAAFA 4Q23
Samplers: ES/MW
Sample ID: CTMW-17D-1223
Date: 12/15/23 Time: 1425
Analysis:
Preservative:

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode". Electrode calibrated in solution.

- * (-) DO is recorded as 0
- Sample vol = 2 gal

Bottles and Analyses: (collected in order below)

(1) 1 x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Total Metals (A), (As), Cr, (Co), (Fe), (Mn), Ni, Pb, Zn) and 1631E (Hg)

(1) 1 x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Dissolved Metals (A), (As), Cr, (Co), (Fe), (Mn), Ni, Pb, Zn) and 1631E (Hg) ☑ Field Filtered (0.45µm)

(1) 1 x 250 mL HDPE for Ferrous Iron

(3) 3 = Total Bottles

DOF DALTON OLMSTED FUGLEVAND

Monitoring Well Sampling Field Sheet

Well No. CTMW-18

Facility/Project: TWAAFA

Date: 12/13/23

Sampling Personnel: ES/MW

Initial Headspace (ppm) 0.9ppm

Sampling Method: low flow peri

Intial-Water Level before purge (ft. BTOC) 6.73' (stickup)

Equipment Used:
WL - 910, #7068 PID - RAE-6000
WQ - YSI Pro Quatro Pump - Masterflex
Turb - 910 turb E/S

Well volume = 0.17 * (total well depth - water level)

End-Water Level post purge/sample with pump on (ft. BTOC): 7.06'

Well Volume = .17(13 - 6.73') ≈ 1.0 gal

Pump Intake Depth (ft.BTOC): ~1' off bottom

Purge start time:	1219	Initial Flow Rate:	300	Flow cell disconnected prior to sampling: ☑
Purge stop time:	1243	Final Flow Rate:	175	

Water Quality Measurements

Time	Water level	Purge Rate	pH	SPC Conductivity	Temperature	Dissoved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL	< 0.1 unit	</= 3%	< 3%	</= 0.3 mg/L	< 10 mV	{3 readings} < 5 NTU or < 10% if >5 NTU
1220	6.89	300	6.91	992	15.9	1.72	80.6	26.6
1223	6.98	300	6.70	980	15.8	1.63	84.6	15.7
1226	7.07	250	6.64	910	15.5	0.38	83.8	17.6
1229	7.06	175	6.63	924	15.4	0.29	82.3	16.8
1232	7.06	175	6.61	935	15.3	0.31	80.8	16.3
	All parms Stable, d/c flow cell							
1235	Collect "CTMW-18-1223"							

Project: TWAAFA 4Q23
Samplers: ES/MW
Sample ID: CTMW-18-1223
Date: 12/13/23 Time: 1235
Analysis:
Preservative:

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode". Electrode calibrated in solution.

- Sample vol + 1 gal

Bottles and Analyses: (collected in order below)

1st

(1) 1 x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Total Metals (Ba, Be, Cr, Co, Cu, Mn, Ni, Pb, Zn) and 1631E (Hg)

(1) 1 x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Dissolved Metals (Al, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg) ☑ Field Filtered (0.45µm)

(1) 1 x 250ml HDPE for Ferrous Iron

(2) 3 = Total Bottles

DOF DALTON OLMSTED FUGLEVAND	Monitoring Well Sampling Field Sheet	Well No. CTMW-23R2
		Facility/Project: TWAAFA
Date: 12/15/23	Sampling Personnel: ES/MW	Initial Headspace (ppm) 0.0
Sampling Method: low flow pump		Intial-Water Level before purge (ft. BTOC) 4.81
Equipment Used: WL - geo. #7068 PID - RAE-4000 WQ - YSI Proquatro Pump - Masterflex E/S Turb geo. turb	Well volume = 0.17 * (total well depth - water level)	End-Water Level post purge/sample with pump on (ft. BTOC): 5.48'
	Well Volume = .17(12.5'-4.81') ≈ 1.3 gal	Pump Intake Depth (ft.BTOC): ~4' off bottom
Purge start time: 0936	Initial Flow Rate: 250	Flow cell disconnected prior to sampling : ☑
Purge stop time: 1024	Final Flow Rate: 100	

Water Quality Measurements

Time	Water level	Purge Rate	pH	SPC Conductivity	Temperature	Dissoved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL	< 0.1 unit	</= 3%	< 3%	</= 0.3 mg/L	< 10 mV	(3 readings) < 5 NTU or < 10% if >5 NTU
0938	5.02	250	7.75	685	14.6	0.67	91.5	9.20
0941	5.19	200	7.31	666	14.1	0.13	93.2	10.40
0944	5.28	150	7.17	684	13.9	0.18	90.7	9.33
0947	5.38	150	7.12	699	13.9	0.13	88.6	8.89
0950	5.47	150	7.11	720	13.5	0.13	87.4	8.64
0953	5.49	150	7.11	721	13.8	0.14	86.3	8.54
0956	5.52	100	7.12	726	13.3	0.15	84.2	8.74
0959	5.56	100	7.13	727	13.4	0.13	83.2	8.36
1002	5.56	100	7.14	730	13.3	0.12	83.1	8.80
1005	5.56	100	7.16	731	13.2	0.11	82.8	8.19
1008	5.57	100	7.17	733	13.3	0.10	81.8	8.02
	All parms stable, drawdown >0.33ft, but AC confirmed (remote) that okay to sample							
1010	Collect "CTMW-23R2-1223"							

Project: TWAAFA 4Q23
Samplers: ES/MW
Sample ID: CTMW-23R2-1223
Date: 12/15/23 Time: 1010
Analysis:
Preservative:

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode". Electrode calibrated in solution.

- Sample vol = 1.25 gal
- Paint fumes here + "Field Blank #1-1223" taken here

Bottles and Analyses: (collected in order below)

1ST

(1) 1 x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Total Metals (Al) (As), Cr, (Cu), (Fe), (Mn), Ni, Pb, Zn) and 1631E (Hg)

(1) 1 x ~~500~~ mL HDPE w/ HNO_3 6020 Dissolved Metals (Al) (As), Cr, (Cu), (Fe), (Mn), Ni, Pb, Zn) and 1631E (Hg) ☑ Field Filtered (0.45µm)

(1) 1 x 250mL HDPE for ferrous Iron

(2) 3 = Total Bottles

DOF DALTON OLMSTED FUGLEVAND

Monitoring Well Sampling Field Sheet

Well No. CTMW-24

Facility/Project: TWAAFA

Date: 12/11/23

Sampling Personnel: ES/MW

Sampling Method: low flow peri

Initial Headspace (ppm) 0.0

Intial-Water Level before purge (ft. BTOC) 5.56' (stickup)

Equipment Used:
WL - Geo. M7068 PID - RKI - 6000
WQ - YSI P.o Quat. Pump - Masterflex E/S
Turb - Geo Tub.

Well volume = 0.17 * (total well depth - water level)

Well Volume = .17(11 - 5.56) = 0.92 gal

End-Water Level post purge/sample with pump on (ft. BTOC): 5.96' (stickup)

Pump Intake Depth (ft.BTOC): ~1' off bottom

Purge start time:	1027	Initial Flow Rate:	300	Flow cell disconnected prior to sampling : ☑
Purge stop time:	1103	Final Flow Rate:	300	

Water Quality Measurements

Time	Water level	Purge Rate	pH	SPC Conductivity	Temperature	Dissoved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL	< 0.1 unit	</= 3%	< 3%	</= 0.3 mg/L	< 10 mV	{3 readings} < 5 NTU or < 10% if >5 NTU
1029	5.76	300	7.98	650	11.4	5.86	144.6	21.6
1032	5.94	300	6.85	271.5	11.3	3.70	143.7	12.5
1035	5.98	300	6.50	254.8	11.4	1.87	145.8	12.1
1038	5.96	300	6.38	255.5	11.4	1.02	147.0	4.05
1041	5.96	300	6.32	256.0	11.5	0.66	149.9	2.70
1044	5.96	300	6.27	258.8	11.5	0.32	152.0	2.42
1047	5.96	300	6.26	262.1	11.5	0.24	153.4	2.21
1050	5.96	300	6.27	264.4	11.5	0.18	153.3	1.41
	All parms stable d/c flow cell							
1100	Collect "CTMW-24-1223"							

Project: TWAAFA 4Q23
Samplers: ES/MW
Sample ID: CTMW-24-1223
Date: 12/11/23 Time: 1100
Analysis:
Preservative:

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode". Electrode calibrated in solution.

- 2.5 gal + sample vol
- (1) HNO3 pres. bottle thrown away due to filling w/o filter (for diss. met.)

Bottles and Analyses: (collected in order below)

1ss

(1) 1 x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Total Metals (Al) (As) Cr, (Cu), (Fe), (Mn), Ni, Pb, Zn) and 1631E (Hg)

(1) 1 x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Dissolved Metals (Al) (As) Cr, (Cu), (Fe), (Mn), Ni, Pb, Zn) and 1631E (Hg) ☑ Field Filtered (0.45µm)

(1) 1 x 250ml HDPE for Ferrous Iron

(2) 3 = Total Bottles

DOF DALTON OLMSTED FUGLEVAND

Monitoring Well Sampling Field Sheet

Well No. CTMW-24D

Facility/Project: TWAAFA

Date: 12/11/23

Sampling Personnel: ES/MN

Initial Headspace (ppm) 0.1 ppm

Sampling Method: low flow peri

Intial-Water Level before purge (ft. BTOC) 12.94' (stickup)

Equipment Used:
WL - Geo #1068 PID - RKI-6000
WQ - YSI Pro Quatt. Pump - Masterflex
Turb - Geo. Turb. EIS

Well volume = 0.17 * (total well depth - water level)

Well Volume = .17(24.5 - 12.94) = 2gal

End-Water Level post purge/sample with pump on (ft. BTOC): 12.92'

Pump Intake Depth (ft.BTOC): ~1' off bottom

Purge start time: 1125

Purge stop time: 1248

Initial Flow Rate: 300

Final Flow Rate: 350

Flow cell disconnected prior to sampling: ☑

Water Quality Measurements

Time	Water level	Purge Rate	pH	SPC Conductivity	Temperature	Dissoved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL	< 0.1 unit	</= 3%	< 3%	</= 0.3 mg/L	< 10 mV	{3 readings} < 5 NTU or < 10% if >5 NTU
1126	12.96	300	YSI Shutoff → Black screen when turned back on					3.14
1129	12.96	300	YSI Troubleshooting					
1132			"					
1135	Pump off while YSI is fixed							
1227	Purge resumes, YSI batteries changed, YSI functioning properly							
1228	12.91	350	6.87	2626	13.0	0.77	150.3	0.02
1231	12.92	350	6.86	2625	13.8	0.30	146.0	0.53
1234	12.92	350	6.85	2634	13.8	0.24	144.1	1.02
1237	12.92	350	6.85	2637	13.8	0.19	140.6	1.94
	All parms stable, d/c flow cell							
1245	Collect "CTMW-24D-1223"							

Project: TWAAFA 4Q23
Samplers: ES/MW
Sample ID: CTMW-24D-1223
Date: 12/11/23 Time: 1245
Analysis:
Preservative:

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode". Electrode calibrated in solution.

- 2.25 gal + Sample vol
-

Bottles and Analyses: (collected in order below)

(1) 1 X ~~500~~ 250 mL HDPE w/ HNO_3 6020 Total Metals (Al, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg)

(1) 1 X ~~500~~ mL HDPE w/ HNO_3 6020 Dissolved Metals (Al, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg) ☑ Field Filtered (0.45µm)

(1) 1 X 250ml HDPE for Ferrous Iron

(3) 3 = Total Bottles

DOF DALTON OLMSTED FUGLEVAND

Monitoring Well Sampling Field Sheet

Well No. MW-4

Facility/Project: TWAAFA

Date: 12/18/23

Sampling Personnel: ES/MW

Initial Headspace (ppm) 0.0

Sampling Method: low flow peri

Intial-Water Level before purge (ft. BTOC) 5.18' (stickup)

Equipment Used:
WL - geo #7068 PID - RKI-6000
WQ - ysi pioquatro Pump - Masterflex
Turb geo tub E/S

Well volume = 0.17 * (total well depth - water level)

Well Volume = .17(13' - 5.18') ≈ 1.3 gal

End-Water Level post purge/sample with pump on (ft. BTOC): 7.01

Pump Intake Depth (ft.BTOC): ~2' off bottom

Purge start time: 1242 | Initial Flow Rate: 400

Purge stop time: 1318 | Final Flow Rate: 100

Flow cell disconnected prior to sampling : ☑

Water Quality Measurements

Time	Water level	Purge Rate	pH	SPC Conductivity	Temperature	Dissoved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL	< 0.1 unit	</= 3%	< 3%	</= 0.3 mg/L	< 10 mV	(3 readings) < 5 NTU or < 10% if >5 NTU
★★ 1243	6.31	200	7.22	2647	13.1	0.26	19.0	5.29
1246	7.10	100	7.16	2698	12.8	0 ★	19.8	4.86
1249	7.12	100	7.18	2717	12.3	0	19.7	4.99
1252	7.13	100	7.18	2705	12.4	0.01	19.5	4.38
1255	7.12	100	7.19	2711	12.4	0	19.3	4.75
1258	7.11	100	7.19	2709	12.6	0	18.6	4.70
	All parms stable, d/c flow cell							
1305	Collect "MW-4-1223"							

Project: TWAAFA 4Q23
Samplers: ES/MW
Sample ID: MW-4-1223
Date: 12/18/23 Time: 1305
Analysis:
Preservative:

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode". Electrode calibrated in solution.

★ (-) 00 recorded as 0

★★ Initial pumping WL was @ 400 mL/min, so 6.31' = WL 1305 Flow was reduced to 100mL/min & WL stabilized @ ± 7.12' (TRUE PUMPING WL)

- Sample vol + 0.75 gal

Bottles and Analyses: (collected in order below)

(1) 1 x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Total Metals (Al, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg)

(1) 1 x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Dissolved Metals (Al, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg) ☑ Field Filtered (0.45µm)

(1) 1 x 250mL HDPE for Ferrous Iron

(3) 3 = Total Bottles

Field Blank #2-1223 taken here!

DOF DALTON OLMSTED FUGLEVAND

Monitoring Well Sampling Field Sheet

Well No. PZ-7

Facility/Project: TWAAFA

Date: 12/11/23

Sampling Personnel: ES/MW

Initial Headspace (ppm) 0.0 ppm

Sampling Method: low flow peri.

Intial-Water Level before purge (ft. BTOC) 10.94' BTOC (stickup)

Equipment Used:
WL - geo tech PID - RKI-6000
WQ - YSI Pro Quatro Pump - Masterflex E/S
Turb - geo tub.

Well volume = 0.17 * (total well depth - water level)

Well Volume = .17 (17 - 10.94) ≈ 1.03 gal

End-Water Level post purge/sample with pump on (ft. BTOC): 11.06'

Pump Intake Depth (ft.BTOC): ~1' off bottom

Purge start time: 1337 / 1322 EDS

Purge stop time: 1401

Initial Flow Rate: 250

Final Flow Rate: 400

Flow cell disconnected prior to sampling : ☑

Water Quality Measurements

Time	Water level	Purge Rate	pH	SPC Conductivity	Temperature	Dissoved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL	< 0.1 unit	</= 3%	< 3%	</= 0.3 mg/L	< 10 mV	(3 readings) < 5 NTU or < 10% if >5 NTU
1322	Purge Start → Pump died, attempting to charge/use via van power (plugged into pump)							
1339	Purge Start, using van generator to power pump							
1338	11.02	250	6.37	1644	14.6	0.18	129.2	3.93
1341	11.04	400	6.29	1690	15.2	0.14	140.7	5.60
1344	11.05	400	6.27	1725	15.4	0.11	146.2	5.65
1347	11.06	400	6.26	1737	15.3	0.07	149.4	4.94
1350	11.06	400	6.25	1752	15.4	0.05	151.0	2.16
1353	11.06	400	6.25	1765	15.5	0.06	151.4	1.63
1400	Collect "PZ-7-1223"							

Project: TWAAFA 4Q23
Samplers: ES/MW
Sample ID: PZ-7-1223
Date: 12/11/23 Time: 1400
Analysis:
Preservative:

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode". Electrode calibrated in solution.

- Sample vol + 1.5 gal

Bottles and Analyses: (collected in order below)

(1) 1 x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Total Metals (Al) (As) Cr, Cu, (Fe) (Mn) (Ni) (Pb) (Zn) and 1631E (Hg)

(1) 1 x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Dissolved Metals (Al) (As) Cr, Cu, (Fe) (Mn) (Ni) (Pb) (Zn) and 1631E (Hg) ☑ Field Filtered (0.45µm)

(1) ~~1~~ 1 x 250ml HDPE for Ferrous Iron

(3) 3 = Total Bottles

DOF DALTON OLMSTED FUGLEVAND

Monitoring Well Sampling Field Sheet

Well No. PZ-8

Facility/Project: TWAAFA

Date: 12/11/23

Sampling Personnel: ES/MW

Initial Headspace (ppm) 0.0 ppm

Sampling Method: low flow pro.

Intial-Water Level before purge (ft. BTOC) 6.83' BTOC (Stickup)

Equipment Used:
WL - geo #7068 PID - RKI-6000
WQ - YSI Pro Quatro Pump - Masterflex
Turb - geo tub ES

Well volume = 0.17 * (total well depth - water level)

Well Volume = 1.7(10.2' - 6.83') ≈ 0.57 gal

End-Water Level post purge/sample with pump on (ft. BTOC): 6.92'

Pump Intake Depth (ft.BTOC): ~1' off bottom

1438 Purge start time: 1423 (EDS)

Purge stop time: 1501

Initial Flow Rate: 300

Final Flow Rate: 300

Flow cell disconnected prior to sampling : ☑

Water Quality Measurements

Time	Water level	Purge Rate	pH	Conductivity	Temperature	Dissoved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL	< 0.1 unit	</= 3%	< 3%	</= 0.3 mg/L	< 10 mV	(3 readings) < 5 NTU or < 10% if >5 NTU
1423	Purge Start, Tubing is creased, replacing w/ 1/4" Inner Diameter tubing (16').							
1438	Tubing replaced, purge start							
1439	6.88	300	6.35	456.2	12.4	0.63	120.1	158
1442	6.92	300	6.31	459.1	12.1	0.62	124.6	119
1445	6.92	300	6.26	460.2	11.9	0.56	128.6	96.8
1448	6.92	300	6.24	460.7	11.7	0.45	130.7	67.4
1451	6.92	300	6.23	461.4	11.6	0.40	132.3	49.0
~~1500~~	~~Collect EDS~~							
	All parms stable, except turb, but SOP-124 allows for sampling as we'rd collecting filtered & unfiltered metals samples & ext. cond'ns (daylight + lab d/o) require sampling to begin, now.							✓
1500	Collect "PZ-8-1223"							
1501	Purge Stop							

Project: TWAAFA 4Q23
Samplers: ES/MW
Sample ID: PZ-8-1223
Date: 12/11/23 Time: 1500
Analysis:
Preservative:

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode". Electrode calibrated in solution.

- 1.5 gal + Sample vol

Bottles and Analyses: (collected in order below)

1st

(1) x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Total Metals (Al, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg)

(1) x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Dissolved Metals (Al, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg) ☑ Field Filtered (0.45µm)

(1) x 250ml HDPE for ferrous Iron

(3) = Total Bottles

DOF DALTON OLMSTED FUGLEVAND

Monitoring Well Sampling Field Sheet

Well No. PZ-9
Facility/Project: TWAAFA

Date: 12/12/23
Sampling Personnel: ES/MW
Sampling Method: low flow peri
Initial Headspace (ppm) 0.2 ppm
Intial-Water Level before purge (ft. BTOC) 5.03' BTOC (stickup)
End-Water Level post purge/sample with pump on (ft. BTOC): 5.68' (stickup)
Equipment Used:
WL - GCO #17068 PID - RKI-6000
WQ - YSI Pro Quatro Pump Masterflex
Turb - GCO-turb. ES
Well volume = 0.17 * (total well depth - water level)
Well Volume = .17(10.2' - 5.03') ≈ 0.88 gal
Pump Intake Depth (ft.BTOC): ~1' off bottom

Purge start time: 1120
Purge stop time: 1146
Initial Flow Rate: 300
Final Flow Rate: 250
Flow cell disconnected prior to sampling: ☑

Water Quality Measurements

Time	Water level	Purge Rate	pH	SPC Conductivity	Temperature	Dissoved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL	< 0.1 unit	</= 3%	< 3%	</= 0.3 mg/L	< 10 mV	(3 readings) < 5 NTU or < 10% if >5 NTU
1121	5.58	300	7.14	1624	14.5	6.71	-61.9	12.2
1124	5.87	300	6.69	1440	14.4	4.16	-18.6	8.97
1127	5.77	300	6.58	1460	14.4	0.21	0.0	12.40
1130	5.72	250	6.54	1472	14.4	0.16	8.0	12.60
1133	5.68	250	6.53	1474	14.8	0.24	10.7	12.40
1151	turned off							~~12.30~~ SDS
1136	5.68	250	6.52	1485	14.8	0.20	13.0	12.30
	All parms stable, d/c flow cell							
1145	collect PZ-9-1223							

Project: TWAAFA 4Q23
Samplers: ES/MW
Sample ID: PZ-9-1223
Date: 12/12/23 Time: 1145
Analysis:
Preservative:

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode". Electrode calibrated in solution.
- Added silicone + 1/4" O.D. tubing to allow for peri pumping
- sample vol = 1.5 gal

Bottles and Analyses: (collected in order below)

(1) 1 x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Total Metals (Al, Sb, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg)
(1) 1 x ~~500~~ mL HDPE w/ HNO_3 6020 Dissolved Metals (Al, Sb, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg) ☑ Field Filtered (0.45µm)
(1) 1 x 250 mL HDPE for ferrous iron

(2) 3 = Total Bottles

DOF DALTON OLMSTED FUGLEVAND

Monitoring Well Sampling Field Sheet

Well No. TWA-4D

Facility/Project: TWAAFA

Date: 12/12/2023

Sampling Personnel: ES/MW

Initial Headspace (ppm) 0.1

Sampling Method: low flow peri

Intial-Water Level before purge (ft. BTOC) 9.10'

Equipment Used:
WL - Geo. #7068 PID - RKI-6000
WQ - YSI Pro Quatro Pump - Masterflex
Turb - Geo. Turb. E/S

Well volume = 0.17 * (total well depth - water level)
water level

Well Volume = .17(- 9.10') =

End-Water Level post purge/sample with pump on (ft. BTOC): 10.58'

Pump Intake Depth (ft.BTOC): ~1' off bottom

Purge start time:	1004	Initial Flow Rate:	400	Flow cell disconnected prior to sampling :	☑
Purge stop time:	1056	Final Flow Rate:	300		

Water Quality Measurements

Time	Water level	Purge Rate	pH	SPC Conductivity	Temperature	Dissoved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL	< 0.1 unit	</= 3%	< 3%	</= 0.3 mg/L	< 10 mV	(3 readings) < 5 NTU or < 10% if >5 NTU
1006	9.15	400	7.57	7809	5.70	14.1	101.8	4.21
1009	10.78	400	7.70	7916	14.1	4.47	93.3	4.27
1012	10.85	400	7.74	7911	14.0	3.29	82.4	2.41
1015	10.85	400	7.76	7910	14.0	1.86	57.7	2.62
1019	10.86	400	7.76	7905	14.0	0.64	11.7	2.03
1021	10.87	400	7.77	7909	14.0	0.33	-16.6	2.03
1024	10.89	400	7.77	7917	14.0	0.21	-35.2	2.94
1027	10.82	300	7.77	7931	13.9	0.13	-60.3	1.32
1030	10.72	300	7.78	7955	13.8	0.07	-80.1	0.02
1033	10.68	300	7.78	7955	13.9	0.07	-85.0	1.18
1036	10.66	300	7.78	8009	13.8	0.04	-93.5	1.00
1039	10.63	300	7.78	8048	13.8	0.03	-100.7	0.92
1042	10.64	300	7.79	8065	13.8	0.03	-105.7	1.72
1045	10.66	300	7.79	8122	13.9	0.04	-110.9	0.83
1048	10.64	300	7.79	8151	13.8	0.04	-115.6	4.35
	All parms stable, d/c flow cell							
1050	Collect "TWA-4D-1223"							

Project: TWAAFA 4Q23
Samplers: ES/MW
Sample ID: TWA-4D-1223
Date: 12/12/23 Time: 1050
Analysis:
Preservative:

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode". Electrode calibrated in solution.

- Sample vol + 4 gal + 1 gal = 5 gal

* dropped pumping rate to combat drawdown

Bottles and Analyses: (collected in order below)

(1) 1 x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Total Metals (Al), (Sb), Cr, (Cu), (Fe), (Mn), Ni, Pb, Zn) and 1631E (Hg)

(1) 1 x ~~500~~ mL HDPE w/ HNO_3 6020 Dissolved Metals (Al), (Sb), Cr, (Cu), (Fe), (Mn), Ni, Pb, Zn) and 1631E (Hg) ☑ Field Filtered (0.45µm)

(1) 1 x 250 ml HDPE for ferrous iron

(2) 3 = Total Bottles

DOF DALTON OLMSTED FUGLEVAND

Monitoring Well Sampling Field Sheet

Well No. TWA-7D

Facility/Project: TWAAFA

Date: 12/12/23

Sampling Personnel: ES/MW

Initial Headspace (ppm) 2.7 ppm

Sampling Method: low flow peri

Intial-Water Level before purge (ft. BTOC) 9.55'

Equipment Used:
WL - geo # 7068 PID - RKI-6000
WQ - YSI Pro Quatro Pump - Masterflex E/S
Turb - geo turb.

Well volume = 0.17 * (total well depth - water level)

Well Volume = .17(-9.55) ≈

End-Water Level post purge/sample with pump on (ft. BTOC): 10.43'

Pump Intake Depth (ft.BTOC): ~1' off bottom

Purge start time:	1215	Initial Flow Rate:	400	Flow cell disconnected prior to sampling :	☑
Purge stop time:	1253	Final Flow Rate:	150		

Water Quality Measurements

Time	Water level	Purge Rate	pH	SPC Conductivity	Temperature	Dissoved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL	< 0.1 unit	</= 3%	< 3%	</= 0.3 mg/L	< 10 mV	{3 readings} < 5 NTU or < 10% if >5 NTU
1216	10.08	400	7.45	6199	15.9	2.83	18.2	5.72
1219	10.60	300	7.74	6307	16.1	0.61	-26.2	2.93
1222	10.89	300	7.80	6254	16.0	0.12	-46.1	3.60
1225	10.89	300	7.82	6188	16.1	0.04	-63.6	2.73
1228	10.81	150	7.83	6159	15.9	0.03	-68.9	2.13
1231	10.60	150	7.84	6158	15.9	0.03	-77.1	3.02
1234	10.49	150	7.84	6140	15.8	0.03	-83.1	3.51
1237	10.41	150	7.84	6097	15.8	0.04	-88.0	0.63
1240	10.39	150	7.84	6092	15.6	0.05	-93.1	1.10
	All parms stable, d/c flow cell							
1245	Collect = TWA-7D-1223"							

Project: TWAAFA 4Q23
Samplers: ES/MW
Sample ID: TWA-7D-1223
Date: 12/12/23 Time: 1245
Analysis:
Preservative:

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode". Electrode calibrated in solution.

- Sample vol + 2.75 gal
- Throw away 1x HNO_3 preS. 250mL HDPE (forgot filter)

Bottles and Analyses: (collected in order below)

1st
(1) 1 x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Total Metals (Al) (As) Cr, (Cu) (Fe) (Mn) Ni, Pb, Zn) and 1631E (Hg)
(1) 1 x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Dissolved Metals (Al), (As), Cr, (Co), (Fe), (Mn) Ni, Pb, Zn) and 1631E (Hg) ☑ Field Filtered (0.45µm)
(1) 1 x 250mL HDPE for Ferrous Iron

(3) 3 = Total Bottles

DOF DALTON OLMSTED FUGLEVAND

Monitoring Well Sampling Field Sheet

Well No. TWA-8D

Facility/Project: TWAAFA

Date: 12/13/23

Sampling Personnel: ES/MW

Sampling Method: low flow

Initial Headspace (ppm) 0.7 ppm

Intial-Water Level before purge (ft. BTOC) 9.32'

Equipment Used:
WL - geo. #7008 PID - RKI-6000
WQ - YSI Pro Quatro Pump - Masterflex
Turb - geo. turb. E/S

Well volume = 0.17 * (total well depth - water level)

Well Volume = .17(56' - 9.32') ≈ 8gal

End-Water Level post purge/sample with pump on (ft. BTOC): 10.98

Pump Intake Depth (ft.BTOC): ~1.5' off bottom

Purge start time:	0859	Initial Flow Rate:	250	Flow cell disconnected prior to sampling:	☑
Purge stop time:	0931	Final Flow Rate:	200		

Water Quality Measurements

Time	Water level	Purge Rate	pH	Spc Conductivity	Temperature	Dissoved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL	< 0.1 unit	</= 3%	< 3%	</= 0.3 mg/L	< 10 mV	{3 readings} < 5 NTU or < 10% if >5 NTU
0902	9.93	250	7.91	10724	13.6	0.50	171.5	0.02
0905	10.32	200	7.81	10631	13.7	0.92	162.1	1.24
0908	10.67	200	7.80	10635	13.6	0.94	155.1	2.19
0911	10.81	200	7.80	10635	13.6	0.45	149.9	3.02
0914	10.89	200	7.79	10638	13.7	0.75	146.6	1.55
0917	10.98	200	7.79	10671	13.6	0.78	144.3	1.72
0920	11.00	200	7.79	10753	13.5	0.72	141.4	0.02
	All parms Stable, d/c flow cell							
0925	Collect	" TWA-8D-1223"						

Project: TWAAFA 4Q23
Samplers: ES/MW
Sample ID: TWA-8D-1223
Date: 12/13/23 Time: 0925
Analysis:
Preservative:

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode". Electrode calibrated in solution.

- Sample vol + 1 gal

Bottles and Analyses: (collected in order below)

(1) 1 x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Total Metals (Al, Sb, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg)

(1) 1 x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Dissolved Metals (Al, Sb, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg) ☑ Field Filtered (0.45µm)

(1) 1 x 250mL HDPE for Ferrous Iron

(3) 3 = Total Bottles

DOF DALTON OLMSTED FUGLEVAND

Monitoring Well Sampling Field Sheet

Well No. TWA-9D

Facility/Project: TWAAFA

Date: 12/14/23

Sampling Personnel: ES/MW

Initial Headspace (ppm) 0.1ppm

Sampling Method: low flow pump

Intial-Water Level before purge (ft. BTOC) 9.37'

Equipment Used:
WL - Geo. #7068 PID - RAE-6000
WQ - YSI ProQuatro Pump - Masterflex E/S
Turb - geo turb

Well volume = 0.17 * (total well depth - water level)

Well Volume = .17(60.2 - 9.37) = 8.6 gal

End-Water Level post purge/sample with pump on (ft. BTOC): 9.55'

Pump Intake Depth (ft.BTOC): ~2' off bottom

Purge start time: 1424

Purge stop time: 1526

Initial Flow Rate: 300

Final Flow Rate: 350

Flow cell disconnected prior to sampling : ☑

Water Quality Measurements

Time	Water level	Purge Rate	pH	SPC Conductivity	Temperature	Dissoved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL	< 0.1 unit	</= 3%	< 3%	</= 0.3 mg/L	< 10 mV	{3 readings} < 5 NTU or < 10% if >5 NTU
1426	9.53	300	7.24	12920	13.8	0.24	121.1	1.13
1429	9.55	300	7.61	12403	13.8	0.13	93.0	0.35
1432	9.56	300	7.76	11737	13.8	0.11	75.6	0.02
1435	9.58	300	7.89	11025	14.0	0.15	53.4	1.02
1438	9.53	300	7.97	9999	14.0	0.12	40.2	0.02
1441	9.58	350	7.99	9613	14.0	0.11	31.6	1.20
1444	9.58	350	8.01	9351	14.0	0.08	21.9	0.80
1447	9.58	350	8.02	9251	13.9	0.08	10.4	0.02
1450	9.58	350	8.02	9183	13.9	0.08	0.6	0.02
1453	9.58	350	8.03	9127	14.0	0.08	-8.8	0.02
1456	9.58	350	8.03	9089	14.0	0.07	-17.8	0.02
1459	9.58	350	8.04	9070	14.0	0.07	-28.8	0.02
1502	9.58	350	8.04	9060	13.9	0.07	-33.9	0.02
1505	9.58	350	8.04	9024	13.9	0.07	-41.0	0.02
1508	9.58	350	8.04	9017	13.9	0.07	-46.2	0.02
1511	9.58	350	8.04	9009	13.9	0.07	-51.8	0.02
1514	9.58	350	8.05	8983	13.9	0.07	-56.4	0.02
1517	9.57	350	8.05	8977	13.8	0.07	-60.6	0.02
	All parms Stable, d/c flow cell							
1520	Collect TWA-9D-1223"							

Project: TWAAFA 4Q23
Samplers: ES/MW
Sample ID: TWA-9D-1223
Date: 12/14/23 Time: 1520
Analysis:
Preservative:

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode". Electrode calibrated in solution.

- Sample vol + 3 gal + 1½ gal
- Slight odor / amber color

Bottles and Analyses: (collected in order below)

(1) 1 x ~~500~~ 250 mL HDPE w/ HNO_3 6020 Total Metals (Al, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg)

(1) 1 x ~~500~~ mL HDPE w/ HNO_3 6020 Dissolved Metals (Al, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg) ☑ Field Filtered (0.45µm)

(1) 1 x 250ml HDPE for ferrous iron

(2) 3 = Total Bottles

PFAS 1Q24

DOF DALTON OLMSTED FUGLEVAND

Monitoring Well Sampling Field Sheet

Well No. CCW-2A

Facility/Project: TWAAFA

Date: 1/11/24

Sampling Personnel: AC/CD

Initial Headspace (ppm): —

Sampling Method: LF PERI

Initial-Water Level before purge (ft. BTOC): 2.0'

Equipment Used:
WL - GEO INT. PID - N/A
WQ - YSI PRO T Pump - GEO PERI
Turb - GEO TURB.

Well volume = 0.17 * (total well depth - water level)

Well Volume = 0.17(5.8 - 2) = 0.65

End-Water Level post purge/sample with pump on (ft. BTOC): 2.04

Pump Intake Depth (ft BTOC): 0.5' FROM BOTTOM ~5.5'

Purge start time	1416	Initial Flow Rate	200	Flow cell disconnected prior to sampling	☑
Purge stop time	1450	Final Flow Rate	200		

Water Quality Measurements

Time	Water level	Purge Rate	pH	Conductivity	Temperature	Dissoved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL	< 0.1 unit	</= 3%	< 3%	</= 0.3 mg/L	< 10 mV	(3 readings) < 5 NTU or < 10% if >5 NTU
1415	2.03	200	6.99	1054	8.8	1.05	-48.2	26.3
1421	2.03	200	6.83	1480	9.1	0.76	-46.9	23.9
1424	2.03	200	6.75	1371	9.1	0.75	-46.6	12.7
1427	2.03	200	6.76	1321	9.2	0.52	-50.2	13.5
1430	2.03	200	6.78	1295	9.2	0.41	-53.2	12.5
1433	2.03	200	6.77	1280	9.1	0.41	-59.1	11.0
	ALL PARMS STABLE; FLOW CELL DISCONN.							
			RPD TURB = 18%		>3 well volumes purged,		METALS NOT ANALYZED.	
1440	CCW-2A-0124 COLLECTED							

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode" Electrode calibrated in solution.

TOTAL GAL PURGED = 2 gal

Bottles and Analyses: (collected in order below)

(1) x ~~500 mL HDPE w/ HNO3 6020 Total Metals (Al, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg)~~ AC

(1) x ~~500 mL HDPE w/ HNO3 6020 Dissolved Metals (Al, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg)~~ ☐ Field Filtered (0.45µm)

2 x 500 mL HDPE 3 1677 3/6 STD LIST.

1 x 125 mL HDPE

(2) 3 = Total Bottles

PFAS 1Q24

DOF DALTON OLMSTED FUGLEVAND

Monitoring Well Sampling Field Sheet

Well No. CCW-2B

Facility/Project: TWAAFA

Date: 1/11/24

Sampling Method: LF PERI

Sampling Personnel: AC/CD

Equipment Used:
WL - HERON LNT; PID - N/A
WQ - YSI 556 P; Pump - GEOPERI
Turb - 2020 TURB

Initial Headspace (ppm): N/A

Initial Water Level before purge (ft. BTOC): 1.64

Well volume = 0.17 * (total well depth - water level)

Well Volume = 0.17 (12.8 - 1.64) = 1.9 gal.

End Water Level post purge/sample with pump on (ft. BTOC): 3.83

Pump Intake Depth (ft BTOC): 2' FROM BOTTOM ~10.8' BTOC

Purge start time: 1325

Purge stop time: 1401

Initial Flow Rate: 350

Final Flow Rate: 200

Flow cell disconnected prior to sampling: ☑

Water Quality Measurements

Time	Water level	Purge Rate	pH	Conductivity	Temperature	Dissoved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL	< 0.1 unit	</= 3%	< 3%	</= 0.3 mg/L	< 10 mV	(3 readings) < 5 NTU or < 10% if >5 NTU
1328	2.35	300	6.99	1863	11.4	0.17	-29.9	44.2
1331	3.25	200	7.02	1851	11.7	0.16	-41.0	40.0
1334	3.23	200	7.12	1829	11.5	0.17	-53.0	33.0
1337	3.23	200	7.12	1825	11.4	0.18	-65.0	24.9
1340	3.28	200	7.14	1823	11.4	0.17	-75.7	27.2
1343	3.30	200	7.19	1807	11.7	0.17	-83.2	23.2
1346	3.47	200	7.19	1811	11.7	0.17	-90.7	26.2
1349	3.64	200	7.19	1812	11.7	0.17	-95.2	27.4
		ALL PARAMS	STABLE.	FLOW CELL	DISCONN.			
			RPD TURB	= 15%, >1	WELL VOLUME	PURGED. METALS	NOT ANALYZED	
1355	CCW-2B	-0124	COLLECTED					

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode". Electrode calibrated in solution.

TOTAL PURGE VOL = 2 gal

Bottles and Analyses: (collected in order below)

(1) ~~x 500 mL HDPE w/HNO3 6020 Total Metals (Al, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg)~~ AC

(1) ~~x 500 mL HDPE w/HNO3 6020 Dissolved Metals (Al, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg)~~ ☐ Field Filtered (0.45µm)

2 x 500 mL HDPE } 1633 246 STANDARD LIST
1 x 125 mL HDPE }

(2) 3 = Total Bottles

PFAs 1Q24

DOF DALTON OLMSTED FUGLEVAND

Monitoring Well Sampling Field Sheet

Well No. CCW-2C

Facility/Project: TWAAFA

Date: 1/11/24

Sampling Personnel: AC / CD

Sampling Method: LF FLOW PERI

Initial Headspace (ppm)

Initial Water Level before purge (ft. BTOC) 8.36

Equipment Used:
WL - GEOTECH INT PID - N/A
WQ - YSI PROT Pump - GF PERI
Turb - HACH TL2

Well volume = 0.17 * (total well depth - water level)

Well Volume = 0.17(74 - 8.36) = 2.65 gal.

End Water Level post purge/sample with pump on (ft. BTOC) 8.35

Pump Intake Depth (ft.BTOC): 2.0' FROM BOTTOM ~ 22' BTOC

Purge start time	1241	Initial Flow Rate	250
Purge stop time	1304	Final Flow Rate	250

Flow cell disconnected prior to sampling ☑

Water Quality Measurements

Time	Water level	Purge Rate	pH	Conductivity	Temperature	Dissolved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL	< 0.1 unit	</= 3%	< 3%	</= 0.3 mg/L	< 10 mV	(3 readings) < 5 NTU or < 10% if >5 NTU
1245	8.33	250	6.96	1715	12.6	0.46	-68.9	13.7
1248	8.38	250	6.95	1710	12.6	0.38	-75.8	1.3
1251	8.36	250	6.95	1708	12.6	0.35	-71.0	1.5
1254	8.38	250	6.94	1700	12.6	0.31	-75.0	2.1
1255	ALL PARAMS STABLE		FLOW CELL DISCONN.					
1300	CCW-2C - 0124							

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode". Electrode calibrated in solution.

TOTAL PURGE VOL = 1.25 gal.

Bottles and Analyses: (collected in order below)

(1) ~~x 500 mL HDPE w/ HNO3, 6020 Total Metals (Al, Sb, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 16326 (Li)~~ AC

(1) ~~x 500 mL HDPE w/ HNO3, 6020 Dissolved Metals (Al, Sb, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 16326 (Li)~~ ☐ Field Filtered (0.45µm)

~~2 x 250 mL HDPE POLY~~ 2 1633 EPA STANDARD LIST

~~1 x 125 mL HDPE POLY~~

(2) 3 = Total Bottles

PFAS 1024

DOR

Monitoring Well Sampling Field Sheet

Well No. CCW-3A
Facility/Project: TVAAFA
Initial Headspace (ppm): n/a
Initial Water Level before purge (ft BTOC): 3.06
End Water Level post purge/sample with pump on (ft BTOC): 3.33
Pump intake Depth (ft BTOC): ~1' from bottom; screen = 5.8-4'

Date: 1/11/2024
Sampling Method: LOW FLOW
Equipment Used:
WL: GEOTECH IWP ; PID: n/a
WQ: YSI PRO+ ; Pump: GEOTECH
Tub: GEOTECH ... ; PERI

Sampling Personnel: AC/CD
Well volume = 0.17 * (total well depth - water level)
Well volume = 0.17(5.8 - 3.06) = 0.47 gal.

Purge start time	1011	Initial Flow Rate	300 ml/min
Purge stop time	1051	Final Flow Rate	200 ml/min

Flow cell disconnected prior to sampling: ☑

Water Quality Measurements

Time	Water level	Purge Rate	pH	Conductivity	Temperature	Dissoved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL	< 0.1 unit	+/- 3%	< 3%	+/- 0.3 mg/L	< 10 mV	(3 readings) < 5 NTU or < 10% if > 5 NTU
1011	PURGE	BEGINS						
1013	3.14	300	6.80	995	7.5	1.18	-44.6	11.8
1016	3.23	200	6.82	1461	9.6	1.60	-65.9	14.7
1019	3.24	200	6.82	1461	9.9	1.05	-70.3	10.5
1022	3.26	200	6.80	1456	10.0	1.04	-74.7	14.4
1025	3.29	200	6.81	1457	10.6	1.10	-78.3	14.3
1028	3.30	200	6.81	1457	10.7	1.10	-81.0	14.6
	ALL PARAMETERS	STABLE. FLOW CELL DISCONNECTED.						
	CCW-3A-0124							
	1035							
	+ FIELD DUP							
	CCW-9-3A-0124							
	1040							

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode" Electrode calibrated in solution

TOTAL PURGE VOL = 2 gallons

Bottles and Analyses: (collected in order below)

(1) x 500 mL HDPE w/ HNO_3 6020 Total Metals (Al, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg) AC

(1) x 500 mL HDPE w/ HNO_3 6020 Dissolved Metals (Al, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg) ☐ Field Filtered (0.45µm)

2 x 250mL unpreserved } 1633-PFAS STANDARD LIST
1 x 125mL unpreserved }

(2) (3) + (3) DUP = Total Bottles

+ FIELD DUPLICATE. CCW-9-3A-0124.
2 x 250mL unpres.
1 x 125mL unpres.

PFAS 1Q24

DALTON OLMSTED FUOLEVAND

Monitoring Well Sampling Field Sheet

Well No. CCW-3B

Facility/Project: TWAAFA

Date: 1/11/2024

Sampling Personnel: AC/CD

Sampling Method: LOFLOW PERI

Initial Headspace (ppm) —

Initial Water Level before purge (ft. BTOC) 3.59

Equipment Used:
WL - GEOTECH INT. PID - N/A
WQ - YSI PROT Pump - GEOTECH PERI
Turb - GEOTECH TURB

Well volume = 0.17 * (total well depth - water level)

Well Volume = 0.17 (10.8 − 3.59) = 1.2 gal.

End Water Level post purge/sample with pump on (ft. BTOC): 3.93

Pump Intake Depth (ft BTOC):
1' FROM BOTTOM = 9.8'.

Purge start time	1135
Purge stop time	1211
Initial Flow Rate	225
Final Flow Rate	200

Flow cell disconnected prior to sampling: ☑

Water Quality Measurements

Time	Water level	Purge Rate	pH	Conductivity	Temperature	Dissolved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL	< 0.1 unit	</= 3%	< 3%	</= 0.3 mg/L	< 10 mV	(3 readings) < 5 NTU or < 10% if >5 NTU
1135	PURGE BEGINS							
1138	3.90	225	6.80	1230	11.1	0.44	+10.4	44.2
1141	3.91	225	6.81	1233	11.1	0.44	-10.5	27.8
1146	3.74	225	6.79	1243	11.2	0.32	-28.5	38.2
1149	3.94	250	6.79	1239	11.6	0.29	-31.1	35.2
1152	3.89	200	6.83	1237	11.4	0.26	-38.3	18.1
1155	3.90	200	6.82	1244	11.8	0.24	-45.2	16.9
1158	3.91	200	6.82	1244	11.8	0.24	-51.2	16.4
	ALL PARAMS STABLE. ORP = 13mV DIFF, EQUIP HAS +/- 20mV ACCURACY.							
	& 2 gallons PURGED.							
1200	CCW-3B-0124							
	COLLECTED.							
	FIELD BLANK #1-0124							
	COLLECTED @ CCW-3B							

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode". Electrode calibrated in solution.

TOTAL PURGE VOL = 2 gals.

* SLIGHT EFFERVESCENCE.

Bottles and Analyses: (collected in order below)

(1) ~~X 500 mL HDPE w/ HNO3 6020 Total Metals (Al, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 16315 (Hg)~~ AC.

(1) ~~X 500 mL HDPE w/ HNO3 6020 Dissolved Metals (Al, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 16315 (Hg)~~ ☐ Field Filtered (0.45µm)

2 x 500 mL
1 x 125 mL
} 1633 B24 STANDARD LIST.

(2) (3) = Total Bottles

PFAS 1024

DOF DALTON OLMSTED FUQUEVAND

Monitoring Well Sampling Field Sheet

Well No. CTMW-17

Facility/Project: TWAAFA

Date: 1/11/24

Sampling Personnel: AC / CD

Sampling Method: LF PERI

Initial Headspace (ppm) N/A

Initial Water Level before purge (ft. BTOC) 6.54

Equipment Used:
WL - GEO INT- PID - N/A
WQ - YSI PRO+ Pump - GEO PERI
Turb - GEO TURB

Well volume = 0.17 * (total well depth - water level)

Well Volume = 0.17 (15.5 - 6.54) = 1.5 gal

End Water Level post purge/sample with pump on (ft. BTOC)

Pump Intake Depth (ft BTOC) 2' PICK UP BOTTOM ~13.5' BTOC

Purge start time	1540	Initial Flow Rate	300	Flow cell disconnected prior to sampling: ☑
Purge stop time	1612	Final Flow Rate	300	

Water Quality Measurements

Time	Water level	Purge Rate	pH	Conductivity	Temperature	Dissoved Oxygen	Redox Potential *	Turbidity
(military)	ft	(mL/min)	pH Units	uS/cm	°C	mg/L	mV	(NTU)
	< 0.33 ft from 2nd reading	< 500 mL	< 0.1 unit	</= 3%	< 3%	</= 0.3 mg/L	< 10 mV	(3 readings) < 5 NTU or < 10% if >5 NTU
1540	PURGE BEGINS 300							
1544	7.01	300	6.86	620	10.0	0.49	-30	27.7
1547	7.05	300	6.84	612	9.8	0.43	-31	22.9
1552	7.07	300	6.88	603	9.5	0.33	-44	23.9
1553	7.09	300	6.89	604	9.4	0.34	-53	27.8
1556	7.11	300	6.90	603	9.4	0.37	-58	25.4
1559	7.11	300	6.92	602	9.3	0.31	-54	29.5
		ALL PARMS STABLE; TURB. RPD = 15% GREATER THAN ONE					WELL VOL. PURGED	
					NO METALS SAMPLED			
1600	CTMW-17-0124	COLLECTED						

Notes: *Per EPA (2023), ORP direct measurement data recorded is "ORP referenced to electrode". Electrode calibrated in solution.

* TRIP BLANK FREE IN VICINITY DURING SAMPLE.

* TOTAL VOLUME = 2.5 gal.

Bottles and Analyses: (collected in order below)

(1) x ~~500 mL HDPE w/ HNO3, 6020 Total Metals (Al, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg)~~ AC

(1) x ~~500 mL HDPE w/ HNO3, 6020 Dissolved Metals (Al, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn) and 1631E (Hg)~~ ☐ Field Filtered (0.45µm)

2 x 500 ml HDPE } 1633 246 STD LIST

1 x 125 ml HDPE

(2) (3) = Total Bottles

Water Field Sampling Data Sheet
TWAAFA Additional Groundwater Sampling
Port of Tacoma

Client Name	Port of Tacoma	**Sampling Location**	TWA-1
Project #	M0615.20.012	**Sampling Date**	12/12/2023
Project Name	TWAAFA Additional Groundwater Sampling	**Sampler**	B. Murphy
Sampling Event	December 2023	**Sample Name**	TWA-1-1223
Sub Area	1514 Taylor Way		
FSDS QA	C. Sifford	**Sample Depth**	10.0
Hydrology/Level Measurements		**Purge Method**	Peristaltic Pump

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Pore Volume
12/12/2023	13:38	13.54	--	3.94	--	9.60	1.56

All depths measured from top of casing of monitoring well.

Water Quality Data

Time	Purge Vol (gal)	Water Level	Flowrate L/min	pH	Temp (C)	E Cond (uS/cm)	DO (mg/L)	ORP	Turbidity
BEGAN PURGE AT: 13:39									
Allowed purge water to clear prior to hooking up YSI. Water initially orange and turbid.									
13:42	0.2	3.99	0.25	--	--	--	--	--	85.3
13:45	0.5	3.99	0.25	--	--	--	--	--	55.2
13:48	0.7	3.99	0.25	6.96	11.0	942	3.24	-19.7	230
13:51	0.9	3.99	0.25	6.86	11.0	898	2.48	-38.2	317
13:54	1.0	3.99	0.25	6.85	10.7	886	3.33	7.1	52.6
13:57	1.2	3.99	0.25	6.84	10.2	870	3.43	32.4	25.9
14:00	1.4	3.99	0.25	6.83	10.4	856	3.52	47.9	17.5
14:03	1.6	3.99	0.25	6.83	10.4	855	3.52	55.2	10.6
14:06	1.8	3.99	0.25	6.83	10.4	851	3.54	61.9	9.80
14:09	2.0	3.99	0.25	6.82	10.4	849	3.50	66.8	8.06
14:12	2.2	3.99	0.25	6.82	10.3	846	3.54	70.2	6.56

Water Field Sampling Data Sheet
TWAAFA Additional Groundwater Sampling
Port of Tacoma

Client Name	Port of Tacoma	**Sampling Location**	TWA-1
Project #	M0615.20.012	**Sampling Date**	12/12/2023

Water Quality Observations:

Cloudy then clear; brown tint then colorless; no odor; no sheen.

Sample Information:

Sampling Method	Sample Type	Sampling Time	Container Code/Preservative	#	Filtered
Peristaltic Pump	Groundwater	14:15	VOA-Glass		
			Amber Glass		
			Yellow Poly		
			Green Poly		
			Red Total Poly	1	No
			Red Dissolved Poly	1	Yes
			Total Bottles	2	

General Sampling Comments:

Equipment Used:

Water Level Meter: Solinst Model 101; Serial Number 531501

Water Quality Meter: YSI Professional Plus; Serial Number 19K102418

Turbidity Meter: HACH 2100P; Serial Number 040500035330

Filter: SingleSample 0.45 µm Groundwater Filter Capsule; Batch AMJ 10-27-20

Total purge volume prior to sampling: 2.2 gallons.

ORP referenced to Ag/AgCl electrode.
3.5 Molar KCl electrode solution.

Water Field Sampling Data Sheet
TWAAFA Additional Groundwater Sampling
Port of Tacoma

Client Name	Port of Tacoma	**Sampling Location**	TWA-2
Project #	M0615.20.012	**Sampling Date**	12/12/2023
Project Name	TWAAFA Additional Groundwater Sampling	**Sampler**	C. Sifford
Sampling Event	December 2023	**Sample Name**	TWA-2-1223
Sub Area	1514 Taylor Way		
FSDS QA	C. Sifford	**Sample Depth**	6.5
Hydrology/Level Measurements		**Purge Method**	Peristaltic Pump

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Pore Volume
12/12/2023	13:51	9.09	--	2.05	--	7.04	1.15

All depths measured from top of casing of monitoring well.

Water Quality Data

Time	Purge Vol (gal)	Water Level	Flowrate L/min	pH	Temp (C)	E Cond (uS/cm)	DO (mg/L)	ORP	Turbidity
BEGAN PURGE AT: 13:53									
Allowed purge water to clear prior to hooking up YSI.									
13:56	0.2	2.26	0.25	--	--	--	--	--	20.0
13:59	0.4	2.29	0.25	7.04	11.0	1362	2.93	120.1	13.7
14:02	0.6	2.30	0.25	7.04	11.0	1267	1.66	115.8	9.78
14:05	0.8	2.31	0.25	7.07	10.9	1207	1.07	111.1	6.53
14:08	0.9	2.31	0.25	7.08	11.0	1188	0.81	106.9	5.24
14:11	1.0	2.32	0.25	7.09	11.0	1168	0.66	102.9	4.65
14:14	1.2	2.31	0.25	7.11	11.0	1135	0.58	98.0	3.66
14:17	1.4	2.31	0.25	7.13	11.0	1123	0.54	94.8	3.21
14:20	1.6	2.32	0.25	7.13	11.0	1112	0.50	91.4	3.25

Water Field Sampling Data Sheet
TWAAFA Additional Groundwater Sampling
Port of Tacoma

Client Name	Port of Tacoma	**Sampling Location**	TWA-2
Project #	M0615.20.012	**Sampling Date**	12/12/2023

Water Quality Observations:

Clear; slight yellow tint; no odor; no sheen.

Sample Information:

Sampling Method	Sample Type	Sampling Time	Container Code/Preservative	#	Filtered
Peristaltic Pump	Groundwater	14:25	VOA-Glass		
			Amber Glass		
			Yellow Poly		
			Green Poly		
			Red Total Poly	1	No
			Red Dissolved Poly	1	Yes
			Total Bottles	2	

General Sampling Comments:

Equipment Used:

Water Level Meter: Solinst Model 101; Serial Number 223663

Water Quality Meter: YSI ProDSS; Serial Number 22C 102235

Turbidity Meter: HACH 2100Q; Serial Number 2301D000512

Filter: SingleSample 0.45 µm Groundwater Filter Capsule; Batch AMJ 10-27-20

Total purge volume prior to sampling: 1.6 gallons.

ORP referenced to Ag/AgCl electrode.
3.5 Molar KCl electrode solution.

Water Field Sampling Data Sheet
TWAAFA Additional Groundwater Sampling
Port of Tacoma

Client Name	Port of Tacoma	**Sampling Location**	TWA-3
Project #	M0615.20.012	**Sampling Date**	12/12/2023
Project Name	TWAAFA Additional Groundwater Sampling	**Sampler**	C. Sifford
Sampling Event	December 2023	**Sample Name**	TWA-3-1223
Sub Area	1514 Taylor Way		
FSDS QA	C. Sifford	**Sample Depth**	8.5
Hydrology/Level Measurements		**Purge Method**	Peristaltic Pump

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Pore Volume
12/12/2023	12:07	9.74	--	6.78	--	2.96	0.48

All depths measured from top of casing of monitoring well.

Water Quality Data

Time	Purge Vol (gal)	Water Level	Flowrate L/min	pH	Temp (C)	E Cond (uS/cm)	DO (mg/L)	ORP	Turbidity
BEGAN PURGE AT: 12:09									
Allowed purge water to clear prior to hooking up YSI.									
12:12	0.1	6.84	0.15	--	--	--	--	--	53.6
12:17	0.2	6.86	0.15	6.67	10.7	2467	2.07	190.0	26.9
12:20	0.4	6.87	0.15	6.68	10.7	2380	1.15	174.1	19.30
12:23	0.5	6.86	0.15	6.69	10.7	2276	0.73	162.6	8.49
12:26	0.6	6.86	0.15	6.69	10.8	2214	0.58	156.4	7.19
12:29	0.7	6.86	0.15	6.70	10.7	2169	0.48	151.2	6.27
12:32	0.9	6.87	0.15	6.70	10.7	2111	0.39	145.1	4.02
12:35	1.1	6.86	0.15	6.70	10.7	2081	0.33	141.0	1.91
12:38	1.2	6.86	0.15	6.70	10.8	2074	0.31	138.9	1.62

Water Field Sampling Data Sheet
TWAAFA Additional Groundwater Sampling
Port of Tacoma

Client Name	Port of Tacoma	Sampling Location	TWA-3
Project #	M0615.20.012	Sampling Date	12/12/2023

Water Quality Observations:

Clear; slight orange tint; no odor; no sheen.

Sample Information:

Sampling Method	Sample Type	Sampling Time	Container Code/Preservative	#	Filtered
Peristaltic Pump	Groundwater	12:40	VOA-Glass		
			Amber Glass		
			Yellow Poly	3	No
			Green Poly		
			Red Total Poly	1	No
			Red Dissolved Poly	1	Yes
			Total Bottles	5	

General Sampling Comments:

Equipment Used:

Water Level Meter: Waterra WS-2 PFAS Free; Serial Number WS2-00616

Water Quality Meter: YSI ProDSS; Serial Number 22C 102235

Turbidity Meter: HACH 2100Q; Serial Number 2301D000512

Filter: SingleSample 0.45 µm Groundwater Filter Capsule; Batch AMJ 10-27-20

Total purge volume prior to sampling: 1.2 gallons.
Field duplicate sample TWA-9-3-1223 collected at this location.
Rinsate Blank1-1223 collected at this location.

ORP referenced to Ag/AgCl electrode.
3.5 Molar KCl electrode solution.

Water Field Sampling Data Sheet
TWAAFA Additional Groundwater Sampling
Port of Tacoma

Client Name	Port of Tacoma	**Sampling Location**	TWA-10D
Project #	M0615.20.012	**Sampling Date**	12/12/2023
Project Name	TWAAFA Additional Groundwater Sampling	**Sampler**	B. Murphy
Sampling Event	December 2023	**Sample Name**	TWA-10D-1223
Sub Area	1514 Taylor Way		
FSDS QA	C. Sifford	**Sample Depth**	53.5
Hydrology/Level Measurements		**Purge Method**	Peristaltic Pump

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Pore Volume
12/12/2023	12:14	58.66	--	9.84	--	48.82	7.96

All depths measured from top of casing of monitoring well.

Water Quality Data

Time	Purge Vol (gal)	Water Level	Flowrate L/min	pH	Temp (C)	E Cond (uS/cm)	DO (mg/L)	ORP	Turbidity
BEGAN PURGE AT: 12:15									
Allowed purge water to clear prior to hooking up YSI.									
12:18	0.2	9.93	0.24	--	--	--	--	--	2.75
12:21	0.3	9.93	0.24	--	--	--	--	--	3.41
12:24	0.5	9.92	0.24	8.06	12.5	7149	0.23	-156.3	6.62
12:27	0.8	9.92	0.24	8.15	12.4	7542	0.17	-193.8	4.82
12:30	1.0	9.92	0.24	8.17	12.4	7639	0.16	-205.3	8.93
12:33	1.2	9.92	0.24	8.18	12.6	7641	0.10	-212.2	3.77
12:36	1.3	9.91	0.24	8.19	12.6	7697	0.13	-216.7	8.81
12:39	1.6	9.91	0.24	8.19	12.6	7708	0.13	-219.1	4.02
12:42	1.8	9.91	0.24	8.20	12.5	7739	0.09	-221.2	4.35
12:45	2.0	9.91	0.24	8.20	12.4	7743	0.09	-221.8	3.90
12:48	2.2	9.91	0.24	8.20	12.5	7752	0.09	-222.3	3.93
12:51	2.3	9.91	0.24	8.21	12.5	7782	0.08	-222.1	3.52

Water Field Sampling Data Sheet
TWAAFA Additional Groundwater Sampling
Port of Tacoma

Client Name	Port of Tacoma	Sampling Location	TWA-10D
Project #	M0615.20.012	Sampling Date	12/12/2023

Water Quality Observations:

Clear; brown tint then colorless; no odor; no sheen.

Sample Information:

Sampling Method	Sample Type	Sampling Time	Container Code/Preservative	#	Filtered
Peristaltic Pump	Groundwater	12:53	VOA-Glass		
			Amber Glass		
			Yellow Poly		
			Green Poly		
			Red Total Poly	1	No
			Red Dissolved Poly	1	Yes
			Total Bottles	2	

General Sampling Comments:

Equipment Used:

Water Level Meter: Solinst Model 101; Serial Number 531501

Water Quality Meter: YSI Professional Plus; Serial Number 19K102418

Turbidity Meter: HACH 2100P; Serial Number 040500035330

Filter: SingleSample 0.45 µm Groundwater Filter Capsule; Batch AMJ 10-27-20

Total purge volume prior to sampling: 2.3 gallons.

ORP referenced to Ag/AgCl electrode.
3.5 Molar KCl electrode solution.

Water Field Sampling Data Sheet
TWAAFA Additional Groundwater Sampling
Port of Tacoma

Client Name	Port of Tacoma	**Sampling Location**	SB-1A
Project #	M0615.20.012	**Sampling Date**	12/12/2023
Project Name	TWAAFA Additional Groundwater Sampling	**Sampler**	B. Murphy
Sampling Event	December 2023	**Sample Name**	SB-1A-1223
Sub Area	Hylebos Marsh		
FSDS QA	C. Sifford	**Sample Depth**	7.5
Hydrology/Level Measurements		**Purge Method**	Peristaltic Pump

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Pore Volume
12/12/2023	15:28	11.56	--	2.06	--	9.50	1.55

All depths measured from top of casing of monitoring well.

Water Quality Data

Time	Purge Vol (gal)	Water Level	Flowrate L/min	pH	Temp (C)	E Cond (uS/cm)	DO (mg/L)	ORP	Turbidity
BEGAN PURGE AT: 15:29									
Allowed purge water to clear prior to hooking up YSI.									
15:32	0.2	2.43	0.24	--	--	--	--	--	22.4
15:35	0.4	2.45	0.24	7.70	11.5	482.6	1.30	-94.0	20.8
15:38	0.6	2.45	0.24	7.49	11.6	481.3	0.89	-94.0	17.0
15:41	0.7	2.45	0.24	7.45	11.6	472.2	0.70	-89.9	8.58
15:44	1.0	2.46	0.24	7.44	11.6	457.1	0.63	-90.2	7.02
15:47	1.1	2.47	0.24	7.42	11.7	454.5	0.51	-88.1	5.18
15:50	1.3	2.47	0.24	7.42	11.6	452.3	0.51	-89.3	4.60
15:53	1.5	2.47	0.24	7.40	11.7	452.0	0.47	-88.6	4.14
15:56	1.7	2.47	0.24	7.40	11.7	454.5	0.47	-87.6	4.08

Water Field Sampling Data Sheet
TWAAFA Additional Groundwater Sampling
Port of Tacoma

Client Name	Port of Tacoma	Sampling Location	SB-1A
Project #	M0615.20.012	Sampling Date	12/12/2023

Water Quality Observations:

Clear; colorless; no odor; no sheen.

Sample Information:

Sampling Method	Sample Type	Sampling Time	Container Code/Preservative	#	Filtered
Peristaltic Pump	Groundwater	16:00	VOA-Glass		
			Amber Glass		
			Yellow Poly		
			Green Poly		
			Red Total Poly	3	No
			Red Dissolved Poly	3	Yes
			Total Bottles	6	

General Sampling Comments:

Equipment Used:

Water Level Meter: Solinst Model 101; Serial Number 531501

Water Quality Meter: YSI Professional Plus; Serial Number 19K102418

Turbidity Meter: HACH 2100P; Serial Number 040500035330

Filter: SingleSample 0.45 µm Groundwater Filter Capsule; Batch AMJ 10-27-20

Total purge volume prior to sampling: 1.7 gallons.
MS/MSD collected at this location.

ORP referenced to Ag/AgCl electrode.
3.5 Molar KCl electrode solution.

Water Field Sampling Data Sheet
TWAAFA Additional Groundwater Sampling
Port of Tacoma

Client Name	Port of Tacoma	**Sampling Location**	SB-2A
Project #	M0615.20.012	**Sampling Date**	12/12/2023
Project Name	TWAAFA Additional Groundwater Sampling	**Sampler**	C. Sifford
Sampling Event	December 2023	**Sample Name**	SB-2A-1223
Sub Area	Hylebos Marsh		
FSDS QA	C. Sifford	**Sample Depth**	10.0
Hydrology/Level Measurements		**Purge Method**	Peristaltic Pump

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Pore Volume
12/12/2023	15:37	12.76	--	3.63	--	9.13	1.49

All depths measured from top of casing of monitoring well.

Water Quality Data

Time	Purge Vol (gal)	Water Level	Flowrate L/min	pH	Temp (C)	E Cond (uS/cm)	DO (mg/L)	ORP	Turbidity
BEGAN PURGE AT: 15:38									
Allowed purge water to clear prior to hooking up YSI.									
15:41	0.1	3.84	0.25	--	--	--	--	--	35.2
15:44	0.2	3.84	0.25	7.13	12.0	589	3.14	87	31.0
15:47	0.4	3.83	0.25	7.06	12.2	592	1.47	67.3	16.3
15:50	0.5	3.87	0.25	7.02	12.3	600	0.80	28.1	11.1
15:53	0.7	3.88	0.25	7.00	12.3	601	0.61	10.7	7.58
15:57	0.9	3.88	0.25	6.97	12.4	598	0.45	-7.5	8.60
16:01	1.1	3.88	0.25	6.96	12.3	596	0.34	-18.9	5.63
16:04	1.2	3.89	0.25	6.95	12.4	595	0.31	-22.7	7.08
16:07	1.4	3.88	0.25	6.95	12.3	592	0.27	-29.9	3.40
16:11	1.6	3.88	0.25	6.95	12.3	589	0.24	-32.8	4.56
16:14	1.8	3.89	0.25	6.94	12.3	587	0.22	-35.3	3.84

Water Field Sampling Data Sheet
TWAAFA Additional Groundwater Sampling
Port of Tacoma

Client Name	Port of Tacoma	Sampling Location	SB-2A
Project #	M0615.20.012	Sampling Date	12/12/2023

Water Quality Observations:

Clear; colorless; no odor; no sheen.

Sample Information:

Sampling Method	Sample Type	Sampling Time	Container Code/Preservative	#	Filtered
Peristaltic Pump	Groundwater	16:15	VOA-Glass		
			Amber Glass		
			Yellow Poly	9	No
			Green Poly		
			Red Total Poly	1	No
			Red Dissolved Poly	1	Yes
			Total Bottles	11	

General Sampling Comments:

Equipment Used:

Water Level Meter: Waterra WS-2 PFAS Free; Serial Number WS2-00616

Water Quality Meter: YSI ProDSS; Serial Number 22C 102235

Turbidity Meter: HACH 2100Q; Serial Number 2301D000512

Filter: SingleSample 0.45 µm Groundwater Filter Capsule; Batch AMJ 10-27-20

Total purge volume prior to sampling: 1.8 gallons.
Field Blank1-1223 collected at this location.
Rinsate Blank2-1223 collected at this location.
PFAS MS/MSD collected at this location.

ORP referenced to Ag/AgCl electrode.
3.5 Molar KCl electrode solution.

Water Field Sampling Data Sheet
TWAAFA Additional Groundwater Sampling
Port of Tacoma

Client Name	Port of Tacoma	**Sampling Location**	TWA-5D
Project #	M0615.20.012	**Sampling Date**	12/13/2023
Project Name	TWAAFA Additional Groundwater Sampling	**Sampler**	B. Murphy
Sampling Event	December 2023	**Sample Name**	TWA-5D-1223
Sub Area	Hylebos Marsh		
FSDS QA	C. Sifford	**Sample Depth**	28.0
Hydrology/Level Measurements		**Purge Method**	Peristaltic Pump

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Pore Volume
12/13/2023	9:12	33.09	--	11.67	--	21.42	3.49

All depths measured from top of casing of monitoring well.

Water Quality Data

Time	Purge Vol (gal)	Water Level	Flowrate L/min	pH	Temp (C)	E Cond (uS/cm)	DO (mg/L)	ORP	Turbidity
BEGAN PURGE AT: 9:13									
Allowed purge water to clear prior to hooking up YSI.									
9:16	0.2	11.71	0.27	--	--	--	--	--	2.45
9:19	0.5	11.71	0.27	7.45	12.7	3734	0.45	-91.4	1.32
9:22	0.7	11.71	0.27	7.49	12.8	3728	0.20	-122.3	1.27
9:25	0.9	11.71	0.27	7.50	12.9	3731	0.14	-134.4	0.59
9:28	1.1	11.70	0.27	7.50	13.0	3738	0.11	-140.8	0.56
9:31	1.3	11.70	0.27	7.49	12.9	3739	0.10	-144.3	0.65

Water Field Sampling Data Sheet
TWAAFA Additional Groundwater Sampling
Port of Tacoma

Client Name	Port of Tacoma	**Sampling Location**	TWA-5D
Project #	M0615.20.012	**Sampling Date**	12/13/2023

Water Quality Observations:

Clear; light brownish-yellow tint; no odor; no sheen.

Sample Information:

Sampling Method	Sample Type	Sampling Time	Container Code/Preservative	#	Filtered
Peristaltic Pump	Groundwater	9:35	VOA-Glass		
			Amber Glass		
			Yellow Poly		
			Green Poly		
			Red Total Poly	1	No
			Red Dissolved Poly	1	Yes
			Total Bottles	2	

General Sampling Comments:

Equipment Used:

Water Level Meter: Solinst Model 101; Serial Number 531501

Water Quality Meter: YSI Professional Plus; Serial Number 19K102418

Turbidity Meter: HACH 2100P; Serial Number 040500035330

Filter: SingleSample 0.45 µm Groundwater Filter Capsule; Batch AMJ 10-27-20

Total purge volume prior to sampling: 1.3 gallons.

ORP referenced to Ag/AgCl electrode.
3.5 Molar KCl electrode solution.

Water Field Sampling Data Sheet
TWAAFA Additional Groundwater Sampling
Port of Tacoma

Client Name	Port of Tacoma	**Sampling Location**	TWA-6D
Project #	M0615.20.012	**Sampling Date**	12/13/2023
Project Name	TWAAFA Additional Groundwater Sampling	**Sampler**	C. Sifford
Sampling Event	December 2023	**Sample Name**	TWA-6D-1223
Sub Area	Hylebos Marsh		
FSDS QA	C. Sifford	**Sample Depth**	31.5
Hydrology/Level Measurements		**Purge Method**	Peristaltic Pump

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Pore Volume
12/13/2023	9:09	33.92	--	11.32	--	22.60	3.68

All depths measured from top of casing of monitoring well.

Water Quality Data

Time	Purge Vol (gal)	Water Level	Flowrate L/min	pH	Temp (C)	E Cond (uS/cm)	DO (mg/L)	ORP	Turbidity
BEGAN PURGE AT: 9:10									
Allowed purge water to clear prior to hooking up YSI.									
9:14	0.1	11.35	0.20	--	--	--	--	--	3.41
9:17	0.3	11.35	0.20	6.75	10.9	3853	3.27	158.3	2.17
9:20	0.4	11.35	0.20	6.80	11.2	3886	1.77	90.7	2.32
9:23	0.5	11.35	0.20	6.93	11.2	3893	1.07	19.1	2.27
9:26	0.7	11.34	0.20	6.93	11.6	3893	0.61	-32.7	1.56
9:29	0.9	11.34	0.20	6.92	11.6	3893	0.47	-45.5	1.29
9:32	1.1	11.34	0.20	6.92	11.6	3889	0.37	-55.7	1.55
9:35	1.3	11.32	0.20	6.91	11.7	3891	0.32	-61.6	1.46
9:38	1.6	11.32	0.20	6.90	11.7	3889	0.26	-68.1	1.32
9:41	1.9	11.32	0.20	6.88	11.7	3893	0.22	-70.9	1.23

Water Field Sampling Data Sheet
TWAAFA Additional Groundwater Sampling
Port of Tacoma

Client Name	Port of Tacoma	Sampling Location	TWA-6D
Project #	M0615.20.012	Sampling Date	12/13/2023

Water Quality Observations:

Clear; strong yellowish-brown tint; no odor; no sheen.

Sample Information:

Sampling Method	Sample Type	Sampling Time	Container Code/Preservative	#	Filtered
Peristaltic Pump	Groundwater	9:45	VOA-Glass		
			Amber Glass		
			Yellow Poly		
			Green Poly		
			Red Total Poly	1	No
			Red Dissolved Poly	1	Yes
			Total Bottles	2	

General Sampling Comments:

Equipment Used:

Water Level Meter: Solinst Model 101; Serial Number 223663

Water Quality Meter: YSI ProDSS; Serial Number 22C 102235

Turbidity Meter: HACH 2100Q; Serial Number 2301D000512

Filter: SingleSample 0.45 µm Groundwater Filter Capsule; Batch AMJ 10-27-20

Total purge volume prior to sampling: 1.9 gallons.

ORP referenced to Ag/AgCl electrode.
3.5 Molar KCl electrode solution.

Water Field Sampling Data Sheet
TWAAFA Additional Groundwater Sampling
Port of Tacoma

Client Name	Port of Tacoma	**Sampling Location**	SB-3A
Project #	M0615.20.012	**Sampling Date**	12/13/2023
Project Name	TWAAFA Additional Groundwater Sampling	**Sampler**	B. Murphy
Sampling Event	December 2023	**Sample Name**	SB-3A-1223
Sub Area	Hylebos Marsh		
FSDS QA	C. Sifford	**Sample Depth**	8.0
Hydrology/Level Measurements		**Purge Method**	Peristaltic Pump

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Pore Volume
12/13/2023	10:00	12.77	--	2.87	--	9.90	1.61

All depths measured from top of casing of monitoring well.

Water Quality Data

Time	Purge Vol (gal)	Water Level	Flowrate L/min	pH	Temp (C)	E Cond (uS/cm)	DO (mg/L)	ORP	Turbidity
BEGAN PURGE AT: 10:01									
10:04	0.4	2.99	0.30	7.50	12.7	799	0.24	-40.0	15.9
10:07	0.7	2.99	0.30	7.50	12.7	746	0.14	-83.90	13.8
10:10	0.9	2.99	0.30	7.47	12.7	726	0.11	-107.4	8.87
10:13	1.1	2.99	0.30	7.48	12.7	699	0.10	-122.9	6.11
10:16	1.3	2.99	0.30	7.49	12.8	680	0.09	-130.7	5.41
10:19	1.5	2.99	0.30	7.49	12.6	668	0.08	-135.3	4.71
10:22	1.7	2.99	0.30	7.50	12.6	660	0.07	-138.7	4.32
10:25	1.9	2.99	0.30	7.50	12.6	653.7	0.07	-141.3	4.04

Water Field Sampling Data Sheet
TWAAFA Additional Groundwater Sampling
Port of Tacoma

Client Name	Port of Tacoma	Sampling Location	SB-3A
Project #	M0615.20.012	Sampling Date	12/13/2023

Water Quality Observations:

Clear; colorless; no odor; no sheen.

Sample Information:

Sampling Method	Sample Type	Sampling Time	Container Code/Preservative	#	Filtered
Peristaltic Pump	Groundwater	10:30	VOA-Glass		
			Amber Glass		
			Yellow Poly		
			Green Poly		
			Red Total Poly	1	No
			Red Dissolved Poly	1	Yes
			Total Bottles	2	

General Sampling Comments:

Equipment Used:

Water Level Meter: Solinst Model 101; Serial Number 531501

Water Quality Meter: YSI Professional Plus; Serial Number 19K102418

Turbidity Meter: HACH 2100P; Serial Number 040500035330

Filter: SingleSample 0.45 µm Groundwater Filter Capsule; Batch AMJ 10-27-20

Total purge volume prior to sampling: 1.9 gallons.

ORP referenced to Ag/AgCl electrode.
3.5 Molar KCl electrode solution.

Water Field Sampling Data Sheet
TWAAFA Additional Groundwater Sampling
Port of Tacoma

Client Name	Port of Tacoma	**Sampling Location**	CTMW-25D
Project #	M0615.20.012	**Sampling Date**	12/13/2023
Project Name	TWAAFA Additional Groundwater Sampling	**Sampler**	B. Murphy
Sampling Event	December 2023	**Sample Name**	CTMW-25D-1223
Sub Area	Potter Parcel		
FSDS QA	C. Sifford	**Sample Depth**	18.0
Hydrology/Level Measurements		**Purge Method**	Peristaltic Pump

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Pore Volume
12/13/2023	11:48	22.78	--	9.59	--	13.19	2.15

All depths measured from top of casing of monitoring well.

Water Quality Data

Time	Purge Vol (gal)	Water Level	Flowrate L/min	pH	Temp (C)	E Cond (uS/cm)	DO (mg/L)	ORP	Turbidity
BEGAN PURGE AT: 11:49									
11:52	0.2	9.61	0.30	7.14	13.5	3210	0.40	-114.7	4.04
11:55	0.5	9.61	0.30	7.14	13.6	3030	0.2	-122.70	1.92
11:58	0.7	9.61	0.30	7.14	13.6	2943	0.12	-126.9	2.31
12:01	0.9	9.61	0.30	7.13	13.7	2856	0.09	-129.8	1.50
12:04	1.2	9.61	0.30	7.13	13.6	2809	0.08	-131.6	2.96

Water Field Sampling Data Sheet
TWAAFA Additional Groundwater Sampling
Port of Tacoma

Client Name	Port of Tacoma	Sampling Location	CTMW-25D
Project #	M0615.20.012	Sampling Date	12/13/2023

Water Quality Observations:

Clear; light brownish-yellow tint; no odor; no sheen.

Sample Information:

Sampling Method	Sample Type	Sampling Time	Container Code/Preservative	#	Filtered
Peristaltic Pump	Groundwater	12:05	VOA-Glass		
			Amber Glass		
			Yellow Poly		
			Green Poly		
			Red Total Poly	1	No
			Red Dissolved Poly	1	Yes
			Total Bottles	2	

General Sampling Comments:

Equipment Used:

Water Level Meter: Solinst Model 101; Serial Number 531501

Water Quality Meter: YSI Professional Plus; Serial Number 19K102418

Turbidity Meter: HACH 2100P; Serial Number 040500035330

Filter: SingleSample 0.45 µm Groundwater Filter Capsule; Batch AMJ 10-27-20

Total purge volume prior to sampling: 1.2 gallons.

ORP referenced to Ag/AgCl electrode.
3.5 Molar KCl electrode solution.

Water Field Sampling Data Sheet
TWAAFA Additional Groundwater Sampling
Port of Tacoma

Client Name	Port of Tacoma	**Sampling Location**	CTMW-20
Project #	M0615.20.012	**Sampling Date**	12/13/2023
Project Name	TWAAFA Additional Groundwater Sampling	**Sampler**	C. Sifford
Sampling Event	December 2023	**Sample Name**	CTMW-20-1223
Sub Area	Potter Parcel		
FSDS QA	C. Sifford	**Sample Depth**	7.0
Hydrology/Level Measurements		**Purge Method**	Peristaltic Pump

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Pore Volume
12/13/2023	11:38	10.64	--	1.28	--	9.36	1.53

All depths measured from top of casing of monitoring well.

Water Quality Data

Time	Purge Vol (gal)	Water Level	Flowrate L/min	pH	Temp (C)	E Cond (uS/cm)	DO (mg/L)	ORP	Turbidity
BEGAN PURGE AT: 11:41									
Allowed purge water to clear prior to hooking up YSI.									
11:43	0.2	1.37	0.35	--	--	--	--	--	14.1
11:47	0.4	1.39	0.35	6.87	11.9	1952	2.11	-88.4	8.99
11:51	0.7	1.39	0.35	6.85	11.9	1863	1.03	-105.5	5.66
11:54	1.1	1.39	0.35	6.86	11.7	1689	0.61	-113.1	5.02
11:57	1.5	1.39	0.35	6.86	11.8	1622	0.47	-115.9	4.99
12:00	1.8	1.39	0.35	6.86	11.7	1604	0.41	-117.5	3.86
12:03	2.1	1.39	0.35	6.86	11.7	1584	0.34	-118.9	3.42

Water Field Sampling Data Sheet
TWAAFA Additional Groundwater Sampling
Port of Tacoma

Client Name	Port of Tacoma	Sampling Location	CTMW-20
Project #	M0615.20.012	Sampling Date	12/13/2023

Water Quality Observations:

Clear; colorless; moderate petroleum hydrocarbon-like odor; no sheen; slightly foamy.

Sample Information:

Sampling Method	Sample Type	Sampling Time	Container Code/Preservative	#	Filtered
Peristaltic Pump	Groundwater	12:10	VOA-Glass		
			Amber Glass		
			Yellow Poly		
			Green Poly		
			Red Total Poly	1	No
			Red Dissolved Poly	1	Yes
			Total Bottles	2	

General Sampling Comments:

Equipment Used:

Water Level Meter: Solinst Model 101; Serial Number 223663

Water Quality Meter: YSI ProDSS; Serial Number 22C 102235

Turbidity Meter: HACH 2100Q; Serial Number 2301D000512

Filter: SingleSample 0.45 µm Groundwater Filter Capsule; Batch AMJ 10-27-20

Total purge volume prior to sampling: 2.1 gallons.

ORP referenced to Ag/AgCl electrode.
3.5 Molar KCl electrode solution.

Water Field Sampling Data Sheet
TWAAFA Additional Groundwater Sampling
Port of Tacoma

Client Name	Port of Tacoma	**Sampling Location**	CTMW-15
Project #	M0615.20.012	**Sampling Date**	12/13/2023
Project Name	TWAAFA Additional Groundwater Sampling	**Sampler**	B. Murphy
Sampling Event	December 2023	**Sample Name**	CTMW-15-1223
Sub Area	Potter Parcel		
FSDS QA	C. Sifford	**Sample Depth**	7.0
Hydrology/Level Measurements		**Purge Method**	Peristaltic Pump

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Pore Volume
12/13/2023	12:30	10.46	--	4.84	--	5.62	0.92

All depths measured from top of casing of monitoring well.

Water Quality Data

Time	Purge Vol (gal)	Water Level	Flowrate L/min	pH	Temp (C)	E Cond (uS/cm)	DO (mg/L)	ORP	Turbidity
BEGAN PURGE AT: 12:31									
12:34	0.3	6.25	0.30	7.00	12.4	754	0.21	14.1	38.6
12:37	0.5	6.81	0.30	6.97	12.1	725	0.2	5.10	30.2
12:40	0.5	7.09	0.10	7.09	11.9	707	0.18	-2.8	37.7
12:43	0.6	7.35	0.10	6.97	11.7	698	0.18	-9.8	38.7
12:46	0.7	7.53	0.10	6.97	11.8	695	0.19	-16.8	29.8
12:49	0.7	7.72	0.10	6.97	11.8	691	0.18	-26.7	--
12:55	0.8	8.04	0.10	6.97	11.9	691	0.15	-42.4	29.8
12:58	1.0	8.12	0.10	6.96	11.9	690	0.15	-48.9	18.0
13:01	1.0	8.12	0.10	6.96	12.0	690	0.15	-62.3	11.2
13:04	1.1	8.12	0.10	6.94	12.0	687	0.19	-79.9	4.80
13:07	1.1	8.12	0.10	6.94	12.0	678	0.17	-89.4	2.68
13:10	1.2	8.10	0.10	6.94	12.0	660.4	0.15	-97.3	1.76

Water Field Sampling Data Sheet
TWAAFA Additional Groundwater Sampling
Port of Tacoma

Client Name	Port of Tacoma	Sampling Location	CTMW-15
Project #	M0615.20.012	Sampling Date	12/13/2023

Water Quality Observations:

Cloudy, then clear; brownish-yellow tint, then colorless; no odor; no sheen.

Sample Information:

Sampling Method	Sample Type	Sampling Time	Container Code/Preservative	#	Filtered
Peristaltic Pump	Groundwater	13:20	VOA-Glass		
			Amber Glass		
			Yellow Poly		
			Green Poly		
			Red Total Poly	1	No
			Red Dissolved Poly	1	Yes
			Total Bottles	2	

General Sampling Comments:

Equipment Used:

Water Level Meter: Solinst Model 101; Serial Number 531501

Water Quality Meter: YSI Professional Plus; Serial Number 19K102418

Turbidity Meter: HACH 2100P; Serial Number 040500035330

Filter: SingleSample 0.45 µm Groundwater Filter Capsule; Batch AMJ 10-27-20

Total purge volume prior to sampling: 1.2 gallons.

Flowrate reduced due to significant drawdown. Continued purging until parameters generally stabilized. Confirmed with A. Hackett in the field.

ORP referenced to Ag/AgCl electrode.

3.5 Molar KCl electrode solution.

Water Field Sampling Data Sheet
TWAAFA Additional Groundwater Sampling
Port of Tacoma

Client Name	Port of Tacoma	**Sampling Location**	MW-1
Project #	M0615.20.012	**Sampling Date**	12/13/2023
Project Name	TWAAFA Additional Groundwater Sampling	**Sampler**	C. Sifford
Sampling Event	December 2023	**Sample Name**	MW-1-1223
Sub Area	Potter Parcel		
FSDS QA	C. Sifford	**Sample Depth**	6.0
Hydrology/Level Measurements		**Purge Method**	Peristaltic Pump

Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Pore Volume
12/13/2023	12:32	8.30	0.93	0.94	0.01	7.36	1.20

All depths measured from top of casing of monitoring well.

Water Quality Data

Time	Purge Vol (gal)	Water Level	Flowrate L/min	pH	Temp (C)	E Cond (uS/cm)	DO (mg/L)	ORP	Turbidity
BEGAN PURGE AT: 12:33									
Allowed purge water to clear prior to hooking up YSI.									
12:36	0.1	2.03	0.38	--	--	--	--	--	59.9
12:50	1.0	1.85	0.25	6.64	10.2	210.5	3.76	-79.4	37.8
12:53	1.2	--	0.25	6.42	10.1	208.9	1.84	-67.3	35.1
12:59	1.7	--	0.25	6.37	10.2	223.5	0.78	-63.0	35.6
13:02	1.9	--	0.25	6.34	10.0	216.3	0.56	-61.5	30.7
13:05	2.1	--	0.25	6.34	10.2	227.9	0.42	-60.8	28.7
13:08	2.3	--	0.25	6.36	10.2	233.2	0.36	-61.6	26.6
13:11	2.5	--	0.25	6.34	10.2	226.4	0.30	-60.6	26.7

Water Field Sampling Data Sheet
TWAAFA Additional Groundwater Sampling
Port of Tacoma

Client Name	Port of Tacoma	**Sampling Location**	MW-1
Project #	M0615.20.012	**Sampling Date**	12/13/2023

Water Quality Observations:

Clear; gray tint; strong petroleum hydrocarbon-like odor; heavy rainbow sheen; tar-like blebs present.

Sample Information:

Sampling Method	Sample Type	Sampling Time	Container Code/Preservative	#	Filtered
Peristaltic Pump	Groundwater	13:15	VOA-Glass		
			Amber Glass		
			Yellow Poly		
			Green Poly		
			Red Total Poly	1	No
			Red Dissolved Poly	1	Yes
			Total Bottles	2	

General Sampling Comments:

Equipment Used:

Water Level Meter: Geotech Interface Probe; Serial Number 4514

Water Quality Meter: YSI ProDSS; Serial Number 22C 102235

Turbidity Meter: HACH 2100Q; Serial Number 2301D000512

Filter: SingleSample 0.45 µm Groundwater Filter Capsule; Batch AMJ 10-27-20

Total purge volume prior to sampling: 2.5 gallons.
LNAPL coating the interface probe prevented water level readings after 12:53.
E Cond readings oscillated between 210 and 240 uS/cm throughout purge.

ORP referenced to Ag/AgCl electrode.
3.5 Molar KCl electrode solution.

DOF DALTON OLMSTED FUGLEVAND

Appendix B

Analytical Laboratory Reports and Data Validation Review Reports

QA/QC SOLUTIONS, LLC

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February 18, 2023

Tasya Gray, LG
DOF Dalton, Olmsted & Fuglevand
1001 SW Klickitat Way, Suite 200B
Seattle, Washington 98134

Subject: Taylor Way and Alexander Ave Fill Area (TWAAFA) Site - 4thQ 2023 Groundwater Sampling Data Validation Summary
Client Project No., Task Order No.: Not Specified, Task No. 9
QA/QC Solutions, LLC Project No.: 010524.1

Dear Tasya:

This letter documents the results of the data validation summary of selected elements completed on groundwater samples associated with Taylor Way and Alexander Ave Fill Area (TWAAFA) Site – Fourth Quarter 2023 Sampling event located in Tacoma, Washington.

The available data were validated to verify applicable laboratory quality assurance and quality control (QA/QC) measurements were reported, documented, and of sufficient quality to support its intended purpose(s). A summary of the overall assessment of data quality, the data set, a summary of the analytical methods used to complete the chemical analyses, a summary of the data validation procedures used, and a summary of the reasons why data were qualified (including other items noted during data validation) is presented below.

Overall Assessment of Data Quality

Overall, the data reported are of good quality and the results for the applicable QA/QC measurements that were used by the laboratories during the analysis of the samples were generally acceptable. Some sample results required qualification during data validation because method-specific QA/QC criteria were not met and/or based on best professional judgement. Data users should note that selected sample results maybe qualified for more than one reason. During data validation the following actions were taken:

- A total of 18 results reported as detected required qualification as estimated and were assigned a *J* data validation qualifier.
- No results reported as detected required restatement as undetected (*U*).
- No results required rejection (*R*).

Analytical data that did not meet method- and/or laboratory-established control limits for applicable quality control measurements or based on best professional judgment were qualified as estimated (*J*) by the laboratory or during data validation. These qualified data are usable and represent data of good quality and

reasonable confidence and have an acceptable degree of uncertainty (i.e., may be less precise or less accurate than unqualified data).

Data Set

The data set consisted of 38 groundwater samples, 2 field duplicates, and 2 field blanks that were collected in December 2023. A summary of the samples collected and the analyses completed are summarized in Table 1.

Analyses were completed by Friedman & Bruya, Inc. (FBI) located in Seattle, Washington and Fremont Analytical, Inc. (FAI) located in Seattle, Washington. The data and electronic data deliverable (EDDs) were reported in a total of 11 deliverables.

Analytical Methods

The analytical methods used to complete the elemental analyses are listed as follows (see also Table 1).

- Total metals (arsenic, copper, iron, lead, manganese, nickel, and zinc) by digestion and analysis by inductively coupled plasma-mass spectrometry (ICP-MS) EPA Method 6020B (U.S. EPA 2023).
- Dissolved metals (arsenic, copper, iron, lead, manganese, nickel, and zinc) by field filtration through 0.45 µm pore diameter membrane filter and analysis by ICP-MS EPA Method 6020B (U.S. EPA 2023).
- Total mercury by oxidation, purge and trap, and Cold Vapor Atomic Fluorescence Spectrometry by Method 1631, Revision E (U.S. EPA 2002a).
- Total aluminum by digestion and analysis by ICP-MS using EPA Method 200.8 (U.S. EPA 1994).
- Dissolved aluminum by field filtration through 0.45 µm pore diameter membrane filter and analysis by ICP-MS EPA Method 200.8 (U.S. EPA 1994).
- Ferrous iron by reducing ferrous iron into solion (phenanthroline method) and colorimetric (spectrophotometric) detection using Standard Method (SM) 3500-Fe B (APHA 2012).

Data Validation Procedures

Data validation procedures included evaluating a summary of the sample results and applicable quality control results reported by the laboratory; this level of validation is also referred to as an abbreviated data review (equivalent to "Stage 2A/2B" review per U.S. EPA 2009. The analytical data were validated generally following the applicable guidance and requirements:

- Method-specific and laboratory-established quality control requirements, as applicable.
- Guidance on Environmental Data Verification and Validation (U.S. EPA 2002b)
- Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use. OSWER No. 9200.1-85. EPA 540-R-08-005. (U.S. EPA 2009).
- National Functional Guidelines for Inorganic Data Superfund Data Review. Final. OLEM 9240.1-66, EPA 542-R-20-006, November 2020. U.S. Environmental

Protection Agency (EPA), Office of Superfund Remediation and Technology Innovation (OSRTI), Washington, DC. (U.S. EPA 2020).

The laboratory data deliverables that were validated and available for review included the following:

- Case narratives discussing analytical problems (if any) and procedures.
- Chain-of-custody documentation to verify completeness of the data set.
- Sample preparation logs or laboratory summary result forms to verify analytical holding times were met.
- Results for applicable method blanks and field blanks to determine whether an analyte that may have been reported as detected in a sample was the result of possible contamination introduced at the laboratory or during sampling, respectively.
- Results for applicable QC measurements (e.g., instrument calibration data, laboratory control sample (LCS) (i.e., blank spike), duplicate LCS, matrix spike [MS], and matrix spike duplicate [MSD] recoveries to assess analytical accuracy.
- Results for applicable laboratory duplicate sample, duplicate LCS, and MSD analyses to assess analytical precision as are applicable.
- Results for the field duplicate samples to provide additional information.
- Laboratory summaries of analytical results reported for the analyses competed.

Verification and validation of 100-percent of all applicable laboratory calculations, transcriptions, review of instrument printouts, and review of bench sheets were not completed during the data validation review. There may be analytical problems that could only be identified by reviewing every instrument printout and associated analytical quality control results. Verification of all possible factors that could result in the degradation of data quality was not completed nor should be inferred at this time. The laboratory case narratives did not indicate any significant problems with data that were not reviewed during data validation. The adequacy of the sampling procedures was not completed during the data validation.

Performance based control limits established by the laboratory, applicable control limits specified in the analytical methods, and best professional judgement were used to evaluate data quality and to determine if specific data required qualification. Data qualifiers were assigned during data validation following guidance specified by U.S. EPA (2002b, 2020a, and 2020b) to the EDD when applicable QC measurement criteria were not met and qualification of the data was warranted.

Reasons for Data Qualification

A total of 18 ferrous iron results reported as detected were qualified as estimated (*J*) because analyses were completed greater than 24 hrs. from time of sample collection.

Data users should note the referenced SM 3500-Fe B (APHA 2012) does not state a definitive holding time limitation; however, an industry standard of “analyze immediately”, with a default of <24 hrs. from time of collection are used by laboratories.

The ferrous iron data qualified during data validation are as follows:

Sample ID	Analyte	Concentration (mg/L)	Data Validation Qualifier	DL (mg/L)	RL (mg/L)
CTMW-24-1224	Iron, Ferrous, Fe+2	1.19	J	0.0602	0.15
CTMW-24D-1224	Iron, Ferrous, Fe+2	0.877	J	0.0602	0.15
PZ-9-1223	Iron, Ferrous, Fe+2	35.1	J	6.02	15
TWA-4D-1223	Iron, Ferrous, Fe+2	0.831	J	0.0602	0.15
TWA-7D-1223	Iron, Ferrous, Fe+2	0.381	J	0.0602	0.15
CTMW-12-1223	Iron, Ferrous, Fe+2	1.41	J	0.0602	0.15
CTMW-17-1223	Iron, Ferrous, Fe+2	0.372	J	0.0602	0.15
CTMW-17D-1223	Iron, Ferrous, Fe+2	0.886	J	0.0602	0.15
CCW-1A-1223	Iron, Ferrous, Fe+2	0.182	J	0.0602	0.15
CCW-8B-1223	Iron, Ferrous, Fe+2	13.8	J	1.51	3.75
CCW-5B-1223	Iron, Ferrous, Fe+2	10.3	J	1.51	3.75
CCW-5C-1223	Iron, Ferrous, Fe+2	8.02	J	1.51	3.75
CCW-6B-1223	Iron, Ferrous, Fe+2	19.7	J	1.51	3.75
CCW-6C-1223	Iron, Ferrous, Fe+2	10.5	J	1.51	3.75
CCW-7B-1223	Iron, Ferrous, Fe+2	20.3	J	1.51	3.75
CCW-7C-1223	Iron, Ferrous, Fe+2	1.16	J	0.0602	0.15
CCW-9-6B-1223	Iron, Ferrous, Fe+2	20.2	J	1.51	3.75
CCW-9-7B-1223	Iron, Ferrous, Fe+2	16	J	1.51	3.75

Notes

DL - detection limit

RL - reporting limit

General Comments:

- Data users should refer to the laboratory data packages for complete information pertinent to the analyses completed.
- Some sample results were reported from a dilution analysis that was required. In these instances, all other sample results were reported from the undiluted analysis.
- In some instances, continuing calibration and/or ongoing precision and accuracy (OPR) QC limits were not met. Qualification of associated sample results were not required because the exceedances were due to an increase of instrument sensitivity and the applicable target element was not detected in the associated sample.
- Chromium was detected in both field blanks and manganese was detected in the field blank #1. Associated sample results did not require qualification for this reason.

- Batch QC data (e.g., MS/MSDs) were associated with several data packages. Results from batch QC samples were not used to determine whether sample data required qualification.

This concludes the data validation review. Should you have any questions regarding the information presented herein, please contact me by telephone at 503.763.6948 or by e-mail at jjmcateer@msn.com.

Cordially,

James J. Mc Ateer, Jr., BS, MRSC
Managing Member

cc: Trevor Louviere, DOF Dalton, Olmsted & Fuglevand, Inc.

Attachments

References

APHA 2012. Standard Methods for the Examination of Water and Wastewater. 22nd Edition. Prepared and published jointly by the American Public Health Association, American Water Works Association, and Water Environment Federation, American Public Health Association, and Washington, DC.

U.S. EPA. 1994. Methods for the determination of metals in environmental samples. EPA-600/R-94-111. May 1994. Determination of trace elements in waters and wastes by inductively coupled plasma - mass spectrometry (EPA Method 200.8, Revision 5.4) Environmental Monitoring Systems Laboratory. Office of Research and Development. U.S. Environmental Protection Agency, Cincinnati, Ohio.

U.S. EPA 2002a. Method 1631, Revision E: Mercury in Water by Oxidation, Purge and Trap, and Cold Vapor Atomic Fluorescence Spectrometry. EPA-821-R-02-019. August 2002. U.S. Environmental Protection Agency, Office of Water, Washington, DC

U.S. EPA 2002b. Guidance on Environmental Data Verification and Data Validation. EPA QA/G-8. EPA/240/R-02/004. November 2002. U.S. Environmental Protection Agency, Office of Environmental Information, Washington DC.

U.S. EPA 2009. Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use. OSWER No. 9200.1-85. EPA 540-R-08-005. January 13, 2009. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC.

U.S. EPA 2020. National Functional Guidelines for Inorganic Data Superfund Data Review. Final. OLEM 9240.1-66 EPA 542-R-20-006. November 2020. Office of Superfund Remediation and Technology Innovation (OSRTI), U.S. Environmental Protection Agency.

U.S. EPA 2024. SW-846 on-line. Test methods for evaluating solid wastes, physical/chemical methods. https://www.epa.gov/hw-sw846/sw-846-compendium (last updated on June 21, 2023). U.S. Environmental Protection Agency, Office of Solid Waste, Washington, DC.

Table 1. Summary of Samples Collected and Analyses Completed

Sample Number	Laboratory ID	Laboratory	Date Collected	Time Collected	Total and Dissolved Metals by SW-846 Method 6020B	Total and Dissolved Aluminum by EPA Method 200.8	Ferrous Iron by SM 3500-Fe B	Total Mercury by EPA 1631E
CTMW-24-1223	312179-01	FBI	12/11/23	12:45	✓			
	2312283-001	FAI				✓	✓	
CTMW-24D-1223	312179-02	FBI	12/11/23	12:45	✓			
	2312283-002	FAI				✓	✓	
PZ-7-1223	312179-03	FBI	12/11/23	14:00	✓			
	2312283-003	FAI				✓	✓	
PZ-8-1223	312179-04	FBI	12/11/23	15:00	✓			
	2312283-004	FAI				✓	✓	
TWA-4D-1223	312209-01	FBI	12/12/23	10:50	✓			
	2312296-001	FAI				✓	✓	
					✓			
PZ-9-1223	312209-02	FBI	12/12/23	11:45		✓	✓	
	2312296-002	FAI						
TWA-7D-1223	312209-03	FBI	12/12/23	12:45	✓			
	2312296-003	FAI				✓	✓	
CTMW-9-1223	312222-01	FBI	12/12/23	15:25	✓			
	2312314-001	FAI				✓	✓	
CTMW-8-1223	312222-02	FBI	12/12/23	15:25	✓			
	2312314-002	FAI				✓	✓	
TWA-8D-1223	312245-01	FBI	12/13/23	09:25	✓			
	2312328-001	FAI				✓	✓	
CTMW-5-1223	312245-02	FBI	12/13/23	10:40	✓			
	2312328-002	FAI				✓	✓	
CTMW-7-1223	312245-03	FBI	12/13/23	12:00	✓			
	2312328-003	FAI				✓	✓	
CTMW-18-1223	312245-04	FBI	12/13/23	12:35	✓			
	2312328-004	FAI				✓	✓	
CTMW-14-1223	312249-01	FBI	12/13/23	14:15	✓			
	2312338-001	FAI				✓	✓	

Table 1, continued

Sample Number	Laboratory ID	Laboratory	Date Collected	Time Collected	Total and Dissolved Metals by SW-846 Method 6020B	Total and Dissolved Aluminum by EPA Method 200.8	Ferrous Iron by SM 3500-Fe B	Total Mercury by EPA 1631E
CCW-3C-1223	312260-01	FBI	12/14/23	09:30	✓			
	2312350-001	FAI				✓	✓	
CCW-3A-1223	312260-02	FBI	12/14/23	10:05	✓			
	2312350-002	FAI				✓	✓	
CCW-3B-1223	312260-03	FBI	12/14/23	10:40	✓			
	2312350-003	FAI				✓	✓	
CCW-2C-1223	312260-04	FBI	12/14/23	11:40	✓			
	2312350-004	FAI				✓	✓	
CCW-2A-1223	312273-01	FBI	12/14/23	12:45	✓			
	2312365-001	FAI				✓	✓	
CCMW-2B-1223	2312365-002	FBI	12/14/23	13:55	✓			
	312273-02	FAI				✓	✓	
TWA-9D-1223	312273-03	FBI	12/14/23	15:20	✓			
	2312365-003	FAI				✓	✓	
CTMW-23R2-1223	312301-01	FBI	12/15/23	10:10	✓			
	2312392-001	FAI				✓	✓	
Field Blank #1-1223	312301-02	FBI	12/15/23	10:15	✓			✓
	2312392-002	FAI				✓	✓	
CTMW-11R2-1223	312301-03	FBI	12/15/23	11:00	✓			
	2312392-003	FAI				✓	✓	
CTMW-12-1223	312311-01	FBI	12/15/23	12:05	✓			
	2312396-001	FAI				✓	✓	
CTMW-17-1223	312311-02	FBI	12/15/23	13:45	✓			✓
	2312396-002	FAI				✓	✓	
CTMW-17D-1223	312311-03	FBI	12/15/23	14:25	✓			
	2312396-003	FAI				✓	✓	
CCW-8B-1223	312337-01	FBI	12/18/23	10:10	✓			
	2312424-001	FAI				✓	✓	

Table 1, continued

Sample Number	Laboratory ID	Laboratory	Date Collected	Time Collected	Total and Dissolved Metals by SW-846 Method 6020B	Total and Dissolved Aluminum by EPA Method 200.8	Ferrous Iron by SM 3500-Fe B	Total Mercury by EPA 1631E
CCW-1A-1223	312337-02	FBI	12/18/23	10:55	✓			
	2312424-002	FAI				✓	✓	
CCW-1B-1223	312337-03	FBI	12/18/23	11:40	✓			
	2312424-003	FAI				✓	✓	
CCW-1C-1223	312337-04	FBI	12/18/23	12:10	✓			
	2312424-004	FAI				✓	✓	
MW-4-1223	312337-05	FBI	12/18/23	13:05	✓			
	2312424-005	FAI				✓	✓	
Field Blank #2-1223	312337-06	FBI	12/18/23	13:10	✓			✓
	2312424-006	FAI				✓	✓	
CCW-4C-1223	312337-07	FBI	12/18/23	13:45	✓			
	2312424-007	FAI				✓	✓	
CCW-6B-1223	312367-01	FBI	12/19/23	10:25	✓			
	2312462-001	FAI				✓	✓	
CCW-9-6B-1223	312367-02	FBI	12/19/23	10:30	✓			
	2312462-002	FAI				✓	✓	
CCW-6C-1223	312367-03	FBI	12/19/23	11:05	✓			
	2312462-003	FAI				✓	✓	
CCW-7C-1223	312367-04	FBI	12/19/23	11:45	✓			
	2312462-004	FAI				✓	✓	
CCW-7B-1223	312367-05	FBI	12/19/23	12:20	✓			
	2312462-005	FAI				✓	✓	
CCW-9-7B-1223	312367-06	FBI	12/19/23	12:25	✓			
	2312462-006	FAI				✓	✓	
CCW-5B-1223	312367-07	FBI	12/19/23	13:15	✓			
	2312462-007	FAI				✓	✓	
CCW-5C-1223	312367-08	FBI	12/19/23	13:55	✓			
	2312462-008	FAI				✓	✓	
			Total Number of Samples:		42	42	42	3

Notes

FAI - Fremont Analytical, Inc.

FAI - Friedman & Bruya, Inc.

QA/QC SOLUTIONS, LLC

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February 18, 2023

Tasya Gray, LG
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Seattle, Washington 98134

Subject: Taylor Way and Alexander Ave Fill Area (TWAAFA) Site - 1Q2024 PFAS Groundwater Sampling Data Validation Summary
Client Project No., Task Order No.: Not Specified, Task No. 10
QA/QC Solutions, LLC Project No.: 020324.1.1

Dear Tasya:

This letter documents the results of the data validation summary for the analysis of Per- and Polyfluoroalkyl Substances (PFAS) completed on groundwater samples and various blank samples associated with Taylor Way and Alexander Ave Fill Area (TWAAFA) Site – First Quarter 2024 PFAS Groundwater Sampling event located in Tacoma, Washington.

The available data were validated to verify applicable laboratory quality assurance and quality control (QA/QC) measurements were reported, documented, and of sufficient quality to support its intended purpose(s). A summary of the overall assessment of data quality, the data set, a summary of the analytical methods used to complete the chemical analyses, a summary of the data validation procedures used, and a summary of the reasons why data were qualified (including other items noted during data validation) is presented below.

Overall Assessment of Data Quality

Overall, the data reported are of good quality and the results for the applicable QA/QC measurements that were used by the laboratories during the analysis of the samples were generally acceptable. One sample result required qualification during data validation because a method-specific QA/QC criterion was not met. During data validation the following actions were taken:

- One result reported as detected for Perfluoropentanesulfonic acid (PFPeS) in Sample CCW-9-3A-0124 was qualified as estimated and assigned a *J* data validation qualifier.
- No results reported as detected required restatement as undetected.
- No results required rejection (*R*).

Analytical data that did not meet method- and/or laboratory-established control limits for applicable quality control measurements or based on best professional judgment were qualified as estimated (*J*) by the laboratory or during data validation. These qualified data are usable and represent data of good quality and

reasonable confidence and have an acceptable degree of uncertainty (i.e., may be less precise or less accurate than unqualified data).

Data Set

The data set consisted of six groundwater samples, one field duplicate groundwater sample, one field blank sample, one rinsate blank sample, and one trip source water blank sample that were collected in January 11, 2024. A summary of the samples collected and the analyses completed are as follows:

Sample Number	Laboratory Sample Number	Date Collected	Time Collected
CCW-3A-0124	320-108677-1	1/11//24	1035
CCW-9-3A-0124	320-108677-2	1/11//24	1046
CCW-3B-0124	320-108677-3	1/11//24	1200
Field Blank #1-0124	320-108677-4	1/11//24	1115
CCW-2C -0124	320-108677-5	1/11//24	1300
CCW-2B-0124	320-108677-6	1/11//24	1355
CCW-2A-0124	320-108677-7	1/11//24	1440
CTMW-17-0124	320-108677-8	1/11//24	1600
Rinsate Blank #1-0124	320-108677-9	1/11//24	1630
Trip Source Water Blank#1-0124	320-108677-10	1/11//24	0900

Analyses were completed by Eurofins Sacramento located in Sacramento California. The data and electronic data deliverable (EDDs) were reported in of one deliverable.

Analytical Methods

PFASs were analyzed using *4th Draft Method 1633* Analysis of Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous, Solid, Biosolids, and Tissue Samples by LC-MS/MS (U.S. EPA 2023)*. Results for 40 target compounds were reported.

*Finalized for the Aqueous Matrices: Wastewater, Surface Water, and Groundwater

Data Validation Procedures

Data validation procedures included evaluating a summary of the sample results and applicable quality control results reported by the laboratory. For this data validation effort, the data were subjected to a Stage 2B level-of-effort (U.S. EPA 2009). The analytical data were validated generally following the applicable guidance and requirements:

- Method-specific and laboratory-established quality control requirements, as applicable.
- Guidance on Environmental Data Verification and Validation (U.S. EPA 2002)
- Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use. OSWER No. 9200.1-85. EPA 540-R-08-005. (U.S. EPA 2009).

Data users should note there currently is no EPA National Functional Guidelines for the validation of non-drinking water matrices.

The laboratory data deliverables that were validated and available for review included the following:

- Case narratives discussing analytical problems (if any) and procedures.
- Chain-of-custody documentation to verify completeness of the data set.
- Sample preparation logs or laboratory summary result forms to verify analytical holding times were met. Holding times were acceptable.
- Results for applicable initial (ICAL) and continuing calibration (CCV) standards results (see pages 1,287 to 2,388 in the Tier 4 data package).
    - The maximum ICAL QC limit for the relative standard deviation/relative standard error (RSE) is ≤20%
        - ICAL results are acceptable.
    - The maximum CCV QC limit for the relative standard deviation (RSD) is ±30%
        - CCV results are acceptable.
- Results for applicable method blanks, the field blanks, the rinsate blank and the trip source water blank to determine whether an analyte that may have been reported as detected in a sample was the result of possible contamination introduced at the laboratory or during sampling.
    - No PFASs were detected in any blank
- Results for applicable a labeled isotope dilution analytes (IDA) were reviewed to assess the correction of the bias of the sample results.
    - IDA recoveries are acceptable. See summary of IDA recoveries for each sample reported with accompanying applicable QC limits in the data package
- Results for applicable internal standards to assess sensitivity and response is stable during each analysis.
    - A QC limit for internal standards area count is 50– 200 percent
        - Internal standards results are acceptable
- Results for all ion ratios (see pages 748 to 793 in the Tier 4 data package) to assess if matrix interferences may have resulted in a potential bias of the results quantified
    - A QC limit for the transition ion ratios is 50-150%
        - Ion ratios are acceptable with one exception; see *Reasons for Data Qualification* section below for details
- Recoveries for laboratory control sample (LCS) (i.e., blank spike) and low-level LCS to assess analytical accuracy in absence of matrix effects.
    - See summary of LCS and LLCS recoveries in the data per with accompanying applicable QC limits in the data package

        - LCS and LLCS recoveries are acceptable
- RPDs for the duplicate sample analysis to assess analytical precision.
    - A QC limit for the RPD for sample duplicate results is ±30%
        - RPDS for duplicate sample analysis are acceptable
- Results for the field duplicate samples to provide additional information.
- Laboratory summaries of analytical results reported for the analyses competed.

Verification and validation of 100-percent of all applicable laboratory calculations, transcriptions, review of instrument printouts, and review of bench sheets were not completed during the data validation review. There may be analytical problems that could only be identified by reviewing every instrument printout and associated analytical quality control results. Verification of all possible factors that could result in the degradation of data quality was not completed nor should be inferred at this time. The laboratory case narratives did not indicate any significant problems with data that were not reviewed during data validation. The adequacy of the sampling procedures was not completed during the data validation.

Performance based control limits established by the laboratory, applicable control limits specified in the analytical methods, and best professional judgement were used to evaluate data quality and to determine if specific data required qualification. Data qualifiers were assigned during data validation following guidance specified by U.S. EPA (2002) to the EDD when applicable QC measurement criteria were not met and qualification of the data was warranted.

Reasons for Data Qualification

The result reported as detected for Perfluoropentanesulfonic acid (PFPeS) for Sample CCW-9-3A-0124 required qualification as estimated (*J*) data validation qualifier because the mass ion ratio was outside the QC limit of 50-150%. An ion ratio of 16.073 was reported for PFPeS (see page 748 of 2,903 in the Tier 4 data package). The target ratio is 1.838 and the ion limits are 0.93 – 2.80.

Eurofins Sacramento noted the following in the case narrative regarding this exceedance:

> "Method 1633: The "I" qualifier means the transition mass ratio for the indicated analyte for Perfluoropentanesulfonic acid (PFPeS) was outside the established ratio limits. The qualitative identification of the analyte has some degree of uncertainty, and the reported value may have some high bias. However, analyst judgment was used to positively identify the analyte: CCW-9-3A-0124 (320-108687-2). The sample was reanalyzed with concurring result, therefore, the best set of data was reported."

General Comments:

- Data users should refer to the laboratory data packages for complete information pertinent to the analyses completed.
- As noted in the case narrative:
    - "The following continuing calibration blank (CCB) was flagged for Isotope Dilution Analyte (IDA) recovery above the method recommended limit: CCB 320-735099/5. The purpose of the CCB is to test for instrument contamination. As the CCB was non-detect for all native analytes, the bracketing continuing calibration verification (CCV) was in

control, and the IDA of the associated samples recovered within limits, there is no adverse impact on data quality; therefore, the data have been reported." None of the associated sample results required qualification for this reason\

- An RPD of 38 was reported for PFPeS-RA (a reanalysis) for the duplicate sample analysis completed on CCW-3B-0124. Since concentration of 4.2 ng/L and 2.84 ng/L were reported, the control limit of ±30% is not applicable because these concentrations are not >5x the reporting limit of 2.0 ng/L.

This concludes the data validation review. Should you have any questions regarding the information presented herein, please contact me by telephone at 503.763.6948 or by e-mail at jjmcateer@msn.com.

Cordially,

James J. Mc Ateer, Jr., BS, MRSC
Managing Member

cc: Trevor Louviere, DOF Dalton, Olmsted & Fuglevand, Inc.

Attachments

References

U.S. EPA 2002 Guidance on Environmental Data Verification and Data Validation. EPA QA/G-8. EPA/240/R-02/004. November 2002. U.S. Environmental Protection Agency, Office of Environmental Information, Washington DC.

U.S. EPA 2009. Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use. OSWER No. 9200.1-85. EPA 540-R-08-005. January 13, 2009. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC.

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U.S. EPA 2024. SW-846 on-line. Test methods for evaluating solid wastes, physical/chemical methods. https://www.epa.gov/hw-sw846/sw-846-compendium (last updated on June 21, 2023). U.S. Environmental Protection Agency, Office of Solid Waste, Washington, DC.

Data Quality Assurance/Quality Control Review

Project No. M0615.20.012 | February 8, 2024 | Port of Tacoma

Maul Foster & Alongi, Inc. (MFA), conducted an independent review of the quality of analytical results for groundwater and associated quality control samples collected on December 12 and 13, 2023, at the Taylor Way and Alexander Avenue Fill Area in Tacoma, Washington.

Friedman & Bruya, Inc. (F&B), Fremont Analytical, Inc. (Fremont), and Eurofins Environment Testing Northern California, LLC, located in West Sacramento, California (Eurofins-WS), performed the analyses. MFA reviewed F&B report number 312247 and Eurofins-WS report number 320-108065-1. F&B subcontracted total and dissolved aluminum analysis to Fremont and the results are included in report 312247.The analyses performed and the samples analyzed are listed in the following tables. Not all analyses were performed on all samples.

Analysis	Reference
Per- and polyfluoroalkyl substances	EPA 1633
Total and dissolved metals	EPA 6020B, EPA 200.8

Note
EPA = U.S. Environmental Protection Agency.

Samples Analyzed		
Report 312247		**Report 320-108065-1**
TWA-3-1223	Filter Blank1-1223	TWA-3-1223
TWA-9-3-1223	TWA-5D-1223	TWA-9-3-1223
TWA-10D-1223	TWA-6D-1223	Rinsate Blank1-1223
TWA-1-1223	SB-3A-1223	Field Blank1-1223
TWA-2-1223	CTMW-25D-1223	SB-2A-1223
Field Blank1-1223	CTMW-20-1223	Rinsate Blank2-1223
SB-1A-1223	MW-1-1223	Trip Blank1-1223
SB-2A-1223	CTMW-15-1223	--

Data Qualification

Analytical results were evaluated according to applicable sections of U.S. Environmental Protection Agency (EPA) guidelines for data review (EPA 2020a, 2020b) and appropriate laboratory- and method-specific guidelines (EPA 1986, Eurofins-WS 2023, F&B 2022, Fremont 2023).

Based on the results of the data quality review procedures described below, the data, with the appropriate final data qualifiers assigned, are considered acceptable for their intended use. Final data qualifiers represent qualifiers originating from the laboratory and accepted by the reviewer, and data qualifiers assigned by the reviewer during validation.

Final data qualifiers:

- J+ = result is estimated, but the result may be biased high.
- K = result is an estimated maximum potential concentration.
- U = result is non-detect at the method reporting limit (MRL).

- UJ = result is non-detect with an estimated MRL.

Total and Dissolved Compounds

For report 312247, total and dissolved EPA Methods 6020B and 200.8 metals results were compared. Where dissolved metals results were greater than their associated total results, qualification was not required when the relative percent difference (RPD) was less than 20 percent.

All detected total metals results were greater than their associated dissolved metals results or met the RPD acceptance criteria.

Estimated Maximum Potential Concentration Results

According to the case narrative accompanying report 320-108065-1, the EPA Method 1633 transition mass ratio for PFOS was outside the established ratio limits for samples TWA-3-1223 and TWA-9-3-1223. The laboratory noted that the samples were reanalyzed with similar results. The laboratory qualified the associated sample results as estimated maximum potential concentrations, and the reviewer accepted the laboratory qualifications, as shown in the following table.

Report	Sample	Analyte	Original Result (ng/L)	Qualified Result (ng/L)
320-108065-1	TWA-3-1223	PFOS	16 K	16 K[(a)]
	TWA-9-3-1223		18 K	18 K[(a)]

Notes
K = result is an estimated maximum potential concentration.
ng/L = nanograms per liter.
[(a)]Qualification from the laboratory was accepted by the reviewer.

Sample Conditions

Sample Custody

Sample custody was appropriately documented on the chain-of-custody (COC) forms accompanying the reports.

Holding Times

Extractions and analyses were performed within the recommended holding times.

Preservation and Sample Storage

According to the case narrative accompanying report 320-108065-1, the EPA Method 1633 portion of sample SB-2A-1223 had a thin layer of sediment present in the bottom of the bottle prior to extraction. Qualification by the reviewer due to the presence of sediment was not required.

The samples were preserved and stored appropriately.

Sample Filtration

Field samples for dissolved EPA Method 6020B and 200.8 analysis were field-filtered with a 0.45-micron filter during sample collection.

Reporting Limits

The laboratories evaluated results to MRLs. Samples that required dilutions because of high analyte concentrations, matrix interferences, and/or dilutions necessary for preparation and/or analysis were reported with raised MRLs.

The reviewer confirmed that when samples were diluted for analysis or when a higher sample volume was used for the extraction F&B provided the preparation or dilution factor after the laboratory sample identification number.

Blanks

Field quality sample results may be qualified as a result of laboratory instrument or batch information, but original or unvalidated laboratory results associated with field quality control samples are used to assess impact on field samples.

When the sample result was greater than the MRL and within five (for organics) or ten (for inorganics) times the associated blank concentration, the reviewer qualified the sample result with J+. Non-detect sample results and sample results greater than five (for organics) or ten (for inorganics) times the blank concentration did not require qualification.

Calibration Blanks

Initial calibration blanks (ICBs) and continuing calibration blanks (CCBs) are used to assess analytical background contamination. ICB and CCB results were not required for validation but were reviewed when provided by Fremont for EPA Method 200.8 in report 312247.

All ICB and CCB results reviewed were non-detect to MRLs.

Method Blanks

Laboratory method blanks are used to assess whether laboratory contamination was introduced during sample preparation and analysis. Laboratory method blank analyses were performed at the required frequencies. For purposes of data qualification, the laboratory method blanks were associated with all samples prepared in the analytical batch.

All laboratory method blank results were non-detect to MRLs.

Equipment Rinsate Blanks

Equipment rinsate blanks are used to evaluate field equipment decontamination.

Two equipment rinsate blanks were submitted with sample delivery group (SDG) 320-108065-1 for EPA Method 1633 analysis. Groundwater samples are associated with equipment rinsate blanks based on sample locations, as shown in the following table.

Report	Equipment Rinsate Blank	Associated Sample(s)
320-108065-1	Rinsate Blank1-1223	TWA-3-1223
		TWA-9-3-1223
	Rinsate Blank2-1223	SB-2A-1223

All equipment rinsate blank results were non-detect to MRLs.

Field Blanks

Field blanks are used to assess if contamination from field conditions was introduced during sampling, preservation, and shipment to the laboratory.

A field blank sample (Field Blank1-1223) was submitted with SDG 312247 for EPA Methods 6020B and 200.8 total metals analysis and with SDG 320-108065-1 for EPA Method 1633 analysis. The field blank is associated with all groundwater sample results provided in reports 312247 and 320-108065-1. The field blank had several detections above MRLs, as shown in the table below.

Report	Analysis	Analyte	Field Blank Result (ug/L)
312247	EPA 6020B	Total chromium	1.72
		Total copper	3.07
		Total manganese	1.44
	EPA 200.8	Total aluminum	19.4

Notes
EPA = U.S. Environmental Protection Agency.
ug/L = micrograms per liter.

Similar dissolved chromium, dissolved manganese, and dissolved aluminum detections are present in the filter blank, as described and evaluated in the section below. However, the field blank had a total copper detection while the filter blank did not have a dissolved copper detection. In lieu of similar field and filter blank copper detections, the reviewer evaluated dissolved copper sample results based on the field blank total copper detection and qualified accordingly. Qualifications by the reviewer based on the field blank are shown in the following table:

Report	Sample	Analyte	Field Blank Result (ug/L)	Original Result (ug/L)	Qualified Result (ug/L)
312247	TWA-3-1223	Dissolved copper	3.07[(a)]	4.21	4.21 J+
	TWA-9-3-1223			3.76	3.76 J+
	TWA-1-1223			3.57	3.57 J+
	TWA-2-1223			10.2	10.2 J+
	TWA-3-1223	Total copper	3.07	4.50	4.50 J+
	TWA-9-3-1223			4.66	4.66 J+
	TWA-10D-1223			4.11	4.11 J+
	TWA-1-1223			3.88	3.88 J+
	TWA-2-1223			10.4	10.4 J+
	SB-1A-1223			2.57	2.57 J+
	TWA-6D-1223			2.97	2.97 J+
	CTMW-25D-1223			2.74	2.74 J+
	MW-1-1223			6.59	6.59 J+
	TWA-1-1223	Total manganese	1.44	11.2	11.2 J+
	CTMW-25D-1223	Total chromium	1.72	15.9	15.9 J+
	TWA-10D-1223	Total aluminum	19.4	46.4	46.4 J+
	TWA-1-1223			14.8	14.8 J+
	TWA-2-1223			34.1	34.1 J+
	SB-2A-1223			49.9	49.9 J+
	TWA-5D-1223			19.7	19.7 J+

Report	Sample	Analyte	Field Blank Result (ug/L)	Original Result (ug/L)	Qualified Result (ug/L)
	TWA-6D-1223			75.6	75.6 J+
	CTMW-25D-1223			88.0	88.0 J+
	MW-1-1223			71.1	71.1 J+

Notes
J+ = result is estimated, but the result may be biased high.
ug/L = micrograms per liter.
[a]Field blank result for total copper.

All remaining field blank results were non-detect to MRLs.

Filter Blanks

Filter blanks are used to evaluate whether contamination was introduced during field filtering procedures.

A filter blank sample (Filter Blank1-1223) was submitted with SDG 312247 for EPA Method 6020B and 200.8 dissolved metals analysis. The filter blank is associated with all dissolved groundwater sample metals results provided in report 312247, since all dissolved groundwater samples were collected and filtered using consistent sampling protocols. The filter blank had several detections above MRLs, as shown in the table below.

Report	Analysis	Analyte	Filter Blank Result (ug/L)
312247	EPA 6020B	Dissolved chromium	1.71
		Dissolved manganese	1.87
	EPA 200.8	Dissolved aluminum	17.5

Notes
EPA = U.S. Environmental Protection Agency.
ug/L = micrograms per liter.

Similar total chromium, total manganese, and total aluminum detections are present in the field blank, but dissolved metals sample results are evaluated based on the filter blank detections, except for dissolved copper, which is qualified in the Field Blank section above. Qualifications by the reviewer based on the filter blank are shown in the following table:

Report	Sample	Analyte	Filter Blank Result (ug/L)	Original Result (ug/L)	Qualified Result (ug/L)
312247	TWA-1-1223	Dissolved manganese	1.87	3.57	3.57 J+
	CTMW-25D-1223	Dissolved chromium	1.71	12.6	12.6 J+
	TWA-10D-1223	Dissolved aluminum	17.5	14.3	14.3 J+
	SB-2A-1223			11.1	11.1 J+
	TWA-5D-1223			11.4	11.4 J+
	TWA-6D-1223			49.9	49.9 J+
	CTMW-25D-1223			59.2	59.2 J+
	MW-1-1223			16.6	16.6 J+

Notes
J+ = result is estimated, but the result may be biased high.
ug/L = micrograms per liter.

All remaining filter blank results were non-detect to MRLs.

Trip Blanks

Trip blanks are used to evaluate whether per- and polyfluoroalkyl substance contamination was introduced during sample storage and during shipment between the sampling location and the laboratory.

A trip blank (Trip Blank1-1223) was submitted with SDG 320-108065-1 for EPA Method 1633 analysis. The trip blank is associated with all groundwater and associated quality control samples submitted with SDG report 320-108065-1, since all samples were shipped together in a single cooler.

All trip blank results were non-detect to MRLs.

Laboratory Control Sample and Laboratory Control Sample Duplicate Results

A laboratory control sample (LCS) and a laboratory control sample duplicate (LCSD) are spiked with target analytes to provide information about laboratory precision and accuracy. The LCS were prepared and analyzed at the required frequency. No LCSDs were reported; thus, laboratory precision was evaluated using matrix spike (MS) and matrix spike duplicate (MSD) results.

In report 320-108065-1, Eurofins-WS reported an "LLCS" for EPA Method 1633. The reviewer confirmed that this is a low-level LCS.

All LCS results were within acceptance limits for percent recovery.

Laboratory Duplicate Results

Laboratory duplicate results are used to evaluate laboratory precision.

Laboratory duplicate results were only reported by Fremont in report 312247 for dissolved aluminum by EPA Method 200.0. This laboratory duplicate sample was prepared and analyzed at the required frequency. Laboratory precision was evaluated using MS and MSD results for the remaining batches.

Laboratory duplicate results greater than five times the MRL were evaluated using laboratory RPD control limits. Laboratory duplicate results less than five times the MRL, including non-detects, were evaluated using a control limit of the MRL of the parent sample; the absolute difference of the laboratory duplicate sample result and the parent sample result, or the MRL for non-detects, was compared to the MRL of the parent sample.

The laboratory duplicate result met the acceptance criterion.

Matrix Spike and Matrix Spike Duplicate Results

MS and MSD results are used to evaluate laboratory precision, accuracy, and the effect of the sample matrix on sample preparation and analysis. All MS and MSD samples were prepared and analyzed at the required frequency.

When MS and MSD were prepared from samples with high concentrations of target analytes, associated MS and/or MSD percent recovery and/or RPD control limit exceedances did not require qualification because spike concentrations could not be accurately quantified. High concentrations of target analytes are defined as four times the spike amount for all analyses.

According to report 320-108065-1, EPA Method 1633 batch 733325 MSD prepared with sample SB-2A-1223 had a PFHxA result above the upper percent recovery acceptance limit of 145 percent, at 150 percent. The associated PFHxA sample result was non-detect and thus did not require

qualification by the reviewer. The MSD also had a PFDoS result below the lower percent recovery acceptance limit of 50 percent, at 43 percent. The reviewer qualified the associated sample result, as shown in the following table.

Report	Sample	Analyte	Original Result (ng/L)	Qualified Result (ng/L)
320-108065-1	SB-2A-1223	PFDoS	2.0 U	2.0 UJ

Notes
ng/L = nanograms per liter.
U = result is non-detect at the method reporting limit.
UJ = result is non-detect with an estimated method reporting limit.

All remaining MS and MSD results were within acceptance limits for percent recovery and RPD.

Isotope Dilution Results

According to report 320-108065-1, EPA Method 1633 samples were spiked with isotopically labeled carbon-13 or deuterated analog standards to quantify the relative response of analytes in each sample.

The reviewer confirmed that Eurofins-WS performed calibration by isotope dilution for the 24 available target analytes and quantitated the remaining target analytes using a closely related labeled analog.

All isotope dilution recoveries were within acceptance limits.

Calibration Verification Results

Initial calibration verification (ICV) and continuing calibration verification (CCV) results are used to verify the accuracy of the instrument calibration and demonstrate instrument precision and accuracy through the end of the sample batch. CCV results were not required for validation but were reviewed when provided by Fremont for EPA Method 200.8 in report 312247.

All CCV results provided were within percent recovery acceptance limits.

Field Duplicate Results

Field duplicate samples measure both field and laboratory precision. The following field duplicate and parent sample pair was submitted for analysis:

Reports	Parent Sample	Field Duplicate Sample
312247 and 320-108065-1	TWA-3-1223	TWA-9-3-1223

MFA uses acceptance criteria of 100 percent RPD for results that are less than five times the MRL or 50 percent RPD for results that are greater than five times the MRL. RPD was not evaluated when both results in the sample pair were non-detect.

All field duplicate results met the RPD acceptance criteria.

Data Package

The data packages were reviewed for transcription errors, omissions, and anomalies.

The reviewer confirmed with the laboratories that F&B and Fremont are not accredited for aluminum analysis by EPA Method 6020B, which was requested on the COC form accompanying report 312247. Fremont is accredited for aluminum analysis by EPA Method 200.8. F&B subcontracted the total and dissolved aluminum analysis to Fremont for analysis by EPA Method 200.8 to meet accreditation requirements.

At MFA's request, report 312247 was revised on February 8, 2024, to correct the sample name for the field duplicate sample. The name was updated from TWA-9-1223 to TWA-9-3-1223.

No other issues were found.

References

EPA. 1986. *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.* EPA publication SW-846. 3rd ed. U.S. Environmental Protection Agency. Final updates I (1993), II (1995), IIA (1994), IIB (1995), III (1997), IIIA (1999), IIIB (2005), IV (2008), V (2015), VI phase I (2017), VI phase II (2018), VI phase III (2019), VII phase I (2019), and VII phase II (2020).

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Fremont. 2023. *Quality Assurance.* Rev. 3.7. Fremont Analytical, Inc.: Seattle, WA. April 18.

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December 22, 2023

Trevor Louviere, Project Manager
Dalton Olmsted Fuglevand
1001 SW Klickitat Way, Suite 200B
Seattle, WA 98134

Dear Mr Louviere:

Included are the results from the testing of material submitted on December 11, 2023 from the TWAAFA-001, F&BI 312179 project. There are 22 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: Anthony Cerruti, Tasya Gray
DOF1222R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on December 11, 2023 by Friedman & Bruya, Inc. from the Dalton Olmsted Fuglevand TWAAFA-001, F&BI 312179 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Dalton Olmsted Fuglevand
312179 -01	CTMW-24-1223
312179 -02	CTMW-24D-1223
312179 -03	PZ-7-1223
312179 -04	PZ-8-1223

The samples were sent to Fremont Analytical for ferrous iron, total aluminum, and dissolved aluminum analyses. The report is enclosed.

The 6020B total and dissolved arsenic calibration standard exceeded the acceptance criteria for sample CTMW-24-1223 and for the iron calibration standard in the total method blank. The metals were not detected, therefore this did not represent an out of control condition.

Lead and zinc in the 6020B dissolved matrix spike and matrix spike duplicate did not meet the acceptance criteria. The laboratory control sample passed the acceptance criteria, therefore the results were due to matrix effect.

All other quality control requirements were acceptable.

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	CTMW-24-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/11/23	Project:	TWAAFA-001
Date Extracted:	12/12/23	Lab ID:	312179-01
Date Analyzed:	12/16/23	Data File:	312179-01.196
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1 k
Copper	<1
Iron	999
Manganese	94.2

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	CTMW-24D-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/11/23	Project:	TWAAFA-001
Date Extracted:	12/12/23	Lab ID:	312179-02
Date Analyzed:	12/16/23	Data File:	312179-02.197
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Copper	<1
Manganese	211

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	CTMW-24D-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/11/23	Project:	TWAAFA-001
Date Extracted:	12/12/23	Lab ID:	312179-02 x5
Date Analyzed:	12/15/23	Data File:	312179-02 x5.171
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<5
Iron	7,370

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	PZ-7-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/11/23	Project:	TWAAFA-001
Date Extracted:	12/12/23	Lab ID:	312179-03
Date Analyzed:	12/16/23	Data File:	312179-03.198
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Iron	207
Lead	<1
Manganese	10.8
Nickel	3.43
Zinc	26.6

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	PZ-7-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/11/23	Project:	TWAAFA-001
Date Extracted:	12/12/23	Lab ID:	312179-03 x5
Date Analyzed:	12/15/23	Data File:	312179-03 x5.172
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<5

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	PZ-8-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/11/23	Project:	TWAAFA-001
Date Extracted:	12/12/23	Lab ID:	312179-04
Date Analyzed:	12/16/23	Data File:	312179-04.199
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

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

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	PZ-8-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/11/23	Project:	TWAAFA-001
Date Extracted:	12/12/23	Lab ID:	312179-04 x5
Date Analyzed:	12/15/23	Data File:	312179-04 x5.173
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<5
Manganese	1,280
Nickel	11.7
Zinc	<25

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	PZ-8-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/11/23	Project:	TWAAFA-001
Date Extracted:	12/12/23	Lab ID:	312179-04 x200
Date Analyzed:	12/20/23	Data File:	312179-04 x200.047
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Iron	44,800

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Dalton Olmsted Fuglevand
Date Received:	Not Applicable	Project:	TWAAFA-001
Date Extracted:	12/12/23	Lab ID:	I3-977 mb2
Date Analyzed:	12/15/23	Data File:	I3-977 mb2.167
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Copper	<1
Iron	<50
Lead	<1
Manganese	<1
Nickel	<1
Zinc	<5

Analysis For Total Metals By EPA Method 6020B

Client ID:	CTMW-24-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/11/23	Project:	TWAAFA-001
Date Extracted:	12/13/23	Lab ID:	312179-01
Date Analyzed:	12/16/23	Data File:	312179-01.207
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1 k
Copper	<1
Iron	919
Manganese	79.8

Analysis For Total Metals By EPA Method 6020B

Client ID:	CTMW-24D-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/11/23	Project:	TWAAFA-001
Date Extracted:	12/13/23	Lab ID:	312179-02
Date Analyzed:	12/16/23	Data File:	312179-02.208
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Copper	<1
Manganese	211

Analysis For Total Metals By EPA Method 6020B

Client ID:	CTMW-24D-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/11/23	Project:	TWAAFA-001
Date Extracted:	12/13/23	Lab ID:	312179-02 x5
Date Analyzed:	12/15/23	Data File:	312179-02 x5.182
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<5
Iron	7,370

Analysis For Total Metals By EPA Method 6020B

Client ID:	PZ-7-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/11/23	Project:	TWAAFA-001
Date Extracted:	12/13/23	Lab ID:	312179-03
Date Analyzed:	12/16/23	Data File:	312179-03.209
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Iron	1,660
Lead	11.1
Manganese	37.2
Nickel	4.08
Zinc	35.3

Analysis For Total Metals By EPA Method 6020B

Client ID:	PZ-7-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/11/23	Project:	TWAAFA-001
Date Extracted:	12/13/23	Lab ID:	312179-03 x5
Date Analyzed:	12/16/23	Data File:	312179-03 x5.183
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	5.02

Analysis For Total Metals By EPA Method 6020B

Client ID:	PZ-8-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/11/23	Project:	TWAAFA-001
Date Extracted:	12/13/23	Lab ID:	312179-04
Date Analyzed:	12/16/23	Data File:	312179-04.210
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

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

Analysis For Total Metals By EPA Method 6020B

Client ID:	PZ-8-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/11/23	Project:	TWAAFA-001
Date Extracted:	12/13/23	Lab ID:	312179-04 x5
Date Analyzed:	12/16/23	Data File:	312179-04 x5.184
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	5.19
Manganese	1,250
Nickel	10.1
Zinc	75.7

Analysis For Total Metals By EPA Method 6020B

Client ID:	PZ-8-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/11/23	Project:	TWAAFA-001
Date Extracted:	12/13/23	Lab ID:	312179-04 x100
Date Analyzed:	12/18/23	Data File:	312179-04 x100.084
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Iron	47,400

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Dalton Olmsted Fuglevand
Date Received:	Not Applicable	Project:	TWAAFA-001
Date Extracted:	12/13/23	Lab ID:	I3-981 mb2
Date Analyzed:	12/13/23	Data File:	I3-981 mb2.053
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Copper	<1
Iron	<50 k
Lead	<1
Manganese	<1
Nickel	<1
Zinc	<5

Date of Report: 12/22/23
Date Received: 12/11/23
Project: TWAAFA-001, F&BI 312179

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

Laboratory Code: 312157-01 (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	2.50	75 b	76 b	75-125	1 b
Copper	ug/L (ppb)	20	<5	75	77	75-125	3
Iron	ug/L (ppb)	100	9,650	0 b	0 b	75-125	nm
Lead	ug/L (ppb)	10	<1	71 vo	73 vo	75-125	3
Manganese	ug/L (ppb)	20	1,800	0 b	0 b	75-125	nm
Nickel	ug/L (ppb)	20	50.9	66 b	69 b	75-125	4 b
Zinc	ug/L (ppb)	50	<5	73 vo	74 vo	75-125	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	94	80-120
Copper	ug/L (ppb)	20	92	80-120
Iron	ug/L (ppb)	100	90	80-120
Lead	ug/L (ppb)	10	95	80-120
Manganese	ug/L (ppb)	20	85	80-120
Nickel	ug/L (ppb)	20	93	80-120
Zinc	ug/L (ppb)	50	96	80-120

Date of Report: 12/22/23
Date Received: 12/11/23
Project: TWAAFA-001, F&BI 312179

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

Laboratory Code: 312178-02 (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	1.64	93	92	75-125	1
Copper	ug/L (ppb)	20	<5	85	87	75-125	2
Iron	ug/L (ppb)	100	503	117 b	115 b	75-125	2 b
Lead	ug/L (ppb)	10	<1	77	78	75-125	1
Manganese	ug/L (ppb)	20	118	119 b	121 b	75-125	2 b
Nickel	ug/L (ppb)	20	2.74	89	89	75-125	0
Zinc	ug/L (ppb)	50	<5	92	94	75-125	2

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	93	80-120
Copper	ug/L (ppb)	20	97	80-120
Iron	ug/L (ppb)	100	101	80-120
Lead	ug/L (ppb)	10	90	80-120
Manganese	ug/L (ppb)	20	87	80-120
Nickel	ug/L (ppb)	20	96	80-120
Zinc	ug/L (ppb)	50	98	80-120

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, biased low; or, the calibration results for the analyte were outside of acceptance criteria, biased high, with a detection for the analyte in the sample. 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 standard reporting limit. 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.

k – The calibration results for the analyte were outside of acceptance criteria, biased high, and the analyte was not detected in the sample.

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.

312179

SAMPLE CHAIN OF CUSTODY

12/11/23 Page # 1 of 1 L4

Report To: Anthony Cerruti / Trevor Louviere
CC: Tasya Gray

Company DOF

Address 1001 SW Klickitat Way

City, State, ZIP Seattle, WA 98134

Phone 215-767-7749 Email acerruti@dofnw.com

SAMPLERS (*signature*) [signature]

PROJECT NAME	PO #
TWAAFA	TWAAFA-001

REMARKS ★ Dissolved metals samples field filtered at 0.45 micron before analysis

Project Specific RLs - (Yes) / No

INVOICE TO: DOF

TURNAROUND TIME
- ■ Standard Turnaround
- __ RUSH ______
- Rush charges authorized by:

SAMPLE DISPOSAL
- ■ Dispose after 30 days
- Archive Samples
- Other

ANALYSES REQUESTED

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Matrix	# of Bottles	Total Metals 6020B (As, Cr, Cu, Mn, Ni, Pb, Zn)	Dissolved Metals 6020B (As, Cr, Cu, Mn, Ni, Pb, Zn)	Total Mercury 1631E	Dissolved Mercury 1631E	Total Metals (Al, Fe)	Dissolved Metals (Al, Fe)	Ferrous Iron			MS/MSD Collected? (Y/N)	Notes
CTMW-24-1223	01 A-C	12/11/23	1100	W	3	X	X			X	X	X				Tot/Diss Metals: Al, As, Cu, Fe, Mn
CTMW-24D-1223	02	12/11/23	1245	W	3	X	X			X	X	X				Tot/Diss Metals: Al, As, Cu, Fe, Mn
PZ-7-1223	03	12/11/23	1400	W	3	X	X			X	X	X				Tot Diss Metals: Al, As, Fe, Mn, Ni, Pb, Zn
PZ-8-1223	04	12/11/23	1500	W	3	X	X			X	X	X				Tot/Diss Metals: Al, As, Fe, Mn, Ni, Pb, Zn

Samples received at 2 °C

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: [signature]	Michael Lebr...t	Clear Earth	12/11/23	16:47
Received by: [signature]	ANH PHAN	FBI	12/11/23	16:47
Relinquished by:				
Received by:				

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

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: 312179
Work Order Number: 2312283

December 19, 2023

Attention Michael Erdahl:

Fremont Analytical, Inc. received 4 sample(s) on 12/12/2023 for the analyses presented in the following report.

Dissolved Metals by EPA Method 200.8
Ferrous Iron by SM3500-Fe B
Total Metals by EPA Method 200.8

This report consists of the following:

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

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

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes
Project Manager

Date: *12/19/2023*

CLIENT: Friedman & Bruya
Project: 312179
Work Order: 2312283

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2312283-001	CTMW-24-1224	12/11/2023 11:00 AM	12/12/2023 9:30 AM
2312283-002	CTMW-24D-1224	12/11/2023 12:45 PM	12/12/2023 9:30 AM
2312283-003	PZ-7-1223	12/11/2023 2:00 PM	12/12/2023 9:30 AM
2312283-004	PZ-8-1223	12/11/2023 3:00 PM	12/12/2023 9:30 AM

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

Case Narrative

WO#: **2312283**
Date: **12/19/2023**

CLIENT: Friedman & Bruya
Project: 312179

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: **2312283**
Date Reported: **12/19/2023**

CLIENT: Friedman & Bruya
Project: 312179

Lab ID: 2312283-001 **Collection Date:** 12/11/2023 11:00:00 AM
Client Sample ID: **CTMW-24-1224** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 42343		Analyst: JR
Aluminum	23.1	10.0		µg/L	1	12/15/2023 4:15:00 PM
Total Metals by EPA Method 200.8				Batch ID: 42345		Analyst: JR
Aluminum	40.2	10.0		µg/L	1	12/15/2023 1:55:00 PM
Ferrous Iron by SM3500-Fe B				Batch ID: R88304		Analyst: FG
Ferrous Iron	1.19	0.150	H	mg/L	1	12/12/2023 2:17:54 PM

Lab ID: 2312283-002 **Collection Date:** 12/11/2023 12:45:00 PM
Client Sample ID: **CTMW-24D-1224** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 42343		Analyst: JR
Aluminum	13.0	10.0		µg/L	1	12/15/2023 4:17:00 PM
Total Metals by EPA Method 200.8				Batch ID: 42345		Analyst: JR
Aluminum	13.6	10.0		µg/L	1	12/15/2023 1:57:00 PM
Ferrous Iron by SM3500-Fe B				Batch ID: R88304		Analyst: FG
Ferrous Iron	0.877	0.150	H	mg/L	1	12/12/2023 2:17:54 PM

CLIENT: Friedman & Bruya
Project: 312179

Lab ID: 2312283-003 **Collection Date:** 12/11/2023 2:00:00 PM
Client Sample ID: **PZ-7-1223** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 42343		Analyst: JR
Aluminum	46.7	10.0		µg/L	1	12/15/2023 4:08:00 PM
Total Metals by EPA Method 200.8				Batch ID: 42345		Analyst: JR
Aluminum	49.9	10.0		µg/L	1	12/15/2023 2:00:00 PM
Ferrous Iron by SM3500-Fe B				Batch ID: R88304		Analyst: FG
Ferrous Iron	41.7	15.0	D	mg/L	100	12/12/2023 2:17:54 PM

Lab ID: 2312283-004 **Collection Date:** 12/11/2023 3:00:00 PM
Client Sample ID: **PZ-8-1223** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 42343		Analyst: JR
Aluminum	51.1	10.0		µg/L	1	12/15/2023 4:25:00 PM
Total Metals by EPA Method 200.8				Batch ID: 42345		Analyst: JR
Aluminum	401	10.0		µg/L	1	12/15/2023 2:02:00 PM
Ferrous Iron by SM3500-Fe B				Batch ID: R88304		Analyst: FG
Ferrous Iron	0.266	0.150		mg/L	1	12/12/2023 2:17:54 PM

Work Order: 2312283
CLIENT: Friedman & Bruya
Project: 312179

QC SUMMARY REPORT

Ferrous Iron by SM3500-Fe B

Sample ID: **MB-R88304**	SampType: **MBLK**	Units: **mg/L**	Prep Date: **12/12/2023**	RunNo: **88304**
Client ID: **MBLKW**	Batch ID: **R88304**		Analysis Date: **12/12/2023**	SeqNo: **1843421**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	ND	0.150									

Sample ID: **LCS-R88304**	SampType: **LCS**	Units: **mg/L**	Prep Date: **12/12/2023**	RunNo: **88304**
Client ID: **LCSW**	Batch ID: **R88304**		Analysis Date: **12/12/2023**	SeqNo: **1843422**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.393	0.150	0.4000	0	98.3	85	115				

Sample ID: **2312283-004ADUP**	SampType: **DUP**	Units: **mg/L**	Prep Date: **12/12/2023**	RunNo: **88304**
Client ID: **PZ-8-1223**	Batch ID: **R88304**		Analysis Date: **12/12/2023**	SeqNo: **1843550**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.327	0.150						0.2663	20.4	20	

Sample ID: **2312283-004AMS**	SampType: **MS**	Units: **mg/L**	Prep Date: **12/12/2023**	RunNo: **88304**
Client ID: **PZ-8-1223**	Batch ID: **R88304**		Analysis Date: **12/12/2023**	SeqNo: **1843551**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.735	0.150	0.4000	0.2663	117	70	130				

Sample ID: **2312283-004AMSD**	SampType: **MSD**	Units: **mg/L**	Prep Date: **12/12/2023**	RunNo: **88304**
Client ID: **PZ-8-1223**	Batch ID: **R88304**		Analysis Date: **12/12/2023**	SeqNo: **1843552**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.738	0.150	0.4000	0.2663	118	70	130	0.7348	0.410	30	

Work Order: 2312283
CLIENT: Friedman & Bruya
Project: 312179

QC SUMMARY REPORT

Dissolved Metals by EPA Method 200.8

Sample ID: **MB-42343**	SampType: **MBLK**			Units: **µg/L**		Prep Date: **12/14/2023**		RunNo: **88400**		
Client ID: **MBLKW**	Batch ID: **42343**					Analysis Date: **12/15/2023**		SeqNo: **1845895**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **LCS-42343**	SampType: **LCS**			Units: **µg/L**		Prep Date: **12/14/2023**		RunNo: **88400**		
Client ID: **LCSW**	Batch ID: **42343**					Analysis Date: **12/15/2023**		SeqNo: **1845896**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,050	10.0	1,000	0	105	85	115				

Sample ID: **2312283-003CDUP**	SampType: **DUP**			Units: **µg/L**		Prep Date: **12/14/2023**		RunNo: **88400**		
Client ID: **PZ-7-1223**	Batch ID: **42343**					Analysis Date: **12/15/2023**		SeqNo: **1845898**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	47.4	10.0						46.74	1.47	30	

Sample ID: **2312283-003CMS**	SampType: **MS**			Units: **µg/L**		Prep Date: **12/14/2023**		RunNo: **88400**		
Client ID: **PZ-7-1223**	Batch ID: **42343**					Analysis Date: **12/15/2023**		SeqNo: **1845899**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,130	10.0	1,000	46.74	108	50	150				

Sample ID: **2312328-003BMS**	SampType: **MS**			Units: **µg/L**		Prep Date: **12/14/2023**		RunNo: **88400**		
Client ID: **BATCH**	Batch ID: **42343**					Analysis Date: **12/15/2023**		SeqNo: **1845913**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,040	10.0	1,000	3.483	103	50	150				

Work Order: 2312283
CLIENT: Friedman & Bruya
Project: 312179

QC SUMMARY REPORT

Dissolved Metals by EPA Method 200.8

Sample ID: **MB-42344 FB**	SampType: **MBLK**	Units: **µg/L**	Prep Date: **12/14/2023**	RunNo: **88400**		
Client ID: **MBLKW**	Batch ID: **42343**		Analysis Date: **12/15/2023**	SeqNo: **1845923**		

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Work Order: 2312283
CLIENT: Friedman & Bruya
Project: 312179

QC SUMMARY REPORT

Total Metals by EPA Method 200.8

Sample ID: **MB-42345**	SampType: **MBLK**	Units: **µg/L**	Prep Date: **12/14/2023**	RunNo: **88387**
Client ID: **MBLKW**	Batch ID: **42345**		Analysis Date: **12/15/2023**	SeqNo: **1845604**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **LCS-42345**	SampType: **LCS**	Units: **µg/L**	Prep Date: **12/14/2023**	RunNo: **88387**
Client ID: **LCSW**	Batch ID: **42345**		Analysis Date: **12/15/2023**	SeqNo: **1845563**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,030	10.0	1,000	0	103	85	115				

Sample ID: **2312355-001DDUP**	SampType: **DUP**	Units: **µg/L**	Prep Date: **12/14/2023**	RunNo: **88387**
Client ID: **BATCH**	Batch ID: **42345**		Analysis Date: **12/15/2023**	SeqNo: **1845565**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0						16.30	97.4	30	

Sample ID: **2312355-001DMS**	SampType: **MS**	Units: **µg/L**	Prep Date: **12/14/2023**	RunNo: **88387**
Client ID: **BATCH**	Batch ID: **42345**		Analysis Date: **12/15/2023**	SeqNo: **1845566**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,040	10.0	1,000	16.30	102	70	130				

Sample ID: **2312277-002AMS**	SampType: **MS**	Units: **µg/L**	Prep Date: **12/14/2023**	RunNo: **88387**
Client ID: **BATCH**	Batch ID: **42345**		Analysis Date: **12/15/2023**	SeqNo: **1845584**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,240	10.0	1,000	153.4	109	70	130				

Fremont Analytical
An Alliance Technical Group Company

Sample Log-In Check List

Client Name:	FB	Work Order Number:	2312283
Logged by:	Lyann Rivera	Date Received:	12/12/2023 9:30:00 AM

Chain of Custody

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

Log In

3.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes ☐	No ☐	Not Present ☑
4.	Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
5.	Were all items received at a temperature of >2°C to 6°C *	Yes ☑	No ☐	NA ☐
6.	Sample(s) in proper container(s)?	Yes ☑	No ☐	
7.	Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
8.	Are samples properly preserved?	Yes ☑	No ☐	
9.	Was preservative added to bottles?	Yes ☑	No ☐	NA ☐ HCL, HNO3
10.	Is there headspace in the VOA vials?	Yes ☐	No ☐	NA ☑
11.	Did all samples containers arrive in good condition(unbroken)?	Yes ☑	No ☐	
12.	Does paperwork match bottle labels?	Yes ☑	No ☐	
13.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
14.	Is it clear what analyses were requested?	Yes ☑	No ☐	
15.	Were all hold times (except field parameters, pH e.g.) able to be met?	Yes ☐	No ☑	

Special Handling (if applicable)

16. 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:			

17. Additional remarks:

Item Information

Item #	Temp °C
Sample	0.1

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

SUBCONTRACT SAMPLE CHAIN OF CUSTODY

2312283

Send Report To Michael Erdahl
Company Friedman and Bruya, Inc.
Address 5500 4th Ave S
City, State, ZIP Seattle, WA 98108
Phone # (206) 285-8282 merdahl@friedmanandbruya.com

SUBCONTRACTER Fremont	
PROJECT NAME/NO. 312179	PO # D-589
REMARKS EIM	

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: ferrous iron	sulfate	alkalinity	ferrous iron	dissolved gases	TOC	Total Al	Dissolved Al	- FF		Notes
CTMW-24-1223		12/11/2023	1100	water	1	x						x	x			
CTMW-24D-1223		12/11/2023	1245	water	1	x						x	x			
PZ-7-1223		12/11/2023	1400	water	1	x						x	x			
PZ-8-1223		12/11/2023	1500	water	1	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	12/12/23	0746
Received by:		Nathan Kottle	FAI	12/12/23	930
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

December 27, 2023

Trevor Louviere, Project Manager
Dalton Olmsted Fuglevand
1001 SW Klickitat Way, Suite 200B
Seattle, WA 98134

Dear Mr Louviere:

Included are the results from the testing of material submitted on December 21, 2023 from the TWAAFA-001, F&BI 312209 project. There are 20 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: Anthony Cerruti, Tasya Gray
DOF1227R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on December 21, 2023 by Friedman & Bruya, Inc. from the Dalton Olmsted Fuglevand TWAAFA-001, F&BI 312209 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Dalton Olmsted Fuglevand
312209 -01	TWA-4D-1223
312209 -02	PZ-9-1223
312209 -03	TWA-7D-1223

The samples were sent to Fremont Analytical for ferrous iron, total aluminum, and dissolved aluminum analyses. The report is enclosed.

The 6020B iron total and dissolved calibration standard associated with the method blanks exceeded the acceptance criteria. The metal was not detected in the method blanks, therefore this did not represent an out of control condition.

All other quality control requirements were acceptable.

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	TWA-4D-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/21/23	Project:	TWAAFA-001, F&BI 312209
Date Extracted:	12/13/23	Lab ID:	312209-01
Date Analyzed:	12/16/23	Data File:	312209-01.200
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Copper	1.18
Iron	4,040
Manganese	106

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	TWA-4D-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/21/23	Project:	TWAAFA-001, F&BI 312209
Date Extracted:	12/13/23	Lab ID:	312209-01 x5
Date Analyzed:	12/15/23	Data File:	312209-01 x5.174
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	10.3

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	PZ-9-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/21/23	Project:	TWAAFA-001, F&BI 312209
Date Extracted:	12/13/23	Lab ID:	312209-02
Date Analyzed:	12/16/23	Data File:	312209-02.201
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

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

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	PZ-9-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/21/23	Project:	TWAAFA-001, F&BI 312209
Date Extracted:	12/13/23	Lab ID:	312209-02 x5
Date Analyzed:	12/15/23	Data File:	312209-02 x5.175
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	8.57
Manganese	3,090
Nickel	<5
Zinc	<25

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	PZ-9-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/21/23	Project:	TWAAFA-001, F&BI 312209
Date Extracted:	12/13/23	Lab ID:	312209-02 x200
Date Analyzed:	12/20/23	Data File:	312209-02 x200.048
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Iron	34,600

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	TWA-7D-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/21/23	Project:	TWAAFA-001, F&BI 312209
Date Extracted:	12/13/23	Lab ID:	312209-03
Date Analyzed:	12/16/23	Data File:	312209-03.202
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Copper	<1
Iron	1,510
Manganese	118

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	TWA-7D-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/21/23	Project:	TWAAFA-001, F&BI 312209
Date Extracted:	12/13/23	Lab ID:	312209-03 x5
Date Analyzed:	12/15/23	Data File:	312209-03 x5.176
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	7.82

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Dalton Olmsted Fuglevand
Date Received:	Not Applicable	Project:	TWAAFA-001, F&BI 312209
Date Extracted:	12/13/23	Lab ID:	I3-980 mb2
Date Analyzed:	12/13/23	Data File:	I3-980 mb2.052
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Copper	<1
Iron	<50 k
Lead	<1
Manganese	<1
Nickel	<1
Zinc	<5

Analysis For Total Metals By EPA Method 6020B

Client ID:	TWA-4D-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/21/23	Project:	TWAAFA-001, F&BI 312209
Date Extracted:	12/13/23	Lab ID:	312209-01
Date Analyzed:	12/16/23	Data File:	312209-01.211
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Copper	1.03
Iron	4,080
Manganese	105

Analysis For Total Metals By EPA Method 6020B

Client ID:	TWA-4D-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/21/23	Project:	TWAAFA-001, F&BI 312209
Date Extracted:	12/13/23	Lab ID:	312209-01 x5
Date Analyzed:	12/16/23	Data File:	312209-01 x5.185
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	9.85

Analysis For Total Metals By EPA Method 6020B

Client ID:	PZ-9-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/21/23	Project:	TWAAFA-001, F&BI 312209
Date Extracted:	12/13/23	Lab ID:	312209-02
Date Analyzed:	12/16/23	Data File:	312209-02.212
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

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

Analysis For Total Metals By EPA Method 6020B

Client ID:	PZ-9-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/21/23	Project:	TWAAFA-001, F&BI 312209
Date Extracted:	12/13/23	Lab ID:	312209-02 x5
Date Analyzed:	12/16/23	Data File:	312209-02 x5.186
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	9.82
Manganese	2,970
Nickel	<5
Zinc	<25

Analysis For Total Metals By EPA Method 6020B

Client ID:	PZ-9-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/21/23	Project:	TWAAFA-001, F&BI 312209
Date Extracted:	12/13/23	Lab ID:	312209-02 x100
Date Analyzed:	12/18/23	Data File:	312209-02 x100.085
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Iron	38,700

Analysis For Total Metals By EPA Method 6020B

Client ID:	TWA-7D-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/21/23	Project:	TWAAFA-001, F&BI 312209
Date Extracted:	12/13/23	Lab ID:	312209-03
Date Analyzed:	12/16/23	Data File:	312209-03.213
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Copper	0.750
Iron	1,590
Manganese	113

Analysis For Total Metals By EPA Method 6020B

Client ID:	TWA-7D-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/21/23	Project:	TWAAFA-001, F&BI 312209
Date Extracted:	12/13/23	Lab ID:	312209-03 x5
Date Analyzed:	12/16/23	Data File:	312209-03 x5.187
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	7.86

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Dalton Olmsted Fuglevand
Date Received:	Not Applicable	Project:	TWAAFA-001, F&BI 312209
Date Extracted:	12/13/23	Lab ID:	I3-981 mb2
Date Analyzed:	12/13/23	Data File:	I3-981 mb2.053
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Copper	<0.4
Iron	<50 k
Lead	<1
Manganese	<1
Nickel	<1
Zinc	<5

Date of Report: 12/27/23
Date Received: 12/21/23
Project: TWAAFA-001, F&BI 312209

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

Laboratory Code: 312178-01 (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	1.16	99	103	75-125	4
Copper	ug/L (ppb)	20	<5	90	91	75-125	1
Iron	ug/L (ppb)	100	350	95 b	98 b	75-125	3 b
Lead	ug/L (ppb)	10	<1	78	80	75-125	3
Manganese	ug/L (ppb)	20	150	113 b	118 b	75-125	4 b
Nickel	ug/L (ppb)	20	4.66	96 b	96 b	75-125	0 b
Zinc	ug/L (ppb)	50	<5	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	94	80-120
Copper	ug/L (ppb)	20	97	80-120
Iron	ug/L (ppb)	100	95	80-120
Lead	ug/L (ppb)	10	90	80-120
Manganese	ug/L (ppb)	20	87	80-120
Nickel	ug/L (ppb)	20	97	80-120
Zinc	ug/L (ppb)	50	98	80-120

Date of Report: 12/27/23
Date Received: 12/21/23
Project: TWAAFA-001, F&BI 312209

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

Laboratory Code: 312178-02 (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	1.64	93	92	75-125	1
Copper	ug/L (ppb)	20	<5	85	87	75-125	2
Iron	ug/L (ppb)	100	503	117 b	115 b	75-125	2 b
Lead	ug/L (ppb)	10	<1	77	78	75-125	1
Manganese	ug/L (ppb)	20	118	119 b	121 b	75-125	2 b
Nickel	ug/L (ppb)	20	2.74	89	89	75-125	0
Zinc	ug/L (ppb)	50	<5	92	94	75-125	2

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	93	80-120
Copper	ug/L (ppb)	20	97	80-120
Iron	ug/L (ppb)	100	101	80-120
Lead	ug/L (ppb)	10	90	80-120
Manganese	ug/L (ppb)	20	87	80-120
Nickel	ug/L (ppb)	20	96	80-120
Zinc	ug/L (ppb)	50	98	80-120

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, biased low; or, the calibration results for the analyte were outside of acceptance criteria, biased high, with a detection for the analyte in the sample. 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 standard reporting limit. 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.

k – The calibration results for the analyte were outside of acceptance criteria, biased high, and the analyte was not detected in the sample.

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.

312209

SAMPLE CHAIN OF CUSTODY

12/12/23

Page # 1 of

Report To: Anthony Cerruti / Trevor Louviere
CC: Tasya Gray

Company DOF

Address 1001 SW Klickitat Way

City, State, ZIP Seattle, WA 98134

Phone 215-767-7749 Email acerruti@dofnw.com

SAMPLERS (*signature*): EDS

PROJECT NAME: TWAAFA

PO # TWAAFA-001

REMARKS: Dissolved metals samples field filtered at 0.45 micron before analysis
Project Specific RLs - (Yes) / No

INVOICE TO: DOF

TURNAROUND TIME
■ Standard Turnaround
__ RUSH _____
Rush charges authorized by:

SAMPLE DISPOSAL
■ Dispose after 30 days
Archive Samples
Other

ANALYSES REQUESTED

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Matrix	# of Bottles	Total Metals 6020B (As, Cr, Cu, Mn, Ni, Pb, Zn)	Dissolved Metals 6020B (As, Cr, Cu, Mn, Ni, Pb, Zn)	Total Mercury 1631E	Dissolved Mercury 1631E	Total Metals (Al, Fe)	Dissolved Metals (Al, Fe)	Ferrous Iron			MS/MSD Collected? (Y/N)	Notes
TWA-4D-1223	01 A-C	12/12/23	1050	W	3	X	X			X	X	X				Tot/Diss Metals: Al, As, Fe, Mn, Cu
PZ-9-1223	02	12/12/23	1145	W	3	X	X			X	X	X				Tot/Diss Metals: Al, As, Fe, Mn, Ni, Pb
TWA-7D-1223	03	12/12/23	1245	W	3	X	X			X	X	X				Tot/Diss Metals: Al, As, Cu, Fe, Mn

EDS

Samples received at 4 °C

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

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	EDS	Elliott Scheumann	DOF	12/12/23	1320
Received by:	Couriered under Custody Seal by Delivery Express			12/12/23	1320
Relinquished by:					
Received by:		Nhan Phan	FEBI	12/12/23	1410

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: 312209
Work Order Number: 2312296

December 19, 2023

Attention Michael Erdahl:

Fremont Analytical, Inc. received 3 sample(s) on 12/12/2023 for the analyses presented in the following report.

Dissolved Metals by EPA Method 200.8
Ferrous Iron by SM3500-Fe B
Total Metals by EPA Method 200.8

This report consists of the following:

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

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

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes
Project Manager

Date: *12/19/2023*

CLIENT: Friedman & Bruya
Project: 312209
Work Order: 2312296

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2312296-001	TWA-4D-1223	12/12/2023 10:50 AM	12/12/2023 3:07 PM
2312296-002	PZ-9-1223	12/12/2023 11:45 AM	12/12/2023 3:07 PM
2312296-003	TWA-7D-1223	12/12/2023 12:45 PM	12/12/2023 3:07 PM

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

Case Narrative

WO#: **2312296**
Date: **12/19/2023**

CLIENT: Friedman & Bruya
Project: 312209

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: 312209

Lab ID: 2312296-001 **Collection Date:** 12/12/2023 10:50:00 AM
Client Sample ID: **TWA-4D-1223** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 42343		Analyst: JR
Aluminum	ND	10.0		µg/L	1	12/15/2023 4:27:00 PM
Total Metals by EPA Method 200.8				Batch ID: 42377		Analyst: JR
Aluminum	10.2	10.0		µg/L	1	12/19/2023 12:58:00 PM
Ferrous Iron by SM3500-Fe B				Batch ID: R88304		Analyst: FG
Ferrous Iron	0.831	0.150		mg/L	1	12/12/2023 2:17:54 PM

Lab ID: 2312296-002 **Collection Date:** 12/12/2023 11:45:00 AM
Client Sample ID: **PZ-9-1223** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 42343		Analyst: JR
Aluminum	19.3	10.0		µg/L	1	12/15/2023 4:30:00 PM
Total Metals by EPA Method 200.8				Batch ID: 42377		Analyst: JR
Aluminum	27.6	10.0		µg/L	1	12/19/2023 1:01:00 PM
Ferrous Iron by SM3500-Fe B				Batch ID: R88304		Analyst: FG
Ferrous Iron	35.1	15.0	D	mg/L	100	12/12/2023 2:17:54 PM

CLIENT: Friedman & Bruya
Project: 312209

Lab ID: 2312296-003 **Collection Date:** 12/12/2023 12:45:00 PM
Client Sample ID: **TWA-7D-1223** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 42343		Analyst: JR
Aluminum	ND	10.0		µg/L	1	12/15/2023 4:32:00 PM
Total Metals by EPA Method 200.8				Batch ID: 42377		Analyst: JR
Aluminum	ND	10.0		µg/L	1	12/19/2023 1:03:00 PM
Ferrous Iron by SM3500-Fe B				Batch ID: R88304		Analyst: FG
Ferrous Iron	0.381	0.150		mg/L	1	12/12/2023 2:17:54 PM

Work Order: 2312296
CLIENT: Friedman & Bruya
Project: 312209

QC SUMMARY REPORT

Ferrous Iron by SM3500-Fe B

Sample ID: **MB-R88304**	SampType: **MBLK**	Units: **mg/L**	Prep Date: **12/12/2023**	RunNo: **88304**
Client ID: **MBLKW**	Batch ID: **R88304**		Analysis Date: **12/12/2023**	SeqNo: **1843421**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	ND	0.150									

Sample ID: **LCS-R88304**	SampType: **LCS**	Units: **mg/L**	Prep Date: **12/12/2023**	RunNo: **88304**
Client ID: **LCSW**	Batch ID: **R88304**		Analysis Date: **12/12/2023**	SeqNo: **1843422**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.393	0.150	0.4000	0	98.3	85	115				

Sample ID: **2312283-004ADUP**	SampType: **DUP**	Units: **mg/L**	Prep Date: **12/12/2023**	RunNo: **88304**
Client ID: **BATCH**	Batch ID: **R88304**		Analysis Date: **12/12/2023**	SeqNo: **1843550**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.327	0.150						0.2663	20.4	20	

Sample ID: **2312283-004AMS**	SampType: **MS**	Units: **mg/L**	Prep Date: **12/12/2023**	RunNo: **88304**
Client ID: **BATCH**	Batch ID: **R88304**		Analysis Date: **12/12/2023**	SeqNo: **1843551**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.735	0.150	0.4000	0.2663	117	70	130				

Sample ID: **2312283-004AMSD**	SampType: **MSD**	Units: **mg/L**	Prep Date: **12/12/2023**	RunNo: **88304**
Client ID: **BATCH**	Batch ID: **R88304**		Analysis Date: **12/12/2023**	SeqNo: **1843552**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.738	0.150	0.4000	0.2663	118	70	130	0.7348	0.410	30	

Work Order: 2312296
CLIENT: Friedman & Bruya
Project: 312209

QC SUMMARY REPORT

Dissolved Metals by EPA Method 200.8

Sample ID: **MB-42343**	SampType: **MBLK**			Units: **µg/L**		Prep Date: **12/14/2023**		RunNo: **88400**		
Client ID: **MBLKW**	Batch ID: **42343**					Analysis Date: **12/15/2023**		SeqNo: **1845895**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **LCS-42343**	SampType: **LCS**			Units: **µg/L**		Prep Date: **12/14/2023**		RunNo: **88400**		
Client ID: **LCSW**	Batch ID: **42343**					Analysis Date: **12/15/2023**		SeqNo: **1845896**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,050	10.0	1,000	0	105	85	115				

Sample ID: **2312283-003CDUP**	SampType: **DUP**			Units: **µg/L**		Prep Date: **12/14/2023**		RunNo: **88400**		
Client ID: **BATCH**	Batch ID: **42343**					Analysis Date: **12/15/2023**		SeqNo: **1845898**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	47.4	10.0						46.74	1.47	30	

Sample ID: **2312283-003CMS**	SampType: **MS**			Units: **µg/L**		Prep Date: **12/14/2023**		RunNo: **88400**		
Client ID: **BATCH**	Batch ID: **42343**					Analysis Date: **12/15/2023**		SeqNo: **1845899**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,130	10.0	1,000	46.74	108	50	150				

Sample ID: **2312328-003BMS**	SampType: **MS**			Units: **µg/L**		Prep Date: **12/14/2023**		RunNo: **88400**		
Client ID: **BATCH**	Batch ID: **42343**					Analysis Date: **12/15/2023**		SeqNo: **1845913**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,040	10.0	1,000	3.483	103	50	150				

Work Order: 2312296
CLIENT: Friedman & Bruya
Project: 312209

QC SUMMARY REPORT

Dissolved Metals by EPA Method 200.8

Sample ID: **MB-42344 FB**	SampType: **MBLK**		Units: **µg/L**	Prep Date: **12/14/2023**		RunNo: **88400**
Client ID: **MBLKW**	Batch ID: **42343**			Analysis Date: **12/15/2023**		SeqNo: **1845923**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Work Order: 2312296
CLIENT: Friedman & Bruya
Project: 312209

QC SUMMARY REPORT

Total Metals by EPA Method 200.8

Sample ID: **MB-42377**	SampType: **MBLK**			Units: **µg/L**		Prep Date: **12/18/2023**		RunNo: **88449**		
Client ID: **MBLKW**	Batch ID: **42377**					Analysis Date: **12/19/2023**		SeqNo: **1847008**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **LCS-42377**	SampType: **LCS**			Units: **µg/L**		Prep Date: **12/18/2023**		RunNo: **88449**		
Client ID: **LCSW**	Batch ID: **42377**					Analysis Date: **12/19/2023**		SeqNo: **1847009**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,050	10.0	1,000	0	105	85	115				

Sample ID: **2312404-001ADUP**	SampType: **DUP**			Units: **µg/L**		Prep Date: **12/18/2023**		RunNo: **88449**		
Client ID: **BATCH**	Batch ID: **42377**					Analysis Date: **12/19/2023**		SeqNo: **1847011**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	132	10.0						128.3	2.76	30	

Sample ID: **2312404-001AMS**	SampType: **MS**			Units: **µg/L**		Prep Date: **12/18/2023**		RunNo: **88449**		
Client ID: **BATCH**	Batch ID: **42377**					Analysis Date: **12/19/2023**		SeqNo: **1847012**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,170	10.0	1,000	128.3	105	70	130				

Sample ID: **2312318-001CMS**	SampType: **MS**			Units: **µg/L**		Prep Date: **12/18/2023**		RunNo: **88449**		
Client ID: **BATCH**	Batch ID: **42377**					Analysis Date: **12/19/2023**		SeqNo: **1846967**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,130	10.0	1,000	76.68	106	70	130				

Fremont Analytical
An Alliance Technical Group Company

Sample Log-In Check List

Client Name:	FB	Work Order Number:	2312296
Logged by:	Lyann Rivera	Date Received:	12/12/2023 3:07:00 PM

Chain of Custody

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

Log In

3.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes ☐	No ☐	Not Present ☑
4.	Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
5.	Were all items received at a temperature of >2°C to 6°C *	Yes ☑	No ☐	NA ☐
6.	Sample(s) in proper container(s)?	Yes ☑	No ☐	
7.	Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
8.	Are samples properly preserved?	Yes ☑	No ☐	
9.	Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
10.	Is there headspace in the VOA vials?	Yes ☐	No ☐	NA ☑
11.	Did all samples containers arrive in good condition(unbroken)?	Yes ☑	No ☐	
12.	Does paperwork match bottle labels?	Yes ☑	No ☐	
13.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
14.	Is it clear what analyses were requested?	Yes ☑	No ☐	
15.	Were all hold times (except field parameters, pH e.g.) able to be met?	Yes ☑	No ☐	

Special Handling (if applicable)

16. 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:			

17. Additional remarks:

Item Information

Item #	Temp °C
Sample	1.0

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

SUBCONTRACT SAMPLE CHAIN OF CUSTODY

2312296

Send Report To Michael Erdahl

Company Friedman and Bruya, Inc.

Address 5500 4th Ave S

City, State, ZIP Seattle, WA 98108

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

SUBCONTRACTER Fremont	
PROJECT NAME/NO. 312209	PO # D-589
REMARKS	

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: ferrous iron	total aluminum	dissolved aluminum	ferrous iron	dissolved gases	TOC					Notes
TWA-4D-1223		12/12/2023	1050	water	3	x	x	x								
PZ-9-1223		12/12/2023	1145	water	3	x	x	x								
TWA-7D-1223		12/12/2023	1245	water	3	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	12/12/23	1430
Received by:		Alli Miller	FAI	12/12/23	1507
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

December 22, 2023

Anthony Cerruti, Project Manager
Dalton Olmsted Fuglevand
1001 SW Klickitat Way, Suite 200B
Seattle, WA 98134

Dear Mr Cerruti:

Included are the results from the testing of material submitted on December 12, 2023 from the TWAAFA-001, F&BI 312222 project. There are 14 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: Trevor Louviere, Tasya Gray
DOF1222R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on December 12, 2023 by Friedman & Bruya, Inc. from the Dalton Olmsted Fuglevand TWAAFA-001, F&BI 312222 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Dalton Olmsted Fuglevand
312222 -01	CTMW-9-1223
312222 -02	CTMW-8-1223

The samples were sent to Fremont Analytical for ferrous iron, total aluminum, and dissolved aluminum analyses. The report is enclosed.

All quality control requirements were acceptable.

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	CTMW-9-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/12/23	Project:	TWAAFA-001, F&BI 312222
Date Extracted:	12/13/23	Lab ID:	312222-01
Date Analyzed:	12/16/23	Data File:	312222-01.203
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Copper	<1
Iron	4,460
Manganese	373

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	CTMW-9-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/12/23	Project:	TWAAFA-001, F&BI 312222
Date Extracted:	12/13/23	Lab ID:	312222-01 x5
Date Analyzed:	12/15/23	Data File:	312222-01 x5.177
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	8.65

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	CTMW-8-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/12/23	Project:	TWAAFA-001, F&BI 312222
Date Extracted:	12/13/23	Lab ID:	312222-02
Date Analyzed:	12/16/23	Data File:	312222-02.206
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Copper	<1
Iron	4,270
Manganese	<1

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	CTMW-8-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/12/23	Project:	TWAAFA-001, F&BI 312222
Date Extracted:	12/13/23	Lab ID:	312222-02 x5
Date Analyzed:	12/15/23	Data File:	312222-02 x5.178
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<5

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Dalton Olmsted Fuglevand
Date Received:	Not Applicable	Project:	TWAAFA-001, F&BI 312222
Date Extracted:	12/13/23	Lab ID:	I3-980 mb2
Date Analyzed:	12/13/23	Data File:	I3-980 mb2.052
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

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

Analysis For Total Metals By EPA Method 6020B

Client ID:	CTMW-9-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/12/23	Project:	TWAAFA-001, F&BI 312222
Date Extracted:	12/13/23	Lab ID:	312222-01
Date Analyzed:	12/16/23	Data File:	312222-01.214
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Copper	1.10
Manganese	398

Analysis For Total Metals By EPA Method 6020B

Client ID:	CTMW-9-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/12/23	Project:	TWAAFA-001, F&BI 312222
Date Extracted:	12/13/23	Lab ID:	312222-01 x5
Date Analyzed:	12/16/23	Data File:	312222-01 x5.188
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	8.91
Iron	8,430

Analysis For Total Metals By EPA Method 6020B

Client ID:	CTMW-8-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/12/23	Project:	TWAAFA-001, F&BI 312222
Date Extracted:	12/13/23	Lab ID:	312222-02
Date Analyzed:	12/16/23	Data File:	312222-02.215
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Copper	1.14
Iron	4,300
Manganese	2.45

Analysis For Total Metals By EPA Method 6020B

Client ID:	CTMW-8-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/12/23	Project:	TWAAFA-001, F&BI 312222
Date Extracted:	12/13/23	Lab ID:	312222-02 x5
Date Analyzed:	12/16/23	Data File:	312222-02 x5.189
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<5

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Dalton Olmsted Fuglevand
Date Received:	Not Applicable	Project:	TWAAFA-001, F&BI 312222
Date Extracted:	12/13/23	Lab ID:	I3-978 mb2
Date Analyzed:	12/18/23	Data File:	I3-978 mb2.041
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

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

Date of Report: 12/22/23
Date Received: 12/12/23
Project: TWAAFA, F&BI 312222

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

Laboratory Code: 312178-01 (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	1.16	99	103	75-125	4
Copper	ug/L (ppb)	20	<5	90	91	75-125	1
Iron	ug/L (ppb)	100	350	95 b	98 b	75-125	3 b
Manganese	ug/L (ppb)	20	150	113 b	118 b	75-125	4 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	94	80-120
Copper	ug/L (ppb)	20	97	80-120
Iron	ug/L (ppb)	100	95	80-120
Manganese	ug/L (ppb)	20	87	80-120

Date of Report: 12/22/23
Date Received: 12/12/23
Project: TWAAFA, F&BI 312222

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

Laboratory Code: 312177-01 (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	<1	112	110	75-125	2
Copper	ug/L (ppb)	20	<5	100	97	75-125	3
Iron	ug/L (ppb)	100	419	118 b	103 b	75-125	14 b
Manganese	ug/L (ppb)	20	335	96 b	21 b	75-125	128 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	94	80-120
Copper	ug/L (ppb)	20	97	80-120
Iron	ug/L (ppb)	100	93	80-120
Manganese	ug/L (ppb)	20	89	80-120

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, biased low; or, the calibration results for the analyte were outside of acceptance criteria, biased high, with a detection for the analyte in the sample. 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 standard reporting limit. 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.

k – The calibration results for the analyte were outside of acceptance criteria, biased high, and the analyte was not detected in the sample.

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 12/12/23

23

Page # 1 of 1

312222

Report To: Anthony Cerruti / Trevor Louviere
CC: Tasya Gray

Company DOF

Address 1001 SW Klickitat Way

City, State, ZIP Seattle, WA 98134

Phone 215-767-7749 Email acerruti@dofnw.com

SAMPLERS (*signature*)	
EDF	
PROJECT NAME: TWAAFA	PO # TWAAFA-001
REMARKS: Dissolved metals samples field filtered at 0.45 micron before analysis Project Specific RLs - (Yes) / No	INVOICE TO: DOF

TURNAROUND TIME
■ Standard Turnaround
__ RUSH _____
Rush charges authorized by: _____

SAMPLE DISPOSAL
■ Dispose after 30 days
Archive Samples
Other _____

ANALYSES REQUESTED

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Matrix	# of Bottles	Total Metals 6020B (As, Cr, Cu, Mn, Ni, Pb, Zn)	Dissolved Metals 6020B (As, Cr, Cu, Mn, Ni, Pb, Zn)	Total Mercury 1631E	Dissolved Mercury 1631E	Total Metals (Al, Fe)	Dissolved Metals (Al, Fe)	Ferrous Iron			MS/MSD Collected? (Y/N)	Notes
CTMW-9-1223	01 A-C	12/12/23	1430	W	3	X	X			X	X	X				Tot/Diss Metals: Al, As, Cu, Fe, Mn
CTMW-8-1223	02 V	12/12/23	1525	W	3	X	X			X	X	X				Tot/Diss Metals: Al, As, Cu, Fe, Mn

EDF

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Michael Wright	Michael Wright	Clear Earth	12/12/23	17:39
Received by:	JOE MOHAMMED	FBI	12/12/23	17:39
Relinquished by:	Samples received at 2 °C			
Received by:				

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

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: 312222
Work Order Number: 2312314

December 20, 2023

Attention Michael Erdahl:

Fremont Analytical, Inc. received 2 sample(s) on 12/13/2023 for the analyses presented in the following report.

Dissolved Metals by EPA Method 200.8
Ferrous Iron by SM3500-Fe B
Total Metals by EPA Method 200.8

This report consists of the following:

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

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

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes
Project Manager

Date: *12/20/2023*

CLIENT: Friedman & Bruya
Project: 312222
Work Order: 2312314

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2312314-001	CTMW-9-1223	12/12/2023 2:30 PM	12/13/2023 11:05 AM
2312314-002	CTMW-8-1223	12/12/2023 3:25 PM	12/13/2023 11:05 AM

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

Case Narrative

WO#: **2312314**
Date: **12/20/2023**

CLIENT: Friedman & Bruya
Project: 312222

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: 312222

Lab ID: 2312314-001 **Collection Date:** 12/12/2023 2:30:00 PM
Client Sample ID: **CTMW-9-1223** **Matrix:** Water

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 42343		Analyst: JR
Aluminum	ND	10.0		µg/L	1	12/18/2023 1:09:00 PM
Total Metals by EPA Method 200.8				Batch ID: 42377		Analyst: JR
Aluminum	25.9	10.0		µg/L	1	12/19/2023 1:10:00 PM
Ferrous Iron by SM3500-Fe B				Batch ID: R88320		Analyst: FG
Ferrous Iron	0.889	0.150		mg/L	1	12/13/2023 12:30:00 PM

Lab ID: 2312314-002 **Collection Date:** 12/12/2023 3:25:00 PM
Client Sample ID: **CTMW-8-1223** **Matrix:** Water

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 42343		Analyst: JR
Aluminum	212	10.0		µg/L	1	12/18/2023 1:11:00 PM
Total Metals by EPA Method 200.8				Batch ID: 42377		Analyst: JR
Aluminum	218	10.0		µg/L	1	12/19/2023 1:13:00 PM
Ferrous Iron by SM3500-Fe B				Batch ID: R88320		Analyst: FG
Ferrous Iron	ND	0.150		mg/L	1	12/13/2023 12:30:00 PM

Work Order: 2312314
CLIENT: Friedman & Bruya
Project: 312222

QC SUMMARY REPORT

Ferrous Iron by SM3500-Fe B

Sample ID: **MB-R88320**	SampType: **MBLK**	Units: **mg/L**	Prep Date: **12/13/2023**	RunNo: **88320**
Client ID: **MBLKW**	Batch ID: **R88320**		Analysis Date: **12/13/2023**	SeqNo: **1844051**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	ND	0.150									

Sample ID: **LCS-R88320**	SampType: **LCS**	Units: **mg/L**	Prep Date: **12/13/2023**	RunNo: **88320**
Client ID: **LCSW**	Batch ID: **R88320**		Analysis Date: **12/13/2023**	SeqNo: **1844052**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.436	0.150	0.4000	0	109	85	115				

Sample ID: **2312314-002CDUP**	SampType: **DUP**	Units: **mg/L**	Prep Date: **12/13/2023**	RunNo: **88320**
Client ID: **CTMW-8-1223**	Batch ID: **R88320**		Analysis Date: **12/13/2023**	SeqNo: **1844056**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	ND	0.150						0		20	

Sample ID: **2312314-002CMS**	SampType: **MS**	Units: **mg/L**	Prep Date: **12/13/2023**	RunNo: **88320**
Client ID: **CTMW-8-1223**	Batch ID: **R88320**		Analysis Date: **12/13/2023**	SeqNo: **1844057**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.390	0.150	0.4000	0	97.6	70	130				

Sample ID: **2312314-002CMSD**	SampType: **MSD**	Units: **mg/L**	Prep Date: **12/13/2023**	RunNo: **88320**
Client ID: **CTMW-8-1223**	Batch ID: **R88320**		Analysis Date: **12/13/2023**	SeqNo: **1844058**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.433	0.150	0.4000	0	108	70	130	0.3902	10.3	30	

Work Order: 2312314
CLIENT: Friedman & Bruya
Project: 312222

QC SUMMARY REPORT

Dissolved Metals by EPA Method 200.8

Sample ID: **MB-42343**	SampType: **MBLK**			Units: **µg/L**		Prep Date: **12/14/2023**		RunNo: **88400**		
Client ID: **MBLKW**	Batch ID: **42343**					Analysis Date: **12/15/2023**		SeqNo: **1845895**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **LCS-42343**	SampType: **LCS**			Units: **µg/L**		Prep Date: **12/14/2023**		RunNo: **88400**		
Client ID: **LCSW**	Batch ID: **42343**					Analysis Date: **12/15/2023**		SeqNo: **1845896**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,050	10.0	1,000	0	105	85	115				

Sample ID: **2312283-003CDUP**	SampType: **DUP**			Units: **µg/L**		Prep Date: **12/14/2023**		RunNo: **88400**		
Client ID: **BATCH**	Batch ID: **42343**					Analysis Date: **12/15/2023**		SeqNo: **1845898**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	47.4	10.0						46.74	1.47	30	

Sample ID: **2312283-003CMS**	SampType: **MS**			Units: **µg/L**		Prep Date: **12/14/2023**		RunNo: **88400**		
Client ID: **BATCH**	Batch ID: **42343**					Analysis Date: **12/15/2023**		SeqNo: **1845899**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,130	10.0	1,000	46.74	108	50	150				

Sample ID: **2312328-003BMS**	SampType: **MS**			Units: **µg/L**		Prep Date: **12/14/2023**		RunNo: **88400**		
Client ID: **BATCH**	Batch ID: **42343**					Analysis Date: **12/15/2023**		SeqNo: **1845913**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,040	10.0	1,000	3.483	103	50	150				

Work Order: 2312314
CLIENT: Friedman & Bruya
Project: 312222

QC SUMMARY REPORT

Dissolved Metals by EPA Method 200.8

Sample ID: **MB-42344 FB**	SampType: **MBLK**	Units: **µg/L**	Prep Date: **12/14/2023**	RunNo: **88400**		
Client ID: **MBLKW**	Batch ID: **42343**		Analysis Date: **12/15/2023**	SeqNo: **1845923**		

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Work Order: 2312314
CLIENT: Friedman & Bruya
Project: 312222

QC SUMMARY REPORT

Total Metals by EPA Method 200.8

Sample ID: **MB-42377**	SampType: **MBLK**			Units: **µg/L**		Prep Date: **12/18/2023**		RunNo: **88449**		
Client ID: **MBLKW**	Batch ID: **42377**					Analysis Date: **12/19/2023**		SeqNo: **1847008**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **LCS-42377**	SampType: **LCS**			Units: **µg/L**		Prep Date: **12/18/2023**		RunNo: **88449**		
Client ID: **LCSW**	Batch ID: **42377**					Analysis Date: **12/19/2023**		SeqNo: **1847009**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,050	10.0	1,000	0	105	85	115				

Sample ID: **2312404-001ADUP**	SampType: **DUP**			Units: **µg/L**		Prep Date: **12/18/2023**		RunNo: **88449**		
Client ID: **BATCH**	Batch ID: **42377**					Analysis Date: **12/19/2023**		SeqNo: **1847011**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	132	10.0						128.3	2.76	30	

Sample ID: **2312404-001AMS**	SampType: **MS**			Units: **µg/L**		Prep Date: **12/18/2023**		RunNo: **88449**		
Client ID: **BATCH**	Batch ID: **42377**					Analysis Date: **12/19/2023**		SeqNo: **1847012**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,170	10.0	1,000	128.3	105	70	130				

Sample ID: **2312318-001CMS**	SampType: **MS**			Units: **µg/L**		Prep Date: **12/18/2023**		RunNo: **88449**		
Client ID: **BATCH**	Batch ID: **42377**					Analysis Date: **12/19/2023**		SeqNo: **1846967**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,130	10.0	1,000	76.68	106	70	130				

Fremont Analytical
An Alliance Technical Group Company

Sample Log-In Check List

Client Name:	FB	Work Order Number:	2312314
Logged by:	Lyann Rivera	Date Received:	12/13/2023 11:05:00 AM

Chain of Custody

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

Log In

3.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes ☐	No ☐	Not Present ☑
4.	Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
5.	Were all items received at a temperature of >2°C to 6°C *	Yes ☑	No ☐	NA ☐
6.	Sample(s) in proper container(s)?	Yes ☑	No ☐	
7.	Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
8.	Are samples properly preserved?	Yes ☑	No ☐	
9.	Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
10.	Is there headspace in the VOA vials?	Yes ☐	No ☐	NA ☑
11.	Did all samples containers arrive in good condition(unbroken)?	Yes ☑	No ☐	
12.	Does paperwork match bottle labels?	Yes ☑	No ☐	
13.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
14.	Is it clear what analyses were requested?	Yes ☑	No ☐	
15.	Were all hold times (except field parameters, pH e.g.) able to be met?	Yes ☑	No ☐	

Special Handling (if applicable)

16. 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:			

17. Additional remarks:

Item Information

Item #	Temp °C
Sample	2.3

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

SUBCONTRACT SAMPLE CHAIN OF CUSTODY

312314

Send Report To Michael Erdahl
Company Friedman and Bruya, Inc.
Address 5500 4th Ave S
City, State, ZIP Seattle, WA 98108
Phone # (206) 285-8282 merdahl@friedmanandbruya.com

SUBCONTRACTER
Fremont

PROJECT NAME/NO.	PO #
312222	D-589

REMARKS

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: total aluminum	dissolved aluminum	ferrous iron	ferrous iron	dissolved gases	TOC					Notes
CTMW-9-1223		12/12/2023	1430	water	3	x	x	x								
CTMW-8-1223		12/12/2023	1525	water	3	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	12/13/23	0852.
Received by:		Nathan Kettler	FAI	12/13/23	1105
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

December 28, 2023

Trevor Louviere, Project Manager
Dalton Olmsted Fuglevand
1001 SW Klickitat Way, Suite 200B
Seattle, WA 98134

Dear Mr Louviere:

Included are the results from the testing of material submitted on December 13, 2023 from the TWAAFA-001, F&BI 312245 project. There are 16 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: Anthony Cerruti, Tasya Gray
DOF1228R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on December 13, 2023 by Friedman & Bruya, Inc. from the Dalton Olmsted Fuglevand TWAAFA-001, F&BI 312245 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Dalton Olmsted Fuglevand
312245 -01	TWA-8D-1223
312245 -02	CTMW-5-1223
312245 -03	CTMW-7-1223
312245 -04	CTMW-18-1223

The samples were sent to Fremont Analytical for ferrous iron, total aluminum, and dissolved aluminum analyses. The report is enclosed.

The 6020B total arsenic calibration standard exceeded the acceptance criteria in sample CTMW-7-1223. The metal was not detected, therefore this did not represent an out of control condition.

Several metals in the total 6020B matrix spike and matrix spike duplicate failed the acceptance criteria. The laboratory control sample passed the acceptance criteria, therefore the results were due to matrix effect.

All other quality control requirements were acceptable.

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	TWA-8D-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/13/23	Project:	TWAAFA-001, F&BI 312245
Date Extracted:	12/19/23	Lab ID:	312245-01 x5
Date Analyzed:	12/21/23	Data File:	312245-01 x5.213
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	15.9
Copper	3.57
Iron	2,250
Manganese	389

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	CTMW-5-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/13/23	Project:	TWAAFA-001, F&BI 312245
Date Extracted:	12/19/23	Lab ID:	312245-02 x5
Date Analyzed:	12/21/23	Data File:	312245-02 x5.214
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	49.5
Copper	163
Iron	1,130
Manganese	71.9
Nickel	19.0
Zinc	556

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	CTMW-7-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/13/23	Project:	TWAAFA-001, F&BI 312245
Date Extracted:	12/19/23	Lab ID:	312245-03 x5
Date Analyzed:	12/21/23	Data File:	312245-03 x5.215
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<5
Copper	2.12
Iron	16,700
Manganese	558

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	CTMW-18-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/13/23	Project:	TWAAFA-001, F&BI 312245
Date Extracted:	12/19/23	Lab ID:	312245-04 x5
Date Analyzed:	12/21/23	Data File:	312245-04 x5.219
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	5.08
Copper	8.11
Iron	1,190
Manganese	1,540

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Dalton Olmsted Fuglevand
Date Received:	Not Applicable	Project:	TWAAFA-001, F&BI 312245
Date Extracted:	12/19/23	Lab ID:	I3-1001 mb2
Date Analyzed:	12/20/23	Data File:	I3-1001 mb2.152
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Copper	<0.4
Iron	<50
Manganese	<1
Nickel	<1
Zinc	<5

Analysis For Total Metals By EPA Method 6020B

Client ID:	TWA-8D-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/13/23	Project:	TWAAFA-001, F&BI 312245
Date Extracted:	12/14/23	Lab ID:	312245-01 x2
Date Analyzed:	12/18/23	Data File:	312245-01 x2.099
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	14.9
Copper	<2
Iron	1,980
Manganese	348

Analysis For Total Metals By EPA Method 6020B

Client ID:	CTMW-5-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/13/23	Project:	TWAAFA-001, F&BI 312245
Date Extracted:	12/14/23	Lab ID:	312245-02
Date Analyzed:	12/16/23	Data File:	312245-02.219
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Copper	200
Nickel	17.8
Zinc	568

Analysis For Total Metals By EPA Method 6020B

Client ID:	CTMW-5-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/13/23	Project:	TWAAFA-001, F&BI 312245
Date Extracted:	12/14/23	Lab ID:	312245-02 x5
Date Analyzed:	12/16/23	Data File:	312245-02 x5.191
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	55.7
Iron	1,200
Manganese	70.7

Analysis For Total Metals By EPA Method 6020B

Client ID:	CTMW-7-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/13/23	Project:	TWAAFA-001, F&BI 312245
Date Extracted:	12/14/23	Lab ID:	312245-03
Date Analyzed:	12/16/23	Data File:	312245-03.220
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

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

Analysis For Total Metals By EPA Method 6020B

Client ID:	CTMW-7-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/13/23	Project:	TWAAFA-001, F&BI 312245
Date Extracted:	12/14/23	Lab ID:	312245-03 x5
Date Analyzed:	12/16/23	Data File:	312245-03 x5.194
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<5 k
Iron	16,100
Manganese	552

Analysis For Total Metals By EPA Method 6020B

Client ID:	CTMW-18-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/13/23	Project:	TWAAFA-001, F&BI 312245
Date Extracted:	12/14/23	Lab ID:	312245-04 x5
Date Analyzed:	12/21/23	Data File:	312245-04 x5.115
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	6.04
Copper	20.0
Iron	1,320
Manganese	1,430

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Dalton Olmsted Fuglevand
Date Received:	Not Applicable	Project:	TWAAFA-001, F&BI 312245
Date Extracted:	12/14/23	Lab ID:	I3-989 mb
Date Analyzed:	12/18/23	Data File:	I3-989 mb.068
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Copper	<1
Iron	<50
Manganese	<1
Nickel	<1
Zinc	<5

Date of Report: 12/28/23
Date Received: 12/13/23
Project: TWAAFA-001, F&BI 312245

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

Laboratory Code: 312273-02 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	1,110	304 b	625 b	75-125	69 b
Copper	ug/L (ppb)	20	<50	89	87	75-125	2
Iron	ug/L (ppb)	100	4,770	133 b	210 b	75-125	45 b
Manganese	ug/L (ppb)	20	188	103 b	110 b	75-125	7 b
Nickel	ug/L (ppb)	20	12.4	90 b	86 b	75-125	5 b
Zinc	ug/L (ppb)	50	<50	94	96	75-125	2

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	87	80-120
Copper	ug/L (ppb)	20	91	80-120
Iron	ug/L (ppb)	100	87	80-120
Manganese	ug/L (ppb)	20	83	80-120
Nickel	ug/L (ppb)	20	91	80-120
Zinc	ug/L (ppb)	50	95	80-120

Date of Report: 12/28/23
Date Received: 12/13/23
Project: TWAAFA-001, F&BI 312245

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

Laboratory Code: 312250-01 (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	11.8	99 b	99 b	75-125	0 b
Copper	ug/L (ppb)	20	<5	50 vo	52 vo	75-125	4
Iron	ug/L (ppb)	100	23,400	2160 b	3270 b	75-125	41 b
Manganese	ug/L (ppb)	20	1,220	531 b	816 b	75-125	42 b
Nickel	ug/L (ppb)	20	<1	51 vo	54 vo	75-125	6
Zinc	ug/L (ppb)	50	<5	57 vo	58 vo	75-125	2

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	91	80-120
Copper	ug/L (ppb)	20	91	80-120
Iron	ug/L (ppb)	100	83	80-120
Manganese	ug/L (ppb)	20	87	80-120
Nickel	ug/L (ppb)	20	94	80-120
Zinc	ug/L (ppb)	50	89	80-120

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, biased low; or, the calibration results for the analyte were outside of acceptance criteria, biased high, with a detection for the analyte in the sample. 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 standard reporting limit. 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.

k – The calibration results for the analyte were outside of acceptance criteria, biased high, and the analyte was not detected in the sample.

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

12/13/23 L3

312245

Page # 1 of 1

Report To: Anthony Cerruti / Trevor Louviere
cc: Tasya Gray

Company DOF

Address 1001 SW Klickitat Way

City, State, ZIP Seattle, WA 98134

Phone 215-767-7749 Email acerruti@dofnw.com

SAMPLERS (*signature*)

PROJECT NAME: TWAAFA

PO # TWAAFA-001

REMARKS: Dissolved metals samples field filtered at 0.45 micron before analysis
Project Specific RLs - (Yes) / No

INVOICE TO: DOF

TURNAROUND TIME
■ Standard Turnaround
__ RUSH _____
Rush charges authorized by:

SAMPLE DISPOSAL
■ Dispose after 30 days
Archive Samples
Other

ANALYSES REQUESTED

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Matrix	# of Bottles	Total Metals 6020B (As, Cr, Cu, Mn, Ni, Pb, Zn)	Dissolved Metals 6020B (As, Cr, Cu, Mn, Ni, Pb, Zn)	Total Mercury 1631E	Dissolved Mercury 1631E	Total Metals (Al, Fe)	Dissolved Metals (Al, Fe)	Ferrous Iron			MS/MSD Collected? (Y/N)	Notes
TWA-8D-1223	01 A-C	12/13/23	0925	W	3	X	X			X	X	X				Tot/Diss Metals: Al, As, Cu, Fe, Mn
CTMW-5-1223	02	12/13/23	1040	W	3	X	X			X	X	X				Tot/Diss Metals: Al, As, Cu, Fe, Mn, Ni, Zn
CTMW-7-1223	03	12/13/23	1200	W	3	X	X			X	X	X				Tot/Diss Metals: Al, As, Cu, Fe, Mn
CTMW-18-1223	04	12/13/23	1235	W	3	X	X			X	X	X				Tot/Diss Metals: Al, As, Cu, Fe, Mn

Samples received at 2 °C

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	EDS	Elliott Scheumann	DOF	12/13/23	1340
Received by:	Couriered under	Custody Seal by Delivery	Express	12/13/23	1340
Relinquished by:					
Received by:		ANH PHAN	F&B	12/13/23	15:07

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

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: 312245
Work Order Number: 2312328

December 20, 2023

Attention Michael Erdahl:

Fremont Analytical, Inc. received 4 sample(s) on 12/13/2023 for the analyses presented in the following report.

Dissolved Metals by EPA Method 200.8
Ferrous Iron by SM3500-Fe B
Total Metals by EPA Method 200.8

This report consists of the following:

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

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

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes
Project Manager

Date: *12/20/2023*

CLIENT: Friedman & Bruya
Project: 312245
Work Order: 2312328

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2312328-001	TWA-8D-1223	12/13/2023 9:25 AM	12/13/2023 4:00 PM
2312328-002	CTMW-5-1223	12/13/2023 10:40 AM	12/13/2023 4:00 PM
2312328-003	CTMW-7-1223	12/13/2023 12:00 PM	12/13/2023 4:00 PM
2312328-004	CTMW-18-1223	12/13/2023 12:35 PM	12/13/2023 4:00 PM

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

Case Narrative

WO#: **2312328**
Date: **12/20/2023**

CLIENT: Friedman & Bruya
Project: 312245

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: 312245

Lab ID: 2312328-001 **Collection Date:** 12/13/2023 9:25:00 AM
Client Sample ID: **TWA-8D-1223** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 42343		Analyst: JR
Aluminum	ND	10.0		µg/L	1	12/18/2023 1:13:00 PM
Total Metals by EPA Method 200.8				Batch ID: 42378		Analyst: JR
Aluminum	ND	10.0		µg/L	1	12/19/2023 5:14:00 PM
Ferrous Iron by SM3500-Fe B				Batch ID: R88336		Analyst: SLL
Ferrous Iron	0.408	0.150		mg/L	1	12/14/2023 8:06:01 AM

Lab ID: 2312328-002 **Collection Date:** 12/13/2023 10:40:00 AM
Client Sample ID: **CTMW-5-1223** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 42343		Analyst: JR
Aluminum	392	10.0		µg/L	1	12/18/2023 1:16:00 PM
Total Metals by EPA Method 200.8				Batch ID: 42378		Analyst: JR
Aluminum	425	10.0		µg/L	1	12/19/2023 5:07:00 PM
Ferrous Iron by SM3500-Fe B				Batch ID: R88336		Analyst: SLL
Ferrous Iron	0.454	0.150		mg/L	1	12/14/2023 8:06:01 AM

CLIENT: Friedman & Bruya
Project: 312245

Lab ID: 2312328-003 **Collection Date:** 12/13/2023 12:00:00 PM
Client Sample ID: **CTMW-7-1223** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 42343		Analyst: JR
Aluminum	ND	10.0		µg/L	1	12/18/2023 1:18:00 PM
Total Metals by EPA Method 200.8				Batch ID: 42378		Analyst: JR
Aluminum	ND	10.0		µg/L	1	12/19/2023 5:17:00 PM
Ferrous Iron by SM3500-Fe B				Batch ID: R88336		Analyst: SLL
Ferrous Iron	13.5	3.75	D	mg/L	25	12/14/2023 8:06:01 AM

Lab ID: 2312328-004 **Collection Date:** 12/13/2023 12:35:00 PM
Client Sample ID: **CTMW-18-1223** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 42343		Analyst: JR
Aluminum	29.1	10.0		µg/L	1	12/15/2023 4:54:00 PM
Total Metals by EPA Method 200.8				Batch ID: 42378		Analyst: JR
Aluminum	189	10.0		µg/L	1	12/19/2023 5:19:00 PM
Ferrous Iron by SM3500-Fe B				Batch ID: R88336		Analyst: SLL
Ferrous Iron	1.00	0.150		mg/L	1	12/14/2023 8:06:01 AM

Work Order: 2312328
CLIENT: Friedman & Bruya
Project: 312245

QC SUMMARY REPORT

Ferrous Iron by SM3500-Fe B

Sample ID: **CCV-R88336A**	SampType: **CCV**			Units: **mg/L**		Prep Date: **12/14/2023**		RunNo: **88336**			
Client ID: **CCV**	Batch ID: **R88336**					Analysis Date: **12/14/2023**		SeqNo: **1844402**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.414	0.150	0.4000	0	104	85	115				

Sample ID: **MB-R88336**	SampType: **MBLK**			Units: **mg/L**		Prep Date: **12/14/2023**		RunNo: **88336**			
Client ID: **MBLKW**	Batch ID: **R88336**					Analysis Date: **12/14/2023**		SeqNo: **1844403**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	ND	0.150									

Sample ID: **LCS-R88336**	SampType: **LCS**			Units: **mg/L**		Prep Date: **12/14/2023**		RunNo: **88336**			
Client ID: **LCSW**	Batch ID: **R88336**					Analysis Date: **12/14/2023**		SeqNo: **1844404**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.417	0.150	0.4000	0	104	85	115				

Sample ID: **2312328-001CDUP**	SampType: **DUP**			Units: **mg/L**		Prep Date: **12/14/2023**		RunNo: **88336**			
Client ID: **TWA-8D-1223**	Batch ID: **R88336**					Analysis Date: **12/14/2023**		SeqNo: **1844406**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.445	0.150						0.4084	8.50	20	

Sample ID: **2312328-001CMS**	SampType: **MS**			Units: **mg/L**		Prep Date: **12/14/2023**		RunNo: **88336**			
Client ID: **TWA-8D-1223**	Batch ID: **R88336**					Analysis Date: **12/14/2023**		SeqNo: **1844407**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.910	0.150	0.4000	0.4084	125	70	130				

Work Order: 2312328
CLIENT: Friedman & Bruya
Project: 312245

QC SUMMARY REPORT

Ferrous Iron by SM3500-Fe B

Sample ID: **2312328-001CMSD**	SampType: **MSD**			Units: **mg/L**		Prep Date: **12/14/2023**		RunNo: **88336**			
Client ID: **TWA-8D-1223**	Batch ID: **R88336**					Analysis Date: **12/14/2023**		SeqNo: **1844408**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.925	0.150	0.4000	0.4084	129	70	130	0.9100	1.65	30	

Sample ID: **CCV-R88336B**	SampType: **CCV**			Units: **mg/L**		Prep Date: **12/14/2023**		RunNo: **88336**			
Client ID: **CCV**	Batch ID: **R88336**					Analysis Date: **12/14/2023**		SeqNo: **1844412**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.427	0.150	0.4000	0	107	85	115				

Sample ID: **CCB-R88336B**	SampType: **CCB**			Units: **mg/L**		Prep Date: **12/14/2023**		RunNo: **88336**			
Client ID: **CCB**	Batch ID: **R88336**					Analysis Date: **12/14/2023**		SeqNo: **1844413**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	ND	0.150									

Sample ID: **CCV-R88336C**	SampType: **CCV**			Units: **mg/L**		Prep Date: **12/14/2023**		RunNo: **88336**			
Client ID: **CCV**	Batch ID: **R88336**					Analysis Date: **12/14/2023**		SeqNo: **1845060**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.448	0.150	0.4000	0	112	85	115				

Sample ID: **CCB-R88336C**	SampType: **CCB**			Units: **mg/L**		Prep Date: **12/14/2023**		RunNo: **88336**			
Client ID: **CCB**	Batch ID: **R88336**					Analysis Date: **12/14/2023**		SeqNo: **1845068**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	ND	0.150									

Work Order: 2312328
CLIENT: Friedman & Bruya
Project: 312245

QC SUMMARY REPORT

Ferrous Iron by SM3500-Fe B

Sample ID: **CCV-R88336D**	SampType: **CCV**			Units: **mg/L**		Prep Date: **12/14/2023**			RunNo: **88336**		
Client ID: **CCV**	Batch ID: **R88336**					Analysis Date: **12/14/2023**			SeqNo: **1845066**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.433	0.150	0.4000	0	108	85	115				

Sample ID: **CCB-R88336D**	SampType: **CCB**			Units: **mg/L**		Prep Date: **12/14/2023**			RunNo: **88336**		
Client ID: **CCB**	Batch ID: **R88336**					Analysis Date: **12/14/2023**			SeqNo: **1845067**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	ND	0.150									

Work Order: 2312328
CLIENT: Friedman & Bruya
Project: 312245

QC SUMMARY REPORT

Dissolved Metals by EPA Method 200.8

Sample ID: **ICB**	SampType: **ICB**	Units: **µg/L**	Prep Date: **12/15/2023**	RunNo: **88400**
Client ID: **ICB**	Batch ID: **42343**		Analysis Date: **12/15/2023**	SeqNo: **1845892**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **ICV**	SampType: **ICV**	Units: **µg/L**	Prep Date: **12/15/2023**	RunNo: **88400**
Client ID: **ICV**	Batch ID: **42343**		Analysis Date: **12/15/2023**	SeqNo: **1845893**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,470	10.0	1,500	0	98.0	90	110				

Sample ID: **MB-42343**	SampType: **MBLK**	Units: **µg/L**	Prep Date: **12/14/2023**	RunNo: **88400**
Client ID: **MBLKW**	Batch ID: **42343**		Analysis Date: **12/15/2023**	SeqNo: **1845895**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **LCS-42343**	SampType: **LCS**	Units: **µg/L**	Prep Date: **12/14/2023**	RunNo: **88400**
Client ID: **LCSW**	Batch ID: **42343**		Analysis Date: **12/15/2023**	SeqNo: **1845896**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,050	10.0	1,000	0	105	85	115				

Sample ID: **2312283-003CDUP**	SampType: **DUP**	Units: **µg/L**	Prep Date: **12/14/2023**	RunNo: **88400**
Client ID: **BATCH**	Batch ID: **42343**		Analysis Date: **12/15/2023**	SeqNo: **1845898**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	47.4	10.0						46.74	1.47	30	

Work Order: 2312328
CLIENT: Friedman & Bruya
Project: 312245

QC SUMMARY REPORT

Dissolved Metals by EPA Method 200.8

Sample ID: **2312283-003CMS**	SampType: **MS**			Units: **µg/L**		Prep Date: **12/14/2023**		RunNo: **88400**		
Client ID: **BATCH**	Batch ID: **42343**					Analysis Date: **12/15/2023**		SeqNo: **1845899**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,130	10.0	1,000	46.74	108	50	150				

Sample ID: **CCV-42343A**	SampType: **CCV**			Units: **µg/L**		Prep Date: **12/15/2023**		RunNo: **88400**		
Client ID: **CCV**	Batch ID: **42343**					Analysis Date: **12/15/2023**		SeqNo: **1845902**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,050	10.0	1,000	0	105	90	110				

Sample ID: **CCB-42343A**	SampType: **CCB**			Units: **µg/L**		Prep Date: **12/15/2023**		RunNo: **88400**		
Client ID: **CCB**	Batch ID: **42343**					Analysis Date: **12/15/2023**		SeqNo: **1845903**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **2312328-003BMS**	SampType: **MS**			Units: **µg/L**		Prep Date: **12/14/2023**		RunNo: **88400**		
Client ID: **CTMW-7-1223**	Batch ID: **42343**					Analysis Date: **12/15/2023**		SeqNo: **1845913**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,040	10.0	1,000	3.483	103	50	150				

Sample ID: **CCV-42343B**	SampType: **CCV**			Units: **µg/L**		Prep Date: **12/15/2023**		RunNo: **88400**		
Client ID: **CCV**	Batch ID: **42343**					Analysis Date: **12/15/2023**		SeqNo: **1845914**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,080	10.0	1,000	0	108	90	110				

Work Order: 2312328
CLIENT: Friedman & Bruya
Project: 312245

QC SUMMARY REPORT

Dissolved Metals by EPA Method 200.8

Sample ID: **CCB-42343B**	SampType: **CCB**			Units: **µg/L**		Prep Date: **12/15/2023**		RunNo: **88400**		
Client ID: **CCB**	Batch ID: **42343**					Analysis Date: **12/15/2023**		SeqNo: **1845915**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **MB-42344 FB**	SampType: **MBLK**			Units: **µg/L**		Prep Date: **12/14/2023**		RunNo: **88400**		
Client ID: **MBLKW**	Batch ID: **42343**					Analysis Date: **12/15/2023**		SeqNo: **1845923**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **CCV-42343C**	SampType: **CCV**			Units: **µg/L**		Prep Date: **12/15/2023**		RunNo: **88400**		
Client ID: **CCV**	Batch ID: **42343**					Analysis Date: **12/15/2023**		SeqNo: **1845924**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,070	10.0	1,000	0	107	90	110				

Sample ID: **CCB-42343C**	SampType: **CCB**			Units: **µg/L**		Prep Date: **12/15/2023**		RunNo: **88400**		
Client ID: **CCB**	Batch ID: **42343**					Analysis Date: **12/15/2023**		SeqNo: **1845925**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **ICB**	SampType: **ICB**			Units: **µg/L**		Prep Date: **12/18/2023**		RunNo: **88400**		
Client ID: **ICB**	Batch ID: **42343**					Analysis Date: **12/18/2023**		SeqNo: **1846208**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Work Order: 2312328
CLIENT: Friedman & Bruya
Project: 312245

QC SUMMARY REPORT

Dissolved Metals by EPA Method 200.8

Sample ID: **ICV**	SampType: **ICV**	Units: **µg/L**	Prep Date: **12/18/2023**	RunNo: **88400**
Client ID: **ICV**	Batch ID: **42343**		Analysis Date: **12/18/2023**	SeqNo: **1846209**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,480	10.0	1,500	0	98.4	90	110				

Sample ID: **CCV-42343D**	SampType: **CCV**	Units: **µg/L**	Prep Date: **12/18/2023**	RunNo: **88400**
Client ID: **CCV**	Batch ID: **42343**		Analysis Date: **12/18/2023**	SeqNo: **1846190**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,060	10.0	1,000	0	106	90	110				

Sample ID: **CCB-42343D**	SampType: **CCB**	Units: **µg/L**	Prep Date: **12/18/2023**	RunNo: **88400**
Client ID: **CCB**	Batch ID: **42343**		Analysis Date: **12/18/2023**	SeqNo: **1846191**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **CCV-42343E**	SampType: **CCV**	Units: **µg/L**	Prep Date: **12/18/2023**	RunNo: **88400**
Client ID: **CCV**	Batch ID: **42343**		Analysis Date: **12/18/2023**	SeqNo: **1846196**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,050	10.0	1,000	0	105	90	110				

Sample ID: **CCB-42343E**	SampType: **CCB**	Units: **µg/L**	Prep Date: **12/18/2023**	RunNo: **88400**
Client ID: **CCB**	Batch ID: **42343**		Analysis Date: **12/18/2023**	SeqNo: **1846197**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Work Order: 2312328
CLIENT: Friedman & Bruya
Project: 312245

QC SUMMARY REPORT

Total Metals by EPA Method 200.8

Sample ID: **ICB**	SampType: **ICB**	Units: **µg/L**	Prep Date: **12/19/2023**	RunNo: **88458**
Client ID: **ICB**	Batch ID: **42378**		Analysis Date: **12/19/2023**	SeqNo: **1847318**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **ICV**	SampType: **ICV**	Units: **µg/L**	Prep Date: **12/19/2023**	RunNo: **88458**
Client ID: **ICV**	Batch ID: **42378**		Analysis Date: **12/19/2023**	SeqNo: **1847319**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,470	10.0	1,500	0	98.3	90	110				

Sample ID: **CCV-42378A**	SampType: **CCV**	Units: **µg/L**	Prep Date: **12/19/2023**	RunNo: **88458**
Client ID: **CCV**	Batch ID: **42378**		Analysis Date: **12/19/2023**	SeqNo: **1847321**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,060	10.0	1,000	0	106	90	110				

Sample ID: **CCB-42378A**	SampType: **CCB**	Units: **µg/L**	Prep Date: **12/19/2023**	RunNo: **88458**
Client ID: **CCB**	Batch ID: **42378**		Analysis Date: **12/19/2023**	SeqNo: **1847322**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **MB-42378**	SampType: **MBLK**	Units: **µg/L**	Prep Date: **12/18/2023**	RunNo: **88458**
Client ID: **MBLKW**	Batch ID: **42378**		Analysis Date: **12/19/2023**	SeqNo: **1847323**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Work Order: 2312328
CLIENT: Friedman & Bruya
Project: 312245

QC SUMMARY REPORT

Total Metals by EPA Method 200.8

Sample ID: **LCS-42378**	SampType: **LCS**			Units: **µg/L**		Prep Date: **12/18/2023**		RunNo: **88458**		
Client ID: **LCSW**	Batch ID: **42378**					Analysis Date: **12/19/2023**		SeqNo: **1847324**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,040	10.0	1,000	0	104	85	115				

Sample ID: **2312328-002ADUP**	SampType: **DUP**			Units: **µg/L**		Prep Date: **12/18/2023**		RunNo: **88458**		
Client ID: **CTMW-5-1223**	Batch ID: **42378**					Analysis Date: **12/19/2023**		SeqNo: **1847326**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	416	20.0						424.5	1.99	30	

Sample ID: **2312328-002AMS**	SampType: **MS**			Units: **µg/L**		Prep Date: **12/18/2023**		RunNo: **88458**		
Client ID: **CTMW-5-1223**	Batch ID: **42378**					Analysis Date: **12/19/2023**		SeqNo: **1847327**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	2,530	20.0	2,000	424.5	105	70	130				

Sample ID: **CCV-42378B**	SampType: **CCV**			Units: **µg/L**		Prep Date: **12/19/2023**		RunNo: **88458**		
Client ID: **CCV**	Batch ID: **42378**					Analysis Date: **12/19/2023**		SeqNo: **1847332**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,070	10.0	1,000	0	107	90	110				

Sample ID: **CCB-42378B**	SampType: **CCB**			Units: **µg/L**		Prep Date: **12/19/2023**		RunNo: **88458**		
Client ID: **CCB**	Batch ID: **42378**					Analysis Date: **12/19/2023**		SeqNo: **1847333**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Work Order: 2312328
CLIENT: Friedman & Bruya
Project: 312245

QC SUMMARY REPORT

Total Metals by EPA Method 200.8

Sample ID: **CCV-42378C**	SampType: **CCV**			Units: **µg/L**		Prep Date: **12/19/2023**		RunNo: **88458**		
Client ID: **CCV**	Batch ID: **42378**					Analysis Date: **12/19/2023**		SeqNo: **1847344**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,040	10.0	1,000	0	104	90	110				

Sample ID: **CCB-42378C**	SampType: **CCB**			Units: **µg/L**		Prep Date: **12/19/2023**		RunNo: **88458**		
Client ID: **CCB**	Batch ID: **42378**					Analysis Date: **12/19/2023**		SeqNo: **1847345**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **2312336-001AMS**	SampType: **MS**			Units: **µg/L**		Prep Date: **12/18/2023**		RunNo: **88458**		
Client ID: **BATCH**	Batch ID: **42378**					Analysis Date: **12/19/2023**		SeqNo: **1847346**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,080	10.0	1,000	49.99	103	70	130				

Sample ID: **CCV-42378D**	SampType: **CCV**			Units: **µg/L**		Prep Date: **12/19/2023**		RunNo: **88458**		
Client ID: **CCV**	Batch ID: **42378**					Analysis Date: **12/19/2023**		SeqNo: **1847353**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,030	10.0	1,000	0	103	90	110				

Sample ID: **CCB-42378D**	SampType: **CCB**			Units: **µg/L**		Prep Date: **12/19/2023**		RunNo: **88458**		
Client ID: **CCB**	Batch ID: **42378**					Analysis Date: **12/19/2023**		SeqNo: **1847354**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Work Order: 2312328
CLIENT: Friedman & Bruya
Project: 312245

QC SUMMARY REPORT

Total Metals by EPA Method 200.8

Sample ID: **ICB**	SampType: **ICB**	Units: **µg/L**	Prep Date: **12/20/2023**	RunNo: **88458**
Client ID: **ICB**	Batch ID: **42378**		Analysis Date: **12/20/2023**	SeqNo: **1847455**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **ICV**	SampType: **ICV**	Units: **µg/L**	Prep Date: **12/20/2023**	RunNo: **88458**
Client ID: **ICV**	Batch ID: **42378**		Analysis Date: **12/20/2023**	SeqNo: **1847456**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,490	10.0	1,500	0	99.0	90	110				

Sample ID: **CCV-42378E**	SampType: **CCV**	Units: **µg/L**	Prep Date: **12/20/2023**	RunNo: **88458**
Client ID: **CCV**	Batch ID: **42378**		Analysis Date: **12/20/2023**	SeqNo: **1847458**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,030	10.0	1,000	0	103	90	110				

Sample ID: **CCB-42378E**	SampType: **CCB**	Units: **µg/L**	Prep Date: **12/20/2023**	RunNo: **88458**
Client ID: **CCB**	Batch ID: **42378**		Analysis Date: **12/20/2023**	SeqNo: **1847459**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **CCV-42378F**	SampType: **CCV**	Units: **µg/L**	Prep Date: **12/20/2023**	RunNo: **88458**
Client ID: **CCV**	Batch ID: **42378**		Analysis Date: **12/20/2023**	SeqNo: **1847465**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,040	10.0	1,000	0	104	90	110				

Work Order: 2312328
CLIENT: Friedman & Bruya
Project: 312245

QC SUMMARY REPORT

Total Metals by EPA Method 200.8

Sample ID: **CCB-42378F** SampType: **CCB** Units: **µg/L** Prep Date: **12/20/2023** RunNo: **88458**
Client ID: **CCB** Batch ID: **42378** Analysis Date: **12/20/2023** SeqNo: **1847466**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Fremont Analytical
An Alliance Technical Group Company

Sample Log-In Check List

Client Name:	FB	Work Order Number:	2312328
Logged by:	Morgan Wilson	Date Received:	12/13/2023 4:00:00 PM

Chain of Custody

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

Log In

3.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes ☐	No ☐	Not Present ☑
4.	Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
5.	Were all items received at a temperature of >2°C to 6°C *	Yes ☑	No ☐	NA ☐
6.	Sample(s) in proper container(s)?	Yes ☐	No ☑	
7.	Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
8.	Are samples properly preserved?	Yes ☑	No ☐	
9.	Was preservative added to bottles?	Yes ☑	No ☐	NA ☐ HCL
10.	Is there headspace in the VOA vials?	Yes ☐	No ☐	NA ☑
11.	Did all samples containers arrive in good condition(unbroken)?	Yes ☑	No ☐	
12.	Does paperwork match bottle labels?	Yes ☑	No ☐	
13.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
14.	Is it clear what analyses were requested?	Yes ☑	No ☐	
15.	Were all hold times (except field parameters, pH e.g.) able to be met?	Yes ☑	No ☐	

Special Handling (if applicable)

16. 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:			

17. Additional remarks:

Item Information

Item #	Temp °C
Sample	5.1

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

SUBCONTRACT SAMPLE CHAIN OF CUSTODY

2312328

Send Report To Michael Erdahl

Company Friedman and Bruya, Inc.

Address 5500 4th Ave S

City, State, ZIP Seattle, WA 98108

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

SUBCONTRACTER
Fremont

PROJECT NAME/NO.	PO #
312245	D-594

REMARKS

TIER IV REPORT

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: total aluminum	dissolved aluminum	ferrous iron								Notes
TWA-8D-1223		12/13/2023	925	water	3	x	x	x								
CTMW-5-1223		12/13/2023	1040	water	3	x	x	x								
CTMW-7-1223		12/13/2023	1200	water	3	x	x	x								
CTMW-18-1223		12/13/2023	1235	water	3	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	12/13/23	1517
Received by:		Alli Miller	FAI	12/13/23	1600
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

December 29, 2024

Trevor Louviere, Project Manager
Dalton Olmsted Fuglevand
1001 SW Klickitat Way, Suite 200B
Seattle, WA 98134

Dear Mr Louviere:

Included are the amended results from the testing of material submitted on December 13, 2023 from the TWAAFA-001, F&BI 312249 project. The sample ID was corrected.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Anthony Cerruti, Tasya Gray
DOF1227R.DOC

FRIEDMAN & BRUYA, INC.

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www.friedmanandbruya.com

December 27, 2023

Trevor Louviere, Project Manager
Dalton Olmsted Fuglevand
1001 SW Klickitat Way, Suite 200B
Seattle, WA 98134

Dear Mr Louviere:

Included are the results from the testing of material submitted on December 13, 2023 from the TWAAFA-001, F&BI 312249 project. There are 10 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: Anthony Cerruti, Tasya Gray
DOF1227R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on December 13, 2023 by Friedman & Bruya, Inc. from the Dalton Olmsted Fuglevand TWAAFA-001, F&BI 312249 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Dalton Olmsted Fuglevand
312249 -01	CTMW-14-1223

Sample CTMW-14-1223 was sent to Fremont Analytical for ferrous iron, total aluminum, and dissolved aluminum analyses. The report is enclosed.

Copper in the 6020B total matrix spike and matrix spike duplicate did not meet the acceptance criteria. The laboratory control sample passed the acceptance criteria, therefore the results were due to matrix effect.

The 6020B total arsenic calibration standard exceeded the acceptance criteria in sample CTMW-14-1223. The metal was not detected, therefore this did not represent an out of control condition.

All other quality control requirements were acceptable.

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	CTMW-14-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/13/23	Project:	TWAAFA-001, F&BI 312249
Date Extracted:	12/19/23	Lab ID:	312249-01
Date Analyzed:	12/21/23	Data File:	312249-01.305
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	3.78
Iron	156
Manganese	3.53

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	CTMW-14-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/13/23	Project:	TWAAFA-001, F&BI 312249
Date Extracted:	12/19/23	Lab ID:	312249-01 x5
Date Analyzed:	12/21/23	Data File:	312249-01 x5.212
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Copper	5.62

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Dalton Olmsted Fuglevand
Date Received:	Not Applicable	Project:	TWAAFA-001, F&BI 312249
Date Extracted:	12/19/23	Lab ID:	I3-1001 mb2
Date Analyzed:	12/20/23	Data File:	I3-1001 mb2.152
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

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

Analysis For Total Metals By EPA Method 6020B

Client ID:	CTMW-14-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/13/23	Project:	TWAAFA-001, F&BI 312249
Date Extracted:	12/14/23	Lab ID:	312249-01
Date Analyzed:	12/16/23	Data File:	312249-01.225
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Copper	4.73
Iron	220
Manganese	<5

Analysis For Total Metals By EPA Method 6020B

Client ID:	CTMW-14-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/13/23	Project:	TWAAFA-001, F&BI 312249
Date Extracted:	12/14/23	Lab ID:	312249-01 x5
Date Analyzed:	12/20/23	Data File:	312249-01 x5.067
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<5 k

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Dalton Olmsted Fuglevand
Date Received:	Not Applicable	Project:	TWAAFA-001, F&BI 312249
Date Extracted:	12/14/23	Lab ID:	I3-989 mb
Date Analyzed:	12/15/23	Data File:	I3-989 mb.094
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Copper	<1
Iron	<50
Manganese	<5

Date of Report: 12/27/23
Date Received: 12/13/23
Project: TWAAFA-001, F&BI 312249

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

Laboratory Code: 312273-02 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	1,110	304 b	625 b	75-125	69 b
Copper	ug/L (ppb)	20	<50	89	87	75-125	2
Iron	ug/L (ppb)	100	4,770	133 b	210 b	75-125	45 b
Manganese	ug/L (ppb)	20	188	103 b	110 b	75-125	7 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	87	80-120
Copper	ug/L (ppb)	20	91	80-120
Iron	ug/L (ppb)	100	87	80-120
Manganese	ug/L (ppb)	20	83	80-120

Date of Report: 12/27/23
Date Received: 12/13/23
Project: TWAAFA-001, F&BI 312249

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

Laboratory Code: 312250-01 (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	11.8	99 b	99 b	75-125	0 b
Copper	ug/L (ppb)	20	<5	50 vo	52 vo	75-125	4
Iron	ug/L (ppb)	100	23,400	2160 b	3270 b	75-125	41 b
Manganese	ug/L (ppb)	20	1,220	531 b	816 b	75-125	42 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	91	80-120
Copper	ug/L (ppb)	20	91	80-120
Iron	ug/L (ppb)	100	83	80-120
Manganese	ug/L (ppb)	20	87	80-120

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, biased low; or, the calibration results for the analyte were outside of acceptance criteria, biased high, with a detection for the analyte in the sample. 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 standard reporting limit. 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.

k – The calibration results for the analyte were outside of acceptance criteria, biased high, and the analyte was not detected in the sample.

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 12/13/23 L1

312249

Report To: Anthony Cerruti / Trevor Louviere
CC: Tasya Gray

Company DOF

Address 1001 SW Klickitat Way

City, State, ZIP Seattle, WA 98134

Phone 215-767-7749 Email acerruti@dofnw.com

SAMPLERS (*signature*): EDS

PROJECT NAME: TWAAFA

PO #: TWAAFA-001

REMARKS: Dissolved metals samples field filtered at 0.45 micron before analysis
Project Specific RLs - (Yes) / No

INVOICE TO: DOF

Page # 1 of 1

TURNAROUND TIME
■ Standard Turnaround
__ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
■ Dispose after 30 days
Archive Samples
Other

ANALYSES REQUESTED

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Matrix	# of Bottles	Total Metals 6020B (As, Cr, Cu, Mn, Ni, Pb, Zn)	Dissolved Metals 6020B (As, Cr, Cu, Mn, Ni, Pb, Zn)	Total Mercury 1631E	Dissolved Mercury 1631E	Total Metals (Al, Fe)	Dissolved Metals (Al, Fe)	Ferrous Iron			MS/MSD Collected? (Y/N)	Notes
CTHW-14-1223	01A-C	12/13/23	1415	W	3	X	X			X	X	X				Tot/Diss Metals Al, As, Cu, Fe, Mn

Samples received at 3 °C

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Michael Wright	Cleanl Earth	12/13/23	15:59
Received by:		ANHPHAN	FSO	12/13/23	15:59
Relinquished by:					
Received by:					

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

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: 312249
Work Order Number: 2312339

December 21, 2023

Attention Michael Erdahl:

Fremont Analytical, Inc. received 1 sample(s) on 12/14/2023 for the analyses presented in the following report.

Dissolved Metals by EPA Method 200.8
Ferrous Iron by SM3500-Fe B
Total Metals by EPA Method 200.8

This report consists of the following:

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

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

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes
Project Manager

Date: *12/21/2023*

CLIENT: Friedman & Bruya
Project: 312249
Work Order: 2312339

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2312339-001	CTMW-14-1223	12/13/2023 2:15 PM	12/14/2023 10:36 AM

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

Original

Case Narrative

WO#: **2312339**
Date: **12/21/2023**

CLIENT: Friedman & Bruya
Project: 312249

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: **2312339**
Date Reported: **12/21/2023**

Client: Friedman & Bruya
Collection Date: 12/13/2023 2:15:00 PM
Project: 312249
Lab ID: 2312339-001
Matrix: Water
Client Sample ID: **CTMW-14-1223**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 42413		Analyst: SLL
Aluminum	21.4	10.0		µg/L	1	12/21/2023 10:59:00 AM
Total Metals by EPA Method 200.8				Batch ID: 42397		Analyst: SLL
Aluminum	55.2	10.0		µg/L	1	12/21/2023 2:31:00 PM
Ferrous Iron by SM3500-Fe B				Batch ID: R88336		Analyst: SLL
Ferrous Iron	ND	0.150		mg/L	1	12/14/2023 11:00:00 AM

Work Order: 2312339
CLIENT: Friedman & Bruya
Project: 312249

QC SUMMARY REPORT

Ferrous Iron by SM3500-Fe B

Sample ID: **CCV-R88336A**	SampType: **CCV**			Units: **mg/L**		Prep Date: **12/14/2023**		RunNo: **88336**			
Client ID: **CCV**	Batch ID: **R88336**					Analysis Date: **12/14/2023**		SeqNo: **1844402**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.414	0.150	0.4000	0	104	85	115				

Sample ID: **MB-R88336**	SampType: **MBLK**			Units: **mg/L**		Prep Date: **12/14/2023**		RunNo: **88336**			
Client ID: **MBLKW**	Batch ID: **R88336**					Analysis Date: **12/14/2023**		SeqNo: **1844403**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	ND	0.150									

Sample ID: **LCS-R88336**	SampType: **LCS**			Units: **mg/L**		Prep Date: **12/14/2023**		RunNo: **88336**			
Client ID: **LCSW**	Batch ID: **R88336**					Analysis Date: **12/14/2023**		SeqNo: **1844404**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.417	0.150	0.4000	0	104	85	115				

Sample ID: **2312328-001CDUP**	SampType: **DUP**			Units: **mg/L**		Prep Date: **12/14/2023**		RunNo: **88336**			
Client ID: **BATCH**	Batch ID: **R88336**					Analysis Date: **12/14/2023**		SeqNo: **1844406**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.445	0.150						0.4084	8.50	20	

Sample ID: **2312328-001CMS**	SampType: **MS**			Units: **mg/L**		Prep Date: **12/14/2023**		RunNo: **88336**			
Client ID: **BATCH**	Batch ID: **R88336**					Analysis Date: **12/14/2023**		SeqNo: **1844407**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.910	0.150	0.4000	0.4084	125	70	130				

Work Order: 2312339
CLIENT: Friedman & Bruya
Project: 312249

QC SUMMARY REPORT

Ferrous Iron by SM3500-Fe B

Sample ID: **2312328-001CMSD**	SampType: **MSD**	Units: **mg/L**	Prep Date: **12/14/2023**	RunNo: **88336**
Client ID: **BATCH**	Batch ID: **R88336**		Analysis Date: **12/14/2023**	SeqNo: **1844408**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.925	0.150	0.4000	0.4084	129	70	130	0.9100	1.65	30	

Sample ID: **CCV-R88336B**	SampType: **CCV**	Units: **mg/L**	Prep Date: **12/14/2023**	RunNo: **88336**
Client ID: **CCV**	Batch ID: **R88336**		Analysis Date: **12/14/2023**	SeqNo: **1844412**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.427	0.150	0.4000	0	107	85	115				

Sample ID: **CCB-R88336B**	SampType: **CCB**	Units: **mg/L**	Prep Date: **12/14/2023**	RunNo: **88336**
Client ID: **CCB**	Batch ID: **R88336**		Analysis Date: **12/14/2023**	SeqNo: **1844413**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	ND	0.150									

Sample ID: **CCV-R88336C**	SampType: **CCV**	Units: **mg/L**	Prep Date: **12/14/2023**	RunNo: **88336**
Client ID: **CCV**	Batch ID: **R88336**		Analysis Date: **12/14/2023**	SeqNo: **1845060**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.448	0.150	0.4000	0	112	85	115				

Sample ID: **CCB-R88336C**	SampType: **CCB**	Units: **mg/L**	Prep Date: **12/14/2023**	RunNo: **88336**
Client ID: **CCB**	Batch ID: **R88336**		Analysis Date: **12/14/2023**	SeqNo: **1845068**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	ND	0.150									

Work Order: 2312339
CLIENT: Friedman & Bruya
Project: 312249

QC SUMMARY REPORT

Ferrous Iron by SM3500-Fe B

Sample ID: **CCV-R88336D**	SampType: **CCV**			Units: **mg/L**		Prep Date: **12/14/2023**			RunNo: **88336**		
Client ID: **CCV**	Batch ID: **R88336**					Analysis Date: **12/14/2023**			SeqNo: **1845066**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.433	0.150	0.4000	0	108	85	115				

Sample ID: **CCB-R88336D**	SampType: **CCB**			Units: **mg/L**		Prep Date: **12/14/2023**			RunNo: **88336**		
Client ID: **CCB**	Batch ID: **R88336**					Analysis Date: **12/14/2023**			SeqNo: **1845067**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	ND	0.150									

Work Order: 2312339
CLIENT: Friedman & Bruya
Project: 312249

QC SUMMARY REPORT

Dissolved Metals by EPA Method 200.8

Sample ID: **ICB**	SampType: **ICB**	Units: **µg/L**	Prep Date: **12/21/2023**	RunNo: **88496**
Client ID: **ICB**	Batch ID: **42413**		Analysis Date: **12/21/2023**	SeqNo: **1848083**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **ICV**	SampType: **ICV**	Units: **µg/L**	Prep Date: **12/21/2023**	RunNo: **88496**
Client ID: **ICV**	Batch ID: **42413**		Analysis Date: **12/21/2023**	SeqNo: **1848084**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,450	10.0	1,500	0	96.8	90	110				

Sample ID: **MB-42413**	SampType: **MBLK**	Units: **µg/L**	Prep Date: **12/21/2023**	RunNo: **88496**
Client ID: **MBLKW**	Batch ID: **42413**		Analysis Date: **12/21/2023**	SeqNo: **1848085**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **LCS-42413**	SampType: **LCS**	Units: **µg/L**	Prep Date: **12/21/2023**	RunNo: **88496**
Client ID: **LCSW**	Batch ID: **42413**		Analysis Date: **12/21/2023**	SeqNo: **1848086**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	906	10.0	1,000	0	90.6	85	115				

Sample ID: **2312341-007BDUP**	SampType: **DUP**	Units: **µg/L**	Prep Date: **12/21/2023**	RunNo: **88496**
Client ID: **BATCH**	Batch ID: **42413**		Analysis Date: **12/21/2023**	SeqNo: **1848088**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0						0		30	

Work Order: 2312339
CLIENT: Friedman & Bruya
Project: 312249

QC SUMMARY REPORT

Dissolved Metals by EPA Method 200.8

Sample ID: **2312341-007BMS**	SampType: **MS**			Units: **µg/L**		Prep Date: **12/21/2023**		RunNo: **88496**		
Client ID: **BATCH**	Batch ID: **42413**					Analysis Date: **12/21/2023**		SeqNo: **1848089**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,020	10.0	1,000	0	102	50	150				

Sample ID: **2312341-007BMSD**	SampType: **MSD**			Units: **µg/L**		Prep Date: **12/21/2023**		RunNo: **88496**		
Client ID: **BATCH**	Batch ID: **42413**					Analysis Date: **12/21/2023**		SeqNo: **1848090**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,170	10.0	1,000	0	117	50	150	1,022	13.2	30	

Sample ID: **CCV-42413A**	SampType: **CCV**			Units: **µg/L**		Prep Date: **12/21/2023**		RunNo: **88496**		
Client ID: **CCV**	Batch ID: **42413**					Analysis Date: **12/21/2023**		SeqNo: **1848092**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	993	10.0	1,000	0	99.3	90	110				

Sample ID: **CCB-42413A**	SampType: **CCB**			Units: **µg/L**		Prep Date: **12/21/2023**		RunNo: **88496**		
Client ID: **CCB**	Batch ID: **42413**					Analysis Date: **12/21/2023**		SeqNo: **1848093**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **CCV-42413B**	SampType: **CCV**			Units: **µg/L**		Prep Date: **12/21/2023**		RunNo: **88496**		
Client ID: **CCV**	Batch ID: **42413**					Analysis Date: **12/21/2023**		SeqNo: **1848104**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,020	10.0	1,000	0	102	90	110				

Work Order: 2312339
CLIENT: Friedman & Bruya
Project: 312249

QC SUMMARY REPORT

Dissolved Metals by EPA Method 200.8

Sample ID: **CCB-42413B** SampType: **CCB** Units: **µg/L** Prep Date: **12/21/2023** RunNo: **88496**
Client ID: **CCB** Batch ID: **42413** Analysis Date: **12/21/2023** SeqNo: **1848105**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **2312350-004BMS** SampType: **MS** Units: **µg/L** Prep Date: **12/21/2023** RunNo: **88496**
Client ID: **BATCH** Batch ID: **42413** Analysis Date: **12/21/2023** SeqNo: **1848114**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,050	10.0	1,000	8.025	105	50	150				

Sample ID: **CCV-42413C** SampType: **CCV** Units: **µg/L** Prep Date: **12/21/2023** RunNo: **88496**
Client ID: **CCV** Batch ID: **42413** Analysis Date: **12/21/2023** SeqNo: **1848115**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,010	10.0	1,000	0	101	90	110				

Sample ID: **CCB-42413C** SampType: **CCB** Units: **µg/L** Prep Date: **12/21/2023** RunNo: **88496**
Client ID: **CCB** Batch ID: **42413** Analysis Date: **12/21/2023** SeqNo: **1848116**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Work Order: 2312339
CLIENT: Friedman & Bruya
Project: 312249

QC SUMMARY REPORT

Total Metals by EPA Method 200.8

Sample ID: **ICB**	SampType: **ICB**	Units: **µg/L**	Prep Date: **12/21/2023**	RunNo: **88509**
Client ID: **ICB**	Batch ID: **42397**		Analysis Date: **12/21/2023**	SeqNo: **1848375**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **ICV**	SampType: **ICV**	Units: **µg/L**	Prep Date: **12/21/2023**	RunNo: **88509**
Client ID: **ICV**	Batch ID: **42397**		Analysis Date: **12/21/2023**	SeqNo: **1848376**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,450	10.0	1,500	0	96.8	90	110				

Sample ID: **CCV-42397A**	SampType: **CCV**	Units: **µg/L**	Prep Date: **12/21/2023**	RunNo: **88509**
Client ID: **CCV**	Batch ID: **42397**		Analysis Date: **12/21/2023**	SeqNo: **1848377**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	986	10.0	1,000	0	98.6	90	110				

Sample ID: **CCB-42397A**	SampType: **CCB**	Units: **µg/L**	Prep Date: **12/21/2023**	RunNo: **88509**
Client ID: **CCB**	Batch ID: **42397**		Analysis Date: **12/21/2023**	SeqNo: **1848378**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **MB-42397**	SampType: **MBLK**	Units: **µg/L**	Prep Date: **12/19/2023**	RunNo: **88509**
Client ID: **MBLKW**	Batch ID: **42397**		Analysis Date: **12/21/2023**	SeqNo: **1848379**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Work Order: 2312339
CLIENT: Friedman & Bruya
Project: 312249

QC SUMMARY REPORT

Total Metals by EPA Method 200.8

Sample ID: **2312365-002AMS**	SampType: **MS**			Units: **µg/L**		Prep Date: **12/19/2023**		RunNo: **88509**		
Client ID: **BATCH**	Batch ID: **42397**					Analysis Date: **12/21/2023**		SeqNo: **1848382**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	728	10.0	1,000	0	72.8	70	130				

Sample ID: **2312365-002AMSD**	SampType: **MSD**			Units: **µg/L**		Prep Date: **12/19/2023**		RunNo: **88509**		
Client ID: **BATCH**	Batch ID: **42397**					Analysis Date: **12/21/2023**		SeqNo: **1848383**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	926	10.0	1,000	0	92.6	70	130	728.2	24.0	30	

Sample ID: **CCV-42397B**	SampType: **CCV**			Units: **µg/L**		Prep Date: **12/21/2023**		RunNo: **88509**		
Client ID: **CCV**	Batch ID: **42397**					Analysis Date: **12/21/2023**		SeqNo: **1848393**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,010	10.0	1,000	0	101	90	110				

Sample ID: **CCB-42397B**	SampType: **CCB**			Units: **µg/L**		Prep Date: **12/21/2023**		RunNo: **88509**		
Client ID: **CCB**	Batch ID: **42397**					Analysis Date: **12/21/2023**		SeqNo: **1848394**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **2312350-001AMS**	SampType: **MS**			Units: **µg/L**		Prep Date: **12/19/2023**		RunNo: **88509**		
Client ID: **BATCH**	Batch ID: **42397**					Analysis Date: **12/21/2023**		SeqNo: **1848396**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	865	10.0	1,000	34.80	83.1	70	130				

Work Order: 2312339
CLIENT: Friedman & Bruya
Project: 312249

QC SUMMARY REPORT

Total Metals by EPA Method 200.8

Sample ID: **CCV-42397C**	SampType: **CCV**			Units: **µg/L**		Prep Date: **12/21/2023**		RunNo: **88509**		
Client ID: **CCV**	Batch ID: **42397**					Analysis Date: **12/21/2023**		SeqNo: **1848405**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	998	10.0	1,000	0	99.8	90	110				

Sample ID: **CCB-42397C**	SampType: **CCB**			Units: **µg/L**		Prep Date: **12/21/2023**		RunNo: **88509**		
Client ID: **CCB**	Batch ID: **42397**					Analysis Date: **12/21/2023**		SeqNo: **1848406**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **CCV-42397D**	SampType: **CCV**			Units: **µg/L**		Prep Date: **12/21/2023**		RunNo: **88509**		
Client ID: **CCV**	Batch ID: **42397**					Analysis Date: **12/21/2023**		SeqNo: **1848412**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	986	10.0	1,000	0	98.6	90	110				

Sample ID: **CCB-42397D**	SampType: **CCB**			Units: **µg/L**		Prep Date: **12/21/2023**		RunNo: **88509**		
Client ID: **CCB**	Batch ID: **42397**					Analysis Date: **12/21/2023**		SeqNo: **1848413**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **LCS-42397**	SampType: **LCS**			Units: **µg/L**		Prep Date: **12/19/2023**		RunNo: **88509**		
Client ID: **LCSW**	Batch ID: **42397**					Analysis Date: **12/21/2023**		SeqNo: **1848471**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,020	10.0	1,000	0	102	85	115				

Fremont Analytical
An Alliance Technical Group Company

Sample Log-In Check List

Client Name:	FB	Work Order Number:	2312339
Logged by:	Morgan Wilson	Date Received:	12/14/2023 10:36:00 AM

Chain of Custody

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

Log In

3.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes ☐	No ☐	Not Present ☑
4.	Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
5.	Were all items received at a temperature of >2°C to 6°C *	Yes ☑	No ☐	NA ☐
6.	Sample(s) in proper container(s)?	Yes ☑	No ☐	
7.	Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
8.	Are samples properly preserved?	Yes ☑	No ☐	
9.	Was preservative added to bottles?	Yes ☑	No ☐	NA ☐ HCL
10.	Is there headspace in the VOA vials?	Yes ☐	No ☐	NA ☑
11.	Did all samples containers arrive in good condition(unbroken)?	Yes ☑	No ☐	
12.	Does paperwork match bottle labels?	Yes ☑	No ☐	
13.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
14.	Is it clear what analyses were requested?	Yes ☑	No ☐	
15.	Were all hold times (except field parameters, pH e.g.) able to be met?	Yes ☑	No ☐	

Special Handling (if applicable)

16. 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:			

17. Additional remarks:

Item Information

Item #	Temp °C
Sample	5.2

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

SUBCONTRACT SAMPLE CHAIN OF CUSTODY

23L2991

Send Report To Michael Erdahl
Company Friedman and Bruya, Inc.
Address 5500 4th Ave S
City, State, ZIP Seattle, WA 98108
Phone # (206) 285-8282 merdahl@friedmanandbruya.com

SUBCONTRACTER: Fremont

PROJECT NAME/NO.	PO #
312249	D-594

REMARKS: TIER IV, EIM

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: total aluminum	dissolved aluminum	ferrous iron	ferrous iron	dissolved gases	TOC					Notes
CTMW-14-1223		12/13/2023	1415	water	3	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	12/14/23	0735
Received by:	Ali Miller	FAI	12-14-23	1036
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

December 29, 2023

Trevor Louviere, Project Manager
Dalton Olmsted Fuglevand
1001 SW Klickitat Way, Suite 200B
Seattle, WA 98134

Dear Mr Louviere:

Included are the results from the testing of material submitted on December 14, 2023 from the TWAAFA-001, F&BI 312260 project. There are 20 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: Anthony Cerruti, Tasya Gray
DOF1229R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on December 14, 2023 by Friedman & Bruya, Inc. from the Dalton Olmsted Fuglevand TWAAFA-001, F&BI 312260 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Dalton Olmsted Fuglevand
312260 -01	CCW-3C-1223
312260 -02	CCW-3A-1223
312260 -03	CCW-3B-1223
312260 -04	CCW-2C-1223

The samples were sent to Fremont Analytical for ferrous iron, total aluminum, and dissolved aluminum analyses. The report is enclosed.

All quality control requirements were acceptable.

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	CCW-3C-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/14/23	Project:	TWAAFA-001, F&BI 312260
Date Extracted:	12/18/23	Lab ID:	312260-01
Date Analyzed:	12/21/23	Data File:	312260-01.238
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	1.56
Copper	0.484
Manganese	868

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	CCW-3C-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/14/23	Project:	TWAAFA-001, F&BI 312260
Date Extracted:	12/18/23	Lab ID:	312260-01 x5
Date Analyzed:	12/22/23	Data File:	312260-01 x5.157
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Iron	8,180

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	CCW-3A-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/14/23	Project:	TWAAFA-001, F&BI 312260
Date Extracted:	12/18/23	Lab ID:	312260-02
Date Analyzed:	12/21/23	Data File:	312260-02.239
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	67.9
Copper	0.913
Lead	<1
Manganese	81.6
Nickel	148
Zinc	433

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	CCW-3A-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/14/23	Project:	TWAAFA-001, F&BI 312260
Date Extracted:	12/18/23	Lab ID:	312260-02 x5
Date Analyzed:	12/22/23	Data File:	312260-02 x5.158
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Iron	15,000

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	CCW-3B-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/14/23	Project:	TWAAFA-001, F&BI 312260
Date Extracted:	12/18/23	Lab ID:	312260-03
Date Analyzed:	12/21/23	Data File:	312260-03.240
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	3.08
Copper	<0.48
Iron	4,990
Manganese	959

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	CCW-2C-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/14/23	Project:	TWAAFA-001, F&BI 312260
Date Extracted:	12/18/23	Lab ID:	312260-04
Date Analyzed:	12/21/23	Data File:	312260-04.241
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	2.95
Copper	0.576
Manganese	145

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	CCW-2C-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/14/23	Project:	TWAAFA-001, F&BI 312260
Date Extracted:	12/18/23	Lab ID:	312260-04 x5
Date Analyzed:	12/22/23	Data File:	312260-04 x5.160
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Iron	7,420

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Dalton Olmsted Fuglevand
Date Received:	Not Applicable	Project:	TWAAFA-001, F&BI 312260
Date Extracted:	12/18/23	Lab ID:	I3-1003 mb
Date Analyzed:	12/18/23	Data File:	I3-1003 mb.143
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Copper	<0.48
Iron	<50
Lead	<1
Manganese	<1
Nickel	<1
Zinc	<5

Analysis For Total Metals By EPA Method 6020B

Client ID:	CCW-3C-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/14/23	Project:	TWAAFA-001, F&BI 312260
Date Extracted:	12/18/23	Lab ID:	312260-01
Date Analyzed:	12/21/23	Data File:	312260-01.294
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	1.50
Manganese	978

Analysis For Total Metals By EPA Method 6020B

Client ID:	CCW-3C-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/14/23	Project:	TWAAFA-001, F&BI 312260
Date Extracted:	12/18/23	Lab ID:	312260-01 x5
Date Analyzed:	12/22/23	Data File:	312260-01 x5.161
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Copper	<2.4
Iron	8,750

Analysis For Total Metals By EPA Method 6020B

Client ID:	CCW-3A-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/14/23	Project:	TWAAFA-001, F&BI 312260
Date Extracted:	12/18/23	Lab ID:	312260-02 x5
Date Analyzed:	12/22/23	Data File:	312260-02 x5.162
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	94.3
Copper	4.78
Iron	19,500
Lead	33.4
Manganese	87.5
Nickel	175
Zinc	583

Analysis For Total Metals By EPA Method 6020B

Client ID:	CCW-3B-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/14/23	Project:	TWAAFA-001, F&BI 312260
Date Extracted:	12/18/23	Lab ID:	312260-03
Date Analyzed:	12/21/23	Data File:	312260-03.296
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	3.10

Analysis For Total Metals By EPA Method 6020B

Client ID:	CCW-3B-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/14/23	Project:	TWAAFA-001, F&BI 312260
Date Extracted:	12/18/23	Lab ID:	312260-03 x5
Date Analyzed:	12/22/23	Data File:	312260-03 x5.163
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Copper	<2.4
Iron	4,490
Manganese	965

Analysis For Total Metals By EPA Method 6020B

Client ID:	CCW-2C-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/14/23	Project:	TWAAFA-001, F&BI 312260
Date Extracted:	12/18/23	Lab ID:	312260-04
Date Analyzed:	12/21/23	Data File:	312260-04.297
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	2.80
Manganese	156

Analysis For Total Metals By EPA Method 6020B

Client ID:	CCW-2C-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/14/23	Project:	TWAAFA-001, F&BI 312260
Date Extracted:	12/18/23	Lab ID:	312260-04 x5
Date Analyzed:	12/22/23	Data File:	312260-04 x5.164
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Copper	<2.4
Iron	7,620

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Dalton Olmsted Fuglevand
Date Received:	Not Applicable	Project:	TWAAFA-001, F&BI 312260
Date Extracted:	12/18/23	Lab ID:	I3-1004 mb
Date Analyzed:	12/18/23	Data File:	I3-1004 mb.145
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Copper	<0.48
Iron	<50
Lead	<1
Manganese	<1
Nickel	<1
Zinc	<5

Date of Report: 12/29/23
Date Received: 12/14/23
Project: TWAAFA-001, F&BI 312260

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

Laboratory Code: 312247-07 (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	2.13	105 b	104 b	75-125	1 b
Copper	ug/L (ppb)	20	<5	85	85	75-125	0
Iron	ug/L (ppb)	100	2,320	84 b	125 b	75-125	39 b
Lead	ug/L (ppb)	10	<1	80	79	75-125	1
Manganese	ug/L (ppb)	20	141	84 b	99 b	75-125	16 b
Nickel	ug/L (ppb)	20	3.29	89	88	75-125	1
Zinc	ug/L (ppb)	50	<5	92	93	75-125	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	94	80-120
Copper	ug/L (ppb)	20	94	80-120
Iron	ug/L (ppb)	100	100	80-120
Lead	ug/L (ppb)	10	91	80-120
Manganese	ug/L (ppb)	20	87	80-120
Nickel	ug/L (ppb)	20	94	80-120
Zinc	ug/L (ppb)	50	94	80-120

Date of Report: 12/29/23
Date Received: 12/14/23
Project: TWAAFA-001, F&BI 312260

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

Laboratory Code: 312247-07 (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	2.41	105 b	103 b	75-125	2 b
Copper	ug/L (ppb)	20	<5	83	81	75-125	2
Iron	ug/L (ppb)	100	2,950	88 b	0 b	75-125	200 b
Lead	ug/L (ppb)	10	<1	78	76	75-125	3
Manganese	ug/L (ppb)	20	147	89 b	78 b	75-125	13 b
Nickel	ug/L (ppb)	20	3.28	88	84	75-125	5
Zinc	ug/L (ppb)	50	<5	91	89	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
Copper	ug/L (ppb)	20	95	80-120
Iron	ug/L (ppb)	100	96	80-120
Lead	ug/L (ppb)	10	94	80-120
Manganese	ug/L (ppb)	20	89	80-120
Nickel	ug/L (ppb)	20	97	80-120
Zinc	ug/L (ppb)	50	97	80-120

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, biased low; or, the calibration results for the analyte were outside of acceptance criteria, biased high, with a detection for the analyte in the sample. 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 standard reporting limit. 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.

k – The calibration results for the analyte were outside of acceptance criteria, biased high, and the analyte was not detected in the sample.

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

12/14/23

Page # 4 of 1

312260

Report To: Anthony Cerruti / Trevor Louviere
cc: Tasya Gray

Company DOF

Address 1001 SW Klickitat Way

City, State, ZIP Seattle, WA 98134

Phone 215-767-7749 Email acerruti@dofnw.com

SAMPLERS (*signature*) EDS

PROJECT NAME: TWAAFA

PO # TWAAFA-001

REMARKS
Dissolved metals samples field filtered at 0.45 micron before analysis
Project Specific RLs - (Yes) / No

INVOICE TO: DOF

TURNAROUND TIME
■ Standard Turnaround
__ RUSH _____
Rush charges authorized by:

SAMPLE DISPOSAL
■ Dispose after 30 days
Archive Samples
Other _____

ANALYSES REQUESTED

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Matrix	# of Bottles	Total Metals 6020B (As, Cr, Cu, Mn, Ni, Pb, Zn)	Dissolved Metals 6020B (As, Cr, Cu, Mn, Ni, Pb, Zn)	Total Mercury 1631E	Dissolved Mercury 1631E	Total Metals (Al, Fe)	Dissolved Metals (Al, Fe)	Ferrous Iron			MS/MSD Collected? (Y/N)	Notes
CCW-3C-1223	01 A-C	12/14/23	0930	W	3	X	X			X	X	X				Tot/Diss Metals: Al, As, Cu, Fe, Mn
CCW-3A-1223	02	12/14/23	1005	W	3	X	X			X	X	X				Tot/Diss Metals: Al, As, Cu, Fe, Mn, Ni, Zn
CCW-3B-1223	03	12/14/23	1040	W	3	X	X			X	X	X				Tot/Diss Metals: Al, As, Cu, Fe, Mn
CCW-2C-1223	04	12/14/23	1140	W	3	X	X			X	X	X				Tot/Diss Metals: Al, As, Cu, Fe, Mn

EDS

Samples received at 2 °C

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: EDS	Elliott Scheumann	DOF	12/14/23	1150
Received by: NG	Tasya Gray	DOF	12/14/23	1150
Relinquished by: NG	Tasya Gray	DOF	12/14/23	1302
Received by: Wesley Ewd	Wesley Ewd	FBI	12/14/23	1302

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

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: 312260
Work Order Number: 2312350

December 21, 2023

Attention Michael Erdahl:

Fremont Analytical, Inc. received 4 sample(s) on 12/14/2023 for the analyses presented in the following report.

Dissolved Metals by EPA Method 200.8
Ferrous Iron by SM3500-Fe B
Total Metals by EPA Method 200.8

This report consists of the following:

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

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

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes
Project Manager

Date: *12/21/2023*

CLIENT: Friedman & Bruya
Project: 312260
Work Order: 2312350

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2312350-001	CCW-3C-1223	12/14/2023 9:30 AM	12/14/2023 2:15 PM
2312350-002	CCW-3A-1223	12/14/2023 10:05 AM	12/14/2023 2:15 PM
2312350-003	CCW-3B-1223	12/14/2023 10:40 AM	12/14/2023 2:15 PM
2312350-004	CCW-2C-1223	12/14/2023 11:40 AM	12/14/2023 2:15 PM

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

Case Narrative

WO#: **2312350**
Date: **12/21/2023**

CLIENT: Friedman & Bruya
Project: 312260

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: 312260

Lab ID: 2312350-001 **Collection Date:** 12/14/2023 9:30:00 AM
Client Sample ID: **CCW-3C-1223** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 42413		Analyst: SLL
Aluminum	ND	10.0		µg/L	1	12/21/2023 11:45:00 AM
Total Metals by EPA Method 200.8				Batch ID: 42397		Analyst: SLL
Aluminum	34.8	10.0		µg/L	1	12/21/2023 2:43:00 PM
Ferrous Iron by SM3500-Fe B				Batch ID: R88336		Analyst: SLL
Ferrous Iron	3.24	0.750	D	mg/L	5	12/14/2023 6:10:01 PM

Lab ID: 2312350-002 **Collection Date:** 12/14/2023 10:05:00 AM
Client Sample ID: **CCW-3A-1223** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 42413		Analyst: SLL
Aluminum	ND	10.0		µg/L	1	12/21/2023 11:48:00 AM
Total Metals by EPA Method 200.8				Batch ID: 42397		Analyst: SLL
Aluminum	49.0	10.0		µg/L	1	12/21/2023 2:47:00 PM
Ferrous Iron by SM3500-Fe B				Batch ID: R88336		Analyst: SLL
Ferrous Iron	9.08	3.75	D	mg/L	25	12/14/2023 6:10:01 PM

CLIENT: Friedman & Bruya
Project: 312260

Lab ID: 2312350-003 **Collection Date:** 12/14/2023 10:40:00 AM
Client Sample ID: **CCW-3B-1223** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 42413		Analyst: SLL
Aluminum	ND	10.0		µg/L	1	12/21/2023 11:50:00 AM
Total Metals by EPA Method 200.8				Batch ID: 42397		Analyst: SLL
Aluminum	12.6	10.0		µg/L	1	12/21/2023 2:50:00 PM
Ferrous Iron by SM3500-Fe B				Batch ID: R88336		Analyst: SLL
Ferrous Iron	2.42	0.750	D	mg/L	5	12/14/2023 6:10:01 PM

Lab ID: 2312350-004 **Collection Date:** 12/14/2023 11:40:00 AM
Client Sample ID: **CCW-2C-1223** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 42413		Analyst: SLL
Aluminum	ND	10.0		µg/L	1	12/21/2023 11:53:00 AM
Total Metals by EPA Method 200.8				Batch ID: 42397		Analyst: SLL
Aluminum	11.5	10.0		µg/L	1	12/21/2023 2:52:00 PM
Ferrous Iron by SM3500-Fe B				Batch ID: R88336		Analyst: SLL
Ferrous Iron	1.98	0.750	D	mg/L	5	12/14/2023 6:10:01 PM

Work Order: 2312350
CLIENT: Friedman & Bruya
Project: 312260

QC SUMMARY REPORT

Ferrous Iron by SM3500-Fe B

Sample ID: **CCV-R88336A**	SampType: **CCV**			Units: **mg/L**		Prep Date: **12/14/2023**		RunNo: **88336**			
Client ID: **CCV**	Batch ID: **R88336**					Analysis Date: **12/14/2023**		SeqNo: **1844402**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.414	0.150	0.4000	0	104	85	115				

Sample ID: **MB-R88336**	SampType: **MBLK**			Units: **mg/L**		Prep Date: **12/14/2023**		RunNo: **88336**			
Client ID: **MBLKW**	Batch ID: **R88336**					Analysis Date: **12/14/2023**		SeqNo: **1844403**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	ND	0.150									

Sample ID: **LCS-R88336**	SampType: **LCS**			Units: **mg/L**		Prep Date: **12/14/2023**		RunNo: **88336**			
Client ID: **LCSW**	Batch ID: **R88336**					Analysis Date: **12/14/2023**		SeqNo: **1844404**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.417	0.150	0.4000	0	104	85	115				

Sample ID: **2312328-001CDUP**	SampType: **DUP**			Units: **mg/L**		Prep Date: **12/14/2023**		RunNo: **88336**			
Client ID: **BATCH**	Batch ID: **R88336**					Analysis Date: **12/14/2023**		SeqNo: **1844406**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.445	0.150						0.4084	8.50	20	

Sample ID: **2312328-001CMS**	SampType: **MS**			Units: **mg/L**		Prep Date: **12/14/2023**		RunNo: **88336**			
Client ID: **BATCH**	Batch ID: **R88336**					Analysis Date: **12/14/2023**		SeqNo: **1844407**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.910	0.150	0.4000	0.4084	125	70	130				

Work Order: 2312350
CLIENT: Friedman & Bruya
Project: 312260

QC SUMMARY REPORT

Ferrous Iron by SM3500-Fe B

Sample ID: **2312328-001CMSD**	SampType: **MSD**	Units: **mg/L**	Prep Date: **12/14/2023**	RunNo: **88336**
Client ID: **BATCH**	Batch ID: **R88336**		Analysis Date: **12/14/2023**	SeqNo: **1844408**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.925	0.150	0.4000	0.4084	129	70	130	0.9100	1.65	30	

Sample ID: **CCV-R88336B**	SampType: **CCV**	Units: **mg/L**	Prep Date: **12/14/2023**	RunNo: **88336**
Client ID: **CCV**	Batch ID: **R88336**		Analysis Date: **12/14/2023**	SeqNo: **1844412**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.427	0.150	0.4000	0	107	85	115				

Sample ID: **CCB-R88336B**	SampType: **CCB**	Units: **mg/L**	Prep Date: **12/14/2023**	RunNo: **88336**
Client ID: **CCB**	Batch ID: **R88336**		Analysis Date: **12/14/2023**	SeqNo: **1844413**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	ND	0.150									

Sample ID: **CCV-R88336C**	SampType: **CCV**	Units: **mg/L**	Prep Date: **12/14/2023**	RunNo: **88336**
Client ID: **CCV**	Batch ID: **R88336**		Analysis Date: **12/14/2023**	SeqNo: **1845060**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.448	0.150	0.4000	0	112	85	115				

Sample ID: **CCB-R88336C**	SampType: **CCB**	Units: **mg/L**	Prep Date: **12/14/2023**	RunNo: **88336**
Client ID: **CCB**	Batch ID: **R88336**		Analysis Date: **12/14/2023**	SeqNo: **1845068**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	ND	0.150									

Work Order: 2312350
CLIENT: Friedman & Bruya
Project: 312260

QC SUMMARY REPORT

Ferrous Iron by SM3500-Fe B

Sample ID: **CCV-R88336D**	SampType: **CCV**			Units: **mg/L**		Prep Date: **12/14/2023**			RunNo: **88336**		
Client ID: **CCV**	Batch ID: **R88336**					Analysis Date: **12/14/2023**			SeqNo: **1845066**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.433	0.150	0.4000	0	108	85	115				

Sample ID: **CCB-R88336D**	SampType: **CCB**			Units: **mg/L**		Prep Date: **12/14/2023**			RunNo: **88336**		
Client ID: **CCB**	Batch ID: **R88336**					Analysis Date: **12/14/2023**			SeqNo: **1845067**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	ND	0.150									

Work Order: 2312350
CLIENT: Friedman & Bruya
Project: 312260

QC SUMMARY REPORT

Dissolved Metals by EPA Method 200.8

Sample ID: **ICB**	SampType: **ICB**	Units: **µg/L**	Prep Date: **12/21/2023**	RunNo: **88496**
Client ID: **ICB**	Batch ID: **42413**		Analysis Date: **12/21/2023**	SeqNo: **1848083**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **ICV**	SampType: **ICV**	Units: **µg/L**	Prep Date: **12/21/2023**	RunNo: **88496**
Client ID: **ICV**	Batch ID: **42413**		Analysis Date: **12/21/2023**	SeqNo: **1848084**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,450	10.0	1,500	0	96.8	90	110				

Sample ID: **MB-42413**	SampType: **MBLK**	Units: **µg/L**	Prep Date: **12/21/2023**	RunNo: **88496**
Client ID: **MBLKW**	Batch ID: **42413**		Analysis Date: **12/21/2023**	SeqNo: **1848085**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **LCS-42413**	SampType: **LCS**	Units: **µg/L**	Prep Date: **12/21/2023**	RunNo: **88496**
Client ID: **LCSW**	Batch ID: **42413**		Analysis Date: **12/21/2023**	SeqNo: **1848086**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	906	10.0	1,000	0	90.6	85	115				

Sample ID: **2312341-007BDUP**	SampType: **DUP**	Units: **µg/L**	Prep Date: **12/21/2023**	RunNo: **88496**
Client ID: **BATCH**	Batch ID: **42413**		Analysis Date: **12/21/2023**	SeqNo: **1848088**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0						0		30	

Work Order: 2312350
CLIENT: Friedman & Bruya
Project: 312260

QC SUMMARY REPORT

Dissolved Metals by EPA Method 200.8

Sample ID: **2312341-007BMS**	SampType: **MS**			Units: **µg/L**		Prep Date: **12/21/2023**		RunNo: **88496**		
Client ID: **BATCH**	Batch ID: **42413**					Analysis Date: **12/21/2023**		SeqNo: **1848089**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,020	10.0	1,000	0	102	50	150				

Sample ID: **2312341-007BMSD**	SampType: **MSD**			Units: **µg/L**		Prep Date: **12/21/2023**		RunNo: **88496**		
Client ID: **BATCH**	Batch ID: **42413**					Analysis Date: **12/21/2023**		SeqNo: **1848090**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,170	10.0	1,000	0	117	50	150	1,022	13.2	30	

Sample ID: **CCV-42413A**	SampType: **CCV**			Units: **µg/L**		Prep Date: **12/21/2023**		RunNo: **88496**		
Client ID: **CCV**	Batch ID: **42413**					Analysis Date: **12/21/2023**		SeqNo: **1848092**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	993	10.0	1,000	0	99.3	90	110				

Sample ID: **CCB-42413A**	SampType: **CCB**			Units: **µg/L**		Prep Date: **12/21/2023**		RunNo: **88496**		
Client ID: **CCB**	Batch ID: **42413**					Analysis Date: **12/21/2023**		SeqNo: **1848093**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **CCV-42413B**	SampType: **CCV**			Units: **µg/L**		Prep Date: **12/21/2023**		RunNo: **88496**		
Client ID: **CCV**	Batch ID: **42413**					Analysis Date: **12/21/2023**		SeqNo: **1848104**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,020	10.0	1,000	0	102	90	110				

Work Order: 2312350
CLIENT: Friedman & Bruya
Project: 312260

QC SUMMARY REPORT

Dissolved Metals by EPA Method 200.8

Sample ID: **CCB-42413B**	SampType: **CCB**			Units: **µg/L**		Prep Date: **12/21/2023**		RunNo: **88496**		
Client ID: **CCB**	Batch ID: **42413**					Analysis Date: **12/21/2023**		SeqNo: **1848105**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **2312350-004BMS**	SampType: **MS**			Units: **µg/L**		Prep Date: **12/21/2023**		RunNo: **88496**		
Client ID: **CCW-2C-1223**	Batch ID: **42413**					Analysis Date: **12/21/2023**		SeqNo: **1848114**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,050	10.0	1,000	8.025	105	50	150				

Sample ID: **CCV-42413C**	SampType: **CCV**			Units: **µg/L**		Prep Date: **12/21/2023**		RunNo: **88496**		
Client ID: **CCV**	Batch ID: **42413**					Analysis Date: **12/21/2023**		SeqNo: **1848115**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,010	10.0	1,000	0	101	90	110				

Sample ID: **CCB-42413C**	SampType: **CCB**			Units: **µg/L**		Prep Date: **12/21/2023**		RunNo: **88496**		
Client ID: **CCB**	Batch ID: **42413**					Analysis Date: **12/21/2023**		SeqNo: **1848116**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Work Order: 2312350
CLIENT: Friedman & Bruya
Project: 312260

QC SUMMARY REPORT

Total Metals by EPA Method 200.8

Sample ID: **ICB**	SampType: **ICB**	Units: **µg/L**	Prep Date: **12/21/2023**	RunNo: **88509**
Client ID: **ICB**	Batch ID: **42397**		Analysis Date: **12/21/2023**	SeqNo: **1848375**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **ICV**	SampType: **ICV**	Units: **µg/L**	Prep Date: **12/21/2023**	RunNo: **88509**
Client ID: **ICV**	Batch ID: **42397**		Analysis Date: **12/21/2023**	SeqNo: **1848376**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,450	10.0	1,500	0	96.8	90	110				

Sample ID: **CCV-42397A**	SampType: **CCV**	Units: **µg/L**	Prep Date: **12/21/2023**	RunNo: **88509**
Client ID: **CCV**	Batch ID: **42397**		Analysis Date: **12/21/2023**	SeqNo: **1848377**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	986	10.0	1,000	0	98.6	90	110				

Sample ID: **CCB-42397A**	SampType: **CCB**	Units: **µg/L**	Prep Date: **12/21/2023**	RunNo: **88509**
Client ID: **CCB**	Batch ID: **42397**		Analysis Date: **12/21/2023**	SeqNo: **1848378**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **MB-42397**	SampType: **MBLK**	Units: **µg/L**	Prep Date: **12/19/2023**	RunNo: **88509**
Client ID: **MBLKW**	Batch ID: **42397**		Analysis Date: **12/21/2023**	SeqNo: **1848379**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Work Order: 2312350
CLIENT: Friedman & Bruya
Project: 312260

QC SUMMARY REPORT

Total Metals by EPA Method 200.8

Sample ID: **2312365-002AMS**	SampType: **MS**			Units: **µg/L**		Prep Date: **12/19/2023**		RunNo: **88509**		
Client ID: **BATCH**	Batch ID: **42397**					Analysis Date: **12/21/2023**		SeqNo: **1848382**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	728	10.0	1,000	0	72.8	70	130				

Sample ID: **2312365-002AMSD**	SampType: **MSD**			Units: **µg/L**		Prep Date: **12/19/2023**		RunNo: **88509**		
Client ID: **BATCH**	Batch ID: **42397**					Analysis Date: **12/21/2023**		SeqNo: **1848383**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	926	10.0	1,000	0	92.6	70	130	728.2	24.0	30	

Sample ID: **CCV-42397B**	SampType: **CCV**			Units: **µg/L**		Prep Date: **12/21/2023**		RunNo: **88509**		
Client ID: **CCV**	Batch ID: **42397**					Analysis Date: **12/21/2023**		SeqNo: **1848393**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,010	10.0	1,000	0	101	90	110				

Sample ID: **CCB-42397B**	SampType: **CCB**			Units: **µg/L**		Prep Date: **12/21/2023**		RunNo: **88509**		
Client ID: **CCB**	Batch ID: **42397**					Analysis Date: **12/21/2023**		SeqNo: **1848394**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **2312350-001AMS**	SampType: **MS**			Units: **µg/L**		Prep Date: **12/19/2023**		RunNo: **88509**		
Client ID: **CCW-3C-1223**	Batch ID: **42397**					Analysis Date: **12/21/2023**		SeqNo: **1848396**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	865	10.0	1,000	34.80	83.1	70	130				

Work Order: 2312350
CLIENT: Friedman & Bruya
Project: 312260

QC SUMMARY REPORT

Total Metals by EPA Method 200.8

Sample ID: **CCV-42397C**	SampType: **CCV**			Units: **µg/L**		Prep Date: **12/21/2023**		RunNo: **88509**		
Client ID: **CCV**	Batch ID: **42397**					Analysis Date: **12/21/2023**		SeqNo: **1848405**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	998	10.0	1,000	0	99.8	90	110				

Sample ID: **CCB-42397C**	SampType: **CCB**			Units: **µg/L**		Prep Date: **12/21/2023**		RunNo: **88509**		
Client ID: **CCB**	Batch ID: **42397**					Analysis Date: **12/21/2023**		SeqNo: **1848406**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **CCV-42397D**	SampType: **CCV**			Units: **µg/L**		Prep Date: **12/21/2023**		RunNo: **88509**		
Client ID: **CCV**	Batch ID: **42397**					Analysis Date: **12/21/2023**		SeqNo: **1848412**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	986	10.0	1,000	0	98.6	90	110				

Sample ID: **CCB-42397D**	SampType: **CCB**			Units: **µg/L**		Prep Date: **12/21/2023**		RunNo: **88509**		
Client ID: **CCB**	Batch ID: **42397**					Analysis Date: **12/21/2023**		SeqNo: **1848413**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Fremont Analytical
An Alliance Technical Group Company

Sample Log-In Check List

Client Name:	FB	Work Order Number:	2312350
Logged by:	Morgan Wilson	Date Received:	12/14/2023 2:15:00 PM

Chain of Custody

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

Log In

3.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes ☐	No ☐	Not Present ☑
4.	Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
5.	Were all items received at a temperature of >2°C to 6°C *	Yes ☑	No ☐	NA ☐
6.	Sample(s) in proper container(s)?	Yes ☑	No ☐	
7.	Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
8.	Are samples properly preserved?	Yes ☑	No ☐	
9.	Was preservative added to bottles?	Yes ☑	No ☐	NA ☐ HCL
10.	Is there headspace in the VOA vials?	Yes ☐	No ☐	NA ☑
11.	Did all samples containers arrive in good condition(unbroken)?	Yes ☑	No ☐	
12.	Does paperwork match bottle labels?	Yes ☑	No ☐	
13.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
14.	Is it clear what analyses were requested?	Yes ☑	No ☐	
15.	Were all hold times (except field parameters, pH e.g.) able to be met?	Yes ☑	No ☐	

Special Handling (if applicable)

16. 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:			

17. Additional remarks:

Item Information

Item #	Temp °C
Sample	0.8

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

SUBCONTRACT SAMPLE CHAIN OF CUSTODY

2312350

Send Report To Michael Erdahl
Company Friedman and Bruya, Inc.
Address 5500 4th Ave S
City, State, ZIP Seattle, WA 98108
Phone # (206) 285-8282 merdahl@friedmanandbruya.com

SUBCONTRACTER
Fremont

PROJECT NAME/NO.	PO #
312260	D-596

REMARKS
TIER IV, EIM

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: total aluminum	dissolved aluminum	ferrous iron	ferrous iron	dissolved gases	TOC					Notes
CCW-3C-1223		12/14/2023	930	water	3	x	x	x								
CCW-3A-1223		12/14/2023	1005	water	3	x	x	x								
CCW-3B-1223		12/14/2023	1040	water	3	x	x	x								
CCW-2C-1223		12/14/2023	1140	water	3	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	12/14/23	1323
Received by:		Nathan Kotter	FAI	12/14/23	1415
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

December 29, 2023

Trevor Louviere, Project Manager
Dalton Olmsted Fuglevand
1001 SW Klickitat Way, Suite 200B
Seattle, WA 98134

Dear Mr Louviere:

Included are the results from the testing of material submitted on December 14, 2023 from the TWAAFA-001, F&BI 312273 project. There are 19 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: Anthony Cerruti, Tasya Gray
DOF1229R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on December 14, 2023 by Friedman & Bruya, Inc. from the Dalton Olmsted Fuglevand TWAAFA-001, F&BI 312273 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Dalton Olmsted Fuglevand
312273 -01	CCW-2A-1223
312273 -02	CCW-2B-1223
312273 -03	TWA-9D-1223

The samples were sent to Fremont Analytical for ferrous iron, total aluminum, and dissolved aluminum analyses. The report is enclosed.

All quality control requirements were acceptable.

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	CCW-2A-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/14/23	Project:	TWAAFA-001, F&BI 312273
Date Extracted:	12/18/23	Lab ID:	312273-01
Date Analyzed:	12/19/23	Data File:	312273-01.286
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	2.09
Copper	0.669
Manganese	836

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	CCW-2A-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/14/23	Project:	TWAAFA-001, F&BI 312273
Date Extracted:	12/18/23	Lab ID:	312273-01 x50
Date Analyzed:	12/20/23	Data File:	312273-01 x50.075
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Iron	12,100

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	CCW-2B-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/14/23	Project:	TWAAFA-001, F&BI 312273
Date Extracted:	12/18/23	Lab ID:	312273-02
Date Analyzed:	12/19/23	Data File:	312273-02.266
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Copper	<0.6
Manganese	200

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	CCW-2B-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/14/23	Project:	TWAAFA-001, F&BI 312273
Date Extracted:	12/18/23	Lab ID:	312273-02 x5
Date Analyzed:	12/19/23	Data File:	312273-02 x5.251
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	1,150

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	CCW-2B-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/14/23	Project:	TWAAFA-001, F&BI 312273
Date Extracted:	12/18/23	Lab ID:	312273-02 x50
Date Analyzed:	12/20/23	Data File:	312273-02 x50.050
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Iron	4,180

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	TWA-9D-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/14/23	Project:	TWAAFA-001, F&BI 312273
Date Extracted:	12/18/23	Lab ID:	312273-03
Date Analyzed:	12/19/23	Data File:	312273-03.287
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Copper	1.10
Iron	461
Manganese	49.2

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	TWA-9D-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/14/23	Project:	TWAAFA-001, F&BI 312273
Date Extracted:	12/18/23	Lab ID:	312273-03 x5
Date Analyzed:	12/19/23	Data File:	312273-03 x5.252
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	15.6

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Dalton Olmsted Fuglevand
Date Received:	Not Applicable	Project:	TWAAFA-001, F&BI 312273
Date Extracted:	12/18/23	Lab ID:	I3-1001 mb
Date Analyzed:	12/18/23	Data File:	I3-1001 mb.051
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Copper	<0.6
Iron	<50
Manganese	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	CCW-2A-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/14/23	Project:	TWAAFA-001, F&BI 312273
Date Extracted:	12/18/23	Lab ID:	312273-01
Date Analyzed:	12/19/23	Data File:	312273-01.290
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	4.88
Copper	7.59
Manganese	883

Analysis For Total Metals By EPA Method 6020B

Client ID:	CCW-2A-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/14/23	Project:	TWAAFA-001, F&BI 312273
Date Extracted:	12/18/23	Lab ID:	312273-01 x100
Date Analyzed:	12/20/23	Data File:	312273-01 x100.051
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Iron	14,000

Analysis For Total Metals By EPA Method 6020B

Client ID:	CCW-2B-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/14/23	Project:	TWAAFA-001, F&BI 312273
Date Extracted:	12/18/23	Lab ID:	312273-02
Date Analyzed:	12/19/23	Data File:	312273-02.279
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Copper	0.730
Manganese	211

Analysis For Total Metals By EPA Method 6020B

Client ID:	CCW-2B-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/14/23	Project:	TWAAFA-001, F&BI 312273
Date Extracted:	12/18/23	Lab ID:	312273-02 x50
Date Analyzed:	12/20/23	Data File:	312273-02 x50.052
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	1,140
Iron	4,430

Analysis For Total Metals By EPA Method 6020B

Client ID:	TWA-9D-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/14/23	Project:	TWAAFA-001, F&BI 312273
Date Extracted:	12/18/23	Lab ID:	312273-03 x4
Date Analyzed:	12/20/23	Data File:	312273-03 x4.060
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Copper	<2.4

Analysis For Total Metals By EPA Method 6020B

Client ID:	TWA-9D-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/14/23	Project:	TWAAFA-001, F&BI 312273
Date Extracted:	12/18/23	Lab ID:	312273-03 x10
Date Analyzed:	12/19/23	Data File:	312273-03 x10.137
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	11.7
Iron	806
Manganese	63.1

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Dalton Olmsted Fuglevand
Date Received:	Not Applicable	Project:	TWAAFA-001, F&BI 312273
Date Extracted:	12/18/23	Lab ID:	I3-999 mb
Date Analyzed:	12/18/23	Data File:	I3-999 mb.049
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Copper	<0.6
Iron	<50
Manganese	<1

Date of Report: 12/29/23
Date Received: 12/14/23
Project: TWAAFA-001, F&BI 312273

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

Laboratory Code: 312273-02 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	1,110	304 b	625 b	75-125	69 b
Copper	ug/L (ppb)	20	<50	89	87	75-125	2
Iron	ug/L (ppb)	100	4,770	133 b	210 b	75-125	45 b
Manganese	ug/L (ppb)	20	188	103 b	110 b	75-125	7 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	87	80-120
Copper	ug/L (ppb)	20	91	80-120
Iron	ug/L (ppb)	100	87	80-120
Manganese	ug/L (ppb)	20	83	80-120

Date of Report: 12/29/23
Date Received: 12/14/23
Project: TWAAFA-001, F&BI 312273

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

Laboratory Code: 312273-02 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	1,200	0 b	0 b	75-125	nm
Copper	ug/L (ppb)	20	<50	91	90	75-125	1
Iron	ug/L (ppb)	100	5,320	0 b	0 b	75-125	nm
Manganese	ug/L (ppb)	20	205	13 b	37 b	75-125	96 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	87	80-120
Copper	ug/L (ppb)	20	91	80-120
Iron	ug/L (ppb)	100	89	80-120
Manganese	ug/L (ppb)	20	88	80-120

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, biased low; or, the calibration results for the analyte were outside of acceptance criteria, biased high, with a detection for the analyte in the sample. 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 standard reporting limit. 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.

k – The calibration results for the analyte were outside of acceptance criteria, biased high, and the analyte was not detected in the sample.

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.

312273

SAMPLE CHAIN OF CUSTODY

12/14/23

23

Page # 1 of 1

Report To: Anthony Cerruti / Trevor Louviere
cc: Tasya Gray

Company DOF

Address 1001 SW Klickitat Way

City, State, ZIP Seattle, WA 98134

Phone 215-767-7749 Email acerruti@dofnw.com

SAMPLERS (*signature*)

PROJECT NAME: TWAAFA

PO # TWAAFA-001

REMARKS *
Dissolved metals samples field filtered at 0.45 micron before analysis
Project Specific RLs - (Yes) / No

INVOICE TO: DOF

TURNAROUND TIME
■ Standard Turnaround
__ RUSH _____
Rush charges authorized by:

SAMPLE DISPOSAL
■ Dispose after 30 days
Archive Samples
Other _____

ANALYSES REQUESTED

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Matrix	# of Bottles	Total Metals 6020B (As, Cr, Cu, Mn, Ni, Pb, Zn)	Dissolved Metals 6020B * (As, Cr, Cu, Mn, Ni, Pb, Zn)	Total Mercury 1631E	Dissolved Mercury 1631E	Total Metals (Al, Fe)	Dissolved Metals (Al, Fe) *	Ferrous Iron				MS/MSD Collected? (Y/N)	Notes
CCW-2A-1223	01 A-C	12/14/23	1245	W	3	X	X			X	X	X				N	Tot/Diss Metals: Al, As, Cu, Fe, Mn
CCW-2B-1223	01 A-I	12/14/23	1355	W	9	X	X			X	X	X				Y	Tot/Diss Metals: Al, As, Cu, Fe, Mn
TWA-9D-1223	03 A-C	12/14/23	1520	W	3	X	X			X	X	X				N	Tot/Diss Metals: Al, As, Cu, Fe, Mn

Samples received at 4 °C

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Michael Wright	Clean Earth	12/14/23	16:50
Received by:			F&B	12/14/23	1651
Relinquished by:					
Received by:					

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

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: 312273
Work Order Number: 2312365

December 27, 2023

Attention Michael Erdahl:

Fremont Analytical, Inc. received 3 sample(s) on 12/15/2023 for the analyses presented in the following report.

Dissolved Metals by EPA Method 200.8
Ferrous Iron by SM3500-Fe B
Total Metals by EPA Method 200.8

This report consists of the following:

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

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

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes
Project Manager

Date: *12/27/2023*

CLIENT: Friedman & Bruya
Project: 312273
Work Order: 2312365

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2312365-001	CCMW-2A-1223	12/14/2023 12:45 PM	12/15/2023 11:45 AM
2312365-002	CCMW-2B-1223	12/14/2023 1:55 PM	12/15/2023 11:45 AM
2312365-003	TWA-9D-1223	12/14/2023 3:20 PM	12/15/2023 11:45 AM

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

Original

Case Narrative

WO#: **2312365**
Date: **12/27/2023**

CLIENT: Friedman & Bruya
Project: 312273

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.

Notations:

In the original Ferrous Iron run, sample "TWA-9D-1223" was inadvertently used for the MS/MSD in place of "CCMW-2B-1223". To correct for the issue, "CCMW-2B-1223" was used for the MS/MSD in the following run and the results are presented in this report.

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: **2312365**
Date Reported: **12/27/2023**

Client: Friedman & Bruya
Collection Date: 12/14/2023 12:45:00 PM
Project: 312273
Lab ID: 2312365-001
Matrix: Water
Client Sample ID: **CCMW-2A-1223**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 42426		Analyst: SS
Aluminum	35.3	10.0		µg/L	1	12/22/2023 7:33:00 PM
Total Metals by EPA Method 200.8				Batch ID: 42397		Analyst: SLL
Aluminum	41.7	10.0		µg/L	1	12/21/2023 2:26:00 PM
Ferrous Iron by SM3500-Fe B				Batch ID: R88407		Analyst: FG
Ferrous Iron	10.7	3.75	D	mg/L	25	12/15/2023 12:17:59 PM

Analytical Report

Work Order: **2312365**
Date Reported: **12/27/2023**

Client: Friedman & Bruya
Collection Date: 12/14/2023 1:55:00 PM
Project: 312273
Lab ID: 2312365-002
Matrix: Water
Client Sample ID: **CCMW-2B-1223**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 42426		Analyst: SS
Aluminum	ND	10.0		µg/L	1	12/22/2023 7:24:00 PM
Total Metals by EPA Method 200.8				Batch ID: 42397		Analyst: SLL
Aluminum	ND	10.0		µg/L	1	12/21/2023 2:19:00 PM
Ferrous Iron by SM3500-Fe B				Batch ID: R88407		Analyst: FG
Ferrous Iron	0.747	0.150		mg/L	1	12/15/2023 12:17:59 PM

Analytical Report

Work Order: **2312365**
Date Reported: **12/27/2023**

Client: Friedman & Bruya
Collection Date: 12/14/2023 3:20:00 PM
Project: 312273
Lab ID: 2312365-003
Matrix: Water
Client Sample ID: **TWA-9D-1223**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 42426		Analyst: SS
Aluminum	ND	10.0		µg/L	1	12/22/2023 7:35:00 PM
Total Metals by EPA Method 200.8				Batch ID: 42397		Analyst: SLL
Aluminum	ND	10.0		µg/L	1	12/21/2023 2:28:00 PM
Ferrous Iron by SM3500-Fe B				Batch ID: R88407		Analyst: FG
Ferrous Iron	0.399	0.150		mg/L	1	12/15/2023 12:17:59 PM

Work Order: 2312365
CLIENT: Friedman & Bruya
Project: 312273

QC SUMMARY REPORT

Ferrous Iron by SM3500-Fe B

Sample ID: **CCV-R88407A**	SampType: **CCV**			Units: **mg/L**		Prep Date: **12/15/2023**		RunNo: **88407**		
Client ID: **CCV**	Batch ID: **R88407**					Analysis Date: **12/15/2023**		SeqNo: **1846072**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.439	0.150	0.4000	0	110	85	115				

Sample ID: **CCB-R88407**	SampType: **CCB**			Units: **mg/L**		Prep Date: **12/15/2023**		RunNo: **88407**		
Client ID: **CCB**	Batch ID: **R88407**					Analysis Date: **12/15/2023**		SeqNo: **1846073**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	ND	0.150									

Sample ID: **LCS-R88407**	SampType: **LCS**			Units: **mg/L**		Prep Date: **12/15/2023**		RunNo: **88407**		
Client ID: **LCSW**	Batch ID: **R88407**					Analysis Date: **12/15/2023**		SeqNo: **1846074**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.454	0.150	0.4000	0	113	85	115				

Sample ID: **MB-R88407**	SampType: **MBLK**			Units: **mg/L**		Prep Date: **12/15/2023**		RunNo: **88407**		
Client ID: **MBLKW**	Batch ID: **R88407**					Analysis Date: **12/15/2023**		SeqNo: **1846075**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	ND	0.150									

Sample ID: **2312365-003CDUP**	SampType: **DUP**			Units: **mg/L**		Prep Date: **12/15/2023**		RunNo: **88407**		
Client ID: **TWA-9D-1223**	Batch ID: **R88407**					Analysis Date: **12/15/2023**		SeqNo: **1846079**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.396	0.150						0.3993	0.760	20	

Work Order: 2312365
CLIENT: Friedman & Bruya
Project: 312273

QC SUMMARY REPORT

Ferrous Iron by SM3500-Fe B

Sample ID: **2312365-003CMS**	SampType: **MS**	Units: **mg/L**	Prep Date: **12/15/2023**	RunNo: **88407**
Client ID: **TWA-9D-1223**	Batch ID: **R88407**		Analysis Date: **12/15/2023**	SeqNo: **1846080**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.789	0.150	0.4000	0.3993	97.5	70	130				

Sample ID: **2312365-003CMSD**	SampType: **MSD**	Units: **mg/L**	Prep Date: **12/15/2023**	RunNo: **88407**
Client ID: **TWA-9D-1223**	Batch ID: **R88407**		Analysis Date: **12/15/2023**	SeqNo: **1846081**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.934	0.150	0.4000	0.3993	134	70	130	0.7892	16.8	30	S

NOTES:
S - Spiked amount was low relative to sample concentration. Outlying spike recoveries may be expected.

Sample ID: **CCV-R88407B**	SampType: **CCV**	Units: **mg/L**	Prep Date: **12/15/2023**	RunNo: **88407**
Client ID: **CCV**	Batch ID: **R88407**		Analysis Date: **12/15/2023**	SeqNo: **1846236**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.433	0.150	0.4000	0	108	85	115				

Sample ID: **CCB-R88407B**	SampType: **CCB**	Units: **mg/L**	Prep Date: **12/15/2023**	RunNo: **88407**
Client ID: **CCB**	Batch ID: **R88407**		Analysis Date: **12/15/2023**	SeqNo: **1846237**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	ND	0.150									

Sample ID: **CCV-R88407C**	SampType: **CCV**	Units: **mg/L**	Prep Date: **12/15/2023**	RunNo: **88407**
Client ID: **CCV**	Batch ID: **R88407**		Analysis Date: **12/15/2023**	SeqNo: **1846241**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.405	0.150	0.4000	0	101	85	115				

Work Order: 2312365
CLIENT: Friedman & Bruya
Project: 312273

QC SUMMARY REPORT

Ferrous Iron by SM3500-Fe B

Sample ID: **CCB-R88407C**	SampType: **CCB**			Units: **mg/L**		Prep Date: **12/15/2023**		RunNo: **88407**	
Client ID: **CCB**	Batch ID: **R88407**					Analysis Date: **12/15/2023**		SeqNo: **1846242**	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	ND	0.150									

Sample ID: **CCV-R88521**	SampType: **CCV**			Units: **mg/L**		Prep Date: **12/18/2023**		RunNo: **88521**	
Client ID: **CCV**	Batch ID: **R88521**					Analysis Date: **12/18/2023**		SeqNo: **1848523**	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.417	0.150	0.4000	0	104	85	115				

Sample ID: **CCB-R88521**	SampType: **CCB**			Units: **mg/L**		Prep Date: **12/18/2023**		RunNo: **88521**	
Client ID: **CCB**	Batch ID: **R88521**					Analysis Date: **12/18/2023**		SeqNo: **1848524**	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	ND	0.150									

Sample ID: **LCS-R88521**	SampType: **LCS**			Units: **mg/L**		Prep Date: **12/18/2023**		RunNo: **88521**	
Client ID: **LCSW**	Batch ID: **R88521**					Analysis Date: **12/18/2023**		SeqNo: **1848525**	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.448	0.150	0.4000	0	112	85	115				

Sample ID: **MB-R88521**	SampType: **MBLK**			Units: **mg/L**		Prep Date: **12/18/2023**		RunNo: **88521**	
Client ID: **MBLKW**	Batch ID: **R88521**					Analysis Date: **12/18/2023**		SeqNo: **1848526**	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	ND	0.150									

Work Order: 2312365
CLIENT: Friedman & Bruya
Project: 312273

QC SUMMARY REPORT

Ferrous Iron by SM3500-Fe B

Sample ID: **2312396-002ADUP**	SampType: **DUP**	Units: **mg/L**	Prep Date: **12/18/2023**	RunNo: **88521**
Client ID: **BATCH**	Batch ID: **R88521**		Analysis Date: **12/18/2023**	SeqNo: **1848529**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.363	0.150						0.3721	2.47	20	H

Sample ID: **2312396-002AMS**	SampType: **MS**	Units: **mg/L**	Prep Date: **12/18/2023**	RunNo: **88521**
Client ID: **BATCH**	Batch ID: **R88521**		Analysis Date: **12/18/2023**	SeqNo: **1848530**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.798	0.150	0.4000	0.3721	107	70	130				H

Sample ID: **2312396-002AMSD**	SampType: **MSD**	Units: **mg/L**	Prep Date: **12/18/2023**	RunNo: **88521**
Client ID: **BATCH**	Batch ID: **R88521**		Analysis Date: **12/18/2023**	SeqNo: **1848531**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.777	0.150	0.4000	0.3721	101	70	130	0.7982	2.69	30	H

Sample ID: **CCV-R88521**	SampType: **CCV**	Units: **mg/L**	Prep Date: **12/18/2023**	RunNo: **88521**
Client ID: **CCV**	Batch ID: **R88521**		Analysis Date: **12/18/2023**	SeqNo: **1848533**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.457	0.150	0.4000	0	114	85	115				

Sample ID: **CCB-R88521**	SampType: **CCB**	Units: **mg/L**	Prep Date: **12/18/2023**	RunNo: **88521**
Client ID: **CCB**	Batch ID: **R88521**		Analysis Date: **12/18/2023**	SeqNo: **1848534**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	ND	0.150									

Work Order: 2312365
CLIENT: Friedman & Bruya
Project: 312273

QC SUMMARY REPORT

Ferrous Iron by SM3500-Fe B

Sample ID: **2312365-002CMS** SampType: **MS** Units: **mg/L** Prep Date: **12/18/2023** RunNo: **88521**
Client ID: **CCMW-2B-1223** Batch ID: **R88521** Analysis Date: **12/18/2023** SeqNo: **1848536**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.647	0.150	0.4000	0.5262	30.2	70	130				SH

NOTES:
S - Spiked amount was low relative to sample concentration. Outlying spike recoveries may be expected.

Sample ID: **2312365-002CMSD** SampType: **MSD** Units: **mg/L** Prep Date: **12/18/2023** RunNo: **88521**
Client ID: **CCMW-2B-1223** Batch ID: **R88521** Analysis Date: **12/18/2023** SeqNo: **1848537**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.659	0.150	0.4000	0.5262	33.2	70	130	0.6471	1.85	30	SH

NOTES:
S - Spiked amount was low relative to sample concentration. Outlying spike recoveries may be expected.

Sample ID: **CCV-R88521** SampType: **CCV** Units: **mg/L** Prep Date: **12/18/2023** RunNo: **88521**
Client ID: **CCV** Batch ID: **R88521** Analysis Date: **12/18/2023** SeqNo: **1848538**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.439	0.150	0.4000	0	110	85	115				

Sample ID: **CCB-R88521** SampType: **CCB** Units: **mg/L** Prep Date: **12/18/2023** RunNo: **88521**
Client ID: **CCB** Batch ID: **R88521** Analysis Date: **12/18/2023** SeqNo: **1848539**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	ND	0.150									

Work Order: 2312365
CLIENT: Friedman & Bruya
Project: 312273

QC SUMMARY REPORT

Dissolved Metals by EPA Method 200.8

Sample ID: **ICB**	SampType: **ICB**	Units: **µg/L**	Prep Date: **12/22/2023**	RunNo: **88568**
Client ID: **ICB**	Batch ID: **42426**		Analysis Date: **12/22/2023**	SeqNo: **1849551**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **ICV**	SampType: **ICV**	Units: **µg/L**	Prep Date: **12/22/2023**	RunNo: **88568**
Client ID: **ICV**	Batch ID: **42426**		Analysis Date: **12/22/2023**	SeqNo: **1849552**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,510	10.0	1,500	0	101	90	110				

Sample ID: **CCV-42526A**	SampType: **CCV**	Units: **µg/L**	Prep Date: **12/22/2023**	RunNo: **88568**
Client ID: **CCV**	Batch ID: **42426**		Analysis Date: **12/22/2023**	SeqNo: **1849555**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	996	10.0	1,000	0	99.6	90	110				

Sample ID: **CCB-42526A**	SampType: **CCB**	Units: **µg/L**	Prep Date: **12/22/2023**	RunNo: **88568**
Client ID: **CCB**	Batch ID: **42426**		Analysis Date: **12/22/2023**	SeqNo: **1849556**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **MB-42426**	SampType: **MBLK**	Units: **µg/L**	Prep Date: **12/22/2023**	RunNo: **88568**
Client ID: **MBLKW**	Batch ID: **42426**		Analysis Date: **12/22/2023**	SeqNo: **1849557**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Work Order: 2312365
CLIENT: Friedman & Bruya
Project: 312273

QC SUMMARY REPORT

Dissolved Metals by EPA Method 200.8

Sample ID: **LCS-42426**	SampType: **LCS**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88568**		
Client ID: **LCSW**	Batch ID: **42426**					Analysis Date: **12/22/2023**		SeqNo: **1849558**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,020	10.0	1,000	0	102	85	115				

Sample ID: **2312365-002BDUP**	SampType: **DUP**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88568**		
Client ID: **CCMW-2B-1223**	Batch ID: **42426**					Analysis Date: **12/22/2023**		SeqNo: **1849560**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0						0		30	

Sample ID: **2312365-002BMS**	SampType: **MS**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88568**		
Client ID: **CCMW-2B-1223**	Batch ID: **42426**					Analysis Date: **12/22/2023**		SeqNo: **1849561**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,030	10.0	1,000	0	103	50	150				

Sample ID: **2312365-002BMSD**	SampType: **MSD**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88568**		
Client ID: **CCMW-2B-1223**	Batch ID: **42426**					Analysis Date: **12/22/2023**		SeqNo: **1849562**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,040	10.0	1,000	0	104	50	150	1,032	0.643	30	

Sample ID: **CCV-42526B**	SampType: **CCV**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88568**		
Client ID: **CCV**	Batch ID: **42426**					Analysis Date: **12/22/2023**		SeqNo: **1849567**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,040	10.0	1,000	0	104	90	110				

Work Order: 2312365
CLIENT: Friedman & Bruya
Project: 312273

QC SUMMARY REPORT

Dissolved Metals by EPA Method 200.8

Sample ID: **CCB-42526B**	SampType: **CCB**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88568**		
Client ID: **CCB**	Batch ID: **42426**					Analysis Date: **12/22/2023**		SeqNo: **1849568**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **2312427-001CMS**	SampType: **MS**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88568**		
Client ID: **BATCH**	Batch ID: **42426**					Analysis Date: **12/22/2023**		SeqNo: **1849578**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,010	10.0	1,000	0	101	50	150				

Sample ID: **CCV-42526C**	SampType: **CCV**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88568**		
Client ID: **CCV**	Batch ID: **42426**					Analysis Date: **12/22/2023**		SeqNo: **1849579**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,010	10.0	1,000	0	101	90	110				

Sample ID: **CCB-42526C**	SampType: **CCB**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88568**		
Client ID: **CCB**	Batch ID: **42426**					Analysis Date: **12/22/2023**		SeqNo: **1849580**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **CCV-42526D**	SampType: **CCV**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88568**		
Client ID: **CCV**	Batch ID: **42426**					Analysis Date: **12/22/2023**		SeqNo: **1849694**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,010	10.0	1,000	0	101	90	110				

Work Order: 2312365
CLIENT: Friedman & Bruya
Project: 312273

QC SUMMARY REPORT

Dissolved Metals by EPA Method 200.8

Sample ID: **CCB-42526C**	SampType: **CCB**	Units: **µg/L**	Prep Date: **12/22/2023**	RunNo: **88568**	
Client ID: **CCB**	Batch ID: **42426**		Analysis Date: **12/22/2023**	SeqNo: **1849695**	

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Work Order: 2312365
CLIENT: Friedman & Bruya
Project: 312273

QC SUMMARY REPORT

Total Metals by EPA Method 200.8

Sample ID: **ICB**	SampType: **ICB**	Units: **µg/L**	Prep Date: **12/21/2023**	RunNo: **88509**
Client ID: **ICB**	Batch ID: **42397**		Analysis Date: **12/21/2023**	SeqNo: **1848375**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **ICV**	SampType: **ICV**	Units: **µg/L**	Prep Date: **12/21/2023**	RunNo: **88509**
Client ID: **ICV**	Batch ID: **42397**		Analysis Date: **12/21/2023**	SeqNo: **1848376**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,450	10.0	1,500	0	96.8	90	110				

Sample ID: **CCV-42397A**	SampType: **CCV**	Units: **µg/L**	Prep Date: **12/21/2023**	RunNo: **88509**
Client ID: **CCV**	Batch ID: **42397**		Analysis Date: **12/21/2023**	SeqNo: **1848377**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	986	10.0	1,000	0	98.6	90	110				

Sample ID: **CCB-42397A**	SampType: **CCB**	Units: **µg/L**	Prep Date: **12/21/2023**	RunNo: **88509**
Client ID: **CCB**	Batch ID: **42397**		Analysis Date: **12/21/2023**	SeqNo: **1848378**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **MB-42397**	SampType: **MBLK**	Units: **µg/L**	Prep Date: **12/19/2023**	RunNo: **88509**
Client ID: **MBLKW**	Batch ID: **42397**		Analysis Date: **12/21/2023**	SeqNo: **1848379**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Work Order: 2312365
CLIENT: Friedman & Bruya
Project: 312273

QC SUMMARY REPORT

Total Metals by EPA Method 200.8

Sample ID: **2312365-002AMS**	SampType: **MS**			Units: **µg/L**		Prep Date: **12/19/2023**		RunNo: **88509**		
Client ID: **CCMW-2B-1223**	Batch ID: **42397**					Analysis Date: **12/21/2023**		SeqNo: **1848382**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	728	10.0	1,000	0	72.8	70	130				

Sample ID: **2312365-002AMSD**	SampType: **MSD**			Units: **µg/L**		Prep Date: **12/19/2023**		RunNo: **88509**		
Client ID: **CCMW-2B-1223**	Batch ID: **42397**					Analysis Date: **12/21/2023**		SeqNo: **1848383**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	926	10.0	1,000	0	92.6	70	130	728.2	24.0	30	

Sample ID: **CCV-42397B**	SampType: **CCV**			Units: **µg/L**		Prep Date: **12/21/2023**		RunNo: **88509**		
Client ID: **CCV**	Batch ID: **42397**					Analysis Date: **12/21/2023**		SeqNo: **1848393**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,010	10.0	1,000	0	101	90	110				

Sample ID: **CCB-42397B**	SampType: **CCB**			Units: **µg/L**		Prep Date: **12/21/2023**		RunNo: **88509**		
Client ID: **CCB**	Batch ID: **42397**					Analysis Date: **12/21/2023**		SeqNo: **1848394**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **2312350-001AMS**	SampType: **MS**			Units: **µg/L**		Prep Date: **12/19/2023**		RunNo: **88509**		
Client ID: **BATCH**	Batch ID: **42397**					Analysis Date: **12/21/2023**		SeqNo: **1848396**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	865	10.0	1,000	34.80	83.1	70	130				

Work Order: 2312365
CLIENT: Friedman & Bruya
Project: 312273

QC SUMMARY REPORT

Total Metals by EPA Method 200.8

Sample ID: **CCV-42397C**	SampType: **CCV**			Units: **µg/L**		Prep Date: **12/21/2023**		RunNo: **88509**		
Client ID: **CCV**	Batch ID: **42397**					Analysis Date: **12/21/2023**		SeqNo: **1848405**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	998	10.0	1,000	0	99.8	90	110				

Sample ID: **CCB-42397C**	SampType: **CCB**			Units: **µg/L**		Prep Date: **12/21/2023**		RunNo: **88509**		
Client ID: **CCB**	Batch ID: **42397**					Analysis Date: **12/21/2023**		SeqNo: **1848406**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **CCV-42397D**	SampType: **CCV**			Units: **µg/L**		Prep Date: **12/21/2023**		RunNo: **88509**		
Client ID: **CCV**	Batch ID: **42397**					Analysis Date: **12/21/2023**		SeqNo: **1848412**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	986	10.0	1,000	0	98.6	90	110				

Sample ID: **CCB-42397D**	SampType: **CCB**			Units: **µg/L**		Prep Date: **12/21/2023**		RunNo: **88509**		
Client ID: **CCB**	Batch ID: **42397**					Analysis Date: **12/21/2023**		SeqNo: **1848413**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **LCS-42397**	SampType: **LCS**			Units: **µg/L**		Prep Date: **12/19/2023**		RunNo: **88509**		
Client ID: **LCSW**	Batch ID: **42397**					Analysis Date: **12/21/2023**		SeqNo: **1848471**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,020	10.0	1,000	0	102	85	115				

Fremont Analytical
An Alliance Technical Group Company

Sample Log-In Check List

Client Name:	FB	Work Order Number:	2312365
Logged by:	Lyann Rivera	Date Received:	12/15/2023 11:45:00 AM

Chain of Custody

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

Log In

3.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes ☐	No ☐	Not Present ☑
4.	Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
5.	Were all items received at a temperature of >2°C to 6°C *	Yes ☑	No ☐	NA ☐
6.	Sample(s) in proper container(s)?	Yes ☑	No ☐	
7.	Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
8.	Are samples properly preserved?	Yes ☑	No ☐	
9.	Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
10.	Is there headspace in the VOA vials?	Yes ☐	No ☐	NA ☑
11.	Did all samples containers arrive in good condition(unbroken)?	Yes ☑	No ☐	
12.	Does paperwork match bottle labels?	Yes ☑	No ☐	
13.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
14.	Is it clear what analyses were requested?	Yes ☑	No ☐	
15.	Were all hold times (except field parameters, pH e.g.) able to be met?	Yes ☑	No ☐	

Special Handling (if applicable)

16. 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: _____

17. Additional remarks:

Item Information

Item #	Temp ºC
Sample	2.6

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

SUBCONTRACT SAMPLE CHAIN OF CUSTODY

L312365

Page # 1 of 1

Send Report To Michael Erdahl

Company Friedman and Bruya, Inc.

Address 5500 4th Ave S

City, State, ZIP Seattle, WA 98108

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

SUBCONTRACTER	
Fremont	
PROJECT NAME/NO.	PO #
312273	D-596
REMARKS	
Tier IV, EQuIS 4	

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: total aluminum	dissolved aluminum	ferrous iron	ferrous iron	dissolved gases	TOC					Notes
CCMW-2A-1223		12/14/2023	1245	water	3	x	x	x								
CCMW-2B-1232		12/14/2023	1355	water	7 8	x	x	x								MS/MD
TWA-9D-1223		12/14/2023	1520	water	3	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	12/15/23	0746
Received by:		Matthew Hoffer	FAI	12/15/23	1145
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

December 29, 2023

Trevor Louviere, Project Manager
Dalton Olmsted Fuglevand
1001 SW Klickitat Way, Suite 200B
Seattle, WA 98134

Dear Mr Louviere:

Included are the results from the testing of material submitted on December 15, 2023 from the TWAAFA-001, F&BI 312301 project. There are 16 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: Anthony Cerruti, Tasya Gray
DOF1229R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on December 15, 2023 by Friedman & Bruya, Inc. from the Dalton Olmsted Fuglevand TWAAFA-001, F&BI 312301 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Dalton Olmsted Fuglevand
312301 -01	CTMW-23R2-1223
312301 -02	Field Blank #1-1223
312301 -03	CTMW-11R2-1223

The samples were sent to Fremont Analytical for ferrous iron, total aluminum, and dissolved aluminum analyses. The report is enclosed.

The 1631E calibration standard exceeded the acceptance criteria. Mercury was not detected, therefore this did not represent an out of control condition.

All other quality control requirements were acceptable.

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	CTMW-23R2-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/15/23	Project:	TWAAFA-001, F&BI 312301
Date Extracted:	12/18/23	Lab ID:	312301-01
Date Analyzed:	12/19/23	Data File:	312301-01.288
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	3.59
Copper	0.607
Iron	660
Manganese	493

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	CTMW-11R2-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/15/23	Project:	TWAAFA-001, F&BI 312301
Date Extracted:	12/18/23	Lab ID:	312301-03 x4
Date Analyzed:	12/20/23	Data File:	312301-03 x4.059
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Copper	<2.4

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	CTMW-11R2-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/15/23	Project:	TWAAFA-001, F&BI 312301
Date Extracted:	12/18/23	Lab ID:	312301-03 x5
Date Analyzed:	12/19/23	Data File:	312301-03 x5.254
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<5
Manganese	<5

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	CTMW-11R2-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/15/23	Project:	TWAAFA-001, F&BI 312301
Date Extracted:	12/18/23	Lab ID:	312301-03 x50
Date Analyzed:	12/19/23	Data File:	312301-03 x50.128
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Iron	4,260

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Dalton Olmsted Fuglevand
Date Received:	Not Applicable	Project:	TWAAFA-001, F&BI 312301
Date Extracted:	12/18/23	Lab ID:	I3-1001 mb
Date Analyzed:	12/18/23	Data File:	I3-1001 mb.051
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Copper	<0.6
Iron	<50
Manganese	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	CTMW-23R2-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/15/23	Project:	TWAAFA-001, F&BI 312301
Date Extracted:	12/18/23	Lab ID:	312301-01
Date Analyzed:	12/19/23	Data File:	312301-01.292
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	3.45
Copper	1.92
Iron	780
Manganese	542

Analysis For Total Metals By EPA Method 6020B

Client ID:	Field Blank #1-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/15/23	Project:	TWAAFA-001, F&BI 312301
Date Extracted:	12/18/23	Lab ID:	312301-02
Date Analyzed:	12/19/23	Data File:	312301-02.293
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Chromium	1.22
Copper	<0.6
Iron	<50
Lead	<1
Manganese	1.46
Nickel	<1
Zinc	<5

Analysis For Total Metals By EPA Method 6020B

Client ID:	CTMW-11R2-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/15/23	Project:	TWAAFA-001, F&BI 312301
Date Extracted:	12/18/23	Lab ID:	312301-03 x2
Date Analyzed:	12/19/23	Data File:	312301-03 x2.147
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Copper	1.67
Iron	3,520
Manganese	<2

Analysis For Total Metals By EPA Method 6020B

Client ID:	CTMW-11R2-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/15/23	Project:	TWAAFA-001, F&BI 312301
Date Extracted:	12/18/23	Lab ID:	312301-03 x5
Date Analyzed:	12/19/23	Data File:	312301-03 x5.265
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<5

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Dalton Olmsted Fuglevand
Date Received:	Not Applicable	Project:	TWAAFA-001, F&BI 312301
Date Extracted:	12/18/23	Lab ID:	I3-999 mb
Date Analyzed:	12/18/23	Data File:	I3-999 mb.049
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Chromium	<1
Copper	<0.6
Iron	<50
Lead	<1
Manganese	<1
Nickel	<1
Zinc	<5

Date of Report: 12/29/23
Date Received: 12/15/23
Project: TWAAFA-001, F&BI 312301
Date Extracted: 12/18/23
Date Analyzed: 12/26/23

RESULTS FROM THE ANALYSIS OF WATER SAMPLES
FOR TOTAL MERCURY
USING EPA METHOD 1631E
Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Total Mercury
Field Blank #1-1223 312301-02	<0.02 k
Method Blank i3-1000 MB	<0.02 k

Date of Report: 12/29/23
Date Received: 12/15/23
Project: TWAAFA-001, F&BI 312301

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

Laboratory Code: 312273-02 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	1,110	304 b	625 b	75-125	69 b
Chromium	ug/L (ppb)	20	<10	86	84	75-125	2
Copper	ug/L (ppb)	20	<50	89	87	75-125	2
Iron	ug/L (ppb)	100	4,770	133 b	210 b	75-125	45 b
Lead	ug/L (ppb)	10	<10	82	79	75-125	4
Manganese	ug/L (ppb)	20	188	103 b	110 b	75-125	7 b
Nickel	ug/L (ppb)	20	12.4	90 b	86 b	75-125	5 b
Zinc	ug/L (ppb)	50	<50	94	96	75-125	2

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	87	80-120
Chromium	ug/L (ppb)	20	90	80-120
Copper	ug/L (ppb)	20	91	80-120
Iron	ug/L (ppb)	100	87	80-120
Lead	ug/L (ppb)	10	88	80-120
Manganese	ug/L (ppb)	20	83	80-120
Nickel	ug/L (ppb)	20	91	80-120
Zinc	ug/L (ppb)	50	95	80-120

Date of Report: 12/29/23
Date Received: 12/15/23
Project: TWAAFA-001, F&BI 312301

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

Laboratory Code: 312273-02 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	1,200	0 b	0 b	75-125	nm
Chromium	ug/L (ppb)	20	<10	90	89	75-125	1
Copper	ug/L (ppb)	20	<50	91	90	75-125	1
Iron	ug/L (ppb)	100	5,320	0 b	0 b	75-125	nm
Lead	ug/L (ppb)	10	<10	85	84	75-125	1
Manganese	ug/L (ppb)	20	205	13 b	37 b	75-125	96 b
Nickel	ug/L (ppb)	20	12.4	92 b	89 b	75-125	3 b
Zinc	ug/L (ppb)	50	<50	92	91	75-125	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	87	80-120
Chromium	ug/L (ppb)	20	95	80-120
Copper	ug/L (ppb)	20	91	80-120
Iron	ug/L (ppb)	100	89	80-120
Lead	ug/L (ppb)	10	91	80-120
Manganese	ug/L (ppb)	20	88	80-120
Nickel	ug/L (ppb)	20	94	80-120
Zinc	ug/L (ppb)	50	95	80-120

Date of Report: 12/29/23
Date Received: 12/15/23
Project: TWAAFA-001, F&BI 312301

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL MERCURY USING EPA METHOD 1631E

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Mercury	ug/L (ppb)	0.01	109	118	66-126	8

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, biased low; or, the calibration results for the analyte were outside of acceptance criteria, biased high, with a detection for the analyte in the sample. 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 standard reporting limit. 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.

k – The calibration results for the analyte were outside of acceptance criteria, biased high, and the analyte was not detected in the sample.

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.

312301

SAMPLE CHAIN OF CUSTODY

12/15/23

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Page # 1 of 1

Report To: Anthony Cerruti / Trevor Louviere
cc: Tasya Gray

Company DOF

Address 1001 SW Klickitat Way

City, State, ZIP Seattle, WA 98134

Phone 215-767-7749 Email acerruti@dofnw.com

SAMPLERS (*signature*): EDS

PROJECT NAME: TWAAFA

PO # TWAAFA-001

REMARKS: Dissolved metals samples field filtered at 0.45 micron before analysis

Project Specific RLs - (Yes) / No

INVOICE TO: DOF

TURNAROUND TIME
■ Standard Turnaround
__ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
■ Dispose after 30 days
Archive Samples
Other

ANALYSES REQUESTED

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Matrix	# of Bottles	Total Metals 6020B (As, Cr, Cu, Mn, Ni, Pb, Zn)	Dissolved Metals 6020B (As, Cr, Cu, Mn, Ni, Pb, Zn)	Total Mercury 1631E	Dissolved Mercury 1631E	Total Metals (Al, Fe)	Dissolved Metals (Al, Fe)	Ferrous Iron			MS/MSD Collected? (Y/N)	Notes
CTMW-23R2-1223	01 A-C	12/15/23	1010	W	3	X	X			X	X	X				Tot/Diss Metals: Al, As, Cu, Fe, Mn
Field Blank#1-1223	02 A-B	12/15/23	1015	W	2	X		X		X		X				Tot Metals for ALL (Al, As, Cr, Cu, Fe, Mn, Ni, Pb, Zn)
CTMW-11R2-1223	03 A-C	12/15/23	1100	W	3	X	X			X	X	X				Tot/Diss Metals: Al, As, Cu, Fe, Mn

Samples received at 3 °C

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: EDS	Elliott Schumann	DOF	12/15/23	1115
Received by: Couriered under	Custody Seal by Delivery Express		12/15/23	1115
Relinquished by:				
Received by:	Nhan Phan	FCBE	12/15/23	1325

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

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: 312301
Work Order Number: 2312392

December 27, 2023

Attention Michael Erdahl:

Fremont Analytical, Inc. received 3 sample(s) on 12/15/2023 for the analyses presented in the following report.

Dissolved Metals by EPA Method 200.8
Ferrous Iron by SM3500-Fe B
Total Metals by EPA Method 200.8

This report consists of the following:

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

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

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes
Project Manager

Date: *12/27/2023*

CLIENT: Friedman & Bruya
Project: 312301
Work Order: 2312392

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2312392-001	CTMW-23R2-1223	12/15/2023 10:10 AM	12/15/2023 4:20 PM
2312392-002	Field Blank#1-1223	12/15/2023 10:15 AM	12/15/2023 4:20 PM
2312392-003	CTMW-11R2-1223	12/15/2023 11:00 AM	12/15/2023 4:20 PM

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

Original

Case Narrative

WO#: **2312392**
Date: **12/27/2023**

CLIENT: Friedman & Bruya
Project: 312301

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: **2312392**
Date Reported: **12/27/2023**

Client: Friedman & Bruya
Collection Date: 12/15/2023 10:10:00 AM
Project: 312301
Lab ID: 2312392-001
Matrix: Water
Client Sample ID: **CTMW-23R2-1223**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 42426		Analyst: SS
Aluminum	22.8	10.0		µg/L	1	12/22/2023 7:38:00 PM
Total Metals by EPA Method 200.8				Batch ID: 42425		Analyst: SLL
Aluminum	77.2	10.0		µg/L	1	12/22/2023 6:22:00 PM
Ferrous Iron by SM3500-Fe B				Batch ID: R88407		Analyst: FG
Ferrous Iron	0.272	0.150		mg/L	1	12/15/2023 12:17:59 PM

Analytical Report

Work Order: **2312392**
Date Reported: **12/27/2023**

Client: Friedman & Bruya
Collection Date: 12/15/2023 10:15:00 AM
Project: 312301
Lab ID: 2312392-002
Matrix: Water
Client Sample ID: **Field Blank#1-1223**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Total Metals by EPA Method 200.8				Batch ID: 42425		Analyst: SLL
Aluminum	ND	10.0		µg/L	1	12/22/2023 6:24:00 PM
Ferrous Iron by SM3500-Fe B				Batch ID: R88407		Analyst: FG
Ferrous Iron	ND	0.150		mg/L	1	12/15/2023 12:17:59 PM

Analytical Report

Work Order: **2312392**
Date Reported: **12/27/2023**

Client: Friedman & Bruya
Collection Date: 12/15/2023 11:00:00 AM
Project: 312301
Lab ID: 2312392-003
Matrix: Water
Client Sample ID: **CTMW-11R2-1223**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 42426		Analyst: SS
Aluminum	394	10.0		µg/L	1	12/22/2023 7:40:00 PM
Total Metals by EPA Method 200.8				Batch ID: 42425		Analyst: SLL
Aluminum	397	10.0		µg/L	1	12/22/2023 6:27:00 PM
Ferrous Iron by SM3500-Fe B				Batch ID: R88407		Analyst: FG
Ferrous Iron	ND	0.150		mg/L	1	12/15/2023 12:17:59 PM

Work Order: 2312392
CLIENT: Friedman & Bruya
Project: 312301

QC SUMMARY REPORT

Ferrous Iron by SM3500-Fe B

Sample ID: **CCV-R88407A**	SampType: **CCV**			Units: **mg/L**		Prep Date: **12/15/2023**		RunNo: **88407**		
Client ID: **CCV**	Batch ID: **R88407**					Analysis Date: **12/15/2023**		SeqNo: **1846072**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.439	0.150	0.4000	0	110	85	115				

Sample ID: **CCB-R88407**	SampType: **CCB**			Units: **mg/L**		Prep Date: **12/15/2023**		RunNo: **88407**		
Client ID: **CCB**	Batch ID: **R88407**					Analysis Date: **12/15/2023**		SeqNo: **1846073**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	ND	0.150									

Sample ID: **LCS-R88407**	SampType: **LCS**			Units: **mg/L**		Prep Date: **12/15/2023**		RunNo: **88407**		
Client ID: **LCSW**	Batch ID: **R88407**					Analysis Date: **12/15/2023**		SeqNo: **1846074**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.454	0.150	0.4000	0	113	85	115				

Sample ID: **MB-R88407**	SampType: **MBLK**			Units: **mg/L**		Prep Date: **12/15/2023**		RunNo: **88407**		
Client ID: **MBLKW**	Batch ID: **R88407**					Analysis Date: **12/15/2023**		SeqNo: **1846075**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	ND	0.150									

Sample ID: **2312365-003CDUP**	SampType: **DUP**			Units: **mg/L**		Prep Date: **12/15/2023**		RunNo: **88407**		
Client ID: **BATCH**	Batch ID: **R88407**					Analysis Date: **12/15/2023**		SeqNo: **1846079**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.396	0.150						0.3993	0.760	20	

Work Order: 2312392
CLIENT: Friedman & Bruya
Project: 312301

QC SUMMARY REPORT

Ferrous Iron by SM3500-Fe B

Sample ID: **2312365-003CMS**	SampType: **MS**			Units: **mg/L**		Prep Date: **12/15/2023**		RunNo: **88407**		
Client ID: **BATCH**	Batch ID: **R88407**					Analysis Date: **12/15/2023**		SeqNo: **1846080**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.789	0.150	0.4000	0.3993	97.5	70	130				

Sample ID: **2312365-003CMSD**	SampType: **MSD**			Units: **mg/L**		Prep Date: **12/15/2023**		RunNo: **88407**		
Client ID: **BATCH**	Batch ID: **R88407**					Analysis Date: **12/15/2023**		SeqNo: **1846081**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.934	0.150	0.4000	0.3993	134	70	130	0.7892	16.8	30	S

NOTES:
S - Spiked amount was low relative to sample concentration. Outlying spike recoveries may be expected.

Sample ID: **CCV-R88407B**	SampType: **CCV**			Units: **mg/L**		Prep Date: **12/15/2023**		RunNo: **88407**		
Client ID: **CCV**	Batch ID: **R88407**					Analysis Date: **12/15/2023**		SeqNo: **1846236**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.433	0.150	0.4000	0	108	85	115				

Sample ID: **CCB-R88407B**	SampType: **CCB**			Units: **mg/L**		Prep Date: **12/15/2023**		RunNo: **88407**		
Client ID: **CCB**	Batch ID: **R88407**					Analysis Date: **12/15/2023**		SeqNo: **1846237**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	ND	0.150									

Sample ID: **CCV-R88407C**	SampType: **CCV**			Units: **mg/L**		Prep Date: **12/15/2023**		RunNo: **88407**		
Client ID: **CCV**	Batch ID: **R88407**					Analysis Date: **12/15/2023**		SeqNo: **1846241**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.405	0.150	0.4000	0	101	85	115				

Work Order: 2312392
CLIENT: Friedman & Bruya
Project: 312301

QC SUMMARY REPORT

Ferrous Iron by SM3500-Fe B

Sample ID: **CCB-R88407C** SampType: **CCB** Units: **mg/L** Prep Date: **12/15/2023** RunNo: **88407**
Client ID: **CCB** Batch ID: **R88407** Analysis Date: **12/15/2023** SeqNo: **1846242**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	ND	0.150									

Work Order: 2312392
CLIENT: Friedman & Bruya
Project: 312301

QC SUMMARY REPORT

Dissolved Metals by EPA Method 200.8

Sample ID: **ICB**	SampType: **ICB**	Units: **µg/L**	Prep Date: **12/22/2023**	RunNo: **88568**
Client ID: **ICB**	Batch ID: **42426**		Analysis Date: **12/22/2023**	SeqNo: **1849551**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **ICV**	SampType: **ICV**	Units: **µg/L**	Prep Date: **12/22/2023**	RunNo: **88568**
Client ID: **ICV**	Batch ID: **42426**		Analysis Date: **12/22/2023**	SeqNo: **1849552**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,510	10.0	1,500	0	101	90	110				

Sample ID: **CCV-42526A**	SampType: **CCV**	Units: **µg/L**	Prep Date: **12/22/2023**	RunNo: **88568**
Client ID: **CCV**	Batch ID: **42426**		Analysis Date: **12/22/2023**	SeqNo: **1849555**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	996	10.0	1,000	0	99.6	90	110				

Sample ID: **CCB-42526A**	SampType: **CCB**	Units: **µg/L**	Prep Date: **12/22/2023**	RunNo: **88568**
Client ID: **CCB**	Batch ID: **42426**		Analysis Date: **12/22/2023**	SeqNo: **1849556**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **MB-42426**	SampType: **MBLK**	Units: **µg/L**	Prep Date: **12/22/2023**	RunNo: **88568**
Client ID: **MBLKW**	Batch ID: **42426**		Analysis Date: **12/22/2023**	SeqNo: **1849557**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Work Order: 2312392
CLIENT: Friedman & Bruya
Project: 312301

QC SUMMARY REPORT

Dissolved Metals by EPA Method 200.8

Sample ID: **LCS-42426**	SampType: **LCS**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88568**		
Client ID: **LCSW**	Batch ID: **42426**					Analysis Date: **12/22/2023**		SeqNo: **1849558**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,020	10.0	1,000	0	102	85	115				

Sample ID: **2312365-002BDUP**	SampType: **DUP**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88568**		
Client ID: **BATCH**	Batch ID: **42426**					Analysis Date: **12/22/2023**		SeqNo: **1849560**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0						0		30	

Sample ID: **2312365-002BMS**	SampType: **MS**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88568**		
Client ID: **BATCH**	Batch ID: **42426**					Analysis Date: **12/22/2023**		SeqNo: **1849561**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,030	10.0	1,000	0	103	50	150				

Sample ID: **2312365-002BMSD**	SampType: **MSD**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88568**		
Client ID: **BATCH**	Batch ID: **42426**					Analysis Date: **12/22/2023**		SeqNo: **1849562**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,040	10.0	1,000	0	104	50	150	1,032	0.643	30	

Sample ID: **CCV-42526B**	SampType: **CCV**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88568**		
Client ID: **CCV**	Batch ID: **42426**					Analysis Date: **12/22/2023**		SeqNo: **1849567**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,040	10.0	1,000	0	104	90	110				

Work Order: 2312392
CLIENT: Friedman & Bruya
Project: 312301

QC SUMMARY REPORT

Dissolved Metals by EPA Method 200.8

Sample ID: **CCB-42526B**	SampType: **CCB**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88568**		
Client ID: **CCB**	Batch ID: **42426**					Analysis Date: **12/22/2023**		SeqNo: **1849568**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **2312427-001CMS**	SampType: **MS**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88568**		
Client ID: **BATCH**	Batch ID: **42426**					Analysis Date: **12/22/2023**		SeqNo: **1849578**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,010	10.0	1,000	0	101	50	150				

Sample ID: **CCV-42526C**	SampType: **CCV**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88568**		
Client ID: **CCV**	Batch ID: **42426**					Analysis Date: **12/22/2023**		SeqNo: **1849579**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,010	10.0	1,000	0	101	90	110				

Sample ID: **CCB-42526C**	SampType: **CCB**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88568**		
Client ID: **CCB**	Batch ID: **42426**					Analysis Date: **12/22/2023**		SeqNo: **1849580**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **CCV-42526D**	SampType: **CCV**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88568**		
Client ID: **CCV**	Batch ID: **42426**					Analysis Date: **12/22/2023**		SeqNo: **1849694**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,010	10.0	1,000	0	101	90	110				

Work Order: 2312392
CLIENT: Friedman & Bruya
Project: 312301

QC SUMMARY REPORT

Dissolved Metals by EPA Method 200.8

Sample ID: **CCB-42526C**	SampType: **CCB**	Units: **µg/L**	Prep Date: **12/22/2023**	RunNo: **88568**	
Client ID: **CCB**	Batch ID: **42426**		Analysis Date: **12/22/2023**	SeqNo: **1849695**	

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Work Order: 2312392
CLIENT: Friedman & Bruya
Project: 312301

QC SUMMARY REPORT

Total Metals by EPA Method 200.8

Sample ID: **ICB**	SampType: **ICB**	Units: **µg/L**	Prep Date: **12/22/2023**	RunNo: **88561**
Client ID: **ICB**	Batch ID: **42425**		Analysis Date: **12/22/2023**	SeqNo: **1849410**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **ICV**	SampType: **ICV**	Units: **µg/L**	Prep Date: **12/22/2023**	RunNo: **88561**
Client ID: **ICV**	Batch ID: **42425**		Analysis Date: **12/22/2023**	SeqNo: **1849411**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,510	10.0	1,500	0	101	90	110				

Sample ID: **MB-42425**	SampType: **MBLK**	Units: **µg/L**	Prep Date: **12/22/2023**	RunNo: **88561**
Client ID: **MBLKW**	Batch ID: **42425**		Analysis Date: **12/22/2023**	SeqNo: **1849412**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **LCS-42425**	SampType: **LCS**	Units: **µg/L**	Prep Date: **12/22/2023**	RunNo: **88561**
Client ID: **LCSW**	Batch ID: **42425**		Analysis Date: **12/22/2023**	SeqNo: **1849413**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,040	10.0	1,000	0	104	85	115				

Sample ID: **2312443-001ADUP**	SampType: **DUP**	Units: **µg/L**	Prep Date: **12/22/2023**	RunNo: **88561**
Client ID: **BATCH**	Batch ID: **42425**		Analysis Date: **12/22/2023**	SeqNo: **1849415**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	644	10.0						599.3	7.21	30	

Work Order: 2312392
CLIENT: Friedman & Bruya
Project: 312301

QC SUMMARY REPORT

Total Metals by EPA Method 200.8

Sample ID: **2312443-001AMS**	SampType: **MS**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88561**		
Client ID: **BATCH**	Batch ID: **42425**					Analysis Date: **12/22/2023**		SeqNo: **1849416**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,680	10.0	1,000	599.3	108	70	130				

Sample ID: **CCV-42425A**	SampType: **CCV**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88561**		
Client ID: **CCV**	Batch ID: **42425**					Analysis Date: **12/22/2023**		SeqNo: **1849421**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,020	10.0	1,000	0	102	90	110				

Sample ID: **CCB-42425A**	SampType: **CCB**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88561**		
Client ID: **CCB**	Batch ID: **42425**					Analysis Date: **12/22/2023**		SeqNo: **1849422**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **2312391-001CMS**	SampType: **MS**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88561**		
Client ID: **BATCH**	Batch ID: **42425**					Analysis Date: **12/22/2023**		SeqNo: **1849463**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,090	10.0	1,000	39.95	105	70	130				

Sample ID: **CCV-42425B**	SampType: **CCV**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88561**		
Client ID: **CCV**	Batch ID: **42425**					Analysis Date: **12/22/2023**		SeqNo: **1849464**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,010	10.0	1,000	0	101	90	110				

Work Order: 2312392
CLIENT: Friedman & Bruya
Project: 312301

QC SUMMARY REPORT

Total Metals by EPA Method 200.8

Sample ID: **CCB-42425B**	SampType: **CCB**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88561**		
Client ID: **CCB**	Batch ID: **42425**					Analysis Date: **12/22/2023**		SeqNo: **1849465**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **CCV-42425C**	SampType: **CCV**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88561**		
Client ID: **CCV**	Batch ID: **42425**					Analysis Date: **12/22/2023**		SeqNo: **1849476**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,020	10.0	1,000	0	102	90	110				

Sample ID: **CCB-42425C**	SampType: **CCB**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88561**		
Client ID: **CCB**	Batch ID: **42425**					Analysis Date: **12/22/2023**		SeqNo: **1849477**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Fremont Analytical
An Alliance Technical Group Company

Sample Log-In Check List

Client Name:	FB	Work Order Number:	2312392
Logged by:	Morgan Wilson	Date Received:	12/15/2023 4:20:00 PM

Chain of Custody

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

Log In

3.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes ☐	No ☐	Not Present ☑
4.	Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
5.	Were all items received at a temperature of >2°C to 6°C *	Yes ☑	No ☐	NA ☐
6.	Sample(s) in proper container(s)?	Yes ☑	No ☐	
7.	Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
8.	Are samples properly preserved?	Yes ☑	No ☐	
9.	Was preservative added to bottles?	Yes ☑	No ☐	NA ☐ HCL
10.	Is there headspace in the VOA vials?	Yes ☐	No ☐	NA ☑
11.	Did all samples containers arrive in good condition(unbroken)?	Yes ☑	No ☐	
12.	Does paperwork match bottle labels?	Yes ☑	No ☐	
13.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
14.	Is it clear what analyses were requested?	Yes ☑	No ☐	
15.	Were all hold times (except field parameters, pH e.g.) able to be met?	Yes ☑	No ☐	

Special Handling (if applicable)

16.	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: _____

17. Additional remarks:

Item Information

Item #	Temp °C
Sample	4.9

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

SUBCONTRACT SAMPLE CHAIN OF CUSTODY

2312392

Page # 1 of 1

Send Report To Michael Erdahl

Company Friedman and Bruya, Inc.

Address 5500 4th Ave S

City, State, ZIP Seattle, WA 98108

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

SUBCONTRACTER	
Fremont	
PROJECT NAME/NO.	PO #
312301	D-599
REMARKS	

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: total aluminum	dissolved aluminum	ferrous iron	ferrous iron	dissolved gases	TOC					Notes
CTMW-23R2-1223		12/15/2023	1010	water	3	x	x	x								
Field Blank#1-1223		12/15/2023	1015	water	2 B	x		x								
CTMW-11R2-1223		12/15/2023	1100	water	3	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	12/15/23	1315
Received by:		Nathan Hoffer	FAI	12/15/23	1620
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

December 29, 2023

Trevor Louviere, Project Manager
Dalton Olmsted Fuglevand
1001 SW Klickitat Way, Suite 200B
Seattle, WA 98134

Dear Mr Louviere:

Included are the results from the testing of material submitted on December 15, 2023 from the TWAAFA-001, F&BI 312311 project. There are 18 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: Anthony Cerruti, Tasya Gray
DOF1229R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on December 15, 2023 by Friedman & Bruya, Inc. from the Dalton Olmsted Fuglevand TWAAFA-001, F&BI 312311 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Dalton Olmsted Fuglevand
312311 -01	CTMW-12-1223
312311 -02	CTMW-17-1223
312311 -03	CTMW-17D-1223

The samples were sent to Fremont Analytical for ferrous iron, total aluminum, and dissolved aluminum analyses. The report is enclosed.

All quality control requirements were acceptable.

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	CTMW-12-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/15/23	Project:	TWAAFA-001, F&BI 312311
Date Extracted:	12/19/23	Lab ID:	312311-01 x5
Date Analyzed:	12/21/23	Data File:	312311-01 x5.209
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<5
Copper	<2
Iron	9,720
Manganese	1,180

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	CTMW-17-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/15/23	Project:	TWAAFA-001, F&BI 312311
Date Extracted:	12/19/23	Lab ID:	312311-02 x5
Date Analyzed:	12/21/23	Data File:	312311-02 x5.210
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	194
Chromium	9.01
Copper	65.6
Iron	571
Manganese	316

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	CTMW-17D-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/15/23	Project:	TWAAFA-001, F&BI 312311
Date Extracted:	12/19/23	Lab ID:	312311-03 x5
Date Analyzed:	12/21/23	Data File:	312311-03 x5.211
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<5
Copper	<2
Iron	9,280
Manganese	337

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Dalton Olmsted Fuglevand
Date Received:	Not Applicable	Project:	TWAAFA-001, F&BI 312311
Date Extracted:	12/19/23	Lab ID:	I3-1001 mb2
Date Analyzed:	12/20/23	Data File:	I3-1001 mb2.152
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Chromium	<1
Copper	<0.4
Iron	<50
Manganese	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	CTMW-12-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/15/23	Project:	TWAAFA-001, F&BI 312311
Date Extracted:	12/19/23	Lab ID:	312311-01
Date Analyzed:	12/22/23	Data File:	312311-01.245
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	2.51
Copper	0.502
Manganese	844

Analysis For Total Metals By EPA Method 6020B

Client ID:	CTMW-12-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/15/23	Project:	TWAAFA-001, F&BI 312311
Date Extracted:	12/19/23	Lab ID:	312311-01 x20
Date Analyzed:	12/22/23	Data File:	312311-01 x20.133
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Iron	8,270

Analysis For Total Metals By EPA Method 6020B

Client ID:	CTMW-17-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/15/23	Project:	TWAAFA-001, F&BI 312311
Date Extracted:	12/19/23	Lab ID:	312311-02 x5
Date Analyzed:	12/22/23	Data File:	312311-02 x5.134
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	230
Chromium	36.3
Copper	382
Iron	768
Manganese	300

Analysis For Total Metals By EPA Method 6020B

Client ID:	CTMW-17D-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/15/23	Project:	TWAAFA-001, F&BI 312311
Date Extracted:	12/19/23	Lab ID:	312311-03
Date Analyzed:	12/22/23	Data File:	312311-03.247
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	2.29
Copper	2.25
Manganese	318

Analysis For Total Metals By EPA Method 6020B

Client ID:	CTMW-17D-1223	Client:	Dalton Olmsted Fuglevand
Date Received:	12/15/23	Project:	TWAAFA-001, F&BI 312311
Date Extracted:	12/19/23	Lab ID:	312311-03 x20
Date Analyzed:	12/22/23	Data File:	312311-03 x20.135
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Iron	9,160

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Dalton Olmsted Fuglevand
Date Received:	Not Applicable	Project:	TWAAFA-001, F&BI 312311
Date Extracted:	12/19/23	Lab ID:	I3-999 mb2
Date Analyzed:	12/26/23	Data File:	I3-999 mb2.075
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Chromium	<1
Copper	<0.48
Iron	<50
Manganese	<1

Date of Report: 12/29/23
Date Received: 12/15/23
Project: TWAAFA-001, F&BI 312311
Date Extracted: 12/26/23
Date Analyzed: 12/27/23

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR DISSOLVED MERCURY USING EPA METHOD 1631E

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Dissolved Mercury
CTMW-17-1223 312311-02 x10	<0.02
Method Blank i3-1021 MB	<0.02

Date of Report: 12/29/23
Date Received: 12/15/23
Project: TWAAFA-001, F&BI 312311
Date Extracted: 12/26/23
Date Analyzed: 12/27/23

RESULTS FROM THE ANALYSIS OF WATER SAMPLES
FOR TOTAL MERCURY
USING EPA METHOD 1631E
Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Total Mercury
CTMW-17-1223 312311-02 x10	0.13
Method Blank i3-1021 MB	<0.02

Date of Report: 12/29/23
Date Received: 12/15/23
Project: TWAAFA-001, F&BI 312311

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

Laboratory Code: 312273-02 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	1,110	304 b	625 b	75-125	69 b
Chromium	ug/L (ppb)	20	<10	86	84	75-125	2
Copper	ug/L (ppb)	20	<50	89	87	75-125	2
Iron	ug/L (ppb)	100	4,770	133 b	210 b	75-125	45 b
Manganese	ug/L (ppb)	20	188	103 b	110 b	75-125	7 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	87	80-120
Chromium	ug/L (ppb)	20	90	80-120
Copper	ug/L (ppb)	20	91	80-120
Iron	ug/L (ppb)	100	87	80-120
Manganese	ug/L (ppb)	20	83	80-120

Date of Report: 12/29/23
Date Received: 12/15/23
Project: TWAAFA-001, F&BI 312311

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

Laboratory Code: 312273-02 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	1,200	0 b	0 b	75-125	nm
Chromium	ug/L (ppb)	20	<10	90	89	75-125	1
Copper	ug/L (ppb)	20	<50	91	90	75-125	1
Iron	ug/L (ppb)	100	5,320	0 b	0 b	75-125	nm
Manganese	ug/L (ppb)	20	205	13 b	37 b	75-125	96 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	87	80-120
Chromium	ug/L (ppb)	20	95	80-120
Copper	ug/L (ppb)	20	91	80-120
Iron	ug/L (ppb)	100	89	80-120
Manganese	ug/L (ppb)	20	88	80-120

Date of Report: 12/29/23
Date Received: 12/15/23
Project: TWAAFA-001, F&BI 312311

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR DISSOLVED MERCURY USING EPA METHOD 1631E

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Mercury	ug/L (ppb)	0.01	99	107	66-126	8

Date of Report: 12/29/23
Date Received: 12/15/23
Project: TWAAFA-001, F&BI 312311

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL MERCURY USING EPA METHOD 1631E

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Mercury	ug/L (ppb)	0.01	99	107	66-126	8

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, biased low; or, the calibration results for the analyte were outside of acceptance criteria, biased high, with a detection for the analyte in the sample. 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 standard reporting limit. 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.

k – The calibration results for the analyte were outside of acceptance criteria, biased high, and the analyte was not detected in the sample.

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

12/15/23 L4

Page # 1 of 1

312311

Report To: Anthony Cerruti / Trevor Louviere
CC: Tasya Gray

Company DOF

Address 1001 SW Klickitat Way

City, State, ZIP Seattle, WA 98134

Phone 215-767-7749 Email acerruti@dofnw.com

SAMPLERS (*signature*)	
PROJECT NAME: TWAAFA	PO #: TWAAFA-001
REMARKS: Dissolved metals samples field filtered at 0.45 micron before analysis. Project Specific RLs - (Yes) / No	INVOICE TO: DOF

TURNAROUND TIME
■ Standard Turnaround
__ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
■ Dispose after 30 days
Archive Samples
Other

ANALYSES REQUESTED

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Matrix	# of Bottles	Total Metals 6020B (As, Cr, Cu, Mn, Ni, Pb, Zn)	Dissolved Metals 6020B (As, Cr, Cu, Mn, Ni, Pb, Zn)	Total Mercury 1631E	Dissolved Mercury 1631E	Total Metals (Al, Fe)	Dissolved Metals (Al, Fe)	Ferrous Iron			MS/MSD Collected? (Y/N)	Notes
CTMW-12-1223	01 A-C	12/15/23	1205	W	3	X	X			X	X	X				Tot/Diss Metals: Al, As, Cu, Fe, Mn
CTMW-17-1223	02	12/15/23	1345	W	3	X	X	X	X	X	X	X				Tot/Diss Metals: Al, As, Cr, Cu, Fe,
CTMW-17D-1223	03	12/15/23	1425	W	3	X	X			X	X	X				Tot/Diss Metals: Al, As, Cu, Fe, Mn

SDS

Samples received at 0 °C

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Michael Wright	Clear Earth	12/15/23	16:12
Received by:		ANYHPHAN	F&B	12/15/23	16:12
Relinquished by:					
Received by:					

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

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: 312311
Work Order Number: 2312396

December 27, 2023

Attention Michael Erdahl:

Fremont Analytical, Inc. received 3 sample(s) on 12/18/2023 for the analyses presented in the following report.

Dissolved Metals by EPA Method 200.8
Ferrous Iron by SM3500-Fe B
Total Metals by EPA Method 200.8

This report consists of the following:

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

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

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes
Project Manager

Date: *12/27/2023*

CLIENT: Friedman & Bruya
Project: 312311
Work Order: 2312396

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2312396-001	CTMW-12-1223	12/15/2023 12:05 PM	12/18/2023 10:15 AM
2312396-002	CTMW-17-1223	12/15/2023 1:45 PM	12/18/2023 10:15 AM
2312396-003	CTMW-17D-1223	12/15/2023 2:25 PM	12/18/2023 10:15 AM

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

Original

Case Narrative

WO#: **2312396**
Date: **12/27/2023**

CLIENT: Friedman & Bruya
Project: 312311

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: **2312396**
Date Reported: **12/27/2023**

Client: Friedman & Bruya
Collection Date: 12/15/2023 12:05:00 PM
Project: 312311
Lab ID: 2312396-001
Matrix: Water
Client Sample ID: **CTMW-12-1223**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 42426		Analyst: SS
Aluminum	ND	10.0		µg/L	1	12/22/2023 7:47:00 PM
Total Metals by EPA Method 200.8				Batch ID: 42425		Analyst: SLL
Aluminum	20.7	10.0		µg/L	1	12/22/2023 6:31:00 PM
Ferrous Iron by SM3500-Fe B				Batch ID: R88521		Analyst: AM
Ferrous Iron	1.41	0.150	H	mg/L	1	12/18/2023 4:00:00 PM

Analytical Report

Work Order: **2312396**
Date Reported: **12/27/2023**

Client: Friedman & Bruya
Collection Date: 12/15/2023 1:45:00 PM
Project: 312311
Lab ID: 2312396-002
Matrix: Water
Client Sample ID: **CTMW-17-1223**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 42426		Analyst: SS
Aluminum	44.8	10.0		µg/L	1	12/22/2023 7:50:00 PM
Total Metals by EPA Method 200.8				Batch ID: 42425		Analyst: SLL
Aluminum	169	10.0		µg/L	1	12/22/2023 6:34:00 PM
Ferrous Iron by SM3500-Fe B				Batch ID: R88521		Analyst: AM
Ferrous Iron	0.372	0.150	H	mg/L	1	12/18/2023 4:00:00 PM

Analytical Report

Work Order: **2312396**
Date Reported: **12/27/2023**

Client: Friedman & Bruya
Collection Date: 12/15/2023 2:25:00 PM
Project: 312311
Lab ID: 2312396-003
Matrix: Water
Client Sample ID: **CTMW-17D-1223**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 42426		Analyst: SS
Aluminum	ND	10.0		µg/L	1	12/22/2023 7:52:00 PM
Total Metals by EPA Method 200.8				Batch ID: 42425		Analyst: SLL
Aluminum	27.4	10.0		µg/L	1	12/22/2023 6:36:00 PM
Ferrous Iron by SM3500-Fe B				Batch ID: R88521		Analyst: AM
Ferrous Iron	0.886	0.150	H	mg/L	1	12/18/2023 4:00:00 PM

Work Order: 2312396
CLIENT: Friedman & Bruya
Project: 312311

QC SUMMARY REPORT

Ferrous Iron by SM3500-Fe B

Sample ID: **CCV-R88521**	SampType: **CCV**			Units: **mg/L**		Prep Date: **12/18/2023**		RunNo: **88521**			
Client ID: **CCV**	Batch ID: **R88521**					Analysis Date: **12/18/2023**		SeqNo: **1848523**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.417	0.150	0.4000	0	104	85	115				

Sample ID: **CCB-R88521**	SampType: **CCB**			Units: **mg/L**		Prep Date: **12/18/2023**		RunNo: **88521**			
Client ID: **CCB**	Batch ID: **R88521**					Analysis Date: **12/18/2023**		SeqNo: **1848524**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	ND	0.150									

Sample ID: **LCS-R88521**	SampType: **LCS**			Units: **mg/L**		Prep Date: **12/18/2023**		RunNo: **88521**			
Client ID: **LCSW**	Batch ID: **R88521**					Analysis Date: **12/18/2023**		SeqNo: **1848525**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.448	0.150	0.4000	0	112	85	115				

Sample ID: **MB-R88521**	SampType: **MBLK**			Units: **mg/L**		Prep Date: **12/18/2023**		RunNo: **88521**			
Client ID: **MBLKW**	Batch ID: **R88521**					Analysis Date: **12/18/2023**		SeqNo: **1848526**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	ND	0.150									

Sample ID: **2312396-002ADUP**	SampType: **DUP**			Units: **mg/L**		Prep Date: **12/18/2023**		RunNo: **88521**			
Client ID: **CTMW-17-1223**	Batch ID: **R88521**					Analysis Date: **12/18/2023**		SeqNo: **1848529**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.363	0.150						0.3721	2.47	20	H

Work Order: 2312396
CLIENT: Friedman & Bruya
Project: 312311

QC SUMMARY REPORT

Ferrous Iron by SM3500-Fe B

Sample ID: **2312396-002AMS**	SampType: **MS**			Units: **mg/L**		Prep Date: **12/18/2023**			RunNo: **88521**		
Client ID: **CTMW-17-1223**	Batch ID: **R88521**					Analysis Date: **12/18/2023**			SeqNo: **1848530**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.798	0.150	0.4000	0.3721	107	70	130				H

Sample ID: **2312396-002AMSD**	SampType: **MSD**			Units: **mg/L**		Prep Date: **12/18/2023**			RunNo: **88521**		
Client ID: **CTMW-17-1223**	Batch ID: **R88521**					Analysis Date: **12/18/2023**			SeqNo: **1848531**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.777	0.150	0.4000	0.3721	101	70	130	0.7982	2.69	30	H

Sample ID: **CCV-R88521**	SampType: **CCV**			Units: **mg/L**		Prep Date: **12/18/2023**			RunNo: **88521**		
Client ID: **CCV**	Batch ID: **R88521**					Analysis Date: **12/18/2023**			SeqNo: **1848533**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.457	0.150	0.4000	0	114	85	115				

Sample ID: **CCB-R88521**	SampType: **CCB**			Units: **mg/L**		Prep Date: **12/18/2023**			RunNo: **88521**		
Client ID: **CCB**	Batch ID: **R88521**					Analysis Date: **12/18/2023**			SeqNo: **1848534**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	ND	0.150									

Sample ID: **2312365-002CMS**	SampType: **MS**			Units: **mg/L**		Prep Date: **12/18/2023**			RunNo: **88521**		
Client ID: **BATCH**	Batch ID: **R88521**					Analysis Date: **12/18/2023**			SeqNo: **1848536**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.647	0.150	0.4000	0.5262	30.2	70	130				SH

NOTES:
S - Spiked amount was low relative to sample concentration. Outlying spike recoveries may be expected.

Work Order: 2312396
CLIENT: Friedman & Bruya
Project: 312311

QC SUMMARY REPORT

Ferrous Iron by SM3500-Fe B

Sample ID: **2312365-002CMSD** SampType: **MSD** Units: **mg/L** Prep Date: **12/18/2023** RunNo: **88521**
Client ID: **BATCH** Batch ID: **R88521** Analysis Date: **12/18/2023** SeqNo: **1848537**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.659	0.150	0.4000	0.5262	33.2	70	130	0.6471	1.85	30	SH

NOTES:
S - Spiked amount was low relative to sample concentration. Outlying spike recoveries may be expected.

Sample ID: **CCV-R88521** SampType: **CCV** Units: **mg/L** Prep Date: **12/18/2023** RunNo: **88521**
Client ID: **CCV** Batch ID: **R88521** Analysis Date: **12/18/2023** SeqNo: **1848538**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	0.439	0.150	0.4000	0	110	85	115				

Sample ID: **CCB-R88521** SampType: **CCB** Units: **mg/L** Prep Date: **12/18/2023** RunNo: **88521**
Client ID: **CCB** Batch ID: **R88521** Analysis Date: **12/18/2023** SeqNo: **1848539**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Ferrous Iron	ND	0.150									

Work Order: 2312396
CLIENT: Friedman & Bruya
Project: 312311

QC SUMMARY REPORT

Dissolved Metals by EPA Method 200.8

Sample ID: **ICB**	SampType: **ICB**	Units: **µg/L**	Prep Date: **12/22/2023**	RunNo: **88568**
Client ID: **ICB**	Batch ID: **42426**		Analysis Date: **12/22/2023**	SeqNo: **1849551**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **ICV**	SampType: **ICV**	Units: **µg/L**	Prep Date: **12/22/2023**	RunNo: **88568**
Client ID: **ICV**	Batch ID: **42426**		Analysis Date: **12/22/2023**	SeqNo: **1849552**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,510	10.0	1,500	0	101	90	110				

Sample ID: **CCV-42526A**	SampType: **CCV**	Units: **µg/L**	Prep Date: **12/22/2023**	RunNo: **88568**
Client ID: **CCV**	Batch ID: **42426**		Analysis Date: **12/22/2023**	SeqNo: **1849555**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	996	10.0	1,000	0	99.6	90	110				

Sample ID: **CCB-42526A**	SampType: **CCB**	Units: **µg/L**	Prep Date: **12/22/2023**	RunNo: **88568**
Client ID: **CCB**	Batch ID: **42426**		Analysis Date: **12/22/2023**	SeqNo: **1849556**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **MB-42426**	SampType: **MBLK**	Units: **µg/L**	Prep Date: **12/22/2023**	RunNo: **88568**
Client ID: **MBLKW**	Batch ID: **42426**		Analysis Date: **12/22/2023**	SeqNo: **1849557**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Work Order: 2312396
CLIENT: Friedman & Bruya
Project: 312311

QC SUMMARY REPORT

Dissolved Metals by EPA Method 200.8

Sample ID: **LCS-42426**	SampType: **LCS**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88568**		
Client ID: **LCSW**	Batch ID: **42426**					Analysis Date: **12/22/2023**		SeqNo: **1849558**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,020	10.0	1,000	0	102	85	115				

Sample ID: **2312365-002BDUP**	SampType: **DUP**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88568**		
Client ID: **BATCH**	Batch ID: **42426**					Analysis Date: **12/22/2023**		SeqNo: **1849560**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0						0		30	

Sample ID: **2312365-002BMS**	SampType: **MS**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88568**		
Client ID: **BATCH**	Batch ID: **42426**					Analysis Date: **12/22/2023**		SeqNo: **1849561**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,030	10.0	1,000	0	103	50	150				

Sample ID: **2312365-002BMSD**	SampType: **MSD**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88568**		
Client ID: **BATCH**	Batch ID: **42426**					Analysis Date: **12/22/2023**		SeqNo: **1849562**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,040	10.0	1,000	0	104	50	150	1,032	0.643	30	

Sample ID: **CCV-42526B**	SampType: **CCV**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88568**		
Client ID: **CCV**	Batch ID: **42426**					Analysis Date: **12/22/2023**		SeqNo: **1849567**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,040	10.0	1,000	0	104	90	110				

Work Order: 2312396
CLIENT: Friedman & Bruya
Project: 312311

QC SUMMARY REPORT

Dissolved Metals by EPA Method 200.8

Sample ID: **CCB-42526B**	SampType: **CCB**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88568**	
Client ID: **CCB**	Batch ID: **42426**					Analysis Date: **12/22/2023**		SeqNo: **1849568**	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **2312427-001CMS**	SampType: **MS**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88568**	
Client ID: **BATCH**	Batch ID: **42426**					Analysis Date: **12/22/2023**		SeqNo: **1849578**	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,010	10.0	1,000	0	101	50	150				

Sample ID: **CCV-42526C**	SampType: **CCV**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88568**	
Client ID: **CCV**	Batch ID: **42426**					Analysis Date: **12/22/2023**		SeqNo: **1849579**	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,010	10.0	1,000	0	101	90	110				

Sample ID: **CCB-42526C**	SampType: **CCB**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88568**	
Client ID: **CCB**	Batch ID: **42426**					Analysis Date: **12/22/2023**		SeqNo: **1849580**	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **CCV-42526D**	SampType: **CCV**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88568**	
Client ID: **CCV**	Batch ID: **42426**					Analysis Date: **12/22/2023**		SeqNo: **1849694**	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,010	10.0	1,000	0	101	90	110				

Work Order: 2312396
CLIENT: Friedman & Bruya
Project: 312311

QC SUMMARY REPORT

Dissolved Metals by EPA Method 200.8

Sample ID: **CCB-42526C** SampType: **CCB** Units: **µg/L** Prep Date: **12/22/2023** RunNo: **88568**
Client ID: **CCB** Batch ID: **42426** Analysis Date: **12/22/2023** SeqNo: **1849695**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Work Order: 2312396
CLIENT: Friedman & Bruya
Project: 312311

QC SUMMARY REPORT

Total Metals by EPA Method 200.8

Sample ID: **ICB**	SampType: **ICB**	Units: **µg/L**	Prep Date: **12/22/2023**	RunNo: **88561**
Client ID: **ICB**	Batch ID: **42425**		Analysis Date: **12/22/2023**	SeqNo: **1849410**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **ICV**	SampType: **ICV**	Units: **µg/L**	Prep Date: **12/22/2023**	RunNo: **88561**
Client ID: **ICV**	Batch ID: **42425**		Analysis Date: **12/22/2023**	SeqNo: **1849411**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,510	10.0	1,500	0	101	90	110				

Sample ID: **MB-42425**	SampType: **MBLK**	Units: **µg/L**	Prep Date: **12/22/2023**	RunNo: **88561**
Client ID: **MBLKW**	Batch ID: **42425**		Analysis Date: **12/22/2023**	SeqNo: **1849412**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **LCS-42425**	SampType: **LCS**	Units: **µg/L**	Prep Date: **12/22/2023**	RunNo: **88561**
Client ID: **LCSW**	Batch ID: **42425**		Analysis Date: **12/22/2023**	SeqNo: **1849413**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,040	10.0	1,000	0	104	85	115				

Sample ID: **2312443-001ADUP**	SampType: **DUP**	Units: **µg/L**	Prep Date: **12/22/2023**	RunNo: **88561**
Client ID: **BATCH**	Batch ID: **42425**		Analysis Date: **12/22/2023**	SeqNo: **1849415**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	644	10.0						599.3	7.21	30	

Work Order: 2312396
CLIENT: Friedman & Bruya
Project: 312311

QC SUMMARY REPORT

Total Metals by EPA Method 200.8

Sample ID: **2312443-001AMS**	SampType: **MS**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88561**		
Client ID: **BATCH**	Batch ID: **42425**					Analysis Date: **12/22/2023**		SeqNo: **1849416**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,680	10.0	1,000	599.3	108	70	130				

Sample ID: **CCV-42425A**	SampType: **CCV**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88561**		
Client ID: **CCV**	Batch ID: **42425**					Analysis Date: **12/22/2023**		SeqNo: **1849421**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,020	10.0	1,000	0	102	90	110				

Sample ID: **CCB-42425A**	SampType: **CCB**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88561**		
Client ID: **CCB**	Batch ID: **42425**					Analysis Date: **12/22/2023**		SeqNo: **1849422**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **2312391-001CMS**	SampType: **MS**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88561**		
Client ID: **BATCH**	Batch ID: **42425**					Analysis Date: **12/22/2023**		SeqNo: **1849463**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,090	10.0	1,000	39.95	105	70	130				

Sample ID: **CCV-42425B**	SampType: **CCV**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88561**		
Client ID: **CCV**	Batch ID: **42425**					Analysis Date: **12/22/2023**		SeqNo: **1849464**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,010	10.0	1,000	0	101	90	110				

Work Order: 2312396
CLIENT: Friedman & Bruya
Project: 312311

QC SUMMARY REPORT

Total Metals by EPA Method 200.8

Sample ID: **CCB-42425B**	SampType: **CCB**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88561**		
Client ID: **CCB**	Batch ID: **42425**					Analysis Date: **12/22/2023**		SeqNo: **1849465**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **CCV-42425C**	SampType: **CCV**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88561**		
Client ID: **CCV**	Batch ID: **42425**					Analysis Date: **12/22/2023**		SeqNo: **1849476**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,020	10.0	1,000	0	102	90	110				

Sample ID: **CCB-42425C**	SampType: **CCB**			Units: **µg/L**		Prep Date: **12/22/2023**		RunNo: **88561**		
Client ID: **CCB**	Batch ID: **42425**					Analysis Date: **12/22/2023**		SeqNo: **1849477**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Fremont Analytical
An Alliance Technical Group Company

Sample Log-In Check List

Client Name:	FB	Work Order Number:	2312396
Logged by:	Morgan Wilson	Date Received:	12/18/2023 10:15:00 AM

Chain of Custody

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

Log In

3.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes ☐	No ☐	Not Present ☑
4.	Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
5.	Were all items received at a temperature of >2°C to 6°C *	Yes ☑	No ☐	NA ☐
6.	Sample(s) in proper container(s)?	Yes ☑	No ☐	
7.	Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
8.	Are samples properly preserved?	Yes ☑	No ☐	
9.	Was preservative added to bottles?	Yes ☑	No ☐	NA ☐ HCL, HNO3
10.	Is there headspace in the VOA vials?	Yes ☐	No ☐	NA ☑
11.	Did all samples containers arrive in good condition(unbroken)?	Yes ☑	No ☐	
12.	Does paperwork match bottle labels?	Yes ☑	No ☐	
13.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
14.	Is it clear what analyses were requested?	Yes ☑	No ☐	
15.	Were all hold times (except field parameters, pH e.g.) able to be met?	Yes ☑	No ☐	

Special Handling (if applicable)

16. 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:			

17. Additional remarks:

Item Information

Item #	Temp °C
Sample	2.8

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

SUBCONTRACT SAMPLE CHAIN OF CUSTODY

23123396

Send Report To Michael Erdahl
Company Friedman and Bruya, Inc.
Address 5500 4th Ave S
City, State, ZIP Seattle, WA 98108
Phone # (206) 285-8282 merdahl@friedmanandbruya.com

SUBCONTRACTER: Fremont

PROJECT NAME/NO.	PO #
312311	D-599

REMARKS: EIM and Tier IV reprot

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: ferrous iron	dissolved aluminum	total aluminum	ferrous iron	dissolved gases	TOC					Notes
CTMW-12-1223		12/15/2023	1205	water	3	x	x	x								
CTMW-17-1223		12/15/2023	1345	water	3	x	x	x								
CTMW-17D-1223		12/15/2023	1425	water	3	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	12/18/23	0730
Received by:		NK	FAI	12/18/23	10:15
Relinquished by:					
Received by:					

ANALYTICAL REPORT

PREPARED FOR

Attn: Trevor Louviere
Dalton, Olmsted & Fuglevand, Inc
1001 SW Klickitat Way
Suite 200B
Seattle, Washington 98134

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JOB DESCRIPTION

PFAS, Tacoma WA

JOB NUMBER

320-108687-1

Eurofins Sacramento
880 Riverside Parkway
West Sacramento CA 95605

See page two for job notes and contact information.

Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Northern California, LLC Project Manager.

Authorization

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Authorized for release by
Nathaniel Horner, Project Management Assistant I
Nathaniel.Horner@et.eurofinsus.com
(916)374-4306

Table of Contents

Definitions/Glossary

Client: Dalton, Olmsted & Fuglevand, Inc
Project/Site: PFAS, Tacoma WA

Job ID: 320-108687-1

Qualifiers

LCMS

Qualifier	Qualifier Description
F5	Duplicate RPD exceeds limit, and one or both sample results are less than 5 times RL, and the absolute difference between results is < the upper reporting limits for both.
I	Value is EMPC (estimated maximum possible concentration).

Glossary

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

Case Narrative

Client: Dalton, Olmsted & Fuglevand, Inc
Project: PFAS, Tacoma WA

Job ID: 320-108687-1

Job ID: 320-108687-1 — Eurofins Sacramento

Receipt
The samples were received on 1/13/2024 8:05 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperatures of the 2 coolers at receipt time were 4.7º C and 4.9º C.

LCMS
Method 1633: The following continuing calibration blank (CCB) was flagged for Isotope Dilution Analyte (IDA) recovery above the method recommended limit: CCB 320-735099/5. The purpose of the CCB is to test for instrument contamination. As the CCB was non-detect for all native analytes, the bracketing continuing calibration verification (CCV) was in control, and the IDA of the associated samples recovered within limits, there is no adverse impact on data quality; therefore, the data have been reported.

Method 1633: The "I" qualifier means the transition mass ratio for the indicated analyte for Perfluoropentanesulfonic acid (PFPeS) was outside the established ratio limits. The qualitative identification of the analyte has some degree of uncertainty, and the reported value may have some high bias. However, analyst judgment was used to positively identify the analyte: CCW-9-3A-0124 (320-108687-2). The sample was reanalyzed with concurring result, therefore, the best set of data was reported.

Method 1633: The sample duplicate (DUP) precision for preparation batch 320-734182 and analytical batch 320-735099 was outside control limits. Sample matrix interference is suspected.

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

Organic Prep
Method 1633: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-734182.

Method 1633: The following samples were diluted due to low isotope recoveries: CCW-3A-0124 (320-108687-1), CCW-9-3A-0124 (320-108687-2) and CTMW-17-0124 (320-108687-8). Elevated reporting limits (RL) are provided.

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

Detection Summary

Client: Dalton, Olmsted & Fuglevand, Inc
Project/Site: PFAS, Tacoma WA

Job ID: 320-108687-1

Client Sample ID: CCW-3A-0124 — Lab Sample ID: 320-108687-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	31		7.5		ng/L	1		1633	Total/NA
Perfluoroheptanoic acid (PFHpA)	10		1.9		ng/L	1		1633	Total/NA
Perfluorooctanoic acid (PFOA)	96		1.9		ng/L	1		1633	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	9.4		1.9		ng/L	1		1633	Total/NA
Perfluorooctanesulfonic acid (PFOS)	19		1.9		ng/L	1		1633	Total/NA
NEtFOSAA	10		1.9		ng/L	1		1633	Total/NA
Perfluorobutanesulfonic acid (PFBS) - RA	3.5		1.9		ng/L	1		1633	Total/NA

Client Sample ID: CCW-9-3A-0124 — Lab Sample ID: 320-108687-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	35		7.3		ng/L	1		1633	Total/NA
Perfluoroheptanoic acid (PFHpA)	9.1		1.8		ng/L	1		1633	Total/NA
Perfluorooctanoic acid (PFOA)	93		1.8		ng/L	1		1633	Total/NA
Perfluoropentanesulfonic acid (PFPeS)	15	I	1.8		ng/L	1		1633	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	9.5		1.8		ng/L	1		1633	Total/NA
Perfluorooctanesulfonic acid (PFOS)	22		1.8		ng/L	1		1633	Total/NA
NEtFOSAA	9.6		1.8		ng/L	1		1633	Total/NA
Perfluorobutanesulfonic acid (PFBS) - RA	2.9		1.8		ng/L	1		1633	Total/NA

Client Sample ID: CCW-3B-0124 — Lab Sample ID: 320-108687-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	70		7.3		ng/L	1		1633	Total/NA
Perfluoropentanoic acid (PFPeA)	44		3.6		ng/L	1		1633	Total/NA
Perfluorohexanoic acid (PFHxA)	32		1.8		ng/L	1		1633	Total/NA
Perfluoroheptanoic acid (PFHpA)	15		1.8		ng/L	1		1633	Total/NA
Perfluorooctanoic acid (PFOA)	61		1.8		ng/L	1		1633	Total/NA
Perfluorononanoic acid (PFNA)	4.1		1.8		ng/L	1		1633	Total/NA
Perfluorobutanesulfonic acid (PFBS)	6.5		1.8		ng/L	1		1633	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	23		1.8		ng/L	1		1633	Total/NA
Perfluorooctanesulfonic acid (PFOS)	20		1.8		ng/L	1		1633	Total/NA
NEtFOSAA	2.4		1.8		ng/L	1		1633	Total/NA
Perfluoropentanesulfonic acid (PFPeS) - RA	4.2		1.8		ng/L	1		1633	Total/NA

Client Sample ID: FIELD BLANK #1-0124 — Lab Sample ID: 320-108687-4

No Detections.

Client Sample ID: CCW-2C-0124 — Lab Sample ID: 320-108687-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	5.2		1.8		ng/L	1		1633	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.1		1.8		ng/L	1		1633	Total/NA
Perfluorooctanoic acid (PFOA)	12		1.8		ng/L	1		1633	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	5.7		1.8		ng/L	1		1633	Total/NA

Client Sample ID: CCW-2B-0124 — Lab Sample ID: 320-108687-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	35		7.2		ng/L	1		1633	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Client Sample ID: CCW-2B-0124 (Continued) — Lab Sample ID: 320-108687-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	2.5		1.8		ng/L	1		1633	Total/NA
Perfluorooctanoic acid (PFOA)	17		1.8		ng/L	1		1633	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	7.0		1.8		ng/L	1		1633	Total/NA
Perfluorooctanesulfonic acid (PFOS)	27		1.8		ng/L	1		1633	Total/NA
Perfluorooctanesulfonamide (FOSA)	1.8		1.8		ng/L	1		1633	Total/NA
NEtFOSAA	2.2		1.8		ng/L	1		1633	Total/NA
Perfluorohexanoic acid (PFHxA) - RA	4.0		1.8		ng/L	1		1633	Total/NA

Client Sample ID: CCW-2A-0124 — Lab Sample ID: 320-108687-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	13		7.7		ng/L	1		1633	Total/NA
Perfluorohexanoic acid (PFHxA)	6.6		1.9		ng/L	1		1633	Total/NA
Perfluoroheptanoic acid (PFHpA)	3.6		1.9		ng/L	1		1633	Total/NA
Perfluorooctanoic acid (PFOA)	6.4		1.9		ng/L	1		1633	Total/NA
Perfluorobutanesulfonic acid (PFBS)	1.9		1.9		ng/L	1		1633	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	5.3		1.9		ng/L	1		1633	Total/NA
Perfluorooctanesulfonic acid (PFOS)	12		1.9		ng/L	1		1633	Total/NA
Perfluoropentanoic acid (PFPeA) - RA	7.1		3.8		ng/L	1		1633	Total/NA

Client Sample ID: CTMW-17-0124 — Lab Sample ID: 320-108687-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	1500		7.6		ng/L	1		1633	Total/NA
Perfluoroundecanoic acid (PFUnA)	11		1.9		ng/L	1		1633	Total/NA
6:2 FTS	86		7.6		ng/L	1		1633	Total/NA
Perfluorohexanoic acid (PFHxA) - RE	39		20		ng/L	1		1633	Total/NA
Perfluoroheptanoic acid (PFHpA) - RE	20		20		ng/L	1		1633	Total/NA
Perfluorooctanoic acid (PFOA) - RE	54		20		ng/L	1		1633	Total/NA
Perfluorononanoic acid (PFNA) - RE	44		20		ng/L	1		1633	Total/NA
Perfluorobutanesulfonic acid (PFBS) - RE	2100		20		ng/L	1		1633	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - RE	38		20		ng/L	1		1633	Total/NA
Perfluorooctanesulfonic acid (PFOS) - RE	110		20		ng/L	1		1633	Total/NA

Client Sample ID: RINSATE BLANK #1-0124 — Lab Sample ID: 320-108687-9

No Detections.

Client Sample ID: TRIP SOURCE WATER BLANK #1-0124 — Lab Sample ID: 320-108687-10

No Detections.

This Detection Summary does not include radiochemical test results.

Client: Dalton, Olmsted & Fuglevand, Inc
Project/Site: PFAS, Tacoma WA

Job ID: 320-108687-1

Client Sample ID: CCW-3A-0124
Date Collected: 01/11/24 10:35
Date Received: 01/13/24 08:05

Lab Sample ID: 320-108687-1
Matrix: Water

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**31**		7.5		ng/L		01/17/24 11:51	01/18/24 23:42	1
Perfluoroheptanoic acid (PFHpA)	**10**		1.9		ng/L		01/17/24 11:51	01/18/24 23:42	1
Perfluorooctanoic acid (PFOA)	**96**		1.9		ng/L		01/17/24 11:51	01/18/24 23:42	1
Perfluorodecanoic acid (PFDA)	ND		1.9		ng/L		01/17/24 11:51	01/18/24 23:42	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9		ng/L		01/17/24 11:51	01/18/24 23:42	1
Perfluorododecanoic acid (PFDoA)	ND		1.9		ng/L		01/17/24 11:51	01/18/24 23:42	1
Perfluorotridecanoic acid (PFTrDA)	ND		1.9		ng/L		01/17/24 11:51	01/18/24 23:42	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9		ng/L		01/17/24 11:51	01/18/24 23:42	1
Perfluorohexanesulfonic acid (PFHxS)	**9.4**		1.9		ng/L		01/17/24 11:51	01/18/24 23:42	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		1.9		ng/L		01/17/24 11:51	01/18/24 23:42	1
Perfluorooctanesulfonic acid (PFOS)	**19**		1.9		ng/L		01/17/24 11:51	01/18/24 23:42	1
Perfluorononanesulfonic acid (PFNS)	ND		1.9		ng/L		01/17/24 11:51	01/18/24 23:42	1
Perfluorodecanesulfonic acid (PFDS)	ND		1.9		ng/L		01/17/24 11:51	01/18/24 23:42	1
Perfluorododecanesulfonic acid (PFDoS)	ND		1.9		ng/L		01/17/24 11:51	01/18/24 23:42	1
6:2 FTS	ND		7.5		ng/L		01/17/24 11:51	01/18/24 23:42	1
8:2 FTS	ND		7.5		ng/L		01/17/24 11:51	01/18/24 23:42	1
Perfluorooctanesulfonamide (FOSA)	ND		1.9		ng/L		01/17/24 11:51	01/18/24 23:42	1
NMeFOSA	ND		1.9		ng/L		01/17/24 11:51	01/18/24 23:42	1
NEtFOSA	ND		1.9		ng/L		01/17/24 11:51	01/18/24 23:42	1
NMeFOSAA	ND		1.9		ng/L		01/17/24 11:51	01/18/24 23:42	1
NEtFOSAA	**10**		1.9		ng/L		01/17/24 11:51	01/18/24 23:42	1
NMeFOSE	ND		19		ng/L		01/17/24 11:51	01/18/24 23:42	1
NEtFOSE	ND		19		ng/L		01/17/24 11:51	01/18/24 23:42	1
HFPO-DA (GenX)	ND		7.5		ng/L		01/17/24 11:51	01/18/24 23:42	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		7.5		ng/L		01/17/24 11:51	01/18/24 23:42	1
9Cl-PF3ONS	ND		7.5		ng/L		01/17/24 11:51	01/18/24 23:42	1
11Cl-PF3OUdS	ND		7.5		ng/L		01/17/24 11:51	01/18/24 23:42	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*8*		*5 - 130*	*01/17/24 11:51*	*01/18/24 23:42*	*1*
13C4 PFHpA	*77*		*40 - 130*	*01/17/24 11:51*	*01/18/24 23:42*	*1*
13C8 PFOA	*61*		*40 - 130*	*01/17/24 11:51*	*01/18/24 23:42*	*1*
13C9 PFNA	*64*		*40 - 130*	*01/17/24 11:51*	*01/18/24 23:42*	*1*
13C6 PFDA	*61*		*40 - 130*	*01/17/24 11:51*	*01/18/24 23:42*	*1*
13C7 PFUnA	*68*		*30 - 130*	*01/17/24 11:51*	*01/18/24 23:42*	*1*
13C2 PFDoA	*56*		*10 - 130*	*01/17/24 11:51*	*01/18/24 23:42*	*1*
13C2 PFTeDA	*57*		*10 - 130*	*01/17/24 11:51*	*01/18/24 23:42*	*1*
13C3 PFBS	*52*		*40 - 135*	*01/17/24 11:51*	*01/18/24 23:42*	*1*
13C3 PFHxS	*67*		*40 - 130*	*01/17/24 11:51*	*01/18/24 23:42*	*1*
13C8 PFOS	*68*		*40 - 130*	*01/17/24 11:51*	*01/18/24 23:42*	*1*
13C8 FOSA	*53*		*40 - 130*	*01/17/24 11:51*	*01/18/24 23:42*	*1*
d3-NMeFOSAA	*63*		*40 - 170*	*01/17/24 11:51*	*01/18/24 23:42*	*1*
d5-NEtFOSAA	*73*		*25 - 135*	*01/17/24 11:51*	*01/18/24 23:42*	*1*
M2-6:2 FTS	*69*		*40 - 200*	*01/17/24 11:51*	*01/18/24 23:42*	*1*
M2-8:2 FTS	*104*		*40 - 300*	*01/17/24 11:51*	*01/18/24 23:42*	*1*
13C3 HFPO-DA	*40*		*40 - 130*	*01/17/24 11:51*	*01/18/24 23:42*	*1*

Client Sample ID: CCW-3A-0124

Date Collected: 01/11/24 10:35
Date Received: 01/13/24 08:05

Lab Sample ID: 320-108687-1

Matrix: Water

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 (Continued)

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d7-N-MeFOSE-M	*21*		*10 - 130*	*01/17/24 11:51*	*01/18/24 23:42*	*1*
d9-N-EtFOSE-M	*26*		*10 - 130*	*01/17/24 11:51*	*01/18/24 23:42*	*1*
d5-NEtPFOSA	*38*		*10 - 130*	*01/17/24 11:51*	*01/18/24 23:42*	*1*
d3-NMePFOSA	*34*		*10 - 130*	*01/17/24 11:51*	*01/18/24 23:42*	*1*

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorononanoic acid (PFNA)	ND		1.9		ng/L		01/17/24 11:51	01/19/24 17:47	1
Perfluorobutanesulfonic acid (PFBS)	**3.5**		1.9		ng/L		01/17/24 11:51	01/19/24 17:47	1
Perfluoropentanesulfonic acid (PFPeS)	ND		1.9		ng/L		01/17/24 11:51	01/19/24 17:47	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C9 PFNA	*66*		*40 - 130*	*01/17/24 11:51*	*01/19/24 17:47*	*1*
13C3 PFBS	*61*		*40 - 135*	*01/17/24 11:51*	*01/19/24 17:47*	*1*
13C3 PFHxS	*100*		*40 - 130*	*01/17/24 11:51*	*01/19/24 17:47*	*1*

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoropentanoic acid (PFPeA)	ND		40		ng/L		01/22/24 04:23	01/26/24 16:51	1
Perfluorohexanoic acid (PFHxA)	ND		20		ng/L		01/22/24 04:23	01/26/24 16:51	1
4:2 FTS	ND		80		ng/L		01/22/24 04:23	01/26/24 16:51	1
PFMBA	ND		40		ng/L		01/22/24 04:23	01/26/24 16:51	1
NFDHA	ND		40		ng/L		01/22/24 04:23	01/26/24 16:51	1
PFMPA	ND		40		ng/L		01/22/24 04:23	01/26/24 16:51	1
PFEESA	ND		40		ng/L		01/22/24 04:23	01/26/24 16:51	1
3:3 FTCA	ND		100		ng/L		01/22/24 04:23	01/26/24 16:51	1
5:3 FTCA	ND		500		ng/L		01/22/24 04:23	01/26/24 16:51	1
7:3 FTCA	ND		500		ng/L		01/22/24 04:23	01/26/24 16:51	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C5 PFPeA	*79*		*40 - 130*	*01/22/24 04:23*	*01/26/24 16:51*	*1*
13C5 PFHxA	*83*		*40 - 130*	*01/22/24 04:23*	*01/26/24 16:51*	*1*
M2-4:2 FTS	*111*		*40 - 200*	*01/22/24 04:23*	*01/26/24 16:51*	*1*

Client Sample ID: CCW-9-3A-0124

Date Collected: 01/11/24 10:40
Date Received: 01/13/24 08:05

Lab Sample ID: 320-108687-2

Matrix: Water

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**35**		7.3		ng/L		01/17/24 11:51	01/19/24 00:00	1
Perfluorohexanoic acid (PFHxA)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 00:00	1
Perfluoroheptanoic acid (PFHpA)	**9.1**		1.8		ng/L		01/17/24 11:51	01/19/24 00:00	1
Perfluorooctanoic acid (PFOA)	**93**		1.8		ng/L		01/17/24 11:51	01/19/24 00:00	1
Perfluorononanoic acid (PFNA)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 00:00	1
Perfluorodecanoic acid (PFDA)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 00:00	1
Perfluoroundecanoic acid (PFUnA)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 00:00	1
Perfluorododecanoic acid (PFDoA)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 00:00	1
Perfluorotridecanoic acid (PFTrDA)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 00:00	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 00:00	1

Client: Dalton, Olmsted & Fuglevand, Inc
Project/Site: PFAS, Tacoma WA

Job ID: 320-108687-1

Client Sample ID: CCW-9-3A-0124
Date Collected: 01/11/24 10:40
Date Received: 01/13/24 08:05

Lab Sample ID: 320-108687-2
Matrix: Water

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoropentanesulfonic acid (PFPeS)	**15**	**I**	1.8		ng/L		01/17/24 11:51	01/19/24 00:00	1
Perfluorohexanesulfonic acid (PFHxS)	**9.5**		1.8		ng/L		01/17/24 11:51	01/19/24 00:00	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 00:00	1
Perfluorooctanesulfonic acid (PFOS)	**22**		1.8		ng/L		01/17/24 11:51	01/19/24 00:00	1
Perfluorononanesulfonic acid (PFNS)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 00:00	1
Perfluorodecanesulfonic acid (PFDS)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 00:00	1
Perfluorododecanesulfonic acid (PFDoS)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 00:00	1
6:2 FTS	ND		7.3		ng/L		01/17/24 11:51	01/19/24 00:00	1
8:2 FTS	ND		7.3		ng/L		01/17/24 11:51	01/19/24 00:00	1
Perfluorooctanesulfonamide (FOSA)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 00:00	1
NMeFOSA	ND		1.8		ng/L		01/17/24 11:51	01/19/24 00:00	1
NEtFOSA	ND		1.8		ng/L		01/17/24 11:51	01/19/24 00:00	1
NMeFOSAA	ND		1.8		ng/L		01/17/24 11:51	01/19/24 00:00	1
NEtFOSAA	**9.6**		1.8		ng/L		01/17/24 11:51	01/19/24 00:00	1
NMeFOSE	ND		18		ng/L		01/17/24 11:51	01/19/24 00:00	1
NEtFOSE	ND		18		ng/L		01/17/24 11:51	01/19/24 00:00	1
HFPO-DA (GenX)	ND		7.3		ng/L		01/17/24 11:51	01/19/24 00:00	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		7.3		ng/L		01/17/24 11:51	01/19/24 00:00	1
NFDHA	ND		3.6		ng/L		01/17/24 11:51	01/19/24 00:00	1
9Cl-PF3ONS	ND		7.3		ng/L		01/17/24 11:51	01/19/24 00:00	1
11Cl-PF3OUdS	ND		7.3		ng/L		01/17/24 11:51	01/19/24 00:00	1
PFEESA	ND		3.6		ng/L		01/17/24 11:51	01/19/24 00:00	1
5:3 FTCA	ND		46		ng/L		01/17/24 11:51	01/19/24 00:00	1
7:3 FTCA	ND		46		ng/L		01/17/24 11:51	01/19/24 00:00	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*11*		*5 - 130*	*01/17/24 11:51*	*01/19/24 00:00*	*1*
13C5 PFHxA	*43*		*40 - 130*	*01/17/24 11:51*	*01/19/24 00:00*	*1*
13C4 PFHpA	*76*		*40 - 130*	*01/17/24 11:51*	*01/19/24 00:00*	*1*
13C8 PFOA	*56*		*40 - 130*	*01/17/24 11:51*	*01/19/24 00:00*	*1*
13C9 PFNA	*64*		*40 - 130*	*01/17/24 11:51*	*01/19/24 00:00*	*1*
13C6 PFDA	*53*		*40 - 130*	*01/17/24 11:51*	*01/19/24 00:00*	*1*
13C7 PFUnA	*57*		*30 - 130*	*01/17/24 11:51*	*01/19/24 00:00*	*1*
13C2 PFDoA	*50*		*10 - 130*	*01/17/24 11:51*	*01/19/24 00:00*	*1*
13C2 PFTeDA	*45*		*10 - 130*	*01/17/24 11:51*	*01/19/24 00:00*	*1*
13C3 PFHxS	*59*		*40 - 130*	*01/17/24 11:51*	*01/19/24 00:00*	*1*
13C8 PFOS	*54*		*40 - 130*	*01/17/24 11:51*	*01/19/24 00:00*	*1*
13C8 FOSA	*44*		*40 - 130*	*01/17/24 11:51*	*01/19/24 00:00*	*1*
d3-NMeFOSAA	*56*		*40 - 170*	*01/17/24 11:51*	*01/19/24 00:00*	*1*
d5-NEtFOSAA	*63*		*25 - 135*	*01/17/24 11:51*	*01/19/24 00:00*	*1*
M2-6:2 FTS	*79*		*40 - 200*	*01/17/24 11:51*	*01/19/24 00:00*	*1*
M2-8:2 FTS	*87*		*40 - 300*	*01/17/24 11:51*	*01/19/24 00:00*	*1*
13C3 HFPO-DA	*56*		*40 - 130*	*01/17/24 11:51*	*01/19/24 00:00*	*1*
d7-N-MeFOSE-M	*17*		*10 - 130*	*01/17/24 11:51*	*01/19/24 00:00*	*1*
d9-N-EtFOSE-M	*21*		*10 - 130*	*01/17/24 11:51*	*01/19/24 00:00*	*1*
d5-NEtPFOSA	*32*		*10 - 130*	*01/17/24 11:51*	*01/19/24 00:00*	*1*

Client Sample ID: CCW-9-3A-0124

Lab Sample ID: 320-108687-2

Date Collected: 01/11/24 10:40

Matrix: Water

Date Received: 01/13/24 08:05

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 (Continued)

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
d3-NMePFOSA	*31*		*10 - 130*	*01/17/24 11:51*	*01/19/24 00:00*	*1*

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	**2.9**		1.8		ng/L		01/17/24 11:51	01/19/24 18:04	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 PFBS	*81*		*40 - 135*	*01/17/24 11:51*	*01/19/24 18:04*	*1*

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoropentanoic acid (PFPeA)	ND		40		ng/L		01/22/24 04:23	01/26/24 17:09	1
4:2 FTS	ND		80		ng/L		01/22/24 04:23	01/26/24 17:09	1
PFMBA	ND		40		ng/L		01/22/24 04:23	01/26/24 17:09	1
PFMPA	ND		40		ng/L		01/22/24 04:23	01/26/24 17:09	1
3:3 FTCA	ND		100		ng/L		01/22/24 04:23	01/26/24 17:09	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C5 PFPeA	*73*		*40 - 130*	*01/22/24 04:23*	*01/26/24 17:09*	*1*
M2-4:2 FTS	*99*		*40 - 200*	*01/22/24 04:23*	*01/26/24 17:09*	*1*

Client Sample ID: CCW-3B-0124

Lab Sample ID: 320-108687-3

Date Collected: 01/11/24 12:00

Matrix: Water

Date Received: 01/13/24 08:05

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**70**		7.3		ng/L		01/17/24 11:51	01/19/24 00:17	1
Perfluoropentanoic acid (PFPeA)	**44**		3.6		ng/L		01/17/24 11:51	01/19/24 00:17	1
Perfluorohexanoic acid (PFHxA)	**32**		1.8		ng/L		01/17/24 11:51	01/19/24 00:17	1
Perfluoroheptanoic acid (PFHpA)	**15**		1.8		ng/L		01/17/24 11:51	01/19/24 00:17	1
Perfluorooctanoic acid (PFOA)	**61**		1.8		ng/L		01/17/24 11:51	01/19/24 00:17	1
Perfluorononanoic acid (PFNA)	**4.1**		1.8		ng/L		01/17/24 11:51	01/19/24 00:17	1
Perfluorodecanoic acid (PFDA)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 00:17	1
Perfluoroundecanoic acid (PFUnA)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 00:17	1
Perfluorododecanoic acid (PFDoA)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 00:17	1
Perfluorotridecanoic acid (PFTrDA)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 00:17	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 00:17	1
Perfluorobutanesulfonic acid (PFBS)	**6.5**		1.8		ng/L		01/17/24 11:51	01/19/24 00:17	1
Perfluorohexanesulfonic acid (PFHxS)	**23**		1.8		ng/L		01/17/24 11:51	01/19/24 00:17	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 00:17	1
Perfluorooctanesulfonic acid (PFOS)	**20**		1.8		ng/L		01/17/24 11:51	01/19/24 00:17	1
Perfluorononanesulfonic acid (PFNS)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 00:17	1
Perfluorodecanesulfonic acid (PFDS)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 00:17	1
Perfluorododecanesulfonic acid (PFDoS)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 00:17	1
4:2 FTS	ND		7.3		ng/L		01/17/24 11:51	01/19/24 00:17	1
6:2 FTS	ND		7.3		ng/L		01/17/24 11:51	01/19/24 00:17	1

Client Sample ID: CCW-3B-0124
Date Collected: 01/11/24 12:00
Date Received: 01/13/24 08:05

Lab Sample ID: 320-108687-3
Matrix: Water

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
8:2 FTS	ND		7.3		ng/L		01/17/24 11:51	01/19/24 00:17	1
Perfluorooctanesulfonamide (FOSA)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 00:17	1
NMeFOSA	ND		1.8		ng/L		01/17/24 11:51	01/19/24 00:17	1
NEtFOSA	ND		1.8		ng/L		01/17/24 11:51	01/19/24 00:17	1
NMeFOSAA	ND		1.8		ng/L		01/17/24 11:51	01/19/24 00:17	1
NEtFOSAA	**2.4**		1.8		ng/L		01/17/24 11:51	01/19/24 00:17	1
NMeFOSE	ND		18		ng/L		01/17/24 11:51	01/19/24 00:17	1
NEtFOSE	ND		18		ng/L		01/17/24 11:51	01/19/24 00:17	1
HFPO-DA (GenX)	ND		7.3		ng/L		01/17/24 11:51	01/19/24 00:17	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		7.3		ng/L		01/17/24 11:51	01/19/24 00:17	1
PFMBA	ND		3.6		ng/L		01/17/24 11:51	01/19/24 00:17	1
NFDHA	ND		3.6		ng/L		01/17/24 11:51	01/19/24 00:17	1
PFMPA	ND		3.6		ng/L		01/17/24 11:51	01/19/24 00:17	1
9Cl-PF3ONS	ND		7.3		ng/L		01/17/24 11:51	01/19/24 00:17	1
11Cl-PF3OUdS	ND		7.3		ng/L		01/17/24 11:51	01/19/24 00:17	1
PFEESA	ND		3.6		ng/L		01/17/24 11:51	01/19/24 00:17	1
3:3 FTCA	ND		9.1		ng/L		01/17/24 11:51	01/19/24 00:17	1
5:3 FTCA	ND		46		ng/L		01/17/24 11:51	01/19/24 00:17	1
7:3 FTCA	ND		46		ng/L		01/17/24 11:51	01/19/24 00:17	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*27*		*5 - 130*	*01/17/24 11:51*	*01/19/24 00:17*	*1*
13C5 PFPeA	*65*		*40 - 130*	*01/17/24 11:51*	*01/19/24 00:17*	*1*
13C5 PFHxA	*71*		*40 - 130*	*01/17/24 11:51*	*01/19/24 00:17*	*1*
13C4 PFHpA	*89*		*40 - 130*	*01/17/24 11:51*	*01/19/24 00:17*	*1*
13C8 PFOA	*75*		*40 - 130*	*01/17/24 11:51*	*01/19/24 00:17*	*1*
13C9 PFNA	*76*		*40 - 130*	*01/17/24 11:51*	*01/19/24 00:17*	*1*
13C6 PFDA	*74*		*40 - 130*	*01/17/24 11:51*	*01/19/24 00:17*	*1*
13C7 PFUnA	*71*		*30 - 130*	*01/17/24 11:51*	*01/19/24 00:17*	*1*
13C2 PFDoA	*58*		*10 - 130*	*01/17/24 11:51*	*01/19/24 00:17*	*1*
13C2 PFTeDA	*50*		*10 - 130*	*01/17/24 11:51*	*01/19/24 00:17*	*1*
13C3 PFBS	*73*		*40 - 135*	*01/17/24 11:51*	*01/19/24 00:17*	*1*
13C3 PFHxS	*82*		*40 - 130*	*01/17/24 11:51*	*01/19/24 00:17*	*1*
13C8 PFOS	*78*		*40 - 130*	*01/17/24 11:51*	*01/19/24 00:17*	*1*
13C8 FOSA	*84*		*40 - 130*	*01/17/24 11:51*	*01/19/24 00:17*	*1*
d3-NMeFOSAA	*96*		*40 - 170*	*01/17/24 11:51*	*01/19/24 00:17*	*1*
d5-NEtFOSAA	*93*		*25 - 135*	*01/17/24 11:51*	*01/19/24 00:17*	*1*
M2-4:2 FTS	*101*		*40 - 200*	*01/17/24 11:51*	*01/19/24 00:17*	*1*
M2-6:2 FTS	*123*		*40 - 200*	*01/17/24 11:51*	*01/19/24 00:17*	*1*
M2-8:2 FTS	*118*		*40 - 300*	*01/17/24 11:51*	*01/19/24 00:17*	*1*
13C3 HFPO-DA	*78*		*40 - 130*	*01/17/24 11:51*	*01/19/24 00:17*	*1*
d7-N-MeFOSE-M	*44*		*10 - 130*	*01/17/24 11:51*	*01/19/24 00:17*	*1*
d9-N-EtFOSE-M	*37*		*10 - 130*	*01/17/24 11:51*	*01/19/24 00:17*	*1*
d5-NEtPFOSA	*47*		*10 - 130*	*01/17/24 11:51*	*01/19/24 00:17*	*1*
d3-NMePFOSA	*49*		*10 - 130*	*01/17/24 11:51*	*01/19/24 00:17*	*1*

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoropentanesulfonic acid (PFPeS)	**4.2**		1.8		ng/L		01/17/24 11:51	01/19/24 18:20	1

Client Sample ID: CCW-3B-0124

Lab Sample ID: 320-108687-3

Date Collected: 01/11/24 12:00

Matrix: Water

Date Received: 01/13/24 08:05

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C3 PFHxS	86		40 - 130	01/17/24 11:51	01/19/24 18:20	1

Client Sample ID: FIELD BLANK #1-0124

Lab Sample ID: 320-108687-4

Date Collected: 01/11/24 11:15

Matrix: Water

Date Received: 01/13/24 08:05

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		8.4		ng/L		01/17/24 11:51	01/19/24 00:52	1
Perfluoropentanoic acid (PFPeA)	ND		4.2		ng/L		01/17/24 11:51	01/19/24 00:52	1
Perfluorohexanoic acid (PFHxA)	ND		2.1		ng/L		01/17/24 11:51	01/19/24 00:52	1
Perfluoroheptanoic acid (PFHpA)	ND		2.1		ng/L		01/17/24 11:51	01/19/24 00:52	1
Perfluorooctanoic acid (PFOA)	ND		2.1		ng/L		01/17/24 11:51	01/19/24 00:52	1
Perfluorononanoic acid (PFNA)	ND		2.1		ng/L		01/17/24 11:51	01/19/24 00:52	1
Perfluorodecanoic acid (PFDA)	ND		2.1		ng/L		01/17/24 11:51	01/19/24 00:52	1
Perfluoroundecanoic acid (PFUnA)	ND		2.1		ng/L		01/17/24 11:51	01/19/24 00:52	1
Perfluorododecanoic acid (PFDoA)	ND		2.1		ng/L		01/17/24 11:51	01/19/24 00:52	1
Perfluorotridecanoic acid (PFTrDA)	ND		2.1		ng/L		01/17/24 11:51	01/19/24 00:52	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.1		ng/L		01/17/24 11:51	01/19/24 00:52	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.1		ng/L		01/17/24 11:51	01/19/24 00:52	1
Perfluoropentanesulfonic acid (PFPeS)	ND		2.1		ng/L		01/17/24 11:51	01/19/24 00:52	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.1		ng/L		01/17/24 11:51	01/19/24 00:52	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		2.1		ng/L		01/17/24 11:51	01/19/24 00:52	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.1		ng/L		01/17/24 11:51	01/19/24 00:52	1
Perfluorononanesulfonic acid (PFNS)	ND		2.1		ng/L		01/17/24 11:51	01/19/24 00:52	1
Perfluorodecanesulfonic acid (PFDS)	ND		2.1		ng/L		01/17/24 11:51	01/19/24 00:52	1
Perfluorododecanesulfonic acid (PFDoS)	ND		2.1		ng/L		01/17/24 11:51	01/19/24 00:52	1
4:2 FTS	ND		8.4		ng/L		01/17/24 11:51	01/19/24 00:52	1
6:2 FTS	ND		8.4		ng/L		01/17/24 11:51	01/19/24 00:52	1
8:2 FTS	ND		8.4		ng/L		01/17/24 11:51	01/19/24 00:52	1
Perfluorooctanesulfonamide (FOSA)	ND		2.1		ng/L		01/17/24 11:51	01/19/24 00:52	1
NMeFOSA	ND		2.1		ng/L		01/17/24 11:51	01/19/24 00:52	1
NEtFOSA	ND		2.1		ng/L		01/17/24 11:51	01/19/24 00:52	1
NMeFOSAA	ND		2.1		ng/L		01/17/24 11:51	01/19/24 00:52	1
NEtFOSAA	ND		2.1		ng/L		01/17/24 11:51	01/19/24 00:52	1
NMeFOSE	ND		21		ng/L		01/17/24 11:51	01/19/24 00:52	1
NEtFOSE	ND		21		ng/L		01/17/24 11:51	01/19/24 00:52	1
HFPO-DA (GenX)	ND		8.4		ng/L		01/17/24 11:51	01/19/24 00:52	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		8.4		ng/L		01/17/24 11:51	01/19/24 00:52	1
PFMBA	ND		4.2		ng/L		01/17/24 11:51	01/19/24 00:52	1
NFDHA	ND		4.2		ng/L		01/17/24 11:51	01/19/24 00:52	1
PFMPA	ND		4.2		ng/L		01/17/24 11:51	01/19/24 00:52	1
9Cl-PF3ONS	ND		8.4		ng/L		01/17/24 11:51	01/19/24 00:52	1
11Cl-PF3OUdS	ND		8.4		ng/L		01/17/24 11:51	01/19/24 00:52	1
PFEESA	ND		4.2		ng/L		01/17/24 11:51	01/19/24 00:52	1
3:3 FTCA	ND		11		ng/L		01/17/24 11:51	01/19/24 00:52	1
5:3 FTCA	ND		53		ng/L		01/17/24 11:51	01/19/24 00:52	1
7:3 FTCA	ND		53		ng/L		01/17/24 11:51	01/19/24 00:52	1

Client Sample ID: FIELD BLANK #1-0124

Lab Sample ID: 320-108687-4

Date Collected: 01/11/24 11:15
Matrix: Water
Date Received: 01/13/24 08:05

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*74*		*5 - 130*	*01/17/24 11:51*	*01/19/24 00:52*	*1*
13C5 PFPeA	*73*		*40 - 130*	*01/17/24 11:51*	*01/19/24 00:52*	*1*
13C5 PFHxA	*73*		*40 - 130*	*01/17/24 11:51*	*01/19/24 00:52*	*1*
13C4 PFHpA	*79*		*40 - 130*	*01/17/24 11:51*	*01/19/24 00:52*	*1*
13C8 PFOA	*78*		*40 - 130*	*01/17/24 11:51*	*01/19/24 00:52*	*1*
13C9 PFNA	*73*		*40 - 130*	*01/17/24 11:51*	*01/19/24 00:52*	*1*
13C6 PFDA	*73*		*40 - 130*	*01/17/24 11:51*	*01/19/24 00:52*	*1*
13C7 PFUnA	*73*		*30 - 130*	*01/17/24 11:51*	*01/19/24 00:52*	*1*
13C2 PFDoA	*72*		*10 - 130*	*01/17/24 11:51*	*01/19/24 00:52*	*1*
13C2 PFTeDA	*77*		*10 - 130*	*01/17/24 11:51*	*01/19/24 00:52*	*1*
13C3 PFBS	*76*		*40 - 135*	*01/17/24 11:51*	*01/19/24 00:52*	*1*
13C3 PFHxS	*75*		*40 - 130*	*01/17/24 11:51*	*01/19/24 00:52*	*1*
13C8 PFOS	*79*		*40 - 130*	*01/17/24 11:51*	*01/19/24 00:52*	*1*
13C8 FOSA	*74*		*40 - 130*	*01/17/24 11:51*	*01/19/24 00:52*	*1*
d3-NMeFOSAA	*87*		*40 - 170*	*01/17/24 11:51*	*01/19/24 00:52*	*1*
d5-NEtFOSAA	*81*		*25 - 135*	*01/17/24 11:51*	*01/19/24 00:52*	*1*
M2-4:2 FTS	*94*		*40 - 200*	*01/17/24 11:51*	*01/19/24 00:52*	*1*
M2-6:2 FTS	*93*		*40 - 200*	*01/17/24 11:51*	*01/19/24 00:52*	*1*
M2-8:2 FTS	*92*		*40 - 300*	*01/17/24 11:51*	*01/19/24 00:52*	*1*
13C3 HFPO-DA	*63*		*40 - 130*	*01/17/24 11:51*	*01/19/24 00:52*	*1*
d7-N-MeFOSE-M	*72*		*10 - 130*	*01/17/24 11:51*	*01/19/24 00:52*	*1*
d9-N-EtFOSE-M	*68*		*10 - 130*	*01/17/24 11:51*	*01/19/24 00:52*	*1*
d5-NEtPFOSA	*67*		*10 - 130*	*01/17/24 11:51*	*01/19/24 00:52*	*1*
d3-NMePFOSA	*59*		*10 - 130*	*01/17/24 11:51*	*01/19/24 00:52*	*1*

Client Sample ID: CCW-2C-0124

Lab Sample ID: 320-108687-5

Date Collected: 01/11/24 13:00
Matrix: Water
Date Received: 01/13/24 08:05

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		7.2		ng/L		01/17/24 11:51	01/19/24 01:10	1
Perfluoropentanoic acid (PFPeA)	ND		3.6		ng/L		01/17/24 11:51	01/19/24 01:10	1
Perfluorohexanoic acid (PFHxA)	**5.2**		1.8		ng/L		01/17/24 11:51	01/19/24 01:10	1
Perfluoroheptanoic acid (PFHpA)	**2.1**		1.8		ng/L		01/17/24 11:51	01/19/24 01:10	1
Perfluorooctanoic acid (PFOA)	**12**		1.8		ng/L		01/17/24 11:51	01/19/24 01:10	1
Perfluorononanoic acid (PFNA)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 01:10	1
Perfluorodecanoic acid (PFDA)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 01:10	1
Perfluoroundecanoic acid (PFUnA)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 01:10	1
Perfluorododecanoic acid (PFDoA)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 01:10	1
Perfluorotridecanoic acid (PFTrDA)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 01:10	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 01:10	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 01:10	1
Perfluorohexanesulfonic acid (PFHxS)	**5.7**		1.8		ng/L		01/17/24 11:51	01/19/24 01:10	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 01:10	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 01:10	1
Perfluorononanesulfonic acid (PFNS)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 01:10	1
Perfluorodecanesulfonic acid (PFDS)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 01:10	1
Perfluorododecanesulfonic acid (PFDoS)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 01:10	1

Client: Dalton, Olmsted & Fuglevand, Inc
Project/Site: PFAS, Tacoma WA

Job ID: 320-108687-1

Client Sample ID: CCW-2C-0124
Date Collected: 01/11/24 13:00
Date Received: 01/13/24 08:05

Lab Sample ID: 320-108687-5
Matrix: Water

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4:2 FTS	ND		7.2		ng/L		01/17/24 11:51	01/19/24 01:10	1
6:2 FTS	ND		7.2		ng/L		01/17/24 11:51	01/19/24 01:10	1
8:2 FTS	ND		7.2		ng/L		01/17/24 11:51	01/19/24 01:10	1
Perfluorooctanesulfonamide (FOSA)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 01:10	1
NMeFOSA	ND		1.8		ng/L		01/17/24 11:51	01/19/24 01:10	1
NEtFOSA	ND		1.8		ng/L		01/17/24 11:51	01/19/24 01:10	1
NMeFOSAA	ND		1.8		ng/L		01/17/24 11:51	01/19/24 01:10	1
NEtFOSAA	ND		1.8		ng/L		01/17/24 11:51	01/19/24 01:10	1
NMeFOSE	ND		18		ng/L		01/17/24 11:51	01/19/24 01:10	1
NEtFOSE	ND		18		ng/L		01/17/24 11:51	01/19/24 01:10	1
HFPO-DA (GenX)	ND		7.2		ng/L		01/17/24 11:51	01/19/24 01:10	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		7.2		ng/L		01/17/24 11:51	01/19/24 01:10	1
PFMBA	ND		3.6		ng/L		01/17/24 11:51	01/19/24 01:10	1
NFDHA	ND		3.6		ng/L		01/17/24 11:51	01/19/24 01:10	1
PFMPA	ND		3.6		ng/L		01/17/24 11:51	01/19/24 01:10	1
9Cl-PF3ONS	ND		7.2		ng/L		01/17/24 11:51	01/19/24 01:10	1
11Cl-PF3OUdS	ND		7.2		ng/L		01/17/24 11:51	01/19/24 01:10	1
PFEESA	ND		3.6		ng/L		01/17/24 11:51	01/19/24 01:10	1
3:3 FTCA	ND		9.0		ng/L		01/17/24 11:51	01/19/24 01:10	1
5:3 FTCA	ND		45		ng/L		01/17/24 11:51	01/19/24 01:10	1
7:3 FTCA	ND		45		ng/L		01/17/24 11:51	01/19/24 01:10	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*55*		*5 - 130*	*01/17/24 11:51*	*01/19/24 01:10*	*1*
13C5 PFPeA	*62*		*40 - 130*	*01/17/24 11:51*	*01/19/24 01:10*	*1*
13C5 PFHxA	*70*		*40 - 130*	*01/17/24 11:51*	*01/19/24 01:10*	*1*
13C4 PFHpA	*78*		*40 - 130*	*01/17/24 11:51*	*01/19/24 01:10*	*1*
13C8 PFOA	*80*		*40 - 130*	*01/17/24 11:51*	*01/19/24 01:10*	*1*
13C9 PFNA	*78*		*40 - 130*	*01/17/24 11:51*	*01/19/24 01:10*	*1*
13C6 PFDA	*74*		*40 - 130*	*01/17/24 11:51*	*01/19/24 01:10*	*1*
13C7 PFUnA	*67*		*30 - 130*	*01/17/24 11:51*	*01/19/24 01:10*	*1*
13C2 PFDoA	*57*		*10 - 130*	*01/17/24 11:51*	*01/19/24 01:10*	*1*
13C2 PFTeDA	*49*		*10 - 130*	*01/17/24 11:51*	*01/19/24 01:10*	*1*
13C3 PFBS	*78*		*40 - 135*	*01/17/24 11:51*	*01/19/24 01:10*	*1*
13C3 PFHxS	*77*		*40 - 130*	*01/17/24 11:51*	*01/19/24 01:10*	*1*
13C8 PFOS	*77*		*40 - 130*	*01/17/24 11:51*	*01/19/24 01:10*	*1*
13C8 FOSA	*75*		*40 - 130*	*01/17/24 11:51*	*01/19/24 01:10*	*1*
d3-NMeFOSAA	*82*		*40 - 170*	*01/17/24 11:51*	*01/19/24 01:10*	*1*
d5-NEtFOSAA	*73*		*25 - 135*	*01/17/24 11:51*	*01/19/24 01:10*	*1*
M2-4:2 FTS	*90*		*40 - 200*	*01/17/24 11:51*	*01/19/24 01:10*	*1*
M2-6:2 FTS	*83*		*40 - 200*	*01/17/24 11:51*	*01/19/24 01:10*	*1*
M2-8:2 FTS	*85*		*40 - 300*	*01/17/24 11:51*	*01/19/24 01:10*	*1*
13C3 HFPO-DA	*62*		*40 - 130*	*01/17/24 11:51*	*01/19/24 01:10*	*1*
d7-N-MeFOSE-M	*47*		*10 - 130*	*01/17/24 11:51*	*01/19/24 01:10*	*1*
d9-N-EtFOSE-M	*37*		*10 - 130*	*01/17/24 11:51*	*01/19/24 01:10*	*1*
d5-NEtPFOSA	*53*		*10 - 130*	*01/17/24 11:51*	*01/19/24 01:10*	*1*
d3-NMePFOSA	*54*		*10 - 130*	*01/17/24 11:51*	*01/19/24 01:10*	*1*

Client Sample ID: CCW-2C-0124

Lab Sample ID: 320-108687-5

Date Collected: 01/11/24 13:00

Matrix: Water

Date Received: 01/13/24 08:05

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoropentanesulfonic acid (PFPeS)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 18:53	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 PFHxS	*79*		*40 - 130*	*01/17/24 11:51*	*01/19/24 18:53*	*1*

Client Sample ID: CCW-2B-0124

Lab Sample ID: 320-108687-6

Date Collected: 01/11/24 13:55

Matrix: Water

Date Received: 01/13/24 08:05

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**35**		7.2		ng/L		01/17/24 11:51	01/19/24 01:28	1
Perfluoropentanoic acid (PFPeA)	ND		3.6		ng/L		01/17/24 11:51	01/19/24 01:28	1
Perfluoroheptanoic acid (PFHpA)	**2.5**		1.8		ng/L		01/17/24 11:51	01/19/24 01:28	1
Perfluorooctanoic acid (PFOA)	**17**		1.8		ng/L		01/17/24 11:51	01/19/24 01:28	1
Perfluorodecanoic acid (PFDA)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 01:28	1
Perfluoroundecanoic acid (PFUnA)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 01:28	1
Perfluorododecanoic acid (PFDoA)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 01:28	1
Perfluorotridecanoic acid (PFTrDA)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 01:28	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 01:28	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 01:28	1
Perfluorohexanesulfonic acid (PFHxS)	**7.0**		1.8		ng/L		01/17/24 11:51	01/19/24 01:28	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 01:28	1
Perfluorooctanesulfonic acid (PFOS)	**27**		1.8		ng/L		01/17/24 11:51	01/19/24 01:28	1
Perfluorononanesulfonic acid (PFNS)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 01:28	1
Perfluorodecanesulfonic acid (PFDS)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 01:28	1
Perfluorododecanesulfonic acid (PFDoS)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 01:28	1
4:2 FTS	ND		7.2		ng/L		01/17/24 11:51	01/19/24 01:28	1
6:2 FTS	ND		7.2		ng/L		01/17/24 11:51	01/19/24 01:28	1
8:2 FTS	ND		7.2		ng/L		01/17/24 11:51	01/19/24 01:28	1
Perfluorooctanesulfonamide (FOSA)	**1.8**		1.8		ng/L		01/17/24 11:51	01/19/24 01:28	1
NMeFOSA	ND		1.8		ng/L		01/17/24 11:51	01/19/24 01:28	1
NEtFOSA	ND		1.8		ng/L		01/17/24 11:51	01/19/24 01:28	1
NMeFOSAA	ND		1.8		ng/L		01/17/24 11:51	01/19/24 01:28	1
NEtFOSAA	**2.2**		1.8		ng/L		01/17/24 11:51	01/19/24 01:28	1
NMeFOSE	ND		18		ng/L		01/17/24 11:51	01/19/24 01:28	1
NEtFOSE	ND		18		ng/L		01/17/24 11:51	01/19/24 01:28	1
HFPO-DA (GenX)	ND		7.2		ng/L		01/17/24 11:51	01/19/24 01:28	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		7.2		ng/L		01/17/24 11:51	01/19/24 01:28	1
PFMBA	ND		3.6		ng/L		01/17/24 11:51	01/19/24 01:28	1
NFDHA	ND		3.6		ng/L		01/17/24 11:51	01/19/24 01:28	1
PFMPA	ND		3.6		ng/L		01/17/24 11:51	01/19/24 01:28	1
9Cl-PF3ONS	ND		7.2		ng/L		01/17/24 11:51	01/19/24 01:28	1
11Cl-PF3OUdS	ND		7.2		ng/L		01/17/24 11:51	01/19/24 01:28	1
PFEESA	ND		3.6		ng/L		01/17/24 11:51	01/19/24 01:28	1

Client Sample ID: CCW-2B-0124

Date Collected: 01/11/24 13:55
Date Received: 01/13/24 08:05

Lab Sample ID: 320-108687-6

Matrix: Water

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
3:3 FTCA	ND		9.0		ng/L		01/17/24 11:51	01/19/24 01:28	1
5:3 FTCA	ND		45		ng/L		01/17/24 11:51	01/19/24 01:28	1
7:3 FTCA	ND		45		ng/L		01/17/24 11:51	01/19/24 01:28	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*13*		*5 - 130*	*01/17/24 11:51*	*01/19/24 01:28*	*1*
13C5 PFPeA	*61*		*40 - 130*	*01/17/24 11:51*	*01/19/24 01:28*	*1*
13C5 PFHxA	*73*		*40 - 130*	*01/17/24 11:51*	*01/19/24 01:28*	*1*
13C4 PFHpA	*94*		*40 - 130*	*01/17/24 11:51*	*01/19/24 01:28*	*1*
13C8 PFOA	*77*		*40 - 130*	*01/17/24 11:51*	*01/19/24 01:28*	*1*
13C9 PFNA	*86*		*40 - 130*	*01/17/24 11:51*	*01/19/24 01:28*	*1*
13C6 PFDA	*81*		*40 - 130*	*01/17/24 11:51*	*01/19/24 01:28*	*1*
13C7 PFUnA	*82*		*30 - 130*	*01/17/24 11:51*	*01/19/24 01:28*	*1*
13C2 PFDoA	*66*		*10 - 130*	*01/17/24 11:51*	*01/19/24 01:28*	*1*
13C2 PFTeDA	*50*		*10 - 130*	*01/17/24 11:51*	*01/19/24 01:28*	*1*
13C3 PFBS	*72*		*40 - 135*	*01/17/24 11:51*	*01/19/24 01:28*	*1*
13C3 PFHxS	*76*		*40 - 130*	*01/17/24 11:51*	*01/19/24 01:28*	*1*
13C8 PFOS	*81*		*40 - 130*	*01/17/24 11:51*	*01/19/24 01:28*	*1*
13C8 FOSA	*97*		*40 - 130*	*01/17/24 11:51*	*01/19/24 01:28*	*1*
d3-NMeFOSAA	*107*		*40 - 170*	*01/17/24 11:51*	*01/19/24 01:28*	*1*
d5-NEtFOSAA	*106*		*25 - 135*	*01/17/24 11:51*	*01/19/24 01:28*	*1*
M2-4:2 FTS	*99*		*40 - 200*	*01/17/24 11:51*	*01/19/24 01:28*	*1*
M2-6:2 FTS	*138*		*40 - 200*	*01/17/24 11:51*	*01/19/24 01:28*	*1*
M2-8:2 FTS	*134*		*40 - 300*	*01/17/24 11:51*	*01/19/24 01:28*	*1*
13C3 HFPO-DA	*73*		*40 - 130*	*01/17/24 11:51*	*01/19/24 01:28*	*1*
d7-N-MeFOSE-M	*33*		*10 - 130*	*01/17/24 11:51*	*01/19/24 01:28*	*1*
d9-N-EtFOSE-M	*24*		*10 - 130*	*01/17/24 11:51*	*01/19/24 01:28*	*1*
d5-NEtPFOSA	*58*		*10 - 130*	*01/17/24 11:51*	*01/19/24 01:28*	*1*
d3-NMePFOSA	*58*		*10 - 130*	*01/17/24 11:51*	*01/19/24 01:28*	*1*

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	**4.0**		1.8		ng/L		01/17/24 11:51	01/19/24 19:10	1
Perfluorononanoic acid (PFNA)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 19:10	1
Perfluoropentanesulfonic acid (PFPeS)	ND		1.8		ng/L		01/17/24 11:51	01/19/24 19:10	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C5 PFHxA	*77*		*40 - 130*	*01/17/24 11:51*	*01/19/24 19:10*	*1*
13C9 PFNA	*87*		*40 - 130*	*01/17/24 11:51*	*01/19/24 19:10*	*1*
13C3 PFHxS	*93*		*40 - 130*	*01/17/24 11:51*	*01/19/24 19:10*	*1*

Client Sample ID: CCW-2A-0124

Date Collected: 01/11/24 14:40
Date Received: 01/13/24 08:05

Lab Sample ID: 320-108687-7

Matrix: Water

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**13**		7.7		ng/L		01/17/24 11:51	01/19/24 02:21	1
Perfluorohexanoic acid (PFHxA)	**6.6**		1.9		ng/L		01/17/24 11:51	01/19/24 02:21	1
Perfluoroheptanoic acid (PFHpA)	**3.6**		1.9		ng/L		01/17/24 11:51	01/19/24 02:21	1
Perfluorooctanoic acid (PFOA)	**6.4**		1.9		ng/L		01/17/24 11:51	01/19/24 02:21	1

Client: Dalton, Olmsted & Fuglevand, Inc
Project/Site: PFAS, Tacoma WA

Job ID: 320-108687-1

Client Sample ID: CCW-2A-0124
Date Collected: 01/11/24 14:40
Date Received: 01/13/24 08:05

Lab Sample ID: 320-108687-7
Matrix: Water

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorononanoic acid (PFNA)	ND		1.9		ng/L		01/17/24 11:51	01/19/24 02:21	1
Perfluorodecanoic acid (PFDA)	ND		1.9		ng/L		01/17/24 11:51	01/19/24 02:21	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9		ng/L		01/17/24 11:51	01/19/24 02:21	1
Perfluorododecanoic acid (PFDoA)	ND		1.9		ng/L		01/17/24 11:51	01/19/24 02:21	1
Perfluorotridecanoic acid (PFTrDA)	ND		1.9		ng/L		01/17/24 11:51	01/19/24 02:21	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9		ng/L		01/17/24 11:51	01/19/24 02:21	1
Perfluorobutanesulfonic acid (PFBS)	**1.9**		1.9		ng/L		01/17/24 11:51	01/19/24 02:21	1
Perfluoropentanesulfonic acid (PFPeS)	ND		1.9		ng/L		01/17/24 11:51	01/19/24 02:21	1
Perfluorohexanesulfonic acid (PFHxS)	**5.3**		1.9		ng/L		01/17/24 11:51	01/19/24 02:21	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		1.9		ng/L		01/17/24 11:51	01/19/24 02:21	1
Perfluorooctanesulfonic acid (PFOS)	**12**		1.9		ng/L		01/17/24 11:51	01/19/24 02:21	1
Perfluorononanesulfonic acid (PFNS)	ND		1.9		ng/L		01/17/24 11:51	01/19/24 02:21	1
Perfluorodecanesulfonic acid (PFDS)	ND		1.9		ng/L		01/17/24 11:51	01/19/24 02:21	1
Perfluorododecanesulfonic acid (PFDoS)	ND		1.9		ng/L		01/17/24 11:51	01/19/24 02:21	1
4:2 FTS	ND		7.7		ng/L		01/17/24 11:51	01/19/24 02:21	1
6:2 FTS	ND		7.7		ng/L		01/17/24 11:51	01/19/24 02:21	1
8:2 FTS	ND		7.7		ng/L		01/17/24 11:51	01/19/24 02:21	1
Perfluorooctanesulfonamide (FOSA)	ND		1.9		ng/L		01/17/24 11:51	01/19/24 02:21	1
NMeFOSA	ND		1.9		ng/L		01/17/24 11:51	01/19/24 02:21	1
NEtFOSA	ND		1.9		ng/L		01/17/24 11:51	01/19/24 02:21	1
NMeFOSAA	ND		1.9		ng/L		01/17/24 11:51	01/19/24 02:21	1
NEtFOSAA	ND		1.9		ng/L		01/17/24 11:51	01/19/24 02:21	1
NMeFOSE	ND		19		ng/L		01/17/24 11:51	01/19/24 02:21	1
NEtFOSE	ND		19		ng/L		01/17/24 11:51	01/19/24 02:21	1
HFPO-DA (GenX)	ND		7.7		ng/L		01/17/24 11:51	01/19/24 02:21	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		7.7		ng/L		01/17/24 11:51	01/19/24 02:21	1
PFMBA	ND		3.8		ng/L		01/17/24 11:51	01/19/24 02:21	1
NFDHA	ND		3.8		ng/L		01/17/24 11:51	01/19/24 02:21	1
PFMPA	ND		3.8		ng/L		01/17/24 11:51	01/19/24 02:21	1
9Cl-PF3ONS	ND		7.7		ng/L		01/17/24 11:51	01/19/24 02:21	1
11Cl-PF3OUdS	ND		7.7		ng/L		01/17/24 11:51	01/19/24 02:21	1
PFEESA	ND		3.8		ng/L		01/17/24 11:51	01/19/24 02:21	1
3:3 FTCA	ND		9.6		ng/L		01/17/24 11:51	01/19/24 02:21	1
5:3 FTCA	ND		48		ng/L		01/17/24 11:51	01/19/24 02:21	1
7:3 FTCA	ND		48		ng/L		01/17/24 11:51	01/19/24 02:21	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*50*		*5 - 130*	*01/17/24 11:51*	*01/19/24 02:21*	*1*
13C5 PFPeA	*47*		*40 - 130*	*01/17/24 11:51*	*01/19/24 02:21*	*1*
13C5 PFHxA	*49*		*40 - 130*	*01/17/24 11:51*	*01/19/24 02:21*	*1*
13C4 PFHpA	*56*		*40 - 130*	*01/17/24 11:51*	*01/19/24 02:21*	*1*
13C8 PFOA	*55*		*40 - 130*	*01/17/24 11:51*	*01/19/24 02:21*	*1*
13C9 PFNA	*56*		*40 - 130*	*01/17/24 11:51*	*01/19/24 02:21*	*1*
13C6 PFDA	*51*		*40 - 130*	*01/17/24 11:51*	*01/19/24 02:21*	*1*
13C7 PFUnA	*46*		*30 - 130*	*01/17/24 11:51*	*01/19/24 02:21*	*1*

Client Sample ID: CCW-2A-0124

Lab Sample ID: 320-108687-7

Date Collected: 01/11/24 14:40

Matrix: Water

Date Received: 01/13/24 08:05

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 (Continued)

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFDoA	*38*		*10 - 130*	*01/17/24 11:51*	*01/19/24 02:21*	*1*
13C2 PFTeDA	*40*		*10 - 130*	*01/17/24 11:51*	*01/19/24 02:21*	*1*
13C3 PFBS	*49*		*40 - 135*	*01/17/24 11:51*	*01/19/24 02:21*	*1*
13C3 PFHxS	*57*		*40 - 130*	*01/17/24 11:51*	*01/19/24 02:21*	*1*
13C8 PFOS	*54*		*40 - 130*	*01/17/24 11:51*	*01/19/24 02:21*	*1*
13C8 FOSA	*52*		*40 - 130*	*01/17/24 11:51*	*01/19/24 02:21*	*1*
d3-NMeFOSAA	*64*		*40 - 170*	*01/17/24 11:51*	*01/19/24 02:21*	*1*
d5-NEtFOSAA	*58*		*25 - 135*	*01/17/24 11:51*	*01/19/24 02:21*	*1*
M2-4:2 FTS	*76*		*40 - 200*	*01/17/24 11:51*	*01/19/24 02:21*	*1*
M2-6:2 FTS	*79*		*40 - 200*	*01/17/24 11:51*	*01/19/24 02:21*	*1*
M2-8:2 FTS	*80*		*40 - 300*	*01/17/24 11:51*	*01/19/24 02:21*	*1*
13C3 HFPO-DA	*42*		*40 - 130*	*01/17/24 11:51*	*01/19/24 02:21*	*1*
d7-N-MeFOSE-M	*36*		*10 - 130*	*01/17/24 11:51*	*01/19/24 02:21*	*1*
d9-N-EtFOSE-M	*31*		*10 - 130*	*01/17/24 11:51*	*01/19/24 02:21*	*1*
d5-NEtPFOSA	*35*		*10 - 130*	*01/17/24 11:51*	*01/19/24 02:21*	*1*
d3-NMePFOSA	*35*		*10 - 130*	*01/17/24 11:51*	*01/19/24 02:21*	*1*

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoropentanoic acid (PFPeA)	**7.1**		3.8		ng/L		01/17/24 11:51	01/19/24 19:27	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C5 PFPeA	*55*		*40 - 130*	*01/17/24 11:51*	*01/19/24 19:27*	*1*

Client Sample ID: CTMW-17-0124

Lab Sample ID: 320-108687-8

Date Collected: 01/11/24 16:00

Matrix: Water

Date Received: 01/13/24 08:05

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**1500**		7.6		ng/L		01/17/24 11:51	01/19/24 02:38	1
Perfluoroundecanoic acid (PFUnA)	**11**		1.9		ng/L		01/17/24 11:51	01/19/24 02:38	1
Perfluorododecanoic acid (PFDoA)	ND		1.9		ng/L		01/17/24 11:51	01/19/24 02:38	1
Perfluorotridecanoic acid (PFTrDA)	ND		1.9		ng/L		01/17/24 11:51	01/19/24 02:38	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9		ng/L		01/17/24 11:51	01/19/24 02:38	1
4:2 FTS	ND		7.6		ng/L		01/17/24 11:51	01/19/24 02:38	1
6:2 FTS	**86**		7.6		ng/L		01/17/24 11:51	01/19/24 02:38	1
8:2 FTS	ND		7.6		ng/L		01/17/24 11:51	01/19/24 02:38	1
NMeFOSA	ND		1.9		ng/L		01/17/24 11:51	01/19/24 02:38	1
NEtFOSA	ND		1.9		ng/L		01/17/24 11:51	01/19/24 02:38	1
NEtFOSAA	ND		1.9		ng/L		01/17/24 11:51	01/19/24 02:38	1
NMeFOSE	ND		19		ng/L		01/17/24 11:51	01/19/24 02:38	1
NEtFOSE	ND		19		ng/L		01/17/24 11:51	01/19/24 02:38	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*36*		*5 - 130*	*01/17/24 11:51*	*01/19/24 02:38*	*1*
13C7 PFUnA	*31*		*30 - 130*	*01/17/24 11:51*	*01/19/24 02:38*	*1*
13C2 PFDoA	*21*		*10 - 130*	*01/17/24 11:51*	*01/19/24 02:38*	*1*
13C2 PFTeDA	*18*		*10 - 130*	*01/17/24 11:51*	*01/19/24 02:38*	*1*
d5-NEtFOSAA	*40*		*25 - 135*	*01/17/24 11:51*	*01/19/24 02:38*	*1*
M2-4:2 FTS	*59*		*40 - 200*	*01/17/24 11:51*	*01/19/24 02:38*	*1*

Client Sample ID: CTMW-17-0124
Date Collected: 01/11/24 16:00
Date Received: 01/13/24 08:05

Lab Sample ID: 320-108687-8
Matrix: Water

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
M2-6:2 FTS	*68*		*40 - 200*	*01/17/24 11:51*	*01/19/24 02:38*	*1*
M2-8:2 FTS	*62*		*40 - 300*	*01/17/24 11:51*	*01/19/24 02:38*	*1*
d7-N-MeFOSE-M	*23*		*10 - 130*	*01/17/24 11:51*	*01/19/24 02:38*	*1*
d9-N-EtFOSE-M	*20*		*10 - 130*	*01/17/24 11:51*	*01/19/24 02:38*	*1*
d5-NEtPFOSA	*22*		*10 - 130*	*01/17/24 11:51*	*01/19/24 02:38*	*1*
d3-NMePFOSA	*23*		*10 - 130*	*01/17/24 11:51*	*01/19/24 02:38*	*1*

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoropentanoic acid (PFPeA)	ND		40		ng/L		01/22/24 04:23	01/26/24 17:26	1
Perfluorohexanoic acid (PFHxA)	**39**		20		ng/L		01/22/24 04:23	01/26/24 17:26	1
Perfluoroheptanoic acid (PFHpA)	**20**		20		ng/L		01/22/24 04:23	01/26/24 17:26	1
Perfluorooctanoic acid (PFOA)	**54**		20		ng/L		01/22/24 04:23	01/26/24 17:26	1
Perfluorononanoic acid (PFNA)	**44**		20		ng/L		01/22/24 04:23	01/26/24 17:26	1
Perfluorodecanoic acid (PFDA)	ND		20		ng/L		01/22/24 04:23	01/26/24 17:26	1
Perfluorobutanesulfonic acid (PFBS)	**2100**		20		ng/L		01/22/24 04:23	01/26/24 17:26	1
Perfluoropentanesulfonic acid (PFPeS)	ND		20		ng/L		01/22/24 04:23	01/26/24 17:26	1
Perfluorohexanesulfonic acid (PFHxS)	**38**		20		ng/L		01/22/24 04:23	01/26/24 17:26	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		20		ng/L		01/22/24 04:23	01/26/24 17:26	1
Perfluorooctanesulfonic acid (PFOS)	**110**		20		ng/L		01/22/24 04:23	01/26/24 17:26	1
Perfluorononanesulfonic acid (PFNS)	ND		20		ng/L		01/22/24 04:23	01/26/24 17:26	1
Perfluorodecanesulfonic acid (PFDS)	ND		20		ng/L		01/22/24 04:23	01/26/24 17:26	1
Perfluorododecanesulfonic acid (PFDoS)	ND		20		ng/L		01/22/24 04:23	01/26/24 17:26	1
Perfluorooctanesulfonamide (FOSA)	ND		20		ng/L		01/22/24 04:23	01/26/24 17:26	1
NMeFOSAA	ND		20		ng/L		01/22/24 04:23	01/26/24 17:26	1
HFPO-DA (GenX)	ND		80		ng/L		01/22/24 04:23	01/26/24 17:26	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		80		ng/L		01/22/24 04:23	01/26/24 17:26	1
PFMBA	ND		40		ng/L		01/22/24 04:23	01/26/24 17:26	1
NFDHA	ND		40		ng/L		01/22/24 04:23	01/26/24 17:26	1
PFMPA	ND		40		ng/L		01/22/24 04:23	01/26/24 17:26	1
9Cl-PF3ONS	ND		80		ng/L		01/22/24 04:23	01/26/24 17:26	1
11Cl-PF3OUdS	ND		80		ng/L		01/22/24 04:23	01/26/24 17:26	1
PFEESA	ND		40		ng/L		01/22/24 04:23	01/26/24 17:26	1
3:3 FTCA	ND		100		ng/L		01/22/24 04:23	01/26/24 17:26	1
5:3 FTCA	ND		500		ng/L		01/22/24 04:23	01/26/24 17:26	1
7:3 FTCA	ND		500		ng/L		01/22/24 04:23	01/26/24 17:26	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C5 PFPeA	*72*		*40 - 130*	*01/22/24 04:23*	*01/26/24 17:26*	*1*
13C5 PFHxA	*72*		*40 - 130*	*01/22/24 04:23*	*01/26/24 17:26*	*1*
13C4 PFHpA	*76*		*40 - 130*	*01/22/24 04:23*	*01/26/24 17:26*	*1*
13C8 PFOA	*75*		*40 - 130*	*01/22/24 04:23*	*01/26/24 17:26*	*1*
13C9 PFNA	*78*		*40 - 130*	*01/22/24 04:23*	*01/26/24 17:26*	*1*
13C6 PFDA	*70*		*40 - 130*	*01/22/24 04:23*	*01/26/24 17:26*	*1*
13C3 PFBS	*79*		*40 - 135*	*01/22/24 04:23*	*01/26/24 17:26*	*1*

Client Sample ID: CTMW-17-0124

Lab Sample ID: 320-108687-8

Date Collected: 01/11/24 16:00

Matrix: Water

Date Received: 01/13/24 08:05

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 - RE (Continued)

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 PFHxS	*75*		*40 - 130*	*01/22/24 04:23*	*01/26/24 17:26*	*1*
13C8 PFOS	*78*		*40 - 130*	*01/22/24 04:23*	*01/26/24 17:26*	*1*
13C8 FOSA	*71*		*40 - 130*	*01/22/24 04:23*	*01/26/24 17:26*	*1*
d3-NMeFOSAA	*79*		*40 - 170*	*01/22/24 04:23*	*01/26/24 17:26*	*1*
13C3 HFPO-DA	*69*		*40 - 130*	*01/22/24 04:23*	*01/26/24 17:26*	*1*

Client Sample ID: RINSATE BLANK #1-0124

Lab Sample ID: 320-108687-9

Date Collected: 01/11/24 16:30

Matrix: Water

Date Received: 01/13/24 08:05

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		8.2		ng/L		01/17/24 11:51	01/19/24 02:56	1
Perfluoropentanoic acid (PFPeA)	ND		4.1		ng/L		01/17/24 11:51	01/19/24 02:56	1
Perfluorohexanoic acid (PFHxA)	ND		2.1		ng/L		01/17/24 11:51	01/19/24 02:56	1
Perfluoroheptanoic acid (PFHpA)	ND		2.1		ng/L		01/17/24 11:51	01/19/24 02:56	1
Perfluorooctanoic acid (PFOA)	ND		2.1		ng/L		01/17/24 11:51	01/19/24 02:56	1
Perfluorononanoic acid (PFNA)	ND		2.1		ng/L		01/17/24 11:51	01/19/24 02:56	1
Perfluorodecanoic acid (PFDA)	ND		2.1		ng/L		01/17/24 11:51	01/19/24 02:56	1
Perfluoroundecanoic acid (PFUnA)	ND		2.1		ng/L		01/17/24 11:51	01/19/24 02:56	1
Perfluorododecanoic acid (PFDoA)	ND		2.1		ng/L		01/17/24 11:51	01/19/24 02:56	1
Perfluorotridecanoic acid (PFTrDA)	ND		2.1		ng/L		01/17/24 11:51	01/19/24 02:56	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.1		ng/L		01/17/24 11:51	01/19/24 02:56	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.1		ng/L		01/17/24 11:51	01/19/24 02:56	1
Perfluoropentanesulfonic acid (PFPeS)	ND		2.1		ng/L		01/17/24 11:51	01/19/24 02:56	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.1		ng/L		01/17/24 11:51	01/19/24 02:56	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		2.1		ng/L		01/17/24 11:51	01/19/24 02:56	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.1		ng/L		01/17/24 11:51	01/19/24 02:56	1
Perfluorononanesulfonic acid (PFNS)	ND		2.1		ng/L		01/17/24 11:51	01/19/24 02:56	1
Perfluorodecanesulfonic acid (PFDS)	ND		2.1		ng/L		01/17/24 11:51	01/19/24 02:56	1
Perfluorododecanesulfonic acid (PFDoS)	ND		2.1		ng/L		01/17/24 11:51	01/19/24 02:56	1
4:2 FTS	ND		8.2		ng/L		01/17/24 11:51	01/19/24 02:56	1
6:2 FTS	ND		8.2		ng/L		01/17/24 11:51	01/19/24 02:56	1
8:2 FTS	ND		8.2		ng/L		01/17/24 11:51	01/19/24 02:56	1
Perfluorooctanesulfonamide (FOSA)	ND		2.1		ng/L		01/17/24 11:51	01/19/24 02:56	1
NMeFOSA	ND		2.1		ng/L		01/17/24 11:51	01/19/24 02:56	1
NEtFOSA	ND		2.1		ng/L		01/17/24 11:51	01/19/24 02:56	1
NMeFOSAA	ND		2.1		ng/L		01/17/24 11:51	01/19/24 02:56	1
NEtFOSAA	ND		2.1		ng/L		01/17/24 11:51	01/19/24 02:56	1
NMeFOSE	ND		21		ng/L		01/17/24 11:51	01/19/24 02:56	1
NEtFOSE	ND		21		ng/L		01/17/24 11:51	01/19/24 02:56	1
HFPO-DA (GenX)	ND		8.2		ng/L		01/17/24 11:51	01/19/24 02:56	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		8.2		ng/L		01/17/24 11:51	01/19/24 02:56	1
PFMBA	ND		4.1		ng/L		01/17/24 11:51	01/19/24 02:56	1
NFDHA	ND		4.1		ng/L		01/17/24 11:51	01/19/24 02:56	1
PFMPA	ND		4.1		ng/L		01/17/24 11:51	01/19/24 02:56	1
9Cl-PF3ONS	ND		8.2		ng/L		01/17/24 11:51	01/19/24 02:56	1

Client Sample ID: RINSATE BLANK #1-0124

Lab Sample ID: 320-108687-9

Date Collected: 01/11/24 16:30
Matrix: Water
Date Received: 01/13/24 08:05

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
11Cl-PF3OUdS	ND		8.2		ng/L		01/17/24 11:51	01/19/24 02:56	1
PFEESA	ND		4.1		ng/L		01/17/24 11:51	01/19/24 02:56	1
3:3 FTCA	ND		10		ng/L		01/17/24 11:51	01/19/24 02:56	1
5:3 FTCA	ND		52		ng/L		01/17/24 11:51	01/19/24 02:56	1
7:3 FTCA	ND		52		ng/L		01/17/24 11:51	01/19/24 02:56	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*86*		*5 - 130*	*01/17/24 11:51*	*01/19/24 02:56*	*1*
13C5 PFPeA	*87*		*40 - 130*	*01/17/24 11:51*	*01/19/24 02:56*	*1*
13C5 PFHxA	*86*		*40 - 130*	*01/17/24 11:51*	*01/19/24 02:56*	*1*
13C4 PFHpA	*92*		*40 - 130*	*01/17/24 11:51*	*01/19/24 02:56*	*1*
13C8 PFOA	*85*		*40 - 130*	*01/17/24 11:51*	*01/19/24 02:56*	*1*
13C9 PFNA	*81*		*40 - 130*	*01/17/24 11:51*	*01/19/24 02:56*	*1*
13C6 PFDA	*86*		*40 - 130*	*01/17/24 11:51*	*01/19/24 02:56*	*1*
13C7 PFUnA	*78*		*30 - 130*	*01/17/24 11:51*	*01/19/24 02:56*	*1*
13C2 PFDoA	*75*		*10 - 130*	*01/17/24 11:51*	*01/19/24 02:56*	*1*
13C2 PFTeDA	*81*		*10 - 130*	*01/17/24 11:51*	*01/19/24 02:56*	*1*
13C3 PFBS	*93*		*40 - 135*	*01/17/24 11:51*	*01/19/24 02:56*	*1*
13C3 PFHxS	*89*		*40 - 130*	*01/17/24 11:51*	*01/19/24 02:56*	*1*
13C8 PFOS	*92*		*40 - 130*	*01/17/24 11:51*	*01/19/24 02:56*	*1*
13C8 FOSA	*88*		*40 - 130*	*01/17/24 11:51*	*01/19/24 02:56*	*1*
d3-NMeFOSAA	*91*		*40 - 170*	*01/17/24 11:51*	*01/19/24 02:56*	*1*
d5-NEtFOSAA	*82*		*25 - 135*	*01/17/24 11:51*	*01/19/24 02:56*	*1*
M2-4:2 FTS	*111*		*40 - 200*	*01/17/24 11:51*	*01/19/24 02:56*	*1*
M2-6:2 FTS	*106*		*40 - 200*	*01/17/24 11:51*	*01/19/24 02:56*	*1*
M2-8:2 FTS	*111*		*40 - 300*	*01/17/24 11:51*	*01/19/24 02:56*	*1*
13C3 HFPO-DA	*78*		*40 - 130*	*01/17/24 11:51*	*01/19/24 02:56*	*1*
d7-N-MeFOSE-M	*85*		*10 - 130*	*01/17/24 11:51*	*01/19/24 02:56*	*1*
d9-N-EtFOSE-M	*82*		*10 - 130*	*01/17/24 11:51*	*01/19/24 02:56*	*1*
d5-NEtPFOSA	*76*		*10 - 130*	*01/17/24 11:51*	*01/19/24 02:56*	*1*
d3-NMePFOSA	*70*		*10 - 130*	*01/17/24 11:51*	*01/19/24 02:56*	*1*

Client Sample ID: TRIP SOURCE WATER BLANK #1-0124

Lab Sample ID: 320-108687-10

Date Collected: 01/11/24 09:00
Matrix: Water
Date Received: 01/13/24 08:05

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		6.9		ng/L		01/17/24 11:51	01/19/24 03:13	1
Perfluoropentanoic acid (PFPeA)	ND		3.5		ng/L		01/17/24 11:51	01/19/24 03:13	1
Perfluorohexanoic acid (PFHxA)	ND		1.7		ng/L		01/17/24 11:51	01/19/24 03:13	1
Perfluoroheptanoic acid (PFHpA)	ND		1.7		ng/L		01/17/24 11:51	01/19/24 03:13	1
Perfluorooctanoic acid (PFOA)	ND		1.7		ng/L		01/17/24 11:51	01/19/24 03:13	1
Perfluorononanoic acid (PFNA)	ND		1.7		ng/L		01/17/24 11:51	01/19/24 03:13	1
Perfluorodecanoic acid (PFDA)	ND		1.7		ng/L		01/17/24 11:51	01/19/24 03:13	1
Perfluoroundecanoic acid (PFUnA)	ND		1.7		ng/L		01/17/24 11:51	01/19/24 03:13	1
Perfluorododecanoic acid (PFDoA)	ND		1.7		ng/L		01/17/24 11:51	01/19/24 03:13	1
Perfluorotridecanoic acid (PFTrDA)	ND		1.7		ng/L		01/17/24 11:51	01/19/24 03:13	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.7		ng/L		01/17/24 11:51	01/19/24 03:13	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.7		ng/L		01/17/24 11:51	01/19/24 03:13	1

Client Sample ID: TRIP SOURCE WATER BLANK #1-0124
Date Collected: 01/11/24 09:00
Date Received: 01/13/24 08:05

Lab Sample ID: 320-108687-10
Matrix: Water

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoropentanesulfonic acid (PFPeS)	ND		1.7		ng/L		01/17/24 11:51	01/19/24 03:13	1
Perfluorohexanesulfonic acid (PFHxS)	ND		1.7		ng/L		01/17/24 11:51	01/19/24 03:13	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		1.7		ng/L		01/17/24 11:51	01/19/24 03:13	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.7		ng/L		01/17/24 11:51	01/19/24 03:13	1
Perfluorononanesulfonic acid (PFNS)	ND		1.7		ng/L		01/17/24 11:51	01/19/24 03:13	1
Perfluorodecanesulfonic acid (PFDS)	ND		1.7		ng/L		01/17/24 11:51	01/19/24 03:13	1
Perfluorododecanesulfonic acid (PFDoS)	ND		1.7		ng/L		01/17/24 11:51	01/19/24 03:13	1
4:2 FTS	ND		6.9		ng/L		01/17/24 11:51	01/19/24 03:13	1
6:2 FTS	ND		6.9		ng/L		01/17/24 11:51	01/19/24 03:13	1
8:2 FTS	ND		6.9		ng/L		01/17/24 11:51	01/19/24 03:13	1
Perfluorooctanesulfonamide (FOSA)	ND		1.7		ng/L		01/17/24 11:51	01/19/24 03:13	1
NMeFOSA	ND		1.7		ng/L		01/17/24 11:51	01/19/24 03:13	1
NEtFOSA	ND		1.7		ng/L		01/17/24 11:51	01/19/24 03:13	1
NMeFOSAA	ND		1.7		ng/L		01/17/24 11:51	01/19/24 03:13	1
NEtFOSAA	ND		1.7		ng/L		01/17/24 11:51	01/19/24 03:13	1
NMeFOSE	ND		17		ng/L		01/17/24 11:51	01/19/24 03:13	1
NEtFOSE	ND		17		ng/L		01/17/24 11:51	01/19/24 03:13	1
HFPO-DA (GenX)	ND		6.9		ng/L		01/17/24 11:51	01/19/24 03:13	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		6.9		ng/L		01/17/24 11:51	01/19/24 03:13	1
PFMBA	ND		3.5		ng/L		01/17/24 11:51	01/19/24 03:13	1
NFDHA	ND		3.5		ng/L		01/17/24 11:51	01/19/24 03:13	1
PFMPA	ND		3.5		ng/L		01/17/24 11:51	01/19/24 03:13	1
9Cl-PF3ONS	ND		6.9		ng/L		01/17/24 11:51	01/19/24 03:13	1
11Cl-PF3OUdS	ND		6.9		ng/L		01/17/24 11:51	01/19/24 03:13	1
PFEESA	ND		3.5		ng/L		01/17/24 11:51	01/19/24 03:13	1
3:3 FTCA	ND		8.7		ng/L		01/17/24 11:51	01/19/24 03:13	1
5:3 FTCA	ND		43		ng/L		01/17/24 11:51	01/19/24 03:13	1
7:3 FTCA	ND		43		ng/L		01/17/24 11:51	01/19/24 03:13	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*93*		*5 - 130*	*01/17/24 11:51*	*01/19/24 03:13*	*1*
13C5 PFPeA	*92*		*40 - 130*	*01/17/24 11:51*	*01/19/24 03:13*	*1*
13C5 PFHxA	*89*		*40 - 130*	*01/17/24 11:51*	*01/19/24 03:13*	*1*
13C4 PFHpA	*102*		*40 - 130*	*01/17/24 11:51*	*01/19/24 03:13*	*1*
13C8 PFOA	*92*		*40 - 130*	*01/17/24 11:51*	*01/19/24 03:13*	*1*
13C9 PFNA	*95*		*40 - 130*	*01/17/24 11:51*	*01/19/24 03:13*	*1*
13C6 PFDA	*92*		*40 - 130*	*01/17/24 11:51*	*01/19/24 03:13*	*1*
13C7 PFUnA	*87*		*30 - 130*	*01/17/24 11:51*	*01/19/24 03:13*	*1*
13C2 PFDoA	*86*		*10 - 130*	*01/17/24 11:51*	*01/19/24 03:13*	*1*
13C2 PFTeDA	*94*		*10 - 130*	*01/17/24 11:51*	*01/19/24 03:13*	*1*
13C3 PFBS	*102*		*40 - 135*	*01/17/24 11:51*	*01/19/24 03:13*	*1*
13C3 PFHxS	*102*		*40 - 130*	*01/17/24 11:51*	*01/19/24 03:13*	*1*
13C8 PFOS	*101*		*40 - 130*	*01/17/24 11:51*	*01/19/24 03:13*	*1*
13C8 FOSA	*94*		*40 - 130*	*01/17/24 11:51*	*01/19/24 03:13*	*1*
d3-NMeFOSAA	*109*		*40 - 170*	*01/17/24 11:51*	*01/19/24 03:13*	*1*
d5-NEtFOSAA	*99*		*25 - 135*	*01/17/24 11:51*	*01/19/24 03:13*	*1*
M2-4:2 FTS	*121*		*40 - 200*	*01/17/24 11:51*	*01/19/24 03:13*	*1*

Client: Dalton, Olmsted & Fuglevand, Inc
Project/Site: PFAS, Tacoma WA

Job ID: 320-108687-1

Client Sample ID: TRIP SOURCE WATER BLANK #1-0124 **Lab Sample ID: 320-108687-10**
Date Collected: 01/11/24 09:00 **Matrix: Water**
Date Received: 01/13/24 08:05

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
M2-6:2 FTS	116		40 - 200	01/17/24 11:51	01/19/24 03:13	1
M2-8:2 FTS	129		40 - 300	01/17/24 11:51	01/19/24 03:13	1
13C3 HFPO-DA	99		40 - 130	01/17/24 11:51	01/19/24 03:13	1
d7-N-MeFOSE-M	91		10 - 130	01/17/24 11:51	01/19/24 03:13	1
d9-N-EtFOSE-M	91		10 - 130	01/17/24 11:51	01/19/24 03:13	1
d5-NEtPFOSA	93		10 - 130	01/17/24 11:51	01/19/24 03:13	1
d3-NMePFOSA	81		10 - 130	01/17/24 11:51	01/19/24 03:13	1

Isotope Dilution Summary

Client: Dalton, Olmsted & Fuglevand, Inc
Project/Site: PFAS, Tacoma WA

Job ID: 320-108687-1

Method: 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24

Matrix: Water **Prep Type: Total/NA**

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	PFBA (5-130)	PFPeA (40-130)	13C5PHA (40-130)	C4PFHA (40-130)	C8PFOA (40-130)	C9PFNA (40-130)	C6PFDA (40-130)	13C7PUA (30-130)
320-108687-1	CCW-3A-0124	8			77	61	64	61	68
320-108687-1 - RA	CCW-3A-0124						66		
320-108687-1 - RE	CCW-3A-0124		79	83					
320-108687-2	CCW-9-3A-0124	11		43	76	56	64	53	57
320-108687-2 - RA	CCW-9-3A-0124								
320-108687-2 - RE	CCW-9-3A-0124		73						
320-108687-3	CCW-3B-0124	27	65	71	89	75	76	74	71
320-108687-3 - RA	CCW-3B-0124								
320-108687-3 DU	CCW-3B-0124	29	67	74	92	75	89	79	81
320-108687-3 DU - RA	CCW-3B-0124								
320-108687-4	FIELD BLANK #1-0124	74	73	73	79	78	73	73	73
320-108687-5	CCW-2C-0124	55	62	70	78	80	78	74	67
320-108687-5 - RA	CCW-2C-0124								
320-108687-6	CCW-2B-0124	13	61	73	94	77	86	81	82
320-108687-6 - RA	CCW-2B-0124			77			87		
320-108687-7	CCW-2A-0124	50	47	49	56	55	56	51	46
320-108687-7 - RA	CCW-2A-0124		55						
320-108687-8	CTMW-17-0124	36							31
320-108687-8 - RE	CTMW-17-0124		72	72	76	75	78	70	
320-108687-9	RINSATE BLANK #1-0124	86	87	86	92	85	81	86	78
320-108687-10	TRIP SOURCE WATER BLANK #1-0124	93	92	89	102	92	95	92	87
LCS 320-734182/3-A	Lab Control Sample	75	74	70	76	77	72	77	80
LCS 320-735177/3-A	Lab Control Sample	83	76	76	76	80	74	74	77
LLCS 320-734182/2-A	Lab Control Sample	73	74	73	76	73	72	78	74
LLCS 320-735177/2-A	Lab Control Sample	84	80	83	81	86	78	75	84
MB 320-734182/1-A	Method Blank	77	77	80	85	75	84	74	68
MB 320-735177/1-A	Method Blank	82	75	76	73	82	78	75	79

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	PFDoA (10-130)	PFTDA (10-130)	C3PFBS (40-135)	C3PFHS (40-130)	C8PFOS (40-130)	PFOSA (40-130)	d3NMFOS (40-170)	d5NEFOS (25-135)
320-108687-1	CCW-3A-0124	56	57	52	67	68	53	63	73
320-108687-1 - RA	CCW-3A-0124			61	100				
320-108687-1 - RE	CCW-3A-0124								
320-108687-2	CCW-9-3A-0124	50	45		59	54	44	56	63
320-108687-2 - RA	CCW-9-3A-0124			81					
320-108687-2 - RE	CCW-9-3A-0124								
320-108687-3	CCW-3B-0124	58	50	73	82	78	84	96	93
320-108687-3 - RA	CCW-3B-0124				86				
320-108687-3 DU	CCW-3B-0124	68	52	73	78	84	98	99	108
320-108687-3 DU - RA	CCW-3B-0124				106				
320-108687-4	FIELD BLANK #1-0124	72	77	76	75	79	74	87	81
320-108687-5	CCW-2C-0124	57	49	78	77	77	75	82	73
320-108687-5 - RA	CCW-2C-0124				79				
320-108687-6	CCW-2B-0124	66	50	72	76	81	97	107	106
320-108687-6 - RA	CCW-2B-0124				93				
320-108687-7	CCW-2A-0124	38	40	49	57	54	52	64	58
320-108687-7 - RA	CCW-2A-0124								
320-108687-8	CTMW-17-0124	21	18						40

Isotope Dilution Summary

Client: Dalton, Olmsted & Fuglevand, Inc
Job ID: 320-108687-1
Project/Site: PFAS, Tacoma WA

Method: 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 (Continued)

Matrix: Water **Prep Type: Total/NA**

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	PFDoA (10-130)	PFTDA (10-130)	C3PFBS (40-135)	C3PFHS (40-130)	C8PFOS (40-130)	PFOSA (40-130)	d3NMFOS (40-170)	d5NEFOS (25-135)
320-108687-8 - RE	CTMW-17-0124			79	75	78	71	79	
320-108687-9	RINSATE BLANK #1-0124	75	81	93	89	92	88	91	82
320-108687-10	TRIP SOURCE WATER BLANK #1-0124	86	94	102	102	101	94	109	99
LCS 320-734182/3-A	Lab Control Sample	73	76	80	79	78	76	91	81
LCS 320-735177/3-A	Lab Control Sample	59	66	83	80	82	73	73	73
LLCS 320-734182/2-A	Lab Control Sample	67	74	79	78	79	70	78	73
LLCS 320-735177/2-A	Lab Control Sample	67	74	86	81	84	76	72	71
MB 320-734182/1-A	Method Blank	60	66	83	83	84	74	84	75
MB 320-735177/1-A	Method Blank	66	71	83	76	80	73	70	70

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	M242FTS (40-200)	M262FTS (40-200)	M282FTS (40-300)	HFPODA (40-130)	NMFM (10-130)	NEFM (10-130)	d5NPFSA (10-130)	d3NMFSA (10-130)
320-108687-1	CCW-3A-0124		69	104	40	21	26	38	34
320-108687-1 - RA	CCW-3A-0124								
320-108687-1 - RE	CCW-3A-0124	111							
320-108687-2	CCW-9-3A-0124		79	87	56	17	21	32	31
320-108687-2 - RA	CCW-9-3A-0124								
320-108687-2 - RE	CCW-9-3A-0124	99							
320-108687-3	CCW-3B-0124	101	123	118	78	44	37	47	49
320-108687-3 - RA	CCW-3B-0124								
320-108687-3 DU	CCW-3B-0124	97	122	120	80	58	54	60	59
320-108687-3 DU - RA	CCW-3B-0124								
320-108687-4	FIELD BLANK #1-0124	94	93	92	63	72	68	67	59
320-108687-5	CCW-2C-0124	90	83	85	62	47	37	53	54
320-108687-5 - RA	CCW-2C-0124								
320-108687-6	CCW-2B-0124	99	138	134	73	33	24	58	58
320-108687-6 - RA	CCW-2B-0124								
320-108687-7	CCW-2A-0124	76	79	80	42	36	31	35	35
320-108687-7 - RA	CCW-2A-0124								
320-108687-8	CTMW-17-0124	59	68	62		23	20	22	23
320-108687-8 - RE	CTMW-17-0124				69				
320-108687-9	RINSATE BLANK #1-0124	111	106	111	78	85	82	76	70
320-108687-10	TRIP SOURCE WATER BLANK #1-0124	121	116	129	99	91	91	93	81
LCS 320-734182/3-A	Lab Control Sample	89	85	92	66	72	69	66	59
LCS 320-735177/3-A	Lab Control Sample	68	70	69	70	65	69	61	61
LLCS 320-734182/2-A	Lab Control Sample	92	92	98	66	68	68	59	54
LLCS 320-735177/2-A	Lab Control Sample	71	73	68	73	71	73	67	68
MB 320-734182/1-A	Method Blank	102	99	104	76	66	62	59	54
MB 320-735177/1-A	Method Blank	68	71	67	73	65	68	62	62

Surrogate Legend

PFBA = 13C4 PFBA
PFPeA = 13C5 PFPeA
13C5PHA = 13C5 PFHxA
C4PFHA = 13C4 PFHpA
C8PFOA = 13C8 PFOA
C9PFNA = 13C9 PFNA
C6PFDA = 13C6 PFDA
13C7PUA = 13C7 PFUnA

Isotope Dilution Summary

Client: Dalton, Olmsted & Fuglevand, Inc
Job ID: 320-108687-1
Project/Site: PFAS, Tacoma WA

PFDoA = 13C2 PFDoA
PFTDA = 13C2 PFTeDA
C3PFBS = 13C3 PFBS
C3PFHS = 13C3 PFHxS
C8PFOS = 13C8 PFOS
PFOSA = 13C8 FOSA
d3NMFOS = d3-NMeFOSAA
d5NEFOS = d5-NEtFOSAA
M242FTS = M2-4:2 FTS
M262FTS = M2-6:2 FTS
M282FTS = M2-8:2 FTS
HFPODA = 13C3 HFPO-DA
NMFM = d7-N-MeFOSE-M
NEFM = d9-N-EtFOSE-M
d5NPFSA = d5-NEtPFOSA
d3NMFSA = d3-NMePFOSA

Method: 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24

Lab Sample ID: MB 320-734182/1-A
Matrix: Water
Analysis Batch: 734653

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 734182

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		8.0		ng/L		01/17/24 11:51	01/18/24 22:49	1
Perfluoropentanoic acid (PFPeA)	ND		4.0		ng/L		01/17/24 11:51	01/18/24 22:49	1
Perfluorohexanoic acid (PFHxA)	ND		2.0		ng/L		01/17/24 11:51	01/18/24 22:49	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0		ng/L		01/17/24 11:51	01/18/24 22:49	1
Perfluorooctanoic acid (PFOA)	ND		2.0		ng/L		01/17/24 11:51	01/18/24 22:49	1
Perfluorononanoic acid (PFNA)	ND		2.0		ng/L		01/17/24 11:51	01/18/24 22:49	1
Perfluorodecanoic acid (PFDA)	ND		2.0		ng/L		01/17/24 11:51	01/18/24 22:49	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0		ng/L		01/17/24 11:51	01/18/24 22:49	1
Perfluorododecanoic acid (PFDoA)	ND		2.0		ng/L		01/17/24 11:51	01/18/24 22:49	1
Perfluorotridecanoic acid (PFTrDA)	ND		2.0		ng/L		01/17/24 11:51	01/18/24 22:49	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0		ng/L		01/17/24 11:51	01/18/24 22:49	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0		ng/L		01/17/24 11:51	01/18/24 22:49	1
Perfluoropentanesulfonic acid (PFPeS)	ND		2.0		ng/L		01/17/24 11:51	01/18/24 22:49	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0		ng/L		01/17/24 11:51	01/18/24 22:49	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		2.0		ng/L		01/17/24 11:51	01/18/24 22:49	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0		ng/L		01/17/24 11:51	01/18/24 22:49	1
Perfluorononanesulfonic acid (PFNS)	ND		2.0		ng/L		01/17/24 11:51	01/18/24 22:49	1
Perfluorodecanesulfonic acid (PFDS)	ND		2.0		ng/L		01/17/24 11:51	01/18/24 22:49	1
Perfluorododecanesulfonic acid (PFDoS)	ND		2.0		ng/L		01/17/24 11:51	01/18/24 22:49	1
4:2 FTS	ND		8.0		ng/L		01/17/24 11:51	01/18/24 22:49	1
6:2 FTS	ND		8.0		ng/L		01/17/24 11:51	01/18/24 22:49	1
8:2 FTS	ND		8.0		ng/L		01/17/24 11:51	01/18/24 22:49	1
Perfluorooctanesulfonamide (FOSA)	ND		2.0		ng/L		01/17/24 11:51	01/18/24 22:49	1
NMeFOSA	ND		2.0		ng/L		01/17/24 11:51	01/18/24 22:49	1
NEtFOSA	ND		2.0		ng/L		01/17/24 11:51	01/18/24 22:49	1
NMeFOSAA	ND		2.0		ng/L		01/17/24 11:51	01/18/24 22:49	1
NEtFOSAA	ND		2.0		ng/L		01/17/24 11:51	01/18/24 22:49	1
NMeFOSE	ND		20		ng/L		01/17/24 11:51	01/18/24 22:49	1
NEtFOSE	ND		20		ng/L		01/17/24 11:51	01/18/24 22:49	1
HFPO-DA (GenX)	ND		8.0		ng/L		01/17/24 11:51	01/18/24 22:49	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		8.0		ng/L		01/17/24 11:51	01/18/24 22:49	1
PFMBA	ND		4.0		ng/L		01/17/24 11:51	01/18/24 22:49	1
NFDHA	ND		4.0		ng/L		01/17/24 11:51	01/18/24 22:49	1
PFMPA	ND		4.0		ng/L		01/17/24 11:51	01/18/24 22:49	1
9Cl-PF3ONS	ND		8.0		ng/L		01/17/24 11:51	01/18/24 22:49	1
11Cl-PF3OUdS	ND		8.0		ng/L		01/17/24 11:51	01/18/24 22:49	1
PFEESA	ND		4.0		ng/L		01/17/24 11:51	01/18/24 22:49	1
3:3 FTCA	ND		10		ng/L		01/17/24 11:51	01/18/24 22:49	1
5:3 FTCA	ND		50		ng/L		01/17/24 11:51	01/18/24 22:49	1
7:3 FTCA	ND		50		ng/L		01/17/24 11:51	01/18/24 22:49	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*77*		*5 - 130*	*01/17/24 11:51*	*01/18/24 22:49*	*1*
13C5 PFPeA	*77*		*40 - 130*	*01/17/24 11:51*	*01/18/24 22:49*	*1*
13C5 PFHxA	*80*		*40 - 130*	*01/17/24 11:51*	*01/18/24 22:49*	*1*

Method: 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 (Continued)

Lab Sample ID: MB 320-734182/1-A
Matrix: Water
Analysis Batch: 734653

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 734182

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFHpA	85		40 - 130	01/17/24 11:51	01/18/24 22:49	1
13C8 PFOA	75		40 - 130	01/17/24 11:51	01/18/24 22:49	1
13C9 PFNA	84		40 - 130	01/17/24 11:51	01/18/24 22:49	1
13C6 PFDA	74		40 - 130	01/17/24 11:51	01/18/24 22:49	1
13C7 PFUnA	68		30 - 130	01/17/24 11:51	01/18/24 22:49	1
13C2 PFDoA	60		10 - 130	01/17/24 11:51	01/18/24 22:49	1
13C2 PFTeDA	66		10 - 130	01/17/24 11:51	01/18/24 22:49	1
13C3 PFBS	83		40 - 135	01/17/24 11:51	01/18/24 22:49	1
13C3 PFHxS	83		40 - 130	01/17/24 11:51	01/18/24 22:49	1
13C8 PFOS	84		40 - 130	01/17/24 11:51	01/18/24 22:49	1
13C8 FOSA	74		40 - 130	01/17/24 11:51	01/18/24 22:49	1
d3-NMeFOSAA	84		40 - 170	01/17/24 11:51	01/18/24 22:49	1
d5-NEtFOSAA	75		25 - 135	01/17/24 11:51	01/18/24 22:49	1
M2-4:2 FTS	102		40 - 200	01/17/24 11:51	01/18/24 22:49	1
M2-6:2 FTS	99		40 - 200	01/17/24 11:51	01/18/24 22:49	1
M2-8:2 FTS	104		40 - 300	01/17/24 11:51	01/18/24 22:49	1
13C3 HFPO-DA	76		40 - 130	01/17/24 11:51	01/18/24 22:49	1
d7-N-MeFOSE-M	66		10 - 130	01/17/24 11:51	01/18/24 22:49	1
d9-N-EtFOSE-M	62		10 - 130	01/17/24 11:51	01/18/24 22:49	1
d5-NEtPFOSA	59		10 - 130	01/17/24 11:51	01/18/24 22:49	1
d3-NMePFOSA	54		10 - 130	01/17/24 11:51	01/18/24 22:49	1

Lab Sample ID: LCS 320-734182/3-A
Matrix: Water
Analysis Batch: 734653

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 734182

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorobutanoic acid (PFBA)	128	124		ng/L		97	70 - 140
Perfluoropentanoic acid (PFPeA)	64.0	64.1		ng/L		100	65 - 135
Perfluorohexanoic acid (PFHxA)	32.0	34.1		ng/L		107	70 - 145
Perfluoroheptanoic acid (PFHpA)	32.0	31.8		ng/L		99	70 - 150
Perfluorooctanoic acid (PFOA)	32.0	30.7		ng/L		96	70 - 150
Perfluorononanoic acid (PFNA)	32.0	28.8		ng/L		90	70 - 150
Perfluorodecanoic acid (PFDA)	32.0	30.6		ng/L		96	70 - 140
Perfluoroundecanoic acid (PFUnA)	32.0	27.8		ng/L		87	70 - 145
Perfluorododecanoic acid (PFDoA)	32.0	30.8		ng/L		96	70 - 140
Perfluorotridecanoic acid (PFTrDA)	32.0	28.1		ng/L		88	65 - 140
Perfluorotetradecanoic acid (PFTeA)	32.0	26.0		ng/L		81	60 - 140
Perfluorobutanesulfonic acid (PFBS)	28.4	25.0		ng/L		88	60 - 145
Perfluoropentanesulfonic acid (PFPeS)	30.1	28.5		ng/L		95	65 - 140
Perfluorohexanesulfonic acid (PFHxS)	29.2	25.1		ng/L		86	65 - 145
Perfluoroheptanesulfonic acid (PFHpS)	30.5	27.6		ng/L		90	70 - 150

Method: 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 (Continued)

Lab Sample ID: LCS 320-734182/3-A
Matrix: Water
Analysis Batch: 734653

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 734182

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorooctanesulfonic acid (PFOS)	29.8	27.4		ng/L		92	55 - 150
Perfluorononanesulfonic acid (PFNS)	30.7	26.2		ng/L		85	65 - 145
Perfluorodecanesulfonic acid (PFDS)	30.8	27.6		ng/L		89	60 - 145
Perfluorododecanesulfonic acid (PFDoS)	31.0	24.6		ng/L		79	50 - 145
4:2 FTS	120	116		ng/L		97	70 - 145
6:2 FTS	122	126		ng/L		103	65 - 155
8:2 FTS	123	129		ng/L		105	60 - 150
Perfluorooctanesulfonamide (FOSA)	32.0	30.5		ng/L		95	70 - 145
NMeFOSA	32.0	31.3		ng/L		98	60 - 150
NEtFOSA	32.0	29.1		ng/L		91	65 - 145
NMeFOSAA	32.0	29.5		ng/L		92	50 - 140
NEtFOSAA	32.0	30.6		ng/L		96	70 - 145
NMeFOSE	320	310		ng/L		97	70 - 145
NEtFOSE	320	312		ng/L		98	70 - 135
HFPO-DA (GenX)	128	120		ng/L		94	70 - 140
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	121	127		ng/L		105	65 - 145
PFMBA	64.0	64.1		ng/L		100	60 - 150
NFDHA	64.0	69.5		ng/L		109	50 - 150
PFMPA	64.0	60.2		ng/L		94	55 - 140
9Cl-PF3ONS	120	128		ng/L		107	70 - 155
11Cl-PF3OUdS	121	132		ng/L		109	55 - 160
PFEESA	57.1	58.9		ng/L		103	70 - 140
3:3 FTCA	160	140		ng/L		88	65 - 130
5:3 FTCA	799	786		ng/L		98	70 - 135
7:3 FTCA	799	789		ng/L		99	50 - 145

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C4 PFBA	*75*		*5 - 130*
13C5 PFPeA	*74*		*40 - 130*
13C5 PFHxA	*70*		*40 - 130*
13C4 PFHpA	*76*		*40 - 130*
13C8 PFOA	*77*		*40 - 130*
13C9 PFNA	*72*		*40 - 130*
13C6 PFDA	*77*		*40 - 130*
13C7 PFUnA	*80*		*30 - 130*
13C2 PFDoA	*73*		*10 - 130*
13C2 PFTeDA	*76*		*10 - 130*
13C3 PFBS	*80*		*40 - 135*
13C3 PFHxS	*79*		*40 - 130*
13C8 PFOS	*78*		*40 - 130*
13C8 FOSA	*76*		*40 - 130*
d3-NMeFOSAA	*91*		*40 - 170*
d5-NEtFOSAA	*81*		*25 - 135*
M2-4:2 FTS	*89*		*40 - 200*

Method: 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 (Continued)

Lab Sample ID: LCS 320-734182/3-A
Matrix: Water
Analysis Batch: 734653

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 734182

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
M2-6:2 FTS	*85*		*40 - 200*
M2-8:2 FTS	*92*		*40 - 300*
13C3 HFPO-DA	*66*		*40 - 130*
d7-N-MeFOSE-M	*72*		*10 - 130*
d9-N-EtFOSE-M	*69*		*10 - 130*
d5-NEtPFOSA	*66*		*10 - 130*
d3-NMePFOSA	*59*		*10 - 130*

Lab Sample ID: LLCS 320-734182/2-A
Matrix: Water
Analysis Batch: 734653

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 734182

Analyte	Spike Added	LLCS Result	LLCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorobutanoic acid (PFBA)	12.8	12.7		ng/L		99	70 - 140
Perfluoropentanoic acid (PFPeA)	6.40	6.49		ng/L		101	65 - 135
Perfluorohexanoic acid (PFHxA)	3.20	3.15		ng/L		98	70 - 145
Perfluoroheptanoic acid (PFHpA)	3.20	3.28		ng/L		102	70 - 150
Perfluorooctanoic acid (PFOA)	3.20	3.29		ng/L		103	70 - 150
Perfluorononanoic acid (PFNA)	3.20	2.94		ng/L		92	70 - 150
Perfluorodecanoic acid (PFDA)	3.20	3.15		ng/L		99	70 - 140
Perfluoroundecanoic acid (PFUnA)	3.20	3.03		ng/L		95	70 - 145
Perfluorododecanoic acid (PFDoA)	3.20	3.21		ng/L		100	70 - 140
Perfluorotridecanoic acid (PFTrDA)	3.20	2.62		ng/L		82	65 - 140
Perfluorotetradecanoic acid (PFTeA)	3.20	2.68		ng/L		84	60 - 140
Perfluorobutanesulfonic acid (PFBS)	2.84	2.57		ng/L		90	60 - 145
Perfluoropentanesulfonic acid (PFPeS)	3.01	2.91		ng/L		97	65 - 140
Perfluorohexanesulfonic acid (PFHxS)	2.92	2.76		ng/L		94	65 - 145
Perfluoroheptanesulfonic acid (PFHpS)	3.05	2.70		ng/L		89	70 - 150
Perfluorooctanesulfonic acid (PFOS)	2.98	2.91		ng/L		98	55 - 150
Perfluorononanesulfonic acid (PFNS)	3.07	2.68		ng/L		87	65 - 145
Perfluorodecanesulfonic acid (PFDS)	3.08	2.66		ng/L		86	60 - 145
Perfluorododecanesulfonic acid (PFDoS)	3.10	2.28		ng/L		73	50 - 145
4:2 FTS	12.0	12.3		ng/L		103	70 - 145
6:2 FTS	12.2	12.1		ng/L		99	65 - 155
8:2 FTS	12.3	12.5		ng/L		101	60 - 150
Perfluorooctanesulfonamide (FOSA)	3.20	3.09		ng/L		97	70 - 145
NMeFOSA	3.20	3.03		ng/L		95	60 - 150
NEtFOSA	3.20	3.14		ng/L		98	65 - 145
NMeFOSAA	3.20	3.19		ng/L		100	50 - 140

Method: 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 (Continued)

Lab Sample ID: LLCS 320-734182/2-A
Matrix: Water
Analysis Batch: 734653

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 734182

Analyte	Spike Added	LLCS Result	LLCS Qualifier	Unit	D	%Rec	%Rec Limits
NEtFOSAA	3.20	3.37		ng/L		105	70 - 145
NMeFOSE	32.0	30.7		ng/L		96	70 - 145
NEtFOSE	32.0	29.1		ng/L		91	70 - 135
HFPO-DA (GenX)	12.8	12.1		ng/L		95	70 - 140
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	12.1	13.4		ng/L		110	65 - 145
PFMBA	6.40	6.57		ng/L		103	60 - 150
NFDHA	6.40	6.60		ng/L		103	50 - 150
PFMPA	6.40	6.21		ng/L		97	55 - 140
9Cl-PF3ONS	12.0	13.1		ng/L		110	70 - 155
11Cl-PF3OUdS	12.1	12.4		ng/L		102	55 - 160
PFEESA	5.71	5.76		ng/L		101	70 - 140
3:3 FTCA	16.0	14.0		ng/L		88	65 - 130
5:3 FTCA	79.9	77.1		ng/L		97	70 - 135
7:3 FTCA	79.9	75.0		ng/L		94	50 - 145

Isotope Dilution	*LLCS %Recovery*	*LLCS Qualifier*	*Limits*
13C4 PFBA	*73*		*5 - 130*
13C5 PFPeA	*74*		*40 - 130*
13C5 PFHxA	*73*		*40 - 130*
13C4 PFHpA	*76*		*40 - 130*
13C8 PFOA	*73*		*40 - 130*
13C9 PFNA	*72*		*40 - 130*
13C6 PFDA	*78*		*40 - 130*
13C7 PFUnA	*74*		*30 - 130*
13C2 PFDoA	*67*		*10 - 130*
13C2 PFTeDA	*74*		*10 - 130*
13C3 PFBS	*79*		*40 - 135*
13C3 PFHxS	*78*		*40 - 130*
13C8 PFOS	*79*		*40 - 130*
13C8 FOSA	*70*		*40 - 130*
d3-NMeFOSAA	*78*		*40 - 170*
d5-NEtFOSAA	*73*		*25 - 135*
M2-4:2 FTS	*92*		*40 - 200*
M2-6:2 FTS	*92*		*40 - 200*
M2-8:2 FTS	*98*		*40 - 300*
13C3 HFPO-DA	*66*		*40 - 130*
d7-N-MeFOSE-M	*68*		*10 - 130*
d9-N-EtFOSE-M	*68*		*10 - 130*
d5-NEtPFOSA	*59*		*10 - 130*
d3-NMePFOSA	*54*		*10 - 130*

Lab Sample ID: 320-108687-3 DU
Matrix: Water
Analysis Batch: 734653

Client Sample ID: CCW-3B-0124
Prep Type: Total/NA
Prep Batch: 734182

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Perfluorobutanoic acid (PFBA)	70		69.8		ng/L		0.5	30
Perfluoropentanoic acid (PFPeA)	44		44.5		ng/L		0.1	30

Client: Dalton, Olmsted & Fuglevand, Inc
Project/Site: PFAS, Tacoma WA

Job ID: 320-108687-1

Method: 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 (Continued)

Lab Sample ID: 320-108687-3 DU
Matrix: Water
Analysis Batch: 734653

Client Sample ID: CCW-3B-0124
Prep Type: Total/NA
Prep Batch: 734182

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Perfluorohexanoic acid (PFHxA)	32			31.6		ng/L				2	30
Perfluoroheptanoic acid (PFHpA)	15			14.6		ng/L				1	30
Perfluorooctanoic acid (PFOA)	61			59.6		ng/L				2	30
Perfluorononanoic acid (PFNA)	4.1			3.90		ng/L				6	30
Perfluorodecanoic acid (PFDA)	ND			ND		ng/L				NC	30
Perfluoroundecanoic acid (PFUnA)	ND			ND		ng/L				NC	30
Perfluorododecanoic acid (PFDoA)	ND			ND		ng/L				NC	30
Perfluorotridecanoic acid (PFTrDA)	ND			ND		ng/L				NC	30
Perfluorotetradecanoic acid (PFTeA)	ND			ND		ng/L				NC	30
Perfluorobutanesulfonic acid (PFBS)	6.5			6.83		ng/L				5	30
Perfluorohexanesulfonic acid (PFHxS)	23			24.6		ng/L				5	30
Perfluoroheptanesulfonic acid (PFHpS)	ND			ND		ng/L				NC	30
Perfluorooctanesulfonic acid (PFOS)	20			19.8		ng/L				2	30
Perfluorononanesulfonic acid (PFNS)	ND			ND		ng/L				NC	30
Perfluorodecanesulfonic acid (PFDS)	ND			ND		ng/L				NC	30
Perfluorododecanesulfonic acid (PFDoS)	ND			ND		ng/L				NC	30
4:2 FTS	ND			ND		ng/L				NC	30
6:2 FTS	ND			ND		ng/L				NC	30
8:2 FTS	ND			ND		ng/L				NC	30
Perfluorooctanesulfonamide (FOSA)	ND			ND		ng/L				NC	30
NMeFOSA	ND			ND		ng/L				NC	30
NEtFOSA	ND			ND		ng/L				NC	30
NMeFOSAA	ND			ND		ng/L				NC	30
NEtFOSAA	2.4			2.58		ng/L				8	30
NMeFOSE	ND			ND		ng/L				NC	30
NEtFOSE	ND			ND		ng/L				NC	30
HFPO-DA (GenX)	ND			ND		ng/L				NC	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND			ND		ng/L				NC	30
PFMBA	ND			ND		ng/L				NC	30
NFDHA	ND			ND		ng/L				NC	30
PFMPA	ND			ND		ng/L				NC	30
9Cl-PF3ONS	ND			ND		ng/L				NC	30
11Cl-PF3OUdS	ND			ND		ng/L				NC	30
PFEESA	ND			ND		ng/L				NC	30
3:3 FTCA	ND			ND		ng/L				NC	30
5:3 FTCA	ND			ND		ng/L				NC	30
7:3 FTCA	ND			ND		ng/L				NC	30

Method: 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 (Continued)

Isotope Dilution	DU %Recovery	DU Qualifier	Limits
13C4 PFBA	29		5 - 130
13C5 PFPeA	67		40 - 130
13C5 PFHxA	74		40 - 130
13C4 PFHpA	92		40 - 130
13C8 PFOA	75		40 - 130
13C9 PFNA	89		40 - 130
13C6 PFDA	79		40 - 130
13C7 PFUnA	81		30 - 130
13C2 PFDoA	68		10 - 130
13C2 PFTeDA	52		10 - 130
13C3 PFBS	73		40 - 135
13C3 PFHxS	78		40 - 130
13C8 PFOS	84		40 - 130
13C8 FOSA	98		40 - 130
d3-NMeFOSAA	99		40 - 170
d5-NEtFOSAA	108		25 - 135
M2-4:2 FTS	97		40 - 200
M2-6:2 FTS	122		40 - 200
M2-8:2 FTS	120		40 - 300
13C3 HFPO-DA	80		40 - 130
d7-N-MeFOSE-M	58		10 - 130
d9-N-EtFOSE-M	54		10 - 130
d5-NEtPFOSA	60		10 - 130
d3-NMePFOSA	59		10 - 130

Lab Sample ID: MB 320-735177/1-A
Matrix: Water
Analysis Batch: 736673

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 735177

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		8.0		ng/L		01/22/24 04:23	01/26/24 09:49	1
Perfluoropentanoic acid (PFPeA)	ND		4.0		ng/L		01/22/24 04:23	01/26/24 09:49	1
Perfluorohexanoic acid (PFHxA)	ND		2.0		ng/L		01/22/24 04:23	01/26/24 09:49	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0		ng/L		01/22/24 04:23	01/26/24 09:49	1
Perfluorooctanoic acid (PFOA)	ND		2.0		ng/L		01/22/24 04:23	01/26/24 09:49	1
Perfluorononanoic acid (PFNA)	ND		2.0		ng/L		01/22/24 04:23	01/26/24 09:49	1
Perfluorodecanoic acid (PFDA)	ND		2.0		ng/L		01/22/24 04:23	01/26/24 09:49	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0		ng/L		01/22/24 04:23	01/26/24 09:49	1
Perfluorododecanoic acid (PFDoA)	ND		2.0		ng/L		01/22/24 04:23	01/26/24 09:49	1
Perfluorotridecanoic acid (PFTrDA)	ND		2.0		ng/L		01/22/24 04:23	01/26/24 09:49	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0		ng/L		01/22/24 04:23	01/26/24 09:49	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0		ng/L		01/22/24 04:23	01/26/24 09:49	1
Perfluoropentanesulfonic acid (PFPeS)	ND		2.0		ng/L		01/22/24 04:23	01/26/24 09:49	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0		ng/L		01/22/24 04:23	01/26/24 09:49	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		2.0		ng/L		01/22/24 04:23	01/26/24 09:49	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0		ng/L		01/22/24 04:23	01/26/24 09:49	1
Perfluorononanesulfonic acid (PFNS)	ND		2.0		ng/L		01/22/24 04:23	01/26/24 09:49	1
Perfluorodecanesulfonic acid (PFDS)	ND		2.0		ng/L		01/22/24 04:23	01/26/24 09:49	1
Perfluorododecanesulfonic acid (PFDoS)	ND		2.0		ng/L		01/22/24 04:23	01/26/24 09:49	1
4:2 FTS	ND		8.0		ng/L		01/22/24 04:23	01/26/24 09:49	1

Method: 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 (Continued)

Lab Sample ID: MB 320-735177/1-A
Matrix: Water
Analysis Batch: 736673

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 735177

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
6:2 FTS	ND		8.0		ng/L		01/22/24 04:23	01/26/24 09:49	1
8:2 FTS	ND		8.0		ng/L		01/22/24 04:23	01/26/24 09:49	1
Perfluorooctanesulfonamide (FOSA)	ND		2.0		ng/L		01/22/24 04:23	01/26/24 09:49	1
NMeFOSA	ND		2.0		ng/L		01/22/24 04:23	01/26/24 09:49	1
NEtFOSA	ND		2.0		ng/L		01/22/24 04:23	01/26/24 09:49	1
NMeFOSAA	ND		2.0		ng/L		01/22/24 04:23	01/26/24 09:49	1
NEtFOSAA	ND		2.0		ng/L		01/22/24 04:23	01/26/24 09:49	1
NMeFOSE	ND		20		ng/L		01/22/24 04:23	01/26/24 09:49	1
NEtFOSE	ND		20		ng/L		01/22/24 04:23	01/26/24 09:49	1
HFPO-DA (GenX)	ND		8.0		ng/L		01/22/24 04:23	01/26/24 09:49	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		8.0		ng/L		01/22/24 04:23	01/26/24 09:49	1
PFMBA	ND		4.0		ng/L		01/22/24 04:23	01/26/24 09:49	1
NFDHA	ND		4.0		ng/L		01/22/24 04:23	01/26/24 09:49	1
PFMPA	ND		4.0		ng/L		01/22/24 04:23	01/26/24 09:49	1
9Cl-PF3ONS	ND		8.0		ng/L		01/22/24 04:23	01/26/24 09:49	1
11Cl-PF3OUdS	ND		8.0		ng/L		01/22/24 04:23	01/26/24 09:49	1
PFEESA	ND		4.0		ng/L		01/22/24 04:23	01/26/24 09:49	1
3:3 FTCA	ND		10		ng/L		01/22/24 04:23	01/26/24 09:49	1
5:3 FTCA	ND		50		ng/L		01/22/24 04:23	01/26/24 09:49	1
7:3 FTCA	ND		50		ng/L		01/22/24 04:23	01/26/24 09:49	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*82*		*5 - 130*	*01/22/24 04:23*	*01/26/24 09:49*	*1*
13C5 PFPeA	*75*		*40 - 130*	*01/22/24 04:23*	*01/26/24 09:49*	*1*
13C5 PFHxA	*76*		*40 - 130*	*01/22/24 04:23*	*01/26/24 09:49*	*1*
13C4 PFHpA	*73*		*40 - 130*	*01/22/24 04:23*	*01/26/24 09:49*	*1*
13C8 PFOA	*82*		*40 - 130*	*01/22/24 04:23*	*01/26/24 09:49*	*1*
13C9 PFNA	*78*		*40 - 130*	*01/22/24 04:23*	*01/26/24 09:49*	*1*
13C6 PFDA	*75*		*40 - 130*	*01/22/24 04:23*	*01/26/24 09:49*	*1*
13C7 PFUnA	*79*		*30 - 130*	*01/22/24 04:23*	*01/26/24 09:49*	*1*
13C2 PFDoA	*66*		*10 - 130*	*01/22/24 04:23*	*01/26/24 09:49*	*1*
13C2 PFTeDA	*71*		*10 - 130*	*01/22/24 04:23*	*01/26/24 09:49*	*1*
13C3 PFBS	*83*		*40 - 135*	*01/22/24 04:23*	*01/26/24 09:49*	*1*
13C3 PFHxS	*76*		*40 - 130*	*01/22/24 04:23*	*01/26/24 09:49*	*1*
13C8 PFOS	*80*		*40 - 130*	*01/22/24 04:23*	*01/26/24 09:49*	*1*
13C8 FOSA	*73*		*40 - 130*	*01/22/24 04:23*	*01/26/24 09:49*	*1*
d3-NMeFOSAA	*70*		*40 - 170*	*01/22/24 04:23*	*01/26/24 09:49*	*1*
d5-NEtFOSAA	*70*		*25 - 135*	*01/22/24 04:23*	*01/26/24 09:49*	*1*
M2-4:2 FTS	*68*		*40 - 200*	*01/22/24 04:23*	*01/26/24 09:49*	*1*
M2-6:2 FTS	*71*		*40 - 200*	*01/22/24 04:23*	*01/26/24 09:49*	*1*
M2-8:2 FTS	*67*		*40 - 300*	*01/22/24 04:23*	*01/26/24 09:49*	*1*
13C3 HFPO-DA	*73*		*40 - 130*	*01/22/24 04:23*	*01/26/24 09:49*	*1*
d7-N-MeFOSE-M	*65*		*10 - 130*	*01/22/24 04:23*	*01/26/24 09:49*	*1*
d9-N-EtFOSE-M	*68*		*10 - 130*	*01/22/24 04:23*	*01/26/24 09:49*	*1*
d5-NEtPFOSA	*62*		*10 - 130*	*01/22/24 04:23*	*01/26/24 09:49*	*1*
d3-NMePFOSA	*62*		*10 - 130*	*01/22/24 04:23*	*01/26/24 09:49*	*1*

Method: 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 (Continued)

Lab Sample ID: LCS 320-735177/3-A
Matrix: Water
Analysis Batch: 736673

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 735177

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorobutanoic acid (PFBA)	128	130		ng/L		102	70 - 140
Perfluoropentanoic acid (PFPeA)	64.0	72.5		ng/L		113	65 - 135
Perfluorohexanoic acid (PFHxA)	32.0	35.3		ng/L		110	70 - 145
Perfluoroheptanoic acid (PFHpA)	32.0	32.7		ng/L		102	70 - 150
Perfluorooctanoic acid (PFOA)	32.0	32.0		ng/L		100	70 - 150
Perfluorononanoic acid (PFNA)	32.0	33.9		ng/L		106	70 - 150
Perfluorodecanoic acid (PFDA)	32.0	32.4		ng/L		101	70 - 140
Perfluoroundecanoic acid (PFUnA)	32.0	31.6		ng/L		99	70 - 145
Perfluorododecanoic acid (PFDoA)	32.0	39.2		ng/L		122	70 - 140
Perfluorotridecanoic acid (PFTrDA)	32.0	35.5		ng/L		111	65 - 140
Perfluorotetradecanoic acid (PFTeA)	32.0	34.4		ng/L		107	60 - 140
Perfluorobutanesulfonic acid (PFBS)	28.4	28.2		ng/L		99	60 - 145
Perfluoropentanesulfonic acid (PFPeS)	30.1	31.8		ng/L		106	65 - 140
Perfluorohexanesulfonic acid (PFHxS)	29.2	28.7		ng/L		98	65 - 145
Perfluoroheptanesulfonic acid (PFHpS)	30.5	30.1		ng/L		99	70 - 150
Perfluorooctanesulfonic acid (PFOS)	29.8	29.4		ng/L		99	55 - 150
Perfluorononanesulfonic acid (PFNS)	30.7	29.7		ng/L		97	65 - 145
Perfluorodecanesulfonic acid (PFDS)	30.8	28.7		ng/L		93	60 - 145
Perfluorododecanesulfonic acid (PFDoS)	31.0	25.9		ng/L		83	50 - 145
4:2 FTS	120	120		ng/L		100	70 - 145
6:2 FTS	122	124		ng/L		101	65 - 155
8:2 FTS	123	126		ng/L		103	60 - 150
Perfluorooctanesulfonamide (FOSA)	32.0	34.8		ng/L		109	70 - 145
NMeFOSA	32.0	33.4		ng/L		104	60 - 150
NEtFOSA	32.0	34.0		ng/L		106	65 - 145
NMeFOSAA	32.0	32.6		ng/L		102	50 - 140
NEtFOSAA	32.0	31.7		ng/L		99	70 - 145
NMeFOSE	320	352		ng/L		110	70 - 145
NEtFOSE	320	322		ng/L		101	70 - 135
HFPO-DA (GenX)	128	127		ng/L		99	70 - 140
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	121	148		ng/L		122	65 - 145
PFMBA	64.0	69.8		ng/L		109	60 - 150
NFDHA	64.0	65.5		ng/L		102	50 - 150
PFMPA	64.0	76.4		ng/L		119	55 - 140
9Cl-PF3ONS	120	137		ng/L		115	70 - 155
11Cl-PF3OUdS	121	127		ng/L		105	55 - 160
PFEESA	57.1	67.0		ng/L		117	70 - 140
3:3 FTCA	160	174		ng/L		109	65 - 130

Method: 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 (Continued)

Lab Sample ID: LCS 320-735177/3-A
Matrix: Water
Analysis Batch: 736673

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 735177

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
5:3 FTCA	799	883		ng/L		111	70 - 135
7:3 FTCA	799	817		ng/L		102	50 - 145

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C4 PFBA	*83*		*5 - 130*
13C5 PFPeA	*76*		*40 - 130*
13C5 PFHxA	*76*		*40 - 130*
13C4 PFHpA	*76*		*40 - 130*
13C8 PFOA	*80*		*40 - 130*
13C9 PFNA	*74*		*40 - 130*
13C6 PFDA	*74*		*40 - 130*
13C7 PFUnA	*77*		*30 - 130*
13C2 PFDoA	*59*		*10 - 130*
13C2 PFTeDA	*66*		*10 - 130*
13C3 PFBS	*83*		*40 - 135*
13C3 PFHxS	*80*		*40 - 130*
13C8 PFOS	*82*		*40 - 130*
13C8 FOSA	*73*		*40 - 130*
d3-NMeFOSAA	*73*		*40 - 170*
d5-NEtFOSAA	*73*		*25 - 135*
M2-4:2 FTS	*68*		*40 - 200*
M2-6:2 FTS	*70*		*40 - 200*
M2-8:2 FTS	*69*		*40 - 300*
13C3 HFPO-DA	*70*		*40 - 130*
d7-N-MeFOSE-M	*65*		*10 - 130*
d9-N-EtFOSE-M	*69*		*10 - 130*
d5-NEtPFOSA	*61*		*10 - 130*
d3-NMePFOSA	*61*		*10 - 130*

Lab Sample ID: LLCS 320-735177/2-A
Matrix: Water
Analysis Batch: 736673

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 735177

Analyte	Spike Added	LLCS Result	LLCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorobutanoic acid (PFBA)	12.8	12.6		ng/L		98	70 - 140
Perfluoropentanoic acid (PFPeA)	6.40	6.89		ng/L		108	65 - 135
Perfluorohexanoic acid (PFHxA)	3.20	3.26		ng/L		102	70 - 145
Perfluoroheptanoic acid (PFHpA)	3.20	3.05		ng/L		95	70 - 150
Perfluorooctanoic acid (PFOA)	3.20	3.22		ng/L		101	70 - 150
Perfluorononanoic acid (PFNA)	3.20	3.63		ng/L		113	70 - 150
Perfluorodecanoic acid (PFDA)	3.20	2.99		ng/L		93	70 - 140
Perfluoroundecanoic acid (PFUnA)	3.20	3.11		ng/L		97	70 - 145
Perfluorododecanoic acid (PFDoA)	3.20	3.75		ng/L		117	70 - 140
Perfluorotridecanoic acid (PFTrDA)	3.20	3.51		ng/L		110	65 - 140
Perfluorotetradecanoic acid (PFTeA)	3.20	3.41		ng/L		107	60 - 140

Method: 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 (Continued)

Lab Sample ID: LLCS 320-735177/2-A
Matrix: Water
Analysis Batch: 736673

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 735177

Analyte	Spike Added	LLCS Result	LLCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorobutanesulfonic acid (PFBS)	2.84	2.69		ng/L		95	60 - 145
Perfluoropentanesulfonic acid (PFPeS)	3.01	3.06		ng/L		102	65 - 140
Perfluorohexanesulfonic acid (PFHxS)	2.92	2.97		ng/L		102	65 - 145
Perfluoroheptanesulfonic acid (PFHpS)	3.05	3.26		ng/L		107	70 - 150
Perfluorooctanesulfonic acid (PFOS)	2.98	2.88		ng/L		97	55 - 150
Perfluorononanesulfonic acid (PFNS)	3.07	2.97		ng/L		97	65 - 145
Perfluorodecanesulfonic acid (PFDS)	3.08	2.89		ng/L		94	60 - 145
Perfluorododecanesulfonic acid (PFDoS)	3.10	2.68		ng/L		86	50 - 145
4:2 FTS	12.0	12.5		ng/L		105	70 - 145
6:2 FTS	12.2	13.4		ng/L		110	65 - 155
8:2 FTS	12.3	12.7		ng/L		103	60 - 150
Perfluorooctanesulfonamide (FOSA)	3.20	3.41		ng/L		107	70 - 145
NMeFOSA	3.20	2.89		ng/L		90	60 - 150
NEtFOSA	3.20	3.07		ng/L		96	65 - 145
NMeFOSAA	3.20	3.27		ng/L		102	50 - 140
NEtFOSAA	3.20	3.13		ng/L		98	70 - 145
NMeFOSE	32.0	33.6		ng/L		105	70 - 145
NEtFOSE	32.0	33.6		ng/L		105	70 - 135
HFPO-DA (GenX)	12.8	12.5		ng/L		98	70 - 140
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	12.1	14.5		ng/L		119	65 - 145
PFMBA	6.40	6.61		ng/L		103	60 - 150
NFDHA	6.40	6.35		ng/L		99	50 - 150
PFMPA	6.40	6.43		ng/L		100	55 - 140
9Cl-PF3ONS	12.0	13.3		ng/L		112	70 - 155
11Cl-PF3OUdS	12.1	13.3		ng/L		110	55 - 160
PFEESA	5.71	6.18		ng/L		108	70 - 140
3:3 FTCA	16.0	16.2		ng/L		102	65 - 130
5:3 FTCA	79.9	81.0		ng/L		101	70 - 135
7:3 FTCA	79.9	72.0		ng/L		90	50 - 145

Isotope Dilution	*LLCS %Recovery*	*LLCS Qualifier*	*Limits*
13C4 PFBA	*84*		*5 - 130*
13C5 PFPeA	*80*		*40 - 130*
13C5 PFHxA	*83*		*40 - 130*
13C4 PFHpA	*81*		*40 - 130*
13C8 PFOA	*86*		*40 - 130*
13C9 PFNA	*78*		*40 - 130*
13C6 PFDA	*75*		*40 - 130*
13C7 PFUnA	*84*		*30 - 130*
13C2 PFDoA	*67*		*10 - 130*
13C2 PFTeDA	*74*		*10 - 130*

Method: 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 (Continued)

Lab Sample ID: LLCS 320-735177/2-A
Matrix: Water
Analysis Batch: 736673

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 735177

Isotope Dilution	LLCS %Recovery	LLCS Qualifier	Limits
13C3 PFBS	86		40 - 135
13C3 PFHxS	81		40 - 130
13C8 PFOS	84		40 - 130
13C8 FOSA	76		40 - 130
d3-NMeFOSAA	72		40 - 170
d5-NEtFOSAA	71		25 - 135
M2-4:2 FTS	71		40 - 200
M2-6:2 FTS	73		40 - 200
M2-8:2 FTS	68		40 - 300
13C3 HFPO-DA	73		40 - 130
d7-N-MeFOSE-M	71		10 - 130
d9-N-EtFOSE-M	73		10 - 130
d5-NEtPFOSA	67		10 - 130
d3-NMePFOSA	68		10 - 130

Method: 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 - RA

Lab Sample ID: 320-108687-3 DU
Matrix: Water
Analysis Batch: 735099

Client Sample ID: CCW-3B-0124
Prep Type: Total/NA
Prep Batch: 734182

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Perfluoropentanesulfonic acid (PFPeS) - RA	4.2			2.83	F5	ng/L				38	30

Isotope Dilution	DU %Recovery	DU Qualifier	Limits
13C3 PFHxS - RA	106		40 - 130

LCMS

Prep Batch: 734182

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-108687-1	CCW-3A-0124	Total/NA	Water	1633	
320-108687-1 - RA	CCW-3A-0124	Total/NA	Water	1633	
320-108687-2	CCW-9-3A-0124	Total/NA	Water	1633	
320-108687-2 - RA	CCW-9-3A-0124	Total/NA	Water	1633	
320-108687-3	CCW-3B-0124	Total/NA	Water	1633	
320-108687-3 - RA	CCW-3B-0124	Total/NA	Water	1633	
320-108687-4	FIELD BLANK #1-0124	Total/NA	Water	1633	
320-108687-5	CCW-2C-0124	Total/NA	Water	1633	
320-108687-5 - RA	CCW-2C-0124	Total/NA	Water	1633	
320-108687-6	CCW-2B-0124	Total/NA	Water	1633	
320-108687-6 - RA	CCW-2B-0124	Total/NA	Water	1633	
320-108687-7	CCW-2A-0124	Total/NA	Water	1633	
320-108687-7 - RA	CCW-2A-0124	Total/NA	Water	1633	
320-108687-8	CTMW-17-0124	Total/NA	Water	1633	
320-108687-9	RINSATE BLANK #1-0124	Total/NA	Water	1633	
320-108687-10	TRIP SOURCE WATER BLANK #1-0124	Total/NA	Water	1633	
MB 320-734182/1-A	Method Blank	Total/NA	Water	1633	
LCS 320-734182/3-A	Lab Control Sample	Total/NA	Water	1633	
LLCS 320-734182/2-A	Lab Control Sample	Total/NA	Water	1633	
320-108687-3 DU	CCW-3B-0124	Total/NA	Water	1633	
320-108687-3 DU - RA	CCW-3B-0124	Total/NA	Water	1633	

Analysis Batch: 734653

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-108687-1	CCW-3A-0124	Total/NA	Water	1633	734182
320-108687-2	CCW-9-3A-0124	Total/NA	Water	1633	734182
320-108687-3	CCW-3B-0124	Total/NA	Water	1633	734182
320-108687-4	FIELD BLANK #1-0124	Total/NA	Water	1633	734182
320-108687-5	CCW-2C-0124	Total/NA	Water	1633	734182
320-108687-6	CCW-2B-0124	Total/NA	Water	1633	734182
320-108687-7	CCW-2A-0124	Total/NA	Water	1633	734182
320-108687-8	CTMW-17-0124	Total/NA	Water	1633	734182
320-108687-9	RINSATE BLANK #1-0124	Total/NA	Water	1633	734182
320-108687-10	TRIP SOURCE WATER BLANK #1-0124	Total/NA	Water	1633	734182
MB 320-734182/1-A	Method Blank	Total/NA	Water	1633	734182
LCS 320-734182/3-A	Lab Control Sample	Total/NA	Water	1633	734182
LLCS 320-734182/2-A	Lab Control Sample	Total/NA	Water	1633	734182
320-108687-3 DU	CCW-3B-0124	Total/NA	Water	1633	734182

Analysis Batch: 735099

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-108687-1 - RA	CCW-3A-0124	Total/NA	Water	1633	734182
320-108687-2 - RA	CCW-9-3A-0124	Total/NA	Water	1633	734182
320-108687-3 - RA	CCW-3B-0124	Total/NA	Water	1633	734182
320-108687-5 - RA	CCW-2C-0124	Total/NA	Water	1633	734182
320-108687-6 - RA	CCW-2B-0124	Total/NA	Water	1633	734182
320-108687-7 - RA	CCW-2A-0124	Total/NA	Water	1633	734182
320-108687-3 DU - RA	CCW-3B-0124	Total/NA	Water	1633	734182

LCMS

Prep Batch: 735177

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-108687-1 - RE	CCW-3A-0124	Total/NA	Water	1633	
320-108687-2 - RE	CCW-9-3A-0124	Total/NA	Water	1633	
320-108687-8 - RE	CTMW-17-0124	Total/NA	Water	1633	
MB 320-735177/1-A	Method Blank	Total/NA	Water	1633	
LCS 320-735177/3-A	Lab Control Sample	Total/NA	Water	1633	
LLCS 320-735177/2-A	Lab Control Sample	Total/NA	Water	1633	

Analysis Batch: 736673

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-108687-1 - RE	CCW-3A-0124	Total/NA	Water	1633	735177
320-108687-2 - RE	CCW-9-3A-0124	Total/NA	Water	1633	735177
320-108687-8 - RE	CTMW-17-0124	Total/NA	Water	1633	735177
MB 320-735177/1-A	Method Blank	Total/NA	Water	1633	735177
LCS 320-735177/3-A	Lab Control Sample	Total/NA	Water	1633	735177
LLCS 320-735177/2-A	Lab Control Sample	Total/NA	Water	1633	735177

Lab Chronicle

Client: Dalton, Olmsted & Fuglevand, Inc
Project/Site: PFAS, Tacoma WA

Job ID: 320-108687-1

Client Sample ID: CCW-3A-0124
Date Collected: 01/11/24 10:35
Date Received: 01/13/24 08:05

Lab Sample ID: 320-108687-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1633			534.3 mL	5.0 mL	734182	01/17/24 11:51	JS	EET SAC
Total/NA	Analysis	1633		1			734653	01/18/24 23:42	EMF	EET SAC
Total/NA	Prep	1633	RE		50.0 mL	5.0 mL	735177	01/22/24 04:23	HJA	EET SAC
Total/NA	Analysis	1633	RE	1			736673	01/26/24 16:51	S1M	EET SAC
Total/NA	Prep	1633	RA		534.3 mL	5.0 mL	734182	01/17/24 11:51	JS	EET SAC
Total/NA	Analysis	1633	RA	1	1 mL	1 mL	735099	01/19/24 17:47	S1M	EET SAC

Client Sample ID: CCW-9-3A-0124
Date Collected: 01/11/24 10:40
Date Received: 01/13/24 08:05

Lab Sample ID: 320-108687-2
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1633			548.1 mL	5.0 mL	734182	01/17/24 11:51	JS	EET SAC
Total/NA	Analysis	1633		1			734653	01/19/24 00:00	EMF	EET SAC
Total/NA	Prep	1633	RE		50.0 mL	5.0 mL	735177	01/22/24 04:23	HJA	EET SAC
Total/NA	Analysis	1633	RE	1			736673	01/26/24 17:09	S1M	EET SAC
Total/NA	Prep	1633	RA		548.1 mL	5.0 mL	734182	01/17/24 11:51	JS	EET SAC
Total/NA	Analysis	1633	RA	1	1 mL	1 mL	735099	01/19/24 18:04	S1M	EET SAC

Client Sample ID: CCW-3B-0124
Date Collected: 01/11/24 12:00
Date Received: 01/13/24 08:05

Lab Sample ID: 320-108687-3
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1633			548.5 mL	5.0 mL	734182	01/17/24 11:51	JS	EET SAC
Total/NA	Analysis	1633		1			734653	01/19/24 00:17	EMF	EET SAC
Total/NA	Prep	1633	RA		548.5 mL	5.0 mL	734182	01/17/24 11:51	JS	EET SAC
Total/NA	Analysis	1633	RA	1	1 mL	1 mL	735099	01/19/24 18:20	S1M	EET SAC

Client Sample ID: FIELD BLANK #1-0124
Date Collected: 01/11/24 11:15
Date Received: 01/13/24 08:05

Lab Sample ID: 320-108687-4
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1633			474.7 mL	5.0 mL	734182	01/17/24 11:51	JS	EET SAC
Total/NA	Analysis	1633		1			734653	01/19/24 00:52	EMF	EET SAC

Client Sample ID: CCW-2C-0124
Date Collected: 01/11/24 13:00
Date Received: 01/13/24 08:05

Lab Sample ID: 320-108687-5
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1633			554.1 mL	5.0 mL	734182	01/17/24 11:51	JS	EET SAC
Total/NA	Analysis	1633		1			734653	01/19/24 01:10	EMF	EET SAC
Total/NA	Prep	1633	RA		554.1 mL	5.0 mL	734182	01/17/24 11:51	JS	EET SAC
Total/NA	Analysis	1633	RA	1	1 mL	1 mL	735099	01/19/24 18:53	S1M	EET SAC

Lab Chronicle

Client: Dalton, Olmsted & Fuglevand, Inc
Project/Site: PFAS, Tacoma WA

Job ID: 320-108687-1

Client Sample ID: CCW-2B-0124
Date Collected: 01/11/24 13:55
Date Received: 01/13/24 08:05

Lab Sample ID: 320-108687-6
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1633			555.3 mL	5.0 mL	734182	01/17/24 11:51	JS	EET SAC
Total/NA	Analysis	1633		1			734653	01/19/24 01:28	EMF	EET SAC
Total/NA	Prep	1633	RA		555.3 mL	5.0 mL	734182	01/17/24 11:51	JS	EET SAC
Total/NA	Analysis	1633	RA	1	1 mL	1 mL	735099	01/19/24 19:10	S1M	EET SAC

Client Sample ID: CCW-2A-0124
Date Collected: 01/11/24 14:40
Date Received: 01/13/24 08:05

Lab Sample ID: 320-108687-7
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1633			519.6 mL	5.0 mL	734182	01/17/24 11:51	JS	EET SAC
Total/NA	Analysis	1633		1			734653	01/19/24 02:21	EMF	EET SAC
Total/NA	Prep	1633	RA		519.6 mL	5.0 mL	734182	01/17/24 11:51	JS	EET SAC
Total/NA	Analysis	1633	RA	1	1 mL	1 mL	735099	01/19/24 19:27	S1M	EET SAC

Client Sample ID: CTMW-17-0124
Date Collected: 01/11/24 16:00
Date Received: 01/13/24 08:05

Lab Sample ID: 320-108687-8
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1633			523.7 mL	5.0 mL	734182	01/17/24 11:51	JS	EET SAC
Total/NA	Analysis	1633		1			734653	01/19/24 02:38	EMF	EET SAC
Total/NA	Prep	1633	RE		50.0 mL	5.0 mL	735177	01/22/24 04:23	HJA	EET SAC
Total/NA	Analysis	1633	RE	1			736673	01/26/24 17:26	S1M	EET SAC

Client Sample ID: RINSATE BLANK #1-0124
Date Collected: 01/11/24 16:30
Date Received: 01/13/24 08:05

Lab Sample ID: 320-108687-9
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1633			484.9 mL	5.0 mL	734182	01/17/24 11:51	JS	EET SAC
Total/NA	Analysis	1633		1			734653	01/19/24 02:56	EMF	EET SAC

Client Sample ID: TRIP SOURCE WATER BLANK #1-0124
Date Collected: 01/11/24 09:00
Date Received: 01/13/24 08:05

Lab Sample ID: 320-108687-10
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1633			576.3 mL	5.0 mL	734182	01/17/24 11:51	JS	EET SAC
Total/NA	Analysis	1633		1			734653	01/19/24 03:13	EMF	EET SAC

Laboratory References:
EET SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Accreditation/Certification Summary

Client: Dalton, Olmsted & Fuglevand, Inc
Job ID: 320-108687-1
Project/Site: PFAS, Tacoma WA

Laboratory: Eurofins Sacramento

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Washington	State	C581	05-05-24

Method Summary

Client: Dalton, Olmsted & Fuglevand, Inc
Project/Site: PFAS, Tacoma WA

Job ID: 320-108687-1

Method	Method Description	Protocol	Laboratory
1633	Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24	EPA	EET SAC
1633	Solid-Phase Extraction (SPE)	EPA	EET SAC

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

EET SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: Dalton, Olmsted & Fuglevand, Inc
Project/Site: PFAS, Tacoma WA

Job ID: 320-108687-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-108687-1	CCW-3A-0124	Water	01/11/24 10:35	01/13/24 08:05
320-108687-2	CCW-9-3A-0124	Water	01/11/24 10:40	01/13/24 08:05
320-108687-3	CCW-3B-0124	Water	01/11/24 12:00	01/13/24 08:05
320-108687-4	FIELD BLANK #1-0124	Water	01/11/24 11:15	01/13/24 08:05
320-108687-5	CCW-2C-0124	Water	01/11/24 13:00	01/13/24 08:05
320-108687-6	CCW-2B-0124	Water	01/11/24 13:55	01/13/24 08:05
320-108687-7	CCW-2A-0124	Water	01/11/24 14:40	01/13/24 08:05
320-108687-8	CTMW-17-0124	Water	01/11/24 16:00	01/13/24 08:05
320-108687-9	RINSATE BLANK #1-0124	Water	01/11/24 16:30	01/13/24 08:05
320-108687-10	TRIP SOURCE WATER BLANK #1-0124	Water	01/11/24 09:00	01/13/24 08:05

Eurofins Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Phone: 5-373-5600 Fax: 916-372-1059

Chain of Custody Record

★ 2 COOLERS ★

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Client Information	Sampler: A. CERRUTI / C. DANIELS	Lab PM: Horner Nathaniel A	Carrier Tracking No(s):	COC No: 320-58154-15829.1
Client Contact: Trevor Louviere / TASYA GRAY / ANTHONY CERRUTI	Phone: (215) 767 7749	E-Mail: Nathaniel.Horner@et.eurofinsus.com	State of Origin:	Page: ~~Page 1 of 2~~ pg 1 of 1
Company: Dalton, Olmsted & Fuglevand, Inc	PWSID:			Job #:
Address: 1001 SW Klickitat Way Suite 200B	Due Date Requested:			
City: Seattle	TAT Requested (days):			
State, Zip: WA, 98134	Compliance Project: Δ Yes Δ No			
Phone: 206-502-1125(Tel)	PO #: Purchase Order Requested			
Email: tlouviere@dofnw.com (tgray@dofnw.com acerruti@dofnw.com)	WO #:			
Project Name: PFAS Tacoma WA	Project #: 32023663			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

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

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	1633_B24 1633 B24 Standard List	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N		
CCW-3A-0124	1/11/24	1035	G	Water			X		
CCW-9-3A-0124	1/11/24	1040	G	Water			X		
CCW-3B-0124	1/11/24	1200	G	Water			X		
FIELD BLANK #1-0124	1/11/24	1115	G	Water			X		
CCW-2C-0124	1/11/24	1300	G	Water			X		
CCW-2B-0124	1/11/24	1355	G	Water			X		
CCW-2A-0124	1/11/24	1440	G	Water			X		
CCW-17-0124	1/11/24	1610	G	Water			X		
RINSATE BLANK #1-0124	1/11/24	1630	G	Water			X		
TRIP SOURCE WATER BLANK #1-0124	1/11/24	0900	G	Water			X		
				Water					

320-108687 Chain of Custody

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

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

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

Special Instructions/QC Requirements:

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

	Relinquished by	Date/Time	Company	Received by	Date/Time	Company
1	ANTHONY CERRUTI	1/12/24 1200	DOF	FEDEX (UNDER COC)		
2					1/13/24 0805	GEL
3						

Custody Seals Intact: ✓ Yes Δ No	Custody Seal No. 2106976 / 2106977	Cooler Temperature(s) °C and Other Remarks: 4.7

Ver 06/08/2021

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Sacramento Sample Receiving Notes (SSRN)

Loc 320
108687

Job.____ _____

Tracking # 7892 7181 4304

SO / PO / FO / SAT / 2-Day / Ground / UPS / CDO / Courier

GSL / OnTrac / Goldstreak / USPS / Other_____

Use this form to record Sample Custody Seal Cooler Custody Seal Temperature & corrected Temperature & other observations.
File in the job folder with the COC

Therm ID VIL Corr Factor (+ / -) _____ °C

Ice ✓ Wet ✓ Gel _____ Other _____

Cooler Custody Seal 2106977

Cooler ID 2 of 2

Temp Observed 4.7 °C Corrected 4.7 °C

From Temp Blank ☐ Sample ☑

Opening/Processing The Shipment	Yes	No	NA
Cooler compromised/tampered with?	☐	☑	☐
Cooler Temperature is acceptable?	☑	☐	☐
Frozen samples show signs of thaw?	☐	☐	☑

Initials MM Date 1/13/24

Unpacking/Labeling The Samples	Yes	No	NA
Containers are not broken or leaking?	☑	☐	☐
Samples compromised/tampered with?	☐	☑	☐
COC is complete w/o discrepancies	☑	☐	☐
Sample custody seal?	☐	☐	☑
Sample containers have legible labels?	☑	☐	☐
Sample date/times are provided?	☑	☐	☐
Appropriate containers are used?	☑	☐	☐
Sample bottles are completely filled?	☑	☐	☐
Sample preservatives verified?	☐	☐	☑
Is the Field Sampler's name on COC?	☑	☐	☐
Samples w/o discrepancies?	☑	☐	☐
Zero headspace?*	☐	☐	☑
Alkalinity has no headspace?	☐	☐	☑
Perchlorate has headspace? (Methods 314 331 6850)	☐	☐	☑
Multiphasic samples are not present?	☑	☐	☐

*Containers requiring zero headspace have no headspace, or bubble < 6 mm (1/4")

Initials MM Date 1/13/24

Notes _____

Trizma Lot #(s) _____

Ammonium Acetate Lot #(s) _____

Login Completion	Yes	No	NA
Receipt Temperature on COC?	☑	☐	☐
NCM Filed?	☐	☐	☑
Samples received within hold time?	☑	☐	☐
Log Release checked in TALS?	☑	☐	☐

Initials MM Date 1/13/24

Login Sample Receipt Checklist

Client: Dalton, Olmsted & Fuglevand, Inc

Job Number: 320-108687-1

Login Number: 108687
List Number: 1
Creator: Medeiros, Ryan M

List Source: Eurofins Sacramento

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

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 5, 2024

Carolyn Wise, Project Manager
Maul Foster Alongi
1329 N State St, Suite 301
Bellingham, WA 98225

Dear Ms Wise:

Included is the amended report from the testing of material submitted on December 13, 2023 from the TWAAFA-Additional GW Sampling M0615.20.012, F&BI 312247 project. Per your request, sample ID TWA-9-1223 has been amended to TWA-9-3-1223.

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

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Fiona Bellows
MFA1229R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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

December 29, 2023

Carolyn Wise, Project Manager
Maul Foster Alongi
1329 N State St, Suite 301
Bellingham, WA 98225

Dear Ms Wise:

Included are the results from the testing of material submitted on December 13, 2023 from the TWAAFA-Additional GW Sampling M0615.20.012, F&BI 312247 project. There are 50 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 should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
MFA1229R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on December 13, 2023 by Friedman & Bruya, Inc. from the Maul Foster Alongi TWAAFA-Additional GW Sampling M0615.20.012, F&BI 312247 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Maul Foster Alongi
312247 -01	TWA-3-1223
312247 -02	TWA-9-3-1223
312247 -03	TWA-10D-1223
312247 -04	TWA-1-1223
312247 -05	TWA-2-1223
312247 -06	Field Blank1-1223
312247 -07	SB-1A-1223
312247 -08	SB-2A-1223
312247 -09	Filter Blank1-1223
312247 -10	TWA-5D-1223
312247 -11	TWA-6D-1223
312247 -12	SB-3A-1223
312247 -13	CTMW-25D-1223
312247 -14	CTMW-20-1223
312247 -15	MW-1-1223
312247 -16	CTMW-15-1223

All quality control requirements were acceptable.

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	TWA-3-1223	Client:	Maul Foster Alongi
Date Received:	12/13/23	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	312247-01
Date Analyzed:	12/21/23	Data File:	312247-01.220
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	2.26
Copper	4.21
Iron	691
Manganese	465
Nickel	10.1

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	TWA-9-3-1223	Client:	Maul Foster Alongi
Date Received:	12/13/23	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	312247-02
Date Analyzed:	12/21/23	Data File:	312247-02.221
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	2.26
Copper	3.76
Iron	681
Manganese	452
Nickel	9.66

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	TWA-10D-1223	Client:	Maul Foster Alongi
Date Received:	12/13/23	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	312247-03
Date Analyzed:	12/21/23	Data File:	312247-03.222
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Copper	<2.4
Iron	1,030
Manganese	42.2

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	TWA-10D-1223	Client:	Maul Foster Alongi
Date Received:	12/13/23	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	312247-03 x5
Date Analyzed:	12/22/23	Data File:	312247-03 x5.147
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	10.2

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	TWA-1-1223	Client:	Maul Foster Alongi
Date Received:	12/13/23	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	312247-04
Date Analyzed:	12/21/23	Data File:	312247-04.223
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Copper	3.57
Iron	568
Manganese	3.57

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	TWA-2-1223	Client:	Maul Foster Alongi
Date Received:	12/13/23	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	312247-05
Date Analyzed:	12/21/23	Data File:	312247-05.224
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	28.6
Copper	10.2
Iron	413
Manganese	347

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	SB-1A-1223	Client:	Maul Foster Alongi
Date Received:	12/13/23	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	312247-07
Date Analyzed:	12/19/23	Data File:	312247-07.273
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	2.13
Copper	<2.4
Manganese	141

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	SB-1A-1223	Client:	Maul Foster Alongi
Date Received:	12/13/23	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	312247-07 x25
Date Analyzed:	12/20/23	Data File:	312247-07 x25.165
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Iron	2,220

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	SB-2A-1223	Client:	Maul Foster Alongi
Date Received:	12/13/23	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	312247-08
Date Analyzed:	12/21/23	Data File:	312247-08.225
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	2.61
Copper	<2.4
Iron	1,770
Manganese	510

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	Filter Blank1-1223	Client:	Maul Foster Alongi
Date Received:	12/13/23	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	312247-09
Date Analyzed:	12/21/23	Data File:	312247-09.226
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Chromium	1.71
Copper	<2.4
Iron	<50
Manganese	1.87
Nickel	<1

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	TWA-5D-1223	Client:	Maul Foster Alongi
Date Received:	12/13/23	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	312247-10
Date Analyzed:	12/21/23	Data File:	312247-10.227
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Copper	<2.4
Iron	1,780
Manganese	181

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	TWA-5D-1223	Client:	Maul Foster Alongi
Date Received:	12/13/23	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	312247-10 x5
Date Analyzed:	12/22/23	Data File:	312247-10 x5.148
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	5.26

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	TWA-6D-1223	Client:	Maul Foster Alongi
Date Received:	12/13/23	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	312247-11
Date Analyzed:	12/21/23	Data File:	312247-11.231
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Chromium	21.0
Copper	<2.4
Iron	2,950
Manganese	753

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	TWA-6D-1223	Client:	Maul Foster Alongi
Date Received:	12/13/23	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	312247-11 x5
Date Analyzed:	12/22/23	Data File:	312247-11 x5.149
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	6.68

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	SB-3A-1223	Client:	Maul Foster Alongi
Date Received:	12/13/23	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	312247-12
Date Analyzed:	12/21/23	Data File:	312247-12.233
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	1.89
Copper	<2.4
Iron	2,600
Manganese	118

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	CTMW-25D-1223	Client:	Maul Foster Alongi
Date Received:	12/13/23	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	312247-13
Date Analyzed:	12/21/23	Data File:	312247-13.234
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	5.71
Chromium	12.6
Copper	<2.4
Manganese	263

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	CTMW-25D-1223	Client:	Maul Foster Alongi
Date Received:	12/13/23	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	312247-13 x10
Date Analyzed:	12/22/23	Data File:	312247-13 x10.150
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Iron	7,560

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	CTMW-20-1223	Client:	Maul Foster Alongi
Date Received:	12/13/23	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	312247-14
Date Analyzed:	12/21/23	Data File:	312247-14.235
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	6.00
Copper	<2.4

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	CTMW-20-1223	Client:	Maul Foster Alongi
Date Received:	12/13/23	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	312247-14 x10
Date Analyzed:	12/22/23	Data File:	312247-14 x10.151
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Iron	19,100
Manganese	1,280

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MW-1-1223	Client:	Maul Foster Alongi
Date Received:	12/13/23	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	312247-15
Date Analyzed:	12/21/23	Data File:	312247-15.236
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	3.88
Copper	<2.4
Manganese	69.4

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MW-1-1223	Client:	Maul Foster Alongi
Date Received:	12/13/23	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	312247-15 x10
Date Analyzed:	12/22/23	Data File:	312247-15 x10.155
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Iron	6,960

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	CTMW-15-1223	Client:	Maul Foster Alongi
Date Received:	12/13/23	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	312247-16
Date Analyzed:	12/21/23	Data File:	312247-16.237
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	1.82
Copper	<2.4
Manganese	246

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	CTMW-15-1223	Client:	Maul Foster Alongi
Date Received:	12/13/23	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	312247-16 x10
Date Analyzed:	12/22/23	Data File:	312247-16 x10.156
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Iron	8,230

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Maul Foster Alongi
Date Received:	Not Applicable	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	I3-1003 mb
Date Analyzed:	12/18/23	Data File:	I3-1003 mb.143
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Chromium	<1
Copper	<2.4
Iron	<50
Manganese	<1
Nickel	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	TWA-3-1223	Client:	Maul Foster Alongi
Date Received:	12/13/23	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	312247-01
Date Analyzed:	12/21/23	Data File:	312247-01.275
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	2.72
Copper	4.50
Iron	786
Manganese	445
Nickel	10.7

Analysis For Total Metals By EPA Method 6020B

Client ID:	TWA-9-3-1223	Client:	Maul Foster Alongi
Date Received:	12/13/23	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	312247-02
Date Analyzed:	12/21/23	Data File:	312247-02.276
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	3.04
Copper	4.66
Iron	832
Manganese	467
Nickel	10.2

Analysis For Total Metals By EPA Method 6020B

Client ID:	TWA-10D-1223	Client:	Maul Foster Alongi
Date Received:	12/13/23	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	312247-03
Date Analyzed:	12/21/23	Data File:	312247-03.277
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Copper	4.11
Iron	1,240
Manganese	45.7

Analysis For Total Metals By EPA Method 6020B

Client ID:	TWA-10D-1223	Client:	Maul Foster Alongi
Date Received:	12/13/23	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	312247-03 x5
Date Analyzed:	12/26/23	Data File:	312247-03 x5.053
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	9.03

Analysis For Total Metals By EPA Method 6020B

Client ID:	TWA-1-1223	Client:	Maul Foster Alongi
Date Received:	12/13/23	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	312247-04
Date Analyzed:	12/21/23	Data File:	312247-04.278
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	1.37
Copper	3.88
Iron	1,850
Manganese	11.2

Analysis For Total Metals By EPA Method 6020B

Client ID:	TWA-2-1223	Client:	Maul Foster Alongi
Date Received:	12/13/23	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	312247-05
Date Analyzed:	12/21/23	Data File:	312247-05.279
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	26.3
Copper	10.4
Iron	530
Manganese	338

Analysis For Total Metals By EPA Method 6020B

Client ID:	Field Blank1-1223	Client:	Maul Foster Alongi
Date Received:	12/13/23	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	312247-06
Date Analyzed:	12/21/23	Data File:	312247-06.280
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Chromium	1.72
Copper	3.07
Iron	<50
Manganese	1.44
Nickel	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	SB-1A-1223	Client:	Maul Foster Alongi
Date Received:	12/13/23	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	312247-07
Date Analyzed:	12/19/23	Data File:	312247-07.276
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	2.41
Copper	2.57
Manganese	147

Analysis For Total Metals By EPA Method 6020B

Client ID:	SB-1A-1223	Client:	Maul Foster Alongi
Date Received:	12/13/23	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	312247-07 x25
Date Analyzed:	12/20/23	Data File:	312247-07 x25.166
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Iron	2,720

Analysis For Total Metals By EPA Method 6020B

Client ID:	SB-2A-1223	Client:	Maul Foster Alongi
Date Received:	12/13/23	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	312247-08
Date Analyzed:	12/21/23	Data File:	312247-08.281
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	2.47
Copper	<2.4
Iron	2,060
Manganese	528

Analysis For Total Metals By EPA Method 6020B

Client ID:	TWA-5D-1223	Client:	Maul Foster Alongi
Date Received:	12/13/23	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	312247-10
Date Analyzed:	12/21/23	Data File:	312247-10.282
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	5.16
Copper	<2.4
Iron	2,010
Manganese	182

Analysis For Total Metals By EPA Method 6020B

Client ID:	TWA-6D-1223	Client:	Maul Foster Alongi
Date Received:	12/13/23	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	312247-11
Date Analyzed:	12/21/23	Data File:	312247-11.287
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	7.26
Chromium	24.4
Copper	2.97
Iron	3,030
Manganese	749

Analysis For Total Metals By EPA Method 6020B

Client ID:	SB-3A-1223	Client:	Maul Foster Alongi
Date Received:	12/13/23	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	312247-12
Date Analyzed:	12/21/23	Data File:	312247-12.289
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	1.80
Copper	<2.4
Iron	2,940
Manganese	121

Analysis For Total Metals By EPA Method 6020B

Client ID:	CTMW-25D-1223	Client:	Maul Foster Alongi
Date Received:	12/13/23	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	312247-13
Date Analyzed:	12/21/23	Data File:	312247-13.290
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	6.33
Chromium	15.9
Copper	2.74
Manganese	299

Analysis For Total Metals By EPA Method 6020B

Client ID:	CTMW-25D-1223	Client:	Maul Foster Alongi
Date Received:	12/13/23	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	312247-13 x10
Date Analyzed:	12/26/23	Data File:	312247-13 x10.054
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Iron	8,210

Analysis For Total Metals By EPA Method 6020B

Client ID:	CTMW-20-1223	Client:	Maul Foster Alongi
Date Received:	12/13/23	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	312247-14
Date Analyzed:	12/21/23	Data File:	312247-14.291
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	5.86
Copper	<2.4

Analysis For Total Metals By EPA Method 6020B

Client ID:	CTMW-20-1223	Client:	Maul Foster Alongi
Date Received:	12/13/23	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	312247-14 x10
Date Analyzed:	12/26/23	Data File:	312247-14 x10.055
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Iron	17,700
Manganese	1,130

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-1-1223	Client:	Maul Foster Alongi
Date Received:	12/13/23	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	312247-15
Date Analyzed:	12/21/23	Data File:	312247-15.292
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	4.22
Copper	6.59
Manganese	70.1

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-1-1223	Client:	Maul Foster Alongi
Date Received:	12/13/23	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	312247-15 x10
Date Analyzed:	12/26/23	Data File:	312247-15 x10.056
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Iron	6,840

Analysis For Total Metals By EPA Method 6020B

Client ID:	CTMW-15-1223	Client:	Maul Foster Alongi
Date Received:	12/13/23	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	312247-16
Date Analyzed:	12/21/23	Data File:	312247-16.293
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	1.79
Copper	<2.4
Manganese	272

Analysis For Total Metals By EPA Method 6020B

Client ID:	CTMW-15-1223	Client:	Maul Foster Alongi
Date Received:	12/13/23	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	312247-16 x10
Date Analyzed:	12/26/23	Data File:	312247-16 x10.057
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Iron	7,710

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Maul Foster Alongi
Date Received:	Not Applicable	Project:	M0615.20.012, F&BI 312247
Date Extracted:	12/18/23	Lab ID:	I3-1004 mb
Date Analyzed:	12/18/23	Data File:	I3-1004 mb.145
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Chromium	<1
Copper	<2.4
Iron	<50
Manganese	<1
Nickel	<1

Date of Report: 12/29/23
Date Received: 12/13/23
Project: TWAAFA-Additional GW Sampling M0615.20.012, F&BI 312247

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

Laboratory Code: 312247-07 (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	2.13	105 b	104 b	75-125	1 b
Chromium	ug/L (ppb)	20	<1	87	86	75-125	1
Copper	ug/L (ppb)	20	<5	85	85	75-125	0
Iron	ug/L (ppb)	100	2,320	84 b	125 b	75-125	39 b
Manganese	ug/L (ppb)	20	141	84 b	99 b	75-125	16 b
Nickel	ug/L (ppb)	20	3.29	89	88	75-125	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	94	80-120
Chromium	ug/L (ppb)	20	85	80-120
Copper	ug/L (ppb)	20	94	80-120
Iron	ug/L (ppb)	100	100	80-120
Manganese	ug/L (ppb)	20	87	80-120
Nickel	ug/L (ppb)	20	94	80-120

Date of Report: 12/29/23
Date Received: 12/13/23
Project: TWAAFA-Additional GW Sampling M0615.20.012, F&BI 312247

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

Laboratory Code: 312247-07 (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	2.41	105 b	103 b	75-125	2 b
Chromium	ug/L (ppb)	20	<1	86	83	75-125	4
Copper	ug/L (ppb)	20	<5	83	81	75-125	2
Iron	ug/L (ppb)	100	2,950	88 b	0 b	75-125	200 b
Manganese	ug/L (ppb)	20	147	89 b	78 b	75-125	13 b
Nickel	ug/L (ppb)	20	3.28	88	84	75-125	5

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	95	80-120
Chromium	ug/L (ppb)	20	89	80-120
Copper	ug/L (ppb)	20	95	80-120
Iron	ug/L (ppb)	100	96	80-120
Manganese	ug/L (ppb)	20	89	80-120
Nickel	ug/L (ppb)	20	97	80-120

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, biased low; or, the calibration results for the analyte were outside of acceptance criteria, biased high, with a detection for the analyte in the sample. 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 standard reporting limit. 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.

k – The calibration results for the analyte were outside of acceptance criteria, biased high, and the analyte was not detected in the sample.

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.

312247

SAMPLE CHAIN OF CUSTODY

12/13/23 LS

Page # 1 of 2

Report To:_Carolyn Wise

Company:_Maul Foster Alongi, Inc.

Address:_1329 North State Street, Suite 301

City, State, ZIP:_Bellingham, WA 98225

Phone: 360-594-6225 Email: cwise@maulfoster.com

SAMPLERS (*signature*): Brenden Murphy

PROJECT NAME: TWAAFA - Additional GW Sampling

PO #: M0615.20.012

REMARKS: All samples field filtered.

Project Specific RLs - (Yes) / No

INVOICE TO: C. Wise, MFA

TURNAROUND TIME
X :Standard Turnaround
:RUSH_____
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
X Archive Samples
Other_____

ID updated per FB 02/02/24 ME

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED: Total/[illegible] As, Cu, EPA 6020 Mn, Al, Fe	[illegible]/Diss Cu, As, EPA 6020 Mn, Al, Fe	Total/Diss Mn EPA 6020	Total/Diss Al EPA 6020	Total/Diss Fe EPA 6020	Total/[illegible] Cr EPA 6020	Total/[illegible] Ni EPA 6020	Dissolved Cr EPA 6020	Dissolved Ni EPA 6020			Notes
TWA-3-1223	01 A-B	12/12/23	12:40	Water	2	X	X					X		X			
TWA-9-3-1223	02	12/12/23	12:40		2	X	X					X		X			
TWA-10D-1223	03	12/12/23	12:53		2	X	X										
TWA-1-1223	04	12/12/23	14:15		2	X	X										
TWA-2-1223	05	12/12/23	14:25		2	X	X										
Field Blank1-1223	06	12/12/23	15:50		1	X					X	X					
SB-1A-1223	07 A-F	12/12/23	16:00		6	X	X										MS/MSD
SB-2A-1223	08 A B	12/12/23	16:15		2	X	X										
Filter Blank1-1223	09	12/13/23	8:45		1		X						X	X			
TWA-5D-1223	10 AB	12/13/23	9:35		2	X	X										Samples received at 1 °C

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Brenden Murphy	Brenden Murphy	MFA	12/13/23	15:45
Received by:	Nhut Truong	F&B	12/13/23	15:45
Relinquished by:				
Received by:				

Friedman & Bruya, Inc.
5500 4th Avenue S
Seattle, WA 98108
Ph. (206) 285-8282

312247

SAMPLE CHAIN OF CUSTODY

12/13/23 LS

Page # 2 of 2

Report To:_Carolyn Wise

Company:_Maul Foster Alongi, Inc.

Address:_1329 North State Street, Suite 301

City, State, ZIP:_Bellingham, WA 98225

Phone: 360-594-6225 Email: cwise@maulfoster.com

SAMPLERS (*signature*): Brenden Murphy

PROJECT NAME: TWAAFA - Additional GW Sampling

PO #: M0615.20.012

REMARKS: All samples field filtered.

Project Specific RLs - (Yes) / No

INVOICE TO: C. Wise, MFA

TURNAROUND TIME
X :Standard Turnaround
:RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
X Archive Samples
Other

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED: Total [redacted] As, Cu, Mn, Al, Fe EPA 6020	Diss [redacted] Cu, As, Mn, Al, Fe EPA 6020	Total/Diss Mn EPA 6020	Total/Diss Al EPA 6020	Total/Diss Fe EPA 6020	Total [redacted] Cr EPA 6020	Total [redacted] Ni EPA 6020	Dissolved Cr EPA 6020	Dissolved Ni EPA 6020			Notes
TWA-6D-1223	11 A-B	12/13/23	9:45	WATER	2	X	X				X		X				
SB-3A-1223	12	12/13/23	10:30		2	X	X										
CTMW-25D-1223	13	12/13/23	12:05		2	X	X				X		X				
CTMW-20-1223	14	12/13/23	12:10		2	X	X										
MW-1-1223	15	12/13/23	13:15		2	X	X										
CTMW-15-1223	16	12/13/23	13:20		2	X	X										
							Samples received at 1 °C										

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Brenden Murphy	Brenden Murphy	MFA	12/13/23	15:45
Received by:	NHUT TRUONG	F&B I	12/13/23	15:5
Relinquished by:				
Received by:				

Friedman & Bruya, Inc.
5500 4th Avenue S
Seattle, WA 98108
Ph. (206) 285-8282

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: 312247
Work Order Number: 2312341

December 21, 2023

Attention Michael Erdahl:

Fremont Analytical, Inc. received 16 sample(s) on 12/14/2023 for the analyses presented in the following report.

Dissolved Metals by EPA Method 200.8
Total Metals by EPA Method 200.8

This report consists of the following:

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

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

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes
Project Manager

CLIENT: Friedman & Bruya
Project: 312247
Work Order: 2312341

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2312341-001	TWA-3-1223	12/12/2023 12:40 PM	12/14/2023 10:20 AM
2312341-002	TWA-9-3-1223	12/12/2023 12:40 PM	12/14/2023 10:20 AM
2312341-003	TWA-10D-1223	12/12/2023 12:53 PM	12/14/2023 10:20 AM
2312341-004	TWA-1-1223	12/12/2023 2:15 PM	12/14/2023 10:20 AM
2312341-005	TWA-2-1223	12/12/2023 2:25 PM	12/14/2023 10:20 AM
2312341-006	Field Blank1-1223	12/12/2023 3:50 PM	12/14/2023 10:20 AM
2312341-007	SB-1A-1223	12/12/2023 4:00 PM	12/14/2023 10:20 AM
2312341-008	SB-2A-1223	12/12/2023 4:15 PM	12/14/2023 10:20 AM
2312341-009	Filter Blank1-1223	12/13/2023 8:45 AM	12/14/2023 10:20 AM
2312341-010	TWA-5D-1223	12/13/2023 9:35 AM	12/14/2023 10:20 AM
2312341-011	TWA-6D-1223	12/13/2023 9:45 AM	12/14/2023 10:20 AM
2312341-012	SB-3A-1223	12/13/2023 10:30 AM	12/14/2023 10:20 AM
2312341-013	CTMW-25D-1223	12/13/2023 12:05 PM	12/14/2023 10:20 AM
2312341-014	CTMW-20-1223	12/13/2023 12:10 PM	12/14/2023 10:20 AM
2312341-015	MW-1-1223	12/13/2023 1:15 PM	12/14/2023 10:20 AM
2312341-016	CTMW-15-1223	12/13/2023 1:20 PM	12/14/2023 10:20 AM

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

Case Narrative

WO#: **2312341**
Date: **12/21/2023**

CLIENT: Friedman & Bruya
Project: 312247

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.

2/5/24- Revised report includes an updated Sample ID for 2312341-002 per client request.

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: 312247

Lab ID: 2312341-001 **Collection Date:** 12/12/2023 12:40:00 PM
Client Sample ID: **TWA-3-1223** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 42413		Analyst: SLL
Aluminum	ND	10.0		µg/L	1	12/21/2023 11:07:00 AM
Total Metals by EPA Method 200.8				Batch ID: 42396		Analyst: SLL
Aluminum	ND	10.0		µg/L	1	12/21/2023 1:09:00 PM

Lab ID: 2312341-002 **Collection Date:** 12/12/2023 12:40:00 PM
Client Sample ID: **TWA-9-3-1223** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 42413		Analyst: SLL
Aluminum	ND	10.0		µg/L	1	12/21/2023 11:09:00 AM
Total Metals by EPA Method 200.8				Batch ID: 42396		Analyst: SLL
Aluminum	ND	10.0		µg/L	1	12/21/2023 1:11:00 PM

Lab ID: 2312341-003 **Collection Date:** 12/12/2023 12:53:00 PM
Client Sample ID: **TWA-10D-1223** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 42413		Analyst: SLL
Aluminum	14.3	10.0		µg/L	1	12/21/2023 11:11:00 AM
Total Metals by EPA Method 200.8				Batch ID: 42396		Analyst: SLL
Aluminum	46.4	10.0		µg/L	1	12/21/2023 1:14:00 PM

CLIENT: Friedman & Bruya
Project: 312247

Lab ID: 2312341-004 **Collection Date:** 12/12/2023 2:15:00 PM
Client Sample ID: **TWA-1-1223** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 42413		Analyst: SLL
Aluminum	ND	10.0		µg/L	1	12/21/2023 11:14:00 AM
Total Metals by EPA Method 200.8				Batch ID: 42396		Analyst: SLL
Aluminum	14.8	10.0		µg/L	1	12/21/2023 1:16:00 PM

Lab ID: 2312341-005 **Collection Date:** 12/12/2023 2:25:00 PM
Client Sample ID: **TWA-2-1223** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 42413		Analyst: SLL
Aluminum	ND	10.0		µg/L	1	12/21/2023 11:16:00 AM
Total Metals by EPA Method 200.8				Batch ID: 42396		Analyst: SLL
Aluminum	34.1	10.0		µg/L	1	12/21/2023 1:19:00 PM

Lab ID: 2312341-006 **Collection Date:** 12/12/2023 3:50:00 PM
Client Sample ID: **Field Blank1-1223** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Total Metals by EPA Method 200.8				Batch ID: 42396		Analyst: SLL
Aluminum	19.4	10.0		µg/L	1	12/21/2023 1:26:00 PM

CLIENT: Friedman & Bruya
Project: 312247

Lab ID: 2312341-007 **Collection Date:** 12/12/2023 4:00:00 PM
Client Sample ID: **SB-1A-1223** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 42413		Analyst: SLL
Aluminum	ND	10.0		µg/L	1	12/21/2023 10:50:00 AM
Total Metals by EPA Method 200.8				Batch ID: 42396		Analyst: SLL
Aluminum	ND	10.0		µg/L	1	12/21/2023 1:02:00 PM

Lab ID: 2312341-008 **Collection Date:** 12/12/2023 4:15:00 PM
Client Sample ID: **SB-2A-1223** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 42413		Analyst: SLL
Aluminum	11.1	10.0		µg/L	1	12/21/2023 11:19:00 AM
Total Metals by EPA Method 200.8				Batch ID: 42396		Analyst: SLL
Aluminum	49.9	10.0		µg/L	1	12/21/2023 1:28:00 PM

Lab ID: 2312341-009 **Collection Date:** 12/13/2023 8:45:00 AM
Client Sample ID: **Filter Blank1-1223** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 42413		Analyst: SLL
Aluminum	17.5	10.0		µg/L	1	12/21/2023 11:21:00 AM

CLIENT: Friedman & Bruya
Project: 312247

Lab ID: 2312341-010 **Collection Date:** 12/13/2023 9:35:00 AM
Client Sample ID: **TWA-5D-1223** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 42413		Analyst: SLL
Aluminum	11.4	10.0		µg/L	1	12/21/2023 11:24:00 AM
Total Metals by EPA Method 200.8				Batch ID: 42396		Analyst: SLL
Aluminum	19.7	10.0		µg/L	1	12/21/2023 1:31:00 PM

Lab ID: 2312341-011 **Collection Date:** 12/13/2023 9:45:00 AM
Client Sample ID: **TWA-6D-1223** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 42413		Analyst: SLL
Aluminum	49.9	10.0		µg/L	1	12/21/2023 11:26:00 AM
Total Metals by EPA Method 200.8				Batch ID: 42396		Analyst: SLL
Aluminum	75.6	10.0		µg/L	1	12/21/2023 1:34:00 PM

Lab ID: 2312341-012 **Collection Date:** 12/13/2023 10:30:00 AM
Client Sample ID: **SB-3A-1223** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 42413		Analyst: SLL
Aluminum	ND	10.0		µg/L	1	12/21/2023 11:29:00 AM
Total Metals by EPA Method 200.8				Batch ID: 42396		Analyst: SLL
Aluminum	ND	10.0		µg/L	1	12/21/2023 1:36:00 PM

CLIENT: Friedman & Bruya
Project: 312247

Lab ID: 2312341-013 **Collection Date:** 12/13/2023 12:05:00 PM
Client Sample ID: **CTMW-25D-1223** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 42413		Analyst: SLL
Aluminum	59.2	10.0		µg/L	1	12/21/2023 11:36:00 AM
Total Metals by EPA Method 200.8				Batch ID: 42396		Analyst: SLL
Aluminum	88.0	10.0		µg/L	1	12/21/2023 1:38:00 PM

Lab ID: 2312341-014 **Collection Date:** 12/13/2023 12:10:00 PM
Client Sample ID: **CTMW-20-1223** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 42413		Analyst: SLL
Aluminum	ND	10.0		µg/L	1	12/21/2023 11:38:00 AM
Total Metals by EPA Method 200.8				Batch ID: 42396		Analyst: SLL
Aluminum	ND	10.0		µg/L	1	12/21/2023 1:41:00 PM

Lab ID: 2312341-015 **Collection Date:** 12/13/2023 1:15:00 PM
Client Sample ID: **MW-1-1223** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 42413		Analyst: SLL
Aluminum	16.6	10.0		µg/L	1	12/21/2023 11:41:00 AM
Total Metals by EPA Method 200.8				Batch ID: 42396		Analyst: SLL
Aluminum	71.1	10.0		µg/L	1	12/21/2023 1:43:00 PM

CLIENT: Friedman & Bruya
Project: 312247

Lab ID: 2312341-016 **Collection Date:** 12/13/2023 1:20:00 PM
Client Sample ID: **CTMW-15-1223** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Metals by EPA Method 200.8				Batch ID: 42413		Analyst: SLL
Aluminum	ND	10.0		µg/L	1	12/21/2023 11:43:00 AM
Total Metals by EPA Method 200.8				Batch ID: 42396		Analyst: SLL
Aluminum	ND	10.0		µg/L	1	12/21/2023 1:46:00 PM

Work Order: 2312341
CLIENT: Friedman & Bruya
Project: 312247

QC SUMMARY REPORT

Dissolved Metals by EPA Method 200.8

Sample ID: **ICB**	SampType: **ICB**	Units: **µg/L**	Prep Date: **12/21/2023**	RunNo: **88496**
Client ID: **ICB**	Batch ID: **R88496**		Analysis Date: **12/21/2023**	SeqNo: **1848083**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **ICV**	SampType: **ICV**	Units: **µg/L**	Prep Date: **12/21/2023**	RunNo: **88496**
Client ID: **ICV**	Batch ID: **R88496**		Analysis Date: **12/21/2023**	SeqNo: **1848084**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,450	10.0	1,500	0	96.8	90	110				

Sample ID: **MB-42413**	SampType: **MBLK**	Units: **µg/L**	Prep Date: **12/21/2023**	RunNo: **88496**
Client ID: **MBLKW**	Batch ID: **42413**		Analysis Date: **12/21/2023**	SeqNo: **1848085**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **LCS-42413**	SampType: **LCS**	Units: **µg/L**	Prep Date: **12/21/2023**	RunNo: **88496**
Client ID: **LCSW**	Batch ID: **42413**		Analysis Date: **12/21/2023**	SeqNo: **1848086**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	906	10.0	1,000	0	90.6	85	115				

Sample ID: **2312341-007BDUP**	SampType: **DUP**	Units: **µg/L**	Prep Date: **12/21/2023**	RunNo: **88496**
Client ID: **SB-1A-1223**	Batch ID: **42413**		Analysis Date: **12/21/2023**	SeqNo: **1848088**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0						0		30	

Work Order: 2312341
CLIENT: Friedman & Bruya
Project: 312247

QC SUMMARY REPORT

Dissolved Metals by EPA Method 200.8

Sample ID: **2312341-007BMS**	SampType: **MS**			Units: **µg/L**		Prep Date: **12/21/2023**		RunNo: **88496**		
Client ID: **SB-1A-1223**	Batch ID: **42413**					Analysis Date: **12/21/2023**		SeqNo: **1848089**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,020	10.0	1,000	0	102	50	150				

Sample ID: **2312341-007BMSD**	SampType: **MSD**			Units: **µg/L**		Prep Date: **12/21/2023**		RunNo: **88496**		
Client ID: **SB-1A-1223**	Batch ID: **42413**					Analysis Date: **12/21/2023**		SeqNo: **1848090**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,170	10.0	1,000	0	117	50	150	1,022	13.2	30	

Sample ID: **CCV-42413A**	SampType: **CCV**			Units: **µg/L**		Prep Date: **12/21/2023**		RunNo: **88496**		
Client ID: **CCV**	Batch ID: **42413**					Analysis Date: **12/21/2023**		SeqNo: **1848092**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	993	10.0	1,000	0	99.3	90	110				

Sample ID: **CCB-42413A**	SampType: **CCB**			Units: **µg/L**		Prep Date: **12/21/2023**		RunNo: **88496**		
Client ID: **CCB**	Batch ID: **42413**					Analysis Date: **12/21/2023**		SeqNo: **1848093**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **CCV-42413B**	SampType: **CCV**			Units: **µg/L**		Prep Date: **12/21/2023**		RunNo: **88496**		
Client ID: **CCV**	Batch ID: **42413**					Analysis Date: **12/21/2023**		SeqNo: **1848104**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,020	10.0	1,000	0	102	90	110				

Work Order: 2312341
CLIENT: Friedman & Bruya
Project: 312247

QC SUMMARY REPORT

Dissolved Metals by EPA Method 200.8

Sample ID: **CCB-42413B**	SampType: **CCB**			Units: **µg/L**		Prep Date: **12/21/2023**		RunNo: **88496**		
Client ID: **CCB**	Batch ID: **42413**					Analysis Date: **12/21/2023**		SeqNo: **1848105**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **2312350-004BMS**	SampType: **MS**			Units: **µg/L**		Prep Date: **12/21/2023**		RunNo: **88496**		
Client ID: **BATCH**	Batch ID: **42413**					Analysis Date: **12/21/2023**		SeqNo: **1848114**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,050	10.0	1,000	8.025	105	50	150				

Sample ID: **CCV-42413C**	SampType: **CCV**			Units: **µg/L**		Prep Date: **12/21/2023**		RunNo: **88496**		
Client ID: **CCV**	Batch ID: **42413**					Analysis Date: **12/21/2023**		SeqNo: **1848115**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,010	10.0	1,000	0	101	90	110				

Sample ID: **CCB-42413C**	SampType: **CCB**			Units: **µg/L**		Prep Date: **12/21/2023**		RunNo: **88496**		
Client ID: **CCB**	Batch ID: **42413**					Analysis Date: **12/21/2023**		SeqNo: **1848116**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Work Order: 2312341
CLIENT: Friedman & Bruya
Project: 312247

QC SUMMARY REPORT

Total Metals by EPA Method 200.8

Sample ID: **ICB**	SampType: **ICB**	Units: **µg/L**	Prep Date: **12/21/2023**	RunNo: **88507**
Client ID: **ICB**	Batch ID: **42396**		Analysis Date: **12/21/2023**	SeqNo: **1848307**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **ICV**	SampType: **ICV**	Units: **µg/L**	Prep Date: **12/21/2023**	RunNo: **88507**
Client ID: **ICV**	Batch ID: **42396**		Analysis Date: **12/21/2023**	SeqNo: **1848308**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,450	10.0	1,500	0	96.8	90	110				

Sample ID: **CCV-42396A**	SampType: **CCV**	Units: **µg/L**	Prep Date: **12/21/2023**	RunNo: **88507**
Client ID: **CCV**	Batch ID: **42396**		Analysis Date: **12/21/2023**	SeqNo: **1848309**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,010	10.0	1,000	0	101	90	110				

Sample ID: **CCB-42396A**	SampType: **CCB**	Units: **µg/L**	Prep Date: **12/21/2023**	RunNo: **88507**
Client ID: **CCB**	Batch ID: **42396**		Analysis Date: **12/21/2023**	SeqNo: **1848310**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **MB-42396**	SampType: **MBLK**	Units: **µg/L**	Prep Date: **12/19/2023**	RunNo: **88507**
Client ID: **MBLKW**	Batch ID: **42396**		Analysis Date: **12/21/2023**	SeqNo: **1848311**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Work Order: 2312341
CLIENT: Friedman & Bruya
Project: 312247

QC SUMMARY REPORT

Total Metals by EPA Method 200.8

Sample ID: **LCS-42396**	SampType: **LCS**	Units: **µg/L**	Prep Date: **12/19/2023**	RunNo: **88507**
Client ID: **LCSW**	Batch ID: **42396**		Analysis Date: **12/21/2023**	SeqNo: **1848274**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,020	10.0	1,000	0	102	85	115				

Sample ID: **2312341-007AMS**	SampType: **MS**	Units: **µg/L**	Prep Date: **12/19/2023**	RunNo: **88507**
Client ID: **SB-1A-1223**	Batch ID: **42396**		Analysis Date: **12/21/2023**	SeqNo: **1848276**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	993	10.0	1,000	7.668	98.6	70	130				

Sample ID: **2312341-007AMSD**	SampType: **MSD**	Units: **µg/L**	Prep Date: **12/19/2023**	RunNo: **88507**
Client ID: **SB-1A-1223**	Batch ID: **42396**		Analysis Date: **12/21/2023**	SeqNo: **1848277**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,010	10.0	1,000	7.668	101	70	130	993.2	2.04	30	

Sample ID: **CCV-42396B**	SampType: **CCV**	Units: **µg/L**	Prep Date: **12/21/2023**	RunNo: **88507**
Client ID: **CCV**	Batch ID: **42396**		Analysis Date: **12/21/2023**	SeqNo: **1848283**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,020	10.0	1,000	0	102	90	110				

Sample ID: **CCB-42396B**	SampType: **CCB**	Units: **µg/L**	Prep Date: **12/21/2023**	RunNo: **88507**
Client ID: **CCB**	Batch ID: **42396**		Analysis Date: **12/21/2023**	SeqNo: **1848284**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Work Order: 2312341
CLIENT: Friedman & Bruya
Project: 312247

QC SUMMARY REPORT

Total Metals by EPA Method 200.8

Sample ID: **CCV-42396C**	SampType: **CCV**			Units: **µg/L**		Prep Date: **12/21/2023**		RunNo: **88507**		
Client ID: **CCV**	Batch ID: **42396**					Analysis Date: **12/21/2023**		SeqNo: **1848295**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	990	10.0	1,000	0	99.0	90	110				

Sample ID: **CCB-42396C**	SampType: **CCB**			Units: **µg/L**		Prep Date: **12/21/2023**		RunNo: **88507**		
Client ID: **CCB**	Batch ID: **42396**					Analysis Date: **12/21/2023**		SeqNo: **1848296**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample ID: **2312338-007CMS**	SampType: **MS**			Units: **µg/L**		Prep Date: **12/19/2023**		RunNo: **88507**		
Client ID: **BATCH**	Batch ID: **42396**					Analysis Date: **12/21/2023**		SeqNo: **1848297**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	1,820	10.0	1,000	553.3	126	70	130				

Sample ID: **2312338-007CDUP**	SampType: **DUP**			Units: **µg/L**		Prep Date: **12/19/2023**		RunNo: **88507**		
Client ID: **BATCH**	Batch ID: **42396**					Analysis Date: **12/21/2023**		SeqNo: **1848315**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	2,090	10.0						553.3	116	30	

Sample ID: **CCV-42396D**	SampType: **CCV**			Units: **µg/L**		Prep Date: **12/21/2023**		RunNo: **88507**		
Client ID: **CCV**	Batch ID: **42396**					Analysis Date: **12/21/2023**		SeqNo: **1848316**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	986	10.0	1,000	0	98.6	90	110				

Work Order: 2312341
CLIENT: Friedman & Bruya
Project: 312247

QC SUMMARY REPORT

Total Metals by EPA Method 200.8

Sample ID: **CCB-42396D**	SampType: **CCB**		Units: **µg/L**	Prep Date: **12/21/2023**		RunNo: **88507**	
Client ID: **CCB**	Batch ID: **42396**			Analysis Date: **12/21/2023**		SeqNo: **1848317**	

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aluminum	ND	10.0									

Sample Log-In Check List

Client Name:	FB	Work Order Number:	2312341
Logged by:	Morgan Wilson	Date Received:	12/14/2023 10:20:00 AM

Chain of Custody

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

Log In

3.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes ☐	No ☐	Not Present ☑
4.	Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
5.	Were all items received at a temperature of >2°C to 6°C *	Yes ☑	No ☐	NA ☐
6.	Sample(s) in proper container(s)?	Yes ☑	No ☐	
7.	Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
8.	Are samples properly preserved?	Yes ☑	No ☐	
9.	Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
10.	Is there headspace in the VOA vials?	Yes ☐	No ☐	NA ☑
11.	Did all samples containers arrive in good condition(unbroken)?	Yes ☑	No ☐	
12.	Does paperwork match bottle labels?	Yes ☑	No ☐	
13.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
14.	Is it clear what analyses were requested?	Yes ☑	No ☐	
15.	Were all hold times (except field parameters, pH e.g.) able to be met?	Yes ☑	No ☐	

Special Handling (if applicable)

16. 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:			

17. Additional remarks:

Item Information

Item #	Temp °C
Sample	5.2

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

SUBCONTRACT SAMPLE CHAIN OF CUSTODY

2312341

Send Report To Michael Erdahl
Company Friedman and Bruya, Inc.
Address 5500 4th Ave S
City, State, ZIP Seattle, WA 98108
Phone # (206) 285-8282 merdahl@friedmanandbruya.com

SUBCONTRACTER
Fremont

PROJECT NAME/NO.	PO #
312247	D-594

REMARKS
TIER IV, EQuIS 4

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: total aluminum	dissolved aluminum	ferrous iron	ferrous iron	dissolved gases	TOC					Notes
TWA-3-1223		12/12/2023	1240	water	2	x	x									
TWA-9-1223		12/12/2023	1240	water	2	x	x									
TWA-10D-1223		12/12/2023	1253	water	2	x	x									
TWA-1-1223		12/12/2023	1415	water	2	x	x									
TWA-2-1223		12/12/2023	1425	water	2	x	x									
Field Blank1-1223		12/12/2023	1550	water	1	x										
SB-1A-1223		12/12/2023	1600	water	(4) 2	x	x									MS/MD
SB-2A-1223		12/12/2023	1615	water	2	x	x									
Filter Blank1-1223		12/13/2023	845	water	1		x									
TWA-5D-1223		12/13/2023	935	water	2	x	x									
TWA-6D-1223		12/13/2023	945	water	2	x	x									
SB-3A-1223		12/13/2023	1030	water	2	x	x									
CTMW-25D-1223		12/13/2023	1205	water	2	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	12/14/23	0800
Received by:		Nathan Hoffer	FAI	12/14/23	1020
Relinquished by:		Atti Miller	FA AM 12.14.23		
Received by:					

SUBCONTRACT SAMPLE CHAIN OF CUSTODY

2312341

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Company Friedman and Bruya, Inc.
Address 5500 4th Ave S
City, State, ZIP Seattle, WA 98108
Phone # (206) 285-8282 merdahl@friedmanandbruya.com

SUBCONTRACTER: Fremont

PROJECT NAME/NO.	PO #
312247	D-594

REMARKS: TIER IV, EQuIS 4

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: total aluminum	dissolved aluminum	ferrous iron	ferrous iron	dissolved gases	TOC					Notes
CTMW-20-1223		12/13/2023	1210	water	2	x	x									
MW-1-1223		12/13/2023	1315	water	2	x	x									
CTMW-15-1223		12/13/2023	1320	water	2	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	12/14/23	0800
Received by:		Alli Millar	FAI	12.14.23	1027
Relinquished by:					
Received by:					

SUBCONTRACT SAMPLE CHAIN OF CUSTODY

2312341

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Company Friedman and Bruya, Inc.
Address 5500 4th Ave S
City, State, ZIP Seattle, WA 98108
Phone # (206) 285-8282 merdahl@friedmanandbruya.com

SUBCONTRACTER
Fremont

PROJECT NAME/NO.	PO #
312247	D-594

REMARKS Updated Client Sample ID per ME. 2/5/24 KL

TIER IV, EQuIS 4

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: total aluminum	dissolved aluminum	ferrous iron	ferrous iron	dissolved gases	TOC					Notes
TWA-3-1223		12/12/2023	1240	water	2	x	x									
~~TWA-9-1223~~ TWA-9-3-1223 KL 2/5/24		12/12/2023	1240	water	2	x	x									
TWA-10D-1223		12/12/2023	1253	water	2	x	x									
TWA-1-1223		12/12/2023	1415	water	2	x	x									
TWA-2-1223		12/12/2023	1425	water	2	x	x									
Field Blank1-1223		12/12/2023	1550	water	1	x										
SB-1A-1223		12/12/2023	1600	water	(4) 2	x	x									MS/MD
SB-2A-1223		12/12/2023	1615	water	2	x	x									
Filter Blank1-1223		12/13/2023	845	water	1		x									
TWA-5D-1223		12/13/2023	935	water	2	x	x									
TWA-6D-1223		12/13/2023	945	water	2	x	x									
SB-3A-1223		12/13/2023	1030	water	2	x	x									
CTMW-25D-1223		12/13/2023	1205	water	2	x	x									

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	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Michael Erdahl	Friedman & Bruya	12/14/23	0800
Received by:		Nathan Hoffer	FAI	12/14/23	1020
Relinquished by:		Atti Miller	FA AM 12.14.23		
Received by:					

SUBCONTRACT SAMPLE CHAIN OF CUSTODY

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Return samples
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Sample ID	Lab ID	Date Sampled	Time Sampled	Matrix	# of jars	ANALYSES REQUESTED: total aluminum	dissolved aluminum	ferrous iron	ferrous iron	dissolved gases	TOC					Notes
CTMW-20-1223		12/13/2023	1210	water	2	x	x									
MW-1-1223		12/13/2023	1315	water	2	x	x									
CTMW-15-1223		12/13/2023	1320	water	2	x	x									

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Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Michael Erdahl	Friedman & Bruya	12/14/23	0800
Received by:		Alli Millar	FAI	12.14.23	1027
Relinquished by:					
Received by:					

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ANALYTICAL REPORT

PREPARED FOR

Attn: Christian Sifford
Maul Foster & Alongi Inc
1329 North State Street
Suite 301
Bellingham, Washington 98225

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JOB DESCRIPTION

TWAAFA, M0615.20.012

JOB NUMBER

320-108065-1

Eurofins Sacramento
880 Riverside Parkway
West Sacramento CA 95605

See page two for job notes and contact information.

Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Northern California, LLC Project Manager.

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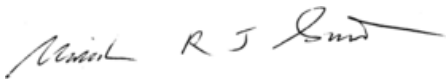

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(916)374-4344

Table of Contents

Definitions/Glossary

Client: Maul Foster & Alongi Inc
Project/Site: TWAAFA, M0615.20.012

Job ID: 320-108065-1

Qualifiers

LCMS

Qualifier	Qualifier Description
F1	MS and/or MSD recovery exceeds control limits.
I	Value is EMPC (estimated maximum possible concentration).

Glossary

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

Job ID: 320-108065-1 — Eurofins Sacramento

Job Narrative
320-108065-1

Receipt
The samples were received on 12/14/2023 9:15 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 0.5º C.

LCMS
Method 1633: The matrix spike duplicate (MSD) recoveries for preparation batch 320-732202 and analytical batch 320-733325 were outside control limits for one or more analytes. See QC Sample Results for detail. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery is within acceptance limits.

Method 1633: The "I" qualifier means the transition mass ratio for Perfluorooctanesulfonic acid (PFOS) was outside the established ratio limits. However, the samples were re-analyzed with concurring result, therefore, the best set of data was reported: TWA-3-1223 and TWA-9-3-1223.

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

Organic Prep
Method 1633: The following samples in preparation batch 320-732202 were observed to have a thin layer of sediment present in the bottom of the bottle prior to extraction. SB-2A-1223.

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

Detection Summary

Client: Maul Foster & Alongi Inc
Project/Site: TWAAFA, M0615.20.012

Job ID: 320-108065-1

Client Sample ID: TWA-3-1223 — Lab Sample ID: 320-108065-1

Analyte	Result	Qualifier	RL		Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	20		8.2		ng/L	1		1633	Total/NA
Perfluoropentanoic acid (PFPeA)	43		4.1		ng/L	1		1633	Total/NA
Perfluorohexanoic acid (PFHxA)	32		2.0		ng/L	1		1633	Total/NA
Perfluoroheptanoic acid (PFHpA)	10		2.0		ng/L	1		1633	Total/NA
Perfluorooctanoic acid (PFOA)	25		2.0		ng/L	1		1633	Total/NA
Perfluorobutanesulfonic acid (PFBS)	75		2.0		ng/L	1		1633	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	6.3		2.0		ng/L	1		1633	Total/NA
Perfluorooctanesulfonic acid (PFOS)	16	I	2.0		ng/L	1		1633	Total/NA
Perfluorononanoic acid (PFNA) - RA	2.1		2.0		ng/L	1		1633	Total/NA

Client Sample ID: TWA-9-3-1223 — Lab Sample ID: 320-108065-2

Analyte	Result	Qualifier	RL		Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	19		8.2		ng/L	1		1633	Total/NA
Perfluoropentanoic acid (PFPeA)	43		4.1		ng/L	1		1633	Total/NA
Perfluorohexanoic acid (PFHxA)	29		2.1		ng/L	1		1633	Total/NA
Perfluoroheptanoic acid (PFHpA)	9.7		2.1		ng/L	1		1633	Total/NA
Perfluorooctanoic acid (PFOA)	25		2.1		ng/L	1		1633	Total/NA
Perfluorononanoic acid (PFNA)	2.6		2.1		ng/L	1		1633	Total/NA
Perfluorobutanesulfonic acid (PFBS)	81		2.1		ng/L	1		1633	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	6.3		2.1		ng/L	1		1633	Total/NA
Perfluorooctanesulfonic acid (PFOS)	18	I	2.1		ng/L	1		1633	Total/NA

Client Sample ID: Rinsate Blank1-1223 — Lab Sample ID: 320-108065-3

No Detections.

Client Sample ID: Field Blank1-1223 — Lab Sample ID: 320-108065-4

No Detections.

Client Sample ID: SB-2A-1223 — Lab Sample ID: 320-108065-5

Analyte	Result	Qualifier	RL		Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	23		8.1		ng/L	1		1633	Total/NA
Perfluorooctanoic acid (PFOA)	4.1		2.0		ng/L	1		1633	Total/NA

Client Sample ID: Rinsate Blank2-1223 — Lab Sample ID: 320-108065-6

No Detections.

Client Sample ID: Trip Blank1-1223 — Lab Sample ID: 320-108065-7

No Detections.

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Client: Maul Foster & Alongi Inc
Project/Site: TWAAFA, M0615.20.012

Job ID: 320-108065-1

Client Sample ID: TWA-3-1223
Date Collected: 12/12/23 12:40
Date Received: 12/14/23 09:15

Lab Sample ID: 320-108065-1
Matrix: Water

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**20**		8.2		ng/L		01/09/24 11:44	01/13/24 23:50	1
Perfluoropentanoic acid (PFPeA)	**43**		4.1		ng/L		01/09/24 11:44	01/13/24 23:50	1
Perfluorohexanoic acid (PFHxA)	**32**		2.0		ng/L		01/09/24 11:44	01/13/24 23:50	1
Perfluoroheptanoic acid (PFHpA)	**10**		2.0		ng/L		01/09/24 11:44	01/13/24 23:50	1
Perfluorooctanoic acid (PFOA)	**25**		2.0		ng/L		01/09/24 11:44	01/13/24 23:50	1
Perfluorodecanoic acid (PFDA)	ND		2.0		ng/L		01/09/24 11:44	01/13/24 23:50	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0		ng/L		01/09/24 11:44	01/13/24 23:50	1
Perfluorododecanoic acid (PFDoA)	ND		2.0		ng/L		01/09/24 11:44	01/13/24 23:50	1
Perfluorotridecanoic acid (PFTrDA)	ND		2.0		ng/L		01/09/24 11:44	01/13/24 23:50	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0		ng/L		01/09/24 11:44	01/13/24 23:50	1
Perfluorobutanesulfonic acid (PFBS)	**75**		2.0		ng/L		01/09/24 11:44	01/13/24 23:50	1
Perfluoropentanesulfonic acid (PFPeS)	ND		2.0		ng/L		01/09/24 11:44	01/13/24 23:50	1
Perfluorohexanesulfonic acid (PFHxS)	**6.3**		2.0		ng/L		01/09/24 11:44	01/13/24 23:50	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		2.0		ng/L		01/09/24 11:44	01/13/24 23:50	1
Perfluorooctanesulfonic acid (PFOS)	**16**	I	2.0		ng/L		01/09/24 11:44	01/13/24 23:50	1
Perfluorononanesulfonic acid (PFNS)	ND		2.0		ng/L		01/09/24 11:44	01/13/24 23:50	1
Perfluorodecanesulfonic acid (PFDS)	ND		2.0		ng/L		01/09/24 11:44	01/13/24 23:50	1
Perfluorododecanesulfonic acid (PFDoS)	ND		2.0		ng/L		01/09/24 11:44	01/13/24 23:50	1
4:2 FTS	ND		8.2		ng/L		01/09/24 11:44	01/13/24 23:50	1
6:2 FTS	ND		8.2		ng/L		01/09/24 11:44	01/13/24 23:50	1
8:2 FTS	ND		8.2		ng/L		01/09/24 11:44	01/13/24 23:50	1
Perfluorooctanesulfonamide (FOSA)	ND		2.0		ng/L		01/09/24 11:44	01/13/24 23:50	1
NMeFOSA	ND		2.0		ng/L		01/09/24 11:44	01/13/24 23:50	1
NEtFOSA	ND		2.0		ng/L		01/09/24 11:44	01/13/24 23:50	1
NMeFOSAA	ND		2.0		ng/L		01/09/24 11:44	01/13/24 23:50	1
NEtFOSAA	ND		2.0		ng/L		01/09/24 11:44	01/13/24 23:50	1
NMeFOSE	ND		20		ng/L		01/09/24 11:44	01/13/24 23:50	1
NEtFOSE	ND		20		ng/L		01/09/24 11:44	01/13/24 23:50	1
HFPO-DA (GenX)	ND		8.2		ng/L		01/09/24 11:44	01/13/24 23:50	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		8.2		ng/L		01/09/24 11:44	01/13/24 23:50	1
PFMBA	ND		4.1		ng/L		01/09/24 11:44	01/13/24 23:50	1
NFDHA	ND		4.1		ng/L		01/09/24 11:44	01/13/24 23:50	1
PFMPA	ND		4.1		ng/L		01/09/24 11:44	01/13/24 23:50	1
9Cl-PF3ONS	ND		8.2		ng/L		01/09/24 11:44	01/13/24 23:50	1
11Cl-PF3OUdS	ND		8.2		ng/L		01/09/24 11:44	01/13/24 23:50	1
PFEESA	ND		4.1		ng/L		01/09/24 11:44	01/13/24 23:50	1
3:3 FTCA	ND		10		ng/L		01/09/24 11:44	01/13/24 23:50	1
5:3 FTCA	ND		51		ng/L		01/09/24 11:44	01/13/24 23:50	1
7:3 FTCA	ND		51		ng/L		01/09/24 11:44	01/13/24 23:50	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*85*		*5 - 130*	*01/09/24 11:44*	*01/13/24 23:50*	*1*
13C5 PFPeA	*84*		*40 - 130*	*01/09/24 11:44*	*01/13/24 23:50*	*1*
13C5 PFHxA	*86*		*40 - 130*	*01/09/24 11:44*	*01/13/24 23:50*	*1*
13C4 PFHpA	*89*		*40 - 130*	*01/09/24 11:44*	*01/13/24 23:50*	*1*

Client Sample ID: TWA-3-1223

Date Collected: 12/12/23 12:40
Date Received: 12/14/23 09:15

Lab Sample ID: 320-108065-1

Matrix: Water

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 (Continued)

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 PFOA	*85*		*40 - 130*	*01/09/24 11:44*	*01/13/24 23:50*	*1*
13C9 PFNA	*93*		*40 - 130*	*01/09/24 11:44*	*01/13/24 23:50*	*1*
13C6 PFDA	*82*		*40 - 130*	*01/09/24 11:44*	*01/13/24 23:50*	*1*
13C7 PFUnA	*73*		*30 - 130*	*01/09/24 11:44*	*01/13/24 23:50*	*1*
13C2 PFDoA	*60*		*10 - 130*	*01/09/24 11:44*	*01/13/24 23:50*	*1*
13C2 PFTeDA	*43*		*10 - 130*	*01/09/24 11:44*	*01/13/24 23:50*	*1*
13C3 PFBS	*98*		*40 - 135*	*01/09/24 11:44*	*01/13/24 23:50*	*1*
13C3 PFHxS	*86*		*40 - 130*	*01/09/24 11:44*	*01/13/24 23:50*	*1*
13C8 PFOS	*83*		*40 - 130*	*01/09/24 11:44*	*01/13/24 23:50*	*1*
13C8 FOSA	*85*		*40 - 130*	*01/09/24 11:44*	*01/13/24 23:50*	*1*
d3-NMeFOSAA	*82*		*40 - 170*	*01/09/24 11:44*	*01/13/24 23:50*	*1*
d5-NEtFOSAA	*71*		*25 - 135*	*01/09/24 11:44*	*01/13/24 23:50*	*1*
M2-4:2 FTS	*107*		*40 - 200*	*01/09/24 11:44*	*01/13/24 23:50*	*1*
M2-6:2 FTS	*92*		*40 - 200*	*01/09/24 11:44*	*01/13/24 23:50*	*1*
M2-8:2 FTS	*80*		*40 - 300*	*01/09/24 11:44*	*01/13/24 23:50*	*1*
13C3 HFPO-DA	*78*		*40 - 130*	*01/09/24 11:44*	*01/13/24 23:50*	*1*
d7-N-MeFOSE-M	*43*		*10 - 130*	*01/09/24 11:44*	*01/13/24 23:50*	*1*
d9-N-EtFOSE-M	*32*		*10 - 130*	*01/09/24 11:44*	*01/13/24 23:50*	*1*
d5-NEtPFOSA	*54*		*10 - 130*	*01/09/24 11:44*	*01/13/24 23:50*	*1*
d3-NMePFOSA	*57*		*10 - 130*	*01/09/24 11:44*	*01/13/24 23:50*	*1*

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 - RA

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Perfluorononanoic acid (PFNA)	**2.1**		2.0		ng/L		01/09/24 11:44	01/15/24 16:42	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C9 PFNA	*92*		*40 - 130*	*01/09/24 11:44*	*01/15/24 16:42*	*1*

Client Sample ID: TWA-9-3-1223

Date Collected: 12/12/23 12:40
Date Received: 12/14/23 09:15

Lab Sample ID: 320-108065-2

Matrix: Water

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**19**		8.2		ng/L		01/09/24 11:44	01/14/24 00:08	1
Perfluoropentanoic acid (PFPeA)	**43**		4.1		ng/L		01/09/24 11:44	01/14/24 00:08	1
Perfluorohexanoic acid (PFHxA)	**29**		2.1		ng/L		01/09/24 11:44	01/14/24 00:08	1
Perfluoroheptanoic acid (PFHpA)	**9.7**		2.1		ng/L		01/09/24 11:44	01/14/24 00:08	1
Perfluorooctanoic acid (PFOA)	**25**		2.1		ng/L		01/09/24 11:44	01/14/24 00:08	1
Perfluorononanoic acid (PFNA)	**2.6**		2.1		ng/L		01/09/24 11:44	01/14/24 00:08	1
Perfluorodecanoic acid (PFDA)	ND		2.1		ng/L		01/09/24 11:44	01/14/24 00:08	1
Perfluoroundecanoic acid (PFUnA)	ND		2.1		ng/L		01/09/24 11:44	01/14/24 00:08	1
Perfluorododecanoic acid (PFDoA)	ND		2.1		ng/L		01/09/24 11:44	01/14/24 00:08	1
Perfluorotridecanoic acid (PFTrDA)	ND		2.1		ng/L		01/09/24 11:44	01/14/24 00:08	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.1		ng/L		01/09/24 11:44	01/14/24 00:08	1
Perfluorobutanesulfonic acid (PFBS)	**81**		2.1		ng/L		01/09/24 11:44	01/14/24 00:08	1
Perfluoropentanesulfonic acid (PFPeS)	ND		2.1		ng/L		01/09/24 11:44	01/14/24 00:08	1
Perfluorohexanesulfonic acid (PFHxS)	**6.3**		2.1		ng/L		01/09/24 11:44	01/14/24 00:08	1

Client Sample ID: TWA-9-3-1223

Date Collected: 12/12/23 12:40
Date Received: 12/14/23 09:15

Lab Sample ID: 320-108065-2

Matrix: Water

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 (Continued)

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanesulfonic acid (PFHpS)	ND		2.1		ng/L		01/09/24 11:44	01/14/24 00:08	1
Perfluorooctanesulfonic acid (PFOS)	**18**	**I**	2.1		ng/L		01/09/24 11:44	01/14/24 00:08	1
Perfluorononanesulfonic acid (PFNS)	ND		2.1		ng/L		01/09/24 11:44	01/14/24 00:08	1
Perfluorodecanesulfonic acid (PFDS)	ND		2.1		ng/L		01/09/24 11:44	01/14/24 00:08	1
Perfluorododecanesulfonic acid (PFDoS)	ND		2.1		ng/L		01/09/24 11:44	01/14/24 00:08	1
4:2 FTS	ND		8.2		ng/L		01/09/24 11:44	01/14/24 00:08	1
6:2 FTS	ND		8.2		ng/L		01/09/24 11:44	01/14/24 00:08	1
8:2 FTS	ND		8.2		ng/L		01/09/24 11:44	01/14/24 00:08	1
Perfluorooctanesulfonamide (FOSA)	ND		2.1		ng/L		01/09/24 11:44	01/14/24 00:08	1
NMeFOSA	ND		2.1		ng/L		01/09/24 11:44	01/14/24 00:08	1
NEtFOSA	ND		2.1		ng/L		01/09/24 11:44	01/14/24 00:08	1
NMeFOSAA	ND		2.1		ng/L		01/09/24 11:44	01/14/24 00:08	1
NEtFOSAA	ND		2.1		ng/L		01/09/24 11:44	01/14/24 00:08	1
NMeFOSE	ND		21		ng/L		01/09/24 11:44	01/14/24 00:08	1
NEtFOSE	ND		21		ng/L		01/09/24 11:44	01/14/24 00:08	1
HFPO-DA (GenX)	ND		8.2		ng/L		01/09/24 11:44	01/14/24 00:08	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		8.2		ng/L		01/09/24 11:44	01/14/24 00:08	1
PFMBA	ND		4.1		ng/L		01/09/24 11:44	01/14/24 00:08	1
NFDHA	ND		4.1		ng/L		01/09/24 11:44	01/14/24 00:08	1
PFMPA	ND		4.1		ng/L		01/09/24 11:44	01/14/24 00:08	1
9Cl-PF3ONS	ND		8.2		ng/L		01/09/24 11:44	01/14/24 00:08	1
11Cl-PF3OUdS	ND		8.2		ng/L		01/09/24 11:44	01/14/24 00:08	1
PFEESA	ND		4.1		ng/L		01/09/24 11:44	01/14/24 00:08	1
3:3 FTCA	ND		10		ng/L		01/09/24 11:44	01/14/24 00:08	1
5:3 FTCA	ND		51		ng/L		01/09/24 11:44	01/14/24 00:08	1
7:3 FTCA	ND		51		ng/L		01/09/24 11:44	01/14/24 00:08	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*85*		*5 - 130*	*01/09/24 11:44*	*01/14/24 00:08*	*1*
13C5 PFPeA	*81*		*40 - 130*	*01/09/24 11:44*	*01/14/24 00:08*	*1*
13C5 PFHxA	*84*		*40 - 130*	*01/09/24 11:44*	*01/14/24 00:08*	*1*
13C4 PFHpA	*86*		*40 - 130*	*01/09/24 11:44*	*01/14/24 00:08*	*1*
13C8 PFOA	*83*		*40 - 130*	*01/09/24 11:44*	*01/14/24 00:08*	*1*
13C9 PFNA	*89*		*40 - 130*	*01/09/24 11:44*	*01/14/24 00:08*	*1*
13C6 PFDA	*78*		*40 - 130*	*01/09/24 11:44*	*01/14/24 00:08*	*1*
13C7 PFUnA	*67*		*30 - 130*	*01/09/24 11:44*	*01/14/24 00:08*	*1*
13C2 PFDoA	*52*		*10 - 130*	*01/09/24 11:44*	*01/14/24 00:08*	*1*
13C2 PFTeDA	*32*		*10 - 130*	*01/09/24 11:44*	*01/14/24 00:08*	*1*
13C3 PFBS	*91*		*40 - 135*	*01/09/24 11:44*	*01/14/24 00:08*	*1*
13C3 PFHxS	*78*		*40 - 130*	*01/09/24 11:44*	*01/14/24 00:08*	*1*
13C8 PFOS	*73*		*40 - 130*	*01/09/24 11:44*	*01/14/24 00:08*	*1*
13C8 FOSA	*84*		*40 - 130*	*01/09/24 11:44*	*01/14/24 00:08*	*1*
d3-NMeFOSAA	*79*		*40 - 170*	*01/09/24 11:44*	*01/14/24 00:08*	*1*
d5-NEtFOSAA	*66*		*25 - 135*	*01/09/24 11:44*	*01/14/24 00:08*	*1*
M2-4:2 FTS	*109*		*40 - 200*	*01/09/24 11:44*	*01/14/24 00:08*	*1*
M2-6:2 FTS	*91*		*40 - 200*	*01/09/24 11:44*	*01/14/24 00:08*	*1*
M2-8:2 FTS	*75*		*40 - 300*	*01/09/24 11:44*	*01/14/24 00:08*	*1*

Client Sample ID: TWA-9-3-1223

Date Collected: 12/12/23 12:40
Date Received: 12/14/23 09:15

Lab Sample ID: 320-108065-2
Matrix: Water

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 (Continued)

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*75*		*40 - 130*	*01/09/24 11:44*	*01/14/24 00:08*	*1*
d7-N-MeFOSE-M	*30*		*10 - 130*	*01/09/24 11:44*	*01/14/24 00:08*	*1*
d9-N-EtFOSE-M	*18*		*10 - 130*	*01/09/24 11:44*	*01/14/24 00:08*	*1*
d5-NEtPFOSA	*50*		*10 - 130*	*01/09/24 11:44*	*01/14/24 00:08*	*1*
d3-NMePFOSA	*52*		*10 - 130*	*01/09/24 11:44*	*01/14/24 00:08*	*1*

Client Sample ID: Rinsate Blank1-1223

Date Collected: 12/12/23 13:15
Date Received: 12/14/23 09:15

Lab Sample ID: 320-108065-3
Matrix: Water

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		7.5	ng/L		01/09/24 11:44	01/14/24 00:26	1
Perfluoropentanoic acid (PFPeA)	ND		3.7	ng/L		01/09/24 11:44	01/14/24 00:26	1
Perfluorohexanoic acid (PFHxA)	ND		1.9	ng/L		01/09/24 11:44	01/14/24 00:26	1
Perfluoroheptanoic acid (PFHpA)	ND		1.9	ng/L		01/09/24 11:44	01/14/24 00:26	1
Perfluorooctanoic acid (PFOA)	ND		1.9	ng/L		01/09/24 11:44	01/14/24 00:26	1
Perfluorononanoic acid (PFNA)	ND		1.9	ng/L		01/09/24 11:44	01/14/24 00:26	1
Perfluorodecanoic acid (PFDA)	ND		1.9	ng/L		01/09/24 11:44	01/14/24 00:26	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	ng/L		01/09/24 11:44	01/14/24 00:26	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	ng/L		01/09/24 11:44	01/14/24 00:26	1
Perfluorotridecanoic acid (PFTrDA)	ND		1.9	ng/L		01/09/24 11:44	01/14/24 00:26	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	ng/L		01/09/24 11:44	01/14/24 00:26	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.9	ng/L		01/09/24 11:44	01/14/24 00:26	1
Perfluoropentanesulfonic acid (PFPeS)	ND		1.9	ng/L		01/09/24 11:44	01/14/24 00:26	1
Perfluorohexanesulfonic acid (PFHxS)	ND		1.9	ng/L		01/09/24 11:44	01/14/24 00:26	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		1.9	ng/L		01/09/24 11:44	01/14/24 00:26	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.9	ng/L		01/09/24 11:44	01/14/24 00:26	1
Perfluorononanesulfonic acid (PFNS)	ND		1.9	ng/L		01/09/24 11:44	01/14/24 00:26	1
Perfluorodecanesulfonic acid (PFDS)	ND		1.9	ng/L		01/09/24 11:44	01/14/24 00:26	1
Perfluorododecanesulfonic acid (PFDoS)	ND		1.9	ng/L		01/09/24 11:44	01/14/24 00:26	1
4:2 FTS	ND		7.5	ng/L		01/09/24 11:44	01/14/24 00:26	1
6:2 FTS	ND		7.5	ng/L		01/09/24 11:44	01/14/24 00:26	1
8:2 FTS	ND		7.5	ng/L		01/09/24 11:44	01/14/24 00:26	1
Perfluorooctanesulfonamide (FOSA)	ND		1.9	ng/L		01/09/24 11:44	01/14/24 00:26	1
NMeFOSA	ND		1.9	ng/L		01/09/24 11:44	01/14/24 00:26	1
NEtFOSA	ND		1.9	ng/L		01/09/24 11:44	01/14/24 00:26	1
NMeFOSAA	ND		1.9	ng/L		01/09/24 11:44	01/14/24 00:26	1
NEtFOSAA	ND		1.9	ng/L		01/09/24 11:44	01/14/24 00:26	1
NMeFOSE	ND		19	ng/L		01/09/24 11:44	01/14/24 00:26	1
NEtFOSE	ND		19	ng/L		01/09/24 11:44	01/14/24 00:26	1
HFPO-DA (GenX)	ND		7.5	ng/L		01/09/24 11:44	01/14/24 00:26	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		7.5	ng/L		01/09/24 11:44	01/14/24 00:26	1
PFMBA	ND		3.7	ng/L		01/09/24 11:44	01/14/24 00:26	1
NFDHA	ND		3.7	ng/L		01/09/24 11:44	01/14/24 00:26	1
PFMPA	ND		3.7	ng/L		01/09/24 11:44	01/14/24 00:26	1
9Cl-PF3ONS	ND		7.5	ng/L		01/09/24 11:44	01/14/24 00:26	1

Client Sample ID: Rinsate Blank1-1223

Lab Sample ID: 320-108065-3

Date Collected: 12/12/23 13:15

Matrix: Water

Date Received: 12/14/23 09:15

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 (Continued)

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
11Cl-PF3OUdS	ND		7.5		ng/L		01/09/24 11:44	01/14/24 00:26	1
PFEESA	ND		3.7		ng/L		01/09/24 11:44	01/14/24 00:26	1
3:3 FTCA	ND		9.4		ng/L		01/09/24 11:44	01/14/24 00:26	1
5:3 FTCA	ND		47		ng/L		01/09/24 11:44	01/14/24 00:26	1
7:3 FTCA	ND		47		ng/L		01/09/24 11:44	01/14/24 00:26	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*84*		*5 - 130*	*01/09/24 11:44*	*01/14/24 00:26*	*1*
13C5 PFPeA	*86*		*40 - 130*	*01/09/24 11:44*	*01/14/24 00:26*	*1*
13C5 PFHxA	*80*		*40 - 130*	*01/09/24 11:44*	*01/14/24 00:26*	*1*
13C4 PFHpA	*85*		*40 - 130*	*01/09/24 11:44*	*01/14/24 00:26*	*1*
13C8 PFOA	*86*		*40 - 130*	*01/09/24 11:44*	*01/14/24 00:26*	*1*
13C9 PFNA	*85*		*40 - 130*	*01/09/24 11:44*	*01/14/24 00:26*	*1*
13C6 PFDA	*83*		*40 - 130*	*01/09/24 11:44*	*01/14/24 00:26*	*1*
13C7 PFUnA	*89*		*30 - 130*	*01/09/24 11:44*	*01/14/24 00:26*	*1*
13C2 PFDoA	*77*		*10 - 130*	*01/09/24 11:44*	*01/14/24 00:26*	*1*
13C2 PFTeDA	*78*		*10 - 130*	*01/09/24 11:44*	*01/14/24 00:26*	*1*
13C3 PFBS	*87*		*40 - 135*	*01/09/24 11:44*	*01/14/24 00:26*	*1*
13C3 PFHxS	*87*		*40 - 130*	*01/09/24 11:44*	*01/14/24 00:26*	*1*
13C8 PFOS	*85*		*40 - 130*	*01/09/24 11:44*	*01/14/24 00:26*	*1*
13C8 FOSA	*85*		*40 - 130*	*01/09/24 11:44*	*01/14/24 00:26*	*1*
d3-NMeFOSAA	*93*		*40 - 170*	*01/09/24 11:44*	*01/14/24 00:26*	*1*
d5-NEtFOSAA	*81*		*25 - 135*	*01/09/24 11:44*	*01/14/24 00:26*	*1*
M2-4:2 FTS	*78*		*40 - 200*	*01/09/24 11:44*	*01/14/24 00:26*	*1*
M2-6:2 FTS	*81*		*40 - 200*	*01/09/24 11:44*	*01/14/24 00:26*	*1*
M2-8:2 FTS	*80*		*40 - 300*	*01/09/24 11:44*	*01/14/24 00:26*	*1*
13C3 HFPO-DA	*77*		*40 - 130*	*01/09/24 11:44*	*01/14/24 00:26*	*1*
d7-N-MeFOSE-M	*75*		*10 - 130*	*01/09/24 11:44*	*01/14/24 00:26*	*1*
d9-N-EtFOSE-M	*73*		*10 - 130*	*01/09/24 11:44*	*01/14/24 00:26*	*1*
d5-NEtPFOSA	*74*		*10 - 130*	*01/09/24 11:44*	*01/14/24 00:26*	*1*
d3-NMePFOSA	*66*		*10 - 130*	*01/09/24 11:44*	*01/14/24 00:26*	*1*

Client Sample ID: Field Blank1-1223

Lab Sample ID: 320-108065-4

Date Collected: 12/12/23 15:50

Matrix: Water

Date Received: 12/14/23 09:15

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		8.0		ng/L		01/09/24 11:44	01/14/24 00:43	1
Perfluoropentanoic acid (PFPeA)	ND		4.0		ng/L		01/09/24 11:44	01/14/24 00:43	1
Perfluorohexanoic acid (PFHxA)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 00:43	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 00:43	1
Perfluorooctanoic acid (PFOA)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 00:43	1
Perfluorononanoic acid (PFNA)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 00:43	1
Perfluorodecanoic acid (PFDA)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 00:43	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 00:43	1
Perfluorododecanoic acid (PFDoA)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 00:43	1
Perfluorotridecanoic acid (PFTrDA)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 00:43	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 00:43	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 00:43	1

Client Sample ID: Field Blank1-1223
Date Collected: 12/12/23 15:50
Date Received: 12/14/23 09:15

Lab Sample ID: 320-108065-4
Matrix: Water

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 (Continued)

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Perfluoropentanesulfonic acid (PFPeS)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 00:43	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 00:43	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 00:43	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 00:43	1
Perfluorononanesulfonic acid (PFNS)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 00:43	1
Perfluorodecanesulfonic acid (PFDS)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 00:43	1
Perfluorododecanesulfonic acid (PFDoS)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 00:43	1
4:2 FTS	ND		8.0		ng/L		01/09/24 11:44	01/14/24 00:43	1
6:2 FTS	ND		8.0		ng/L		01/09/24 11:44	01/14/24 00:43	1
8:2 FTS	ND		8.0		ng/L		01/09/24 11:44	01/14/24 00:43	1
Perfluorooctanesulfonamide (FOSA)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 00:43	1
NMeFOSA	ND		2.0		ng/L		01/09/24 11:44	01/14/24 00:43	1
NEtFOSA	ND		2.0		ng/L		01/09/24 11:44	01/14/24 00:43	1
NMeFOSAA	ND		2.0		ng/L		01/09/24 11:44	01/14/24 00:43	1
NEtFOSAA	ND		2.0		ng/L		01/09/24 11:44	01/14/24 00:43	1
NMeFOSE	ND		20		ng/L		01/09/24 11:44	01/14/24 00:43	1
NEtFOSE	ND		20		ng/L		01/09/24 11:44	01/14/24 00:43	1
HFPO-DA (GenX)	ND		8.0		ng/L		01/09/24 11:44	01/14/24 00:43	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		8.0		ng/L		01/09/24 11:44	01/14/24 00:43	1
PFMBA	ND		4.0		ng/L		01/09/24 11:44	01/14/24 00:43	1
NFDHA	ND		4.0		ng/L		01/09/24 11:44	01/14/24 00:43	1
PFMPA	ND		4.0		ng/L		01/09/24 11:44	01/14/24 00:43	1
9Cl-PF3ONS	ND		8.0		ng/L		01/09/24 11:44	01/14/24 00:43	1
11Cl-PF3OUdS	ND		8.0		ng/L		01/09/24 11:44	01/14/24 00:43	1
PFEESA	ND		4.0		ng/L		01/09/24 11:44	01/14/24 00:43	1
3:3 FTCA	ND		9.9		ng/L		01/09/24 11:44	01/14/24 00:43	1
5:3 FTCA	ND		50		ng/L		01/09/24 11:44	01/14/24 00:43	1
7:3 FTCA	ND		50		ng/L		01/09/24 11:44	01/14/24 00:43	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*92*		*5 - 130*	*01/09/24 11:44*	*01/14/24 00:43*	*1*
13C5 PFPeA	*91*		*40 - 130*	*01/09/24 11:44*	*01/14/24 00:43*	*1*
13C5 PFHxA	*90*		*40 - 130*	*01/09/24 11:44*	*01/14/24 00:43*	*1*
13C4 PFHpA	*98*		*40 - 130*	*01/09/24 11:44*	*01/14/24 00:43*	*1*
13C8 PFOA	*92*		*40 - 130*	*01/09/24 11:44*	*01/14/24 00:43*	*1*
13C9 PFNA	*90*		*40 - 130*	*01/09/24 11:44*	*01/14/24 00:43*	*1*
13C6 PFDA	*94*		*40 - 130*	*01/09/24 11:44*	*01/14/24 00:43*	*1*
13C7 PFUnA	*86*		*30 - 130*	*01/09/24 11:44*	*01/14/24 00:43*	*1*
13C2 PFDoA	*66*		*10 - 130*	*01/09/24 11:44*	*01/14/24 00:43*	*1*
13C2 PFTeDA	*67*		*10 - 130*	*01/09/24 11:44*	*01/14/24 00:43*	*1*
13C3 PFBS	*95*		*40 - 135*	*01/09/24 11:44*	*01/14/24 00:43*	*1*
13C3 PFHxS	*92*		*40 - 130*	*01/09/24 11:44*	*01/14/24 00:43*	*1*
13C8 PFOS	*94*		*40 - 130*	*01/09/24 11:44*	*01/14/24 00:43*	*1*
13C8 FOSA	*90*		*40 - 130*	*01/09/24 11:44*	*01/14/24 00:43*	*1*
d3-NMeFOSAA	*95*		*40 - 170*	*01/09/24 11:44*	*01/14/24 00:43*	*1*
d5-NEtFOSAA	*85*		*25 - 135*	*01/09/24 11:44*	*01/14/24 00:43*	*1*
M2-4:2 FTS	*92*		*40 - 200*	*01/09/24 11:44*	*01/14/24 00:43*	*1*

Client Sample ID: Field Blank1-1223

Lab Sample ID: 320-108065-4
Matrix: Water
Date Collected: 12/12/23 15:50
Date Received: 12/14/23 09:15

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 (Continued)

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
M2-6:2 FTS	*91*		*40 - 200*	*01/09/24 11:44*	*01/14/24 00:43*	*1*
M2-8:2 FTS	*84*		*40 - 300*	*01/09/24 11:44*	*01/14/24 00:43*	*1*
13C3 HFPO-DA	*82*		*40 - 130*	*01/09/24 11:44*	*01/14/24 00:43*	*1*
d7-N-MeFOSE-M	*76*		*10 - 130*	*01/09/24 11:44*	*01/14/24 00:43*	*1*
d9-N-EtFOSE-M	*70*		*10 - 130*	*01/09/24 11:44*	*01/14/24 00:43*	*1*
d5-NEtPFOSA	*74*		*10 - 130*	*01/09/24 11:44*	*01/14/24 00:43*	*1*
d3-NMePFOSA	*69*		*10 - 130*	*01/09/24 11:44*	*01/14/24 00:43*	*1*

Client Sample ID: SB-2A-1223

Lab Sample ID: 320-108065-5
Matrix: Water
Date Collected: 12/12/23 16:15
Date Received: 12/14/23 09:15

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	**23**		8.1		ng/L		01/09/24 11:44	01/14/24 01:01	1
Perfluoropentanoic acid (PFPeA)	ND		4.1		ng/L		01/09/24 11:44	01/14/24 01:01	1
Perfluorohexanoic acid (PFHxA)	ND	F1	2.0		ng/L		01/09/24 11:44	01/14/24 01:01	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 01:01	1
Perfluorooctanoic acid (PFOA)	**4.1**		2.0		ng/L		01/09/24 11:44	01/14/24 01:01	1
Perfluorononanoic acid (PFNA)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 01:01	1
Perfluorodecanoic acid (PFDA)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 01:01	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 01:01	1
Perfluorododecanoic acid (PFDoA)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 01:01	1
Perfluorotridecanoic acid (PFTrDA)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 01:01	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 01:01	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 01:01	1
Perfluoropentanesulfonic acid (PFPeS)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 01:01	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 01:01	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 01:01	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 01:01	1
Perfluorononanesulfonic acid (PFNS)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 01:01	1
Perfluorodecanesulfonic acid (PFDS)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 01:01	1
Perfluorododecanesulfonic acid (PFDoS)	ND	F1	2.0		ng/L		01/09/24 11:44	01/14/24 01:01	1
4:2 FTS	ND		8.1		ng/L		01/09/24 11:44	01/14/24 01:01	1
6:2 FTS	ND		8.1		ng/L		01/09/24 11:44	01/14/24 01:01	1
8:2 FTS	ND		8.1		ng/L		01/09/24 11:44	01/14/24 01:01	1
Perfluorooctanesulfonamide (FOSA)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 01:01	1
NMeFOSA	ND		2.0		ng/L		01/09/24 11:44	01/14/24 01:01	1
NEtFOSA	ND		2.0		ng/L		01/09/24 11:44	01/14/24 01:01	1
NMeFOSAA	ND		2.0		ng/L		01/09/24 11:44	01/14/24 01:01	1
NEtFOSAA	ND		2.0		ng/L		01/09/24 11:44	01/14/24 01:01	1
NMeFOSE	ND		20		ng/L		01/09/24 11:44	01/14/24 01:01	1
NEtFOSE	ND		20		ng/L		01/09/24 11:44	01/14/24 01:01	1
HFPO-DA (GenX)	ND		8.1		ng/L		01/09/24 11:44	01/14/24 01:01	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		8.1		ng/L		01/09/24 11:44	01/14/24 01:01	1
PFMBA	ND		4.1		ng/L		01/09/24 11:44	01/14/24 01:01	1
NFDHA	ND		4.1		ng/L		01/09/24 11:44	01/14/24 01:01	1

Client Sample ID: SB-2A-1223

Lab Sample ID: 320-108065-5

Date Collected: 12/12/23 16:15

Matrix: Water

Date Received: 12/14/23 09:15

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 (Continued)

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
PFMPA	ND		4.1		ng/L		01/09/24 11:44	01/14/24 01:01	1
9Cl-PF3ONS	ND		8.1		ng/L		01/09/24 11:44	01/14/24 01:01	1
11Cl-PF3OUdS	ND		8.1		ng/L		01/09/24 11:44	01/14/24 01:01	1
PFEESA	ND		4.1		ng/L		01/09/24 11:44	01/14/24 01:01	1
3:3 FTCA	ND		10		ng/L		01/09/24 11:44	01/14/24 01:01	1
5:3 FTCA	ND		51		ng/L		01/09/24 11:44	01/14/24 01:01	1
7:3 FTCA	ND		51		ng/L		01/09/24 11:44	01/14/24 01:01	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*87*		*5 - 130*	*01/09/24 11:44*	*01/14/24 01:01*	*1*
13C5 PFPeA	*85*		*40 - 130*	*01/09/24 11:44*	*01/14/24 01:01*	*1*
13C5 PFHxA	*87*		*40 - 130*	*01/09/24 11:44*	*01/14/24 01:01*	*1*
13C4 PFHpA	*88*		*40 - 130*	*01/09/24 11:44*	*01/14/24 01:01*	*1*
13C8 PFOA	*88*		*40 - 130*	*01/09/24 11:44*	*01/14/24 01:01*	*1*
13C9 PFNA	*89*		*40 - 130*	*01/09/24 11:44*	*01/14/24 01:01*	*1*
13C6 PFDA	*78*		*40 - 130*	*01/09/24 11:44*	*01/14/24 01:01*	*1*
13C7 PFUnA	*74*		*30 - 130*	*01/09/24 11:44*	*01/14/24 01:01*	*1*
13C2 PFDoA	*60*		*10 - 130*	*01/09/24 11:44*	*01/14/24 01:01*	*1*
13C2 PFTeDA	*43*		*10 - 130*	*01/09/24 11:44*	*01/14/24 01:01*	*1*
13C3 PFBS	*101*		*40 - 135*	*01/09/24 11:44*	*01/14/24 01:01*	*1*
13C3 PFHxS	*83*		*40 - 130*	*01/09/24 11:44*	*01/14/24 01:01*	*1*
13C8 PFOS	*79*		*40 - 130*	*01/09/24 11:44*	*01/14/24 01:01*	*1*
13C8 FOSA	*80*		*40 - 130*	*01/09/24 11:44*	*01/14/24 01:01*	*1*
d3-NMeFOSAA	*85*		*40 - 170*	*01/09/24 11:44*	*01/14/24 01:01*	*1*
d5-NEtFOSAA	*70*		*25 - 135*	*01/09/24 11:44*	*01/14/24 01:01*	*1*
M2-4:2 FTS	*89*		*40 - 200*	*01/09/24 11:44*	*01/14/24 01:01*	*1*
M2-6:2 FTS	*84*		*40 - 200*	*01/09/24 11:44*	*01/14/24 01:01*	*1*
M2-8:2 FTS	*80*		*40 - 300*	*01/09/24 11:44*	*01/14/24 01:01*	*1*
13C3 HFPO-DA	*77*		*40 - 130*	*01/09/24 11:44*	*01/14/24 01:01*	*1*
d7-N-MeFOSE-M	*49*		*10 - 130*	*01/09/24 11:44*	*01/14/24 01:01*	*1*
d9-N-EtFOSE-M	*39*		*10 - 130*	*01/09/24 11:44*	*01/14/24 01:01*	*1*
d5-NEtPFOSA	*57*		*10 - 130*	*01/09/24 11:44*	*01/14/24 01:01*	*1*
d3-NMePFOSA	*55*		*10 - 130*	*01/09/24 11:44*	*01/14/24 01:01*	*1*

Client Sample ID: Rinsate Blank2-1223

Lab Sample ID: 320-108065-6

Date Collected: 12/12/23 16:40

Matrix: Water

Date Received: 12/14/23 09:15

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		7.9		ng/L		01/09/24 11:44	01/14/24 02:29	1
Perfluoropentanoic acid (PFPeA)	ND		3.9		ng/L		01/09/24 11:44	01/14/24 02:29	1
Perfluorohexanoic acid (PFHxA)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 02:29	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 02:29	1
Perfluorooctanoic acid (PFOA)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 02:29	1
Perfluorononanoic acid (PFNA)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 02:29	1
Perfluorodecanoic acid (PFDA)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 02:29	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 02:29	1
Perfluorododecanoic acid (PFDoA)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 02:29	1
Perfluorotridecanoic acid (PFTrDA)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 02:29	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 02:29	1

Client Sample ID: Rinsate Blank2-1223
Date Collected: 12/12/23 16:40
Date Received: 12/14/23 09:15

Lab Sample ID: 320-108065-6
Matrix: Water

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 (Continued)

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 02:29	1
Perfluoropentanesulfonic acid (PFPeS)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 02:29	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 02:29	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 02:29	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 02:29	1
Perfluorononanesulfonic acid (PFNS)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 02:29	1
Perfluorodecanesulfonic acid (PFDS)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 02:29	1
Perfluorododecanesulfonic acid (PFDoS)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 02:29	1
4:2 FTS	ND		7.9		ng/L		01/09/24 11:44	01/14/24 02:29	1
6:2 FTS	ND		7.9		ng/L		01/09/24 11:44	01/14/24 02:29	1
8:2 FTS	ND		7.9		ng/L		01/09/24 11:44	01/14/24 02:29	1
Perfluorooctanesulfonamide (FOSA)	ND		2.0		ng/L		01/09/24 11:44	01/14/24 02:29	1
NMeFOSA	ND		2.0		ng/L		01/09/24 11:44	01/14/24 02:29	1
NEtFOSA	ND		2.0		ng/L		01/09/24 11:44	01/14/24 02:29	1
NMeFOSAA	ND		2.0		ng/L		01/09/24 11:44	01/14/24 02:29	1
NEtFOSAA	ND		2.0		ng/L		01/09/24 11:44	01/14/24 02:29	1
NMeFOSE	ND		20		ng/L		01/09/24 11:44	01/14/24 02:29	1
NEtFOSE	ND		20		ng/L		01/09/24 11:44	01/14/24 02:29	1
HFPO-DA (GenX)	ND		7.9		ng/L		01/09/24 11:44	01/14/24 02:29	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		7.9		ng/L		01/09/24 11:44	01/14/24 02:29	1
PFMBA	ND		3.9		ng/L		01/09/24 11:44	01/14/24 02:29	1
NFDHA	ND		3.9		ng/L		01/09/24 11:44	01/14/24 02:29	1
PFMPA	ND		3.9		ng/L		01/09/24 11:44	01/14/24 02:29	1
9Cl-PF3ONS	ND		7.9		ng/L		01/09/24 11:44	01/14/24 02:29	1
11Cl-PF3OUdS	ND		7.9		ng/L		01/09/24 11:44	01/14/24 02:29	1
PFEESA	ND		3.9		ng/L		01/09/24 11:44	01/14/24 02:29	1
3:3 FTCA	ND		9.9		ng/L		01/09/24 11:44	01/14/24 02:29	1
5:3 FTCA	ND		49		ng/L		01/09/24 11:44	01/14/24 02:29	1
7:3 FTCA	ND		49		ng/L		01/09/24 11:44	01/14/24 02:29	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*86*		*5 - 130*	*01/09/24 11:44*	*01/14/24 02:29*	*1*
13C5 PFPeA	*88*		*40 - 130*	*01/09/24 11:44*	*01/14/24 02:29*	*1*
13C5 PFHxA	*84*		*40 - 130*	*01/09/24 11:44*	*01/14/24 02:29*	*1*
13C4 PFHpA	*88*		*40 - 130*	*01/09/24 11:44*	*01/14/24 02:29*	*1*
13C8 PFOA	*89*		*40 - 130*	*01/09/24 11:44*	*01/14/24 02:29*	*1*
13C9 PFNA	*88*		*40 - 130*	*01/09/24 11:44*	*01/14/24 02:29*	*1*
13C6 PFDA	*85*		*40 - 130*	*01/09/24 11:44*	*01/14/24 02:29*	*1*
13C7 PFUnA	*88*		*30 - 130*	*01/09/24 11:44*	*01/14/24 02:29*	*1*
13C2 PFDoA	*78*		*10 - 130*	*01/09/24 11:44*	*01/14/24 02:29*	*1*
13C2 PFTeDA	*78*		*10 - 130*	*01/09/24 11:44*	*01/14/24 02:29*	*1*
13C3 PFBS	*87*		*40 - 135*	*01/09/24 11:44*	*01/14/24 02:29*	*1*
13C3 PFHxS	*86*		*40 - 130*	*01/09/24 11:44*	*01/14/24 02:29*	*1*
13C8 PFOS	*90*		*40 - 130*	*01/09/24 11:44*	*01/14/24 02:29*	*1*
13C8 FOSA	*85*		*40 - 130*	*01/09/24 11:44*	*01/14/24 02:29*	*1*
d3-NMeFOSAA	*91*		*40 - 170*	*01/09/24 11:44*	*01/14/24 02:29*	*1*
d5-NEtFOSAA	*84*		*25 - 135*	*01/09/24 11:44*	*01/14/24 02:29*	*1*

Client Sample ID: Rinsate Blank2-1223

Lab Sample ID: 320-108065-6

Date Collected: 12/12/23 16:40

Matrix: Water

Date Received: 12/14/23 09:15

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
M2-4:2 FTS	87		40 - 200	01/09/24 11:44	01/14/24 02:29	1
M2-6:2 FTS	86		40 - 200	01/09/24 11:44	01/14/24 02:29	1
M2-8:2 FTS	83		40 - 300	01/09/24 11:44	01/14/24 02:29	1
13C3 HFPO-DA	75		40 - 130	01/09/24 11:44	01/14/24 02:29	1
d7-N-MeFOSE-M	76		10 - 130	01/09/24 11:44	01/14/24 02:29	1
d9-N-EtFOSE-M	71		10 - 130	01/09/24 11:44	01/14/24 02:29	1
d5-NEtPFOSA	78		10 - 130	01/09/24 11:44	01/14/24 02:29	1
d3-NMePFOSA	73		10 - 130	01/09/24 11:44	01/14/24 02:29	1

Client Sample ID: Trip Blank1-1223

Lab Sample ID: 320-108065-7

Date Collected: 12/12/23 12:00

Matrix: Water

Date Received: 12/14/23 09:15

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		6.9		ng/L		01/09/24 11:44	01/14/24 02:47	1
Perfluoropentanoic acid (PFPeA)	ND		3.4		ng/L		01/09/24 11:44	01/14/24 02:47	1
Perfluorohexanoic acid (PFHxA)	ND		1.7		ng/L		01/09/24 11:44	01/14/24 02:47	1
Perfluoroheptanoic acid (PFHpA)	ND		1.7		ng/L		01/09/24 11:44	01/14/24 02:47	1
Perfluorooctanoic acid (PFOA)	ND		1.7		ng/L		01/09/24 11:44	01/14/24 02:47	1
Perfluorononanoic acid (PFNA)	ND		1.7		ng/L		01/09/24 11:44	01/14/24 02:47	1
Perfluorodecanoic acid (PFDA)	ND		1.7		ng/L		01/09/24 11:44	01/14/24 02:47	1
Perfluoroundecanoic acid (PFUnA)	ND		1.7		ng/L		01/09/24 11:44	01/14/24 02:47	1
Perfluorododecanoic acid (PFDoA)	ND		1.7		ng/L		01/09/24 11:44	01/14/24 02:47	1
Perfluorotridecanoic acid (PFTrDA)	ND		1.7		ng/L		01/09/24 11:44	01/14/24 02:47	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.7		ng/L		01/09/24 11:44	01/14/24 02:47	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.7		ng/L		01/09/24 11:44	01/14/24 02:47	1
Perfluoropentanesulfonic acid (PFPeS)	ND		1.7		ng/L		01/09/24 11:44	01/14/24 02:47	1
Perfluorohexanesulfonic acid (PFHxS)	ND		1.7		ng/L		01/09/24 11:44	01/14/24 02:47	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		1.7		ng/L		01/09/24 11:44	01/14/24 02:47	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.7		ng/L		01/09/24 11:44	01/14/24 02:47	1
Perfluorononanesulfonic acid (PFNS)	ND		1.7		ng/L		01/09/24 11:44	01/14/24 02:47	1
Perfluorodecanesulfonic acid (PFDS)	ND		1.7		ng/L		01/09/24 11:44	01/14/24 02:47	1
Perfluorododecanesulfonic acid (PFDoS)	ND		1.7		ng/L		01/09/24 11:44	01/14/24 02:47	1
4:2 FTS	ND		6.9		ng/L		01/09/24 11:44	01/14/24 02:47	1
6:2 FTS	ND		6.9		ng/L		01/09/24 11:44	01/14/24 02:47	1
8:2 FTS	ND		6.9		ng/L		01/09/24 11:44	01/14/24 02:47	1
Perfluorooctanesulfonamide (FOSA)	ND		1.7		ng/L		01/09/24 11:44	01/14/24 02:47	1
NMeFOSA	ND		1.7		ng/L		01/09/24 11:44	01/14/24 02:47	1
NEtFOSA	ND		1.7		ng/L		01/09/24 11:44	01/14/24 02:47	1
NMeFOSAA	ND		1.7		ng/L		01/09/24 11:44	01/14/24 02:47	1
NEtFOSAA	ND		1.7		ng/L		01/09/24 11:44	01/14/24 02:47	1
NMeFOSE	ND		17		ng/L		01/09/24 11:44	01/14/24 02:47	1
NEtFOSE	ND		17		ng/L		01/09/24 11:44	01/14/24 02:47	1
HFPO-DA (GenX)	ND		6.9		ng/L		01/09/24 11:44	01/14/24 02:47	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		6.9		ng/L		01/09/24 11:44	01/14/24 02:47	1
PFMBA	ND		3.4		ng/L		01/09/24 11:44	01/14/24 02:47	1

Client Sample ID: Trip Blank1-1223
Date Collected: 12/12/23 12:00
Date Received: 12/14/23 09:15

Lab Sample ID: 320-108065-7
Matrix: Water

Method: EPA 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 (Continued)

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
NFDHA	ND		3.4		ng/L		01/09/24 11:44	01/14/24 02:47	1
PFMPA	ND		3.4		ng/L		01/09/24 11:44	01/14/24 02:47	1
9Cl-PF3ONS	ND		6.9		ng/L		01/09/24 11:44	01/14/24 02:47	1
11Cl-PF3OUdS	ND		6.9		ng/L		01/09/24 11:44	01/14/24 02:47	1
PFEESA	ND		3.4		ng/L		01/09/24 11:44	01/14/24 02:47	1
3:3 FTCA	ND		8.6		ng/L		01/09/24 11:44	01/14/24 02:47	1
5:3 FTCA	ND		43		ng/L		01/09/24 11:44	01/14/24 02:47	1
7:3 FTCA	ND		43		ng/L		01/09/24 11:44	01/14/24 02:47	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*86*		*5 - 130*	*01/09/24 11:44*	*01/14/24 02:47*	*1*
13C5 PFPeA	*87*		*40 - 130*	*01/09/24 11:44*	*01/14/24 02:47*	*1*
13C5 PFHxA	*80*		*40 - 130*	*01/09/24 11:44*	*01/14/24 02:47*	*1*
13C4 PFHpA	*83*		*40 - 130*	*01/09/24 11:44*	*01/14/24 02:47*	*1*
13C8 PFOA	*87*		*40 - 130*	*01/09/24 11:44*	*01/14/24 02:47*	*1*
13C9 PFNA	*87*		*40 - 130*	*01/09/24 11:44*	*01/14/24 02:47*	*1*
13C6 PFDA	*84*		*40 - 130*	*01/09/24 11:44*	*01/14/24 02:47*	*1*
13C7 PFUnA	*79*		*30 - 130*	*01/09/24 11:44*	*01/14/24 02:47*	*1*
13C2 PFDoA	*68*		*10 - 130*	*01/09/24 11:44*	*01/14/24 02:47*	*1*
13C2 PFTeDA	*73*		*10 - 130*	*01/09/24 11:44*	*01/14/24 02:47*	*1*
13C3 PFBS	*87*		*40 - 135*	*01/09/24 11:44*	*01/14/24 02:47*	*1*
13C3 PFHxS	*85*		*40 - 130*	*01/09/24 11:44*	*01/14/24 02:47*	*1*
13C8 PFOS	*85*		*40 - 130*	*01/09/24 11:44*	*01/14/24 02:47*	*1*
13C8 FOSA	*82*		*40 - 130*	*01/09/24 11:44*	*01/14/24 02:47*	*1*
d3-NMeFOSAA	*82*		*40 - 170*	*01/09/24 11:44*	*01/14/24 02:47*	*1*
d5-NEtFOSAA	*75*		*25 - 135*	*01/09/24 11:44*	*01/14/24 02:47*	*1*
M2-4:2 FTS	*85*		*40 - 200*	*01/09/24 11:44*	*01/14/24 02:47*	*1*
M2-6:2 FTS	*86*		*40 - 200*	*01/09/24 11:44*	*01/14/24 02:47*	*1*
M2-8:2 FTS	*80*		*40 - 300*	*01/09/24 11:44*	*01/14/24 02:47*	*1*
13C3 HFPO-DA	*77*		*40 - 130*	*01/09/24 11:44*	*01/14/24 02:47*	*1*
d7-N-MeFOSE-M	*77*		*10 - 130*	*01/09/24 11:44*	*01/14/24 02:47*	*1*
d9-N-EtFOSE-M	*75*		*10 - 130*	*01/09/24 11:44*	*01/14/24 02:47*	*1*
d5-NEtPFOSA	*74*		*10 - 130*	*01/09/24 11:44*	*01/14/24 02:47*	*1*
d3-NMePFOSA	*66*		*10 - 130*	*01/09/24 11:44*	*01/14/24 02:47*	*1*

Isotope Dilution Summary

Client: Maul Foster & Alongi Inc
Project/Site: TWAAFA, M0615.20.012

Job ID: 320-108065-1

Method: 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24

Matrix: Water **Prep Type: Total/NA**

		Percent Isotope Dilution Recovery (Acceptance Limits)							
		PFBA	PFPeA	13C5PHA	C4PFHA	C8PFOA	C9PFNA	C6PFDA	13C7PUA
Lab Sample ID	Client Sample ID	(5-130)	(40-130)	(40-130)	(40-130)	(40-130)	(40-130)	(40-130)	(30-130)
320-108065-1	TWA-3-1223	85	84	86	89	85	93	82	73
320-108065-1 - RA	TWA-3-1223						92		
320-108065-2	TWA-9-3-1223	85	81	84	86	83	89	78	67
320-108065-3	Rinsate Blank1-1223	84	86	80	85	86	85	83	89
320-108065-4	Field Blank1-1223	92	91	90	98	92	90	94	86
320-108065-5	SB-2A-1223	87	85	87	88	88	89	78	74
320-108065-5 MS	SB-2A-1223	86	87	84	88	85	88	82	80
320-108065-5 MSD	SB-2A-1223	86	84	82	86	84	85	87	76
320-108065-6	Rinsate Blank2-1223	86	88	84	88	89	88	85	88
320-108065-7	Trip Blank1-1223	86	87	80	83	87	87	84	79
LCS 320-732202/3-A	Lab Control Sample	83	82	80	81	84	86	81	72
LLCS 320-732202/2-A	Lab Control Sample	84	88	85	85	85	88	87	89
MB 320-732202/1-A	Method Blank	86	88	82	88	88	86	88	86

		Percent Isotope Dilution Recovery (Acceptance Limits)							
		PFDoA	PFTDA	C3PFBS	C3PFHS	C8PFOS	PFOSA	d3NMFOS	d5NEFOS
Lab Sample ID	Client Sample ID	(10-130)	(10-130)	(40-135)	(40-130)	(40-130)	(40-130)	(40-170)	(25-135)
320-108065-1	TWA-3-1223	60	43	98	86	83	85	82	71
320-108065-1 - RA	TWA-3-1223								
320-108065-2	TWA-9-3-1223	52	32	91	78	73	84	79	66
320-108065-3	Rinsate Blank1-1223	77	78	87	87	85	85	93	81
320-108065-4	Field Blank1-1223	66	67	95	92	94	90	95	85
320-108065-5	SB-2A-1223	60	43	101	83	79	80	85	70
320-108065-5 MS	SB-2A-1223	68	58	100	86	89	84	90	80
320-108065-5 MSD	SB-2A-1223	59	45	99	89	83	83	84	74
320-108065-6	Rinsate Blank2-1223	78	78	87	86	90	85	91	84
320-108065-7	Trip Blank1-1223	68	73	87	85	85	82	82	75
LCS 320-732202/3-A	Lab Control Sample	65	64	84	82	85	79	85	74
LLCS 320-732202/2-A	Lab Control Sample	81	83	91	91	88	85	88	80
MB 320-732202/1-A	Method Blank	78	80	87	90	84	82	86	76

		Percent Isotope Dilution Recovery (Acceptance Limits)							
		M242FTS	M262FTS	M282FTS	HFPODA	NMFM	NEFM	d5NPFSA	d3NMFSA
Lab Sample ID	Client Sample ID	(40-200)	(40-200)	(40-300)	(40-130)	(10-130)	(10-130)	(10-130)	(10-130)
320-108065-1	TWA-3-1223	107	92	80	78	43	32	54	57
320-108065-1 - RA	TWA-3-1223								
320-108065-2	TWA-9-3-1223	109	91	75	75	30	18	50	52
320-108065-3	Rinsate Blank1-1223	78	81	80	77	75	73	74	66
320-108065-4	Field Blank1-1223	92	91	84	82	76	70	74	69
320-108065-5	SB-2A-1223	89	84	80	77	49	39	57	55
320-108065-5 MS	SB-2A-1223	100	78	78	76	60	51	68	66
320-108065-5 MSD	SB-2A-1223	104	83	79	72	55	46	63	64
320-108065-6	Rinsate Blank2-1223	87	86	83	75	76	71	78	73
320-108065-7	Trip Blank1-1223	85	86	80	77	77	75	74	66
LCS 320-732202/3-A	Lab Control Sample	71	73	74	71	64	59	69	65
LLCS 320-732202/2-A	Lab Control Sample	79	80	83	77	75	75	73	69
MB 320-732202/1-A	Method Blank	77	78	81	78	71	69	67	62

Surrogate Legend

PFBA = 13C4 PFBA

PFPeA = 13C5 PFPeA

Isotope Dilution Summary

Client: Maul Foster & Alongi Inc
Project/Site: TWAAFA, M0615.20.012

Job ID: 320-108065-1

13C5PHA = 13C5 PFHxA
C4PFHA = 13C4 PFHpA
C8PFOA = 13C8 PFOA
C9PFNA = 13C9 PFNA
C6PFDA = 13C6 PFDA
13C7PUA = 13C7 PFUnA
PFDoA = 13C2 PFDoA
PFTDA = 13C2 PFTeDA
C3PFBS = 13C3 PFBS
C3PFHS = 13C3 PFHxS
C8PFOS = 13C8 PFOS
PFOSA = 13C8 FOSA
d3NMFOS = d3-NMeFOSAA
d5NEFOS = d5-NEtFOSAA
M242FTS = M2-4:2 FTS
M262FTS = M2-6:2 FTS
M282FTS = M2-8:2 FTS
HFPODA = 13C3 HFPO-DA
NMFM = d7-N-MeFOSE-M
NEFM = d9-N-EtFOSE-M
d5NPFSA = d5-NEtPFOSA
d3NMFSA = d3-NMePFOSA

Method: 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24

Lab Sample ID: MB 320-732202/1-A
Matrix: Water
Analysis Batch: 733325

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 732202

Analyte	MB Result	MB Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		8.0		ng/L		01/09/24 11:44	01/13/24 22:58	1
Perfluoropentanoic acid (PFPeA)	ND		4.0		ng/L		01/09/24 11:44	01/13/24 22:58	1
Perfluorohexanoic acid (PFHxA)	ND		2.0		ng/L		01/09/24 11:44	01/13/24 22:58	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0		ng/L		01/09/24 11:44	01/13/24 22:58	1
Perfluorooctanoic acid (PFOA)	ND		2.0		ng/L		01/09/24 11:44	01/13/24 22:58	1
Perfluorononanoic acid (PFNA)	ND		2.0		ng/L		01/09/24 11:44	01/13/24 22:58	1
Perfluorodecanoic acid (PFDA)	ND		2.0		ng/L		01/09/24 11:44	01/13/24 22:58	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0		ng/L		01/09/24 11:44	01/13/24 22:58	1
Perfluorododecanoic acid (PFDoA)	ND		2.0		ng/L		01/09/24 11:44	01/13/24 22:58	1
Perfluorotridecanoic acid (PFTrDA)	ND		2.0		ng/L		01/09/24 11:44	01/13/24 22:58	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0		ng/L		01/09/24 11:44	01/13/24 22:58	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0		ng/L		01/09/24 11:44	01/13/24 22:58	1
Perfluoropentanesulfonic acid (PFPeS)	ND		2.0		ng/L		01/09/24 11:44	01/13/24 22:58	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0		ng/L		01/09/24 11:44	01/13/24 22:58	1
Perfluoroheptanesulfonic acid (PFHpS)	ND		2.0		ng/L		01/09/24 11:44	01/13/24 22:58	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0		ng/L		01/09/24 11:44	01/13/24 22:58	1
Perfluorononanesulfonic acid (PFNS)	ND		2.0		ng/L		01/09/24 11:44	01/13/24 22:58	1
Perfluorodecanesulfonic acid (PFDS)	ND		2.0		ng/L		01/09/24 11:44	01/13/24 22:58	1
Perfluorododecanesulfonic acid (PFDoS)	ND		2.0		ng/L		01/09/24 11:44	01/13/24 22:58	1
4:2 FTS	ND		8.0		ng/L		01/09/24 11:44	01/13/24 22:58	1
6:2 FTS	ND		8.0		ng/L		01/09/24 11:44	01/13/24 22:58	1
8:2 FTS	ND		8.0		ng/L		01/09/24 11:44	01/13/24 22:58	1
Perfluorooctanesulfonamide (FOSA)	ND		2.0		ng/L		01/09/24 11:44	01/13/24 22:58	1
NMeFOSA	ND		2.0		ng/L		01/09/24 11:44	01/13/24 22:58	1
NEtFOSA	ND		2.0		ng/L		01/09/24 11:44	01/13/24 22:58	1
NMeFOSAA	ND		2.0		ng/L		01/09/24 11:44	01/13/24 22:58	1
NEtFOSAA	ND		2.0		ng/L		01/09/24 11:44	01/13/24 22:58	1
NMeFOSE	ND		20		ng/L		01/09/24 11:44	01/13/24 22:58	1
NEtFOSE	ND		20		ng/L		01/09/24 11:44	01/13/24 22:58	1
HFPO-DA (GenX)	ND		8.0		ng/L		01/09/24 11:44	01/13/24 22:58	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		8.0		ng/L		01/09/24 11:44	01/13/24 22:58	1
PFMBA	ND		4.0		ng/L		01/09/24 11:44	01/13/24 22:58	1
NFDHA	ND		4.0		ng/L		01/09/24 11:44	01/13/24 22:58	1
PFMPA	ND		4.0		ng/L		01/09/24 11:44	01/13/24 22:58	1
9Cl-PF3ONS	ND		8.0		ng/L		01/09/24 11:44	01/13/24 22:58	1
11Cl-PF3OUdS	ND		8.0		ng/L		01/09/24 11:44	01/13/24 22:58	1
PFEESA	ND		4.0		ng/L		01/09/24 11:44	01/13/24 22:58	1
3:3 FTCA	ND		10		ng/L		01/09/24 11:44	01/13/24 22:58	1
5:3 FTCA	ND		50		ng/L		01/09/24 11:44	01/13/24 22:58	1
7:3 FTCA	ND		50		ng/L		01/09/24 11:44	01/13/24 22:58	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFBA	*86*		*5 - 130*	*01/09/24 11:44*	*01/13/24 22:58*	*1*
13C5 PFPeA	*88*		*40 - 130*	*01/09/24 11:44*	*01/13/24 22:58*	*1*
13C5 PFHxA	*82*		*40 - 130*	*01/09/24 11:44*	*01/13/24 22:58*	*1*

Method: 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 (Continued)

Lab Sample ID: MB 320-732202/1-A
Matrix: Water
Analysis Batch: 733325

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 732202

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFHpA	88		40 - 130	01/09/24 11:44	01/13/24 22:58	1
13C8 PFOA	88		40 - 130	01/09/24 11:44	01/13/24 22:58	1
13C9 PFNA	86		40 - 130	01/09/24 11:44	01/13/24 22:58	1
13C6 PFDA	88		40 - 130	01/09/24 11:44	01/13/24 22:58	1
13C7 PFUnA	86		30 - 130	01/09/24 11:44	01/13/24 22:58	1
13C2 PFDoA	78		10 - 130	01/09/24 11:44	01/13/24 22:58	1
13C2 PFTeDA	80		10 - 130	01/09/24 11:44	01/13/24 22:58	1
13C3 PFBS	87		40 - 135	01/09/24 11:44	01/13/24 22:58	1
13C3 PFHxS	90		40 - 130	01/09/24 11:44	01/13/24 22:58	1
13C8 PFOS	84		40 - 130	01/09/24 11:44	01/13/24 22:58	1
13C8 FOSA	82		40 - 130	01/09/24 11:44	01/13/24 22:58	1
d3-NMeFOSAA	86		40 - 170	01/09/24 11:44	01/13/24 22:58	1
d5-NEtFOSAA	76		25 - 135	01/09/24 11:44	01/13/24 22:58	1
M2-4:2 FTS	77		40 - 200	01/09/24 11:44	01/13/24 22:58	1
M2-6:2 FTS	78		40 - 200	01/09/24 11:44	01/13/24 22:58	1
M2-8:2 FTS	81		40 - 300	01/09/24 11:44	01/13/24 22:58	1
13C3 HFPO-DA	78		40 - 130	01/09/24 11:44	01/13/24 22:58	1
d7-N-MeFOSE-M	71		10 - 130	01/09/24 11:44	01/13/24 22:58	1
d9-N-EtFOSE-M	69		10 - 130	01/09/24 11:44	01/13/24 22:58	1
d5-NEtPFOSA	67		10 - 130	01/09/24 11:44	01/13/24 22:58	1
d3-NMePFOSA	62		10 - 130	01/09/24 11:44	01/13/24 22:58	1

Lab Sample ID: LCS 320-732202/3-A
Matrix: Water
Analysis Batch: 733325

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 732202

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorobutanoic acid (PFBA)	128	128		ng/L		100	70 - 140
Perfluoropentanoic acid (PFPeA)	64.0	64.8		ng/L		101	65 - 135
Perfluorohexanoic acid (PFHxA)	32.0	32.9		ng/L		103	70 - 145
Perfluoroheptanoic acid (PFHpA)	32.0	32.2		ng/L		101	70 - 150
Perfluorooctanoic acid (PFOA)	32.0	31.9		ng/L		100	70 - 150
Perfluorononanoic acid (PFNA)	32.0	31.6		ng/L		99	70 - 150
Perfluorodecanoic acid (PFDA)	32.0	29.1		ng/L		91	70 - 140
Perfluoroundecanoic acid (PFUnA)	32.0	34.1		ng/L		107	70 - 145
Perfluorododecanoic acid (PFDoA)	32.0	32.6		ng/L		102	70 - 140
Perfluorotridecanoic acid (PFTrDA)	32.0	28.5		ng/L		89	65 - 140
Perfluorotetradecanoic acid (PFTeA)	32.0	27.8		ng/L		87	60 - 140
Perfluorobutanesulfonic acid (PFBS)	28.4	27.3		ng/L		96	60 - 145
Perfluoropentanesulfonic acid (PFPeS)	30.1	30.2		ng/L		100	65 - 140
Perfluorohexanesulfonic acid (PFHxS)	29.2	27.4		ng/L		94	65 - 145
Perfluoroheptanesulfonic acid (PFHpS)	30.5	29.3		ng/L		96	70 - 150

Method: 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 (Continued)

Lab Sample ID: LCS 320-732202/3-A
Matrix: Water
Analysis Batch: 733325

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 732202

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorooctanesulfonic acid (PFOS)	29.8	30.4		ng/L		102	55 - 150
Perfluorononanesulfonic acid (PFNS)	30.7	28.4		ng/L		92	65 - 145
Perfluorodecanesulfonic acid (PFDS)	30.8	28.5		ng/L		92	60 - 145
Perfluorododecanesulfonic acid (PFDoS)	31.0	23.1		ng/L		74	50 - 145
4:2 FTS	120	121		ng/L		101	70 - 145
6:2 FTS	122	120		ng/L		98	65 - 155
8:2 FTS	123	129		ng/L		105	60 - 150
Perfluorooctanesulfonamide (FOSA)	32.0	32.2		ng/L		101	70 - 145
NMeFOSA	32.0	31.8		ng/L		99	60 - 150
NEtFOSA	32.0	30.8		ng/L		96	65 - 145
NMeFOSAA	32.0	31.8		ng/L		100	50 - 140
NEtFOSAA	32.0	33.3		ng/L		104	70 - 145
NMeFOSE	320	323		ng/L		101	70 - 145
NEtFOSE	320	335		ng/L		105	70 - 135
HFPO-DA (GenX)	128	123		ng/L		96	70 - 140
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	121	134		ng/L		111	65 - 145
PFMBA	64.0	63.6		ng/L		99	60 - 150
NFDHA	64.0	66.8		ng/L		104	50 - 150
PFMPA	64.0	61.8		ng/L		96	55 - 140
9Cl-PF3ONS	120	136		ng/L		114	70 - 155
11Cl-PF3OUdS	121	127		ng/L		105	55 - 160
PFEESA	57.1	59.9		ng/L		105	70 - 140
3:3 FTCA	160	145		ng/L		91	65 - 130
5:3 FTCA	799	779		ng/L		98	70 - 135
7:3 FTCA	799	771		ng/L		97	50 - 145

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C4 PFBA	*83*		*5 - 130*
13C5 PFPeA	*82*		*40 - 130*
13C5 PFHxA	*80*		*40 - 130*
13C4 PFHpA	*81*		*40 - 130*
13C8 PFOA	*84*		*40 - 130*
13C9 PFNA	*86*		*40 - 130*
13C6 PFDA	*81*		*40 - 130*
13C7 PFUnA	*72*		*30 - 130*
13C2 PFDoA	*65*		*10 - 130*
13C2 PFTeDA	*64*		*10 - 130*
13C3 PFBS	*84*		*40 - 135*
13C3 PFHxS	*82*		*40 - 130*
13C8 PFOS	*85*		*40 - 130*
13C8 FOSA	*79*		*40 - 130*
d3-NMeFOSAA	*85*		*40 - 170*
d5-NEtFOSAA	*74*		*25 - 135*
M2-4:2 FTS	*71*		*40 - 200*

Method: 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 (Continued)

Lab Sample ID: LCS 320-732202/3-A
Matrix: Water
Analysis Batch: 733325

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 732202

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
M2-6:2 FTS	*73*		*40 - 200*
M2-8:2 FTS	*74*		*40 - 300*
13C3 HFPO-DA	*71*		*40 - 130*
d7-N-MeFOSE-M	*64*		*10 - 130*
d9-N-EtFOSE-M	*59*		*10 - 130*
d5-NEtPFOSA	*69*		*10 - 130*
d3-NMePFOSA	*65*		*10 - 130*

Lab Sample ID: LLCS 320-732202/2-A
Matrix: Water
Analysis Batch: 733325

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 732202

Analyte	Spike Added	LLCS Result	LLCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorobutanoic acid (PFBA)	12.8	12.4		ng/L		97	70 - 140
Perfluoropentanoic acid (PFPeA)	6.40	6.08		ng/L		95	65 - 135
Perfluorohexanoic acid (PFHxA)	3.20	3.21		ng/L		100	70 - 145
Perfluoroheptanoic acid (PFHpA)	3.20	3.14		ng/L		98	70 - 150
Perfluorooctanoic acid (PFOA)	3.20	3.19		ng/L		100	70 - 150
Perfluorononanoic acid (PFNA)	3.20	2.92		ng/L		91	70 - 150
Perfluorodecanoic acid (PFDA)	3.20	2.79		ng/L		87	70 - 140
Perfluoroundecanoic acid (PFUnA)	3.20	3.32		ng/L		104	70 - 145
Perfluorododecanoic acid (PFDoA)	3.20	3.09		ng/L		96	70 - 140
Perfluorotridecanoic acid (PFTrDA)	3.20	2.95		ng/L		92	65 - 140
Perfluorotetradecanoic acid (PFTeA)	3.20	2.75		ng/L		86	60 - 140
Perfluorobutanesulfonic acid (PFBS)	2.84	2.88		ng/L		101	60 - 145
Perfluoropentanesulfonic acid (PFPeS)	3.01	2.70		ng/L		90	65 - 140
Perfluorohexanesulfonic acid (PFHxS)	2.92	2.85		ng/L		98	65 - 145
Perfluoroheptanesulfonic acid (PFHpS)	3.05	2.57		ng/L		84	70 - 150
Perfluorooctanesulfonic acid (PFOS)	2.98	2.73		ng/L		92	55 - 150
Perfluorononanesulfonic acid (PFNS)	3.07	2.78		ng/L		91	65 - 145
Perfluorodecanesulfonic acid (PFDS)	3.08	2.88		ng/L		93	60 - 145
Perfluorododecanesulfonic acid (PFDoS)	3.10	2.57		ng/L		83	50 - 145
4:2 FTS	12.0	12.1		ng/L		101	70 - 145
6:2 FTS	12.2	12.3		ng/L		101	65 - 155
8:2 FTS	12.3	12.9		ng/L		105	60 - 150
Perfluorooctanesulfonamide (FOSA)	3.20	3.01		ng/L		94	70 - 145
NMeFOSA	3.20	2.91		ng/L		91	60 - 150
NEtFOSA	3.20	2.80		ng/L		88	65 - 145
NMeFOSAA	3.20	2.95		ng/L		92	50 - 140

Method: 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 (Continued)

Lab Sample ID: LLCS 320-732202/2-A
Matrix: Water
Analysis Batch: 733325

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 732202

Analyte	Spike Added	LLCS Result	LLCS Qualifier	Unit	D	%Rec	%Rec Limits
NEtFOSAA	3.20	3.04		ng/L		95	70 - 145
NMeFOSE	32.0	31.7		ng/L		99	70 - 145
NEtFOSE	32.0	30.9		ng/L		96	70 - 135
HFPO-DA (GenX)	12.8	12.3		ng/L		96	70 - 140
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	12.1	13.1		ng/L		108	65 - 145
PFMBA	6.40	6.05		ng/L		94	60 - 150
NFDHA	6.40	6.28		ng/L		98	50 - 150
PFMPA	6.40	5.83		ng/L		91	55 - 140
9Cl-PF3ONS	12.0	13.0		ng/L		109	70 - 155
11Cl-PF3OUdS	12.1	12.9		ng/L		107	55 - 160
PFEESA	5.71	5.71		ng/L		100	70 - 140
3:3 FTCA	16.0	13.4		ng/L		84	65 - 130
5:3 FTCA	79.9	75.4		ng/L		94	70 - 135
7:3 FTCA	79.9	74.8		ng/L		94	50 - 145

Isotope Dilution	*LLCS %Recovery*	*LLCS Qualifier*	*Limits*
13C4 PFBA	*84*		*5 - 130*
13C5 PFPeA	*88*		*40 - 130*
13C5 PFHxA	*85*		*40 - 130*
13C4 PFHpA	*85*		*40 - 130*
13C8 PFOA	*85*		*40 - 130*
13C9 PFNA	*88*		*40 - 130*
13C6 PFDA	*87*		*40 - 130*
13C7 PFUnA	*89*		*30 - 130*
13C2 PFDoA	*81*		*10 - 130*
13C2 PFTeDA	*83*		*10 - 130*
13C3 PFBS	*91*		*40 - 135*
13C3 PFHxS	*91*		*40 - 130*
13C8 PFOS	*88*		*40 - 130*
13C8 FOSA	*85*		*40 - 130*
d3-NMeFOSAA	*88*		*40 - 170*
d5-NEtFOSAA	*80*		*25 - 135*
M2-4:2 FTS	*79*		*40 - 200*
M2-6:2 FTS	*80*		*40 - 200*
M2-8:2 FTS	*83*		*40 - 300*
13C3 HFPO-DA	*77*		*40 - 130*
d7-N-MeFOSE-M	*75*		*10 - 130*
d9-N-EtFOSE-M	*75*		*10 - 130*
d5-NEtPFOSA	*73*		*10 - 130*
d3-NMePFOSA	*69*		*10 - 130*

Lab Sample ID: 320-108065-5 MS
Matrix: Water
Analysis Batch: 733325

Client Sample ID: SB-2A-1223
Prep Type: Total/NA
Prep Batch: 732202

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorobutanoic acid (PFBA)	23		128	151		ng/L		101	70 - 140
Perfluoropentanoic acid (PFPeA)	ND		63.9	68.2		ng/L		107	65 - 135

Method: 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 (Continued)

Lab Sample ID: 320-108065-5 MS
Matrix: Water
Analysis Batch: 733325

Client Sample ID: SB-2A-1223
Prep Type: Total/NA
Prep Batch: 732202

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorohexanoic acid (PFHxA)	ND	F1	31.9	46.4		ng/L		140	70 - 145
Perfluoroheptanoic acid (PFHpA)	ND		31.9	34.0		ng/L		102	70 - 150
Perfluorooctanoic acid (PFOA)	4.1		31.9	37.4		ng/L		104	70 - 150
Perfluorononanoic acid (PFNA)	ND		31.9	29.9		ng/L		94	70 - 150
Perfluorodecanoic acid (PFDA)	ND		31.9	31.3		ng/L		98	70 - 140
Perfluoroundecanoic acid (PFUnA)	ND		31.9	31.7		ng/L		99	70 - 145
Perfluorododecanoic acid (PFDoA)	ND		31.9	32.1		ng/L		101	70 - 140
Perfluorotridecanoic acid (PFTrDA)	ND		31.9	29.5		ng/L		92	65 - 140
Perfluorotetradecanoic acid (PFTeA)	ND		31.9	28.0		ng/L		88	60 - 140
Perfluorobutanesulfonic acid (PFBS)	ND		28.4	32.8		ng/L		112	60 - 145
Perfluoropentanesulfonic acid (PFPeS)	ND		30.0	32.0		ng/L		107	65 - 140
Perfluorohexanesulfonic acid (PFHxS)	ND		29.1	29.1		ng/L		95	65 - 145
Perfluoroheptanesulfonic acid (PFHpS)	ND		30.5	27.9		ng/L		92	70 - 150
Perfluorooctanesulfonic acid (PFOS)	ND		29.7	28.3		ng/L		90	55 - 150
Perfluorononanesulfonic acid (PFNS)	ND		30.7	25.4		ng/L		83	65 - 145
Perfluorodecanesulfonic acid (PFDS)	ND		30.8	23.5		ng/L		76	60 - 145
Perfluorododecanesulfonic acid (PFDoS)	ND	F1	31.0	16.2		ng/L		52	50 - 145
4:2 FTS	ND		119	97.2		ng/L		81	70 - 145
6:2 FTS	ND		122	133		ng/L		109	65 - 155
8:2 FTS	ND		123	136		ng/L		111	60 - 150
Perfluorooctanesulfonamide (FOSA)	ND		31.9	31.2		ng/L		98	70 - 145
NMeFOSA	ND		31.9	32.1		ng/L		100	60 - 150
NEtFOSA	ND		31.9	32.1		ng/L		100	65 - 145
NMeFOSAA	ND		31.9	31.1		ng/L		97	50 - 140
NEtFOSAA	ND		31.9	33.7		ng/L		105	70 - 145
NMeFOSE	ND		319	335		ng/L		105	70 - 145
NEtFOSE	ND		319	341		ng/L		107	70 - 135
HFPO-DA (GenX)	ND		128	138		ng/L		108	70 - 140
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		121	131		ng/L		109	65 - 145
PFMBA	ND		63.9	68.4		ng/L		107	60 - 150
NFDHA	ND		63.9	77.1		ng/L		121	50 - 150
PFMPA	ND		63.9	59.6		ng/L		93	55 - 140
9Cl-PF3ONS	ND		119	123		ng/L		103	70 - 155
11Cl-PF3OUdS	ND		121	98.3		ng/L		82	55 - 160
PFEESA	ND		57.0	58.1		ng/L		102	70 - 140
3:3 FTCA	ND		159	140		ng/L		88	65 - 130
5:3 FTCA	ND		797	781		ng/L		98	70 - 135
7:3 FTCA	ND		797	786		ng/L		99	50 - 145

Method: 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 (Continued)

Isotope Dilution	MS %Recovery	MS Qualifier	Limits
13C4 PFBA	86		5 - 130
13C5 PFPeA	87		40 - 130
13C5 PFHxA	84		40 - 130
13C4 PFHpA	88		40 - 130
13C8 PFOA	85		40 - 130
13C9 PFNA	88		40 - 130
13C6 PFDA	82		40 - 130
13C7 PFUnA	80		30 - 130
13C2 PFDoA	68		10 - 130
13C2 PFTeDA	58		10 - 130
13C3 PFBS	100		40 - 135
13C3 PFHxS	86		40 - 130
13C8 PFOS	89		40 - 130
13C8 FOSA	84		40 - 130
d3-NMeFOSAA	90		40 - 170
d5-NEtFOSAA	80		25 - 135
M2-4:2 FTS	100		40 - 200
M2-6:2 FTS	78		40 - 200
M2-8:2 FTS	78		40 - 300
13C3 HFPO-DA	76		40 - 130
d7-N-MeFOSE-M	60		10 - 130
d9-N-EtFOSE-M	51		10 - 130
d5-NEtPFOSA	68		10 - 130
d3-NMePFOSA	66		10 - 130

Lab Sample ID: 320-108065-5 MSD
Matrix: Water
Analysis Batch: 733325

Client Sample ID: SB-2A-1223
Prep Type: Total/NA
Prep Batch: 732202

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Perfluorobutanoic acid (PFBA)	23		132	158		ng/L		102	70 - 140	4	30
Perfluoropentanoic acid (PFPeA)	ND		66.0	71.2		ng/L		108	65 - 135	4	30
Perfluorohexanoic acid (PFHxA)	ND	F1	33.0	51.1	F1	ng/L		150	70 - 145	10	30
Perfluoroheptanoic acid (PFHpA)	ND		33.0	34.1		ng/L		99	70 - 150	0	30
Perfluorooctanoic acid (PFOA)	4.1		33.0	36.8		ng/L		99	70 - 150	2	30
Perfluorononanoic acid (PFNA)	ND		33.0	32.1		ng/L		97	70 - 150	7	30
Perfluorodecanoic acid (PFDA)	ND		33.0	30.7		ng/L		93	70 - 140	2	30
Perfluoroundecanoic acid (PFUnA)	ND		33.0	32.0		ng/L		97	70 - 145	1	30
Perfluorododecanoic acid (PFDoA)	ND		33.0	36.3		ng/L		110	70 - 140	12	30
Perfluorotridecanoic acid (PFTrDA)	ND		33.0	32.1		ng/L		97	65 - 140	8	30
Perfluorotetradecanoic acid (PFTeA)	ND		33.0	31.4		ng/L		95	60 - 140	11	30
Perfluorobutanesulfonic acid (PFBS)	ND		29.3	34.5		ng/L		114	60 - 145	5	30
Perfluoropentanesulfonic acid (PFPeS)	ND		31.0	31.9		ng/L		103	65 - 140	0	30
Perfluorohexanesulfonic acid (PFHxS)	ND		30.1	29.5		ng/L		93	65 - 145	1	30
Perfluoroheptanesulfonic acid (PFHpS)	ND		31.5	29.1		ng/L		92	70 - 150	4	30

Method: 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 (Continued)

Lab Sample ID: 320-108065-5 MSD
Matrix: Water
Analysis Batch: 733325

Client Sample ID: SB-2A-1223
Prep Type: Total/NA
Prep Batch: 732202

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Perfluorooctanesulfonic acid (PFOS)	ND		30.7	31.1		ng/L		96	55 - 150	9	30
Perfluorononanesulfonic acid (PFNS)	ND		31.7	27.4		ng/L		86	65 - 145	8	30
Perfluorodecanesulfonic acid (PFDS)	ND		31.8	24.0		ng/L		75	60 - 145	2	30
Perfluorododecanesulfonic acid (PFDoS)	ND	F1	32.0	13.9	F1	ng/L		43	50 - 145	15	30
4:2 FTS	ND		123	99.4		ng/L		81	70 - 145	2	30
6:2 FTS	ND		126	126		ng/L		100	65 - 155	5	30
8:2 FTS	ND		127	129		ng/L		102	60 - 150	5	30
Perfluorooctanesulfonamide (FOSA)	ND		33.0	33.0		ng/L		100	70 - 145	6	30
NMeFOSA	ND		33.0	35.3		ng/L		107	60 - 150	10	30
NEtFOSA	ND		33.0	34.5		ng/L		104	65 - 145	7	30
NMeFOSAA	ND		33.0	32.1		ng/L		97	50 - 140	3	30
NEtFOSAA	ND		33.0	35.8		ng/L		108	70 - 145	6	30
NMeFOSE	ND		330	338		ng/L		102	70 - 145	1	30
NEtFOSE	ND		330	342		ng/L		104	70 - 135	0	30
HFPO-DA (GenX)	ND		132	140		ng/L		106	70 - 140	2	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		125	143		ng/L		114	65 - 145	8	30
PFMBA	ND		66.0	69.2		ng/L		105	60 - 150	1	30
NFDHA	ND		66.0	75.5		ng/L		114	50 - 150	2	30
PFMPA	ND		66.0	61.1		ng/L		93	55 - 140	3	30
9Cl-PF3ONS	ND		123	132		ng/L		107	70 - 155	7	30
11Cl-PF3OUdS	ND		125	96.2		ng/L		77	55 - 160	2	30
PFEESA	ND		58.9	60.1		ng/L		102	70 - 140	3	30
3:3 FTCA	ND		165	144		ng/L		87	65 - 130	3	30
5:3 FTCA	ND		824	791		ng/L		96	70 - 135	1	30
7:3 FTCA	ND		824	803		ng/L		97	50 - 145	2	30

Isotope Dilution	*MSD %Recovery*	*MSD Qualifier*	*Limits*
13C4 PFBA	*86*		*5 - 130*
13C5 PFPeA	*84*		*40 - 130*
13C5 PFHxA	*82*		*40 - 130*
13C4 PFHpA	*86*		*40 - 130*
13C8 PFOA	*84*		*40 - 130*
13C9 PFNA	*85*		*40 - 130*
13C6 PFDA	*87*		*40 - 130*
13C7 PFUnA	*76*		*30 - 130*
13C2 PFDoA	*59*		*10 - 130*
13C2 PFTeDA	*45*		*10 - 130*
13C3 PFBS	*99*		*40 - 135*
13C3 PFHxS	*89*		*40 - 130*
13C8 PFOS	*83*		*40 - 130*
13C8 FOSA	*83*		*40 - 130*
d3-NMeFOSAA	*84*		*40 - 170*
d5-NEtFOSAA	*74*		*25 - 135*
M2-4:2 FTS	*104*		*40 - 200*

Method: 1633 - Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24 (Continued)

Lab Sample ID: 320-108065-5 MSD
Matrix: Water
Analysis Batch: 733325

Client Sample ID: SB-2A-1223
Prep Type: Total/NA
Prep Batch: 732202

Isotope Dilution	MSD %Recovery	MSD Qualifier	Limits
M2-6:2 FTS	83		40 - 200
M2-8:2 FTS	79		40 - 300
13C3 HFPO-DA	72		40 - 130
d7-N-MeFOSE-M	55		10 - 130
d9-N-EtFOSE-M	46		10 - 130
d5-NEtPFOSA	63		10 - 130
d3-NMePFOSA	64		10 - 130

QC Association Summary

Client: Maul Foster & Alongi Inc
Project/Site: TWAAFA, M0615.20.012

Job ID: 320-108065-1

LCMS

Prep Batch: 732202

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-108065-1	TWA-3-1223	Total/NA	Water	1633	
320-108065-1 - RA	TWA-3-1223	Total/NA	Water	1633	
320-108065-2	TWA-9-3-1223	Total/NA	Water	1633	
320-108065-3	Rinsate Blank1-1223	Total/NA	Water	1633	
320-108065-4	Field Blank1-1223	Total/NA	Water	1633	
320-108065-5	SB-2A-1223	Total/NA	Water	1633	
320-108065-6	Rinsate Blank2-1223	Total/NA	Water	1633	
320-108065-7	Trip Blank1-1223	Total/NA	Water	1633	
MB 320-732202/1-A	Method Blank	Total/NA	Water	1633	
LCS 320-732202/3-A	Lab Control Sample	Total/NA	Water	1633	
LLCS 320-732202/2-A	Lab Control Sample	Total/NA	Water	1633	
320-108065-5 MS	SB-2A-1223	Total/NA	Water	1633	
320-108065-5 MSD	SB-2A-1223	Total/NA	Water	1633	

Analysis Batch: 733325

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-108065-1	TWA-3-1223	Total/NA	Water	1633	732202
320-108065-2	TWA-9-3-1223	Total/NA	Water	1633	732202
320-108065-3	Rinsate Blank1-1223	Total/NA	Water	1633	732202
320-108065-4	Field Blank1-1223	Total/NA	Water	1633	732202
320-108065-5	SB-2A-1223	Total/NA	Water	1633	732202
320-108065-6	Rinsate Blank2-1223	Total/NA	Water	1633	732202
320-108065-7	Trip Blank1-1223	Total/NA	Water	1633	732202
MB 320-732202/1-A	Method Blank	Total/NA	Water	1633	732202
LCS 320-732202/3-A	Lab Control Sample	Total/NA	Water	1633	732202
LLCS 320-732202/2-A	Lab Control Sample	Total/NA	Water	1633	732202
320-108065-5 MS	SB-2A-1223	Total/NA	Water	1633	732202
320-108065-5 MSD	SB-2A-1223	Total/NA	Water	1633	732202

Analysis Batch: 733755

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-108065-1 - RA	TWA-3-1223	Total/NA	Water	1633	732202

Client Sample ID: TWA-3-1223
Lab Sample ID: 320-108065-1
Date Collected: 12/12/23 12:40
Matrix: Water
Date Received: 12/14/23 09:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1633			489.5 mL	5.0 mL	732202	01/09/24 11:44	JS	EET SAC
Total/NA	Analysis	1633		1			733325	01/13/24 23:50	EMF	EET SAC
Total/NA	Prep	1633	RA		489.5 mL	5.0 mL	732202	01/09/24 11:44	JS	EET SAC
Total/NA	Analysis	1633	RA	1	1 mL	1 mL	733755	01/15/24 16:42	S1M	EET SAC

Client Sample ID: TWA-9-3-1223
Lab Sample ID: 320-108065-2
Date Collected: 12/12/23 12:40
Matrix: Water
Date Received: 12/14/23 09:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1633			486.9 mL	5.0 mL	732202	01/09/24 11:44	JS	EET SAC
Total/NA	Analysis	1633		1			733325	01/14/24 00:08	EMF	EET SAC

Client Sample ID: Rinsate Blank1-1223
Lab Sample ID: 320-108065-3
Date Collected: 12/12/23 13:15
Matrix: Water
Date Received: 12/14/23 09:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1633			533.5 mL	5.0 mL	732202	01/09/24 11:44	JS	EET SAC
Total/NA	Analysis	1633		1			733325	01/14/24 00:26	EMF	EET SAC

Client Sample ID: Field Blank1-1223
Lab Sample ID: 320-108065-4
Date Collected: 12/12/23 15:50
Matrix: Water
Date Received: 12/14/23 09:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1633			503.1 mL	5.0 mL	732202	01/09/24 11:44	JS	EET SAC
Total/NA	Analysis	1633		1			733325	01/14/24 00:43	EMF	EET SAC

Client Sample ID: SB-2A-1223
Lab Sample ID: 320-108065-5
Date Collected: 12/12/23 16:15
Matrix: Water
Date Received: 12/14/23 09:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1633			492.7 mL	5.0 mL	732202	01/09/24 11:44	JS	EET SAC
Total/NA	Analysis	1633		1			733325	01/14/24 01:01	EMF	EET SAC

Client Sample ID: Rinsate Blank2-1223
Lab Sample ID: 320-108065-6
Date Collected: 12/12/23 16:40
Matrix: Water
Date Received: 12/14/23 09:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1633			507.1 mL	5.0 mL	732202	01/09/24 11:44	JS	EET SAC
Total/NA	Analysis	1633		1			733325	01/14/24 02:29	EMF	EET SAC

Lab Chronicle

Client: Maul Foster & Alongi Inc
Project/Site: TWAAFA, M0615.20.012

Job ID: 320-108065-1

Client Sample ID: Trip Blank1-1223

Date Collected: 12/12/23 12:00
Date Received: 12/14/23 09:15

Lab Sample ID: 320-108065-7

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	1633			582.2 mL	5.0 mL	732202	01/09/24 11:44	JS	EET SAC
Total/NA	Analysis	1633		1			733325	01/14/24 02:47	EMF	EET SAC

Laboratory References:

EET SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Accreditation/Certification Summary

Client: Maul Foster & Alongi Inc
Job ID: 320-108065-1
Project/Site: TWAAFA, M0615.20.012

Laboratory: Eurofins Sacramento

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Washington	State	C581	05-05-24

Method Summary

Client: Maul Foster & Alongi Inc
Project/Site: TWAAFA, M0615.20.012

Job ID: 320-108065-1

Method	Method Description	Protocol	Laboratory
1633	Per- and Polyfluoroalkyl Substances by LC/MS/MS, QSM Table B-24	EPA	EET SAC
1633	Solid-Phase Extraction (SPE)	EPA	EET SAC

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

EET SAC = Eurofins Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: Maul Foster & Alongi Inc
Project/Site: TWAAFA, M0615.20.012

Job ID: 320-108065-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-108065-1	TWA-3-1223	Water	12/12/23 12:40	12/14/23 09:15
320-108065-2	TWA-9-3-1223	Water	12/12/23 12:40	12/14/23 09:15
320-108065-3	Rinsate Blank1-1223	Water	12/12/23 13:15	12/14/23 09:15
320-108065-4	Field Blank1-1223	Water	12/12/23 15:50	12/14/23 09:15
320-108065-5	SB-2A-1223	Water	12/12/23 16:15	12/14/23 09:15
320-108065-6	Rinsate Blank2-1223	Water	12/12/23 16:40	12/14/23 09:15
320-108065-7	Trip Blank1-1223	Water	12/12/23 12:00	12/14/23 09:15

Eurofins Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Phone (916) 373-5600

Chain of Custody Record

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Client Information	Sampler: Christan Sfford	Lab PM: Justinn Gonzales	Carrier Tracking No(s):	COC No: 1
Client Contact: Audrey Hackett	Phone: 541-391-3652	E-Mail: Justinn.Gonzales@et.eurofinsus.com	State of Origin: WA	Page: Page 1 of 1
Company: Maul Foster & Along, Inc	PWSID:	Analysis Requested		Job #:
Address: 2815 2nd Ave, Ste 540	Due Date Requested: 25 days			Preservation Codes: A HCL, B NaOH, C Zn Acetate, D Nitric Acid, E NaHSO4, F MeOH, G Amchlor, H Ascorbic Acid, I Ice, J DI Water, K EDTA, L EDA, M Hexane, N None, O AsNaO2, P Na2O4S, Q Na2SO3, R Na2S2O3, S H2SO4, T TSP Dodecahydrate, U Acetone, V MCAA, W pH 4-5, Y Trizma, Z other (specify)
City: Seattle	TAT Requested (days):			
State, Zip: WA 98121	Compliance Project: Δ Yes Δ No			
Phone: 206 331-1835	PO #:			Other:
Email: ahackett@maulfoster.com	WO #:			
Project Name: TWAAFA Additional GW Sampling	Project #: M0615.20.012			
Site: TWAAFA	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	40 PFAS EPA 1633	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
TWA-3-1223	12/12/23	12 40	G	W	N	N	X	3	
TWA-9-3-1223	12/12/23	12 40	G	W	N	N	X	3	
Rinsate Blank1-1223	12/12/23	13 15	G	W	N	N	X	3	
Field Blank1-1223	12/12/23	15 50	G	W	N	N	X	3	
SB-2A-1223	12/12/23	16 15	G	W	N	Y	X	9	MS/MSD
Rinsate Blank2-1223	12/12/23	16 40	G	W	N	N	X	3	
Trip Blank1-1223	12/12/23	12 00	G	W	N	N	X	3	

320-108065 Chain of Custody

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

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

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

Special Instructions/QC Requirements:

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

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		12/13/23 15 00	MFA		12/14/23 0915	ESTSAC
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No. 2249071 / 2249070

Cooler Temperature(s) °C and Other Remarks: 0 5

Ver 01/16/2019

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Sacramento Sample Receiving Notes (SSRN)

Loc: 320
108065

Tracking # 7879 8095 5416

Job _____ _____

SO / PO / FO / SAT / 2-Day / Ground / UPS / CDO / Courier
GSL / OnTrac / Goldstreak / USPS / Other_____

Use this form to record Sample Custody Seal Cooler Custody Seal Temperature & corrected Temperature & other observations.
File in the job folder with the COC

Therm ID LU2 Corr Factor (+ / -) _____ °C

Ice 1 Wet 1 Gel _____ Other _____

Cooler Custody Seal 2249071 / 2249020

Cooler ID _____

Temp Observed 0.5 °C Corrected 0.5 °C

From Temp Blank ☑ Sample ☐

Opening/Processing The Shipment	**Yes**	**No**	**NA**
Cooler compromised/tampered with?	☐	☑	☐
Cooler Temperature is acceptable?	☑	☐	☐
Frozen samples show signs of thaw?	☐	☐	☑

Initials MM Date 12/14/23

Unpacking/Labeling The Samples	**Yes**	**No**	**NA**
Containers are not broken or leaking?	☑	☐	☐
Samples compromised/tampered with?	☐	☑	☐
COC is complete w/o discrepancies	☑	☐	☐
Sample custody seal?	☐	☑	☐
Sample containers have legible labels?	☑	☐	☐
Sample date/times are provided?	☑	☐	☐
Appropriate containers are used?	☑	☐	☐
Sample bottles are completely filled?	☑	☐	☐
Sample preservatives verified?	☐	☐	☑
Is the Field Sampler's name on COC?	☑	☐	☐
Samples w/o discrepancies?	☑	☐	☐
Zero headspace?*	☐	☐	☑
Alkalinity has no headspace?	☐	☐	☑
Perchlorate has headspace? (Methods 314 331 6850)	☐	☐	☑
Multiphasic samples are not present?	☐	☐	☐

Containers requiring zero headspace have no headspace, or bubble < 6 mm (1/4")

Initials MM Date 12/14/23

Notes _____

Trizma Lot #(s) _____

Ammonium
Acetate Lot #(s) _____

Login Completion	**Yes**	**No**	**NA**
Receipt Temperature on COC?	☑	☐	☐
NCM Filed?	☐	☐	☑
Samples received within hold time?	☑	☐	☐
Log Release checked in TALS?	☑	☐	☐

Initials MY Date 12/14/23

Login Sample Receipt Checklist

Client: Maul Foster & Alongi Inc

Job Number: 320-108065-1

Login Number: 108065
List Number: 1
Creator: Oropeza, Salvador

List Source: Eurofins Sacramento

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