January 13, 2017

Mr. Darius Thompson
City of Tacoma
Public Works Department, Engineering Division
747 Market Street, Room 420
Tacoma, WA 98402-3769

Re: Groundwater Monitoring Results
October 2016
Thea Foss Waterway Esplanade, Thea Foss Uplands
Tacoma, Washington
17646-02

Dear Mr. Thompson:

This letter report presents the results of the October 2016 post-construction groundwater monitoring event conducted at the Thea Foss Waterway Esplanade in Tacoma, Washington (Figure 1).

Purpose and Scope of Work

Groundwater monitoring has been completed along the esplanade since 1997 to evaluate the post-construction groundwater quality along the Thea Foss Waterway Esplanade from East Dock Street to South 15th Street.

The Washington State Department of Ecology (Ecology) reviewed the historical groundwater monitoring reports and recommended reducing the number of wells sampled from 15 to six and limiting the analysis to selected dissolved metals. Ecology's recommendations are summarized in an email to the City of Tacoma dated February 17, 2015.

Our scope of work for the October 2016 monitoring consisted of:

- Measuring the depth to water in each monitoring well before sampling;
- Collecting groundwater samples from monitoring wells using low-flow sampling methods;
- Submitting groundwater samples to the City of Tacoma Environmental Laboratory for chemical analysis; and
- Conducting a chemical data quality review and preparing a report summarizing the results of groundwater sampling and analysis.

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Groundwater Monitoring Results

Monitoring Well Groundwater Sampling Procedures

Groundwater was sampled and analyzed in general accordance with Hart Crowser's sampling and analysis plan (SAP) and quality assurance project plan (QAPP) from the Thea Foss Uplands Site-Specific Remedial Investigation Work Plan (Hart Crowser 1997).

The depth to groundwater was measured before sampling. The equipment was cleaned between monitoring wells to prevent cross-contamination, and the approximate time was recorded during sampling.

Groundwater samples were collected using low-flow sampling techniques to minimize suspended solids in the samples. The wells were purged and sampled with a peristaltic pump. Clean sample tubing was used for each well and disposed of after use. Purge water was collected in a 55-gallon drum and was stored on site prior to off-site disposal.

Groundwater Analysis

Five groundwater monitoring wells (MNW-5, P3-MW01R, P3-MW2, P3-MW03, and Landau Well) were purged and sampled on October 19, 2016. Groundwater samples were submitted to the City's laboratory in Tacoma, Washington, for analysis of dissolved metals (arsenic, copper, lead, nickel, and zinc) using EPA Method 6020A. Monitoring well MW-2 was not sampled during this groundwater monitoring event. MW-2 is in a topographical low in the Thea Foss Esplanade and due to recent heavy rains, there was a large puddle covering the monitoring well.

Analytical results from October 2016 and previous sampling events are summarized in Table 1. The chemical data quality review and laboratory reports are provided in Appendix A.

Analytical Results

Analytical results from the October 2016 groundwater monitoring event include:

- Dissolved arsenic was detected in samples from all wells at concentrations ranging from 0.647 µg/L to 12.1 µg/L. These concentrations are greater than the Consent Decree cleanup level of 0.14 µg/L.
- Dissolved copper was detected in the groundwater sample collected from P3-MW01R at a concentration of 3.45 µg/L, above the consent decree cleanup level of 3.1 µg/L. Dissolved copper was also detected in the sample from P3-MW03 at a concentration of 2.22 µg/L. Dissolved copper was not detected in samples from the other wells above the laboratory practical quantitation limit (PQL).

- Dissolved lead was not detected in samples from any of the wells above the PQL.
- Dissolved nickel was detected in samples from MW-5, P3-MW01R, and P3-MW03 at concentrations of 3.15 µg/L, 1.51 µg/L, and 0.668 µg/L, respectively. These concentrations are below the consent decree cleanup level of 8.2 µg/L. Dissolved nickel was not detected in samples from the other wells at concentrations above the PQL.
- Dissolved zinc was detected in samples from MW-5, P3-MW01R, P3-MW2, and P3-MW03 at concentrations ranging from 0.67 µg/L to 5.92 µg/L, below the consent decree cleanup level of 81 µg/L. Dissolved zinc was not detected in the sample from the Landau Well at a concentration above the PQL.

These results are summarized in Table 1.

Recommendations

As Ecology has requested, we recommend sampling again in October 2017. Groundwater samples should be collected from the same five wells sampled during this event as well as MW-2 and analyzed for only the dissolved metals listed above.

Limitations

Work for this project was performed, and this letter report prepared, in accordance with professional practices generally accepted at the time our work was performed for work of similar nature done in the same or similar localities and under similar conditions. This report is intended for the exclusive use of the City of Tacoma for specific application to the referenced property. This report is not meant to represent a legal opinion. No other warranty, expressed or implied, is made.

Any questions about our work or this letter report, the presentation of the information, or the interpretation of the data are welcome and should be referred to the undersigned.

We trust that this report meets your needs.

Sincerely,

HART CROWSER, INC.

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Principal
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Attachments:
Table 1 – Groundwater Analytical Results
Figure 1 – Vicinity Map
Figure 2 – Site and Well Location Map (South)
Figure 3 – Site and Well Location Map (North)
Appendix A – Chemical Data Quality Review and Laboratory Report

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Table 1 - Groundwater Analytical Results
Thea Foss Waterway Esplanade
City of Tacoma

Well ID	Consent Decree	MW-2					MW-5				
Sampling Date	Level	10/15/2013	4/17/2014	10/23/2014[g]	10/15/2015	10/19/2016[g]	10/15/2013	4/17/2014	10/23/2014	10/15/2015	10/19/2016
Depth to Water in Feet[a]		11.9	11.53	NM	11.76	NM	9.8	9.44	9.01	9.6	8.66
TPH in µg/L											
Diesel	500[c]	100 U	100 U	NA	NA	NA	40 T	100 U	30 UJ	NA	NA
Heavy oil	500[c]	200 U	200 U	NA	NA	NA	200 U	200 U	50 UJ	NA	NA
Gasoline	800[c]	50 U	50 U	NA	NA	NA	50 U	50 U	24.7 J	NA	NA
BTEX in µg/L											
Benzene	71[d]	1.0 U	0.2 U	NA	NA	NA	1.0 U	0.2 U	0.2 U	NA	NA
Toluene	200,000[d]	1.0 U	0.2 U	NA	NA	NA	1.0 U	0.2 U	0.2 U	NA	NA
Ethylbenzene	29,000[d]	1.0 U	0.2 U	NA	NA	NA	1.0 U	0.2 U	0.2 U	NA	NA
Total xylene	1,600[e]	2.0 U	0.4 U	NA	NA	NA	2.0 U	0.4 U	0.4 U	NA	NA
cPAHs in µg/L											
Benzo(a)anthracene		0.026 J	0.010 UJ	NA	NA	NA	0.036 J	0.010 UJ	0.014 J	NA	NA
Benzo(a)pyrene		0.009 JT	0.010 UJ	NA	NA	NA	0.010 UJ	0.010 UJ	0.005 UJ	NA	NA
Benzo(b,k)fluoranthenes		0.017 JT	0.020 UJ	NA	NA	NA	0.020 UJ	0.020 UJ	0.012 UJ	NA	NA
Chrysene		0.018 J	0.010 UJ	NA	NA	NA	0.026 J	0.010 UJ	0.010 J	NA	NA
Dibenz(a,h)anthracene		0.010 UJ	0.010 UJ	NA	NA	NA	0.010 UJ	0.010 UJ	0.004 UJ	NA	NA
Indeno(1,2,3-cd)pyrene		0.006 JT	0.010 UJ	NA	NA	NA	0.010 UJ	0.010 UJ	0.003 UJ	NA	NA
Total cPAHs[b]	0.031[b,d]	0.015 J	0.008 UJ	NA	NA	NA	0.011 J	0.008 UJ	0.005 J	NA	NA
Dissolved Metals in µg/L											
Arsenic	0.14[d]	5 U	**0.441**	NA	0.606	NA	5 U	**0.584**	**3.43**	**0.247**	**12.1**
Copper	3.1[f]	0.2 U	0.2 U	NA	0.5 U	NA	0.2 U	0.2 U	0.71	0.5 U	0.5 U
Lead	8.1[f]	0.2 U	0.026 U	NA	0.5 U	NA	0.2 U	0.026 U	0.138 J	0.5 U	0.5 U
Nickel	8.2[f]	0.202	0.162 JT	NA	0.5 U	NA	0.134 T	0.403	1.49	0.5 U	3.15
Zinc	81[f]	0.66 U	1.99	NA	1.06	NA	0.852 U	3.86	77.9	1.14	5.92

Notes:

Consent Decree level = Consent Decree cleanup levels, which reflect the MCTA Amendments of February 2001.
Blank indicates no cleanup level established or sample not analyzed for specific analyte.
Values in **BOLD** indicate detected concentrations exceed Consent Decree cleanup levels.
U = Not detected at the specified reporting limit.
NM = Not Measured
NA = Not analyzed
T/JT = Estimated value between the method detection limit (MDL) and the reporting limit (RL).
J = Estimated value.

a. Depth to water measurements were collected from top of casing.
b. Total cPAHs calculated using the toxicity equivalency methodology (TEM) in WAC 173-340-708(8). Half detection limit was used for non-detects.
c. Cleanup standard based on MTCA Method A Groundwater Cleanup Level
d. Cleanup standard based on Federal National Toxics Rule Criteria (40 CFR 131) for human consumption of aquatic organisms.
e. Cleanup standard based on Method B Groundwater Cleanup Level.
f. Cleanup standard based on WAC 173-201A Marine Water Chronic.
g. Not sampled because the monument was flooded/under water.

Table 1 - Groundwater Analytical Results
Thea Foss Waterway Esplanade
City of Tacoma

Well ID	Consent Decree	P3-MW01R					P3-MW2				
Sampling Date	Level	10/15/2013	4/17/2014	10/23/2014	10/15/2015	10/19/2016	10/15/2013	4/17/2014	10/23/2014	10/15/2015	10/19/2016
Depth to Water in Feet[a]		8.09	8.19	8.00	8.74	7.64	6.03	6.05	5.30	5.95	5.34
TPH in µg/L											
Diesel	500[c]	50 U	100 U	30 UJ	NA	NA	30 T	100 U	30 UJ	NA	NA
Heavy oil	500[c]	100 U	200 U	50 UJ	NA	NA	200 U	200 U	50 UJ	NA	NA
Gasoline	800[c]	50 U	50 U	16.5 J	NA	NA	50 U	50 U	15.9 J	NA	NA
BTEX in µg/L											
Benzene	71[d]	1.0 U	0.2 U	0.2 U	NA	NA	1.0 U	0.2 U	0.2 U	NA	NA
Toluene	200,000[d]	1.0 U	0.2 U	0.2 U	NA	NA	1.0 U	0.2 U	0.2 U	NA	NA
Ethylbenzene	29,000[d]	1.0 U	0.2 U	0.2 U	NA	NA	1.0 U	0.2 U	0.2 U	NA	NA
Total xylene	1,600[e]	2.0 U	0.4 U	0.4 U	NA	NA	2.0 U	0.4 U	0.4 U	NA	NA
cPAHs in µg/L											
Benzo(a)anthracene		0.030 J	0.010 UJ	0.005 UJ	NA	NA	0.019 J	0.010 UJ	0.005 UJ	NA	NA
Benzo(a)pyrene		0.008 JT	0.010 UJ	0.005 UJ	NA	NA	0.010 UJ	0.010 UJ	0.005 UJ	NA	NA
Benzo(b,k)fluoranthenes		0.018 JT	0.020 UJ	0.012 UJ	NA	NA	0.020 UJ	0.020 UJ	0.012 UJ	NA	NA
Chrysene		0.024 J	0.010 UJ	0.006 UJ	NA	NA	0.017 J	0.010 UJ	0.006 UJ	NA	NA
Dibenz(a,h)anthracene		0.010 UJ	0.010 UJ	0.004 UJ	NA	NA	0.010 UJ	0.010 UJ	0.004 UJ	NA	NA
Indeno(1,2,3-cd)pyrene		0.005 JT	0.010 UJ	0.003 UJ	NA	NA	0.010 UJ	0.010 UJ	0.003 UJ	NA	NA
Total cPAHs[b]	0.031[b,d]	0.014 J	0.008 UJ	0.004 UJ	NA	NA	0.009 J	0.008 UJ	0.004 UJ	NA	NA
Dissolved Metals in µg/L											
Arsenic	0.14[d]	5 U	**1.66**	**1.62**	**1.34**	**2.29**	5 U	**1.93**	**3.79**	**0.759**	**0.724**
Copper	3.1[f]	2.33	2.74	2.44	**3.14**	**3.45**	0.2 U	0.038 U	0.772	0.5 U	0.5 U
Lead	8.1[f]	0.2 U	0.026 U	0.161 J	0.5 U	0.5 U	0.2 U	0.026 U	0.0662 J	0.5 U	0.5 U
Nickel	8.2[f]	1.16	0.788	1.29	1.41	1.51	0.125 T	0.191	0.2 U	0.5 U	0.5 U
Zinc	81[f]	2.35 U	3.42	5.25	19.1	4.02	0.514 U	2.71	2.03	0.88	0.67

Table 1 - Groundwater Analytical Results
Thea Foss Waterway Esplanade
City of Tacoma

Well ID	Consent Decree	P3-MW03					Landau Well				
Sampling Date	Level	10/15/2013	4/17/2014	10/23/2014	10/15/2015	10/19/2016	10/15/2013	4/17/2014	10/23/2014	10/15/2015	10/19/2016
Depth to Water in Feet[a]		9.06	9.11	8.53	9.06	8.02	12.72	12.38	11.20	11.65	11.15
TPH in µg/L											
Diesel	500[c]	30 T	100 U	30 UJ	NA	NA	80 T	100 U	70 J	NA	NA
Heavy oil	500[c]	200 U	200 U	50 UJ	NA	NA	200 U	200 U	50 UJ	NA	NA
Gasoline	800[c]	50 U	50 U	16.2 J	NA	NA	252	213	224 J	NA	NA
BTEX in µg/L											
Benzene	71[d]	1.0 U	0.2 U	0.2 U	NA	NA	0.7 T	0.3 JT	0.5 T	NA	NA
Toluene	200,000[d]	1.0 U	0.2 U	0.2 U	NA	NA	1.0	0.8 JT	1.2	NA	NA
Ethylbenzene	29,000[d]	1.0 U	0.2 U	0.2 U	NA	NA	0.2 T	0.2 U	0.2 U	NA	NA
Total xylene	1,600[e]	2.0 U	0.4 U	0.4 U	NA	NA	1.5 T	1.5 JT	1.7 T	NA	NA
cPAHs in µg/L											
Benzo(a)anthracene		0.024 J	0.010 UJ	0.005 U	NA	NA	0.022 J	0.010 UJ	0.005 U	NA	NA
Benzo(a)pyrene		0.010 UJ	0.010 UJ	0.005 U	NA	NA	0.007 JT	0.010 UJ	0.005 U	NA	NA
Benzo(b,k)fluoranthenes		0.020 UJ	0.020 UJ	0.012 U	NA	NA	0.017 JT	0.020 UJ	0.012 U	NA	NA
Chrysene		0.018 J	0.010 UJ	0.006 U	NA	NA	0.020 J	0.010 UJ	0.006 U	NA	NA
Dibenz(a,h)anthracene		0.010 UJ	0.010 UJ	0.004 U	NA	NA	0.010 UJ	0.010 UJ	0.004 U	NA	NA
Indeno(1,2,3-cd)pyrene		0.010 UJ	0.010 UJ	0.003 U	NA	NA	0.006 JT	0.010 UJ	0.003 U	NA	NA
Total cPAHs[b]	0.031[b,d]	0.010 J	0.008 UJ	0.004 U	NA	NA	0.012 J	0.008 UJ	0.004 U	NA	NA
Dissolved Metals in µg/L											
Arsenic	0.14[d]	5 U	**1.43**	**3.09**	**3.14**	**1.76**	5 U	**0.686**	**0.902**	**1.26**	**0.647**
Copper	3.1[f]	1.04	1.24	1.37	0.5 U	2.22	0.2 U	0.038 U	0.265	0.5 U	0.5 U
Lead	8.1[f]	0.2 U	0.026 U	0.026 U	0.5 U	0.5 U	0.2 U	0.026 U	0.026 U	0.5 U	0.5 U
Nickel	8.2[f]	0.591	0.483	1.12	0.839	0.668	0.36	0.314	0.52 UJ	0.516	0.5 U
Zinc	81[f]	0.873 U	2.47	1.22	1.3	0.85	9.72	2.5	0.99	3.37	0.5 U

Table 1 - Groundwater Analytical Results
Thea Foss Waterway Esplanade
City of Tacoma

Well ID	Consent Decree	MW-16							MW-30						
Sampling Date	Level	8/5/2010	12/29/2010	7/26/2011	3/1/2012	10/15/2013	4/17/2014	10/23/2014	8/5/2010	12/29/2010	7/26/2011	3/1/2012	10/15/2013	4/17/2014	10/23/2014
Depth to Water in Feet[a]		15.21	13.30	15.15	14.3	14.17	13.68	13.55	10.51	7.70	9.99	9.14	10.55	8.51	8.60
TPH in µg/L															
Diesel	500[c]	80 U	100 U	70 U	70 U	100 U	100 U	30 UJ	80 U	100 T	70 T	70 U	100 U	100 U	50 J
Heavy oil	500[c]	210 U	100 U	40 U	50 T	200 U	200 U	50 UJ	210 U	100 U	40 U	40 U	200 U	200 U	50 UJ
Gasoline	800[c]	35 T	50 U	70	10 U	50 U	50 U	21.9 J	87	50 U	158	29.7	114	143	124 J
BTEX in µg/L															
Benzene	71[d]	0.2 U	1 U	0.20	1.0 U	1.0 U	0.2 U	0.2 U	1.6	1.04	9.40	9.4	12	20	15
Toluene	200,000[d]	0.2 U	1 U	0.20	1.0 U	1.0 U	0.2 U	0.2 U	0.2 U	1 U	0.20 T	0.20 U	1.0 U	0.2 U	0.2 U
Ethylbenzene	29,000[d]	0.2 U	1 U	0.30 T	0.2 U	1.0 U	0.2 U	0.2 U	0.2 U	1 U	0.50 T	0.20 U	1.0 U	0.2 JT	0.2 U
Total xylene	1,600[e]	0.6 U	2 U	0.70 T	0.6 U	2.0 U	0.4 U	0.4 U	0.6 U	2 U	1.00 T	0.60 U	0.7 T	0.9 JT	1.0 T
cPAHs in µg/L															
Benzo(a)anthracene		0.107	0.072	0.005 U	0.005 U	0.007 JT	0.010 UJ	0.005 U	0.048	0.006 U	0.005 U	0.005	0.010 UJ	0.010 UJ	0.005 UJ
Benzo(a)pyrene		0.117	0.078	0.009 U	0.009 U	0.01 UJ	0.010 UJ	0.005 U	0.052	0.004 U	0.009 U	0.009	0.010 UJ	0.010 UJ	0.005 UJ
Benzo(b,k)fluoranthenes		0.168	0.119	0.012 U	0.012 U	0.02 UJ	0.020 UJ	0.012 U	0.094	0.007 U	0.012 U	0.012	0.020 UJ	0.020 UJ	0.012 UJ
Chrysene		0.101	0.079	0.003 U	0.003 U	0.01 UJ	0.010 UJ	0.006 U	0.049	0.005 U	0.003 U	0.003	0.010 UJ	0.010 UJ	0.006 UJ
Dibenz(a,h)anthracene		0.014	0.027	0.005 U	0.007 T	0.01 UJ	0.010 UJ	0.004 U	0.009 U	0.008 T	0.005 U	0.005	0.010 UJ	0.010 UJ	0.004 UJ
Indeno(1,2,3-cd)pyrene		0.072	0.055	0.006 U	0.007 T	0.01 UJ	0.010 UJ	0.003 U	0.039	0.006 T	0.006 U	0.006 T	0.010 UJ	0.010 UJ	0.003 UJ
Total cPAHs[b]	0.031[b,d]	**0.154**	**0.106**	0.006 U	0.007	0.008 J	0.008 UJ	0.004 U	**0.071**	0.004	0.006 U	0.012 J	0.008 UJ	0.008 UJ	0.004 UJ
Dissolved Metals in µg/L															
Arsenic	0.14[d]	**6.55**	**9.3**	**5.67**	**7.44**	**6.44**	**9.56**	**6.16**	**8.05**	**21.4**	**17.9**	**19.4**	**9.96**	**10.4**	**10.6**
Copper	3.1[f]	0.09 T	1.05 T	0.758	0.249	0.038 U	0.038 U	0.995	0.12 T	0.4 T	0.038 U	0.108 T	0.044 T	0.038 U	0.357
Lead	8.1[f]	0.028 U	0.6 T	0.413	0.078 T	0.2 U	0.026 U	0.156 J	0.06 T	0.15 T	0.067 T	0.078 T	0.2 U	0.102 JT	0.026 U
Nickel	8.2[f]	4.89	0.9 T	1.56	0.685	0.261	0.274	1.11	3.72	0.8 T	0.975	1.27	0.406	0.396	0.408 U
Zinc	81[f]	16	4.3	3.06	0.688	0.79 U	0.66	2.17	15.4	2 T	0.983	1.93	0.898 U	1.97	1.05

Table 1 - Groundwater Analytical Results
Thea Foss Waterway Esplanade
City of Tacoma

Well ID	Consent Decree	MW-9			P4-MW02						
Sampling Date	Level	10/15/2013	4/17/2014	10/23/2014	8/5/2010	12/30/2010	7/26/2011	2/29/2012	10/15/2013	4/17/2014	10/23/2014
Depth to Water in Feet[a]		13.83	14.62	14.45	8.54	9.10	9.61	9.49	9.51	9.65	9.27
TPH in µg/L											
Diesel	500[c]	**1300**	**6400**	**4400** J	260	200	90 T	280	100 U	100 U	40 J
Heavy oil	500[c]	410	**3400**	**2000** J	210 U	200 T	40 U	360	200 U	200 U	50 UJ
Gasoline	800[c]	**1560**	**1930**	634	160	50 U	89.7	31.2	447	76.7 U	79.2
BTEX in µg/L											
Benzene	71[d]	**120**	**220**	**80**	3.2	2.32	4.9	2.70	3.8	3.5	3.6
Toluene	200,000[d]	2.4	2.5 J	1.4 T	0.6 T	1 U	0.4 T	0.20 U	0.2 T	0.3 JT	0.3 T
Ethylbenzene	29,000[d]	29	36	9.8	1.3	1 U	0.6 T	0.30 T	0.3 T	0.3 JT	0.3 T
Total xylene	1,600[e]	16.2	12.2 J	5.3 T	1.7 T	2 U	1.3 T	0.60 T	1.2 T	1.7 JT	1.5 T
cPAHs in µg/L											
Benzo(a)anthracene		10.200 J	2.34 J	7.56 J	0.454	0.404	0.067	0.236	0.198 J	0.0630 J	0.1420
Benzo(a)pyrene		2.680 J	26.3 J	1.79 J	0.371	0.357	0.016	0.199	0.048 J	0.0270 J	0.0660
Benzo(b,k)fluoranthenes		6.030 J	6.96 J	3.54 J	0.490	0.521	0.024	0.265	0.091 J	0.0380 J	0.0950
Chrysene		10.300 J	52.9 J	6.2 J	0.385	0.430	0.055	0.239	0.177 J	0.0580 J	0.1330
Dibenz(a,h)anthracene		0.276 J	101 J	0.204 J	0.030	0.050	0.005 U	0.020	0.005 JT	0.0100 UJ	0.0040 U
Indeno(1,2,3-cd)pyrene		0.689 J	112 J	0.506 J	0.145	0.158	0.006 U	0.092	0.012 J	0.0100 J	0.0260
Total cPAHs[b]	0.031[b,d]	**4.503** J	**49.059** J	**3.033** J	**0.487**	**0.475**	0.026	**0.263**	**0.080** J	**0.039** J	**0.094**
Dissolved Metals in µg/L											
Arsenic	0.14[d]	5 U	**2.06**	**2.4**	**2.61**	**0.95** T	**0.836**	**0.843** T	5 U	**0.319**	**0.517**
Copper	3.1[f]	0.2 U	0.038 U	0.225	0.14 T	0.6 T	0.038 U	1.69	0.041 T	0.038 U	0.356
Lead	8.1[f]	0.2 U	0.026 U	0.026 U	0.05 JT	3.5	0.026 U	0.401	0.2 U	0.026 U	0.026 U
Nickel	8.2[f]	0.642	0.316	0.368 UJ	6.81	0.4 T	0.886	2.82	0.08 J	0.101 JT	0.2 U
Zinc	81[f]	0.695 U	5.4	0.98	20.5	2.75	0.239	4.19	0.333 U	2.38	2.07

Table 1 - Groundwater Analytical Results
Thea Foss Waterway Esplanade
City of Tacoma

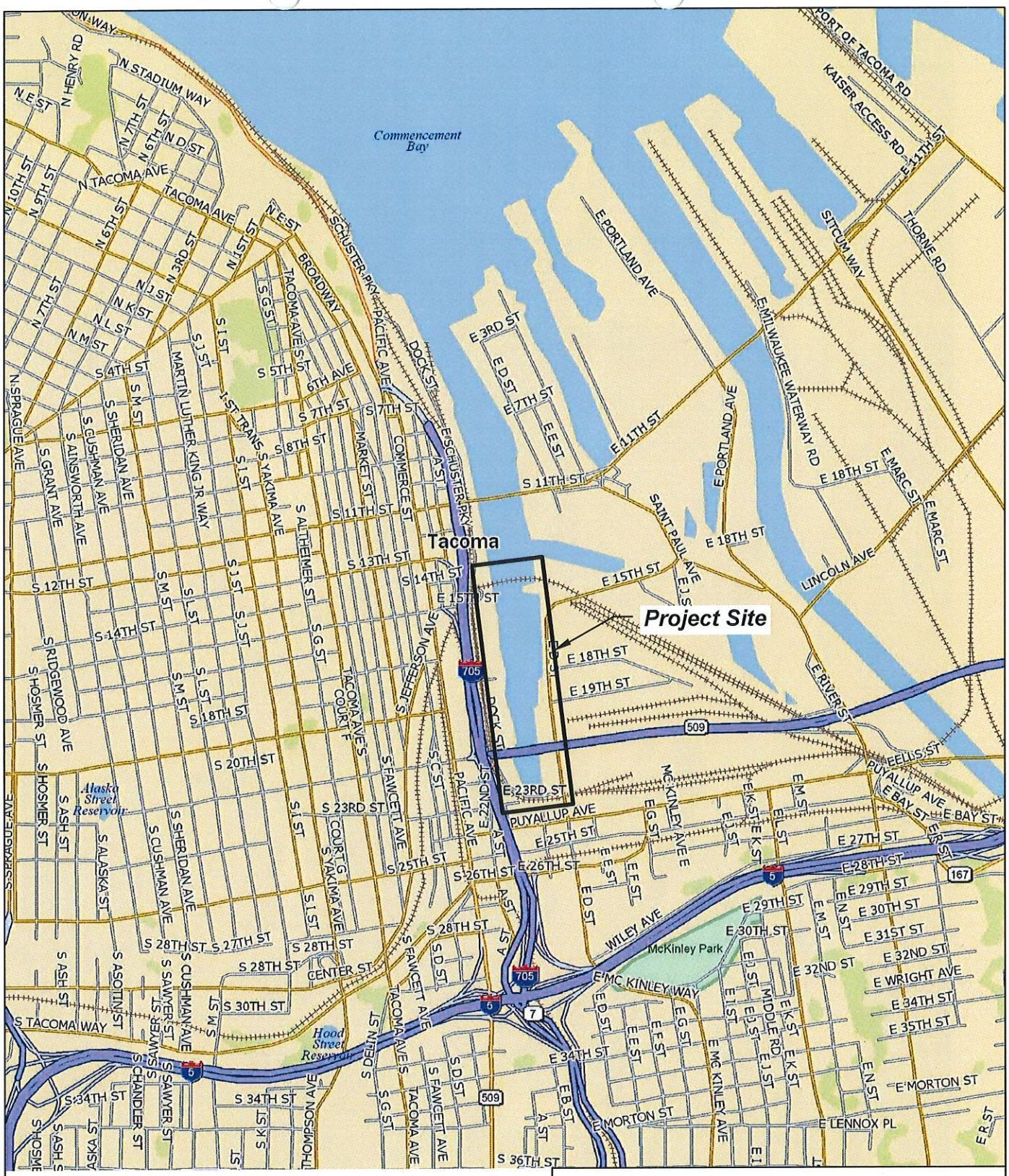
Well ID	Consent Decree	P10-MW03R								
Sampling Date	Level	10/14/1997	1/20/1998	8/10/2010	12/29/2010	7/29/2011	3/1/2012	10/15/2013	4/17/2014	10/23/2014
Depth to Water in Feet[a]				7.93	6.10	8.02	7.37	8.18	7.52	7.05
TPH in µg/L										
Diesel	500[c]	250 U	250 U	80 U	100 J	70	70 U	100 U	100 U	30 UJ
Heavy oil	500[c]	500 U	500 U	210 U	200 T	60 T	40 U	200 U	200 U	50 UJ
Gasoline	800[c]	100 U	100 U	46 T	50 U	60.1	10 U	50 U	50 U	24.1 J
BTEX in µg/L										
Benzene	71[d]	0.5 U	0.5 U	2.0 U	1 U	0.2 U	0.2 U	1.0 U	0.2 U	0.2 U
Toluene	200,000[d]	0.5 U	0.5 U	2.0 U	1 U	0.2 U	0.2 U	1.0 U	0.2 U	0.2 U
Ethylbenzene	29,000[d]	0.5 U	0.5 U	2.0 U	1 U	0.2 U	0.2 U	1.0 U	0.2 U	0.2 U
Total xylene	1,600[e]	0.5 U	0.5 U	6.0 U	2 U	0.6 U	0.6 U	2.0 U	0.4 U	0.4 U
cPAHs in µg/L										
Benzo(a)anthracene		1.000 U	0.015	0.102	0.035	0.040	0.014	0.128 J	0.015 J	0.032 J
Benzo(a)pyrene		1.000 U	0.010 U	0.073	0.029	0.030	0.010	0.054 J	0.010 UJ	0.007 T
Benzo(b,k)fluoranthenes		1.000 U	0.010 U	0.098	0.035	0.044	0.012 T	0.192 J	0.020 UJ	0.015 T
Chrysene		1.000 U	0.012	0.120	0.046	0.049	0.013	0.153 J	0.012 J	0.025 J
Dibenz(a,h)anthracene		1.000 U	0.010 U	0.009 U	0.006	0.005 T	0.005	0.086 J	0.010 UJ	0.004 UJ
Indeno(1,2,3-cd)pyrene		1.000 U	0.010 U	0.032	0.013 T	0.015	0.006 T	0.083 J	0.010 UJ	0.003 UJ
Total cPAHs[b]	0.031[b,d]	**0.705** U	0.008	**0.098**	**0.038** J	**0.041** J	0.014 J	**0.104** J	0.009 J	0.012 J
Dissolved Metals in µg/L										
Arsenic	0.14[d]	1.4 U	1.3 U	**0.73**	**0.3** T	**0.374**	**0.316** J	5 U	**0.276**	**0.278**
Copper	3.1[f]	3.9 U	4.5 U	1.37	0.5 T	0.058 T	1.54	0.2 U	0.2 U	0.266
Lead	8.1[f]	4 U	1.2 U	0.028 U	0.5 T	0.165 T	0.286	0.2 U	0.026 U	0.026 U
Nickel	8.2[f]	0.4 U	0.6 U	8.11	0.75 T	2.67	**26.4**	0.446	0.457	0.379 UJ
Zinc	81[f]	1.9 U	1.4 U	68.5	1.8 T	0.965	10	0.541 U	2.0	0.84

Table 1 - Groundwater Analytical Results
Thea Foss Waterway Esplanade
City of Tacoma

Well ID	Consent Decree	P10-MW04								R21-MW01
Sampling Date	Level	10/14/1997	1/20/1998	8/10/2010	12/29/2010	2/29/2012	10/15/2013	4/17/2014	10/23/2014	10/23/2014
Depth to Water in Feet[a]				10.12	8.10	10.34	10.38	9.74	9.48	8.9
TPH in µg/L										
Diesel	500[c]	250 U	250 U	80 U	300	70	100 U	100 U	30 UJ	30 UJ
Heavy oil	500[c]	500 U	500 U	210 U	**1,300**	40	70 T	200 U	50 J	50 UJ
Gasoline	800[c]	100 U	100 U	18 T	50 U	151	50 U	50 U	16.7 J	18.3 J
BTEX in µg/L										
Benzene	71[d]	0.5 U	0.5 U	0.2 U	1 U	2.5	1.0 U	0.2 U	0.2 U	0.2 U
Toluene	200,000[d]	0.5 U	0.5 U	0.2 U	1 U	14	1.0 U	0.2 U	0.2 U	0.2 U
Ethylbenzene	29,000[d]	0.5 U	0.5 U	0.2 U	1 U	2.8	1.0 U	0.2 U	0.2 U	0.2 U
Total xylene	1,600[e]	0.5 U	0.5 U	0.6 U	2 U	13.9	2.0 U	0.4 U	0.4 U	0.4 U
cPAHs in µg/L										
Benzo(a)anthracene		1.000 U	0.035	0.015	1.010 J	0.005	0.115 J	0.010 UJ	0.013	0.015
Benzo(a)pyrene		1.000 U	0.010 U	0.014	1.130 J	0.009	0.072 J	0.010 UJ	0.005 U	0.005 U
Benzo(b,k)fluoranthenes		1.000 U	0.010 U	0.020	1.710 J	0.012	0.119 J	0.020 UJ	0.012 U	0.012 U
Chrysene		1.000 U	0.022	0.140	1.230 J	0.007 T	0.120 J	0.010 UJ	0.008 T	0.010
Dibenz(a,h)anthracene		1.000 U	0.010 U	0.009 U	0.207 J	0.005	0.014 J	0.010 UJ	0.004 U	0.004 U
Indeno(1,2,3-cd)pyrene		1.000 U	0.010 U	0.009 T	0.683 J	0.006 T	0.043 J	0.010 UJ	0.003 U	0.003 U
Total cPAHs[b]	0.031[b,d]	**0.705** U	0.010	0.020 J	**1.503** J	0.012 J	**0.102** J	0.008 UJ	0.005 J	0.005
Dissolved Metals in µg/L										
Arsenic	0.14[d]	**5.5**	1.3 U	**3.2**	**1.25** T	**2.71** T	5 U	**0.42**	**1.46**	**2.81**
Copper	3.1[f]	3.9 U	9.2 U	0.079 U	0.095 T	0.183 T	0.2 U	0.2 U	0.417	0.307
Lead	8.1[f]	9.4 U	2.3 U	0.15 T	7	0.153 T	0.294 U	0.306	0.407	0.223
Nickel	8.2[f]	0.4 U	0.6 U	7.17	1.9 T	6.21	0.798	0.795	2.24	0.270 UJ
Zinc	81[f]	1.9 U	1.8 U	3.22	6.3	0.756	0.594 U	2.52	76.4	1.83

Table 1 - Groundwater Analytical Results
Thea Foss Waterway Esplanade
City of Tacoma

Well ID	Consent Decree	R21-MW02			MW7-1A		
Sampling Date	Level	10/15/2013	4/17/2014	10/23/2014	10/15/2013	4/17/2014	10/23/2014
Depth to Water in Feet[a]		12.02	10.04	11.59	4.74	4.69	2.91
TPH in µg/L							
Diesel	500[c]	100 U	100 U	30 UJ	40 T	100 U	30 UJ
Heavy oil	500[c]	200 U	200 U	50 UJ	200 U	200 U	50 UJ
Gasoline	800[c]	50 U	50 U	19.8 J	50 U	50 U	16.7 J
BTEX in µg/L							
Benzene	71[d]	1.0 U	0.2 U	0.2 U	1.0 U	0.2 U	0.2 U
Toluene	200,000[d]	1.0 U	0.2 U	0.2 U	1.0 U	0.2 U	0.2 U
Ethylbenzene	29,000[d]	1.0 U	0.2 U	2.0 U	1.0 U	0.2 U	0.2 U
Total xylene	1,600[e]	2.0 U	0.4 U	0.4 U	2.0 U	0.4 U	0.4 U
cPAHs in µg/L							
Benzo(a)anthracene		0.079 J	0.010 UJ	0.005 UJ	0.043 J	0.020 J	0.071 J
Benzo(a)pyrene		0.049 J	0.010 UJ	0.005 UJ	0.023 J	0.023 J	0.084 J
Benzo(b,k)fluoranthenes		0.075 J	0.020 UJ	0.012 UJ	0.060 J	0.060 J	0.242 J
Chrysene		0.077 J	0.010 UJ	0.006 UJ	0.040 J	0.024 J	0.087 J
Dibenz(a,h)anthracene		0.010 J	0.010 UJ	0.004 UJ	0.005 JT	0.010 UJ	0.004 UJ
Indeno(1,2,3-cd)pyrene		0.025 J	0.010 UJ	0.003 UJ	0.021 J	0.021 J	0.079 J
Total cPAHs[b]	0.031[b,d]	**0.069** J	0.008 UJ	0.004 UJ	**0.036** J	**0.034** J	**0.124** J
Dissolved Metals in µg/L							
Arsenic	0.14[d]	25 U	**1.06**	**1.07**	**6.06**	**3.57**	**0.93**
Copper	3.1[f]	0.316 T	0.905	0.854 J	0.346	0.648	**4.06**
Lead	8.1[f]	1 U	0.052 U	0.13 U	0.2 U	0.089 JT	0.469
Nickel	8.2[f]	0.988 T	0.976	1.830 UJ	0.556	0.791	0.377 UJ
Zinc	81[f]	2.26 U	3.42	3.39	1.38 U	3.48	1.77



Source: Base map prepared from DeLorme Topo 7.0, 2007.

0 2000 4000

Scale in Feet

N

Thea Foss Waterway Esplanade
Tacoma, Washington

Vicinity Map

17646-02 11/16

HARTCROWSER

Figure
1

EAL 11/18/16 1764602-001.dwg

Source: Aerial photograph from ArcGIS Online, 2013.

MW-01 Monitoring Well Location and Number

N

0 250 500

Scale in Feet

Thea Foss Waterway Esplanade
Tacoma, Washington

Site and Well Location Map (South)

17646-02 11/16

HARTCROWSER

Figure
2

EAL 11/18/16 1764602-002.dwg

Source: Aerial photograph from ArcGIS Online, 2013.

MW-1 Monitoring Well Location and Number

0 250 500

Scale in Feet

N

Thea Foss Waterway Esplanade
Tacoma, Washington

Site and Well Location Map (North)

17646-02 11/16

HARTCROWSER

Figure
3

EAL 11/18/16 1764602-003.dwg

APPENDIX A
Chemical Data Quality Review and Laboratory Report

APPENDIX A
CHEMICAL DATA QUALITY REVIEW AND LABORATORY REPORT

Chemical Data Quality Review for Thea-Foss Esplanade Groundwater Sampling, October 2016

Five water samples were collected on October 19, 2016. The samples were submitted to the City of Tacoma Environmental Services Laboratory in Tacoma, Washington. The analytical results were reported as project number PWK-00423-01-01.

The water samples were analyzed for dissolved metals (As, Cu, Ni, Pb, and Zn) by EPA Method 6020A.

The laboratory performed ongoing quality assurance/quality control (QA/QC) reviews of laboratory procedures. Hart Crowser reviewed the data to check that they met quality objectives for the project. The following criteria were evaluated:

- Holding times,
- Method blanks,
- Laboratory control sample (LCS) recoveries,
- Matrix spike (MS) recoveries,
- Laboratory duplicate relative percent differences (RPDs), and
- Reporting limits (RL).

The data were determined to be acceptable for use without qualification. The full laboratory results are presented at the end of this appendix. Results of the data review follow.

Sample Receiving Notes

The sample MW-2 marked on the COC was not collected, and was crossed off the COC. The samples were filtered and preserved for dissolved metals analysis at the laboratory.

Dissolved As, Cu, Ni, Pb, and Zn by EPA Method 6020A

The required holding times were met. The reporting limits were acceptable. No method blank contamination was detected. The LCS and MS recoveries were within method control limits. The laboratory duplicate RPD results were within method control limits or were not applicable when the sample and duplicate were less than five times the method detection limit.

Laboratory Report

City of Tacoma
Environmental Services Laboratory

27 October 2016

Darius Thompson
PW Engineering
747 Market Street, Rm 744
Tacoma, WA 98402

Subject: Foss Upland Esplanade

Enclosed are the analytical results for samples collected between 10/11/2016 and 10/19/2016.

Quality Control Data are included with the sample results for your review.

If you have any questions concerning this report, call me at (253)502-2130. Please note that remaining samples associated with this report will be discarded **3 months** from the date of this report unless we are notified otherwise.

Sincerely,

Stuart Magoon
Assistant Division Manager
Environmental Services Laboratory

cc.

PW Engineering	Project: **Foss Upland Esplanade**	
747 Market Street, Rm 744	Project Number: PWK-00423-01-01	**Reported:**
Tacoma WA, 98402	Project Manager: Darius Thompson	31-Oct-16 07:10

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled
MW-5	1610158-02	Water	19-Oct-16 10:05
P3-MW01R	1610158-03	Water	19-Oct-16 10:59
P3-MW2	1610158-04	Water	19-Oct-16 12:11
P3-MW03	1610158-05	Water	19-Oct-16 12:54
Landau Well	1610158-06	Water	19-Oct-16 13:49

CHAIN OF CUSTODY, SAMPLE RECEIPT, PRESERVATION AND STORAGE

Samples were received under appropriate Chain of Custody procedures. Containers were properly preserved and stored in accordance with the applicable method requirements. Samples 1610158-02 and 1610158-03 were preserved with Sulfuric Acid and Nitric Acid. The addition of Sulfuric Acid did not affect the analysis.

HOLDING TIMES

All analyses were performed within the required holding times.

METHODS

The samples were analyzed by the following methods:

EPA Method 6020A

MINIMUM REPORTING LIMITS

All analytes are reported to the Practical Quantitation Limit (PQL) which is below or no greater than the Minimum Project Reporting Limit.

BLANKS

Blanks were analyzed at the required frequencies of the methods. Analytes were not detected in the blanks, sample concentrations were greater than 10 times the blank values, or the analytes detected in the blanks were not detected in associated samples.

LABORATORY CONTROL SAMPLES

Laboratory Control Samples were analyzed with these samples. The recoveries were within the laboratory limits.

DUPLICATE SAMPLE ANALYSIS

Duplicate analysis was performed with these samples. Relative percent differences were within the laboratory limits for analyte concentrations greater than 5 times the reporting limit.

MATRIX SPIKE ANALYSIS

Matrix Spike analysis was performed with these samples. The recoveries were within the laboratory limits.

DATA AVAILABILITY

All data associated with the samples referenced in this report are archived at the Environmental Services Laboratory and are available upon request.

PW Engineering	Project: **Foss Upland Esplanade**	
747 Market Street, Rm 744	Project Number: PWK-00423-01-01	**Reported:**
Tacoma WA, 98402	Project Manager: Darius Thompson	27-Oct-16 13:42

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan and project QAPP.

Reviewed By

PW Engineering 747 Market Street, Rm 744 Tacoma WA, 98402	Project: **Foss Upland Esplanade** Project Number: PWK-00423-01-01 Project Manager: Darius Thompson	**Reported:** 27-Oct-16 13:42

Environmental Services Laboratory

MW-5

1610158-02 (Water)

19-Oct-16 10:05

Analyte		Result		Project Reporting Goal	PQL	Units
Metals						
EPA 6020A	Prepared: 26-Oct-16	Analyzed: 26-Oct-16				
Arsenic, Dissolved		**12.1**		**0.14**	**0.140**	**ug/L**
Copper, Dissolved		0.500	U	3.1	0.500	ug/L
Lead, Dissolved		0.500	U	8.1	0.500	ug/L
Nickel, Dissolved		**3.15**		**8.2**	**0.500**	**ug/L**
Zinc, Dissolved		**5.92**		**81**	**0.50**	**ug/L**

PW Engineering	Project: **Foss Upland Esplanade**	
747 Market Street, Rm 744	Project Number: PWK-00423-01-01	**Reported:**
Tacoma WA, 98402	Project Manager: Darius Thompson	27-Oct-16 13:42

P3-MW01R

1610158-03 (Water)

19-Oct-16 10:59

Analyte		Result		Project Reporting Goal	PQL	Units
Metals						
EPA 6020A	Prepared: 26-Oct-16	Analyzed: 26-Oct-16				
Arsenic, Dissolved		**2.29**		**0.14**	**0.140**	**ug/L**
Copper, Dissolved		**3.45**		**3.1**	**0.500**	**ug/L**
Lead, Dissolved		0.500	U	8.1	0.500	ug/L
Nickel, Dissolved		**1.51**		**8.2**	**0.500**	**ug/L**
Zinc, Dissolved		**4.02**		**81**	**0.50**	**ug/L**

PW Engineering 747 Market Street, Rm 744 Tacoma WA, 98402	Project: **Foss Upland Esplanade** Project Number: PWK-00423-01-01 Project Manager: Darius Thompson	**Reported:** 27-Oct-16 13:42

P3-MW2
1610158-04 (Water)
19-Oct-16 12:11

Analyte	Result		Project Reporting Goal	PQL	Units
Metals					
EPA 6020A Prepared: 26-Oct-16 Analyzed: 26-Oct-16					
Arsenic, Dissolved	**0.724**		**0.14**	**0.140**	**ug/L**
Copper, Dissolved	0.500	U	3.1	0.500	ug/L
Lead, Dissolved	0.500	U	8.1	0.500	ug/L
Nickel, Dissolved	0.500	U	8.2	0.500	ug/L
Zinc, Dissolved	**0.67**		**81**	**0.50**	**ug/L**

PW Engineering	Project: **Foss Upland Esplanade**	
747 Market Street, Rm 744	Project Number: PWK-00423-01-01	**Reported:**
Tacoma WA, 98402	Project Manager: Darius Thompson	27-Oct-16 13:42

P3-MW03

1610158-05 (Water)

19-Oct-16 12:54

Analyte	Result		Project Reporting Goal	PQL	Units
Metals					
EPA 6020A Prepared: 26-Oct-16	Analyzed: 26-Oct-16				
Arsenic, Dissolved	**1.76**		**0.14**	**0.140**	**ug/L**
Copper, Dissolved	**2.22**		**3.1**	**0.500**	**ug/L**
Lead, Dissolved	0.500	U	8.1	0.500	ug/L
Nickel, Dissolved	**0.668**		**8.2**	**0.500**	**ug/L**
Zinc, Dissolved	**0.85**		**81**	**0.50**	**ug/L**

PW Engineering 747 Market Street, Rm 744 Tacoma WA, 98402	Project: **Foss Upland Esplanade** Project Number: PWK-00423-01-01 Project Manager: Darius Thompson	**Reported:** 27-Oct-16 13:42

Landau Well
1610158-06 (Water)
19-Oct-16 13:49

Analyte		Result		Project Reporting Goal	PQL	Units
Metals						
EPA 6020A	Prepared: 26-Oct-16	Analyzed: 26-Oct-16				
Arsenic, Dissolved		**0.647**		**0.14**	**0.140**	**ug/L**
Copper, Dissolved		0.500	U	3.1	0.500	ug/L
Lead, Dissolved		0.500	U	8.1	0.500	ug/L
Nickel, Dissolved		0.500	U	8.2	0.500	ug/L
Zinc, Dissolved		0.50	U	81	0.50	ug/L

PW Engineering	Project: **Foss Upland Esplanade**	
747 Market Street, Rm 744	Project Number: PWK-00423-01-01	**Reported:**
Tacoma WA, 98402	Project Manager: Darius Thompson	27-Oct-16 13:42

Metals - Quality Control

Environmental Services Laboratory

Sample ID / Analyte	Result		MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B643071 - EPA 6020A											
Blank					Prepared & Analyzed: 26-Oct-16						
B643071-BLK1											
Arsenic, Dissolved	0.140	U	0.050	ug/L							
Copper, Dissolved	0.500	U	0.022	ug/L							
Lead, Dissolved	0.500	U	0.0061	ug/L							
Nickel, Dissolved	0.500	U	0.012	ug/L							
Zinc, Dissolved	0.50	U	0.22	ug/L							
B643071-BLK2											
Arsenic, Dissolved	0.140	U	0.050	ug/L							
Copper, Dissolved	0.500	U	0.022	ug/L							
Lead, Dissolved	0.500	U	0.0061	ug/L							
Nickel, Dissolved	0.500	U	0.012	ug/L							
Zinc, Dissolved	0.50	U	0.22	ug/L							
Duplicate	Source: 1610158-04				Prepared & Analyzed: 26-Oct-16						
B643071-DUP1											
Arsenic, Dissolved	0.756		0.050	ug/L		0.724			4	20	
Copper, Dissolved	0.039		0.022	ug/L		0.070			56	20	
Lead, Dissolved	0.500	U	0.0061	ug/L		0.0092				20	
Nickel, Dissolved	0.124		0.012	ug/L		0.119			4	20	
Zinc, Dissolved	0.49		0.22	ug/L		0.67			32	20	
LCS					Prepared & Analyzed: 26-Oct-16						
B643071-BS1											
Arsenic, Dissolved	49.6		0.050	ug/L	50.0		99	80-120		200	
Copper, Dissolved	122		0.022	ug/L	125		98	80-120		200	
Lead, Dissolved	15.4		0.0061	ug/L	15.0		103	80-120		200	
Nickel, Dissolved	199		0.012	ug/L	200		99	80-120		200	
Zinc, Dissolved	100		0.22	ug/L	100		100	80-120		200	
Matrix Spike	Source: 1610158-04				Prepared & Analyzed: 26-Oct-16						
B643071-MS1											
Arsenic, Dissolved	101		0.050	ug/L	100	0.724	100	70-130		20	
Copper, Dissolved	88.5		0.022	ug/L	100	0.070	88	70-130		20	
Lead, Dissolved	95.6		0.0061	ug/L	100	0.0092	96	70-130		20	

PW Engineering 747 Market Street, Rm 744 Tacoma WA, 98402	Project: **Foss Upland Esplanade** Project Number: PWK-00423-01-01 Project Manager: Darius Thompson	**Reported:** 27-Oct-16 13:42

Metals - Quality Control

Environmental Services Laboratory

Sample ID Analyte	Result	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B643071 - EPA 6020A										
Nickel, Dissolved	89.1	0.012	ug/L	100	0.119	89	70-130		20	
Zinc, Dissolved	95.8	0.22	ug/L	100	0.67	95	70-130		200	

PW Engineering	Project: **Foss Upland Esplanade**	
747 Market Street, Rm 744	Project Number: PWK-00423-01-01	**Reported:**
Tacoma WA, 98402	Project Manager: Darius Thompson	27-Oct-16 13:42

Notes and Definitions

U	Analyte Not Detected at or above the associated value
UJ	Analyte Not Detected at or above the associated estimated value
ND	Analyte NOT DETECTED at or above the reporting limit
E	Analyte was determined above the upper quantitation range of the method. The associated value is an estimate.
NJ	There is evidence the analyte is present. The associated value is an estimate.
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

CHAIN OF CUSTODY

City of Tacoma Environmental Services
326 East D Street
Tacoma
WA, 98421-1801
phone (253) 502-2130
fax (253) 502-2170

Lab Work Order Number 1610158

Client Name: PW Engineering	Project Name: Foss Upland Esplanade
Client Contact: Darius Thompson	Project Number: PWK-00423-01-01
Address: 747 Market Street, Rm 744	Project Description: Foss Uplands Esplanade
City: Tacoma	PO Number: 61000073538
State/Zip: WA, 98402	Sampler Signatures: Nicholas Galvin
Phone: (253) 591-5395 / Fax: (253) 594-7941	
Samplers: MWG	

Requested Analyses: EPA 6020A

Requested Turn Around: Rush requests subject to additional charge. Rush requests subject to lab approval. ✓ | Standard (days) | Expedited (days) | Due Date

Sample Name or Field ID #	Sampled Date	Sampled Time	Sample Type Code	Matrix Code	Container Count	EPA 6020A	Sample Comments
~~MW-2~~			G	W	1	1	NOT SAMPLED
MW-5	10/19/16	1005	G	W	1	1	-2
P3-MW01R	↓	1059	G	W	1	1	-3
P3-MW2		1211	G	W	1	1	-4
P3-MW03		1254	G	W	1	1	-5
Landau Well	↓	1349	G	W	1	1	-6

Relinquished By: Nicholas Galvin	Received By: [signature]	Date/Time: 10/19/16 1425
Relinquished By	Received By	Date/Time
Relinquished By	Received By	Date/Time
Cooler Numbers and Temperatures		

Comments: D. METALS ARE NOT FIELD FILTERED

Matrix Codes: W=Water

Preserv. Codes:

Login Reviewed By: [signature] Date: 10/19/16