MAUL FOSTER ALONGI
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April 1, 2021
Project No. 0615.17.01

Mr. Panjini Balaraju and Mr. Andy Smith
Washington State Department of Ecology
PO Box 47600
Olympia, Washington 98504

Re: Groundwater Monitoring Report, Former Cascade Timber No. 3 Sort Yard
Consent Decree No. 94-2-03590-3
Washington State Department of Ecology Facility Site ID No. 1206
Monitoring Date: February 19, 2021

Dear Mr. Balaraju and Mr. Smith:

On February 19, 2021, Maul Foster & Alongi, Inc. (MFA) conducted a groundwater-monitoring event on behalf of the Port of Tacoma (Port) at the former Cascade Timber No. 3 Log Sort Yard (Site), located on the south-southeastern side of Maxwell Way between Port of Tacoma Road and Thorne Road in Tacoma, Washington (Figure 1). Groundwater monitoring/sampling activities were conducted in accordance with the requirements set forth in the Consent Decree (94-2-03590-3), dated April 1994, between the Port and the Washington State Department of Ecology and in the compliance monitoring plan (HLA, 1994). The field activities and the analytical results of the monitoring event are discussed below.

Anchor QEA reported that removal of zinc from the site groundwater-monitoring analyte list had been approved in an email from Dom Reale (Ecology) to Mark Rettman (Port) dated June 28, 2011. The monitoring frequency was changed from 12 months to 18 months based on a memorandum of understanding between Ecology and the Port in 2011. In January 2017, Ecology conducted a periodic review of post-cleanup site conditions and site data to ensure that human health and the environment were being protected. Ecology determined that the requirements of the restrictive covenants and the Consent Decree were met (Anchor QEA, 2019).

The prior groundwater monitoring event was conducted in August 2019 by Anchor QEA. MFA sampled groundwater again on February 19, 2021. Windward completed the most recent cap inspection.

SITE BACKGROUND

The Site is located on the south-southeastern side of Maxwell Way between Port of Tacoma Road and Thorne Road in Tacoma, Washington (refer to Figure 1). The property was leased to the Cascade Timber Company and operated as a log sort yard from 1978 to 1984. In 1982,

approximately 500 tons of slag generated by Asarco Incorporated was placed on the southwest portion of the property as ballast material. The Port is the current property owner. Currently, the Port leases the property to Washington United Terminals, which operates a truck-queuing area and a storage facility for empty shipping containers and chassis at the property.

Ecology collected stormwater runoff samples at the Site between November 1983 and June 1984. Analytical results indicated that metals, in concentrations above the U.S. Environmental Protection Agency (EPA) water-quality standards, were leaving the Site via the stormwater pathway. On October 1991, Ecology and the Port entered into an Agreed Order to complete a remedial investigation/feasibility study (RI/FS). An RI/FS report was submitted to Ecology in June 1993, and an engineering design report was submitted to Ecology in 1994. Construction of a low-permeability asphalt cap and stormwater drainage system was completed in 1994. Monitoring wells MW-1 and MW-2 were installed to monitor the effectiveness of the remedial action (Anchor QEA, 2019).

FIELD PROCEDURES

MFA conducted a groundwater-monitoring event at the Site on February 19, 2021. Water level data are summarized on Table 1. The locations of MW-1 and MW-2 are shown on Figure 2.

Groundwater monitoring and sampling activities were conducted in accordance with industry standard sampling protocols, with at least one pore volume extracted from each well and field parameters allowed to stabilize before sample collection. Depth-to-water measurements at the monitoring wells were measured, and new polyethylene tubing was installed at each monitoring well before groundwater-sampling activities began.

Water-quality parameters were measured with a YSI meter (YSI 556MPS) and a turbidity meter (Hach 2100P) before sample collection, and the process and results were recorded on field sampling data sheets (refer to Attachment A). Three groundwater samples were collected, including a duplicate sample at MW-2, using low-flow sampling techniques involving a peristaltic pump and dedicated tubing.

The groundwater samples were submitted to Friedman & Bruya, Inc., of Seattle, Washington, under standard chain-of-custody procedures. Samples were analyzed for the contaminants of concern, i.e., dissolved metals including arsenic, copper, lead, and zinc, by EPA Method 6020B.

Investigation-derived waste generated during the February 2021 sampling event was properly drummed and labeled and is temporarily stored at the Site, pending pickup and disposal.

RESULTS AND DISCUSSION

Water-level measurements and groundwater analytical results are summarized in Tables 1 and 2, respectively. Laboratory analytical reports are provided as Attachment B. Analytical data and the laboratory's internal quality assurance and quality control data were reviewed to assess whether they met project-specific data quality objectives. This review was performed consistent with accepted EPA procedures for evaluating laboratory analytical data (EPA, 2017). A data validation memorandum summarizing data evaluation procedures, data usability, and deviations from specific field and/or laboratory methods for the February 2021 groundwater quality data is included as Attachment C. The data are considered acceptable for their intended use, with the appropriate data qualifiers assigned.

SUMMARY OF FINDINGS

Groundwater analytical results (refer to Table 2) indicate the following:

- Dissolved arsenic was detected at a concentration of 283 micrograms per liter (ug/L) in MW-1 and 43.6 ug/L in MW-2. Both of these values exceed the Site's designated groundwater cleanup level of 36 ug/L for dissolved arsenic.
- Dissolved copper was not detected above the Site's designated groundwater cleanup level of 2.9 ug/L in either MW-1 or MW-2.
- Dissolved lead was not detected at the method detection limit (5 ug/L) in either MW-1 or MW-2.
- Dissolved zinc was not detected at the method detection limit (25 ug/L) in either MW-1 or MW-2.

Plots of dissolved arsenic, copper, lead, and zinc versus time for MW-1 and MW-2 are presented in Figures 3 through 6, respectively.

Monitoring of the dissolved arsenic, copper, lead, and zinc concentrations in groundwater will continue in accordance with the Consent Decree, as amended. The next scheduled sampling event will take place in February 2022. Groundwater-monitoring results will be submitted to Ecology within 45 days after completion of data validation.

Please contact me if you have any questions regarding this report.

Sincerely,

Maul Foster & Alongi, Inc.

YEN-VY VAN 04-01-2021

Yen-Vy Van, LHG
Senior Hydrogeologist

Attachments: Limitations
References
Tables
Figures
A—Field Sampling Data Sheets
B—Laboratory Analytical Report
C—Data Validation Memorandum

cc: Sarah Weeks, Port of Tacoma

LIMITATIONS

The services undertaken in completing this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, or the use of segregated portions of this report.

REFERENCES

Anchor QEA. 2019. Groundwater monitoring report—former Cascade Timber No. 3 Sort Yard, Consent Decree No. 94-2-03590-3. November 14.

EPA. 2017. EPA contract laboratory program, national functional guidelines for Superfund organic methods data review. EPA 540-R-2017-002. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. January.

TABLES

Table 1
Water-Level Data
Former Cascade Timber No. 3 Log Sort Yard

Well ID	Date	Top of Casing Elevation in Feet	Depth of Water below Top of Casing in Feet	Water Level Elevation in Feet
MW-1	12/28/1994	--	--	--
MW-1	12/09/1994	--	--	--
MW-1	12/01/1995	20.00	3.68	16.32
MW-1	12/13/1996	20.00	3.98	16.02
MW-1	12/09/1997	20.00	5.26	14.74
MW-1	12/07/1998	20.00	4.71	15.29
MW-1	12/22/1999	20.00	4.47	15.53
MW-1	10/11/2000	20.00	6.58	13.42
MW-1	11/03/2000	20.00	--	--
MW-1	11/16/2001	20.00	4.35	15.65
MW-1	11/19/2001	20.00	--	--
MW-1	11/26/2002	20.00	6.58	13.42
MW-1	11/14/2003	20.98	12.22	8.76
MW-1	10/29/2004	20.98	12.31	8.67
MW-1	10/26/2005	20.98	12.71	8.27
MW-1	01/29/2007	20.98	11.83	9.15
MW-1	02/08/2008	20.98	12.45	8.53
MW-1	02/27/2009	20.98	12.18	8.80
MW-1	02/04/2010	20.98	11.13	9.85
MW-1	02/22/2011	20.98	11.54	9.44
MW-1	02/13/2012	20.98	12.24	8.74
MW-1	09/23/2013	20.98	12.23	8.75
MW-1	02/12/2015	20.98	10.90	10.08
MW-1	08/26/2016	20.98	12.35	8.63
MW-1	02/12/2018	20.98	10.74	10.24
MW-1	08/23/2019	20.98	13.59	7.39
MW-1	02/19/2021	20.98	11.34	9.64
MW-2	12/28/1994	--	--	--
MW-2	12/09/1994	--	--	--
MW-2	12/01/1995	18.12	4.60	13.52
MW-2	12/13/1996	18.12	7.35	10.77
MW-2	12/09/1997	18.12	13.66	4.46
MW-2	12/07/1998	18.12	5.82	12.30
MW-2	12/22/1999	18.12	7.21	10.91
MW-2	10/11/2000	18.12	12.60	5.52
MW-2	11/03/2000	18.12	--	--
MW-2	11/16/2001	18.12	13.55	4.57

Table 1
Water-Level Data
Former Cascade Timber No. 3 Log Sort Yard

Well ID	Date	Top of Casing Elevation in Feet	Depth of Water below Top of Casing in Feet	Water Level Elevation in Feet
MW-2	11/19/2001	18.12	6.32	11.80
MW-2	11/26/2002	18.12	8.91	9.21
MW-2	11/14/2003	19.91	10.02	9.89
MW-2	10/29/2004	19.91	9.10	10.81
MW-2	10/26/2005	19.91	9.74	10.17
MW-2	01/29/2007	19.91	5.43	14.48
MW-2	02/08/2008	19.91	10.10	9.81
MW-2	02/27/2009	19.91	8.77	11.14
MW-2	02/04/2010	19.91	12.19	7.72
MW-2	02/22/2011	19.91	5.23	14.68
MW-2	02/13/2012	19.91	6.23	13.68
MW-2	09/23/2013	19.91	7.98	11.93
MW-2	02/12/2015	19.91	4.76	15.15
MW-2	08/26/2016	19.91	8.37	11.54
MW-2	02/12/2018	19.91	4.77	15.14
MW-2	08/23/2019	19.91	8.55	11.36
MW-2	02/19/2021	19.91	5.40	14.51

NOTES:

Top of casing elevations based on information provided by the Port of Tacoma to the previous consultant.

-- = not measured.

Table 2
Groundwater Analytical Data
Former Cascade Timber No. 3 Log Sort Yard

Well ID	Date	Dissolved Arsenic	Dissolved Copper	Dissolved Lead	Dissolved Zinc
		Concentration in ug/L			
Groundwater Cleanup Levels[(a)]:		36	2.9	8.5	86
MW-1	11/28/1994	**940**	**8**	<3	<20
MW-1	12/09/1994	**220**	**4**	<3	<20
MW-1	12/01/1995	**132**	**4**	<1	53
MW-1	12/13/1996	**93**	**6**	<1	9
MW-1	12/09/1997	**60**	2.1	2.4	12
MW-1	12/07/1998	9.7	**11**	3.6	**510**
MW-1	12/22/1999	21.0	2.5	<1	**99**
MW-1	10/11/2000	**73**	<1	<0.5	4.7
MW-1	11/03/2000	14.0	--	--	--
MW-1	11/16/2001	7.02	**8.73**	<0.5	<4
MW-1	11/26/2002	13.4	<2.5	<0.5	<2.5
MW-1	11/14/2003	18.4	<1.0	<0.5	5.2
MW-1	10/29/2004	32.4	<2.5	<2.5	12.2
MW-1	10/26/2005	**46**	<2.5	<2.5	<2.5
MW-1	01/29/2007	**93**	<2.0	<2.0	<5.0
MW-1	02/08/2008	**140**	<0.55	<0.22	5.2J
MW-1	02/27/2009	**57.2**	<0.5	<1	6
MW-1	02/04/2010	**50.3**	0.6	<1	<4
MW-1	02/22/2011	**158**	<0.5	<0.5	0.8
MW-1	02/13/2012	**53**	<0.5	<0.5	--
MW-1	08/23/2013	28.6	<0.5	<0.5	--
MW-1	02/12/2015	**57.7**	0.7	<0.1	--
MW-1	08/26/2016	24.2	<0.5	<0.1	--
MW-1	02/12/2018	**66**	<0.5	<0.1	--
MW-1	08/23/2019	20	<0.5	<0.1	--
MW-1 (Duplicate)	08/23/2019	20.4	<0.5	<0.1	--
MW-1	02/19/2021	**283**	<2.5	<5.0	<25
MW-2	11/28/1994	10	**3**	<3	<20
MW-2	12/01/1995	--	--	--	--
MW-2 (Duplicate)	12/01/1995	**132**	**5**	<1	53
MW-2	12/13/1996	3	**5**	<1	<83
MW-2 (Duplicate)	12/13/1996	**76**	**41**	1	18
MW-2 (Duplicate)	12/09/1997	**54**	**6.1**	2.4	43
MW-2	12/16/1997	5	<2	<1	6
MW-2	12/07/1998	2.3	1.8	5.1	**360**
MW-2 (Duplicate)	12/07/1998	12	**13**	1.2	**600**
MW-2	12/22/1999	4.4	<2	**23**	6.9

Table 2
Groundwater Analytical Data
Former Cascade Timber No. 3 Log Sort Yard

Well ID	Date	Dissolved Arsenic	Dissolved Copper	Dissolved Lead	Dissolved Zinc
		Concentration in ug/L			
Groundwater Cleanup Levels[(a)]:		36	2.9	8.5	86
MW-2 (Duplicate)	12/22/1999	19	**2.9**	<1	38
MW-2	10/11/2000	<1	<1	<1	**99**
MW-2 (Duplicate)	10/11/2000	**42**	<1	<0.5	6.5
MW-2	11/03/2000	2	<1	**600**	8.3
MW-2 (Duplicate)	11/03/2000	7	--	--	--
MW-2	11/13/2000	--	--	**600**	--
MW-2 (Duplicate)	11/16/2001	7.69	**10.2**	<0.5	<4
MW-2	11/19/2001	1.19	<1	3.74	38.6
MW-2	11/26/2002	<2.5	<2.5	**180**	3.36
MW-2 (Duplicate)	11/26/2002	19.7	<2.5	<0.5	<2.5
MW-2	11/14/2003	8.91	<1.0	<0.5	4.64
MW-2 (Duplicate)	11/14/2003	18.5	<1.0	<0.5	3.97
MW-2	10/29/2004	25.4	<2.5	<2.5	<5
MW-2 (Duplicate)	10/29/2004	31.9	<2.5	<2.5	7.15
MW-2	10/26/2005	**39**	<2.5	<2.5	<2.5
MW-2 (Duplicate)	10/26/2005	32	<2.5	<2.5	<2.5
MW-2	01/29/2007	34	<2.0	<2.0	<5.0
MW-2 (Duplicate)	01/29/2007	35	<2.0	<2.0	<5.0
MW-2	02/08/2008	24	0.78J	<0.22	5.1J
MW-2 (Duplicate)	02/08/2008	**140**	<0.55	<0.22	6.0J
MW-2	02/27/2009	32.6	1.6	<1	6
MW-2 (Duplicate)	02/27/2009	32.9	1.5	<1	<4
MW-2	02/04/2010	8.1	**4.1**	<1	<4
MW-2 (Duplicate)	02/04/2010	18.2	5.4	<1	<4
MW-2	02/22/2011	27.2	<0.5	<0.5	0.8
MW-2 (Duplicate)	02/22/2011	26.9	0.5	<0.5	1.1
MW-2	02/13/2012	16	0.5	<0.5	--
MW-2 (Duplicate)	02/13/2012	16	0.6	<0.5	--
MW-2	08/23/2013	4.1	<0.5	<0.5	--
MW-2 (Duplicate)	08/23/2013	4.0	<0.5	<0.5	--
MW-2	02/12/2015	**41.6**	2.0	0.1	--
MW-2 (Duplicate)	02/12/2015	**40.7**	1.8	0.1	--
MW-2	08/26/2016	23.6	<0.5	<0.1	--
MW-2 (Duplicate)	08/26/2016	26.5	<0.5	<0.1	--
MW-2	02/12/2018	**63.6**	1.96	0.092 J	--
MW-2 (Duplicate)	02/12/2018	**60**	2.43	0.112	--
MW-2	08/23/2019	**102**	<0.5	<0.1	--

Table 2
Groundwater Analytical Data
Former Cascade Timber No. 3 Log Sort Yard

Well ID	Date	Dissolved Arsenic	Dissolved Copper	Dissolved Lead	Dissolved Zinc
		Concentration in ug/L			
Groundwater Cleanup Levels[(a)]:		36	2.9	8.5	86
MW-2	02/19/2021	**42.0**	<2.5	<5.0	<25
MW-2 (Duplicate)	02/19/2021	**43.6**	<2.5	<5.0	<25
MW-3S	11/28/1994	25	**28**	<3	<20
MW-3S	12/01/1995	**54**	**3**	2	65
MW-3S	12/13/1996	**190**	<2	3	9
MW-3S	12/09/1997	**63**	2	4.2	**330**
MW-3S	12/07/1998	**50**	**2.9**	2.2	<5
MW-3D	11/28/1994	20	**7**	<3	<20
MW-3D	12/01/1995	3	**4**	<1	35
MW-3D	12/13/1996	4	**14**	<5	18
MW-3D	12/09/1997	27	2.2	2	17
MW-3D	12/07/1998	3	<2	<1	7.8

NOTES:

Analytical results for groundwater samples collected in February 2021 provided by Maul Foster & Alongi, Inc. All previous groundwater analytical results provided by Port of Tacoma.

Groundwater samples were analyzed for dissolved metals; samples collected before 2020 analyzed by EPA Method 200.8 and samples collected after 2020 analyzed by EPA Method 6020B.

Value in bold indicates concentration greater than groundwater cleanup level.

Zinc analysis was discontinued in 2011 with Ecology approval dated June 28, 2011.

-- = not analyzed.

< = laboratory analytical result does not exceed laboratory quantitation limit.

EPA = U.S. Environmental Protection Agency.

J = concentration is estimated.

ug/L = micrograms per liter.

[(a)]Groundwater cleanup levels are based on EPA chronic marine water quality criteria (WAC 173-201A).

FIGURES

Path: X:\0615.17\Fig1_1_Site_Location.mxd

Print Date: 3/18/2021

Reviewed By:

Produced By: aguse

Project: 0615.17

Source:
US Geological Survey (2021) 7.5-minute topographic quadrangle: Tacoma North. Township 21 North, Range 3 East, Section 34. Property boundary obtained from Pierce County GIS.

Legend

Site Boundary

Figure 1
Site Location

Port of Tacoma
Cascade Timber

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0 1,000 2,000
Feet

Figure 2
Site Features
Port of Tacoma
Cascade Timber

Legend

- Monitoring Well
- Site Boundary
- Tax Lots

0 60 120
Feet

Source:
Aerial photograph obtained from Esri.
Tax lot data obtained from Pierce County GIS.

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Path: X:\0615.17\Fig2_1 Site_Features.mxd
Print Date: 3/18/2021
Reviewed By:
Produced By: cgruse
Project: 0615.17

Figure 3
Dissolved Arsenic Concentration Trends
Former Cascade Timber No. 3 Log Sort Yard

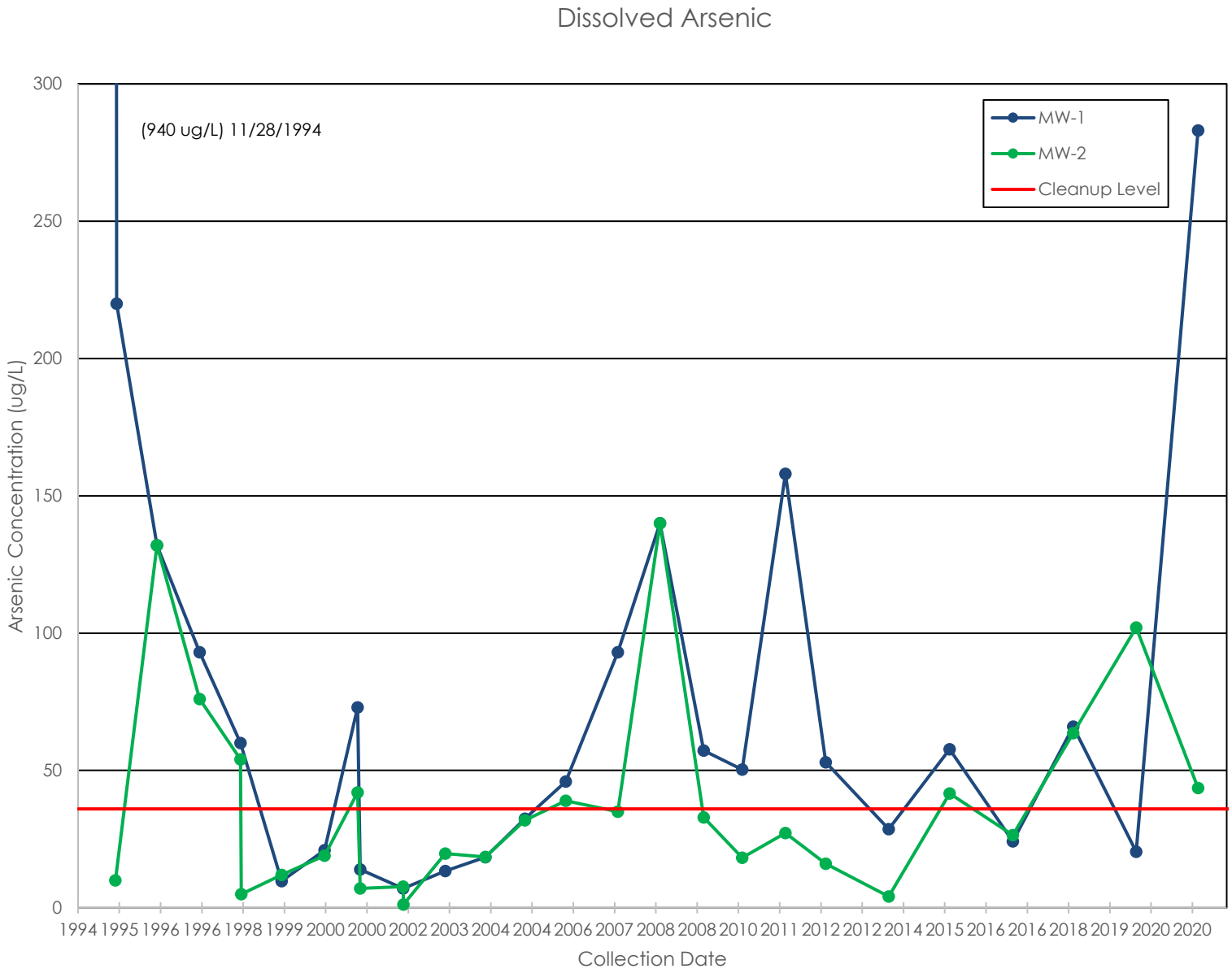


Figure 4
Dissolved Copper Concentration Trends
Former Cascade Timber No. 3 Log Sort Yard

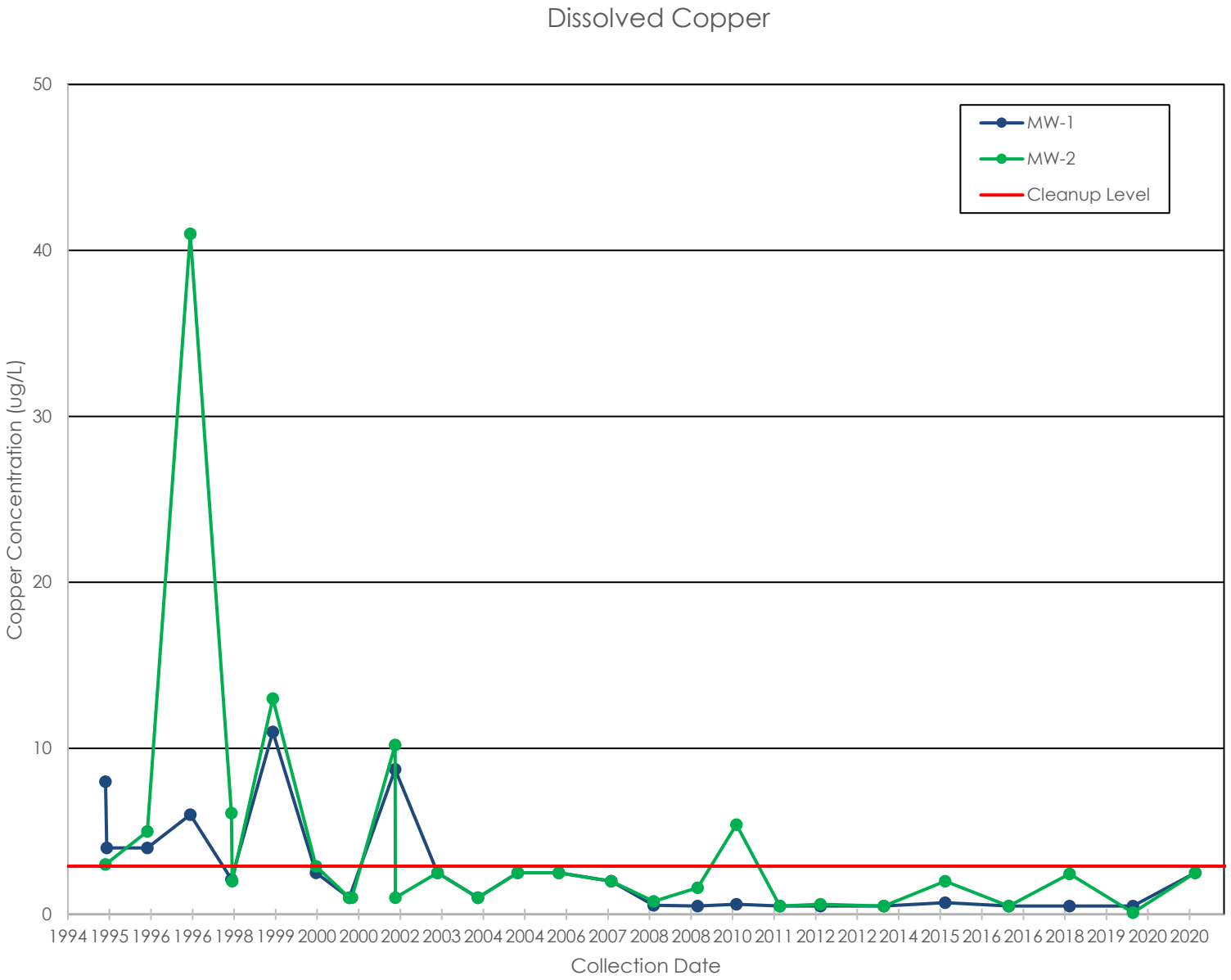


Figure 5
Dissolved Lead Concentration Trends
Former Cascade Timber No. 3 Log Sort Yard

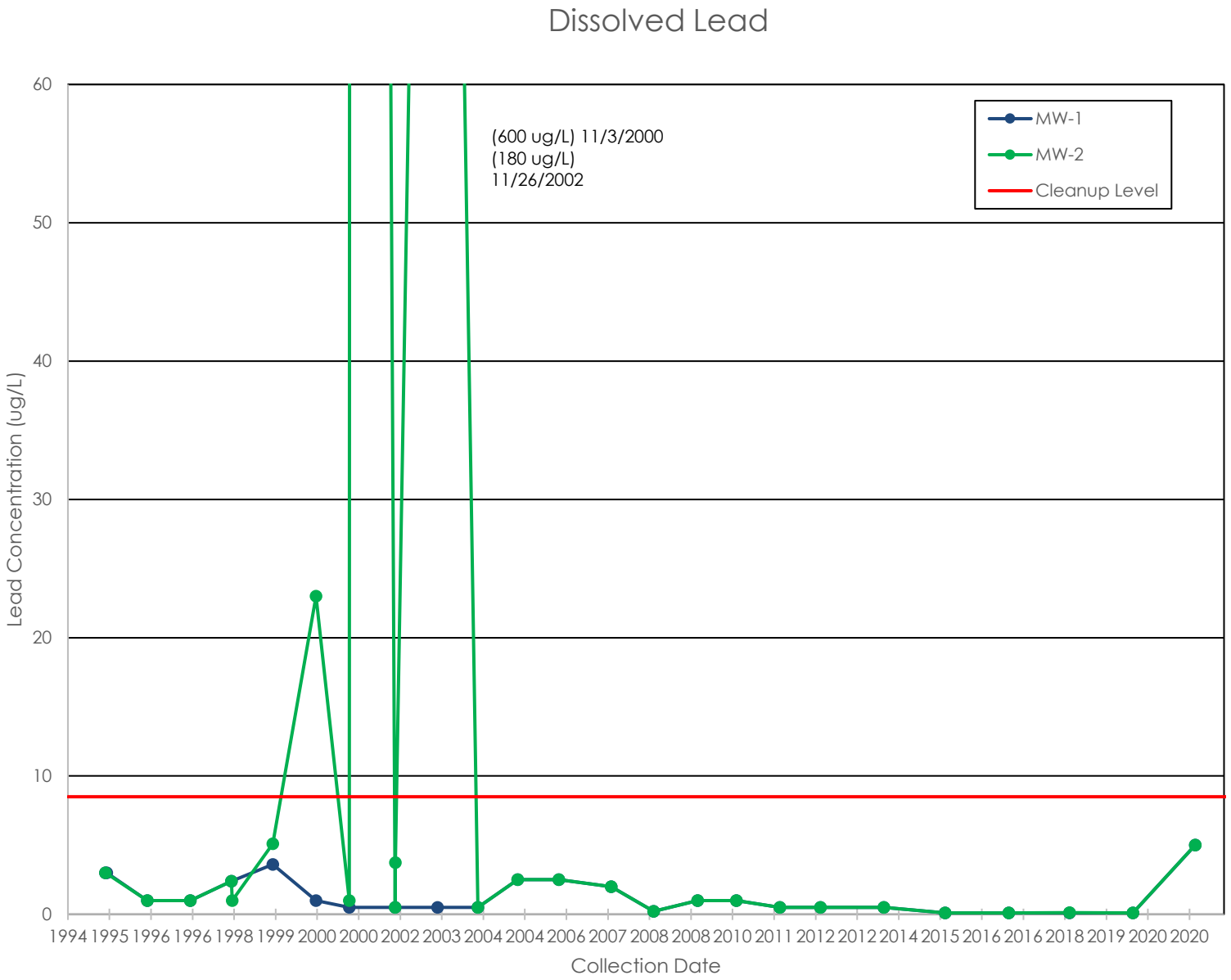
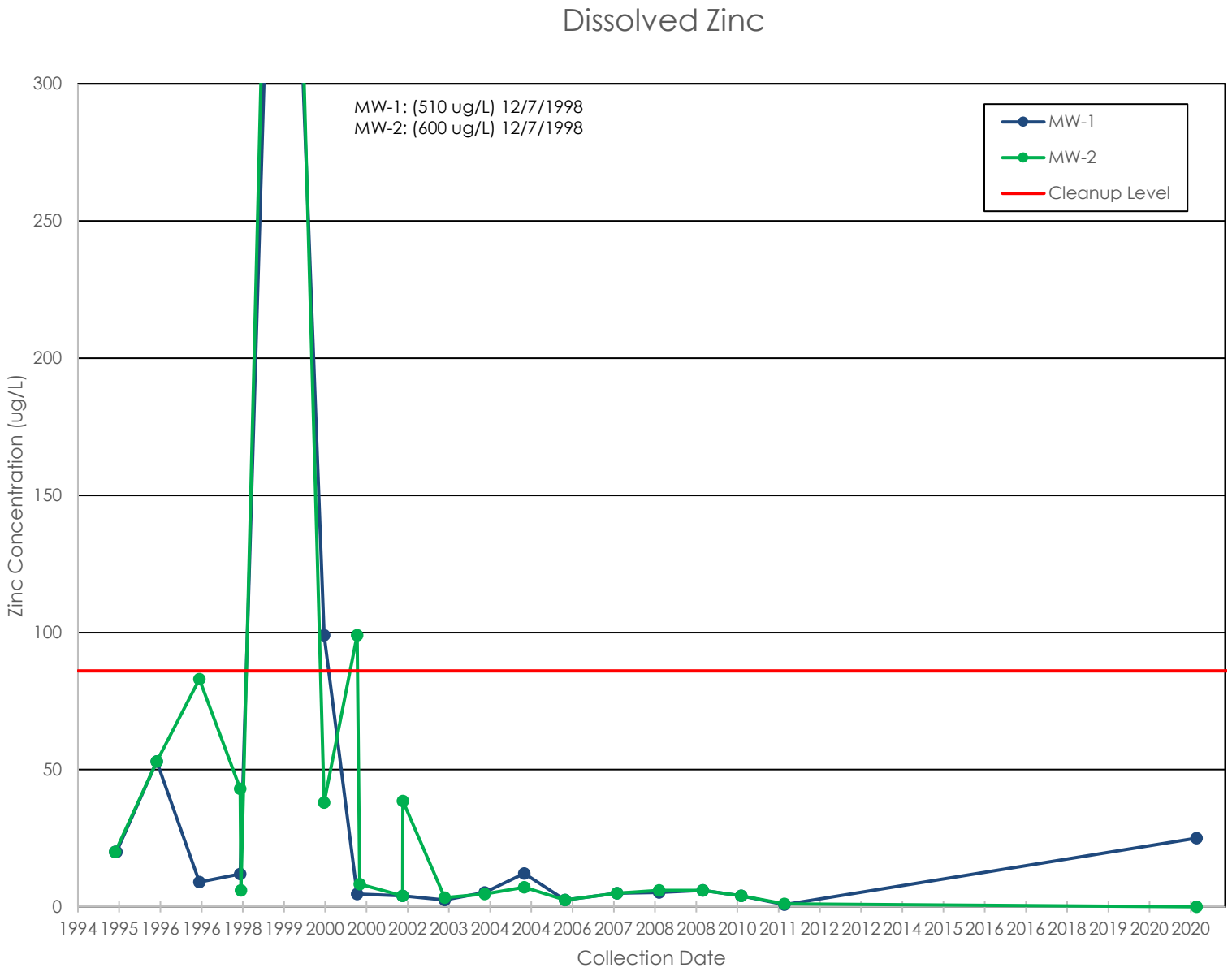


Figure 6
Dissolved Zinc Concentration Trends
Former Cascade Timber No. 3 Log Sort Yard



ATTACHMENT A

FIELD SAMPLING DATA SHEETS

Maul Foster & Alongi, Inc.

109 East 13th Street, Vancouver, WA 98660 (360) 694-2691 Fax. (360) 906-1

Water Field Sampling Data Sheet

Client Name	Port of Tacoma	**Sample Location**	MW-1				
Project #	0615.17.01	**Sampler**	SRM				
Project Name	Former Cascade Timber Property	**Sampling Date**	2/19/2021				
Sampling Event	February 2021	**Sample Name**	MW-1-GW-13.75				
Sub Area		**Sample Depth**	13.75				
FSDS QA:	B. James 3/2/2021	**Easting**		**Northing**		**TOC**	

Hydrology/Level Measurements

					(Product Thickness)	(Water Column)	(Gallons/ft x Water Column)
Date	**Time**	**DT-Bottom**	**DT-Product**	**DT-Water**	**DTP-DTW**	**DTB-DTW**	**Pore Volume**
2/19/2021	14:45	16.19		11.34		4.85	0.8

(0.75" = 0.023 gal/ft) (1" = 0.041 gal/ft) (1.5" = 0.092 gal/ft) (2" = 0.163 gal/ft) (3" = 0.367 gal/ft) (4" = 0.653 gal/ft) (6" = 1.469 gal/ft) (8" = 2.611 gal/ft)

Water Quality Data

Purge Method	**Time**	**Purge Vol (gal)**	**Flowrate l/min**	**pH**	**Temp (C)**	**E Cond (uS/cm)**	**DO (mg/L)**	**ORP**	**Turbidity**
(2) Peristaltic Pump	3:05:00 PM	0.5	0.4	6.12	9.2	595.8	0.99	120.2	7.87
	3:10:00 PM	1	0.4	6.14	9.2	541.5	0.33	119.2	3.57
	3:15:00 PM	1.5	0.4	6.2	9.2	534.1	0.23	115	2.63
Final Field Parameters	3:20:00 PM	2	0.4	6.2	9.2	532.9	0.18	113.1	2.5

Methods: (1) Submersible Pump (2) Peristaltic Pump (3) Disposable Bailer (4) Vacuum Pump (5) Dedicated Bailer (6) Inertia Pump (7) Other (specify)

Water Quality Observations:

Clear; colorless; organic odor; no sheen.

Sample Information

Sampling Method	**Sample Type**	**Sampling Time**	**Container Code/Preservative**	**#**	**Filtered**
(2) Peristaltic Pump	Groundwater	3:25:00 PM	VOA-Glass		
			Amber Glass		
			White Poly		
			Yellow Poly		
			Green Poly		
			Red Total Poly		
			Red Dissolved Poly	1	Yes
			Total Bottles	1	

General Sampling Comments

Began purging at 14:55.

Maul Foster & Alongi, Inc.

109 East 13th Street, Vancouver, WA 98660 (360) 694-2691 Fax. (360) 906-1

Water Field Sampling Data Sheet

Client Name	Port of Tacoma	**Sample Location**	MW-2				
Project #	0615.17.01	**Sampler**	SRM				
Project Name	Former Cascade Timber Property	**Sampling Date**	2/19/2021				
Sampling Event	February 2021	**Sample Name**	MW-2-GW-11.75				
Sub Area		**Sample Depth**	11.75				
FSDS QA:	B. James 3/2/2021	**Easting**		**Northing**		**TOC**	

Hydrology/Level Measurements

					(Product Thickness)	(Water Column)	(Gallons/ft x Water Column)
Date	**Time**	**DT-Bottom**	**DT-Product**	**DT-Water**	**DTP-DTW**	**DTB-DTW**	**Pore Volume**
2/19/2021	13:45	17.91		5.4		12.51	2

(0.75" = 0.023 gal/ft) (1" = 0.041 gal/ft) (1.5" = 0.092 gal/ft) (2" = 0.163 gal/ft) (3" = 0.367 gal/ft) (4" = 0.653 gal/ft) (6" = 1.469 gal/ft) (8" = 2.611 gal/ft)

Water Quality Data

Purge Method	**Time**	**Purge Vol (gal)**	**Flowrate l/min**	**pH**	**Temp (C)**	**E Cond (uS/cm)**	**DO (mg/L)**	**ORP**	**Turbidity**
(2) Peristaltic Pump	2:05:00 PM	0.6	0.4	5.95	10.6	415.1	0.42	95	29.9
	2:10:00 PM	1.3	0.4	5.99	10.5	360.2	0.24	94.3	26.1
	2:15:00 PM	2	0.4	6.04	10.3	335.4	0.17	92.3	23.1
	2:20:00 PM	2.3	0.2	6.11	10.3	330	0.15	89.8	23.6
Final Field Parameters	2:25:00 PM	2.6	0.2	6.11	10.2	327.8	0.15	89.2	22.8

Methods: (1) Submersible Pump (2) Peristaltic Pump (3) Disposable Bailer (4) Vacuum Pump (5) Dedicated Bailer (6) Inertia Pump (7) Other (specify)

Water Quality Observations:

Clear; green tint; black suspended particles; organic odor; no sheen.

Sample Information

Sampling Method	**Sample Type**	**Sampling Time**	**Container Code/Preservative**	**#**	**Filtered**
(2) Peristaltic Pump	Groundwater	2:30:00 PM	VOA-Glass		
			Amber Glass		
			White Poly		
			Yellow Poly		
			Green Poly		
			Red Total Poly		
			Red Dissolved Poly	1	Yes
			Total Bottles	1	

General Sampling Comments

Began purging at 13:57. MWDUP-GW-11.75 collected here.

ATTACHMENT B

LABORATORY ANALYTICAL REPORT

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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

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

March 1, 2021

Yen-Vy Van, Project Manager
Maul Foster Alongi
2815 2nd Ave, Suite 540
Seattle, WA 98121

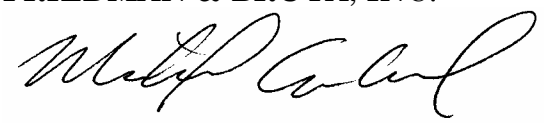
Dear Ms Van:

Included are the results from the testing of material submitted on February 19, 2021 from the Port of Tacoma-Cascade Timber PO 0615.17.01-01, F&BI 102310 project. There are 7 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
MFA0301R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on February 19, 2021 by Friedman & Bruya, Inc. from the Maul Foster Alongi Port of Tacoma-Cascade Timber PO 0615.17.01-01, F&BI 102310 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Maul Foster Alongi
102310 -01	MW-2-GW-11.75
102310 -02	MW-1-GW-13.75
102310 -03	MWDUP-GW-11.75

All quality control requirements were acceptable.

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MW-2-GW-11.75	Client:	Maul Foster Alongi
Date Received:	02/19/21	Project:	Port of Tacoma-Cascade Timber
Date Extracted:	02/22/21	Lab ID:	102310-01 x5
Date Analyzed:	02/25/21	Data File:	102310-01 x5.217
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	42.0
Copper	<25
Lead	<5
Zinc	<25

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MW-1-GW-13.75	Client:	Maul Foster Alongi
Date Received:	02/19/21	Project:	Port of Tacoma-Cascade Timber
Date Extracted:	02/22/21	Lab ID:	102310-02 x5
Date Analyzed:	02/25/21	Data File:	102310-02 x5.218
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	283
Copper	<25
Lead	<5
Zinc	<25

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MWDUP-GW-11.75	Client:	Maul Foster Alongi
Date Received:	02/19/21	Project:	Port of Tacoma-Cascade Timber
Date Extracted:	02/22/21	Lab ID:	102310-03 x5
Date Analyzed:	02/25/21	Data File:	102310-03 x5.219
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	43.6
Copper	<25
Lead	<5
Zinc	<25

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Maul Foster Alongi
Date Received:	Not Applicable	Project:	Port of Tacoma-Cascade Timber
Date Extracted:	02/22/21	Lab ID:	I1-130 mb
Date Analyzed:	02/23/21	Data File:	I1-130 mb.058
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Copper	<5
Lead	<1
Zinc	<5

Date of Report: 03/01/21
Date Received: 02/19/21
Project: Port of Tacoma-Cascade Timber PO 0615.17.01-01, F&BI 102310

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

Laboratory Code: 102311-01 x10 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	ug/L (ppb)	10	<10	105	116	75-125	10
Copper	ug/L (ppb)	20	<50	99	97	75-125	2
Lead	ug/L (ppb)	10	<10	89	89	75-125	0
Zinc	ug/L (ppb)	50	<50	92	92	75-125	0

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	96	80-120
Copper	ug/L (ppb)	20	104	80-120
Lead	ug/L (ppb)	10	101	80-120
Zinc	ug/L (ppb)	50	100	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. The value reported is an estimate.

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

cf - The sample was centrifuged prior to analysis.

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

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

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

102310

SAMPLE CHAIN OF CUSTODY

02-19-21 AI

Page # 1 of 1

Report To Yen-Vy Van

Company Maul Foster & Alongi, Inc.

Address 2815 2nd Avenue, Suite 540

City, State, ZIP Seattle, WA 98121

Phone 253-320-5378 Email yvan@maulfoster.com

SAMPLERS (*signature*)

PROJECT NAME: Port of Tacoma - Cascade Timber

PO #: 0615.17.01-01

REMARKS

Project specific RLs? - Yes / No

INVOICE TO: accounting@maulfoster.com

TURNAROUND TIME
- [x] Standard turnaround
- [ ] RUSH
- Rush charges authorized by:

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

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	As, Pb, Cu, Zn by USEPA 6020 (dissolved)				Notes
MW-2-GW-11.75	01	2/19/2021	1430	GW	1								X				All samples field-filtered
MW-1-GW-13.75	SEM PBS 02		SEM 1525 PBSTD		1								X				
MWDUP-GW-11.75	03		1430		1								X				

ANALYSES REQUESTED

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Sean Maloney	MFA	2/19/21	1700
Received by:	VINH	FBI	2/19/21	1700
Relinquished by:				
Received by:		Samples received at 7 °C		

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

DRAFT

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MW-2-GW-11.75	Client:	Maul Foster Alongi
Date Received:	02/19/21	Project:	Port of Tacoma-Cascade Timber
Date Extracted:	02/22/21	Lab ID:	102310-01 x5
Date Analyzed:	03/17/21	Data File:	102310-01 x5.038
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Copper	<2.5

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MW-1-GW-13.75	Client:	Maul Foster Alongi
Date Received:	02/19/21	Project:	Port of Tacoma-Cascade Timber
Date Extracted:	02/22/21	Lab ID:	102310-02 x5
Date Analyzed:	03/16/21	Data File:	102310-02 x5.140
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Copper	<2.5

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	MWDUP-GW-11.75	Client:	Maul Foster Alongi
Date Received:	02/19/21	Project:	Port of Tacoma-Cascade Timber
Date Extracted:	02/22/21	Lab ID:	102310-03 x5
Date Analyzed:	03/17/21	Data File:	102310-03 x5.039
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Copper	<2.5

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Maul Foster Alongi
Date Received:	Not Applicable	Project:	Port of Tacoma-Cascade Timber
Date Extracted:	02/22/21	Lab ID:	I1-130 mb
Date Analyzed:	02/23/21	Data File:	I1-130 mb.058
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Copper	<0.5

102310

SAMPLE CHAIN OF CUSTODY

02-19-21 AI

Page # 1 of 1

Report To Yen-Vy Van

Company Maul Foster & Alongi, Inc.

Address 2815 2nd Avenue, Suite 540

City, State, ZIP Seattle, WA 98121

Phone 253-320-5378 Email yvan@maulfoster.com

SAMPLERS (*signature*)

PROJECT NAME: Port of Tacoma - Cascade Timber

PO #: 0615.17.01-01

REMARKS

Project specific RLs? - Yes / No

INVOICE TO: accounting@maulfoster.com

TURNAROUND TIME
- [x] Standard turnaround
- [ ] RUSH
- Rush charges authorized by:

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

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	As, Pb, Cu, Zn by USEPA 6020 (dissolved)				Notes
MW-2-GW-11.75	01	2/19/2021	1430	GW	1								X				All samples field-filtered
MW-1-GW-13.75	SEM PBS 02		SEM 1525 PBSTD		1								X				
MWDUP-GW-11.75	03		1430		1								X				

ANALYSES REQUESTED

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Sean Maloney	MFA	2/19/21	1700
Received by:	VINH	FBI	2/19/21	1700
Relinquished by:				
Received by:		Samples received at 7 °C		

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3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

ATTACHMENT C

DATA VALIDATION MEMORANDUM

DATA QUALITY ASSURANCE/QUALITY CONTROL REVIEW

PROJECT NO. 0615.17.01 | MARCH 4, 2021 | PORT OF TACOMA – CASCADE TIMBER

Maul Foster & Alongi, Inc. (MFA) conducted an independent review of the quality of analytical results for groundwater samples collected on February 19, 2021, at the Port of Tacoma Cascade Timber site.

Friedman & Bruya, Inc. (FBI) performed the analyses. FBI reports 102310 and 102310-additional were reviewed. The analyses performed and samples analyzed are listed below.

Analysis	Reference
Dissolved Metals	EPA 6020B
NOTE: EPA = U.S. Environmental Protection Agency.	

Samples Analyzed
Report 102310/102310-additional
MW-2-GW-11.75
MW-1-GW-13.75
MWDUP-GW-11.75

DATA QUALIFICATIONS

Analytical results were evaluated according to applicable sections of U.S. Environmental Protection Agency (EPA) procedures (EPA, 2017) and appropriate laboratory and method-specific guidelines (EPA, 1986; FBI, 2019).

The data are considered acceptable for their intended use, with the appropriate data qualifiers assigned.

HOLDING TIMES, PRESERVATION, AND SAMPLE STORAGE

Holding Times

Extractions and analyses were performed within the recommended holding time criteria.

Preservation and Sample Storage

According to the chain of custody provided in report 102310, samples were received by FBI at 7 degrees Celsius (°C), which is above the upper recommended storage temperature range

of 2 to 6°C. The reviewer confirmed that FBI received the samples only 2.5 hours after collection and that ice was still present in the cooler; thus, qualification was not required.

There were no additional issues related to sample storage or preservation.

BLANKS

Method Blanks

Laboratory method blank analyses were performed at the required frequencies. For purposes of data qualification, the method blanks were associated with all samples prepared in the analytical batch. All laboratory method blank results were non-detect to method reporting limits (MRLs).

Trip Blanks

Trip blanks were not required for this sampling event, as analysis for volatile organic compounds was not conducted.

Equipment Rinsate Blanks

Equipment rinsate blanks were not required for this sampling event, as all samples were collected using dedicated, single-use equipment.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS

Matrix spike/matrix spike duplicate (MS/MSD) results are used to evaluate laboratory precision and accuracy. The MS/MSD samples were extracted and analyzed at the required frequency.

All MS/MSD results were within acceptance limits for percent recovery and relative percent difference (RPD).

LABORATORY DUPLICATE RESULTS

Duplicate results are used to evaluate laboratory precision. All duplicate samples were extracted and analyzed at the required frequency. Laboratory duplicate results were not reported; batch precision was evaluated with MS/MSD sample results.

LABORATORY CONTROL SAMPLE/LABORATORY CONTROL SAMPLE DUPLICATE RESULTS

A laboratory control sample/laboratory control sample duplicate (LCS/LCSD) is spiked with target analytes to provide information on laboratory precision and accuracy. An LCS sample was extracted and analyzed at the required frequency. LCSD results were not reported; batch precision was evaluated with MS/MSD sample results.

All LCS results were within acceptance limits for percent recovery.

FIELD DUPLICATE RESULTS

Field duplicate samples measure both field and laboratory precision. One field duplicate was submitted for analysis (MW-2-GW-11.75/MWDUP-GW-11.75). 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. Non-detect data are not used in the evaluation of field duplicate results. All analytes were within the acceptance criteria.

REPORTING LIMITS

FBI used routine reporting limits for non-detect results, except for samples requiring dilutions because of high analyte concentrations and/or matrix interferences.

DATA PACKAGE

The data packages were reviewed for transcription errors, omissions, and anomalies. None were found.

REFERENCES

EPA. 1986. Test methods for evaluating solid waste, physical/chemical methods. EPA publication SW-846. 3d 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), and VI phase III (2019).

EPA. 2017. EPA contract laboratory program, national functional guidelines for inorganic Superfund methods data review. EPA 540-R-2017-001. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. January.

FBI. 2019. Quality assurance manual. Rev. 16. Friedman & Bruya, Inc., Seattle, Washington. October 2.