Report

First Half 2019
Operations and Monitoring Report
Remedial Action Pilot Study

Former J.H. Baxter & Co. Wood Treating Facility
Arlington, Washington

Prepared for

U.S. Environmental Protection Agency
Region 10
1200 Sixth Avenue
Seattle, WA 98101

Submitted by

J.H. Baxter Team
P.O. Box 10797
Eugene, OR 97440

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Prepared by

GSI Water Solutions, Inc.
55 SW Yamhill Street, Suite 300
Portland, OR 97204
P: 503.239.8799
info@gsiws.com
www.gsiws.com

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1. Significant Developments This Period

The recirculation trench has operated as designed with a total flow rate of approximately 45 to 50 gallons per minute (gpm) from extraction wells EW-1, EW-2, EW-4, and EW-5. There have been no high alarms in the infiltration trench since rehabilitation of the system in July 2015.

Since the first and second quarter monitoring events in 2016, pentachlorophenol (PCP) concentrations have decreased in several wells, including multiple downgradient wells. This suggests the effects of the rehabilitation of the recirculation system and addition of the in situ submerged oxygen curtains (iSOCs) are reducing concentrations downgradient of the system. See Section 4.2 for more details regarding PCP concentrations observed during the first half of 2019.

2. Introduction

The J.H. Baxter Team, consisting of J.H. Baxter & Co. (Baxter) and GSI Water Solutions, Inc. (GSI), has prepared this *First Half 2019 Operations and Monitoring Report – Remedial Action Pilot Study* (O&M report) for the former J.H. Baxter wood-treating facility (Site) that currently is operated by McFarland Cascade Holdings, Inc. (a Stella-Jones Company), located at 6520 188th Street NE in Arlington, Washington (Figure 1). This report has been prepared for the U.S. Environmental Protection Agency (EPA) to document the results of groundwater monitoring and remedial action for the Site during the first half of 2019 (January 1, 2019 to June 30, 2019).

The Remedial Action Pilot Study is considered to be part of the ongoing Corrective Measures Study (CMS; Baxter, 2011), which is being implemented pursuant to Paragraph 53 of the EPA Administrative Order on Consent (AOC) dated April 30, 2001 (EPA, 2001). CMS-related activities were conducted consistent with guidance provided by EPA in the RCRA Corrective Action Plan (Final), dated May 1994 (EPA, 1994); Corrective Actions Advance Notice of Proposed Rulemaking (EPA, 1996); and the AOC.

This semiannual report fulfills the documentation required for the ongoing operations and maintenance (O&M) related to the *Remedial Action Pilot Study Work Plan* (Baxter, 2007a) and *Remedial Action Pilot Study Performance Monitoring Plan* (PMP; Baxter, 2007b), which were submitted to EPA in 2007.

3. Remedial Action Pilot Study

The Remedial Action Pilot Study was designed to enhance in situ bioremediation and passive recovery of light nonaqueous-phase liquid (LNAPL). The pilot study includes an extraction well network, infiltration trench, recovery wells, and monitoring well network (Figure 2). The pilot study installation was completed in January 2008, with six additional monitoring wells added in 2010.

The purpose of the enhanced in situ bioremediation (the recirculation system) is to increase groundwater pH for favorable conditions for biodegradation of PCP. The system also adds oxygen by pumping the reduced water and allowing it to cascade through the vadose zone, picking up oxygen before reaching the groundwater table. The recirculation system uses four extraction wells to extract affected groundwater, which is pumped in an infiltration trench upgradient of the extraction wells. The infiltration trench is composed of basalt gravel and limestone rock, which is intended to raise the pH of the affected groundwater when contact is made. Additionally, LNAPL is passively recovered in five recovery wells with the installation of sorbent socks.

4. Operations, Maintenance, and Monitoring

Routine monitoring changed from monthly to quarterly in July 2010 with EPA's approval (EPA, 2010). EPA approved another reduction in reporting from quarterly to semiannual O&M reports in its May 18, 2015, letter (EPA, 2015b). Routine monitoring includes:

- Record groundwater level measurements in the monitoring well network.
- Collect groundwater samples from the monitoring well network.
- Collect a composite groundwater sample from the extraction wells.
- Inspect the sorbent socks in the recovery wells and replace if saturated.

4.1 Groundwater Level Measurements

Groundwater monitoring events occurred on March 16 and 17, 2019 for the first quarter of 2019 and on June 1 and 2, 2019 for the second quarter of 2019. The groundwater elevations from the first and second quarter 2019 monitoring events, and the previous four monitoring events, are presented in Table 1.

A groundwater elevation contour map of the first and second quarter 2019 monitoring events is presented in Figures 3 and 4, respectively. At the time groundwater measurements were collected, extraction wells EW-1, EW-2, EW-4, and EW-5 were running.

Appendix A provides additional figures with more detailed analyses of groundwater elevations across the Site and information about operation of the recirculation system. Figure A-1 is a cross section location map. Figures A-2 through A-5 present the groundwater elevations along each cross section from the first and second quarter 2019 monitoring events. The wells along each transect have been identified as a shallow well, intermediate well, or deep well based on the following classifications:

- A shallow well has the elevation of the bottom of the screen above 90 feet, North American Vertical Datum of 1988 (NAVD88).
- An intermediate well has the elevation of the bottom of the screen between 70 and 90 feet, NAVD88.
- A deep well has the elevation of the bottom of the screen below 70 feet, NAVD88.

Well clusters of different screened intervals were used to evaluate vertical gradients. The vertical gradients for each well pair are presented in Table 2 and Figure 5, where a negative

gradient indicates an upward trend and a positive gradient indicates a downward trend. In Appendix A, Figures A-2 through A-5 display the vertical gradients for select well pairs. Figures A-4 and A-5 show that water levels in the shallow zone, where the extraction and infiltration occurred, were generally higher in the area of infiltration and lower in the area of extraction, as would be expected. The MW-25/MW-32 well pair (Figure 5) shows a downward gradient that is consistent with past trends and is to be expected near the infiltration trench, where shallow water levels are elevated because of the infiltrating groundwater. In between the infiltration trench and extraction wells, at well pair MW-3/MW-33, an upward vertical gradient was observed during the first quarter of 2019. Second quarter 2019 was not measured for MW-3. A downward vertical gradient between the deep zone and shallow zone near the extraction wells (MW-29/MW-38 well pair) was observed in the first half of 2019. Downgradient of the recirculation system, there is little vertical gradient between the shallow, intermediate, and deep zones with the exception of the upward gradient at the distal well cluster MW-37/MW-41 between the intermediate and deep zones observed in the first half of 2019.

Hydrographs for select monitoring wells representative of aquifer conditions throughout different portions of the site are presented in Appendix A (Figures A-6 through A-11) along with precipitation data. Daily precipitation data, consisting of rain and snowmelt, are from the National Climatic Data Center's station in Arlington, Washington. Trends between the groundwater elevation and precipitation are shown in the hydrographs, with groundwater levels rising after periods of lower precipitation and groundwater levels decreasing after periods of low or no precipitation. Groundwater elevations have shown a muted rising trend in the winter of 2018/2019 due to lower than typical precipitation levels.

4.2 Groundwater Monitoring and Water Quality

The second half of 2019 groundwater monitoring occurred on March 16 and 17, 2019 for the first quarter of 2019 and on June 1, 2 and 9, 2019 for the second quarter of 2019. In the monitoring well network, 31 monitoring wells were sampled in the first quarter and 28 monitoring wells were sampled during the second quarter. A composite sample of the operational extraction wells, with the exception of EW-5 because of accessibility issues, was collected in first quarter 2019 and only from EW-1 and EW-4 in second quarter 2019. All monitoring wells sampled and the extraction well composite sample was analyzed for PCP by EPA Method 8151A.

The following wells were analyzed for PCP by EPA Method 8151A and polycyclic aromatic hydrocarbons (PAH) by EPA Method 8270D SIM:

- BXS-1, BXS-2 (first quarter only)
- MW-2 and MW-3
- MW-15 through MW-17
- MW-18 (second quarter only)
- MW-30
- MW-35 through MW-37

Wells were sampled using dedicated submersible bladder pumps in "Site Investigation" wells installed before 2004, and a portable submersible pump in "PMP" wells installed in

2007 or later that was decontaminated after sampling each well. Groundwater samples were collected by Baxter contractor in general accordance with the *Revised Supplemental Dissolved-phase Groundwater Monitoring Plan* (Baxter, 2005) and *Site Investigation Work Plan* (Baxter, 2002). Samples were analyzed by ALS Environmental (ALS) in Kelso, Washington. Laboratory reports are presented in Appendix B. Monitoring well analytical results are summarized in Table 3A. Extraction well analytical results are summarized in Tables 3B and 3C.

PCP results and isopleth maps for the first and second quarters of 2019 in the shallow and intermediate zones are presented in Figures 6 and 7, respectively. The first and second quarters of 2019 PCP results and isopleth maps for the deep zone are presented in Figures 8 and 9, respectively. Figure 10 displays the PCP concentrations from the second quarter of 2019 along a cross-section longitudinal to the PCP plume. Time series plots of PCP concentrations in wells of interest are presented in Appendix C. PAH concentrations from the first and second quarter of 2019 are presented in Figure 11.

Generally, PCP concentrations in the first half of 2019 are consistent with previous monitoring events. The exceptions (presented in Appendix C) are:

- **MW-22 (Figure C-3)**: Since September 2015, the PCP concentration has generally declined in MW-22 from 130 µg/L in the first quarter of 2016. Concentrations increased slightly during the first half of 2019 relative to 2018 but still shows a general overall decline in PCP concentration. This well is located upgradient of extraction well EW-1, which has been continuously operated since August 2015.
- **MW-23 (Figure C-4)**: Since 2009, the PCP concentration has shown a mid-year increase every year but has overall declined significantly from 2012. This well is located upgradient of extraction well EW-2, which has been continuously operated since August 2015.
- **MW-24 (Figure C-4)**: Since 2012, the PCP concentration has shown a mid-year increase every year but has overall declined significantly from 2013. In addition, the 2019 second quarter PCP concentration is the lowest mid-year spike to date assuming the third quarter 2019 results are consistent or lower. This well is located upgradient of extraction well EW-5, which has been continuously operated since August 2015.
- **MW-27 (Figure C-5)**: PCP concentrations during the third quarter of 2018 were detected at their highest levels since monitoring has begun at this well. However, concentrations were still relatively low at 15 µg/L. Concentrations have been declining towards non-detect values since that time. This well is located cross-gradient from the extraction wells.
- **MW-39 (Figure C-8)**: A PCP concentration of 430 µg/L was detected during the fourth quarter of 2018 and was the highest concentration detected since monitoring has begun at this well. The first quarter 2019 result was non-detect and the second quarter resulted in a low-level detection at 3.4 µg/L indicating this was likely an anomalous detection but will be monitored closely during the second half of 2019. This well is located downgradient of the extraction wells and at the site perimeter.

All remaining sampled wells continue to show a decreasing or stable low concentration trend in PCP concentrations. This includes monitoring wells upgradient of the extraction wells and monitoring wells downgradient of the recirculation system. The number of wells that show a downward trend of PCP has greatly increased since 2015, which likely is caused by the restored operation of the recirculation system. These wells will continue to be observed to determine the effect of the rehabilitation of the recirculation system. Wells farther downgradient of the recirculation system (e.g., HCMW-7, MW-18 and MW-42) also have benefitted from the recirculation system and are all at non-detectable concentrations.

The extraction well samples were a laboratory composite of discrete groundwater samples from EW-1, EW-2, and EW-4 in the first and from EW-1 and EW-4 in the second quarters of 2019 that were analyzed for PCP and select breakdown products. The PCP concentration was 210 µg/L for the first quarter of 2019 and 190 µg/L in the second quarter of 2019. The breakdown product 2,3,5,6-tetrachlorophenol had low level detections in the first quarter and estimated low-level detections between the reporting limits and the method detection limit in the second quarter 2019 sampling. Total tetrachlorophenols were detected at a concentration of 7.8 µg/L in the first quarter of 2019 and is estimated at 8.1 µg/L during the second quarter of 2019.

4.3 Extraction Wells

Extraction wells EW-01, EW-02, EW-04, and EW-05 were operating continuously during the first and second quarters of 2019 at a cumulative rate of approximately 45 to 50 gpm.

4.4 iSOC Wells

On August 1, 2015, during the recirculation trench rehabilitation, iSOCs were installed in three downgradient deep wells (MW-39, MW-40, and MW-41) to add oxygen to the deeper water-bearing zone. The oxygen from the iSOCs is regularly depleted with at least a portion of that being used for degradation of PCP. The oxygen tanks were replaced in MW-39, MW-40, and MW-41 during both the first and second quarter 2019 sampling events.

Since the iSOC installation in August 2015, PCP concentrations generally have decreased in MW-39, MW-40, and MW-41. It is unclear how much of the decrease in concentrations is attributable to the iSOCs versus the recirculation system; both appear to be having a positive effect on reducing PCP concentrations in the groundwater system downgradient of the system.

4.5 LNAPL Recovery

The following five wells have sorbent socks to passively absorb LNAPL:

- MW-12
- MW-13
- MW-19
- MW-20
- MW-21

All of the sorbent socks in the recovery wells were inspected during the first and second quarter 2019. Based on visual assessment, the sorbent socks in MW-12 and MW-13 needed to be replaced during the sampling events Baxter stores spent sorbent socks in a 55-gal satellite drum and arranges for off-site disposal once full. Since the start of the pilot study, it has been observed that the sorbent socks in recovery wells MW-19, MW-20, and MW-21 consistently have less product sorbed compared to the sorbent sock in MW-12 and MW-13.

4.6 Quality Assurance and Quality Control

Groundwater sample data for the first and second quarter 2019 monitoring events were analyzed by GSI. The case narrative in the laboratory report (Appendix B) describes the flags or footnotes associated with exceptions to standard analytical protocols and is summarized below. The results are considered usable with the appropriate flags.

Sample coolers for the March and June 2019 monitoring events arrived at the laboratory in good condition and below EPA's 6 degrees Celsius (˚C) recommendation.

First and second quarter samples for the extraction well composite sample, MW-25, and MW-33 and the second quarter sample MW-32 required dilution before the EPA Method 8151A Modified PCP analysis was ran. MRLs were adjusted accordingly.

Surrogate recoveries met the surrogate recovery criteria for all samples evaluated during the first and second quarter 2019 events.

ALS Environmental qualified analytes with a concentration detected above the MDL, but below the MRL with a J-flag. This qualification indicates an estimated concentration because the result is quantitatively uncertain.

A field equipment rinsate blank was collected during the first quarter monitoring event. The blank was analyzed for PAHs and PCP. During the first quarter event, multiple PAH constituents were detected above the MDL in the rinsate blank. A rinsate blank was erroneously not collected in second quarter 2019. Following EPA guidelines for blank detections, detectable results were rejected where required and flagged as "UR" in Table 1. Investigation continues to be conducted to attempt to identify the source of rinsate blank contamination, including replacement of dedicated tubing in wells.

Method blank samples were analyzed during the first and second quarter monitoring events. The blanks were analyzed for PAHs and PCP. During the first and second quarter events, multiple PAH constituents were detected above the MDL in the blank. Following EPA guidelines for blank detections, detected results below the reporting limit were reported as non-detect at the reporting limit and flagged as "UB" in Table 1.

Two duplicate samples was collected during the first and second quarter monitoring events from BXS-1 and MW-30. The blind samples were analyzed for PAHs and PCP. The parent sample and blind results were found to be comparable.

4.7 Activities Planned for the Second Half of 2019

Quarterly groundwater monitoring events will continue in the second half of 2019 as outlined in the PMP. These monitoring events will include the same elements discussed in this O&M report: groundwater level measurements, groundwater sampling within the monitoring network and an extraction well composite sample, and inspection of the sorbent socks in the recovery wells.

5. References

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Tables

Table 1. Groundwater Elevation Summary

Former J.H. Baxter Wood Treating Facility

Arlington, Washington

Well ID	Northing	Easting	Ground Surface Elevation (ft, NAVD88)	Top of Casing Elevation (ft, NAVD88)	Groundwater Elevations (ft, NAVD88)					
					3/17/2018	6/16/2018	9/29/2018	11/17/2018	3/17/2019	6/2/2019
BXS-1	427577	1320372.8	142.32	142.65	113.45	113.03	108.66	NM	NM	107.31
BXS-2	427429.1	1320176.6	141.09	142.89	116.29	NM	110.34	NM	NM	NM
BXS-3	427202.9	1320143.8	141.73	142.07	NM	NM	NM	NM	NM	NM
BXS-4	426556.4	1320865.9	143.05	143.42	132.82	NM	131.97	NM	NM	NM
MW-1	427352.2	1320826.9	146.21	147.44	125.34	125.38	NM	NM	120.12	119.33
MW-2	428166.9	1320647.4	144.69	145.96	111.50	110.86	106.35	106.72	106.11	105.20
MW-3	427560.7	1320596.2	143.92	146.13	114.13	116.51	109.13	107.05	109.00	NM
MW-4	425935.6	1321013.3	143.02	145.02	134.72	134.76	131.40	131.75	130.00	129.21
HCMW-5	427010.1	1320692.3	143.94	143.75	124.65	124.68	120.03	119.98	119.93	119.69
HCMW-6	427887.2	1320815.7	146.69	146.36	115.16	115.24	110.78	110.64	110.55	110.07
HCMW-7	428230.4	1320337.6	145.01	144.73	110.03	109.73	105.63	104.60	105.10	104.23
MW-10	427175.1	1320566	143.3	144.99	123.49	123.55	121.08	121.18	118.57	117.72
MW-11	427398.1	1321001	146.46	146.06	126.36	126.74	122.90	122.82	121.95	121.17
MW-14	425602.6	1320388.9	139.88	141.70	125.90	141.70	NM	121.59	121.48	120.68
MW-15	427860	1320310.6	142.78	142.22	112.31	111.81	107.62	106.52	107.20	106.28
MW-16	428006.8	1320325.6	143.37	142.91	111.51	NM	106.91	105.87	106.37	NM
MW-17	427863.6	1320173.9	142.17	144.85	111.65	111.62	107.49	106.35	107.02	106.09
MW-18	428312.7	1320075.7	142.79	142.45	109.34	109.23	105.21	104.21	104.61	NM
MW-22	427395.3	1320573.5	143.13	142.75	116.61	115.84	112.08	111.93	111.93	110.79
MW-23[1]	427500	1320578.2	143.47	143.18	115.66	114.74	111.02	110.52	109.16	109.45
MW-24	427563.9	1320645.1	144.47	144.13	114.67	113.71	110.04	109.10	109.17	108.05
MW-25	427492.9	1320682	145.45	144.98	118.38	117.48	113.86	113.74	114.08	112.86
MW-26	427601	1320773	145.13	144.75	115.21	113.95	110.69	108.45	109.55	108.29
MW-27	427677.9	1320702.8	144.62	144.31	114.67	113.38	109.17	108.44	109.31	107.98
MW-28	427502.3	1320488.8	143.02	142.77	114.77	107.36	109.77	109.41	109.59	108.53
MW-29	427637.7	1320503	142.85	142.61	113.81	113.01	107.78	107.54	108.47	107.45
MW-30	427836.7	1320483.2	142.64	142.4	113.01	112.40	108.18	107.79	107.87	106.86
MW-31	427715.8	1320294	141.15	140.95	112.81	112.89	108.03	107.87	107.75	106.69
MW-32	427493.5	1320670.2	145.27	145.01	114.81	113.89	109.51	109.15	109.41	108.30
MW-33	427577.4	1320602	143.76	143.46	114.16	113.44	109.07	108.60	109.02	107.93
MW-34	427647.7	1320498.6	143.02	142.6	113.60	112.20	108.66	108.36	108.42	107.38
MW-35	427726.8	1320608.7	144.34	143.89	113.97	114.07	110.73	109.97	108.56	107.68
MW-36	427676.1	1320399.4	141.57	141.15	113.24	112.58	108.41	108.23	108.23	107.05
MW-37	427969.4	1320251.9	142.37	141.96	112.16	111.56	106.12	106.05	106.54	105.26
MW-38	427653.6	1320491.4	143.36	143.28	113.58	112.84	109.32	109.12	108.40	107.34
MW-39	427993.1	1320148.9	142.73	142.40	110.88	110.40	106.64	106.23	106.00	105.17
MW-40	427859.5	1320316.6	142.56	142.1	112.47	112.29	107.92	106.58	107.38	106.48
MW-41	427968.1	1320255	142.33	141.47	110.17	110.05	106.03	105.46	105.56	103.67
MW-42	428319.7	1320080.9	142.89	142.68	109.58	109.18	105.08	102.88	102.88	103.68
MW-43	428757.5	1319841.1	141.91	141.51	105.79	106.09	102.61	98.51	NM	100.95

Notes

NM = not measured

Table 2. Vertical Groundwater Gradients at Monitoring Well Pairs

Former J.H. Baxter Wood Treating Facility

Arlington, Washington

Vertical Groundwater Gradient[1,2]	Well Pair	9/16/2017	12/13/2017	3/17/2018	6/16/2018	9/29/2018	11/17/2018	3/17/2019	6/2/2019
Shallow to Intermediate Zone	MW-25/MW-32	0.3924	0.3794	0.2432	0.2446	0.2963	0.3127	0.2187	0.3106
	MW-3/MW-33	-0.0006	0.0045	-0.0019	-0.0293	-0.0879	-0.0722	-0.1008	--
	MW-29/MW-34	0.0017	-0.0051	0.0119	0.1151	0.0579	0.0538	0.1669	0.0627
Shallow to Deep Zone	MW-29/MW-38	0.0014	-0.0454	0.0062	0.1281	0.2010	0.1737	0.1689	0.1819
	MW-15/MW-40	0.0000	-0.0128	-0.0043	-0.0436	-0.0450	-0.0518	0.0014	0.0027
Intermediate to Deep Zone	MW-37/MW-41	0.0449	0.0737	0.0819	-0.0497	-0.1226	-0.0361	-0.0572	-0.0831

Notes:

[1] Vertical groundwater gradients are dimensionless.

[2] Gradients are calculated by shallower aquifer groundwater elevation minus deeper aquifer groundwater elevation divided by the distance between well screen midpoints. Positive values indicate a downward flow direction, while negative values indicate an upward flow direction.

Table 3A. Summary of Groundwater Sampling Analytical Results: First Half 2019
Former J.H. Baxter Wood Treating Facility
Arlington, Washington

Event	Well ID	Sample Date	Pentachlorophenol	2-Methylnaphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Naphthalene	Phenanthrene	Pyrene	Total PAHs (calculated)
2019_03SIPMP	BXS-1	3/16/2019	**56**	0.020 UR	0.020 UR	0.0011 U	0.00082 U	0.020 UB	0.0011 U	0.00083 U	0.00086 U	0.00094 U	0.00076 U	0.0013 U	0.00082 U	0.020 UR	0.00089 U	0.020 UR	0.020 UR	0.0010 U	ND
2019_03SIPMP	BXS-2	3/16/2019	0.071 U	0.020 UR	0.020 UR	0.0011 U	0.00082 U	0.020 UB	0.0011 U	0.00083 U	0.00086 U	0.00094 U	0.00076 U	0.0013 U	0.00082 U	0.0011 U	0.00089 U	0.020 UR	0.020 UR	0.0010 U	ND
2019_03SIPMP	HCMW-7	3/16/2019	0.071 U																		
2019_03SIPMP	MW-15	3/16/2019	0.071 U	0.020 UR	0.0012 U	0.0011 U	0.00082 U	0.020 UB	0.0011 U	0.00083 U	0.00086 U	0.00094 U	0.00076 U	0.0013 U	0.00082 U	0.020 UR	0.00089 U	0.020 UR	0.020 UR	0.0010 U	ND
2019_03SIPMP	MW-16	3/16/2019	0.071 U	0.020 UR	0.0012 U	0.0011 U	0.00082 U	0.020 UB	0.0011 U	0.00083 U	0.00086 U	0.00094 U	0.00076 U	0.0013 U	0.00082 U	0.0011 U	0.00089 U	0.020 UR	0.020 UR	0.0010 U	ND
2019_03SIPMP	MW-17	3/16/2019	0.071 U	0.020 UR	0.0012 U	0.0011 U	0.00082 U	0.020 UB	0.0011 U	0.00083 U	0.00086 U	0.00094 U	0.00076 U	0.0013 U	**0.0012 J**	0.020 UR	0.00089 U	0.020 UR	0.020 UR	**0.0012 J**	**0.0024 J**
2019_03SIPMP	MW-18	3/16/2019	0.071 U																		
2019_03SIPMP	MW-2	3/16/2019	0.071 U	0.020 UR	0.0012 U	0.0011 U	0.00082 U	0.020 UB	0.0011 U	0.00083 U	0.00086 U	0.00094 U	0.00076 U	0.0013 U	0.00082 U	0.0011 U	0.00089 U	0.020 UR	0.020 UR	0.0010 U	ND
2019_03SIPMP	MW-22	3/17/2019	**56**																		
2019_03SIPMP	MW-23	3/17/2019	**7.4**																		
2019_03SIPMP	MW-24	3/17/2019	0.071 U																		
2019_03SIPMP	MW-25	3/17/2019	**190**																		
2019_03SIPMP	MW-26	3/17/2019	0.071 U																		
2019_03SIPMP	MW-27	3/17/2019	**6.4**																		
2019_03SIPMP	MW-28	3/16/2019	0.071 U																		
2019_03SIPMP	MW-29	3/16/2019	0.071 U																		
2019_03SIPMP	MW-3	3/17/2019	**1.1**	0.020 UR	0.0012 U	0.0011 U	0.00082 U	0.020 UB	0.0011 U	0.00083 U	0.00086 U	0.00094 U	0.00076 U	0.0013 U	0.00082 U	0.0011 U	0.00089 U	0.020 UR	0.0011 U	0.0010 U	ND
2019_03SIPMP	MW-30	3/16/2019	**0.13 J**	0.040 UR	0.0024 U	0.0022 U	0.0017 U	0.040 UB	0.0011 U	0.00083 U	0.040 UB	0.0019 U	0.0016 U	0.0026 U	**0.0026 J**	0.040 UR	0.0018 U	0.040 UR	0.040 UR	**0.0028 J**	**0.0054 J**
2019_03SIPMP	MW-31	3/16/2019	**1.5**																		
2019_03SIPMP	MW-32	3/17/2019	**48**																		
2019_03SIPMP	MW-33	3/17/2019	**200**																		
2019_03SIPMP	MW-34	3/16/2019	0.071 U																		
2019_03SIPMP	MW-35	3/17/2019	0.071 U	0.040 UR	0.040 UR	0.0022 U	0.0017 U	0.040 UB	**0.045**	**0.086**	**0.11**	**0.018 J**	**0.0012 J**	**0.022 J**	**0.015 J**	0.040 UR	0.040 UB	0.040 UR	0.040 UR	**0.059**	**0.3562 J**
2019_03SIPMP	MW-36	3/16/2019	**1**	0.040 UR	0.0024 U	0.0022 U	0.0017 U	0.040 UB	0.0011 U	0.00083 U	0.00086 U	0.0019 U	0.00076 U	0.0026 U	**0.0018 J**	0.040 UR	0.0018 U	0.040 UR	0.040 UR	**0.0022 J**	**0.0040 J**
2019_03SIPMP	MW-37	3/16/2019	**26**	0.020 UR	0.0012 U	0.0011 U	0.00082 U	0.020 UB	0.0011 U	0.00083 U	0.00086 U	0.00094 U	0.0016 U	0.0013 U	0.00082 U	0.0011 U	0.00089 U	0.020 UR	0.0011 U	0.0010 U	ND
2019_03SIPMP	MW-38	3/16/2019	0.071 U																		
2019_03SIPMP	MW-39	3/16/2019	0.071 U																		
2019_03SIPMP	MW-40	3/16/2019	0.071 U																		
2019_03SIPMP	MW-41	3/16/2019	0.071 U																		
2019_03SIPMP	MW-42	3/16/2019	**0.84**																		
2019_03SIPMP	MW-43	3/23/2019	0.071 U																		
2019_06SIPMP	BXS-1	6/2/2019	**50**	0.02 UB	0.02 UB	0.0011 U	0.00082 U	0.02 UB	0.0011 U	0.00083 U	0.00086 U	0.00094 U	0.00076 U	0.0013 U	0.02 UB	0.02 UB	0.00089 U	0.02 UB	0.02 UB	0.02 UB	ND
2019_06SIPMP	HCMW-7	6/1/2019	0.071 U																		
2019_06SIPMP	MW-15	6/1/2019	0.071 U	**0.0022 J**	0.0012 U	0.0011 U	0.00082 U	0.02 UB	0.0011 U	0.00083 U	0.00086 U	0.00094 U	0.00076 U	0.0013 U	0.00082 U	0.0011 U	0.00089 U	0.02 UB	0.02 UB	0.001 U	**0.0022 J**
2019_06SIPMP	MW-16	6/1/2019	0.071 U	0.02 UB	0.02 UB	0.0011 U	0.00082 U	0.02 UB	0.0011 U	0.00083 U	0.00086 U	0.00094 U	0.00076 U	0.0013 U	0.02 UB	0.02 UB	0.00089 U	0.02 UB	0.02 UB	0.02 UB	ND
2019_06SIPMP	MW-17	6/1/2019	0.071 U	**0.0031 J**	0.0012 U	0.0011 U	0.00082 U	0.02 UB	0.0011 U	0.00083 U	0.00086 U	0.00094 U	0.00076 U	0.0013 U	0.00082 U	0.0011 U	0.00089 U	0.02 UB	0.02 UB	0.001 U	**0.0031 J**
2019_06SIPMP	MW-18	6/1/2019	0.071 U	**0.024 B**	0.02 UB	0.0011 U	0.00082 U	0.02 UB	0.0011 U	0.00083 U	0.00086 U	0.00094 U	0.00076 U	0.0013 U	0.02 UB	0.02 UB	0.00089 U	0.02 UB	0.02 UB	0.001 U	**0.024 B**
2019_06SIPMP	MW-2	6/1/2019	0.071 U	**0.021 J**	0.0012 U	0.0011 U	0.00082 U	0.02 UB	**0.015 J**	0.00083 U	0.00086 U	0.00094 U	0.00076 U	0.0013 U	0.02 UB	**0.002 J**	0.00089 U	0.02 UB	0.02 UB	0.001 U	**0.038 J**
2019_06SIPMP	MW-22	6/2/2019	**65**																		
2019_06SIPMP	MW-23	6/2/2019	**73**																		
2019_06SIPMP	MW-24	6/2/2019	**76**																		
2019_06SIPMP	MW-25	6/2/2019	**100**																		
2019_06SIPMP	MW-26	6/2/2019	**0.19 J**																		
2019_06SIPMP	MW-27	6/2/2019	**1.9**																		
2019_06SIPMP	MW-28	6/2/2019	**0.76**																		
2019_06SIPMP	MW-29	6/1/2019	0.071 U																		
2019_06SIPMP	MW-3	6/2/2019	0.071 U	0.02 UB	0.02 UB	0.0011 U	0.00082 U	0.02 UB	0.0011 U	0.00083 U	0.00086 U	0.00094 U	0.00076 U	0.0013 U	0.02 UB	0.04 UB	0.00089 U	0.02 UB	0.02 UB	0.02 UB	ND
2019_06SIPMP	MW-30	6/1/2019	0.071 U	0.04 UB	0.04 UB	0.0022 U	0.0017 U	0.04 UB	0.0022 U	0.0017 U	0.0018 U	0.0019 U	0.0016 U	0.0026 U	0.04 UB	0.02 UB	0.0018 U	0.04 UB	0.04 UB	0.04 UB	ND
2019_06SIPMP	MW-31	6/1/2019	**1.4**																		
2019_06SIPMP	MW-32	6/2/2019	**160**																		
2019_06SIPMP	MW-33	6/2/2019	**100**																		
2019_06SIPMP	MW-34	6/1/2019	0.071 U																		
2019_06SIPMP	MW-35	6/9/2019	0.071 U	**0.0023 J**	**0.0015 J**	0.0014 U	0.00099 U	0.024 UB	**0.013 J**	0.001 U	0.0011 U	0.0012 U	0.00092 U	0.0016 U	0.00099 U	0.0014 U	0.0011 U	0.024 UB	0.024 UB	0.0012 U	**0.0168 J**
2019_06SIPMP	MW-36	6/1/2019	**7.8**	0.02 UB	0.02 UB	0.0011 U	0.00082 U	0.02 UB	0.0011 U	0.00083 U	0.00086 U	0.00094 U	0.00076 U	0.0013 U	0.02 UB	0.02 UB	0.00089 U	0.02 UB	0.02 UB	0.001 U	ND
2019_06SIPMP	MW-37	6/1/2019	**14**	0.02 UB	0.02 UB	0.0011 U	0.00082 U	0.02 UB	0.0011 U	0.00083 U	0.00086 U	0.00094 U	0.00076 U	0.0013 U	0.02 UB	0.02 UB	0.00089 U	0.02 UB	0.02 UB	0.02 UB	ND
2019_06SIPMP	MW-38	6/1/2019	0.071 U																		
2019_06SIPMP	MW-39	6/1/2019	**3.4**																		
2019_06SIPMP	MW-40	6/1/2019	**0.26 J**																		
2019_06SIPMP	MW-41	6/1/2019	0.071 U																		
2019_06SIPMP	MW-42	6/1/2019	0.071 U																		
2019_06SIPMP	MW-43	6/1/2019	0.071 U																		

Notes:
µg/L = micrograms per liter
i = Method reporting limit/method detection limit is elevated due to a chromatographic interference.
J = Result is an estimated concentration that is less than the method reporting limit, but greater than or equal to the method detection limit.
N = Analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.
NA = Sample bottles arrived at laboratory broken and could not be analyzed.
ND = Not detected.
NJ = Analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.
PAHs = polycyclic aromatic hydrocarbons.
B = This flag is used when the analyte is found in the associated method blank as well as in the sample. It indicates probable blank contamination.
R = Sample result was rejected because of serious deficiencies in meeting QC criteria.
U = Analyte was not detected above the reported sample quantification limit.

Table 3B. Analytical Results of Pentachlorophenol and Breakdown Products in Extraction Well Composite Samples

Former J.H. Baxter Wood Treating Facility

Arlington, Washington

Analyte[1]	Unit	9/16/2017[3]	12/14/2017[3]	3/27/2018[3]	6/16/2018[3]	9/30/2018[3]	11/18/2018[3]	3/17/2019[3]	6/2/2019[3]
Pentachlorophenol	µg/L	260	500	280	170	460	480	210	190
2,4,5-Trichlorophenol	µg/L	ND	ND	ND	ND	0.37 J	0.17 J	ND	ND
2,4,6-Trichlorophenol	µg/L	ND	ND	ND	ND	0.12 J	0.1 J	ND	ND
2,3,4,5-Tetrachlorophenol	µg/L	--	--	--	--	--	--	ND	ND
2,3,5,6-Tetrachlorophenol	µg/L	--	--	--	--	--	--	7.8	8.1 J
3,4-Dichlorophenol	µg/L	--	--	--	--	--	--	--	--
3,5-Dichlorophenol	µg/L	--	--	--	--	--	--	--	--
Total Tetrachlorophenols[4]	µg/L	11	15	13	5.6	12	20	7.8	8.1 J

Notes:

-- = not analyzed.

µg/L = micrograms per liter.

J = Result is an estimated concentration that is less than the method reporting limit, but greater than or equal to the method detection limit.

ND = not detected.

[1] Analysis by EPA method 8151M.

[2] Sample composite from EW-2 and EW-4.

[3] Sample composite from EW-1, EW-2, and EW-4.

[4] Total tetrachlorophenols comprises multiple tetrachlorophenol isomers, including 2,3,4,6-tetrachlorophenol and 2,3,5,6-tetrachlorophenol.

Table 3C. Historical Analytical Results of Pentachlorophenol and Breakdown Products in Extraction Well Composite Samples

Former J.H. Baxter Wood Treating Facility

Arlington, Washington

Sample ID	Sample Date	2,4,5-Trichlorophenol (µg/L)	2,4,6-Trichlorophenol (µg/L)	2,3,4,5-Tetrachlorophenol (µg/L)	2,3,5,6-Tetrachlorophenol (µg/L)	Total Tetrachlorophenols[1] (µg/L)	3,4-Dichlorophenol (µg/L)	3,5-Dichlorophenol (µg/L)	Pentachlorophenol (µg/L)	Comments[2]
EWCOMP030509	3/5/2009	1.0 U	1.0 U	15.0	2.0				430	
EWCOMP040209	4/2/2009	1.0 U	1.0 U	15.0	2.5				180	
EWCOMP052609	5/26/2009	1.1 U	1.1 U	12.0	2.0				240	
EWCOMP070709	7/7/2009	1.0 U	1.0 U	9.1	1.2				190	
EW-1-EW-7	8/5/2009	0.98 U	0.98 U	8.9	1.3				240	PCP from Method 8270D
EWCOMP082709	8/27/2009	1.0 U	1.0 U	7.1	1.0				180	
EWCOMP093009	9/30/2009	1.0 U	1.0 U	9.4	1.4				230	EW 1- EW 6 only
EW-1-EW-6	11/19/2009	0.96 U	0.96 U	10.0	1.9				450	EW 1- EW 6 only; analysis by 8270D SIM
EWCOMP122809	12/28/2009	1.0 U	1.0 U	15.0	1.8				490	EW 1- EW 6 only; analysis by 8270D SIM
EWCOMP12610	1/26/2010	0.99 U	0.99 U	16.0	1.8				470	EW 1- EW 6 only; analysis by 8270D SIM
EW1-7	2/11/2010	1.1 U	1.1 U	8.9	1.2				270	Analysis by 8270D SIM
EWCOMP32410	3/24/2010	1.0 U	1.0 U	13.0	1.6				340	Analysis by 8270D SIM
EWCOMP42910	4/30/2010	1.1 U	1.1 U	11.0	1.4				320	Analysis by 8270D
EW1-7	5/27/2010	0.96 U	0.96 U	5.2	1.0				110	Analysis by 8270D
EWCOMP63010	6/30/2010	1.1 U	1.1 U	11.0	1.8				320	EW1-EW3 & EW5-EW7, Analysis by 8270D SIM
EW1-7	8/19/2010	0.95 U	0.95 U	13.0	2.0				300	Analysis by 8270D
EW1-6	12/7/2010	0.97 U	0.97 U	9.5	1.5				540	Analysis by 8270D
Extraction Well Composite	2/12/2011	0.96 U	0.96 U	32.0	10.0				560	EW 1- EW 6 only; Analysis by 8270D
EW1-4 Composite	5/18/2011	0.099 U	0.06 J			12 U	0.5 U	0.74 U	320	EW 1- EW 4 only; Analysis by 8151M
EW1-4	8/25/2011	0.099 U	0.13 J			28			710	EW 1- EW 4 only; Analysis by 8151M
EW1-4	11/3/2011	0.099 U	0.11 J			33 U			710	EW 1- EW 4 only; Analysis by 8151M
EW1-4	2/14/2012	0.099 U	0.11 J			19 Ui			650	EW 1- EW 4 only; Analysis by 8151M
EW1-4	5/3/2012	1.0 U	0.16 NJ			39 J			770	EW 1- EW 4 only; Analysis by 8151M

Table 3C. Historical Analytical Results of Pentachlorophenol and Breakdown Products in Extraction Well Composite Samples

Former J.H. Baxter Wood Treating Facility

Arlington, Washington

Sample ID	Sample Date	2,4,5-Trichlorophenol (µg/L)		2,4,6-Trichlorophenol (µg/L)		2,3,4,5-Tetrachlorophenol (µg/L)	2,3,5,6-Tetrachlorophenol (µg/L)	Total Tetrachlorophenols[1] (µg/L)		3,4-Dichlorophenol (µg/L)	3,5-Dichlorophenol (µg/L)	Pentachlorophenol (µg/L)	Comments[2]
EW2-4 COMP	8/20/2012	1.0	U	0.5	U			26	U			550	EW 2- EW 4 only; Analysis by 8151M
EW 1-4 COMP	11/12/2012	1.0	U	0.50	U			27	U			690	EW 2- EW 4 only; Analysis by 8151M
EW 1-4 COMP	2/11/2013	1.0	U	0.50	U			39	U			820	J EW 2- EW 4 only; Analysis by 8151M
EW 1-4 COMP	6/4/2013	1.0	U	0.50	U			2.4	U			590	EW 2 & EW 4 only; Analysis by 8151M
EW 1-4 COMP	8/26/2013	0.19	U	0.14	U			18	J			530	EW 2 & EW 4 only; Analysis by 8151M
EW 1-4 COMP	12/2/2013	1.0	U	0.50	U			21				630	EW 2 & EW 4 only; Analysis by 8151M
EW 1-4 COMP	3/17/2014	1.0	U	0.50	U			15				340	EW 2 & EW 4 only; Analysis by 8151M
EW 1-4 COMP	6/2/2014	1.0	U	0.20	J			29				51	EW 4 only; Analysis by 8151M
EW 1-4 COMPOSITE	9/29/2014	0.24	J	0.50	U			31				790	EW 2 & EW 4 only; Analysis by 8151M
EW 1-4 COMPOSITE	11/17/2014	1.0	U	0.50	U			27				590	EW 2 & EW 4 only; Analysis by 8151M
EW 1-4 COMPOSITE	2/23/2015	1.0	UJ	0.50	U			23				590	EW 2 & EW 4 only; Analysis by 8151M
EW 1-4 COMPOSITE	9/15/2015	1.0	UJ	0.50	U			17				380	EW-1, EW-2 & EW-4 only; Analysis by 8151M
EW 1-4 COMPOSITE	12/7/2015	1.0	UJ	0.50	UJ			19				430	EW-1, EW-2 & EW-4 only; Analysis by 8151M
EW 1-4 COMPOSITE	2/29/2016	1.0	UJ	0.50	U			34				620	EW-1, EW-2 & EW-4 only; Analysis by 8151M
EW 1-4 COMPOSITE	6/5/2016	1.0	U	0.50	U			30				550	EW-1, EW-2 & EW-4 only; Analysis by 8151M
EW 1-4 COMPOSITE	9/25/2016	1.0	U	0.18	J			16				410	EW-1, EW-2 & EW-4 only; Analysis by 8151M
EW 1-4 COMPOSITE	11/8/2016	1.0	U	0.54	J			1	U			12	EW-1, EW-2 & EW-4 only; Analysis by 8151M
EW 1-4 COMPOSITE	3/8/2017	1.0	U	0.14	U			21				410	EW-1, EW-2 & EW-4 only; Analysis by 8151M
EW 1-4 COMPOSITE	6/22/2017	1.0	U	0.14	U			17				350	EW-1, EW-2 & EW-4 only; Analysis by 8151M
EW 1-4 COMPOSITE	9/29/2017	0.2	U	0.14	U			11				260	EW-1, EW-2 & EW-4 only; Analysis by 8151M
EW 1-4 COMPOSITE	12/13/2017	1.0	U	0.50	U			15				500	EW-1, EW-2 & EW-4 only; Analysis by 8151M
EW 1-4 COMPOSITE	3/27/2018	1.0	U	0.50	U			13				280	EW-1, EW-2 & EW-4 only; Analysis by 8151M
EW 1-4 COMPOSITE	6/16/2018	1	U	0.50	U			5.6				170	EW-1, EW-2 & EW-4 only; Analysis by 8151M

Table 3C. Historical Analytical Results of Pentachlorophenol and Breakdown Products in Extraction Well Composite Samples

Former J.H. Baxter Wood Treating Facility

Arlington, Washington

Sample ID	Sample Date	2,4,5-Trichlorophenol (µg/L)	2,4,6-Trichlorophenol (µg/L)	2,3,4,5-Tetrachlorophenol (µg/L)	2,3,5,6-Tetrachlorophenol (µg/L)	Total Tetrachlorophenols[1] (µg/L)	3,4-Dichlorophenol (µg/L)	3,5-Dichlorophenol (µg/L)	Pentachlorophenol (µg/L)	Comments[2]
EW 1-4 COMPOSITE	9/30/2018	0.37 J	0.12 J			12			460	EW-1, EW-2 & EW-4 only; Analysis by 8151M
EW 1-4 COMPOSITE	11/18/2018	0.17 J	0.10 J			20			480	EW-1, EW-2 & EW-4 only; Analysis by 8151M
EW COMPOSITE	3/1/2019	0.16 U	0.042 U	0.042 U	7.8	7.8			210	EW-1, EW-2 & EW-4 only; Analysis by 8151M
EW COMPOSITE	6/2/2019	3.2 U	0.84 U	0.84 U	8.1 J	8.1 J			190	EW-1 & EW-4 only; Analysis by 8151M

Notes:

i = Method reporting limit/method detection limit is elevated because of a chromatographic interference.

J = Result is an estimated concentration that is less than the method reporting limit, but greater than or equal to the method detection limit.

NJ = Analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

U =Analyte was not detected above the reported sample quantification limit.

UJ = The analyte was not detected above the reported sample quantification limit. However, the reported quantification limit is approximate and may be inaccurate or imprecise.

[1] Total tetrachlorophenols comprise of multiple tetrachlorophenol isomers, including 2,3,4,6-tetrachlorophenol and 2,3,5,6-tetrachlorophenol.

[2] EW-1, EW-5, and EW-6 were shut down because of a recurring high water level condition in the infiltration trench. EW-7 was discontinued with approval from the EPA in 2010.

EW-3 was shut down during the second quarter of 2013 and was off during sample collection.

Table 4. Light Nonaqueous-Phase Liquid (LNAPL) Recovery

Former J.H. Baxter Wood Treating Facility

Arlington, Washington

Date	Well ID	Weight (pounds)			Volume (gallons)
		Total	Material	LNAPL	
4/7/2008	MW-12	2.24	0.53	1.71	0.20
6/2/2008	MW-12	2.34	0.53	1.81	0.22
7/28/2008	MW-12	2.14	0.54	1.60	0.19
9/26/2008	MW-12	1.9	0.46	1.44	0.17
11/24/2008	MW-12	2.22	0.54	1.68	0.20
1/7/2009	MW-13	2.12	0.56	1.56	0.19
3/5/2009	MW-12	2.35	0.64	1.71	0.20
4/1/2009	MW-12	2.58	0.64	1.94	0.23
5/27/2009	MW-12	2.76	0.68	2.08	0.25
11/19/2009	MW-12	NA	NA	1.82	NA
12/28/2009	MW-12	2.64	0.66	1.98	0.24
1/25/2010	MW-12	2.48	0.64	1.84	0.22
3/23/2010	MW-12	2.6	0.66	1.94	0.23
4/28/2010	MW-12	2.68	0.64	2.04	0.24
6/29/2010	MW-12	2.52	0.64	1.88	0.22
10/19/2010	MW-13	1.49	0.64	0.85	0.10
10/19/2010	MW-12	1.8	0.64	1.16	0.14
2/10/2011	MW-12	2.19	0.56	1.63	0.19
5/18/2011	MW-12	2.56	0.64	1.92	0.23
5/18/2011	MW-13	1.9	0.45	1.45	0.17
5/18/2011	MW-19	1.8	0.63	1.17	0.14
5/18/2011	MW-21	1.59	0.58	1.01	0.12
8/24/2011	MW-12	2.07	0.63	1.44	0.17
11/3/2011	MW-12	2.27	0.61	1.66	0.20
2/15/2012	MW-12	1.89	0.64	1.25	0.15
5/2/2012	MW-12	2.45	0.64	1.81	0.22
8/20/2012	MW-12	1.08	0.47	0.61	0.07
11/13/2012	MW-12	NC	NC	0	0.00
2/12/2013	MW-12	2.38	0.41	1.97	0.23
6/3/2013	MW-12	1.91	0.58	1.33	0.16
8/26/2013	MW-12	0.93	0.2	0.73	0.09
12/3/2013	MW-12	0.98	0.33	0.65	0.08
3/17/2014	MW-12	2.14	0.32	1.8	0.21
6/2/2014	MW-12	2.13	0.3	1.83	0.22
9/29/2014	MW-12	1.16	0.32	0.84	0.10
11/17/2014	MW-12	1.71	0.31	1.41	0.17
2/23/2015	MW-12	2.1	0.31	1.79	0.21
9/15/2015	MW-12	2.15	0.33	1.82	0.22
12/7/2015	MW-12	2.14	0.31	1.83	0.22

Table 4. Light Nonaqueous-Phase Liquid (LNAPL) Recovery

Former J.H. Baxter Wood Treating Facility

Arlington, Washington

Date	Well ID	Weight (pounds)			Volume (gallons)
		Total	Material	LNAPL	
2/29/2016	MW-12	2.58	0.3	2.28	0.27
6/5/2016	MW-12	3.06	0.44	2.62	0.31
9/25/2016	MW-12	2.61	0.26	2.35	0.28
11/8/2016	MW-12	2.44	0.31	2.13	0.25
3/8/2017	MW-12	1.39	0.31	1.08	0.13
6/10/2017	MW-13	1.42	0.31	1.11	0.13
6/10/2017	MW-12	2.41	0.31	2.10	0.25
9/16/2017	MW-12	0.99	0.31	0.68	0.08
12/13/2017	MW-12	0.91	0.33	0.58	0.07
12/13/2017	MW-13	0.86	0.29	0.58	0.07
11/18/2018	MW-12	3.96	0.31	3.65	0.43
11/18/2018	MW-13	4.08	0.31	3.77	0.45
3/17/2019	MW-12	7.11	0.20	6.91	0.82
3/17/2019	MW-13	6.98	0.20	6.78	0.81
6/2/2019	MW-12	7.16	0.19	6.97	0.83
6/2/2019	MW-13	7.11	0.19	6.92	0.82
Total				110.5	12.82

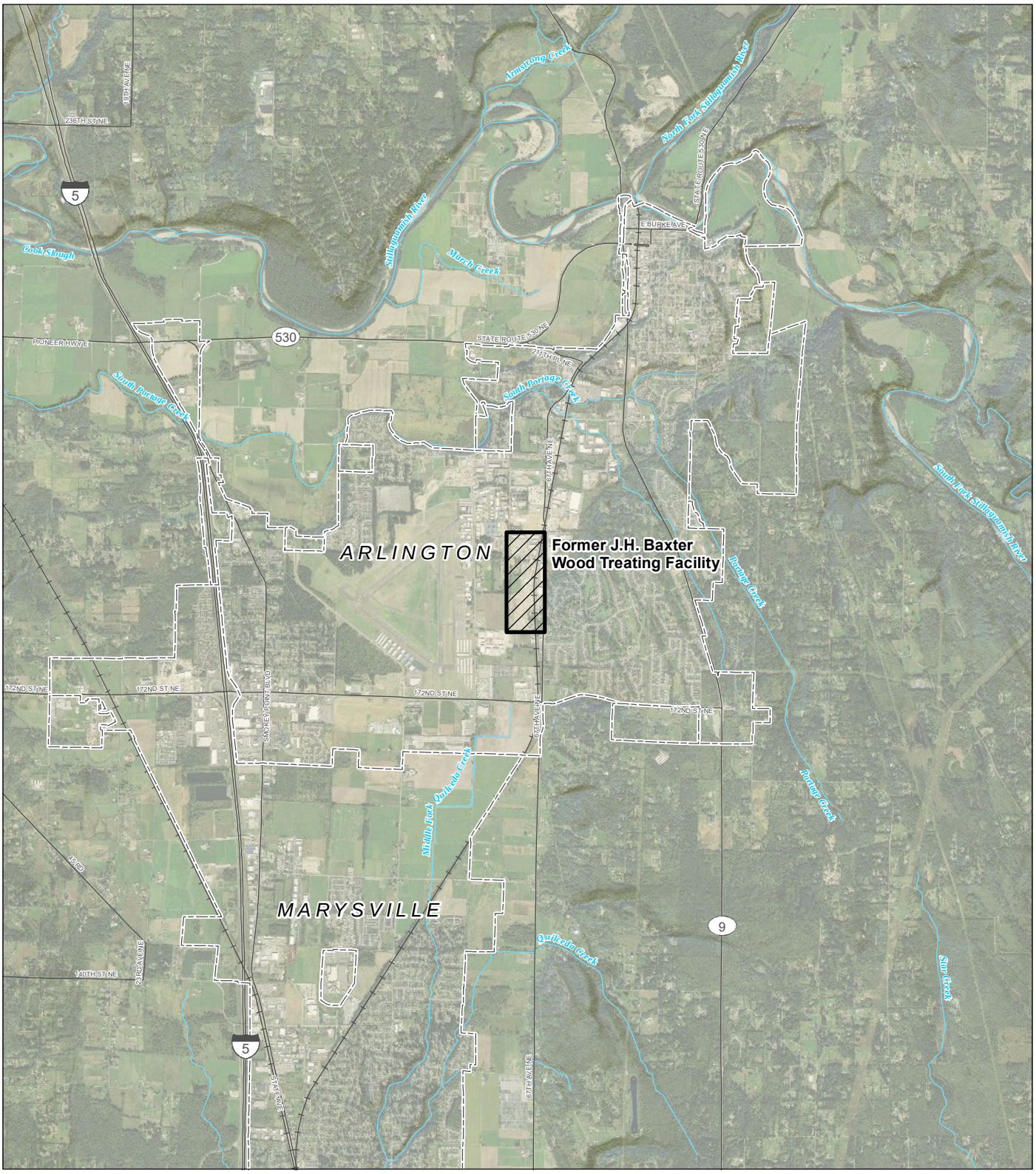
Notes:

LNAPL = light non-aqueous phase liquid

NA = not analyzed.

NC = no change, water level low.

Figures



LEGEND

- Cities
- Railroads
- Major Roads
- Watercourses

MAP NOTES:
Date: July 25, 2016
Data Sources: Air photo taken on September 28, 2015 by the USDA

N

0 0.5 1
Miles

GSI Water Solutions, Inc.

FIGURE 1

Site Vicinity Map

Former J.H. Baxter Wood Treating Facility
Arlington, Washington

Document Path: P:\Portland\302 - Baxter\GIS\Arlington_RCRA\Project_mxds\2016_1H_SA_Report\Figure1_Site_Vicinity_Map.mxd

MW-43
MW-18
MW-42
MW-39
BXS-3
BXS-2
MW-17
HANNER PROPERTY
MW-37
MW-41
MW-31
MW-15
MW-40
MW-16
HCMW-7
MW-14
BXS-1
MW-36
MW-34
MW-29
MW-28
MW-38
MW-30
EW-1
EW-2
EW-4
EW-3
MW-10
MW-22
EW-5
MW-23
MW-3
MW-33
MW-35
MW-2
MW-32
MW-24
EW-6
HCMW-5
MW-25
MW-27
MW-21
MW-20
EW-7
MW-19
MW-12
HCMW-6
MW-26
BXS-4
MW-13
MW-1
HAMPTON LUMBER SUBLEASE AREA
MW-11
MW-4
BNSF RAILROAD
67TH AVE NE
67TH AVE NE
67TH AVE NE
CEDAR DR NE
CEDAR DR NE
CEDAR DR NE
67TH PLACE NE
67TH PLACE NE
67TH PLACE

FIGURE 3

Groundwater Elevation Contour Map: First Quarter 2019

Former J.H. Baxter
Wood Treating Facility
Arlington, Washington

LEGEND

- Groundwater Elevation Contours (dashed where inferred)
- Shallow Monitoring Well (March 2018 Groundwater Elevation)
- Intermediate Monitoring Well (March 2018 Groundwater Elevation)
- Extraction Well
- Infiltration Trench
- Infiltration Gallery Piping

NOTES:

1. All elevations exist in NAVD88.
2. Extraction wells are pumping while water level measurements are collected.
3. Intermediate wells not used for contouring.
4. HCMW-6 was not used for contouring.

N

0 65 130 195
Feet

Date: June 23, 2019
Data Sources: AMEC, ESRI, Digiglobe 2017

GSI Water Solutions, Inc.

Document Path: Y:\0302_Baxter\Source_Figures\Arlington_RCRA\2019_Q1_Report\Figure3_GW_Elev_1Q_2019.mxd

FIGURE 4

Groundwater Elevation Contour Map: Second Quarter 2019

Former J.H. Baxter
Wood Treating Facility
Arlington, Washington

LEGEND

- Groundwater Elevation Contours (dashed where inferred)
- Shallow Monitoring Well (June 2019 Groundwater Elevation)
- Intermediate Monitoring Well (June 2019 Groundwater Elevation)
- Extraction Well
- Infiltration Trench
- Infiltration Gallery Piping

NOTES:

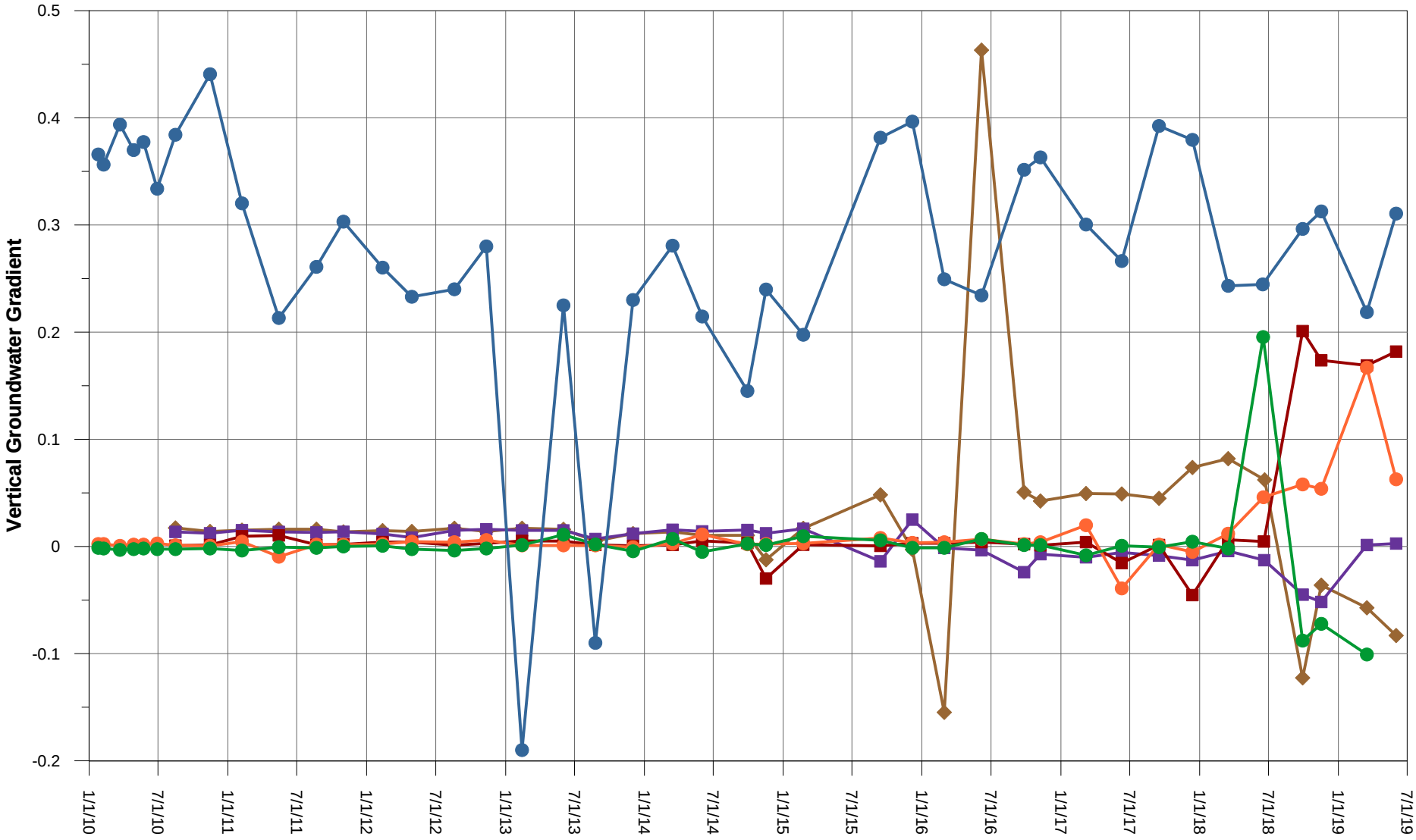
1. All elevations exist in NAVD88.
2. Extraction wells are pumping while water level measurements are collected.
3. Intermediate wells not used for contouring.
4. HCMW-6 was not used for contouring.
3. Abbreviations:
   NM Not Measured

0 65 130 195
Feet

Date: July 18, 2019
Data Sources: AMEC, ESRI, Digiglobe 2017

GSI Water Solutions, Inc.

Document Path: Y:\0302_Baxter\Source_Figures\Arlington_RCRA\2019_1H_SA_Report\Figure4_GW_Elev_2Q_2019.mxd



Legend:

- MW-25/MW-32, Shallow to Intermediate Zone
- MW-3/MW-33, Shallow to Intermediate Zone
- MW-29/MW-34, Shallow to Intermediate Zone
- MW-29/MW-38, Shallow to Deep Zone
- MW-15/MW-40, Shallow to Deep Zone
- MW-37/MW-41, Intermediate to Deep Zone

Notes:

Vertical groundwater gradients are dimensionless.
Positive values indicate a downward flow direction, while negative values indicate an upward flow direction.
In the vicinity of MW-25 and MW-32, a silt layer is approximately 20' below ground surface, and could account for larger vertical gradient.
1Q 2013 and 3Q 2013, the MW-25/MW-32 vertical gradient shifted from a downward gradient to upward gradient. The associated O&M reports cited numerous high level alarm errors during the 1Q 2013 period that shut the extraction system down, and possible human error as reasons for the change.
Suspect measurement at MW-37 in 2Q 2016.
Suspect measurement at MW-3/MW-33 in 2Q 2018.

FIGURE 5
Vertical Groundwater Gradient Trends
Former J.H. Baxter Wood Treating Facility
Arlington, Washington

GSI Water Solutions, Inc.

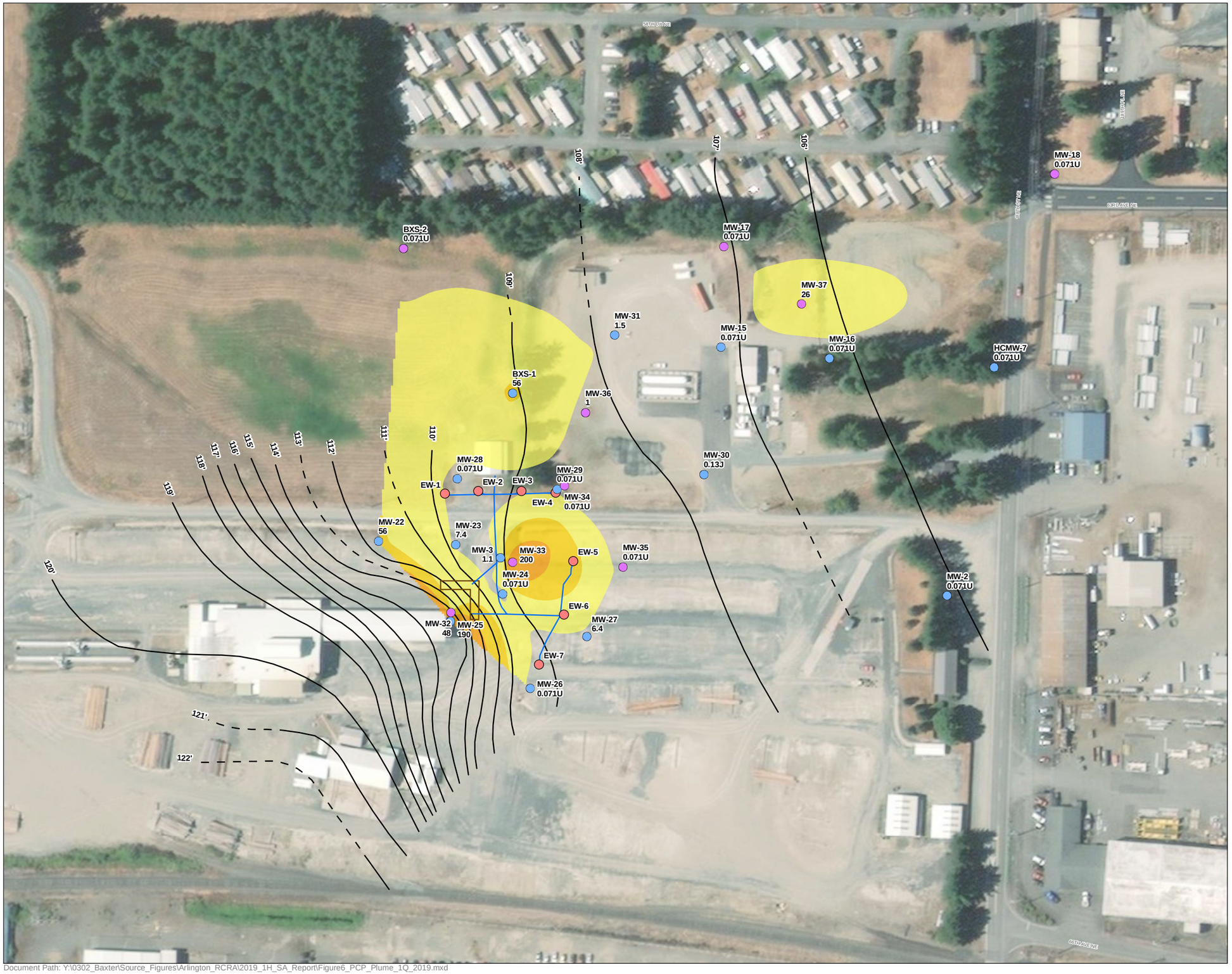


FIGURE 6

Pentachlorophenol Isopleth Map: First Quarter 2019

Former J.H. Baxter
Wood Treating Facility
Arlington, Washington

LEGEND

- Shallow Monitoring Well and Pentachlorophenol (PCP) Concentration (µg/L)
- Intermediate Monitoring Well and Pentachlorophenol (PCP) Concentration (µg/L)

PCP Concentrations (µg/L)

- >500
- 300-500
- 100-300
- 50-100
- 10-50

All Other Features

- Extraction Well
- Infiltration Gallery Piping
- Infiltration Trench
- Groundwater Elevation Contours (dashed where inferred)

NOTES:

1. Results in µg/L.
2. All elevations exist in the North American Vertical Datum of 1988.
3. Abbreviations:
   NA Not Analyzed

N

0 65 130 195
Feet

Date: July 18, 2019
Data Sources: AMEC, ESRI, Digiglobe 2017

GSI Water Solutions, Inc.

Document Path: Y:\0302_Baxter\Source_Figures\Arlington_RCRA\2019_1H_SA_Report\Figure6_PCP_Plume_1Q_2019.mxd

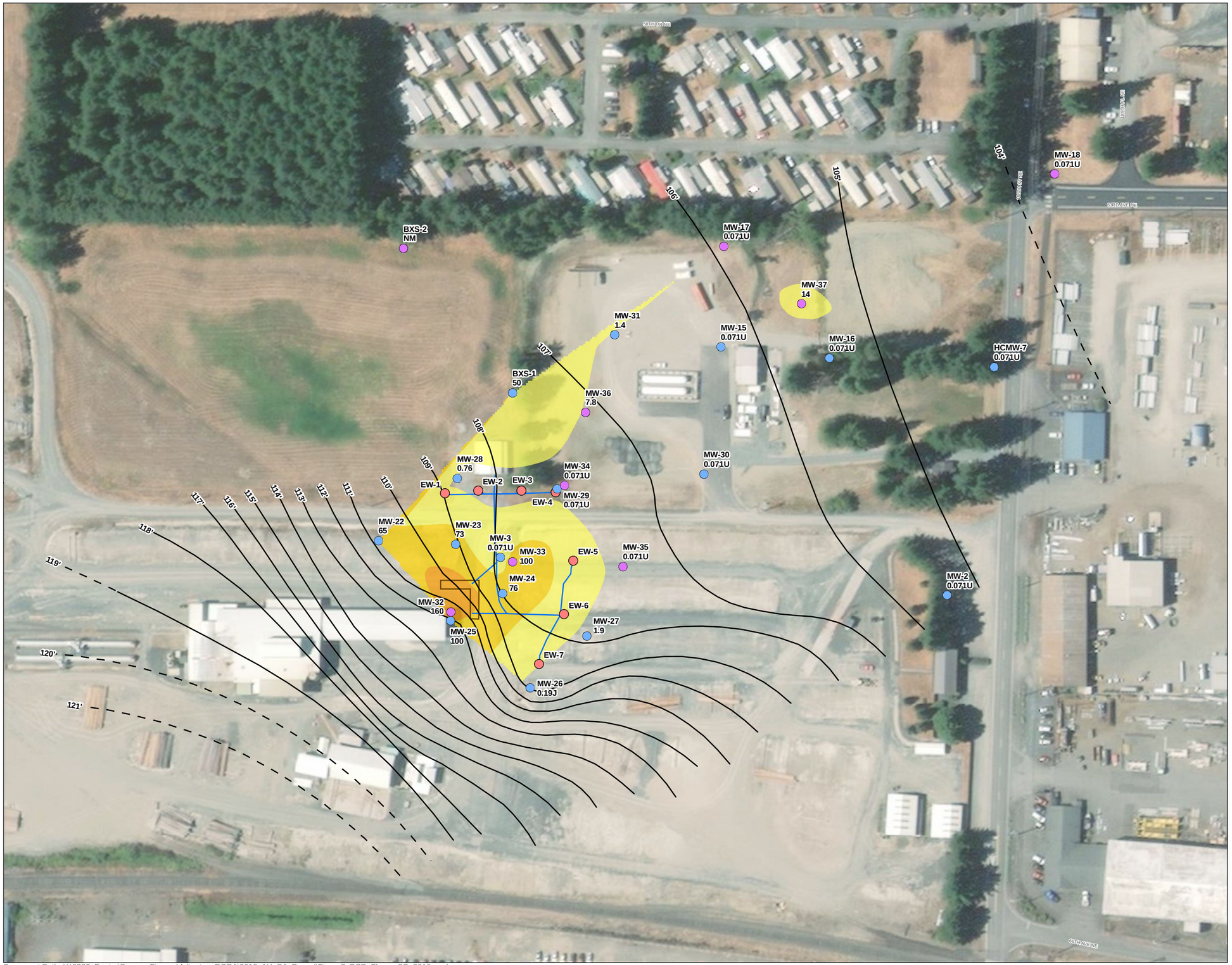


FIGURE 7

Pentachlorophenol Isopleth Map: Second Quarter 2019

Former J.H. Baxter
Wood Treating Facility
Arlington, Washington

LEGEND

- Shallow Monitoring Well and Pentachlorophenol (PCP) Concentration (µg/L)
- Intermediate Monitoring Well and Pentachlorophenol (PCP) Concentration (µg/L)

PCP Concentrations (µg/L)

- >500
- 300-500
- 100-300
- 50-100
- 10-50

All Other Features

- Extraction Well
- Infiltration Gallery Piping
- Infiltration Trench
- Groundwater Elevation Contours (dashed where inferred)

NOTES:

1. Results in µg/L.
2. All elevations exist in the North American Vertical Datum of 1988.
3. Abbreviations:
   NA Not Analyzed
   NM Not Measured

N

0 65 130 195
Feet

Date: July 18, 2019
Data Sources: AMEC, ESRI, Digiglobe 2017

GSI Water Solutions, Inc.

Document Path: Y:\0302_Baxter\Source_Figures\Arlington_RCRA\2019_1H_SA_Report\Figure7_PCP_Plume_2Q_2019.mxd

FIGURE 8

Pentachlorophenol Isopleth Map, Deep Zone: First Quarter 2019

Former J.H. Baxter
Wood Treating Facility
Arlington, Washington

LEGEND

Deep Monitoring Well and Pentachlorophenol (PCP) Concentration (µg/L)

PCP Concentrations (µg/L)

- >500
- 300-500
- 100-300
- 50-100
- 10-50

All Other Features

- Extraction Well
- Infiltration Gallery Piping
- Infiltration Trench

NOTES:

1. Results in µg/L.
2. All elevations exist in the North American Vertical Datum of 1988.
3. Abbreviations:
   NA Not Analyzed

N

0 65 130 195
Feet

Date: July 18, 2019
Data Sources: AMEC, ESRI, Digiglobe 2017

GSI Water Solutions, Inc.

Document Path: Y:\0302_Baxter\Source_Figures\Arlington_RCRA\2019_1H_SA_Report\Figure8_PCP_Plume_1Q_2019_Deep.mxd

FIGURE 9

Pentachlorophenol Isopleth Map, Deep Zone: Second Quarter 2019

Former J.H. Baxter
Wood Treating Facility
Arlington, Washington

LEGEND

Deep Monitoring Well and Pentachlorophenol (PCP) Concentration (µg/L)

PCP Concentrations (µg/L)

- >500
- 300-500
- 100-300
- 50-100
- 10-50

All Other Features

- Extraction Well
- Infiltration Gallery Piping
- Infiltration Trench

NOTES:

1. Results in µg/L.
2. All elevations exist in the North American Vertical Datum of 1988.
3. Abbreviations:
   NA Not Analyzed

N

0 65 130 195
Feet

Date: July 18, 2019
Data Sources: AMEC, ESRI, Digiglobe 2017

GSI Water Solutions, Inc.

Document Path: Y:\0302_Baxter\Source_Figures\Arlington_RCRA\2019_1H_SA_Report\Figure9_PCP_Plume_2Q_2019_Deep.mxd

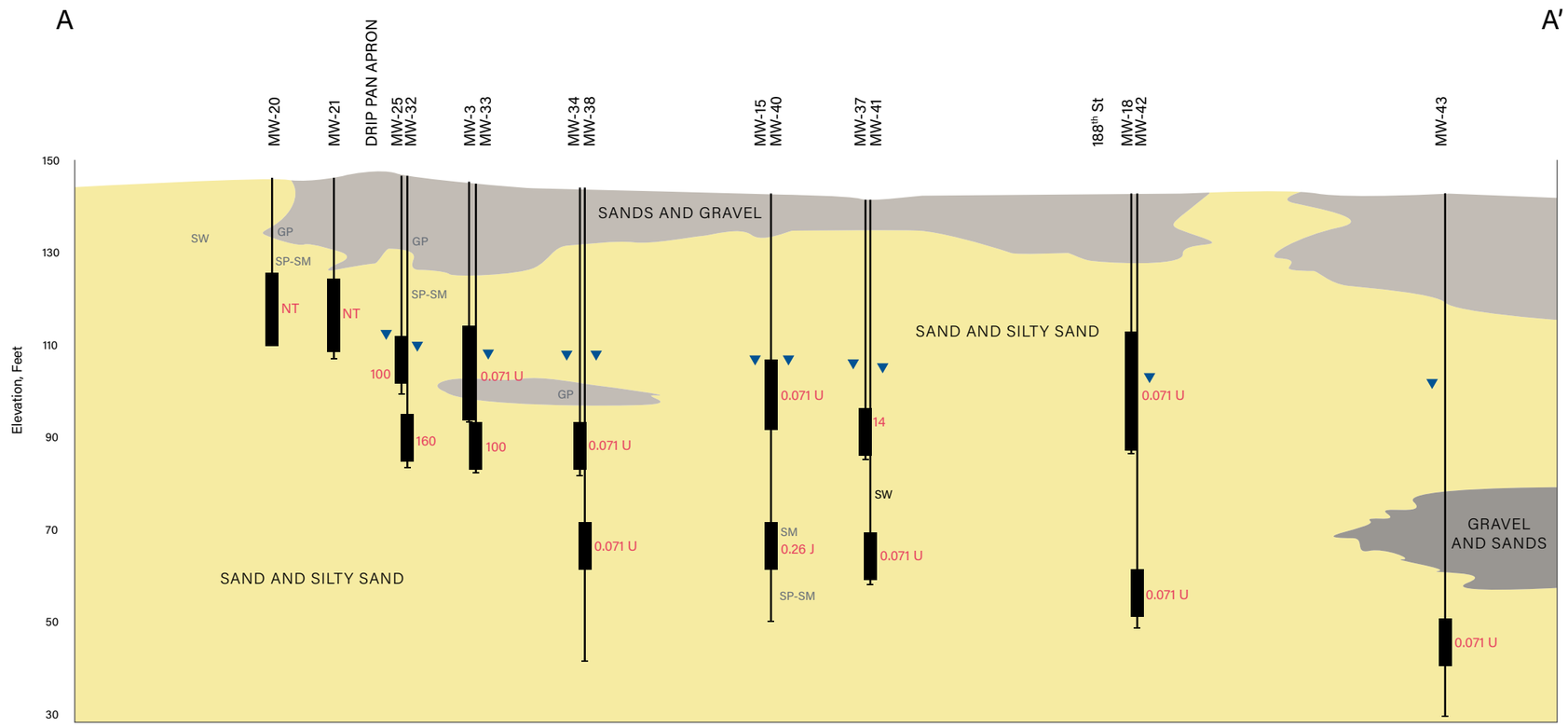


FIGURE 10

Cross Section A-A'
Pentachlorophenol in Groundwater
Second Quarter 2019

Former J.H. Baxter
Wood Treating Facility
Arlington, Washington

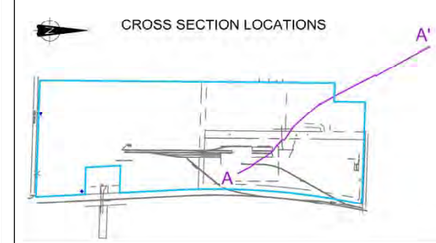
LEGEND

- 340 — Pentachlorophenol (PCP) Concentration in ug/L
- Approximate Water Level in June 2019
- Monitoring Well Cluster, Identifier, and Screen Interval
- Sands and Gravel
- Gravel and Sands
- Sand and Silty Sand

NOTES:

GP:	Poorly Graded Gravel
ND:	Not Detected
NT:	Not Tested
SM:	Silty Sand
SP-SM:	Poorly Graded Sand with Silt
SW:	Well Graded Sand

CROSS SECTION LOCATIONS



N

0 112.5 225 337.5
Feet

MAP NOTES:
Data Sources: Amec, Figure 39, July 17, 2019

GSI Water Solutions, Inc.

Y:\0302_Baxter\Source_Figures\Arlington_RCRA\2019_1H_SA_Report

FIGURE 11

Total PAHs in Groundwater: First and Second Quarter 2019

Former J.H. Baxter
Wood Treating Facility
Arlington, Washington

LEGEND

- Shallow Monitoring Well
- Intermediate Monitoring Well

NOTES:

1. Results in µg/L (microgram per liter)
2. Abbreviations:
   - ND Not-Detected
   - NA Not Analyzed
   - J Estimated Value

N

0 65 130 195
Feet

Date: July 17, 2019
Data Sources: AMEC, ESRI, Air photo taken on May 2, 2015 by Google Earth

GSI Water Solutions, Inc.

Document Path: Y:\0302_Baxter\Source_Figures\Arlington_RCRA\2019_1H_SA_Report\Figure11_Total_PAHs_in_GW_Q1_Q2.mxd

Appendix A

FIGURE A-1

Cross Section Location Map

Former J.H. Baxter Wood Treating Facility
Arlington, Washington

LEGEND

- Cross Section Lines
- Monitoring Well
- Recovery Well
- Extraction Well
- Infiltration Trench

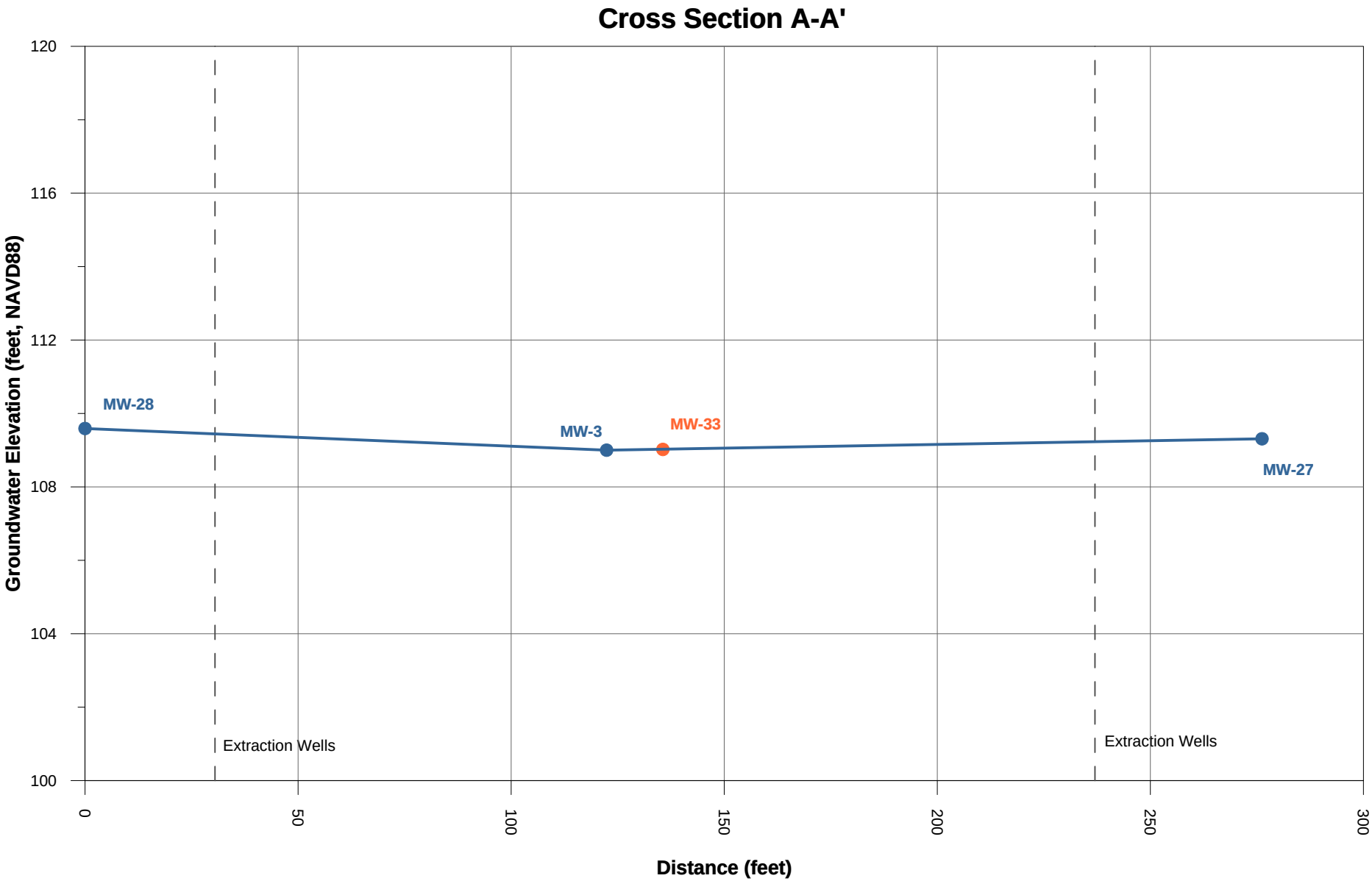
N

0 150 300 450
Feet

MAP NOTES:
Date: March 12, 2015
Data Sources: AMEC, ESRI, Air photo taken on July 9, 2010 by Microsoft

GSI Water Solutions, Inc.

Document Path: P:\Portland\302 - Baxter\GIS\Arlington_RCRA\Project_mxds\2014_Q4_Report\FigureA-1_Cross_Section_Location_Map.mxd

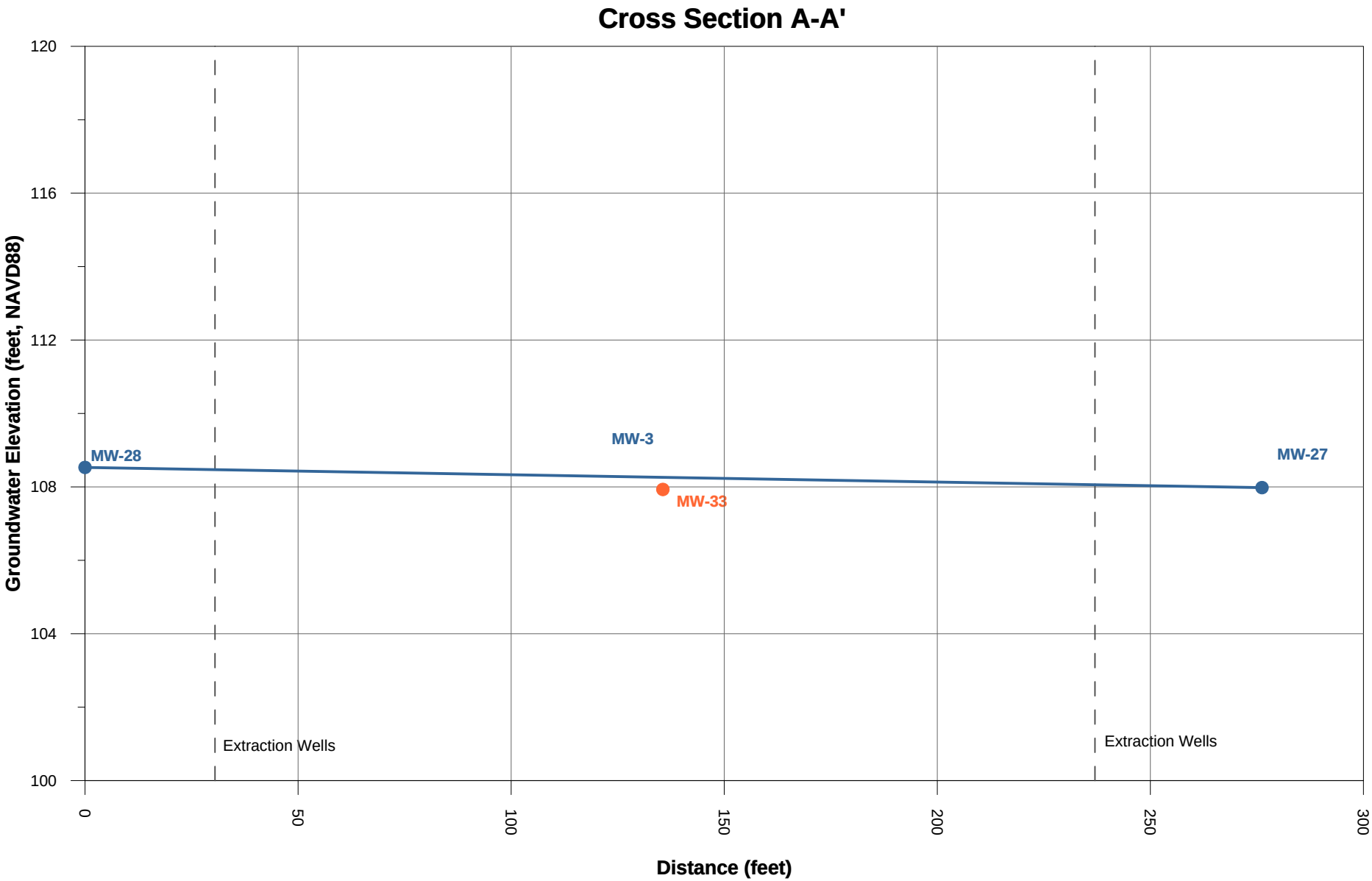


Legend:

- Shallow Well Groundwater Elevation
- Intermediate Well Groundwater Elevation

FIGURE A-2
First Quarter 2019 Groundwater Elevation
Cross Section A-A'
Former J.H. Baxter Wood Treating Facility
Arlington, Washington

GSI Water Solutions, Inc.

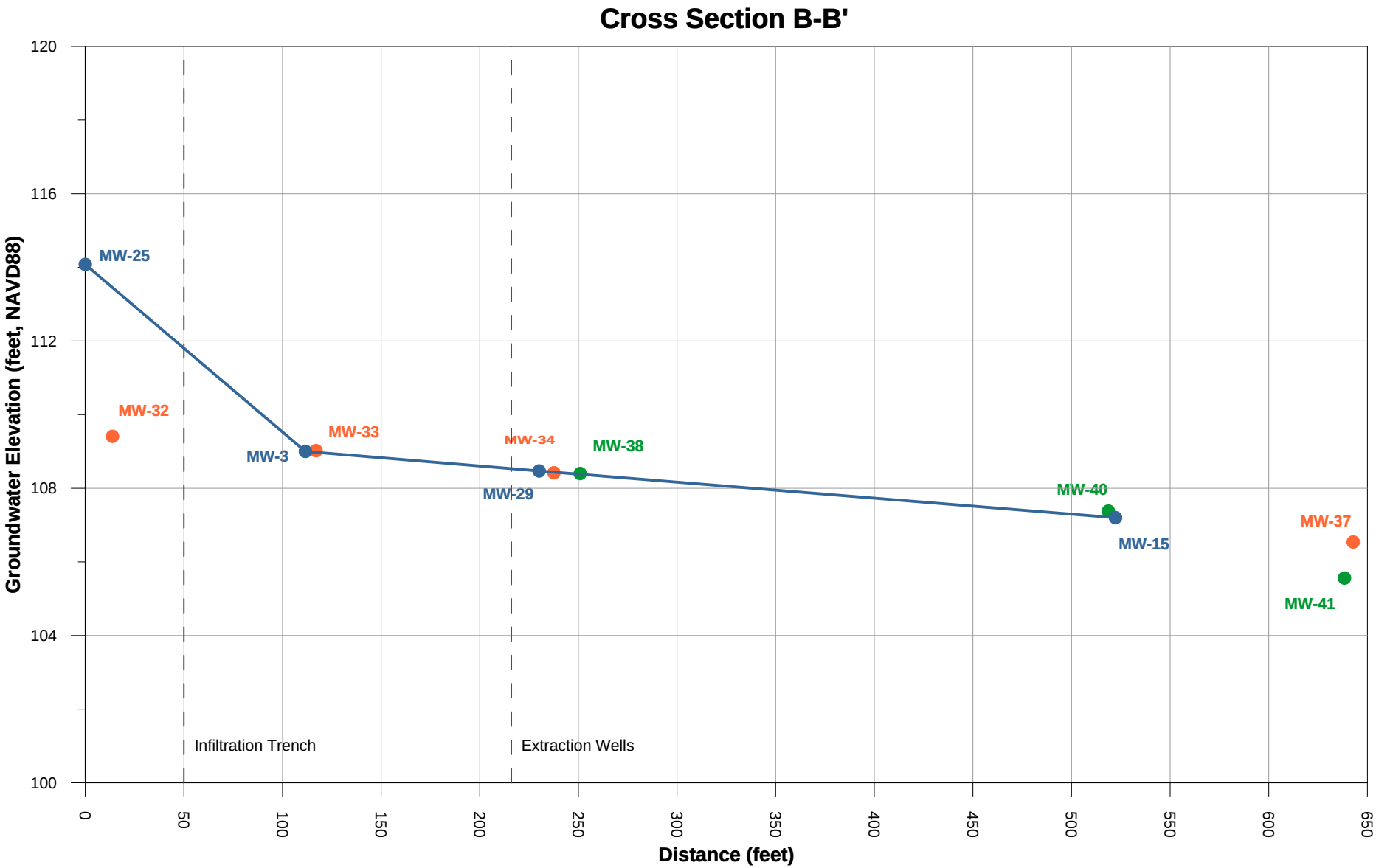


Legend:

- Shallow Well Groundwater Elevation
- Intermediate Well Groundwater Elevation

FIGURE A-3
Second Quarter 2019 Groundwater Elevation
Cross Section A-A'
Former J.H. Baxter Wood Treating Facility
Arlington, Washington

GSI Water Solutions, Inc.



Legend:

- Shallow Well Groundwater Elevation
- Intermediate Well Groundwater Elevation
- Deep Well Groundwater Elevation

Notes:

In vicinity of MW-25 and MW-32, a silt layer is approximately 20' below ground surface; could account for larger differences in groundwater elevation in well pair.

FIGURE A-4

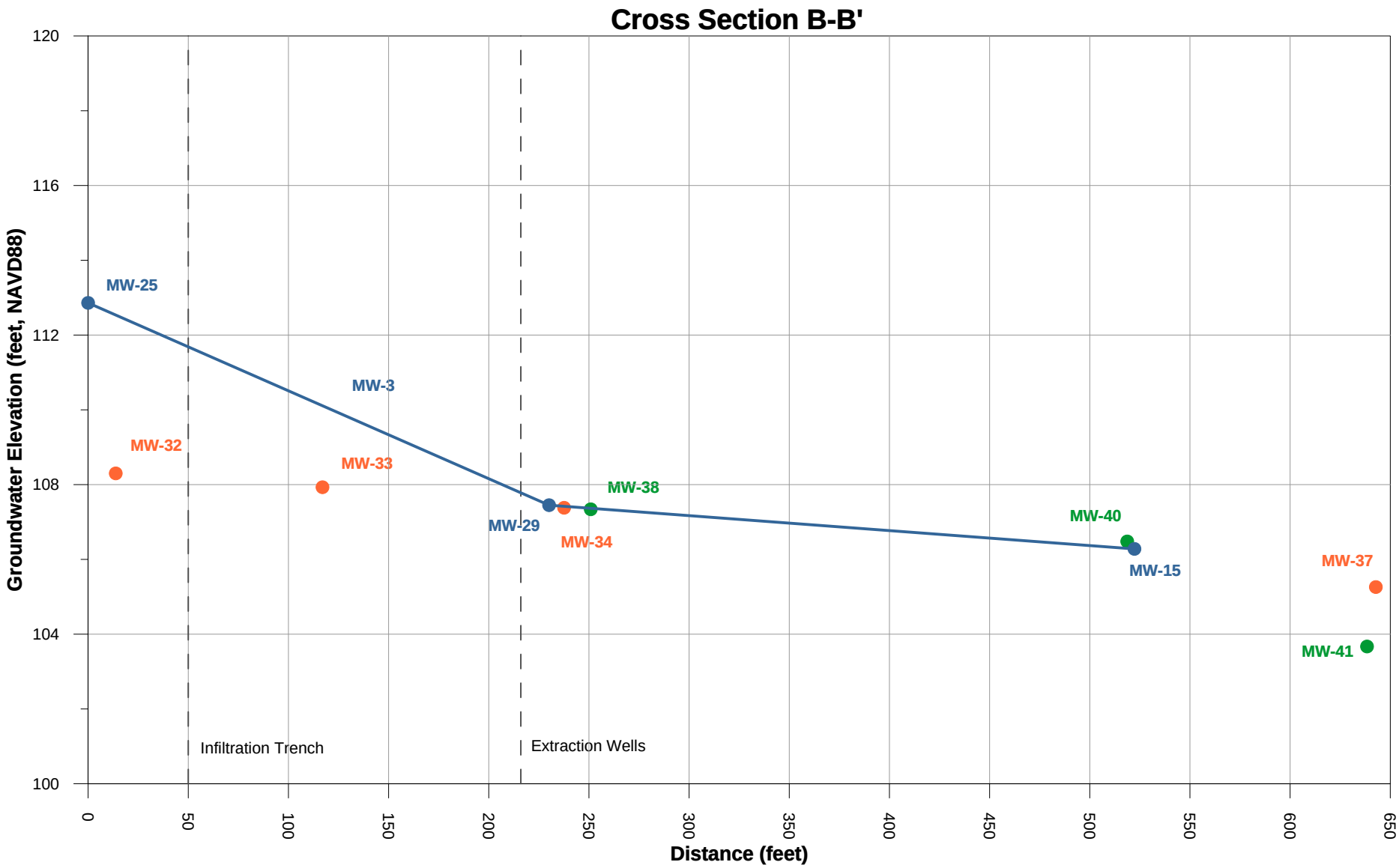
First Quarter 2019 Groundwater Elevation

Cross Section B-B'

Former J.H. Baxter Wood Treating Facility

Arlington, Washington

GSI Water Solutions, Inc.



Legend:

- Shallow Well Groundwater Elevation
- Intermediate Well Groundwater Elevation
- Deep Well Groundwater Elevation

Notes:

In vicinity of MW-25 and MW-32, a silt layer is approximately 20' below ground surface; could account for larger differences in groundwater elevation in well pair.

FIGURE A-5

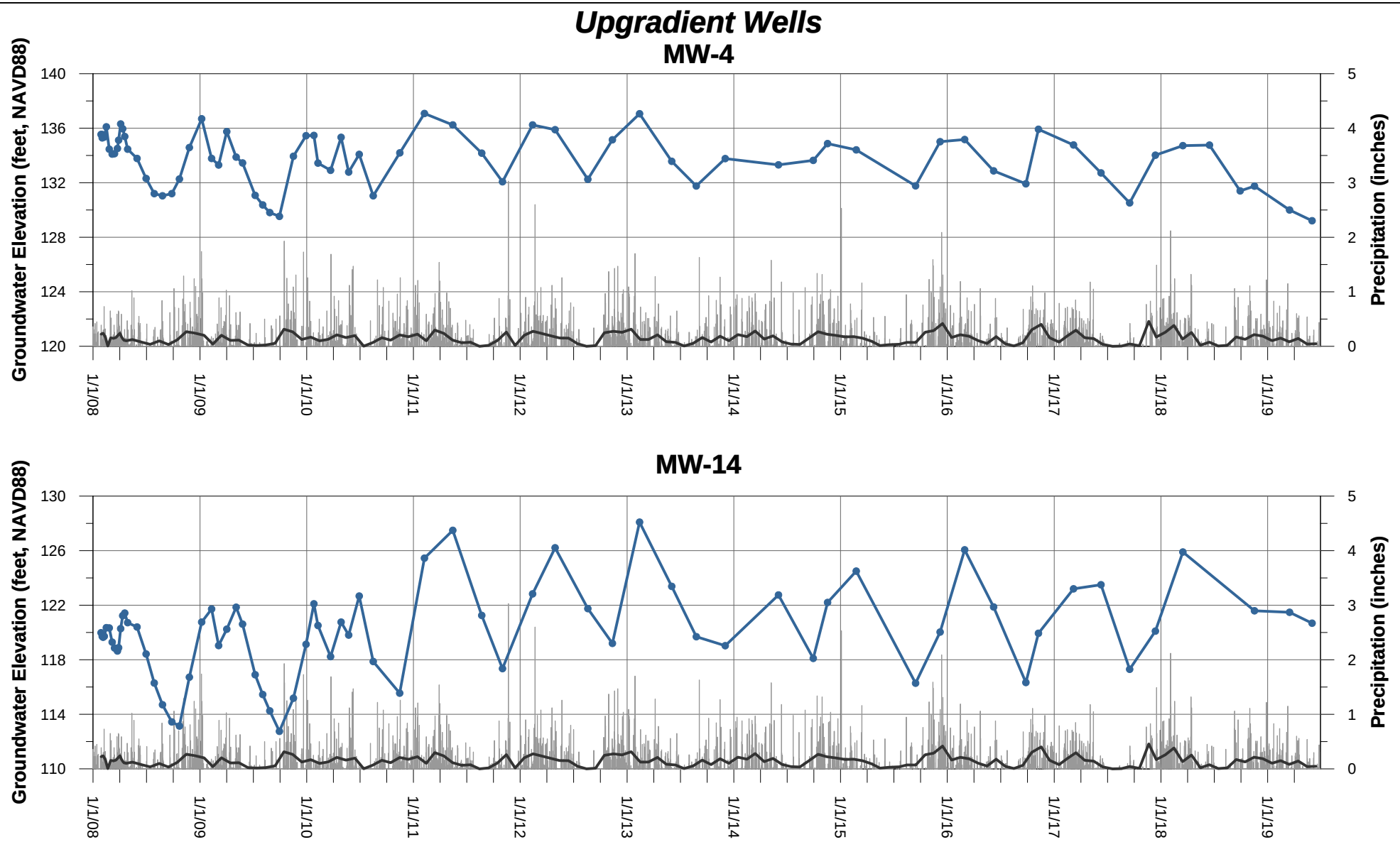
Second Quarter 2019 Groundwater Elevation

Cross Section B-B'

Former J.H. Baxter Wood Treating Facility

Arlington, Washington

GSI Water Solutions, Inc.



Legend:

- Daily Precipitation
- Average Monthly Precipitation

FIGURE A-6

MW-4 and MW-14 Hydrographs with Precipitation

Former J.H. Baxter Wood Treating Facility

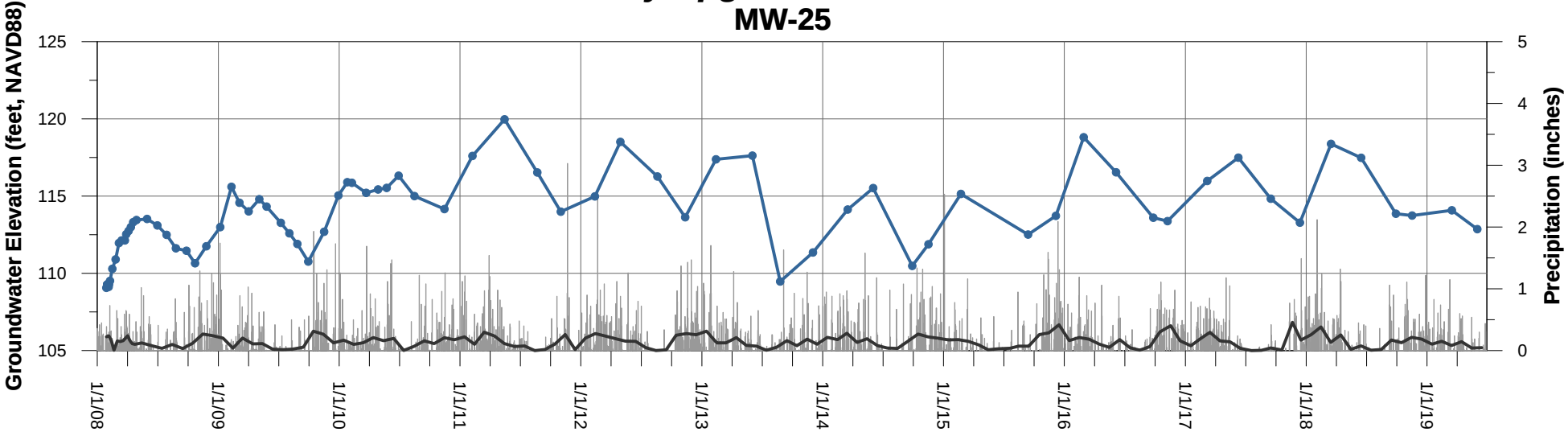
Arlington, Washington

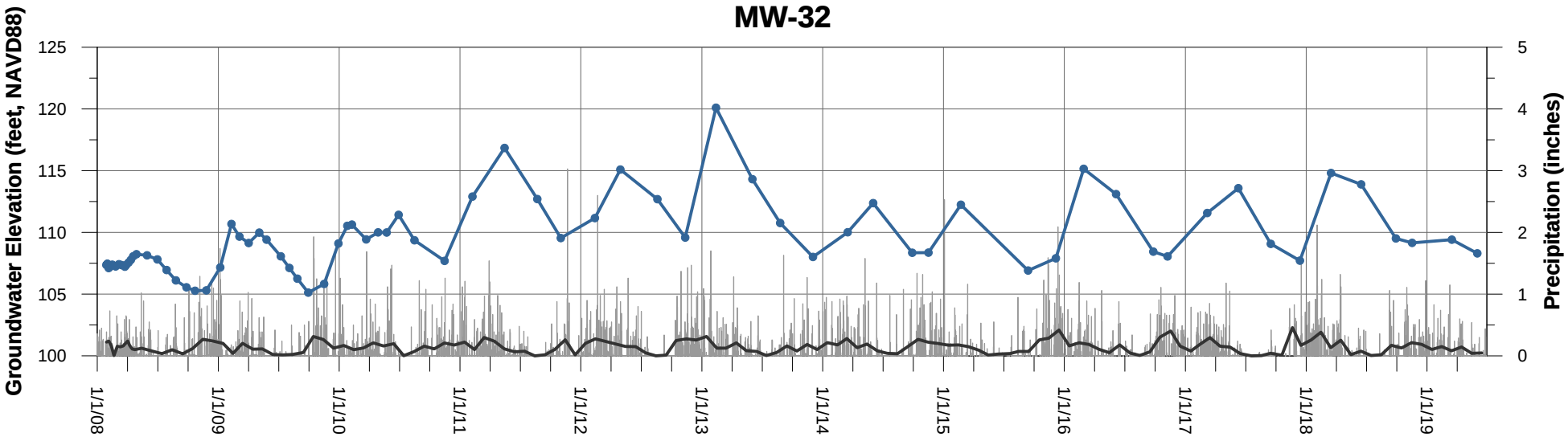
Notes:

Precipitation data source is the National Climatic Data Center (NCDC) Arlington, Washington Station 450257.
Precipitation includes rain and/or snow melt.

GSI Water Solutions, Inc.

Wells Immediately Upgradient of Infiltration Trench





Legend:

- Groundwater Elevation
- Daily Precipitation
- Average Monthly Precipitation

FIGURE A-7

MW-25 and MW-32 Hydrographs with Precipitation

Former J.H. Baxter Wood Treating Facility

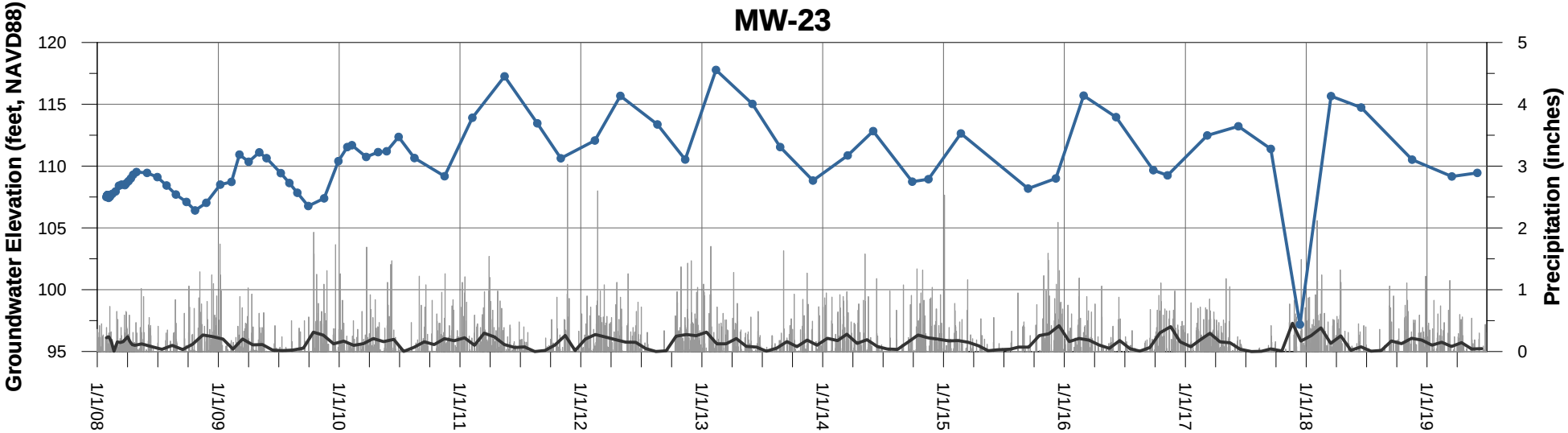
Arlington, Washington

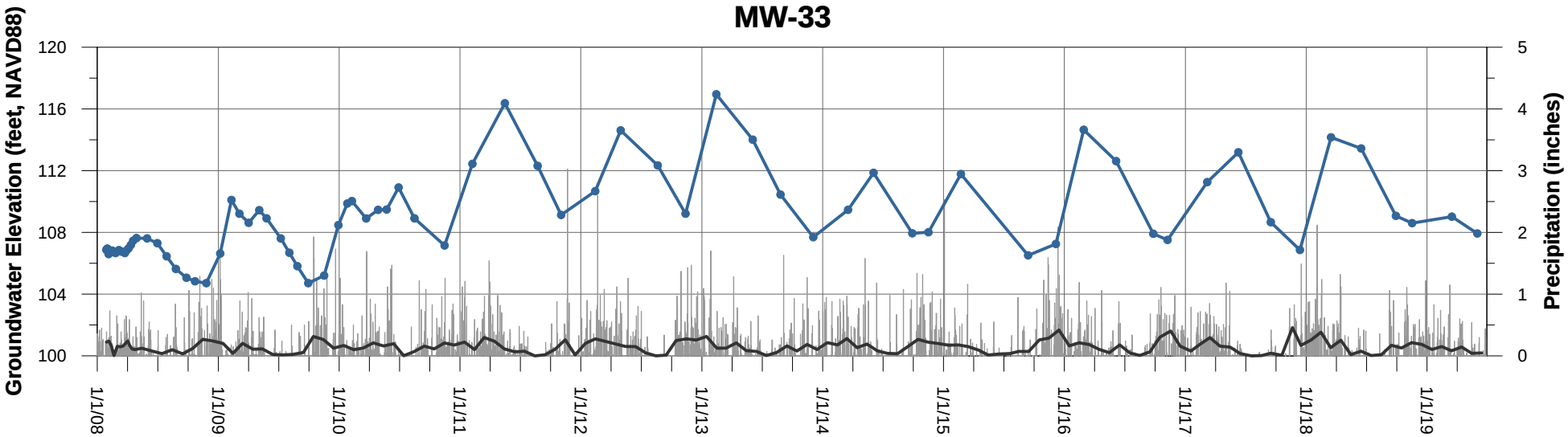
Notes:

Precipitation data source is the National Climatic Data Center (NCDC) Arlington, Washington Station 450257.
Precipitation includes rain and/or snow melt.

GSI Water Solutions, Inc.

Wells Between Infiltration Trench and Extraction Wells





Legend:

- Groundwater Elevation
- Daily Precipitation
- Average Monthly Precipitation

FIGURE A-8

MW-23 and MW-33 Hydrographs with Precipitation

Former J.H. Baxter Wood Treating Facility

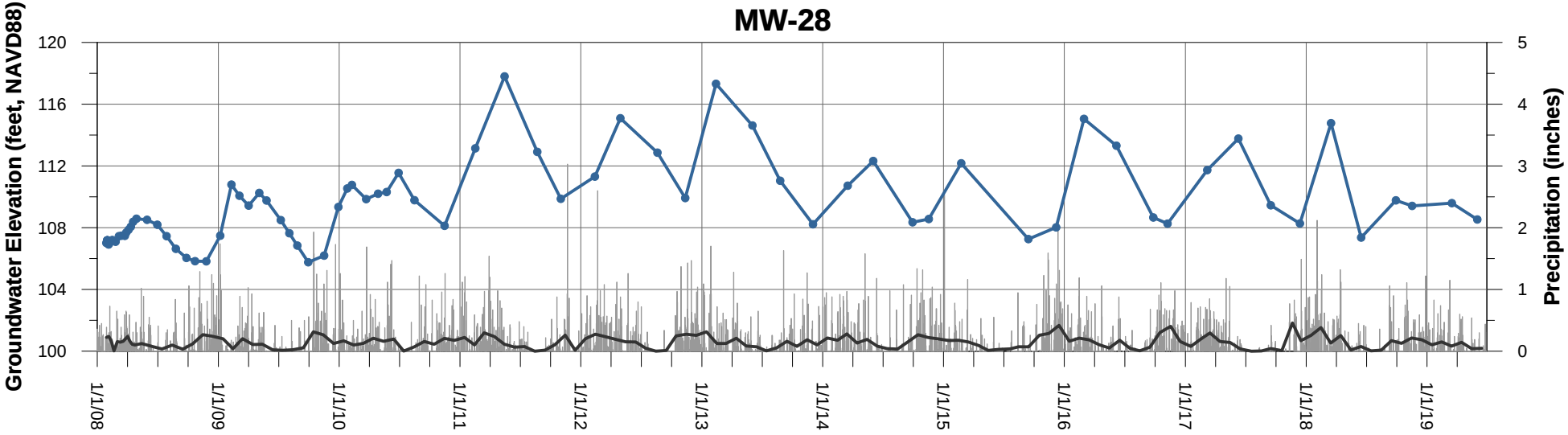
Arlington, Washington

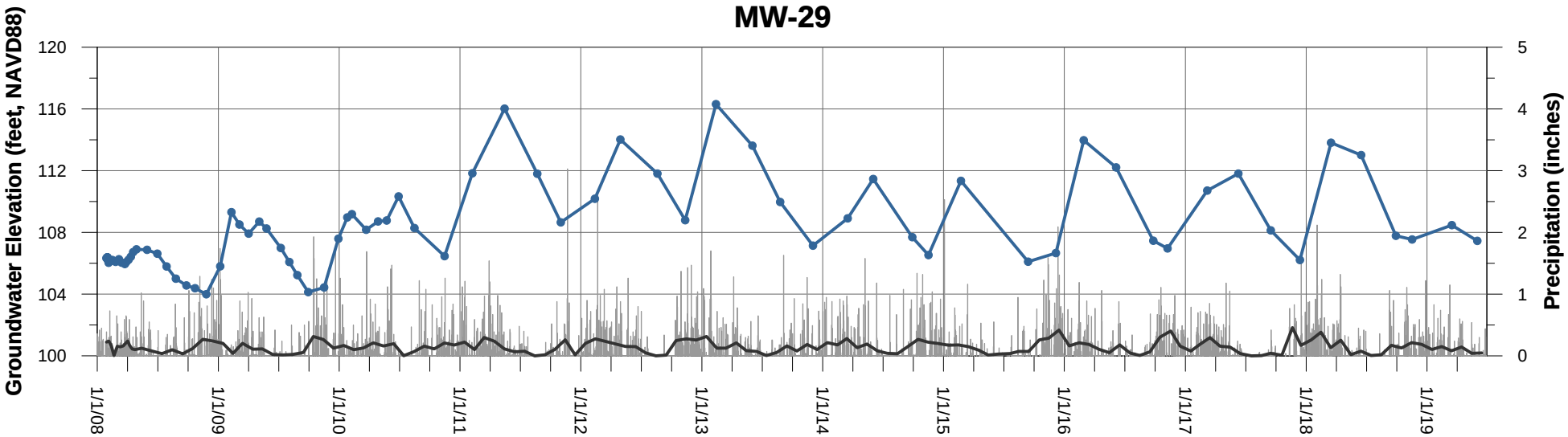
Notes:

Precipitation data source is the National Climatic Data Center (NCDC) Arlington, Washington Station 450257.
Precipitation includes rain and/or snow melt.

GSI Water Solutions, Inc.

Wells Located Near Extraction Wells





Legend:

- Groundwater Elevation
- Daily Precipitation
- Average Monthly Precipitation

FIGURE A-9

MW-28 and MW-29 Hydrographs with Precipitation

Former J.H. Baxter Wood Treating Facility

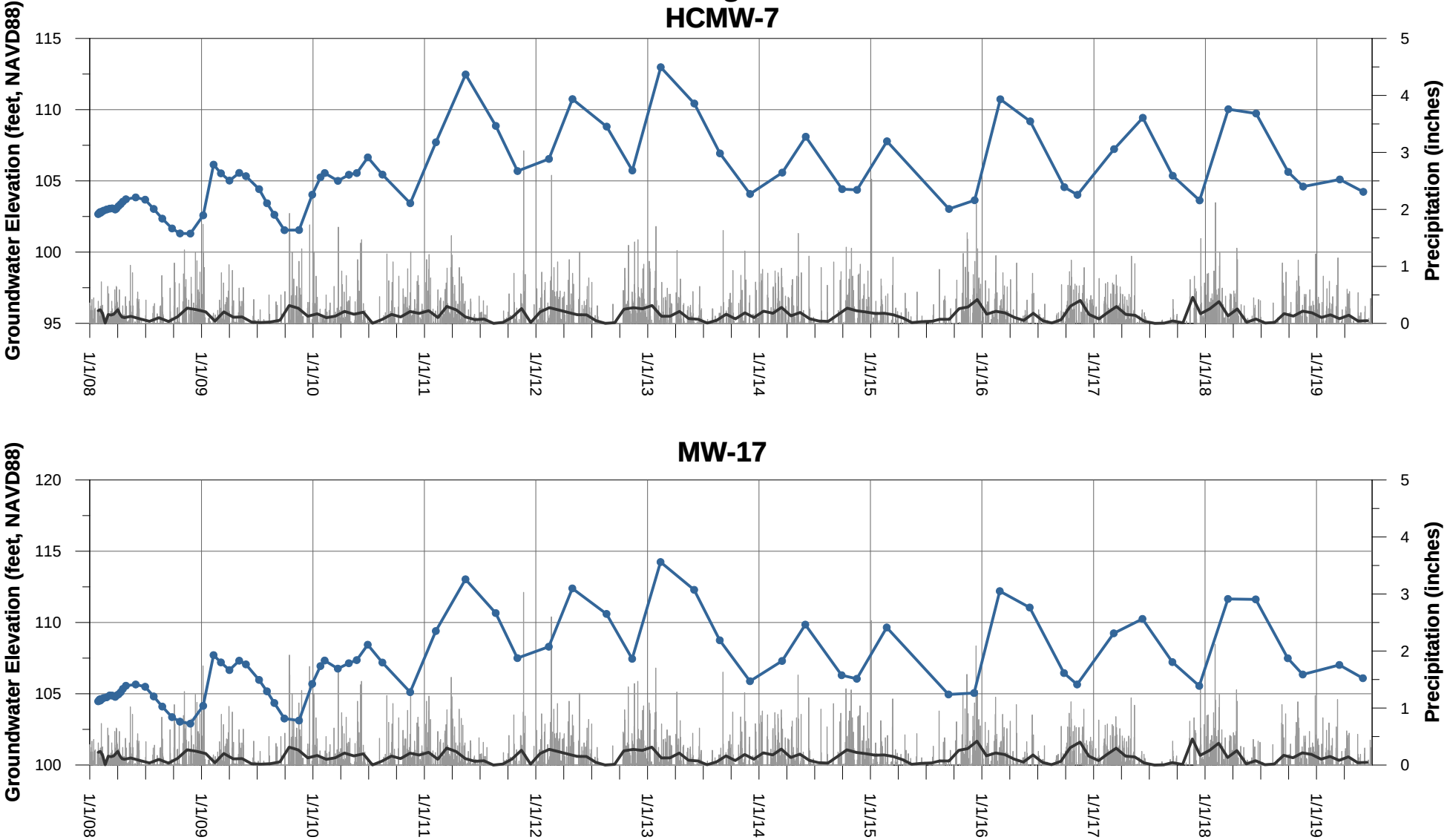
Arlington, Washington

Notes:

Precipitation data source is the National Climatic Data Center (NCDC) Arlington, Washington Station 450257.
Precipitation includes rain and/or snow melt.

GSI Water Solutions, Inc.

Wells Located Near-field Downgradient from Extraction Wells



Legend:

- Groundwater Elevation
- Daily Precipitation
- Average Monthly Precipitation

FIGURE A-10

HCMW-7 and MW-17 Hydrographs with Precipitation

Former J.H. Baxter Wood Treating Facility

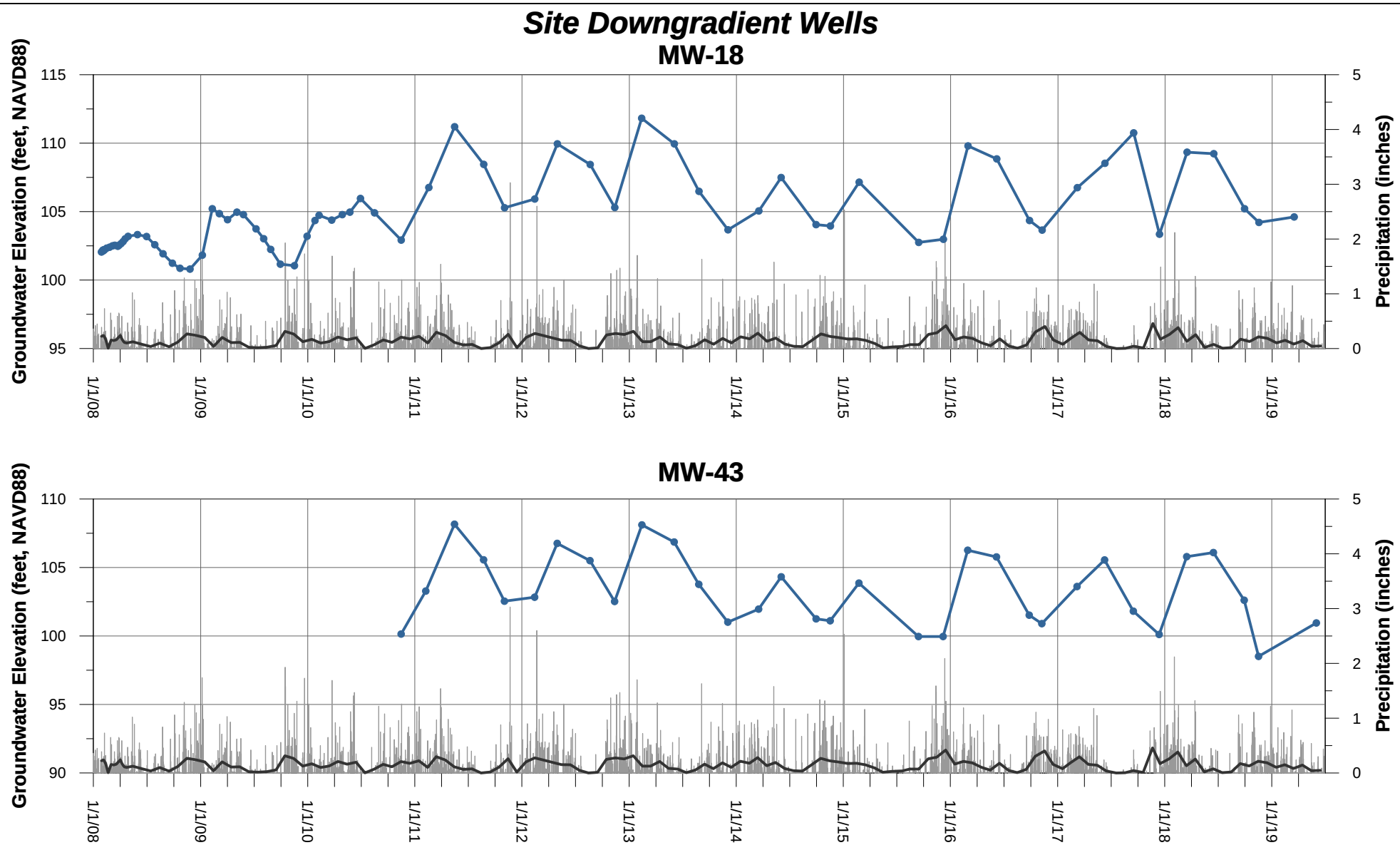
Arlington, Washington

Notes:

Precipitation data source is the National Climatic Data Center (NCDC) Arlington, Washington Station 450257.

Precipitation includes rain and/or snow melt.

GSI Water Solutions, Inc.



Legend:

- Groundwater Elevation
- Daily Precipitation
- Average Monthly Precipitation

FIGURE A-11

MW-18 and MW-43 Hydrographs with Precipitation

Former J.H. Baxter Wood Treating Facility

Arlington, Washington

Notes:

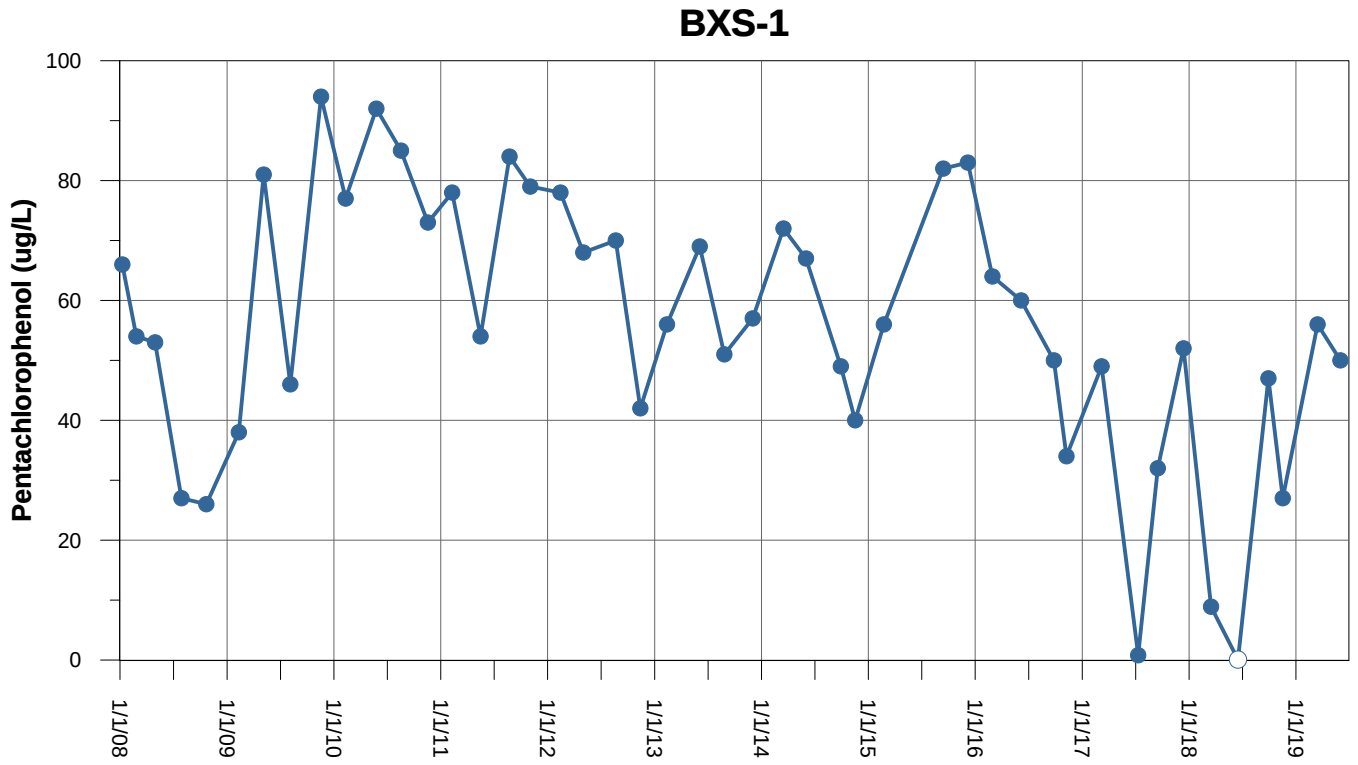
Precipitation data source is the National Climatic Data Center (NCDC) Arlington, Washington Station 450257.
Precipitation includes rain and/or snow melt.

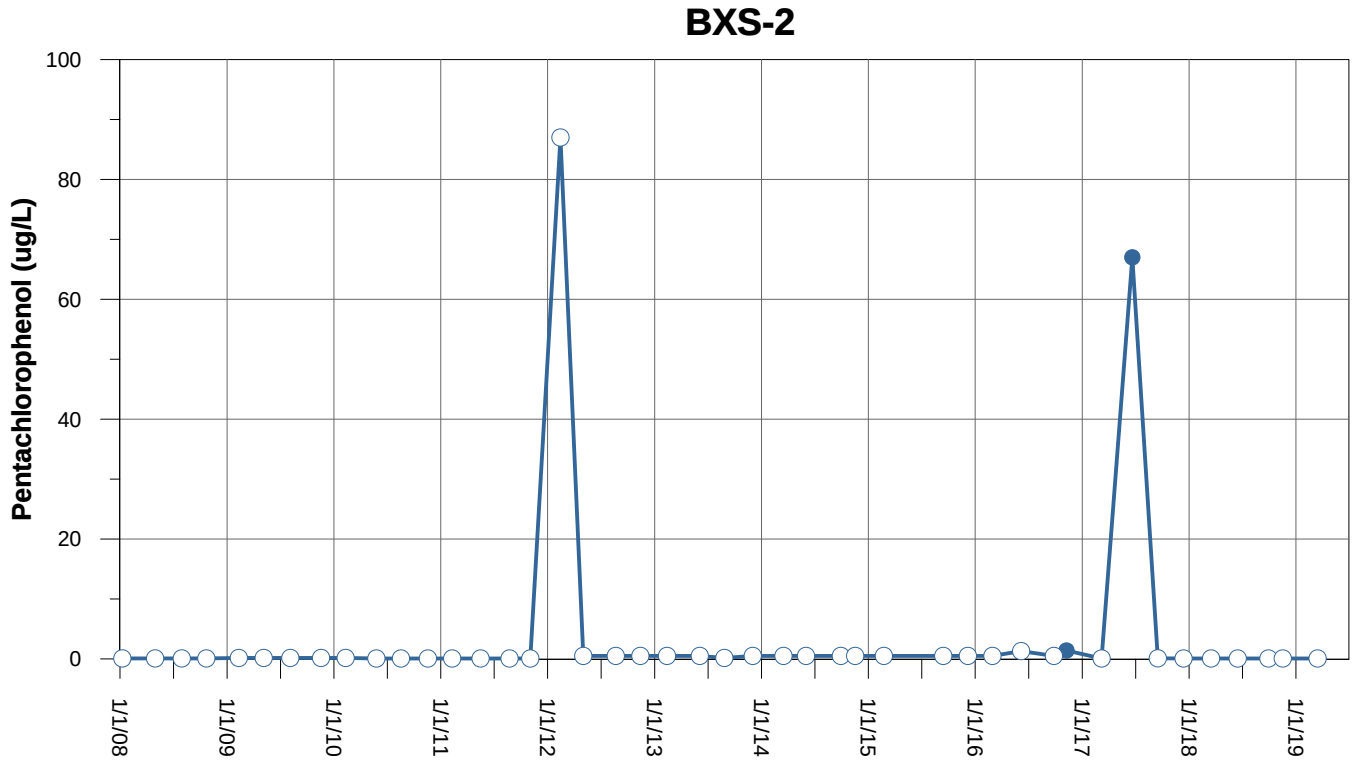
GSI Water Solutions, Inc.

Appendix B

(provided on CD only)

Appendix C





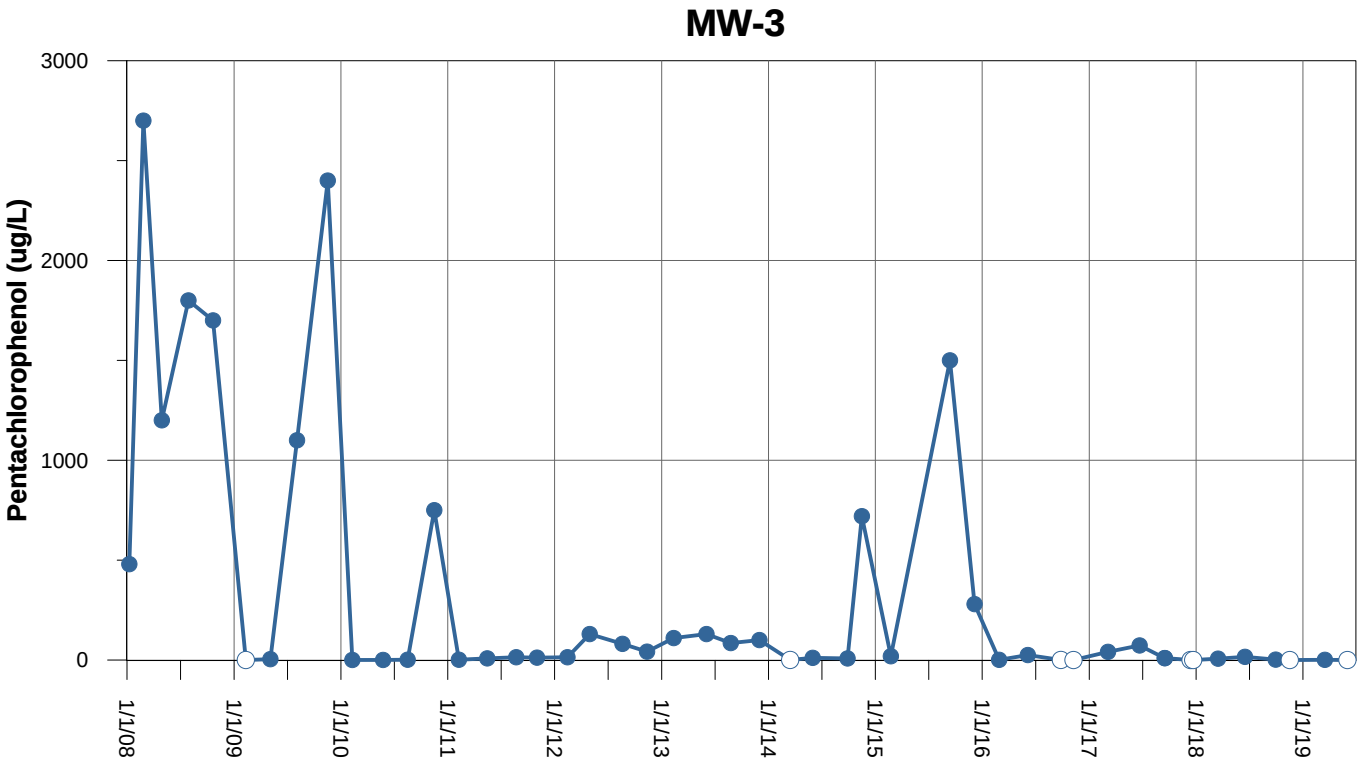
Legend:

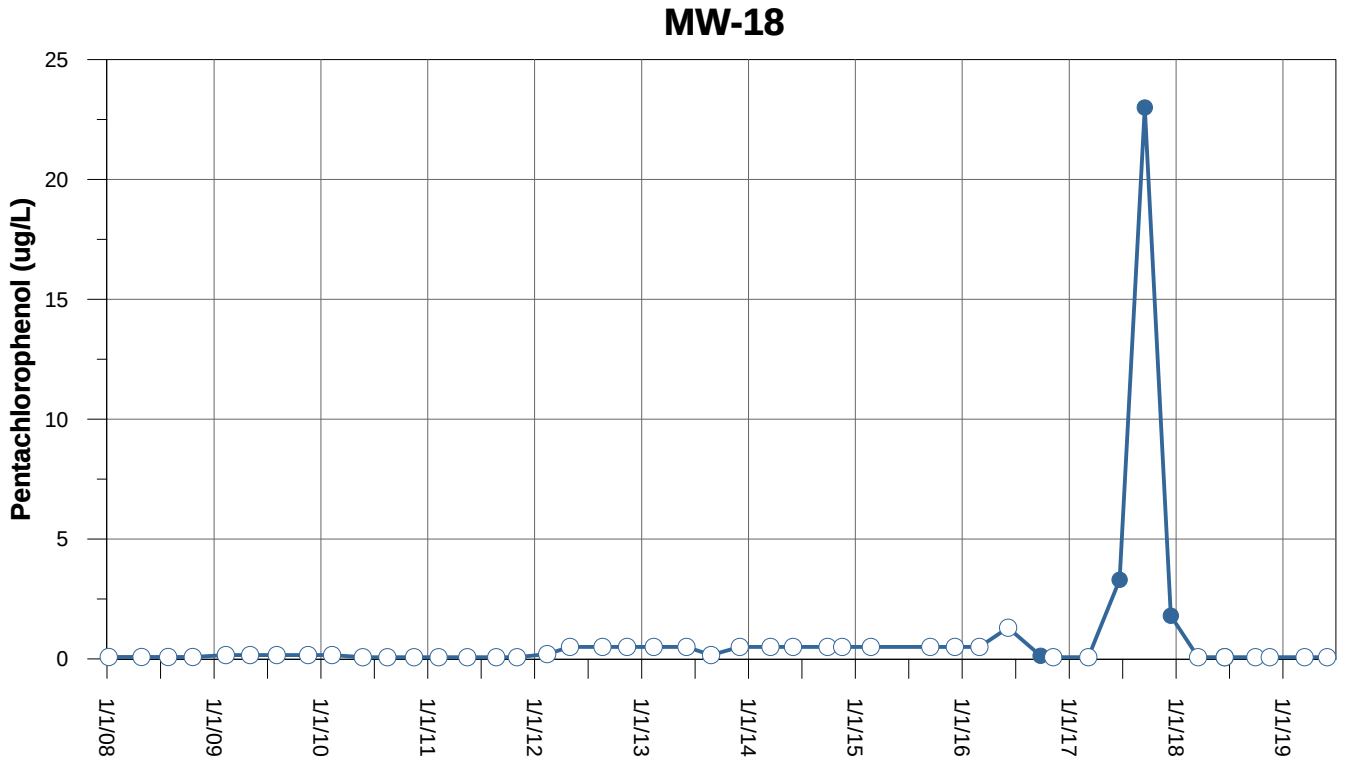
- Pentachlorophenol Detected Values
- Pentachlorophenol Non-Detected Values

Notes:
ug/L = microgram per liter

FIGURE C-1
Pentachlorophenol Groundwater Concentrations in BXS-1 and BXS-2
Former J.H. Baxter Wood Treating Facility
Arlington, Washington

GSI Water Solutions, Inc.





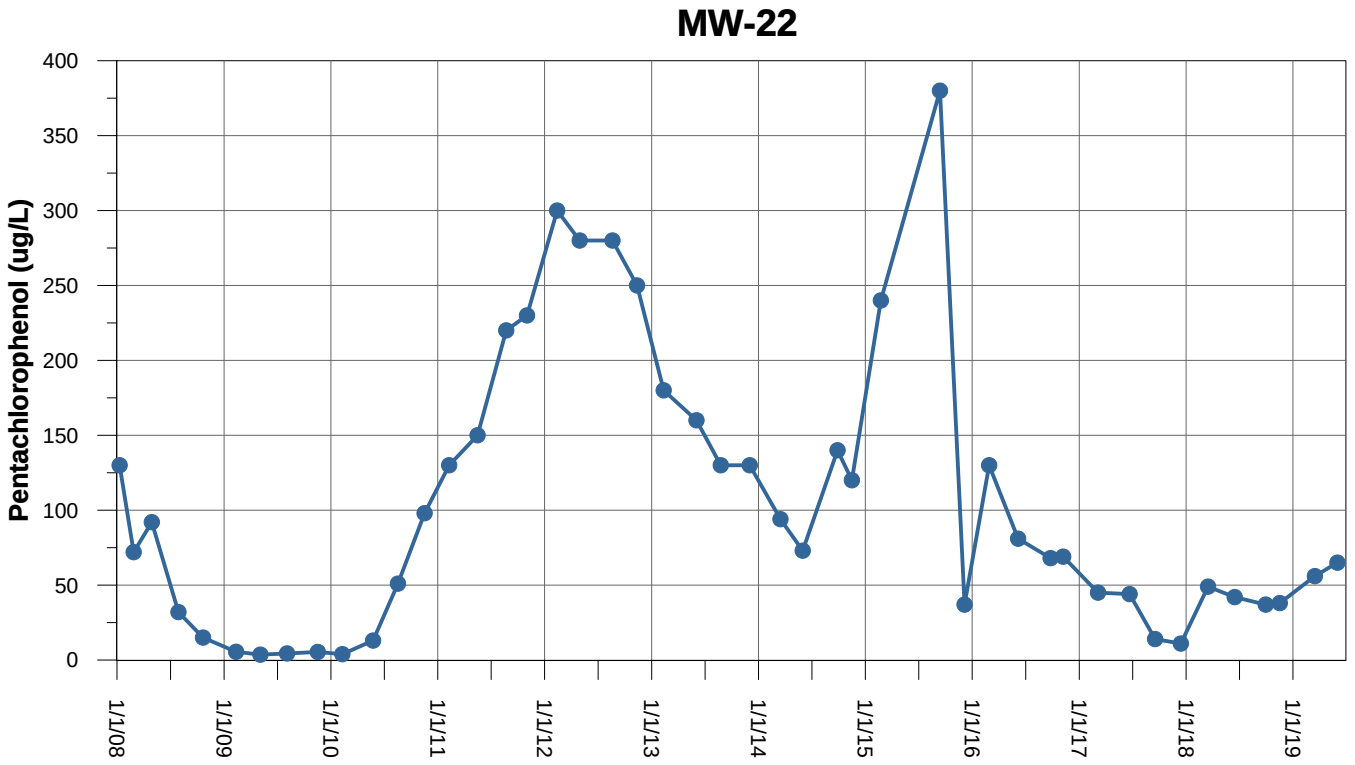
Legend:

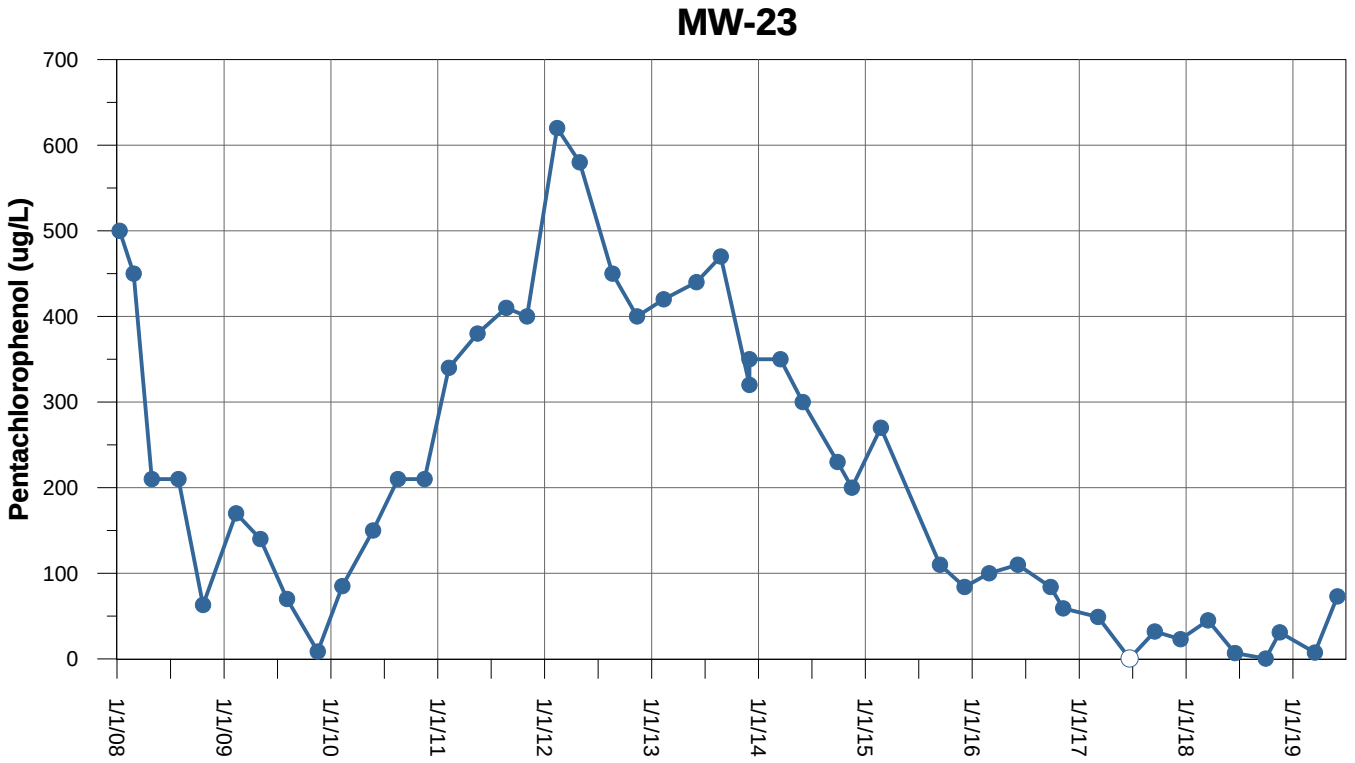
- Pentachlorophenol Detected Values
- Pentachlorophenol Non-Detected Values

Notes:
ug/L = microgram per liter

FIGURE C-2
Pentachlorophenol Groundwater Concentrations in MW-3 and MW-18
Former J.H. Baxter Wood Treating Facility
Arlington, Washington

GSI Water Solutions, Inc.





PAHs not analyzed in MW-22.

Legend:

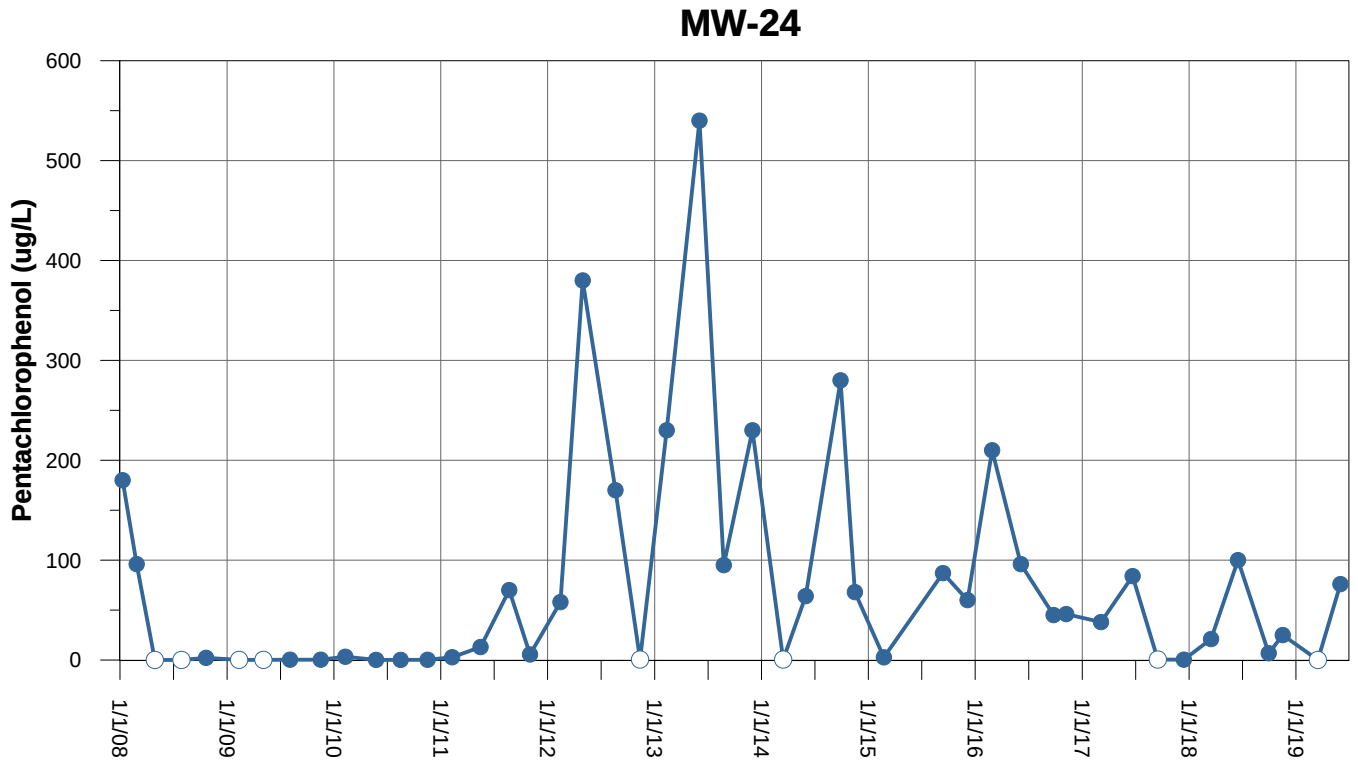
- Pentachlorophenol Detected Values
- Pentachlorophenol Non-Detected Values

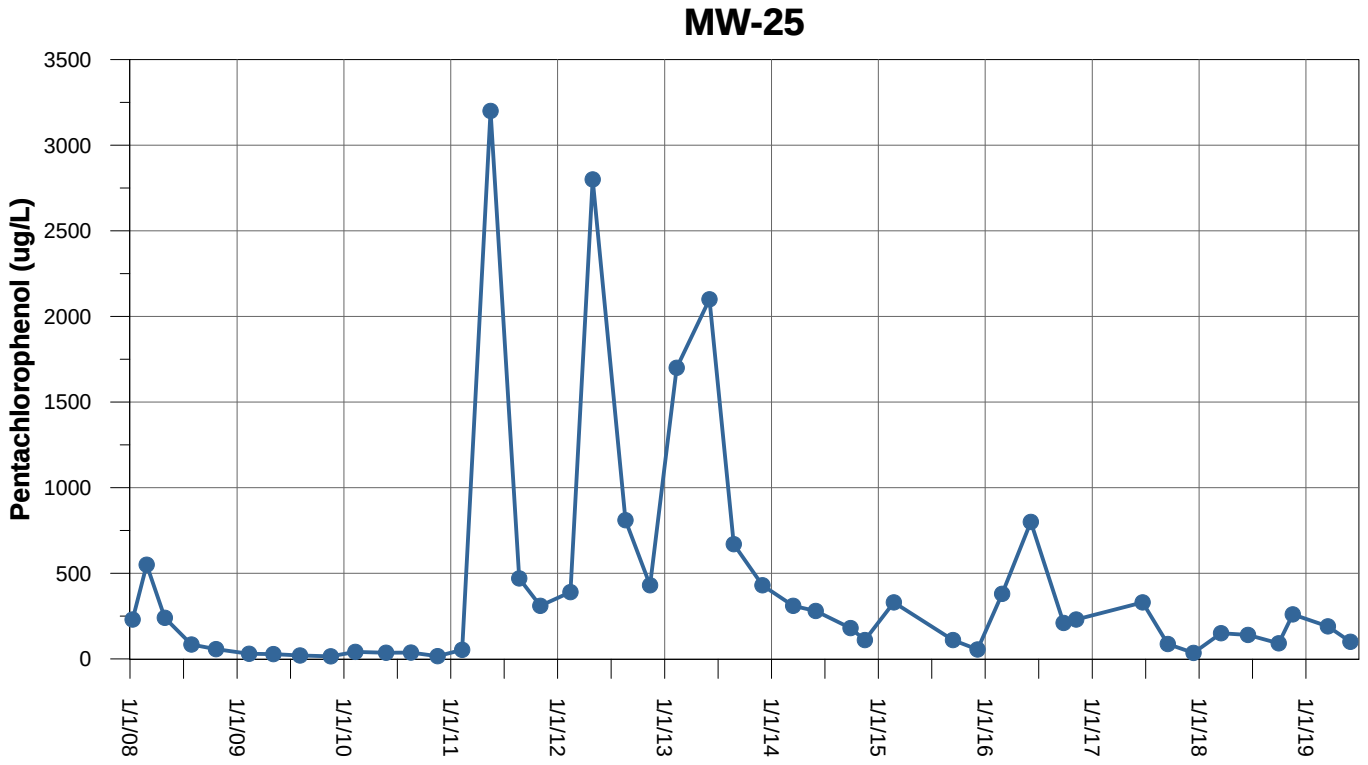
Notes:
ug/L = microgram per liter

FIGURE C-3
Pentachlorophenol Groundwater Concentrations in MW-22 and MW-23

Former J.H. Baxter Wood Treating Facility
Arlington, Washington

GSI Water Solutions, Inc.





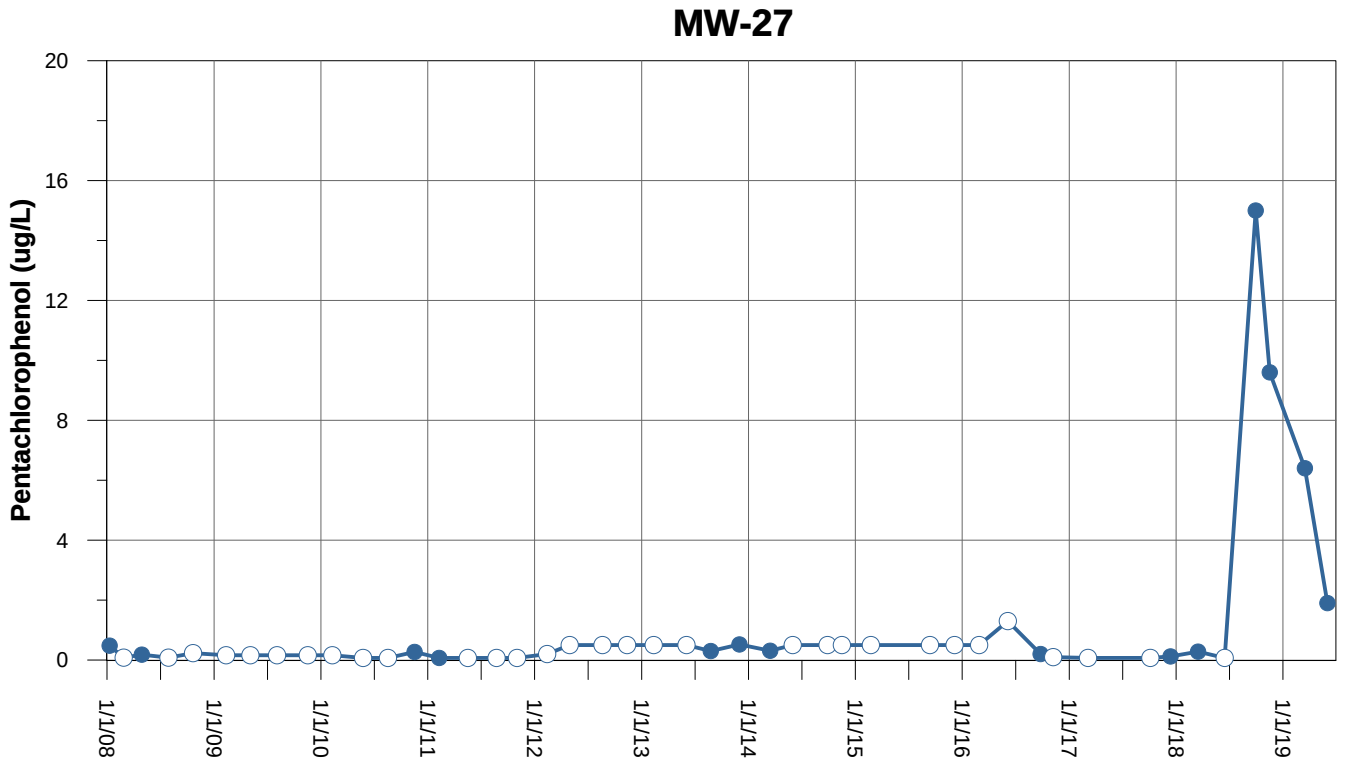
Legend:

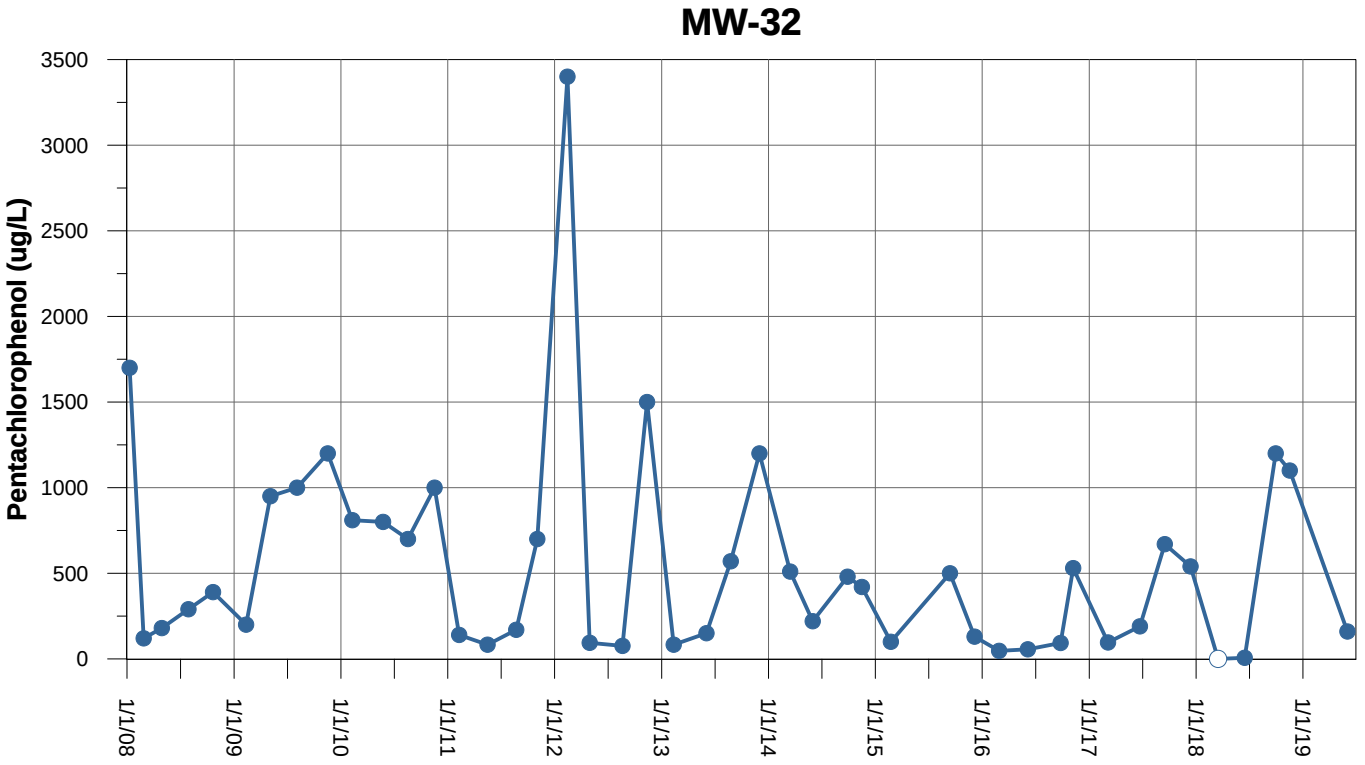
- Pentachlorophenol Detected Values
- Pentachlorophenol Non-Detected Values

Notes:
ug/L = microgram per liter

FIGURE C-4
Pentachlorophenol Groundwater Concentrations in MW-24 and MW-25
Former J.H. Baxter Wood Treating Facility
Arlington, Washington

GSI Water Solutions, Inc.





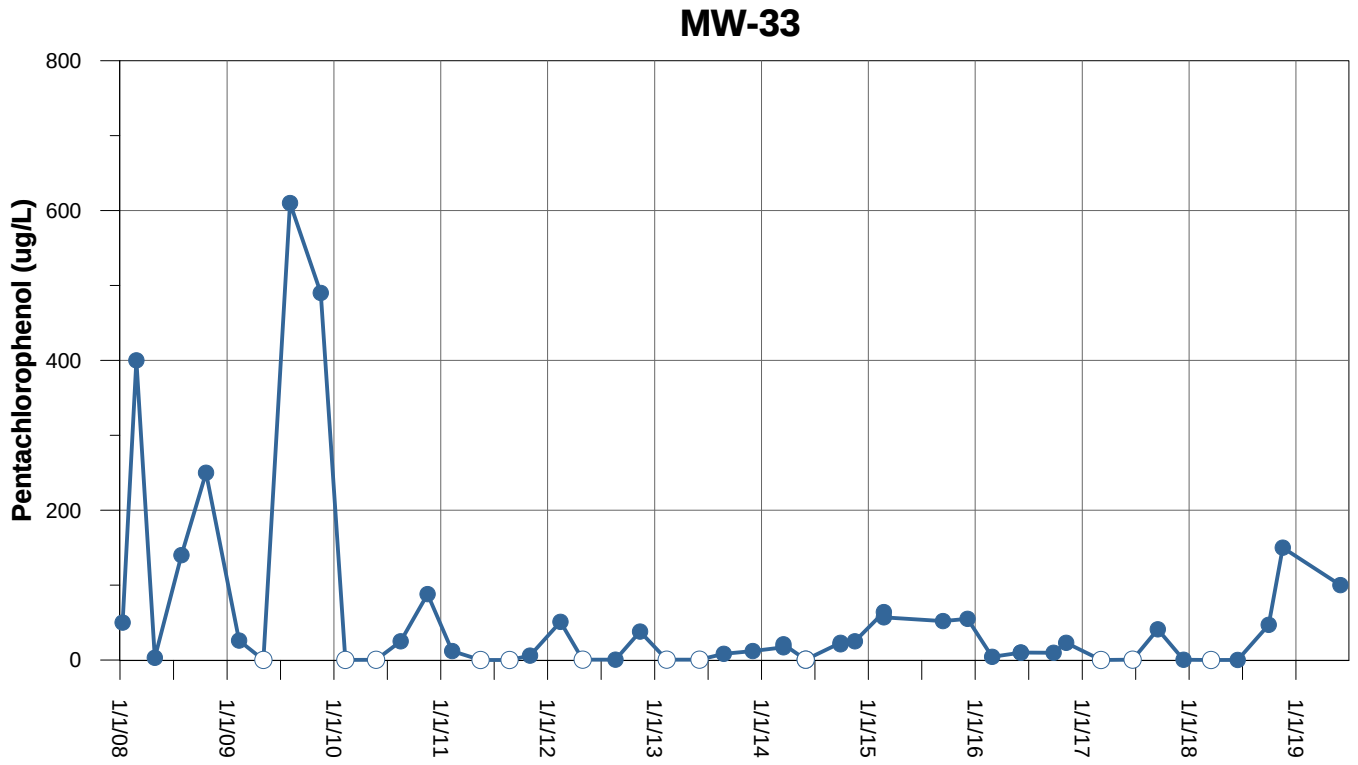
Legend:

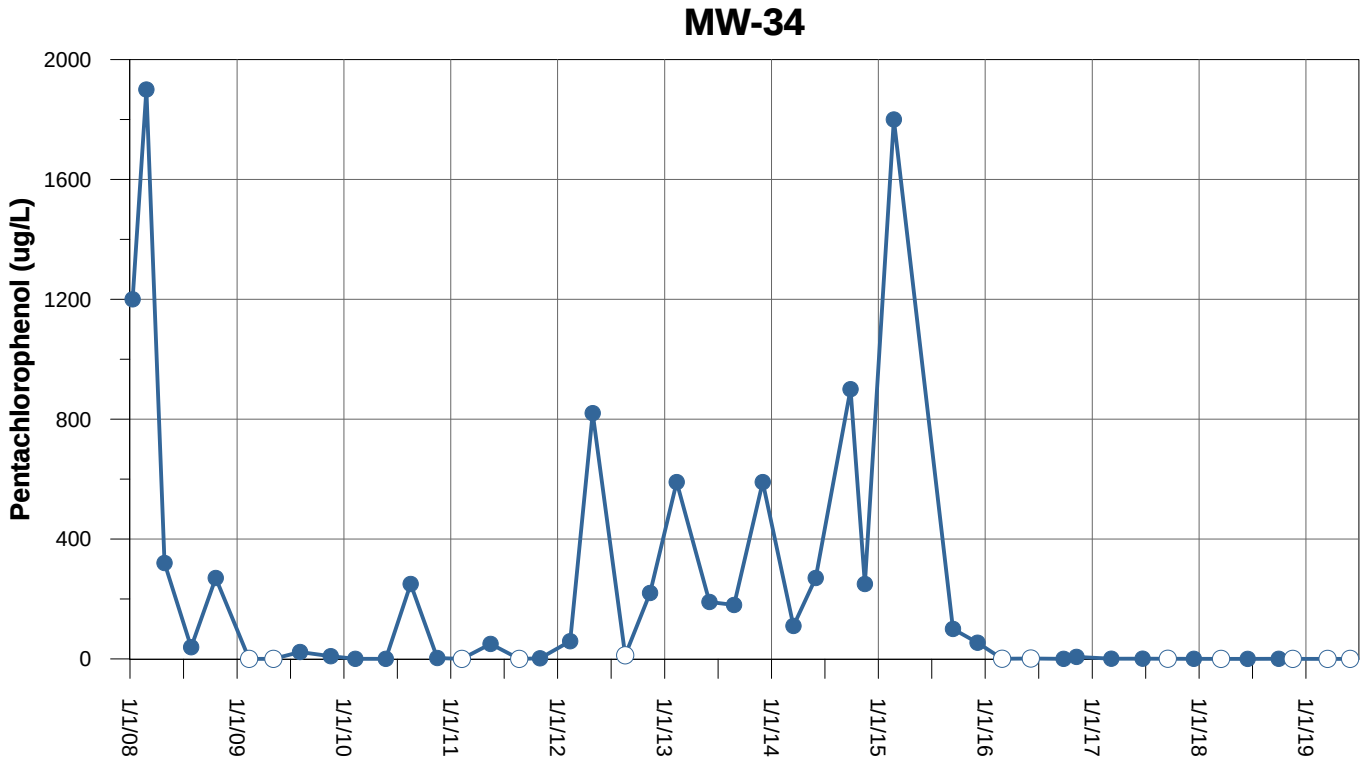
- Pentachlorophenol Detected Values
- Pentachlorophenol Non-Detected Values

Notes:
ug/L = microgram per liter

FIGURE C-5
Pentachlorophenol Groundwater Concentrations in MW-27 and MW-32
Former J.H. Baxter Wood Treating Facility
Arlington, Washington

GSI Water Solutions, Inc.





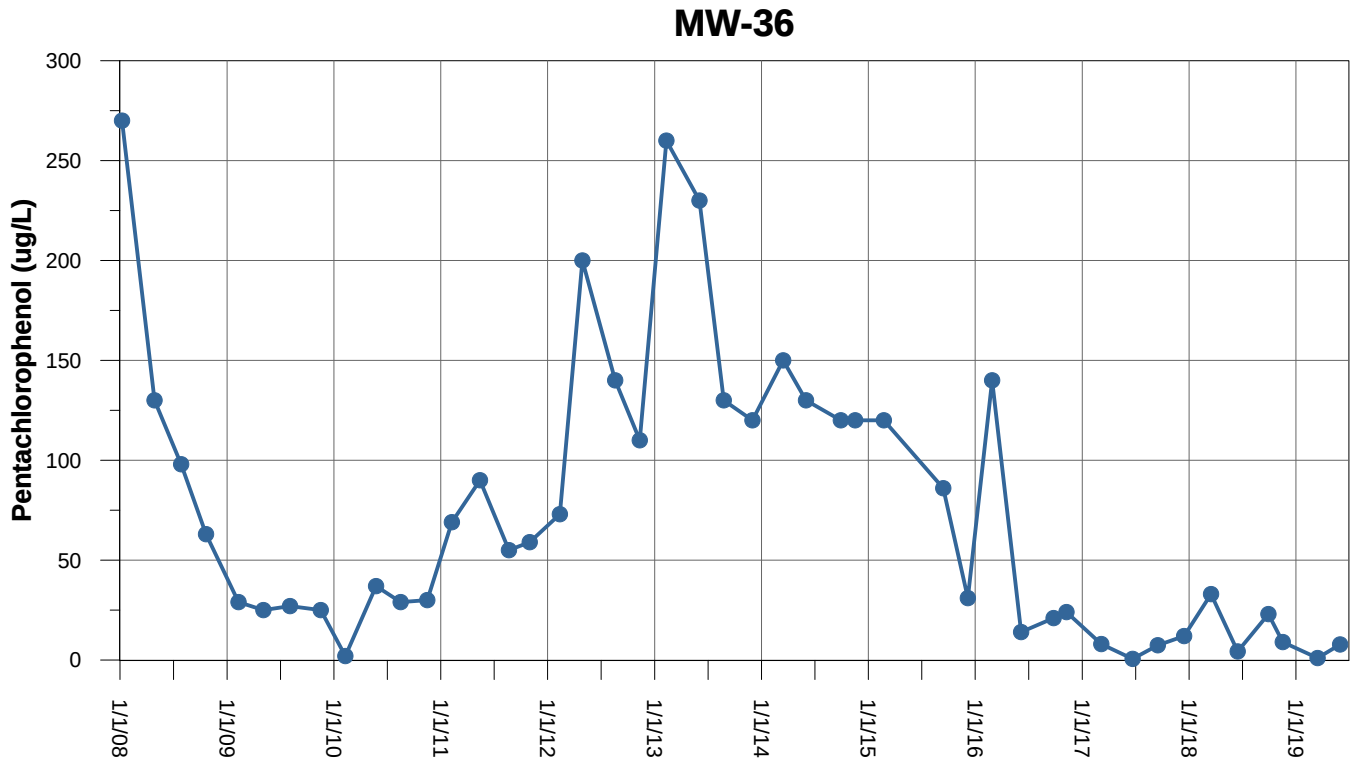
Legend:

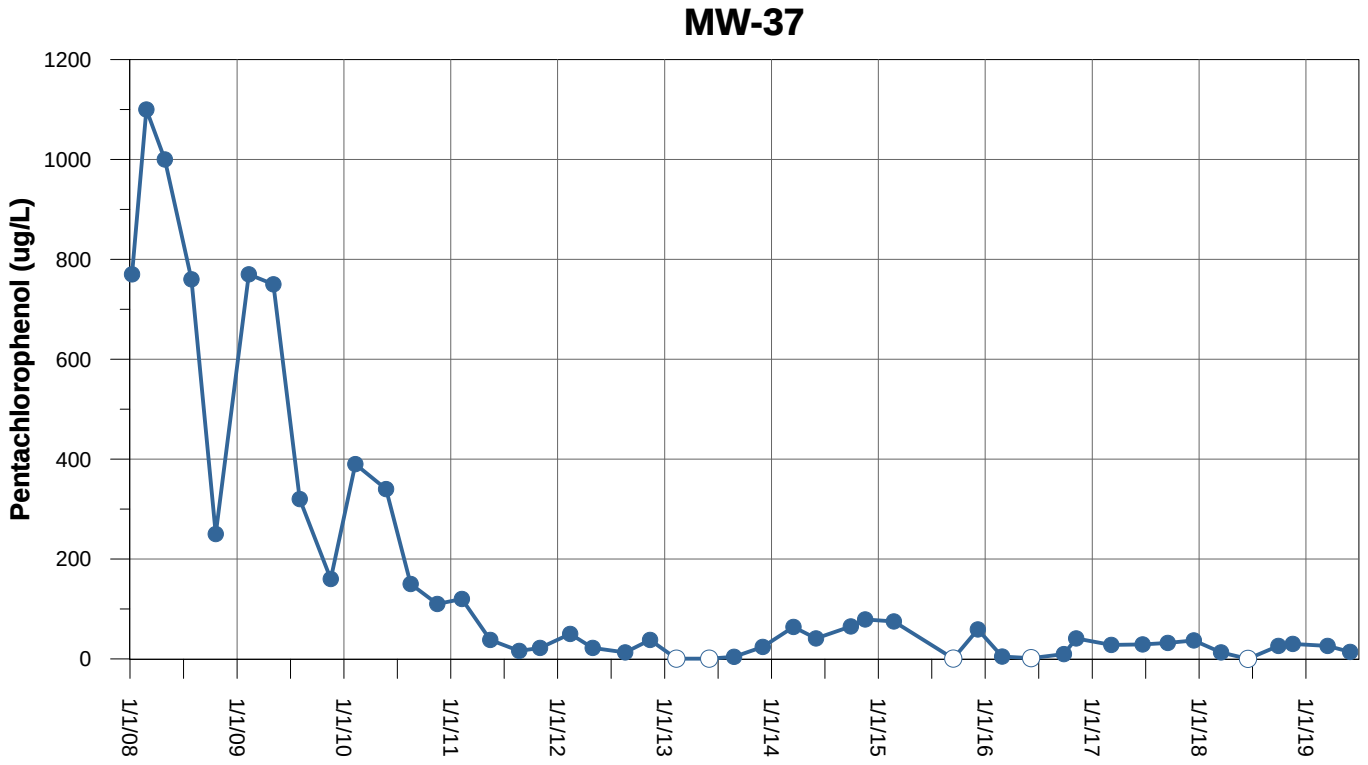
- Pentachlorophenol Detected Values
- Pentachlorophenol Non-Detected Values

Notes:
ug/L = microgram per liter

FIGURE C-6
Pentachlorophenol Groundwater Concentrations in MW-33 and MW-34
Former J.H. Baxter Wood Treating Facility
Arlington, Washington

GSI Water Solutions, Inc.





Legend:

- Pentachlorophenol Detected Values
- Pentachlorophenol Non-Detected Values

FIGURE C-7

Pentachlorophenol Groundwater Concentrations in MW-36 and MW-37

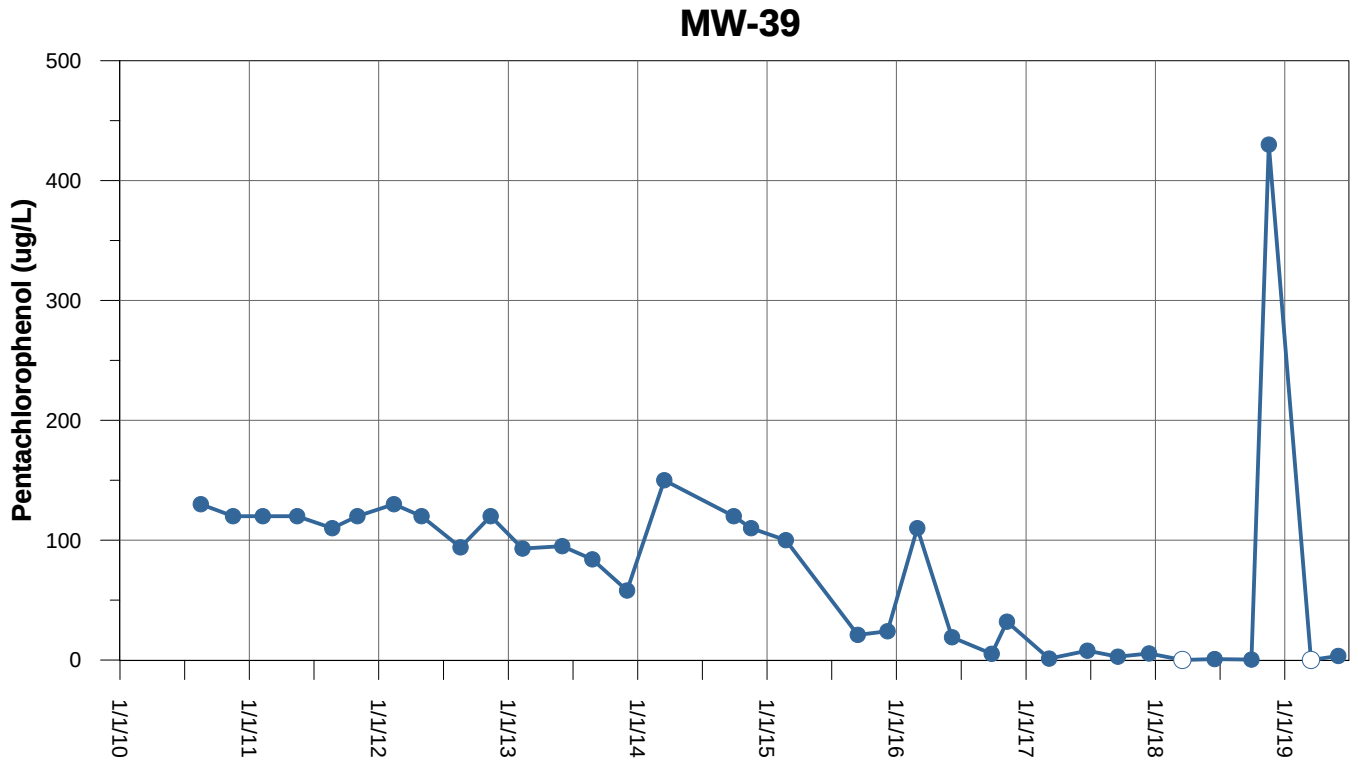
Former J.H. Baxter Wood Treating Facility

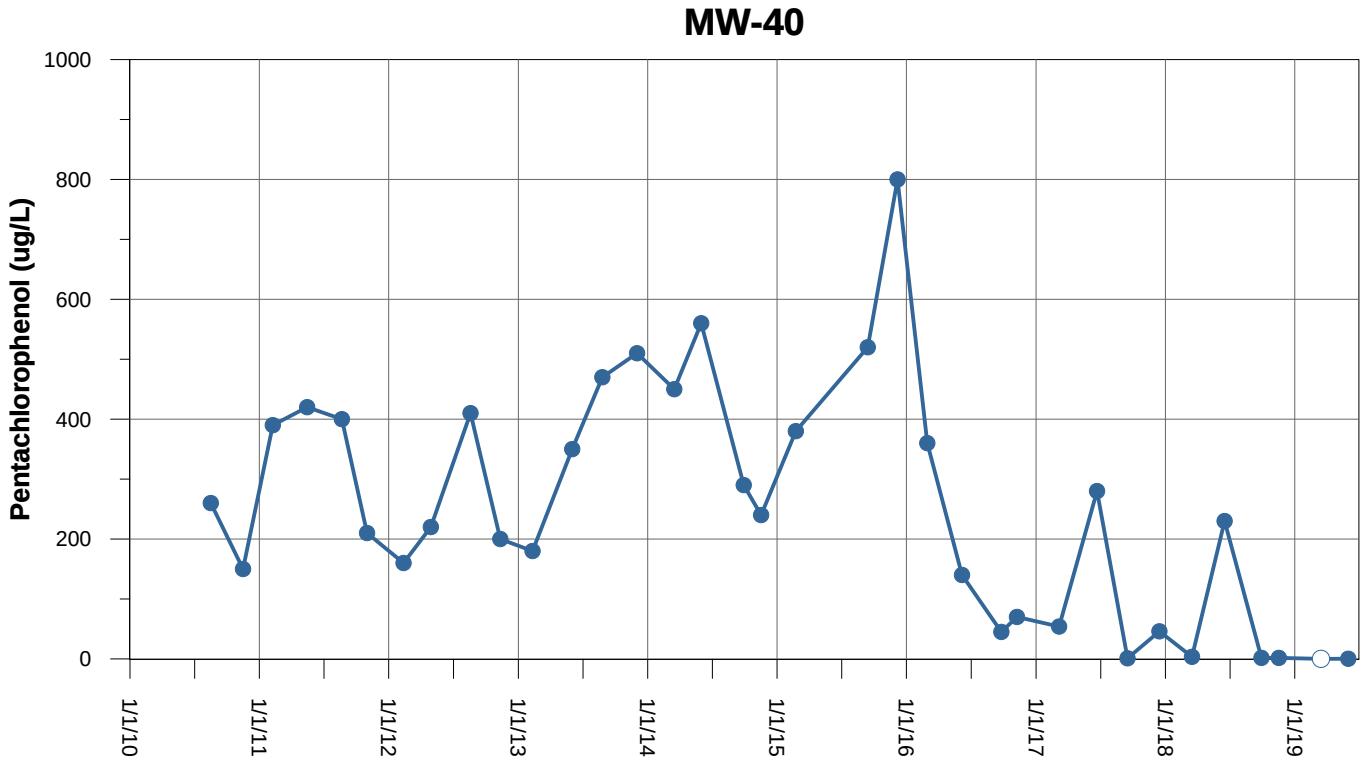
Arlington, Washington

Notes:

ug/L = microgram per liter

GSI Water Solutions, Inc.





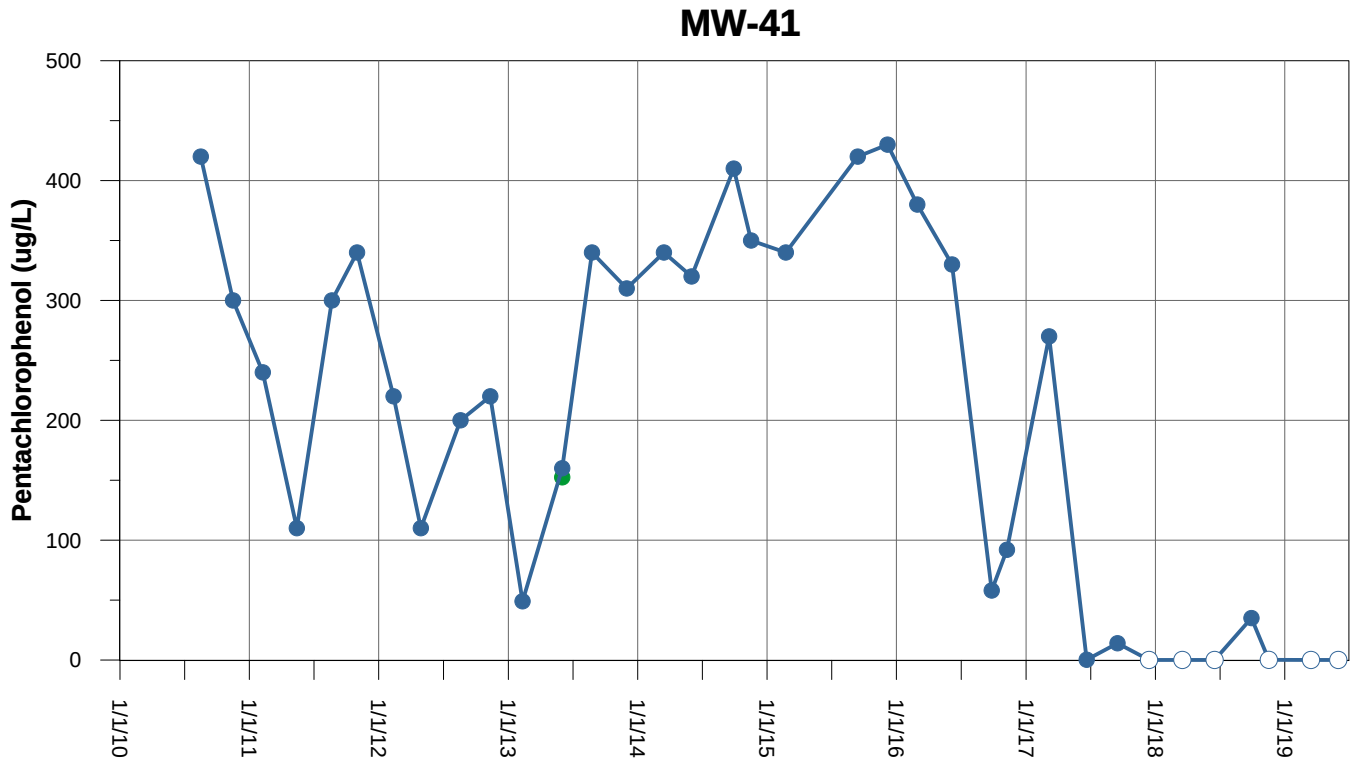
Legend:

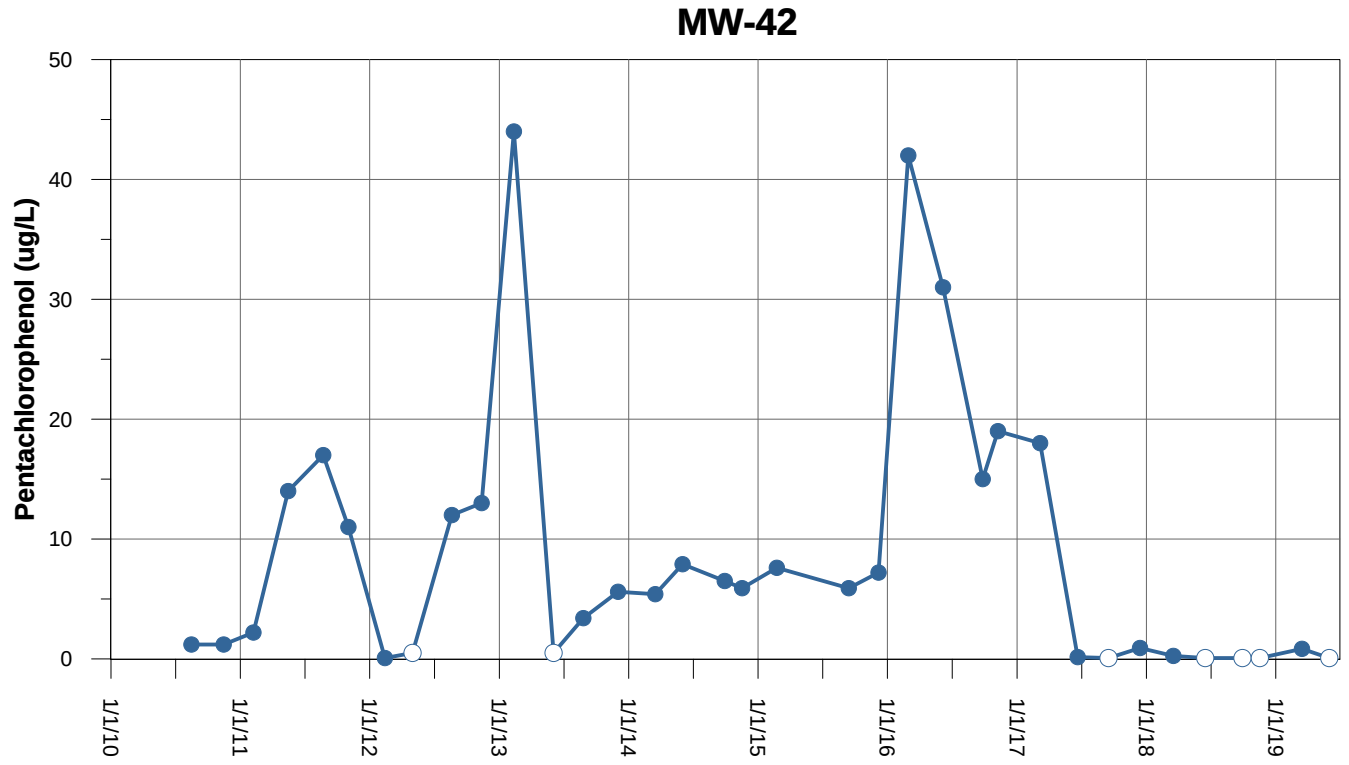
- Pentachlorophenol Detected Values
- Pentachlorophenol Non-Detected Values

Notes:
ug/L = microgram per liter

FIGURE C-8
Pentachlorophenol Groundwater Concentrations in MW-39 and MW-40
Former J.H. Baxter Wood Treating Facility
Arlington, Washington

GSI Water Solutions, Inc.





Legend:

- Pentachlorophenol Detected Values
- Pentachlorophenol Non-Detected Values

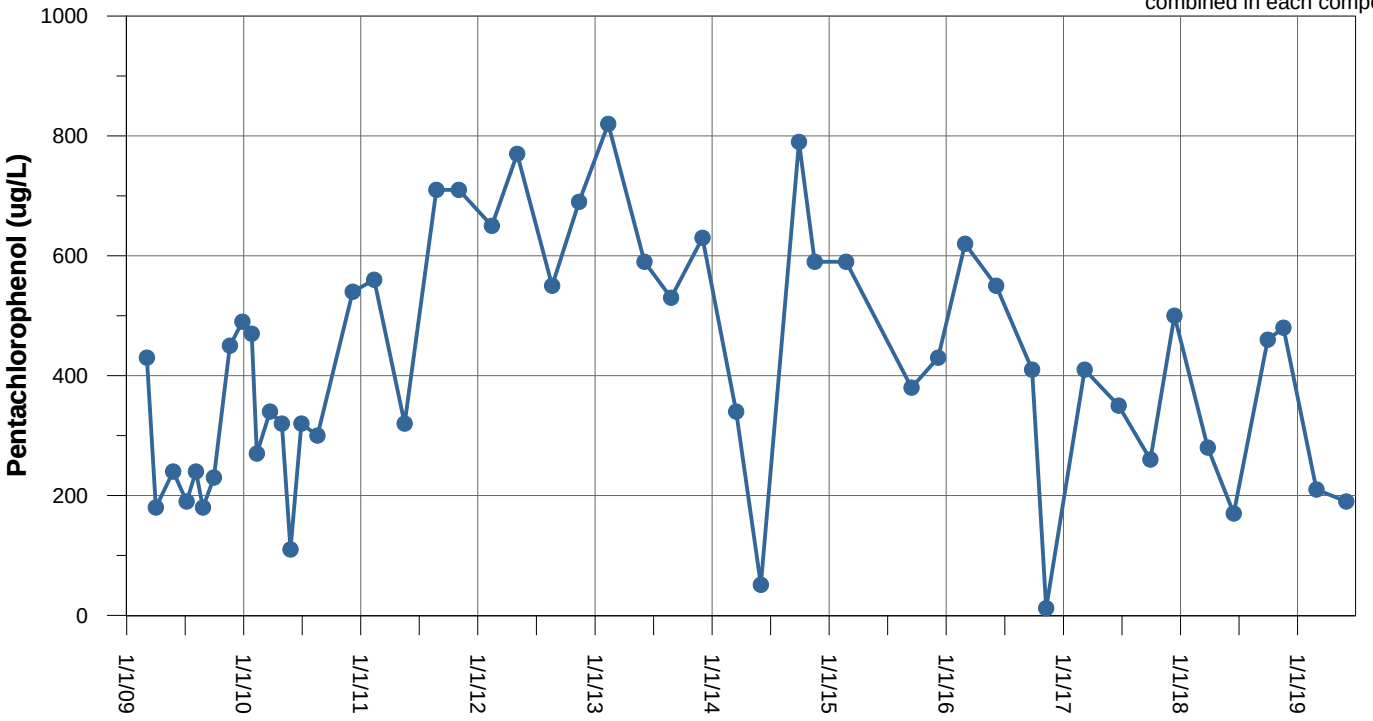
FIGURE C-9
Pentachlorophenol Groundwater Concentrations in MW-41 and MW-42
Former J.H. Baxter Wood Treating Facility
Arlington, Washington

GSI Water Solutions, Inc.

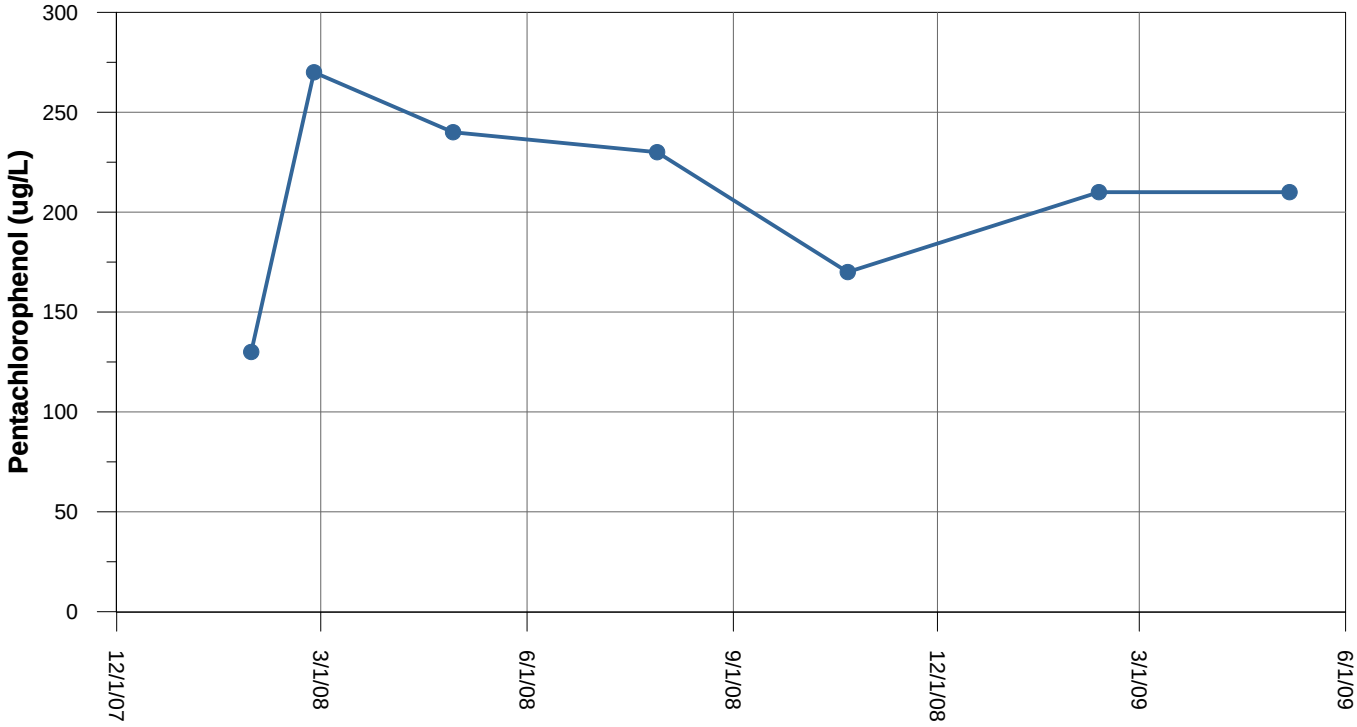
Notes:
ug/L = microgram per liter

Extraction Well Composites
EPA Method 8270D and 8151M
(2009 - current)

See Table 3C for extraction wells combined in each composite sample.



Extraction Well Composites (EW-1 through EW-7)
EPA Method 8151
(2008 - 2009)



Legend:

- Pentachlorophenol Detected Values
- Pentachlorophenol Non-Detected Values

FIGURE C-10

Pentachlorophenol Groundwater Concentrations in Extraction Well Composite Samples by EPA Method 8270D and 8151

Former J.H. Baxter Wood Treating Facility

Arlington, Washington

GSI Water Solutions, Inc.

Notes:

ug/L = microgram per liter