

GROUNDWATER MONITORING TECHNICAL MEMORANDUM

OCTOBER 2011 MONITORING EVENT

PSE Former Olympia MGP Site
320 Columbia Street NW
Olympia, Washington



600 Stewart Street, Suite 1700
Seattle, Washington 98101
Telephone: (206) 728-2674
Fax: (206) 728-2732

Report date: December 21, 2011

GeoEngineers file number: 0186-774-00-0400

Client: Greg Andrina and John Rork, Puget Sound Energy
PO Box 90868, PSE-11N, Bellevue, WA 98009

GeoEngineers project manager: Rob Leet

Sampling date: October 18, 2011

Wells gauged and sampled: On-property wells: Shallow wells MW-1, MW-2, MW-5, and MW-7.
Off-property wells: None.

Purging/sampling methods: Low-flow methods with dedicated submersible pump (MW-1 and MW-2) or peristaltic pump with dedicated tubing (MW-5 and MW-7).

Non-aqueous phase liquid observations (well/thickness): Not observed in any wells.

Groundwater levels and gradients: The measured depths to groundwater in the four shallow monitoring wells gauged and sampled in October 2011 ranged from 4.56 to 5.68 feet below the top of the well casings (Table 1). The calculated groundwater elevations in these wells in October 2011 are shown in Table 1 and Figure 2. Inferred groundwater elevation contours are not shown in Figure 2 because the footprint covered by the four wells gauged in October is relatively small. Deep monitoring wells and off-property wells were not gauged or sampled during the October 2011 monitoring event.

Groundwater levels/gradients similar to previous monitoring events? The groundwater elevations in wells MW-1 and MW-2 were within the range of elevations measured previously in these wells. The groundwater elevation in well MW-5 (9.11 feet NAVD88) was slightly higher than previous elevations measured in this well, and the groundwater elevation in well MW-7 (8.51 feet NAVD88) was slightly lower than previous elevations measured in this well. Hydraulic gradients beneath the property have been variable in the past.

Chemical analysis: The groundwater samples were analyzed for carcinogenic polycyclic aromatic hydrocarbons (cPAHs) by EPA Method 8270D-SIM.

Summary of chemical analytical results: The October 2011 analytical results are presented in Table 2 and Figure 3. The results were generally consistent with previous monitoring events. cPAHs were detected in well MW-7 at a total toxic equivalent concentration (calculated per WAC 173-340-708[8][e]) of 1.6 micrograms per liter (ug/l). This exceeds the Model Toxics Control Act (MTCA) Method A cleanup level of 0.1 ug/l, and is the highest cPAH concentration detected to date in well MW-7 (see Figure 3). cPAH concentrations in well MW-7 have exceeded the MTCA Method A cleanup level for six of the last seven monitoring events. cPAHs were detected *below* the MTCA Method A cleanup level in the groundwater sample obtained from well MW-5 in October 2011 (0.089 ug/l); this is slightly higher than previous cPAH concentrations detected in MW-5 (see Table 2). cPAHs were not detected in the groundwater samples obtained from wells MW-1 and MW-2.

Arsenic concentrations in groundwater are no longer being monitored based on Ecology's concurrence (as expressed in a project review meeting on June 29, 2011) that the elevated arsenic concentrations previously detected in groundwater do not appear to be related to the former MGP.

Attachments:

Table 1 – Measured Groundwater Levels in Monitoring Wells, 2008-2011

Table 2 – Groundwater Chemical Analytical Results, 2008-2011

Figure 1 – Vicinity Map

Figure 2 – Groundwater Elevations in Monitoring Wells – October 18, 2011

Figure 3 – Constituents Detected Above MTCA Method A Cleanup Levels in Groundwater

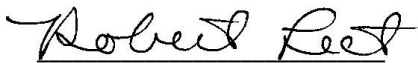
Attachment A – Data Quality Assessment Summary

Attachment B – Laboratory Analytical Report

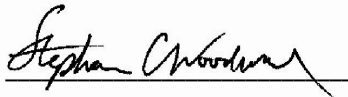
Distribution:

One electronic copy submitted to Greg Andrina and John Rork

Submitted by:



Robert C. Leet, PhD, LG
Senior Project Manager



Stephen C. Woodward, LG
Principal

Disclaimer: Any electronic form, facsimile or hard copy of the original document (email, text, table, and/or figure), if provided, and any attachments are only a copy of the original document. The original document is stored by GeoEngineers, Inc. and will serve as the official document of record.

We have prepared this report for the exclusive use of PSE, their authorized agents, and regulatory agencies. No other party may place reliance on the product of our services unless we agree in advance and in writing to such reliance. Our services were provided in accordance with our agreement with PSE. Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted environmental science practices in this area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood.

Table 1
Measured Groundwater Levels in Monitoring Wells
2008-2011
PSE Former Olympia MGP Site
Olympia, Washington

Monitoring Well	Screened Interval (feet bgs)	Shallow/Deep Well	Top-of-Casing Elevation ¹ (feet NAVD88)	Date	Measured Depth to Groundwater ² (feet below TOC)	Calculated Groundwater Elevation (feet NAVD88)
MW-00S ³	12.4 ³	Shallow	13.59	2/15/10	4.47	9.12
				5/26/10	4.74	8.85
				1/7/11	4.75	8.84
				4/19/11	4.79	8.80
				7/18/11	NM	--
				10/18/11	NM	--
MW-00D	25.5-30.5	Deep	13.32	1/7/11	4.46	8.86
				4/19/11	4.51	8.81
				7/18/11	NM	--
				10/18/11	NM	--
MW-1	5.0-20.0	Shallow	13.17	8/26/08	4.74	8.43
				10/6/08	4.64	8.53
				11/3/09	4.55	8.62
				2/15/10	4.16	9.01
				5/26/10	4.41	8.76
				1/7/11	4.27	8.90
				4/19/11	4.34	8.83
				7/18/11	4.54	8.63
10/18/11	4.56	8.61				
MW-2	5.0-20.0	Shallow	13.67	8/26/08	5.33	8.34
				10/6/08	5.23	8.44
				11/3/09	5.05	8.62
				2/15/10	4.44	9.23
				5/26/10	4.97	8.70
				1/7/11	4.77	8.90
				4/19/11	4.80	8.87
				7/18/11	5.17	8.50
10/18/11	5.14	8.53				
MW-3	39.5-44.5	Deep	13.65	8/26/08	5.27	8.38
				10/6/08	5.08	8.57
				11/3/09	5.02	8.63
				2/15/10	4.62	9.03
				5/26/10	4.94	8.71
				1/7/11	4.75	8.90
				4/19/11	4.82	8.83
				7/18/11	NM	--
10/18/11	NM	--				
MW-4	23.5-28.5	Deep	13.75	8/26/08	5.30	8.45
				10/6/08	5.18	8.57
				11/3/09	5.06	8.69
				2/15/10	4.72	9.03
				5/26/10	5.28	8.47
				1/7/11	4.85	8.90
				4/19/11	4.90	8.85
				7/18/11	NM	--
10/18/11	NM	--				
MW-5	4.5-19.5	Shallow	14.25	11/3/09	5.64	8.61
				2/15/10	5.28	8.97
				5/26/10	5.55	8.70
				1/7/11	5.40	8.85
				4/19/11	5.46	8.79
				7/18/11	5.66	8.59
10/18/11	5.14	9.11				

Monitoring Well	Screened Interval (feet bgs)	Shallow/Deep Well	Top-of-Casing Elevation ¹ (feet NAVD88)	Date	Measured Depth to Groundwater ² (feet below TOC)	Calculated Groundwater Elevation (feet NAVD88)
MW-6 ³	11.1 ³	Shallow	13.69	8/26/08	5.37	8.32
				10/6/08	5.37	8.32
				11/3/09	5.08	8.61
				2/15/10	4.46	9.23
				5/26/10	5.08	8.61
				1/6/11	4.88	8.81
				4/19/11	4.90	8.79
				7/18/11	NM	--
				10/18/11	NM	--
MW-7	4.5-19.5	Shallow	13.65	11/3/09	5.09	8.56
				2/15/10	4.63	9.02
				5/26/10	4.92	8.73
				1/7/11	4.77	8.88
				4/19/11	4.85	8.80
				7/18/11	5.05	8.60
				10/18/11	5.14	8.51
MW-8	5.0-20.0	Shallow	13.76	11/3/09	5.11	8.65
				2/15/10	4.49	9.27
				5/26/10	5.07	8.69
				1/7/11	4.83	8.93
				4/19/11	4.89	8.87
				7/18/11	NM	--
				10/18/11	NM	--
MW-10 ³	14.0 ³	Shallow	13.76	8/26/08	5.31	8.45
				10/6/08	5.25	8.51
				11/3/09	5.14	8.62
				2/15/10	4.66	9.10
				5/26/10	4.96	8.80
				1/6/11	4.91	8.85
				4/19/11	4.92	8.84
				7/18/11	NM	--
				10/18/11	NM	--
MW-12S	5.0-20.2	Shallow	14.19	1/7/11	5.28	8.91
				4/19/11	5.39	8.80
				7/18/11	NM	--
				10/18/11	NM	--
MW-12D	25.0-30.0	Deep	14.20	1/7/11	5.37	8.83
				4/19/11	5.37	8.83
				7/18/11	NM	--
				10/18/11	NM	--
MW-13S	4.5-19.5	Shallow	13.43	1/7/11	4.60	8.83
				4/19/11	4.61	8.82
				7/18/11	NM	--
				10/18/11	NM	--
MW-13D	25.5-30.5	Deep	13.84	1/7/11	5.06	8.78
				4/19/11	5.04	8.80
				7/18/11	NM	--
				10/18/11	NM	--

Notes:

bgs = Below ground surface

TOC = Top of well casing

NAVD88 = North American Vertical Datum of 1988.

NM = Not measured

¹Elevations surveyed in December 2010 by Barghausen Consulting Engineers, Inc. relative to NAVD88. Previous investigations used an arbitrary site-specific datum with an assigned elevation of 10 feet.

²Water levels measured with an electronic water level indicator.

³Pre-existing monitoring well installed by others; screened interval unknown. Value shown for screened interval is the approximate depth to bottom of well casing measured with an electronic water level indicator on February 15, 2010.

Table 2
Groundwater Chemical Analytical Results
2008-2011
PSE Former Olympia MGP Site
Olympia, Washington

Analyte	Units	MTCA Method A Cleanup Level ¹	Well/Sample ID: Sample Date:	MW-00S	MW-00S	MW-00S	MW-00S	MW-00D	MW-00D	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-2	MW-2	MW-2	MW-2/DUP-110309*	MW-2	MW-2
				2/15/2010	5/26/2010	1/7/2011	4/19/2011	1/7/2011	4/19/2011	8/26/2008	10/6/2008	11/3/2009	2/15/2010	5/26/2010	1/7/2011	4/19/2011	7/18/2011	10/18/2011	8/26/2008	10/6/2008	11/3/2009	11/3/2009	2/15/2010	5/26/2010
Volatile Organic Compounds (EPA 8011/8021B/8260B)																								
Benzene	ug/l	5		--	--	--	--	--	--	0.50 U	--	--	--	--	--	--	--	--	0.50 U	--	1.0 U	1.0 U	1.0 U	1.0 U
Toluene	ug/l	1,000		--	--	--	--	--	--	0.50 U	--	--	--	--	--	--	--	--	0.50 U	--	1.0 U	1.0 U	1.0 U	1.0 U
Ethylbenzene	ug/l	700		--	--	--	--	--	--	0.50 U	--	--	--	--	--	--	--	--	0.50 U	--	1.0 U	1.0 U	1.0 U	1.0 U
Xylene, m-,p-	ug/l	1,000 (a)		--	--	--	--	--	--	1.0 U	--	--	--	--	--	--	--	--	1.0 U	--	1.0 U	1.0 U	1.0 U	1.0 U
Xylene, o-	ug/l	1,000 (a)		--	--	--	--	--	--	1.0 U	--	--	--	--	--	--	--	--	1.0 U	--	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dibromoethane (EDB)	ug/l	0.01		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.0095 U	0.0095 U	--	--
1,2-Dichloroethane (EDC)	ug/l	5.0		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.20 U	0.20 U	--	--
Methyl Tertiary Butyl Ether (MTBE)	ug/l	20		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.20 U	0.20 U	--	--
Total Petroleum Hydrocarbons (NWTPH-Gx/Dx)																								
Gasoline-Range	mg/l	0.8		--	--	--	--	--	--	0.10 U	--	--	--	--	--	--	--	--	0.10 U	--	0.10 U	0.10 U	0.10 U	0.10 U
Diesel-Range	mg/l	0.5		--	--	--	--	--	--	0.25 U	--	--	--	--	--	--	--	--	0.25 U	--	0.25 U	0.25 U	0.26 U	0.26 U
Lube Oil-Range	mg/l	0.5		--	--	--	--	--	--	0.40 U	--	--	--	--	--	--	--	--	0.40 U	--	0.40 U	0.40 U	0.41 U	0.41 U
Semivolatile Organic Compounds (EPA 8270D-SIM)																								
ncPAHs																								
Benzo(g,h,i)perylene	ug/l	--		--	--	--	--	--	--	0.0095 U	--	--	--	--	--	--	--	--	0.061	--	--	--	--	--
cPAHs																								
Benzo(a)anthracene	ug/l	--		--	--	--	--	--	--	0.0095 U	--	0.0094 U	0.0094 U	0.0095 U	--	--	0.0098 U	0.0095 U	0.012	--	0.0095 U	0.010 U	0.013	0.0095 U
Chrysene	ug/l	--		--	--	--	--	--	--	0.0095 U	--	0.0094 U	0.0094 U	0.0095 U	--	--	0.0098 U	0.0095 U	0.0099	--	0.0095 U	0.010 U	0.013	0.0095 U
Benzo(b)fluoranthene	ug/l	--		--	--	--	--	--	--	0.0095 U	--	0.0094 U	0.0094 U	0.0095 U	--	--	0.0098 U	0.0095 U	0.020	--	0.0095 U	0.010 U	0.019	0.0095 U
Benzo(k)fluoranthene	ug/l	--		--	--	--	--	--	--	0.0095 U	--	0.0094 U	0.0094 U	0.0095 U	--	--	0.0098 U	0.0095 U	0.0095 U	--	0.0095 U	0.010 U	0.013	0.0095 U
Benzo(a)pyrene	ug/l	--		--	--	--	--	--	--	0.0095 U	--	0.0094 U	0.0094 U	0.0095 U	--	--	0.0098 U	0.0095 U	0.021	--	0.0095 U	0.010 U	0.029	0.0095 U
Indeno(1,2,3-cd)pyrene	ug/l	--		--	--	--	--	--	--	0.0095 U	--	0.0094 U	0.0094 U	0.0095 U	--	--	0.0098 U	0.0095 U	0.026	--	0.0095 U	0.010 U	0.030	0.0095 U
Dibenzo(a,h)anthracene	ug/l	--		--	--	--	--	--	--	0.0095 U	--	0.0094 U	0.0094 U	0.0095 U	--	--	0.0098 U	0.0095 U	0.0095 U	--	0.0095 U	0.010 U	0.0095 U	0.0095 U
Total cPAHs TEC	ug/l	0.1		--	--	--	--	--	--	0.0072 U	--	0.0071 U	0.0071 U	0.0072 U	--	--	0.0074 U	0.0072 U	0.028	--	0.0072 U	0.0076 U	0.037	0.0072 U
Metals (EPA 200.8/335.4/6020/7470A)																								
Total Arsenic	mg/l	0.005		0.010	0.017	0.0052	0.017	0.0051	0.0047	0.024	0.016	0.0062	0.013	0.0061	0.0072	0.050	--	--	0.010	0.012	0.0066	0.0069	0.0072	0.0033 U
Dissolved Arsenic ²	mg/l	0.005		--	--	--	0.0030 U	--	0.0030 U	--	0.017	--	--	--	--	0.0030 U	--	--	--	0.011	--	--	--	--
Total Chromium	mg/l	0.050		--	--	--	--	--	--	0.022	--	0.011 U	0.011 U	0.011 U	--	--	--	--	0.013	--	0.011 U	0.011 U	0.011 U	0.011 U
Total Copper	mg/l	0.59 (b)		--	--	--	--	--	--	0.012	--	--	--	--	--	--	--	--	0.0071	--	--	--	--	--
Total Lead	mg/l	0.015		--	--	--	--	--	--	0.0032	0.0023	0.0011 U	0.0019	0.0011 U	--	--	--	--	0.0051	0.0036	0.0011 U	0.0011 U	0.0046	0.0011 U
Dissolved Lead ²	mg/l	0.015		--	--	--	--	--	--	--	0.0010 U	--	--	--	--	--	--	--	--	0.0010 U	--	--	--	--
Total Mercury	mg/l	0.002		--	--	--	--	--	--	0.00050 U	--	0.00050 U	0.00050 U	0.00050 U	--	--	--	--	0.00050 U	--	0.00050 U	0.00050 U	0.00050 U	0.00050 U
Total Cyanide	mg/l	0.2 (c)		--	--	--	--	--	--	0.005 U	--	--	--	--	--	--	--	--	0.005 U	--	--	--	--	--

Analyte	Units	MTCA Method A Cleanup Level ¹	Well/Sample ID: Sample Date:	MW-2	MW-2	MW-2	MW-2	MW-3	MW-3/D-08-26-08*	MW-3	MW-3	MW-3	MW-3	MW-3	MW-3	MW-4	MW-4	MW-4	MW-4	MW-4	MW-4	MW-4	MW-5	MW-5
				1/7/2011	4/19/2011	7/18/2011	10/18/2011	8/26/2008	8/26/2008	10/6/2008	11/3/2009	2/15/2010	5/26/2010	1/7/2011	4/19/2011	8/26/2008	10/6/2008	11/3/2009	2/15/2010	5/26/2010	1/7/2011	4/19/2011	11/3/2009	2/15/2010
Volatile Organic Compounds (EPA 8011/8021B/8260B)																								
Benzene	ug/l	5		--	--	--	--	0.50 U	0.50 U	--	--	--	--	--	--	0.50 U	--	--	--	--	--	--	1.0 U	1.0 U
Toluene	ug/l	1,000		--	--	--	--	0.50 U	0.50 U	--	--	--	--	--	--	0.50 U	--	--	--	--	--	--	1.0 U	1.0 U
Ethylbenzene	ug/l	700		--	--	--	--	0.50 U	0.50 U	--	--	--	--	--	--	0.50 U	--	--	--	--	--	--	1.0 U	1.0 U
Xylene, m-,p-	ug/l	1,000 (a)		--	--	--	--	1.0 U	1.0 U	--	--	--	--	--	--	1.0 U	--	--	--	--	--	--	1.0 U	1.0 U
Xylene, o-	ug/l	1,000 (a)		--	--	--	--	1.0 U	1.0 U	--	--	--	--	--	--	1.0 U	--	--	--	--	--	--	1.0 U	1.0 U
1,2-Dibromoethane (EDB)	ug/l	0.01		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane (EDC)	ug/l	5.0		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl Tertiary Butyl Ether (MTBE)	ug/l	20		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Petroleum Hydrocarbons (NWTPH-Gx/Dx)																								
Gasoline-Range	mg/l	0.8		--	--	--	--	0.10 U	0.10 U	--	--	--	--	--	--	0.10 U	--	--	--	--	--	--	0.10 U	0.10 U
Diesel-Range	mg/l	0.5		--	--	--	--	0.26 U	0.25 U	--	--	--	--	--	--	0.25 U	--	--	--	--	--	--	0.25 U	0.26 U
Lube Oil-Range	mg/l	0.5		--	--	--	--	0.41 U	0.40 U	--	--	--	--	--	--	0.41 U	--	--	--	--	--	--	0.40 U	0.41 U
Semivolatile Organic Compounds (EPA 8270D-SIM)																								
ncPAHs																								
Benzo(g,h,i)perylene	ug/l	--		--	--	--	--	0.0095 U	0.0095 U	--	--	--	--	--	--	0.0095 U	--	--	--	--	--	--	--	--
cPAHs																								
Benzo(a)anthracene	ug/l	--		--	--	0.010 U	0.0095 U	0.0095 U	0.0095 U	--	0.0093 U	0.0094 U	0.0095 U	--	--	0.0095 U	--	0.0095 U	0.0095 U	0.013	--	--	0.012	0.0095 U
Chrysene	ug/l	--		--	--	0.010 U	0.0095 U	0.0095 U	0.0095 U	--	0.0093 U	0.0094 U	0.0095 U	--	--	0.0095 U	--	0.0095 U	0.0095 U	0.0094 U	--	--	0.012	0.0095 U
Benzo(b)fluoranthene	ug/l	--		--	--	0.010 U	0.0095 U	0.0095 U	0.0095 U	--	0.0093 U	0.0094 U	0.0095 U	--	--	0.0095 U	--	0.0095 U	0.0095 U	0.0094 U	--	--	0.017	0.0095 U
Benzo(k)fluoranthene	ug/l	--		--	--	0.010 U	0.0095 U	0.0095 U	0.0095 U	--	0.0093 U	0.0094 U	0.0095 U	--	--	0.0095 U	--	0.0095 U	0.0095 U	0.0094 U	--	--	0.010 U	0.0095 U
Benzo(a)pyrene	ug/l	--		--	--	0.010 U	0.0095 U	0.0095 U	0.0095 U	--	0.0093 U	0.0094 U	0.0095 U	--	--	0.0095 U	--	0.0095 U	0.0095 U	0.0094 U	--	--	0.010 U	0.0095 U
Indeno(1,2,3-cd)pyrene	ug/l	--		--	--	0.010 U	0.0095 U	0.0095 U	0.0095 U	--	0.0093 U	0.0094 U	0.0095 U	--	--	0.0095 U	--	0.0095 U	0.0095 U	0.0094 U	--	--	0.011	0.0095 U
Dibenzo(a,h)anthracene	ug/l	--		--	--	0.010 U	0.0095 U	0.0095 U	0.0095 U	--	0.0093 U	0.0094 U	0.0095 U	--	--	0.0095 U	--	0.0095 U	0.0095 U	0.0094 U	--	--	0.010 U	0.0095 U
Total cPAHs TEC	ug/l	0.1		--	--	0.0076 U	0.0072 U	0.0072 U	0.0072 U	--	0.0070 U	0.0071 U	0.0072 U	--	--	0.0072 U	--	0.0072 U	0.0072 U	0.0079	--	--	0.010	0.0072 U
Metals (EPA 200.8/335.4/6020/7470A)																								
Total Arsenic	mg/l	0.005		0.0033 U	0.0039	0.0039	0.0039	0.083	0.084	0.052	0.031	0.047	0.041	0.047	0.061	0.12	0.057	0.088	0.092	0.085	0.093	0.084	0.023	0.025
Dissolved Arsenic ²	mg/l	0.005		--	0.0030 U	--	--	--	--	0.034	--	--	--	0.033	--	0.042	--	--	--	--	--	--	--	--
Total Chromium	mg/l	0.050		--	--	--	--	0.043	0.045	--	0.011 U	0.017	0.011 U	--	0.052	--	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	--	0.011 U	0.011 U
Total Copper	mg/l	0.59 (b)		--	--	--	--	0.040	0.040	--	--	--	--	--	0.026	--	--	--	--	--	--	--	--	--
Total Lead	mg/l	0.015		--	--	--	--	0.018	0.018	0.0072	0.0039	0.0080	0.0038	--	--	0.0062	0.0039	0.0013	0.0011 U	0.0011 U	--	--	0.0054	0.0011 U
Dissolved Lead ²	mg/l	0.015		--	--	--	--	--	--	0.0010 U	--	--	--	--	--	0.0010 U	--	--	--	--	--	--	--	--
Total Mercury	mg/l	0.002		--	--	--	--	0.00050 U	0.00050 U	--	0.00050 U	0.00050 U	0.00050 U	--	--	0.00050 U	--	0.00050 U	0.00050 U	0.00050 U	--	--	0.00050 U	0.00050 U
Total Cyanide	mg/l	0.2 (c)		--	--	--	--	0.005 U	0.005 U	--	--	--	--	--	--	0.005 U	--	--	--	--	--	--	--	--

Analyte	Units	MTCA Method A Cleanup Level ¹	Well/Sample ID: Sample Date:	MW-5	MW-5	MW-5	MW-5	MW-5	MW-6	MW-6	MW-6	MW-6	MW-6	MW-6	MW-6	MW-7	MW-7	MW-7/DUP-021510*	MW-7	MW-7/DUP-100526*	MW-7	MW-7/DUP-010711*	MW-7
				5/26/2010	1/7/2011	4/19/2011	7/18/2011	10/18/2011	8/26/2008	10/6/2008	11/3/2009	2/15/2010	5/26/2010	1/6/2011	4/19/2011	11/3/2009	2/15/2010	2/15/2010	5/26/2010	5/26/2010	1/7/2011	1/7/2011	4/19/2011
Volatile Organic Compounds (EPA 8011/8021B/8260B)																							
Benzene	ug/l	5		1.0 U	--	--	--	--	0.50 U	--	1.0 U	1.0 U	1.0 U	--	--	1.1	1.0 U	1.0 U	1.0 U	1.0 U	--	--	--
Toluene	ug/l	1,000		1.0 U	--	--	--	--	0.50 U	--	1.0 U	1.0 U	1.0 U	--	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--	--	--
Ethylbenzene	ug/l	700		1.0 U	--	--	--	--	0.50 U	--	1.0 U	1.0 U	1.0 U	--	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--	--	--
Xylene, m-,p-	ug/l	1,000 (a)		1.0 U	--	--	--	--	1.0 U	--	1.0 U	1.0 U	1.0 U	--	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--	--	--
Xylene, o-	ug/l	1,000 (a)		1.0 U	--	--	--	--	1.0 U	--	1.0 U	1.0 U	1.0 U	--	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--	--	--
1,2-Dibromoethane (EDB)	ug/l	0.01		--	--	--	--	--	--	--	0.0095 U	--	--	--	--	0.0095 U	--	--	--	--	--	--	--
1,2-Dichloroethane (EDC)	ug/l	5.0		--	--	--	--	--	--	--	0.20 U	--	--	--	--	0.20 U	--	--	--	--	--	--	--
Methyl Tertiary Butyl Ether (MTBE)	ug/l	20		--	--	--	--	--	--	--	0.20 U	--	--	--	--	0.20 U	--	--	--	--	--	--	--
Total Petroleum Hydrocarbons (NWTPH-Gx/Dx)																							
Gasoline-Range	mg/l	0.8		0.10 U	--	--	--	--	0.10 U	--	0.10 U	0.10 U	0.10 U	--	--	0.26	0.10 U	0.10 U	0.10 U	0.10 U	--	--	--
Diesel-Range	mg/l	0.5		0.26 U	0.26 U	--	--	--	0.25 U	--	0.25 U	0.26 U	0.26 U	--	--	0.25 U	0.25 U	0.25 U	0.26 U	0.26 U	--	--	--
Lube Oil-Range	mg/l	0.5		0.41 U	0.41 U	--	--	--	0.40 U	--	0.40 U	0.41 U	0.41 U	--	--	0.40 U	0.40 U	0.40 U	0.41 U	0.41 U	--	--	--
Semivolatile Organic Compounds (EPA 8270D-SIM)																							
ncPAHs																							
Benzo(g,h,i)perylene	ug/l	--		--	--	--	--	--	0.0095 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
cPAHs																							
Benzo(a)anthracene	ug/l	--		0.021	0.023	--	0.018	0.031	0.0095 U	--	0.0097 U	0.0095 U	0.0097 U	--	--	0.051	0.064	0.090	0.084 J	0.12 J	0.079 J	0.049 J	0.015 J
Chrysene	ug/l	--		0.017	0.023	--	0.017	0.034	0.0095 U	--	0.0097 U	0.0095 U	0.0097 U	--	--	0.067	0.087 J	0.13 J	0.12 J	0.17 J	0.12 J	0.072 J	0.013 J
Benzo(b)fluoranthene	ug/l	--		0.014	0.028	--	0.024	0.042	0.0095 U	--	0.0097 U	0.0095 U	0.0097 U	--	--	0.13	0.14 J	0.22 J	0.16 J	0.24 J	0.19 J	0.12 J	0.023 J
Benzo(k)fluoranthene	ug/l	--		0.012	0.024	--	0.016	0.036	0.0095 U	--	0.0097 U	0.0095 U	0.0097 U	--	--	0.030	0.12 J	0.18 J	0.10 J	0.17 J	0.16 J	0.087 J	0.014 J
Benzo(a)pyrene	ug/l	--		0.017	0.046	--	0.034	0.072	0.0095 U	--	0.0097 U	0.0095 U	0.0097 U	--	--	0.14	0.21 J	0.31 J	0.23 J	0.37 J	0.28 J	0.17 J	0.019 J
Indeno(1,2,3-cd)pyrene	ug/l	--		0.015	0.035	--	0.024	0.056	0.0095 U	--	0.0097 U	0.0095 U	0.0097 U	--	--	0.15	0.22 J	0.32 J	0.28 J	0.42 J	0.30 J	0.17 J	0.033 J
Dibenzo(a,h)anthracene	ug/l	--		0.0098	0.0097 U	--	0.0098 U	0.0094 U	0.0095 U	--	0.0097 U	0.0095 U	0.0097 U	--	--	0.016	0.023	0.032	0.032 J	0.048 J	0.033 J	0.018 J	0.0095 U
Total cPAHs TEC	ug/l	0.1		0.024	0.058	--	0.042	0.089	0.0072 U	--	0.0073 U	0.0072 U	0.0073 U	--	--	0.18	0.27 J	0.40 J	0.30 J	0.47 J	0.36 J	0.22 J	0.028 J
Metals (EPA 200.8/335.4/6020/7470A)																							
Total Arsenic	mg/l	0.005		0.018	0.0088	0.024	--	--	0.0056	0.0033 U	0.0033 U	0.0033 U	0.0033 U	0.0033 U	0.0033 U	0.011	0.0033 U	0.0033 U	0.0033 U	0.0033 U	0.0033 U	0.0035	0.0033 U
Dissolved Arsenic ²	mg/l	0.005		--	--	0.0044	--	--	--	0.0030 U	--	--	--	--	0.0030 U	--	--	--	--	--	--	--	0.0030 U
Total Chromium	mg/l	0.050		0.011 U	0.011 U	--	--	--	0.013	--	0.011 U	0.011 U	0.011 U	--	--	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	--
Total Copper	mg/l	0.59 (b)		--	--	--	--	--	0.011 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Lead	mg/l	0.015		0.0011 U	0.0011 U	--	--	--	0.0022	0.0086	0.0011 U	0.0011 U	0.0025	--	--	0.0063	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0029	0.0029
Dissolved Lead ²	mg/l	0.015		--	--	--	--	--	--	0.0010 U	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Mercury	mg/l	0.002		0.00050 U	0.00050 U	--	--	--	0.0005 U	--	0.00050 U	0.00050 U	0.00050 U	--	--	0.00050 U	0.00050 U	0.00050 U	0.00050 U	0.00050 U	0.00050 U	0.00050 U	--
Total Cyanide	mg/l	0.2 (c)		--	--	--	--	--	0.005 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Analyte	Units	MTCA Method A Cleanup Level ¹	Well/Sample ID: Sample Date:	MW-7 DUP	MW-7	MW-7	MW-8	MW-8	MW-8	MW-8	MW-8	MW-10	MW-10	MW-10	MW-10	MW-10	MW-10	MW-10	MW-12S	MW-12S	MW-12D	MW-12D	MW-13S	MW-13S	MW-13D	MW-13D	
				4/19/2011	7/18/2011	10/18/2011	11/3/2009	2/15/2010	5/26/2010	1/7/2011	4/19/2011	8/26/2008	10/6/2008	11/3/2009	2/15/2010	5/26/2010	1/6/2011	4/19/2011	1/7/2011	4/19/2011	1/7/2011	4/19/2011	1/7/2011	4/19/2011	1/7/2011	4/19/2011	1/7/2011
Volatile Organic Compounds (EPA 8011/8021B/8260B)																											
Benzene	ug/l	5		--	--	--	1.0 U	1.0 U	1.0 U	--	--	0.50 U	--	1.0 U	1.0 U	1.0 U	--	--	--	--	--	--	--	--	--	--	--
Toluene	ug/l	1,000		--	--	--	1.0 U	1.0 U	1.0 U	--	--	0.50 U	--	1.0 U	1.0 U	1.0 U	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	ug/l	700		--	--	--	1.0 U	1.0 U	1.0 U	--	--	0.50 U	--	1.0 U	1.0 U	1.0 U	--	--	--	--	--	--	--	--	--	--	--
Xylene, m-,p-	ug/l	1,000 (a)		--	--	--	1.0 U	1.0 U	1.0 U	--	--	1.0 U	--	1.0 U	1.0 U	1.0 U	--	--	--	--	--	--	--	--	--	--	--
Xylene, o-	ug/l	1,000 (a)		--	--	--	1.0 U	1.0 U	1.0 U	--	--	1.0 U	--	1.0 U	1.0 U	1.0 U	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane (EDB)	ug/l	0.01		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane (EDC)	ug/l	5.0		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl Tertiary Butyl Ether (MTBE)	ug/l	20		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Petroleum Hydrocarbons (NWTPH-Gx/Dx)																											
Gasoline-Range	mg/l	0.8		--	--	--	0.10 U	0.10 U	0.10 U	--	--	0.10 U	--	0.10 U	0.10 U	0.10 U	--	--	--	--	--	--	--	--	--	--	--
Diesel-Range	mg/l	0.5		--	--	--	0.25 U	0.25 U	0.26 U	--	--	0.25 U	--	0.25 U	0.25 U	0.26 U	--	--	--	--	--	--	--	--	--	--	--
Lube Oil-Range	mg/l	0.5		--	--	--	0.40 U	0.40 U	0.42 U	--	--	0.40 U	--	0.40 U	0.40 U	0.41 U	--	--	--	--	--	--	--	--	--	--	--
Semivolatile Organic Compounds (EPA 8270D-SIM)																											
ncPAHs																											
Benzo(g,h,i)perylene	ug/l	--		--	--	--	--	--	--	--	--	0.0095 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
cPAHs																											
Benzo(a)anthracene	ug/l	--		0.028 J	0.082	0.35	0.0097 U	0.011	0.0095 U	0.0097 U	--	0.0095 U	--	0.0098 U	0.0095 U	0.010	--	--	--	--	--	--	--	--	--	--	--
Chrysene	ug/l	--		0.036 J	0.11	0.50	0.0097 U	0.0095 U	0.0095 U	0.0097 U	--	0.0095 U	--	0.0098 U	0.0095 U	0.0096 U	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	ug/l	--		0.063 J	0.22	0.87	0.0097 U	0.0095 U	0.0095 U	0.0097 U	--	0.0095 U	--	0.0098 U	0.0095 U	0.0096 U	--	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	ug/l	--		0.045 J	0.14	0.75	0.0097 U	0.0095 U	0.0095 U	0.0097 U	--	0.0095 U	--	0.0098 U	0.0095 U	0.0096 U	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	ug/l	--		0.062 J	0.33	1.2	0.0097 U	0.0095 U	0.0095 U	0.0097 U	--	0.0095 U	--	0.0098 U	0.0095 U	0.0096 U	--	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	ug/l	--		0.095 J	0.29	1.4	0.0097 U	0.0095 U	0.0095 U	0.0097 U	--	0.0095 U	--	0.0098 U	0.0095 U	0.0096 U	--	--	--	--	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	ug/l	--		0.011	0.033	0.15	0.0097 U	0.0095 U	0.0095 U	0.0097 U	--	0.0095 U	--	0.0098 U	0.0095 U	0.0096 U	--	--	--	--	--	--	--	--	--	--	--
Total cPAHs TEC	ug/l	0.1		0.087 J	0.41	1.6	0.0073 U	0.0078	0.0072 U	0.0073 U	--	0.0072 U	--	0.0074 U	0.0072 U	0.0078	--	--	--	--	--	--	--	--	--	--	--
Metals (EPA 200.8/335.4/6020/7470A)																											
Total Arsenic	mg/l	0.005		--	--	--	0.0033 U	0.0033 U	0.0033 U	0.0033 U	0.0033 U	0.012	0.011	0.0064	0.0033 U	0.017	0.019	0.061	0.0052	0.029	0.028	0.014	0.0041	0.0033 U	0.34	0.079	
Dissolved Arsenic ²	mg/l	0.005		0.0030 U	--	--	--	--	--	--	0.0030 U	--	0.010	--	--	--	--	0.0030 U	--	0.0030 U	--	0.014	--	0.0030 U	--	0.080	
Total Chromium	mg/l	0.050		--	--	--	0.011 U	0.011 U	0.011 U	0.011 U	--	0.011 U	--	0.011 U	0.011 U	0.011 U	--	--	--	--	--	--	--	--	--	--	
Total Copper	mg/l	0.59 (b)		--	--	--	--	--	--	--	--	0.011 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Total Lead	mg/l	0.015		--	--	--	0.0012	0.0011 U	0.0011 U	0.0011 U	--	0.0011 U	0.0047	0.0024	0.0011 U	0.0097	--	--	--	--	--	--	--	--	--	--	
Dissolved Lead ²	mg/l	0.015		--	--	--	--	--	--	--	--	--	0.0010 U	--	--	--	--	--	--	--	--	--	--	--	--	--	
Total Mercury	mg/l	0.002		--	--	--	0.00050 U	0.00050 U	0.00050 U	0.00050 U	--	0.00050 U	--	0.00050 U	0.00050 U	0.00050 U	--	--	--	--	--	--	--	--	--	--	
Total Cyanide	mg/l	0.2 (c)		--	--	--	--	--	--	--	--	0.005 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Notes:

¹MTCA Method A cleanup levels for potable groundwater (WAC 173-340-720(3)).

²Groundwater samples analyzed for dissolved arsenic and dissolved lead were field-filtered with a 45-micron filter.

(a) Total value for all xylenes.

(b) MTCA Method A cleanup level not established; listed value is the MTCA Method B cleanup level (standard formula value; WAC 173-340-720(4)(b)).

(c) MTCA Method A cleanup level not established; listed value is the Federal Primary Maximum Contaminant Level (MCL) (40 C.F.R. 141).

MTCA = Washington State Model Toxics Control Act

ug/l = Micrograms per liter

mg/l = Milligrams per liter

*Field duplicate sample

cPAHs = Carcinogenic polycyclic aromatic hydrocarbons

ncPAHs = Non-carcinogenic polycyclic aromatic hydrocarbons (results are shown only for ncPAHs that have been historically detected)

TEC = Total toxic equivalent concentration calculated per WAC 173-340-708(8)(e). For non-detected cPAHs, one-half the practical quantitation limit was used in the calculation.

-- = Constituent not analyzed or cleanup level not established

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

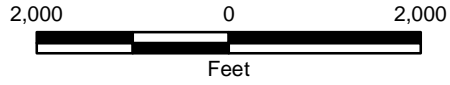
U = The analyte was analyzed for, but was not detected above the reported method reporting limit.

Chemical analyses (except cyanide) performed by OnSite Environmental, Inc. in Redmond, WA; cyanide analysis performed by Analytical Resources, Inc. in Seattle, WA.

Detections are shown in **bold** typeface.

Yellow highlighted cells indicate values that exceed the associated MTCA cleanup level.

Office: SEA Path: \\seal\projects\010186774\GIS\018677400_F1_VM.mxd Map Revised: 14 October 2011 amanza

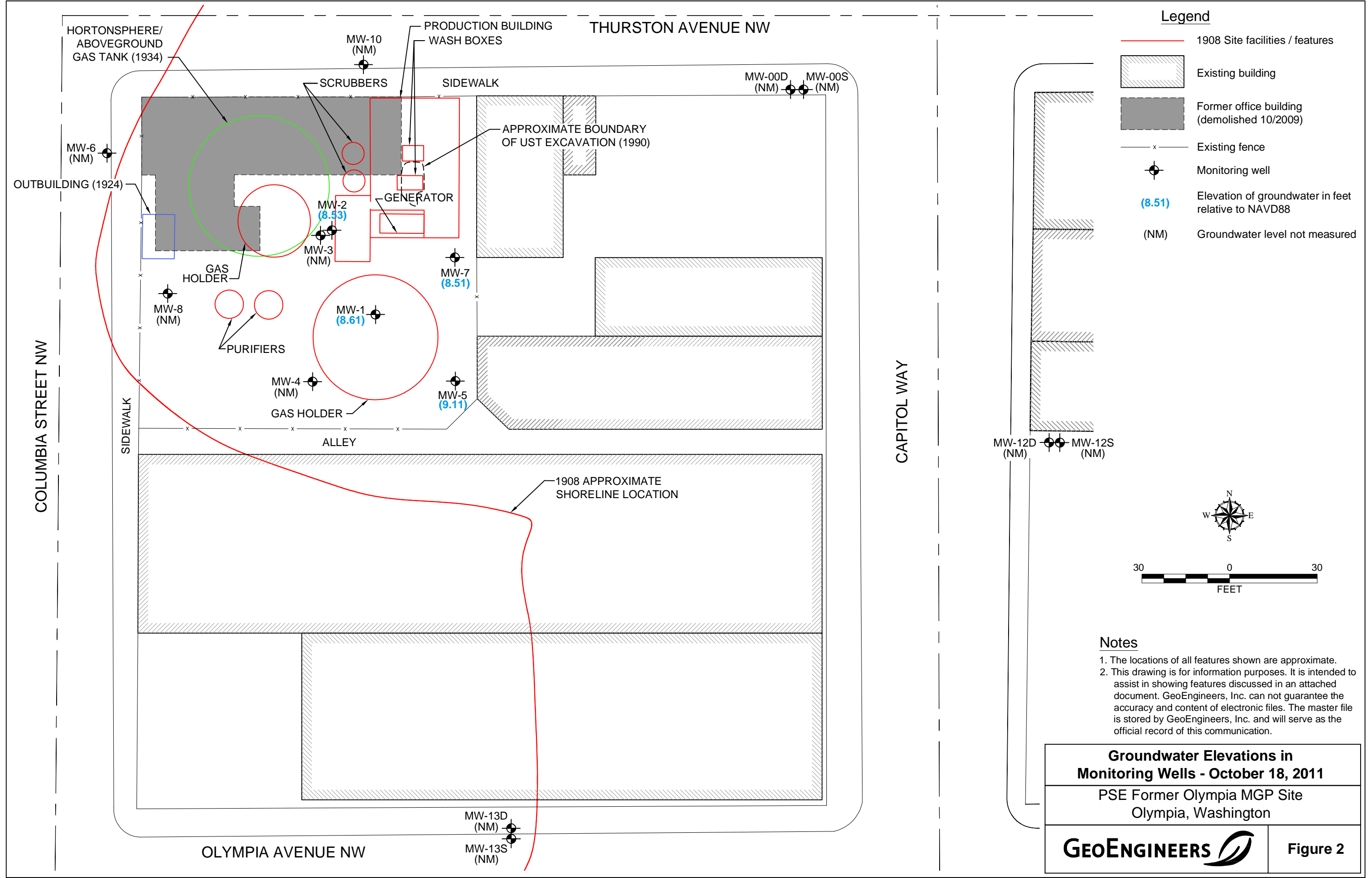


- Notes:
1. The locations of all features shown are approximate.
 2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
 3. It is unlawful to copy or reproduce all or any part thereof, whether for personal use or resale, without permission.

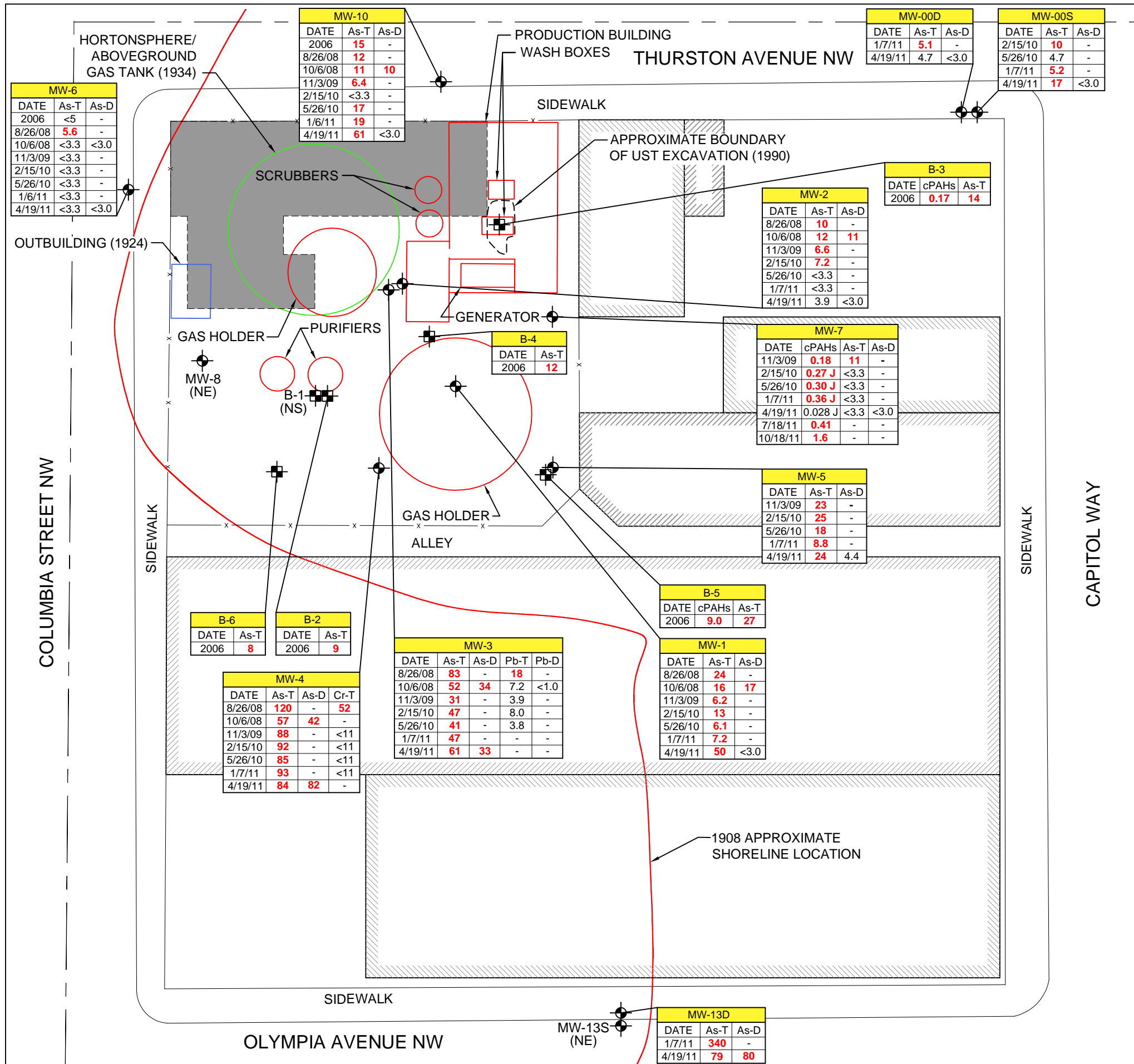
Data Sources: ESRI Data & Maps, Street Maps 2005
 Transverse Mercator, Zone 10 N North, North American Datum 1983
 North arrow oriented to grid north

Vicinity Map	
Former Olympia MGP Site Olympia, Washington	
	Figure 1

P:\01086774\001\TASK 0400 - DATA SUMMARY REPORT, CAP, GW MON\CAD\018677400_TASK 0400 FIG 2 GW_SHALLOW WELLS-OCTOBER 2011.DWG\TAB:F2 MODIFIED BY THICHAUD ON DEC 15, 2011 - 14:08

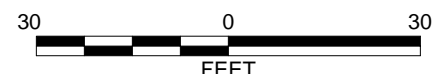


P:\01086774\001\TASK 04.00 - DATA SUMMARY REPORT, CAP, GW MONICAD\018677400_TASK 04.00 DATA SUMMARY FIG 3.DWG\TAB.F3 MODIFIED BY THICHAUD ON DEC 15, 2011 - 15:17



Legend

- 1908 Site facilities / features
 - Existing building
 - Former office building (demolished 10/2009)
 - Existing fence
 - Monitoring well
 - Soil boring; groundwater grab samples collected from upper 4-6 ft of saturated zone
- Groundwater results in ug/l
- As-T = Total arsenic
 - As-D = Dissolved arsenic
 - Pb-T = Total lead
 - Pb-D = Dissolved lead
 - Cr-T = Total chromium
 - cPAHs = Total carcinogenic polycyclic aromatic hydrocarbons - total toxic equivalent concentration
 - J = Estimated concentration
 - (NS) = No groundwater samples analyzed
 - (NE) = No MTCA exceedances
 - Red/bold** values exceed MTCA Method A cleanup levels



Notes

1. Only results for those constituents detected above MTCA cleanup levels in a given well are shown for that well.
2. The locations of all features shown are approximate.
3. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

**Constituents Detected Above
MTCA Method A Cleanup Levels
in Groundwater**

Former Columbia Street MGP Property
Olympia, Washington

Figure 3

ATTACHMENT A

DATA QUALITY ASSESSMENT SUMMARY cPAHs

**Project: PSE Former Olympia MGP Site
(Project No. 0186-774-00-0400)
October 2011 Groundwater Monitoring Event**

**LABORATORY SAMPLE DELIVERY GROUP (SDG):
1110-121**

This Data Quality Assessment Summary documents the results of a United States Environmental Protection Agency (USEPA) Level 2b data validation/verification of analytical data from the analysis of groundwater samples and laboratory quality control (QC) samples associated with the subject project. OnSite Environmental of Redmond, Washington performed the sample analyses. The assessment was performed by GeoEngineers, and included the QC elements listed below. Any data anomalies and/or deficiencies identified during the data quality assessment are noted.

- Sample holding times and sample preservation
- Surrogates (for organics only)
- Method blanks
- Laboratory control samples/laboratory control sample duplicates (LCS/LCSD)
- Instrument tunes
- Internal standards
- Calibrations (initial and continuing)
- Project-required target reporting limits

Overall Assessment

The results of this USEPA Level 2b data validation/verification indicate that the laboratory followed the specified analytical methods. Accuracy was acceptable, as demonstrated by the surrogate and LCS/LCSD percent recovery values. Precision was acceptable, as demonstrated by the LCS/LCSD relative percent difference values. No data were qualified for any reason. All data are acceptable for the intended use.

ATTACHMENT B



14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

October 26, 2011

Rob Leet
GeoEngineers, Inc.
600 Stewart, Suite 1700
Seattle, WA 98101-1233

Re: Analytical Data for Project 0186-774-00; PSE-Olympia-MGP
Laboratory Reference No. 1110-121

Dear Rob:

Enclosed are the analytical results and associated quality control data for samples submitted on October 18, 2011.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

A handwritten signature in black ink, appearing to read "DB", with a long horizontal stroke extending to the right.

David Baumeister
Project Manager

Enclosures

Date of Report: October 26, 2011
Samples Submitted: October 18, 2011
Laboratory Reference: 1110-121
Project: 0186-774-00; PSE-Olympia-MGP

Case Narrative

Samples were collected on October 18, 2011 and received by the laboratory on October 18, 2011. They were maintained at the laboratory at a temperature of 2°C to 6°C.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Date of Report: October 26, 2011
Samples Submitted: October 18, 2011
Laboratory Reference: 1110-121
Project: 0186-774-00; PSE-Olympia-MGP

ANALYTICAL REPORT FOR SAMPLES

Client ID	Laboratory ID	Matrix	Date Sampled	Date Received	Notes
MW-1	10-121-01	Water	10-18-11	10-18-11	
MW-2	10-121-02	Water	10-18-11	10-18-11	
MW-5	10-121-03	Water	10-18-11	10-18-11	
MW-7	10-121-04	Water	10-18-11	10-18-11	

Date of Report: October 26, 2011
 Samples Submitted: October 18, 2011
 Laboratory Reference: 1110-121
 Project: 0186-774-00; PSE-Olympia-MGP

**cPAHs by EPA 8270D/SIM
 (with silica gel clean-up)**

Matrix: Water
 Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MW-7					
Laboratory ID:	10-121-04					
Benzo[a]anthracene	0.35	0.0095	EPA 8270/SIM	10-19-11	10-19-11	
Chrysene	0.50	0.0095	EPA 8270/SIM	10-19-11	10-19-11	
Benzo[b]fluoranthene	0.87	0.0095	EPA 8270/SIM	10-19-11	10-19-11	
Benzo(j,k)fluoranthene	0.75	0.0095	EPA 8270/SIM	10-19-11	10-19-11	
Benzo[a]pyrene	1.2	0.0095	EPA 8270/SIM	10-19-11	10-19-11	
Indeno(1,2,3-c,d)pyrene	1.4	0.0095	EPA 8270/SIM	10-19-11	10-19-11	
Dibenz[a,h]anthracene	0.15	0.0095	EPA 8270/SIM	10-19-11	10-19-11	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorobiphenyl</i>	<i>75</i>	<i>38 - 105</i>				
<i>Pyrene-d10</i>	<i>78</i>	<i>37 - 121</i>				
<i>Terphenyl-d14</i>	<i>83</i>	<i>32 - 112</i>				

Date of Report: October 26, 2011
 Samples Submitted: October 18, 2011
 Laboratory Reference: 1110-121
 Project: 0186-774-00; PSE-Olympia-MGP

**cPAHs by EPA 8270D/SIM
 (with silica gel clean-up)**

Matrix: Water
 Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MW-1					
Laboratory ID:	10-121-01					
Benzo[a]anthracene	ND	0.0095	EPA 8270/SIM	10-21-11	10-25-11	
Chrysene	ND	0.0095	EPA 8270/SIM	10-21-11	10-25-11	
Benzo[b]fluoranthene	ND	0.0095	EPA 8270/SIM	10-21-11	10-25-11	
Benzo[j,k]fluoranthene	ND	0.0095	EPA 8270/SIM	10-21-11	10-25-11	
Benzo[a]pyrene	ND	0.0095	EPA 8270/SIM	10-21-11	10-25-11	
Indeno(1,2,3-c,d)pyrene	ND	0.0095	EPA 8270/SIM	10-21-11	10-25-11	
Dibenz[a,h]anthracene	ND	0.0095	EPA 8270/SIM	10-21-11	10-25-11	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
2-Fluorobiphenyl	76	38 - 105				
Pyrene-d10	88	37 - 121				
Terphenyl-d14	86	32 - 112				

Date of Report: October 26, 2011
 Samples Submitted: October 18, 2011
 Laboratory Reference: 1110-121
 Project: 0186-774-00; PSE-Olympia-MGP

**cPAHs by EPA 8270D/SIM
 (with silica gel clean-up)**

Matrix: Water
 Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MW-2					
Laboratory ID:	10-121-02					
Benzo[a]anthracene	ND	0.0095	EPA 8270/SIM	10-21-11	10-25-11	
Chrysene	ND	0.0095	EPA 8270/SIM	10-21-11	10-25-11	
Benzo[b]fluoranthene	ND	0.0095	EPA 8270/SIM	10-21-11	10-25-11	
Benzo(j,k)fluoranthene	ND	0.0095	EPA 8270/SIM	10-21-11	10-25-11	
Benzo[a]pyrene	ND	0.0095	EPA 8270/SIM	10-21-11	10-25-11	
Indeno(1,2,3-c,d)pyrene	ND	0.0095	EPA 8270/SIM	10-21-11	10-25-11	
Dibenz[a,h]anthracene	ND	0.0095	EPA 8270/SIM	10-21-11	10-25-11	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorobiphenyl</i>	83	38 - 105				
<i>Pyrene-d10</i>	89	37 - 121				
<i>Terphenyl-d14</i>	92	32 - 112				

Date of Report: October 26, 2011
 Samples Submitted: October 18, 2011
 Laboratory Reference: 1110-121
 Project: 0186-774-00; PSE-Olympia-MGP

**cPAHs by EPA 8270D/SIM
 (with silica gel clean-up)**

Matrix: Water
 Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MW-5					
Laboratory ID:	10-121-03					
Benzo[a]anthracene	0.031	0.0094	EPA 8270/SIM	10-21-11	10-25-11	
Chrysene	0.034	0.0094	EPA 8270/SIM	10-21-11	10-25-11	
Benzo[b]fluoranthene	0.042	0.0094	EPA 8270/SIM	10-21-11	10-25-11	
Benzo(j,k)fluoranthene	0.036	0.0094	EPA 8270/SIM	10-21-11	10-25-11	
Benzo[a]pyrene	0.072	0.0094	EPA 8270/SIM	10-21-11	10-25-11	
Indeno(1,2,3-c,d)pyrene	0.056	0.0094	EPA 8270/SIM	10-21-11	10-25-11	
Dibenz[a,h]anthracene	ND	0.0094	EPA 8270/SIM	10-21-11	10-25-11	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorobiphenyl</i>	<i>85</i>	<i>38 - 105</i>				
<i>Pyrene-d10</i>	<i>88</i>	<i>37 - 121</i>				
<i>Terphenyl-d14</i>	<i>89</i>	<i>32 - 112</i>				

Date of Report: October 26, 2011
 Samples Submitted: October 18, 2011
 Laboratory Reference: 1110-121
 Project: 0186-774-00; PSE-Olympia-MGP

**cPAHs by EPA 8270D/SIM
 METHOD BLANK QUALITY CONTROL
 (with silica gel clean-up)**

Matrix: Water
 Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB1019W1					
Benzo[a]anthracene	ND	0.010	EPA 8270/SIM	10-19-11	10-19-11	
Chrysene	ND	0.010	EPA 8270/SIM	10-19-11	10-19-11	
Benzo[b]fluoranthene	ND	0.010	EPA 8270/SIM	10-19-11	10-19-11	
Benzo(j,k)fluoranthene	ND	0.010	EPA 8270/SIM	10-19-11	10-19-11	
Benzo[a]pyrene	ND	0.010	EPA 8270/SIM	10-19-11	10-19-11	
Indeno(1,2,3-c,d)pyrene	ND	0.010	EPA 8270/SIM	10-19-11	10-19-11	
Dibenz[a,h]anthracene	ND	0.010	EPA 8270/SIM	10-19-11	10-19-11	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorobiphenyl</i>	<i>61</i>	<i>38 - 105</i>				
<i>Pyrene-d10</i>	<i>87</i>	<i>37 - 121</i>				
<i>Terphenyl-d14</i>	<i>88</i>	<i>32 - 112</i>				

Date of Report: October 26, 2011
 Samples Submitted: October 18, 2011
 Laboratory Reference: 1110-121
 Project: 0186-774-00; PSE-Olympia-MGP

cPAHs by EPA 8270D/SIM
SB/SBD QUALITY CONTROL
 (with silica gel clean-up)

Matrix: Water
 Units: ug/L

Analyte	Result		Spike Level		Percent Recovery		Recovery	RPD	RPD	Flags
					SB	SBD	Limits	RPD	Limit	
SPIKE BLANKS										
Laboratory ID:	SB1019W1									
	SB	SBD	SB	SBD	SB	SBD				
Benzo[a]anthracene	0.422	0.442	0.500	0.500	84	88	51 - 124	5	18	
Chrysene	0.415	0.439	0.500	0.500	83	88	53 - 123	6	20	
Benzo[b]fluoranthene	0.431	0.448	0.500	0.500	86	90	53 - 126	4	18	
Benzo(j,k)fluoranthene	0.421	0.448	0.500	0.500	84	90	51 - 126	6	23	
Benzo[a]pyrene	0.381	0.402	0.500	0.500	76	80	52 - 127	5	21	
Indeno(1,2,3-c,d)pyrene	0.390	0.421	0.500	0.500	78	84	49 - 123	8	26	
Dibenz[a,h]anthracene	0.382	0.417	0.500	0.500	76	83	39 - 125	9	31	
<i>Surrogate:</i>										
2-Fluorobiphenyl					55	71	38 - 105			
Pyrene-d10					84	90	37 - 121			
Terphenyl-d14					84	87	32 - 112			

Date of Report: October 26, 2011
 Samples Submitted: October 18, 2011
 Laboratory Reference: 1110-121
 Project: 0186-774-00; PSE-Olympia-MGP

**cPAHs by EPA 8270D/SIM
 METHOD BLANK QUALITY CONTROL
 (with silica gel clean-up)**

Matrix: Water
 Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB1021W1					
Benzo[a]anthracene	ND	0.010	EPA 8270/SIM	10-21-11	10-24-11	
Chrysene	ND	0.010	EPA 8270/SIM	10-21-11	10-24-11	
Benzo[b]fluoranthene	ND	0.010	EPA 8270/SIM	10-21-11	10-24-11	
Benzo(j,k)fluoranthene	ND	0.010	EPA 8270/SIM	10-21-11	10-24-11	
Benzo[a]pyrene	ND	0.010	EPA 8270/SIM	10-21-11	10-24-11	
Indeno(1,2,3-c,d)pyrene	ND	0.010	EPA 8270/SIM	10-21-11	10-24-11	
Dibenz[a,h]anthracene	ND	0.010	EPA 8270/SIM	10-21-11	10-24-11	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>2-Fluorobiphenyl</i>	<i>74</i>	<i>38 - 105</i>				
<i>Pyrene-d10</i>	<i>92</i>	<i>37 - 121</i>				
<i>Terphenyl-d14</i>	<i>86</i>	<i>32 - 112</i>				

Date of Report: October 26, 2011
 Samples Submitted: October 18, 2011
 Laboratory Reference: 1110-121
 Project: 0186-774-00; PSE-Olympia-MGP

cPAHs by EPA 8270D/SIM
SB/SBD QUALITY CONTROL
 (with silica gel clean-up)

Matrix: Water
 Units: ug/L

Analyte	Result		Spike Level		Percent Recovery		Recovery	RPD	RPD	Flags
					SB	SBD	Limits		Limit	
SPIKE BLANKS										
Laboratory ID:	SB1021W1									
	SB	SBD	SB	SBD	SB	SBD				
Benzo[a]anthracene	0.455	0.414	0.500	0.500	91	83	51 - 124	9	18	
Chrysene	0.460	0.427	0.500	0.500	92	85	53 - 123	7	20	
Benzo[b]fluoranthene	0.473	0.430	0.500	0.500	95	86	53 - 126	10	18	
Benzo(j,k)fluoranthene	0.455	0.414	0.500	0.500	91	83	51 - 126	9	23	
Benzo[a]pyrene	0.440	0.403	0.500	0.500	88	81	52 - 127	9	21	
Indeno(1,2,3-c,d)pyrene	0.401	0.381	0.500	0.500	80	76	49 - 123	5	26	
Dibenz[a,h]anthracene	0.403	0.390	0.500	0.500	81	78	39 - 125	3	31	
<i>Surrogate:</i>										
2-Fluorobiphenyl					67	74	38 - 105			
Pyrene-d10					92	87	37 - 121			
Terphenyl-d14					88	84	32 - 112			



Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
- B - The analyte indicated was also found in the blank sample.
- C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
- E - The value reported exceeds the quantitation range and is an estimate.
- F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
- H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
- I - Compound recovery is outside of the control limits.
- J - The value reported was below the practical quantitation limit. The value is an estimate.
- K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
- L - The RPD is outside of the control limits.
- M - Hydrocarbons in the gasoline range are impacting the diesel range result.
- M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
- N - Hydrocarbons in the lube oil range are impacting the diesel range result.
- N1 - Hydrocarbons in diesel range are impacting lube oil range results.
- O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
- P - The RPD of the detected concentrations between the two columns is greater than 40.
- Q - Surrogate recovery is outside of the control limits.
- S - Surrogate recovery data is not available due to the necessary dilution of the sample.
- T - The sample chromatogram is not similar to a typical _____.
- U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
- U1 - The practical quantitation limit is elevated due to interferences present in the sample.
- V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
- W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
- X - Sample extract treated with a mercury cleanup procedure.
- Y - Sample extract treated with an acid/silica gel cleanup procedure.
- Z -
- ND - Not Detected at PQL
 PQL - Practical Quantitation Limit
 RPD - Relative Percent Difference

