

**Progress and Groundwater Monitoring Report
January - June 2018
Boomsnub/Airco Superfund Site
Hazel Dell, Washington**

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LIST OF ACRONYMS AND ABBREVIATIONS

ALS	ALS Environmental
Boomsnub	Boomsnub Corporation
City	City of Vancouver
1,1-DCE	1,1-dichloroethene
DO	dissolved oxygen
EA	EA Engineering, Science, and Technology, Inc., PBC
EPA	U.S. Environmental Protection Agency
J	The result is an estimated concentration that is less than the method reporting limit but greater than or equal to the method detection limit.
Linde	Linde LLC
MCL	EPA Maximum Contaminant Level
µg/L	micrograms per liter
MRL	method reporting limit
MS	matrix spike
MSD	matrix spike duplicate
MTCA	Washington State Model Toxics Control Act
O&M	operations and maintenance
OU	Operable Unit
ORP	oxidation-reduction potential
PCE	tetrachloroethene
PDB	passive diffusion bag
PFAS	perfluoroalkyl and polyfluoroalkyl substances
QASP	Quality Assurance and Sampling Plan
ROD	Record of Decision
RPD	Relative Percent Difference
Site	Boomsnub/Airco Superfund Site
1,1,1-TCA	1,1,1-trichloroethane
TCE	trichloroethene

LIST OF ACRONYMS AND ABBREVIATIONS Cont.

U	analyte not detected above the specified reporting limit
VOC	volatile organic compound

1. INTRODUCTION

This document presents the combined progress report and semiannual groundwater sampling report for the Boomsnub/Airco Superfund Site (Site). The results of the Spring 2018 semiannual sampling event are provided, as well as a summary of treatment system operations progress from January through June 2018. The format and schedule for this report follow that approved by the U.S. Environmental Protection Agency (EPA) on 20 July 2016.

1.1 Background

The Site is located in Hazel Dell, Washington, just north of the city limits of Vancouver, Washington. A Site location map is presented as Figure 1.

The Site includes two adjacent properties, the Linde LLC (Linde) facility and the former Boomsnub Corporation (Boomsnub) property (Figure 2). The property currently owned by Linde was formerly operated by The BOC Group and Airco Gases. The primary compounds of concern at the Site are hexavalent chromium (represented by total chromium) and trichloroethene (TCE). The Boomsnub property is designated as Operable Unit (OU)-1 and is the source of hexavalent chromium, and the Linde property is designated as OU-2 and is the source of TCE. The Site also includes impacted groundwater in the Alluvial and Troutdale aquifers (OU-3). The Site extends approximately 4,000 feet in a west-northwest direction from the two properties.

In 2008, an investigation identified a new TCE plume north of the OU-3 Plume, in the area around well AMW-18 (EA Engineering, Science, and Technology, Inc., PBC [EA] 2008). This plume is referred to as the Northern Plume. Additional investigation of the Northern Plume area was performed in May 2011 (EA 2011), and a monitoring well (AMW-64) was installed in the Northern Plume area in February 2012, at the request of the EPA. The source of this plume is unknown; however, EA has concluded, and EPA has agreed, that the contamination is not attributed to activities on the Boomsnub or Linde properties. The EPA is leading the effort to characterize and remediate the Northern Plume.

Linde assumed responsibility for Site operations and maintenance on 1 April 2002, pursuant to an Administrative Order on Consent signed by Linde and the EPA (Docket No. CERCLA 10-2002-0052). The responsibility continued with the entry of a Consent Decree (Docket No. CVO7-5163 FDB) on 29 June 2007. EA currently operates two systems at the Site for Linde; a system that extracts and treats groundwater containing chromium and volatile organic compounds (VOCs), including TCE, and an infiltration gallery on the Linde property that is used for discharge of treated groundwater. Three other treatment systems were previously operated at the Site. A soil vapor extraction system was operated from 2004 to 2008 to treat vadose zone soil in the TCE source area (OU-2); this system was turned off in 2008 with EPA approval. An in-well stripping system was operated from 2004 to 2013 to treat groundwater in OU-2; this system was turned off in 2013 with EPA approval. The Toe-of-Plume Pilot Study, an in-situ treatment program, was successfully performed in 2006 to treat an area of recalcitrant VOC and chromium contamination in the original toe-of-plume area.

Cleanup levels for constituents of concern, as established in the Record of Decision (ROD) (EPA 2000), are presented in the following table.

Groundwater Cleanup Levels

Constituents of Concern	CAS Number	Basis	Practical ^(a) Quantitation Limit (µg/L)	Cleanup ^(b) Level (µg/L)
Hexavalent chromium	18540-29-9	MTCA B	5	80
Chromium (total)	7440-47-3	MCL	5	100
Bromodichloromethane	75-27-4	MTCA B	1	1
Carbon tetrachloride	56-23-5	MTCA B	1	1
Dibromochloromethane	124-48-1	MTCA B	1	1
1,2-Dichloroethane	107-06-2	MCL	1	5
1,1-Dichloroethene (1,1-DCE)	75-35-4	MTCA B	1	1
Tetrachloroethene (PCE)	127-18-4	MCL	1	5
1,1,1-Trichloroethane (1,1,1-TCA)	71-55-6	MCL	1	200
Trichloroethene (TCE)	79-01-6	MCL	1	5
NOTES: CAS = Chemical Abstract Service µg/L = Micrograms per liter MTCA = Washington State Model Toxics Control Act MCL = Maximum Contaminant Level (a) Ecology Implementation Memo No. 3 dated 24 November 1993 (Ecology 1993). (b) Cleanup level established as the higher of the regulatory level or the practical quantitation limit; see Washington Administrative Code 173-340-700(6) and Ecology Implementation Memo No. 3 dated 24 November 1993.				

1.2 Purpose and Scope

1.2.1 Site Progress

The Site progress reporting includes a summary of the treatment system operations and maintenance (O&M) during the reporting period (January through June 2018). Also provided are summaries of meetings that took place, deliverables submitted, and field events completed during the reporting period, as well as a list of anticipated deliverables and field work planned during the next reporting period (July through December 2018). Problems and their associated resolutions are also described, as applicable.

1.2.2 Semiannual Groundwater Monitoring

The Spring 2018 semiannual sampling event included collection of groundwater samples from selected wells at the Site with analysis for VOCs and/or total chromium. Figure 3 presents the locations of Site monitoring and extraction wells and identifies wells sampled during the Spring 2018 event.

The goals of semiannual groundwater sampling at the Site include the following:

- Documenting the lateral and vertical extent of VOCs and chromium in groundwater.
- Monitoring changes in VOC and chromium concentrations in groundwater across the Site.
- Evaluating groundwater flow patterns in the alluvial and Troutdale aquifers.

The following tasks were performed to accomplish these goals:

- Collected/analyzed groundwater samples from selected monitoring and extraction wells.
- Collected water level data from Site monitoring and extraction wells.

1.3 Organization of this Document

This report is divided into seven sections and seven appendices.

- Section 1 provides the project background and scope.
- Section 2 summarizes remedial action progress during the reporting period.
- Section 3 discusses groundwater monitoring field activities performed and samples collected.
- Section 4 provides a brief discussion of analytical results for groundwater samples and groundwater elevation measurements.
- Section 5 presents information on data quality.
- Section 6 presents a summary and findings of note.
- Section 7 lists the references cited in this document.
- Appendix A – a summary of daily O&M tasks of note.
- Appendix B – documentation relative to the OU-3 treatment system O&M.
- Appendix C – depth to groundwater measurements and calculated groundwater elevations during the Spring 2018 sampling event.
- Appendix D – field purge and sampling forms for the Spring 2018 sampling event.
- Appendix E – laboratory chain-of-custody documentation for groundwater samples collected during the Spring 2018 event.
- Appendix F – a summary of the groundwater analytical results for the Spring 2018 sampling event.
- Appendix G – a summary of the results of sampling of wells in the Northern Plume area during the Spring 2018 sampling event.

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2. SITE PROGRESS MADE THIS PERIOD

Following is a discussion of daily O&M activities for the reporting period (January through June 2018) including system availability, system modifications, sampling activities, and meetings. General O&M activities continued throughout the reporting period as specified in the O&M Manual, with modifications approved by the EPA. Daily O&M tasks of note are summarized in Appendix A.

2.1 Treatment System Operations and Maintenance

Documentation regarding OU-3 treatment system operation for the reporting period is provided in Appendix B. Copies of the completed Boomsnub Bi-weekly System Monitoring Checklists are provided in Appendix B.1. System operation tables are provided in Appendix B.2 and include the following: daily extraction system flow information, monthly pumping rates for each of the extraction wells, and monthly system influent and effluent sampling analytical results.

Groundwater pumped through the extraction system was treated via ion exchange and air stripping. The treated groundwater was discharged to the infiltration gallery on Linde property. There were no discharges made to the City of Vancouver (City) sanitary sewer during the reporting period.

From 1 January through 30 June 2018, 33,054,146 gallons of groundwater were treated, removing 3.4 pounds of TCE and 11.7 pounds of total chromium from the groundwater. Appendix B.3 provides mass removal tables and charts.

Included in Appendix B.4 is a copy of the Semiannual Self-Monitoring Report delivered to the City for January through June 2018. Monthly influent and effluent sampling data are submitted to the City with the Semiannual Self-Monitoring Report and are also included in Appendix B.4.

2.1.1 Synopsis of OU-3 System Downtime

The Consent Decree requires that the extraction and treatment systems be operational at least 90 percent of the time. Periodic downtime associated with scheduled maintenance of the extraction and treatment system is not included in the calculation of operational availability; only unscheduled downtime is included in this calculation. The treatment system had over 99 percent availability for the reporting period, exceeding the Consent Decree requirement of 90 percent. System maintenance shut-offs and unscheduled system shut-downs are listed in the table below. Additional details related to the shut-downs and related troubleshooting and maintenance are provided in the Daily O&M Summary in Appendix A.

Summary of System Downtime

Date	System Downtime	Type	Reason
31 January	2 hours; 3 minutes	Maintenance	The system was shutoff to pump water out of vaults CV-3 and CV-9, to fluff IX resin and change filters.
Total January Downtime: 2 hours; 3 minutes			
There were no system shut offs or shut downs in the month of February.			
There were no system shut offs or shut downs in the month of March.			
2 April	15 minutes	Maintenance	The system was shutoff to pump water out of vault CV-9.
Total April Downtime: 15 minutes			
24 May	34 minutes	Maintenance	The system was shutoff for training and to test the system dial-out.
Total May Downtime: 34 minutes			
There were no system shut offs or shut downs in the month of June.			

2.2 Treatment System Sampling

Monthly influent and effluent sampling of the OU-3 groundwater treatment system was completed in accordance with the Site-specific Quality Assurance and Sampling Plan (Site Quality Assurance and Sampling Plan [QASP]; EA 2004). VOCs (EPA Method 8260C) and total chromium (EPA Method 200.7) were analyzed by the project laboratory, ALS Environmental (ALS) in Kelso, Washington. VOC Method 8260C is the most recent version of the method listed in the Site QASP (EPA Method 8260B). A field meter was used to measure pH.

Influent and effluent samples were collected by EA on 4 January, 5 February, 4 March, 2 April, 7 May, and 8 June 2018. Based on the analytical results for these samples, effluent water quality met both the City discharge permit limits and the infiltration gallery discharge limits during the reporting period. Table 3 in Appendix B.2 provides a summary of influent and effluent analytical data from the reporting period. It also presents the discharge permit limits and the infiltration gallery discharge limits.

2.3 Anticipated Problem Areas and Recommended Actions

During the Spring sampling event it was discovered that the CPU-12 concrete monument was broken. Plans are in place to assess and repair or replace the monument prior to or during the Fall 2018 sampling event.

2.4 Problems Resolved

Flow meters were not working properly and were replaced on extraction wells MW-14E, MW-18D, and MW-6B. The MW-14E pump controller was faulty due to a circuit board failure and was replaced.

2.5 Meetings

The following meetings took place during the reporting period:

5 April 2018 – Attendees: David Sordi (Linde); Jonathan Williams, Lee Thomas, Joe Gallaher, and Bernie Zavala (EPA); Hagai Nassau and Kelly MacDonald (SKEO); and Jil Frain (EA). Met with EPA on Site to conduct the Five-year Review site visit, and to discuss in-situ treatments of residual contamination.

14 June 2018 – Attendees: David Sordi (Linde); Jonathan Williams and Lee Thomas (EPA); and Jil Frain (EA). Conference call to discuss the Fall 2018 QASP Addendum, the PFAS Sampling Plan, and in-situ Treatments.

2.6 Deliverables

The following deliverables were submitted during the current reporting period (June through January 2018):

- **8 January 2018** – December 2017 Self-Monitoring Report was submitted to the City.
- **14 February 2018** – Progress and Groundwater Monitoring Report, July – December 2017 was submitted to the EPA.
- **20 February 2018** – Spring 2018 QASP Addendum was submitted to EPA.
- **21 February 2018** – Dangerous Waste Report was submitted to Ecology.
- **26 March 2018** – Closure Plan, Revision 3, was submitted to EPA.
- **9 April 2018** – Notification letters for the Spring 2018 sampling event were mailed to the property owners.
- **12 April 2018** – Annual Status Report was submitted to EPA.
- **5 June 2018** – Submitted Quality Assurance and Sampling Plan Addendum for PFAS Sampling to EPA

The following deliverables are anticipated for submittal during the next reporting period (July through December 2018):

- **20 July 2018** – June 2018 Self-Monitoring Report to be submitted to the City.
- **9 August 2018**– Spring 2018 QASP Addendum to be submitted to EPA.
- **31 August 2018** – Progress and Groundwater Monitoring Report, January – June 2018 to be submitted to EPA.
- **24 September 2018**– Notification letters for the Fall 2018 sampling event to be mailed to the property owners.
- **TBD** - Work plan for in-situ treatment of areas of residual contamination.

2.7 Field Events

The following field events were completed during the current reporting period (June through January 2018):

- **Monthly** – O&M influent and effluent sampling.
- **24 and 25 April 2018** – Spring 2018 semiannual groundwater sampling event.

The following field events are anticipated during the next reporting period July through December 2018):

- **Monthly** – O&M influent and effluent sampling.
- **2 through 11 October 2018** – Fall 2018 semiannual groundwater sampling event.
- **TBD** – In-situ treatment in areas of residual contamination.

2.8 Miscellaneous

Well MW-21D is being impacted by the Northern Plume (see Section 4.2.1.4) and was shut off on June 22, with EPA approval.

3. GROUNDWATER MONITORING ACTIVITIES

3.1 Overview

The Site sampling schedule is presented in the Long-Term Monitoring Plan (EA 2007), with updates provided in the 2017 Annual Status Report (EA 2018a). Wells included in the Spring 2018 sampling event were those on a semiannual sampling schedule. Sampling activities were conducted in accordance with the EPA-approved Site-specific QASP (EA 2004) and the EPA-approved QASP Addendum for the Spring 2018 Semiannual Sampling Event (EA 2018b). These documents are referred to as the Site QASP and the Spring 2018 QASP Addendum, respectively.

The Spring 2018 groundwater sampling activities were conducted in the field on 24 and 25 April 2018. Field personnel present during the sampling event and their responsibilities are listed in the table below.

EA Personnel	Responsibility
Mark Blinstrub	Field Sampling Team Member
Rick Read	Field Sampling Team Leader/Health and Safety Supervisor

The sampling event included collection of groundwater samples from 16 wells. Samples from TCE Source (OU-2) wells were analyzed for VOCs. Samples from OU-3 wells were analyzed for VOCs and total chromium or VOCs only based on the previously approved groundwater monitoring plan. Wells in the Northern Plume area were also sampled for VOCs for use in evaluating potential impacts to Site remediation from the Northern Plume. Additional samples were collected for quality assurance/quality control, including field duplicates, trip blanks, and matrix spike/matrix spike duplicates (MS/MSDs).

3.2 Field Methods

Approved monitoring and sampling methods were used in the field. The methods and procedures are described in detail in the Site-specific QASP (EA 2004) and the Spring 2018 QASP Addendum (EA 2018b).

3.2.1 Water Level Gauging Program

A round of water level measurements was obtained from accessible monitoring and extraction wells during the Spring 2018 sampling event. The water levels were measured to the nearest 0.01 feet relative to the top of the well casing using an electronic water level indicator. Water level measurements were collected while the extraction system was actively pumping to evaluate groundwater flow across the site under drawdown conditions. A summary of the water level data is provided in Appendix C.

3.2.2 Extraction Well Sampling

Six active extraction wells were sampled during the Spring 2018 sampling event. Extraction wells are equipped with 3-inch diameter submersible pumps with operating flow rates ranging from 0.5 to 17.5 gallons per minute. Samples from the extraction wells were collected from sampling spigots located at the wellheads. The spigots were opened and the flow rate was adjusted to less than 0.5 liter per minute prior to measuring field water quality parameters and collecting samples. The field parameters measured consisted of pH, specific conductivity, temperature, dissolved oxygen (DO), turbidity, and oxidation-reduction potential (ORP). Groundwater purge and sampling forms are included in Appendix D. Samples collected from the extraction wells were analyzed for VOCs and total chromium.

3.2.3 Monitoring Well Sampling

Groundwater samples from 10 monitoring wells sampled during this event were collected by using passive diffusion bag (PDB) samplers, deployed at least 14 days in advance of sample collection. Measurement of field parameters is not required when sampling from PDB samplers, as agreed by EPA. The samples were submitted for laboratory analysis of VOCs only. No biofilms were observed on any of the samplers. PDB sampling forms are included in Appendix D.

Six of the monitoring wells were sampled via a dedicated pump (stationed permanently in the well) or a non-dedicated pump (lowered into the well for the sampling event). The field parameters measured consisted of pH, specific conductivity, temperature, DO, turbidity, and ORP. Groundwater purge and sampling forms are included in Appendix D. Samples collected were analyzed for VOCs and total chromium, or VOCs only.

3.3 Sample Quantities, Analyses, and Handling

Groundwater samples were analyzed by ALS of Kelso, Washington, under direct contract with EA. Copies of the chain-of-custody forms that accompanied the samples to ALS are included in Appendix E. The following samples were collected and submitted for laboratory analysis during the Spring 2018 sampling event:

- Two groundwater samples, one field duplicate sample, and one MS/MSD sample were collected from Site wells and analyzed for total chromium (EPA Method 200.7).
- Sixteen groundwater samples, two field duplicate samples, and one MS/MSD sample were collected from Site wells and analyzed for VOCs (EPA Method 8260C).
- One trip blank was transported with the sample cooler and analyzed for VOCs.

3.4 Groundwater Monitoring Problems Encountered and Resolution

The following problems were encountered during the Spring 2018 sampling event:

- Water levels were not collected from wells AMW-20 and AMW-6A located on Linde property. A cooling system was built in the area and the wells were covered with gravel. The wells need to be located and the gravel removed prior to sampling.
- Water levels were not collected in former groundwater extraction wells MW-46, MW-41, AMW-42, and MW-48 because they were converted into flush mount monitoring wells in October 2017 and need to be re-surveyed.
- A water level was not collected in well MW-34. The well was disturbed during the Padden Parkway redevelopment and needs to be re surveyed.
- The water level in well GWSW-1 could not be measured because the pump was not working properly, and the water level was fluctuating.

Items will be addressed prior to or during the Fall 2018 sampling event.

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4. GROUNDWATER MONITORING RESULTS

This section summarizes the analytical results for groundwater samples and groundwater elevation data. In the following discussion, chromium and TCE results are presented by well grouping. Additional VOCs detected are also briefly discussed. Note that concentration trends observed in Site groundwater, by well grouping, are presented in the Annual Status Reports, the most recent of which was prepared for 2017 (EA 2018a). General trends and results of note from the Spring 2018 sampling event are discussed below.

Only wells within the alluvial aquifer were sampled during the Spring event. The alluvial aquifer within the Site area is divided geographically into the following well groupings: Upgradient wells, TCE Source wells, Proximal wells, Intermediate wells, Church of God wells, and Toe-of-Plume wells (including Sentinel and Other Toe wells). Well groupings are presented in Table 1 and shown on Figure 4. Additionally, wells impacted by the Northern Plume are grouped separately for discussion purposes.

Tables 2 through 5 present analytical results for wells sampled during the Spring 2018 event. A summary of the analytical results for total chromium and detected VOCs is presented in Table 2. Wells with analytical results above the cleanup levels are presented in Table 3. Table 4 presents a summary of the chromium analytical results for each well sampled along with results for the previous three semiannual sampling events for comparison purposes. Table 5 presents a summary of the TCE analytical results for each well sampled for TCE, along with results for the previous three semiannual sampling events for comparison purposes. Note that only wells sampled during Spring 2018 are included in Tables 4 and 5. Analytical results for the samples collected during the Spring 2018 semiannual event are included in Appendix F.

Results of sampling for OU-3 chromium concentrations and TCE concentrations in alluvial aquifer groundwater are shown on Figures 5 and 6, respectively.

4.1 Chromium Results and Distribution

As shown on Table 4 and Figure 5, only two groundwater samples were collected for chromium analysis during the Spring 2018 event, and neither of them contained chromium at a concentration above the Site-specific cleanup level of 80 µg/L, as established in the ROD for the Site (EPA 2000). The two samples were collected from alluvial aquifer wells in the Intermediate group. The Intermediate wells are located west of NE St. Johns Road and north and south of NE 78th Street (Figure 4).

No Troutdale aquifer wells were sampled for chromium during the Spring 2018 sampling event.

4.2 Trichloroethene Results and Distribution

As shown in Table 5, TCE was detected at concentrations above the Site-specific cleanup level of 5 µg/L, as established in the ROD (EPA 2000), in 14 of the 16 groundwater samples collected and tested for TCE during the Spring 2018. The following subsections summarize the TCE

results by well grouping. The distribution of TCE in OU-3 groundwater, based on the Spring 2018 sampling results, is depicted on Figure 6. In general, TCE concentrations were similar to past sampling events with the exception of Church of God well MW-21D, which is discussed in Section 4.2.1.4.

No Troutdale aquifer wells were sampled for TCE during the Spring 2018 sampling event.

4.2.1 Alluvial Aquifer

Alluvial aquifer monitoring and extraction wells from the following groupings were sampled for TCE during the Spring 2018 sampling event: TCE Source, Intermediate, and Church of God. Note that wells impacted by the offsite Northern Plume have been grouped together for discussion purposes.

4.2.1.1 TCE Source Wells

In the TCE source area, five wells were sampled for TCE during the Spring 2018 sampling event. (Table 5). The TCE concentration remained above the cleanup level in wells AMW-1A, AMW-2A, AMW-12A, and MW-1A. The TCE concentration in well AMW-53A was above the cleanup level (5.4 µg/L) in Fall 2017 but dropped below in Spring 2018 (3.8 µg/L). TCE concentrations in all TCE Source wells were lower in Spring 2018 than in Fall 2017. Historically, TCE concentrations in wells in this area tend to fluctuate (EA 2018a).

4.2.1.2 Intermediate Wells

TCE concentrations remained above the 5 µg/L groundwater cleanup level in all five Intermediate group wells sampled during Spring 2018 (Table 5). TCE concentrations in four of these five wells were slightly higher than results from Fall 2017. Historically, TCE concentrations in groundwater samples from wells in this area (not impacted by the Northern Plume) have been on a decreasing trend (EA 2018a).

4.2.1.3 Northern Plume Wells

TCE concentrations remained above the 5 µg/L groundwater cleanup level in the five Northern Plume impacted wells sampled during Spring 2018 (Table 5). TCE concentrations in these wells were similar to results from the previous sampling event. Additional discussion of the Northern Plume, including previous monitoring results, is provided in Appendix G.

4.2.1.4 Church of God Wells

Extraction well MW-21D was the only well sampled in this area and is the closest well to the most impacted Northern Plume well. TCE concentrations in well MW-21D had been on a consistent decreasing trend, and below the cleanup level since Spring 2013 (EA 2018a). The TCE concentration in this well increased to the 5 µg/L cleanup level during Spring 2018 (Table 5). Because this is an active extraction well, it is suspected that the increase in the TCE

concentration may indicate that the Northern Plume is being pulled into the treatment system. Consequently, well MW-21D was shut off on June 22, with EPA approval.

4.3 Other Detected VOCs

Several additional VOCs are commonly detected at the Site. Results for these compounds, in relation to Site cleanup levels, are briefly described in this section and summarized in Table 2. Note that the majority of other VOCs detected were at concentrations well below the Site cleanup levels. Results for all VOCs analyzed are provided in Appendix F.

Other VOCs detected in groundwater from Site wells during the Spring 2018 sampling event included the following:

- PCE was not detected above the 5 µg/L Site-specific cleanup level, as established in the ROD (EPA 2000), in any of the groundwater samples.
- Trichlorofluoromethane was not detected above the 2,400 µg/L state Model Toxics Control Act Method B cleanup level in any of the groundwater samples.
- 1,1,1-TCA was not detected above the 200 µg/L Site-specific cleanup level, as established in the ROD (EPA 2000), in any of the groundwater samples.
- 1,1-DCE was detected at a concentration above the 1.0 µg/L Site-specific cleanup level, as established in the ROD (EPA 2000), in 3 of the 16 groundwater samples analyzed for VOCs. Wells with 1,1-DCE concentrations above the cleanup level were alluvial aquifer wells MW-14E (1.8 µg/L), MW-20D (1.2 µg/L), and MW-23D (1.4 µg/L). Wells MW-14E and MW-20D are in the Intermediate well group. Well MW-23D is impacted by the Northern Plume.
- *Cis*-1,2-dichloroethene was not detected above the 70 µg/L EPA MCL in any of the groundwater samples.
- Bromodichloromethane was not detected above the 1 µg/L Site-specific cleanup level, as established in the ROD (EPA 2000), in any of the groundwater samples.

4.4 Groundwater Elevations

Depth-to-groundwater measurements were collected from monitoring and extraction wells during the Spring 2018 semiannual event. Alluvial and Troutdale aquifer wells were gauged on 24 and 25 April 2018 and groundwater levels were measured under active pumping conditions. The groundwater elevation for each well was determined by subtracting the depth-to-groundwater measurement from the surveyed top-of-casing elevation. Groundwater elevations and well construction details are presented in Appendix C.

Generalized groundwater elevation contour maps for the alluvial and Troutdale aquifers for the Spring 2018 water level gauging event are presented as Figures 7 and 8, respectively. The flow direction within the alluvial aquifer is generally to the west-northwest.

Water levels in the alluvial aquifer and Troutdale aquifers were approximately 1 to 3 feet higher in Spring 2018 than during the Fall 2017 sampling event, which is typical of seasonal variations experienced in prior years.

5. ANALYTICAL DATA QUALITY

5.1 Treatment System Influent and Effluent Samples

The monthly OU-3 influent/effluent data for the reporting period were reviewed in accordance with the standards established in the Site QASP (EA 2004). The sample coolers and the samples contained within them were received intact at the laboratory with the proper chemical preservative. No qualification of sample data was made based on the sample receipt or chain of custody.

Methylene chloride, a common laboratory contaminant, was detected in the trip blanks for January, February, March, April, and June 2018 at estimated concentrations below the method reporting limit (MRL) of 2.0 µg/L (Appendix B.4). This chemical was not detected in the field samples; therefore, no qualification of the field sample data was necessary based on these results.

The chromium ICP serial dilution was out of range for the February data package at 114% difference. The initial sample result and serial dilution result were both flagged as non-detect (0.9 U and 2 U respectively) and are not expected to affect the data.

The control criteria were exceeded for Dibromofluoromethane in the March data package. Since the problem may indicate a potential bias the sample was re-analyzed four days past the recommended hold time. The surrogates met control criteria for the re-analysis. Note the reanalysis confirmed an error with the original results. The data from the reanalysis is reported and flagged to indicate the problem.

The surrogate control sample was outside of the control limit for the April data package but reported as no further corrective action required.

The relative percent difference (RPD) for metals was out of range at 36% in the May data package. However, the results are estimated concentrations below the method reporting limit (MRL) and are not expected to affect the data.

5.2 Data Quality Assessment

This section summarizes the results of the data quality assessment and the analytical results for the QC samples collected during the Spring 2018 semiannual groundwater monitoring event. In accordance with the Consent Decree, data validation is only required for one data package from Fall semiannual sampling events; therefore, validation was not performed on data generated during this Spring semiannual sampling event. The analytical results for the environmental and QC samples are provided in Appendix F. The analytical data quality was assessed, as described below. The analytical results for project samples are acceptable as reported and usable for the intended purpose; none of these data have been rejected.

5.3 Field Duplicates

Two field duplicates were collected to evaluate the precision of sampling procedures and laboratory analyses. The following table presents a summary of the field duplicates and associated field samples collected.

Field Duplicate Summary

Well ID	Sample No.	Field Duplicate Sample No.	Analysis	Sample Collection Date	Sample Collection Time
MW-18D	1817004	1817005	VOCs/Total Chromium	24 April 2018	11:10/11:25
AMW-2A	1817015	1817016	VOCs	24 April 2018	15:50/16:00

NOTE: VOCs = volatile organic compounds.

The precision between primary and duplicate field sample results is specified in the Reference QASP (EA 2004) as a maximum relative percent difference of 25 percent. The calculated relative percent differences were within the project established limit of 25 percent for the field duplicate and original sample results.

A comparison of VOC and chromium concentrations for primary and duplicate groundwater samples is presented in Table 6.

5.4 Equipment Rinsate Blanks

Only PDBs and dedicated pumps were used for sampling during this event; therefore, no equipment rinsate blank samples were required or collected.

5.5 Trip Blanks

One trip blank sample was collected to evaluate the potential for VOC cross-contamination during sample handling, shipping, or storage on site or at the laboratory. A trip blank was included in each cooler that contained project samples for VOC analysis, as specified in the Reference QASP (EA 2004). The following table presents a summary of the trip blank samples collected.

Trip Blank Summary

Sample No.	Associated Field Samples
1817001	1817002 through 1817019

No VOC contamination was reported in the trip blank, with the exception of methylene chloride at 0.15 µg/L, below the reporting limit of 2.0 µg/L. The results for this analyte in the associated samples were non-detect; therefore, no qualification is necessary based on the results of the trip blank sample.

5.6 Completeness

Usable analytical data were available for the VOC and chromium analyses; therefore, the total analytical completeness was 100 percent. Analytical completeness was calculated by reviewing the number of acceptable analytical results against the total number of analytical results.

The entire set of planned field samples was collected, resulting in a field completeness of 100 percent.

5.7 Data Review Summary

The following table summarizes the findings for the data quality assessment.

Data Quality Assessment Summary

Parameter	Holding Time	Field/Method Blank Contamination	Precision		Accuracy			Completeness	
			Lab	Field	SMC	MS/MSD	LCS	Analytical	Field
VOCs	X	X	X	X	X	X	X	100%	100%
Chromium	X	X	X	X	NA	X	X	100%	100%

NOTE:

X = The data are usable as reported based on the review of this quality measurement.
 SMC = System monitoring compound surrogate.
 MS/MSD = Matrix spike/matrix spike duplicate.
 LCS = Laboratory control sample.
 NA = The quality measurement does not apply to this matrix or analytical methodology.
 VOCs = Volatile organic compounds.

The data collected as part of the Spring 2018 semiannual groundwater monitoring event were found to meet the standards established in the Site QASP (EA 2004).

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6. SUMMARY AND FINDINGS

6.1 Treatment System

The system continued to operate as designed and in compliance with the Consent Decree and treatment standards. During this reporting period, MW-21D was shut off, with EPA approval, to limit pulling the Northern Plume into the Site treatment system. All treated groundwater was discharged to the infiltration gallery on Linde property during the reporting period from 1 January through 30 June 2018. During the reporting period, 33,054,146 gallons of groundwater were treated, and the system removed 3.4 pounds of TCE and 11.7 pounds of total chromium.

6.2 Groundwater Monitoring

In general, contaminant concentrations in groundwater across the Site have decreased or remained relatively stable since the previous semiannual sampling event.

6.2.1 Chromium

Groundwater samples from two wells in the Intermediate Group were analyzed for chromium during the Spring 2018 sampling event. Chromium was not detected at concentrations above the Site-specific cleanup level of 80 µg/L in either of the wells sampled. Historically, chromium concentrations have been higher in the Spring than the Fall.

6.2.2 Trichloroethene

As shown in Table 5, TCE was detected at concentrations above the Site-specific cleanup level of 5 µg/L, in 14 of the 16 groundwater samples collected for VOC analysis during the Spring 2018 event, which included wells in the TCE Source and Intermediate well groups. TCE was detected at the Site-specific cleanup level of 5 µg/L in the one well sampled in the Church of God well group.

The TCE concentration in TCE Source group well AMW-53A dropped below the cleanup level in Spring 2018 (3.8 µg/L), from 5.4 µg/L in Fall 2017. Within the OU-3 Plume, the highest TCE concentration detected was in groundwater from well MW-1A (77 µg/L).

Well MW-21D was shut off on June 22, with EPA approval, because it is an active extraction well and it is suspected that the increase in the TCE concentration may indicate that the Northern Plume is being pulled into the treatment system.

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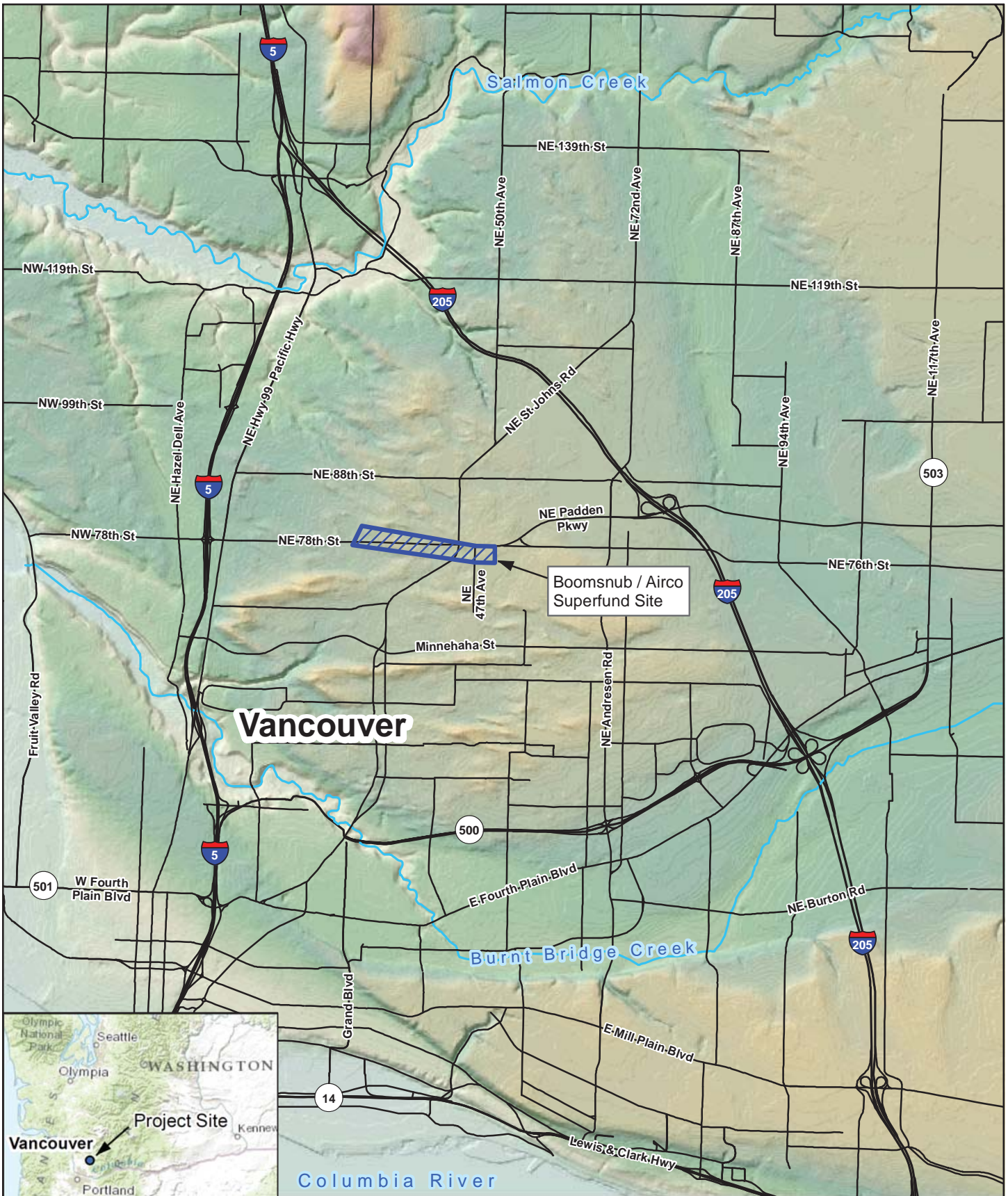
7. REFERENCES

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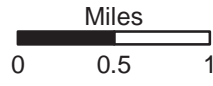
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Figures

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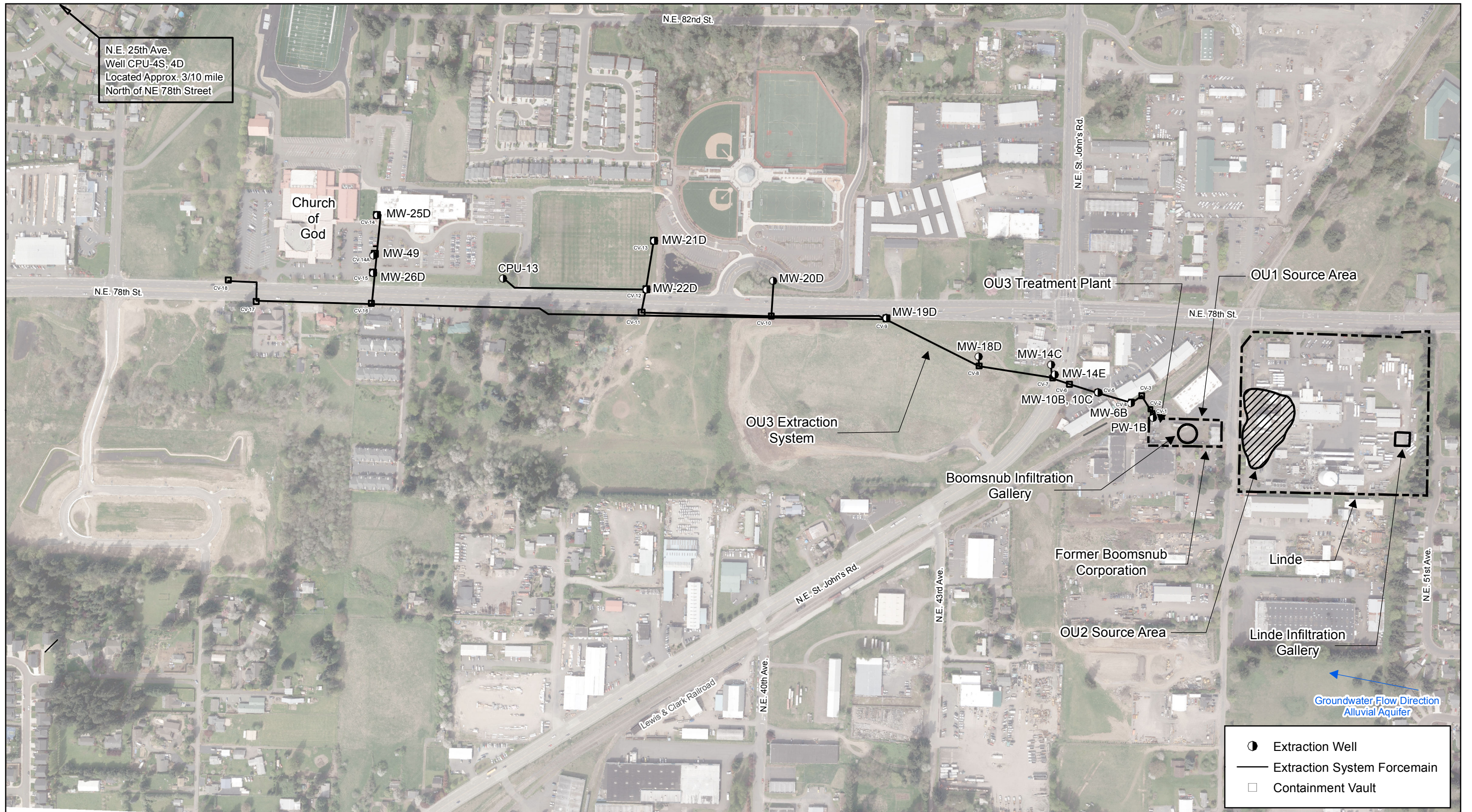


BOOMSNUB / AIRCO SUPERFUND SITE
 HAZEL DELL, WASHINGTON

FIGURE 1
SITE LOCATION MAP

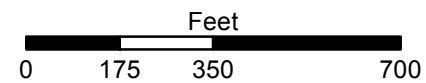
EA Project No. 1524058
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N.E. 25th Ave.
Well CPU-4S, 4D
Located Approx. 3/10 mile
North of NE 78th Street

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Seattle, WA 98121
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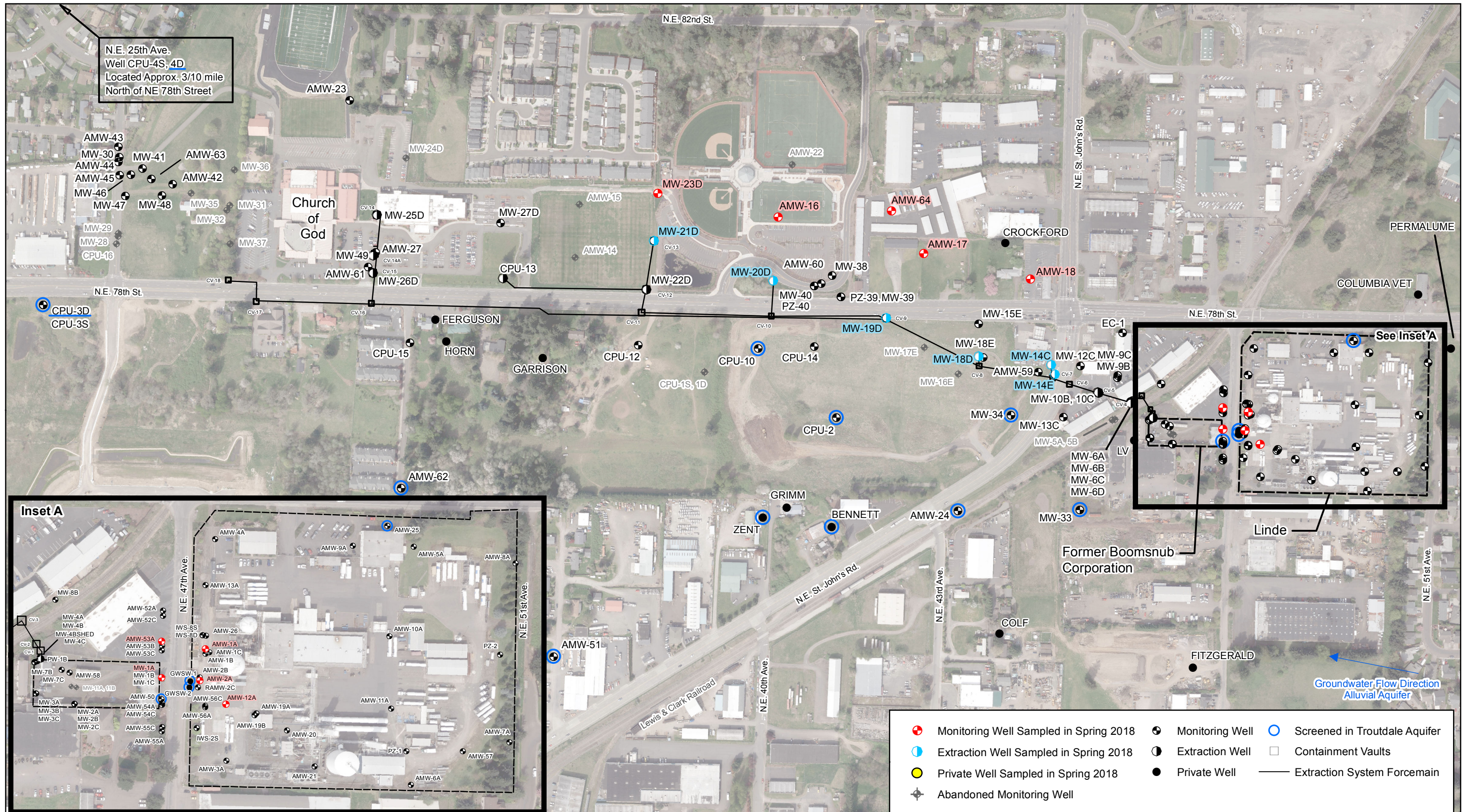


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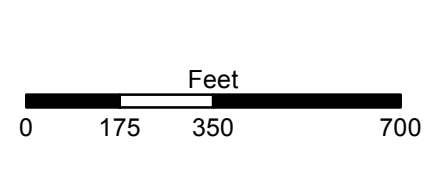
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File Name: Fig_2_OU_Treatment_Spring18

FIGURE 2
OPERABLE UNITS AND TREATMENT SYSTEM
SPRING 2018

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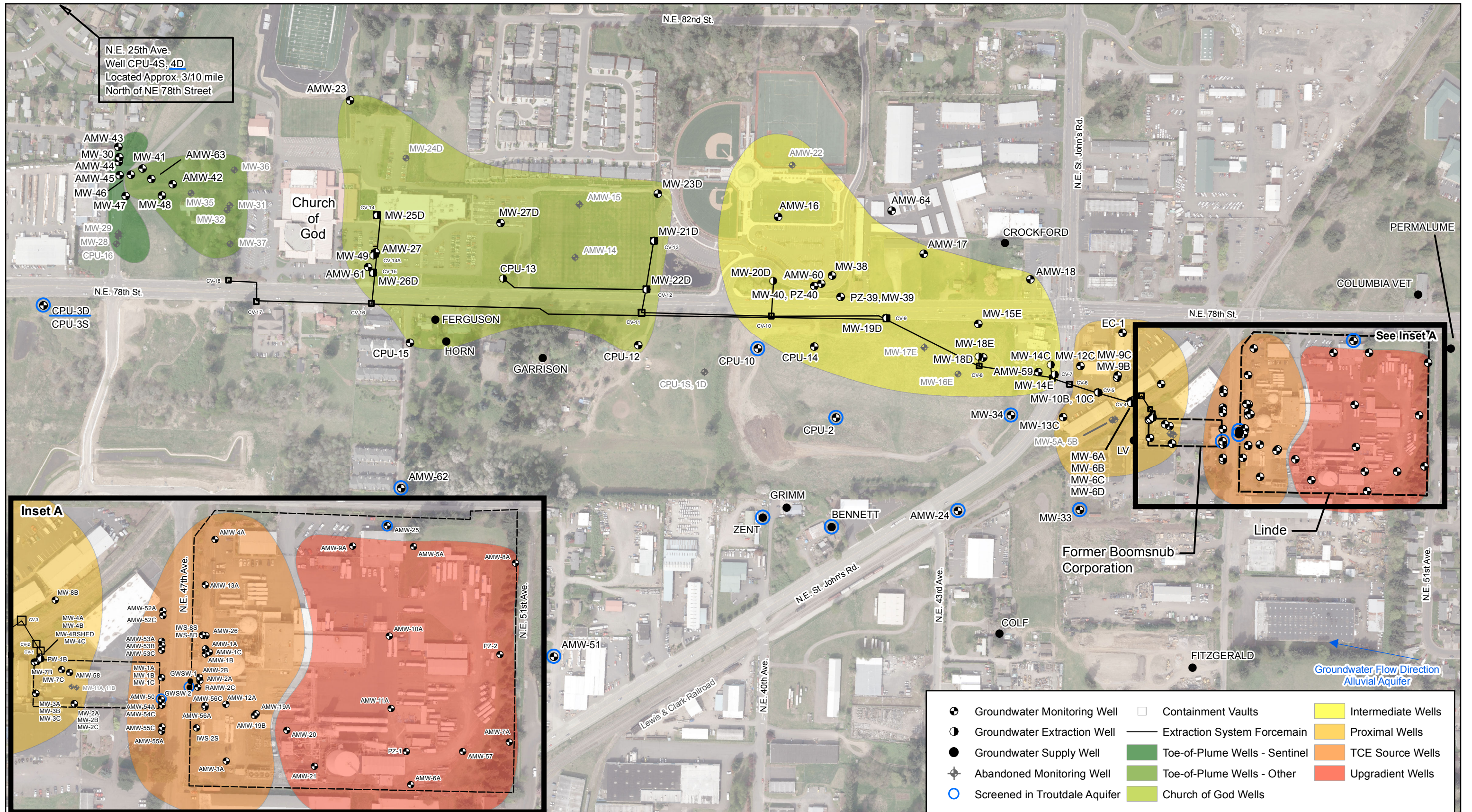


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**FIGURE 3
 GROUNDWATER SAMPLING LOCATIONS
 SPRING 2018**

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N.E. 25th Ave.
Well CPU-4S, 4D
Located Approx. 3/10 mile
North of NE 78th Street

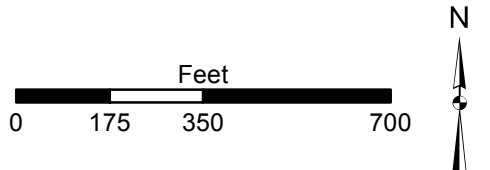
Inset A

See Inset A

Groundwater Flow Direction
Alluvial Aquifer

- | | | |
|---------------------------------|---------------------------------|----------------------|
| ⊕ Groundwater Monitoring Well | □ Containment Vaults | 🟡 Intermediate Wells |
| ⦿ Groundwater Extraction Well | — Extraction System Forcemain | 🟠 Proximal Wells |
| ● Groundwater Supply Well | 🟢 Toe-of-Plume Wells - Sentinel | 🟠 TCE Source Wells |
| ⊕ Abandoned Monitoring Well | 🟢 Toe-of-Plume Wells - Other | 🔴 Upgradient Wells |
| ○ Screened in Troutdale Aquifer | 🟡 Church of God Wells | |

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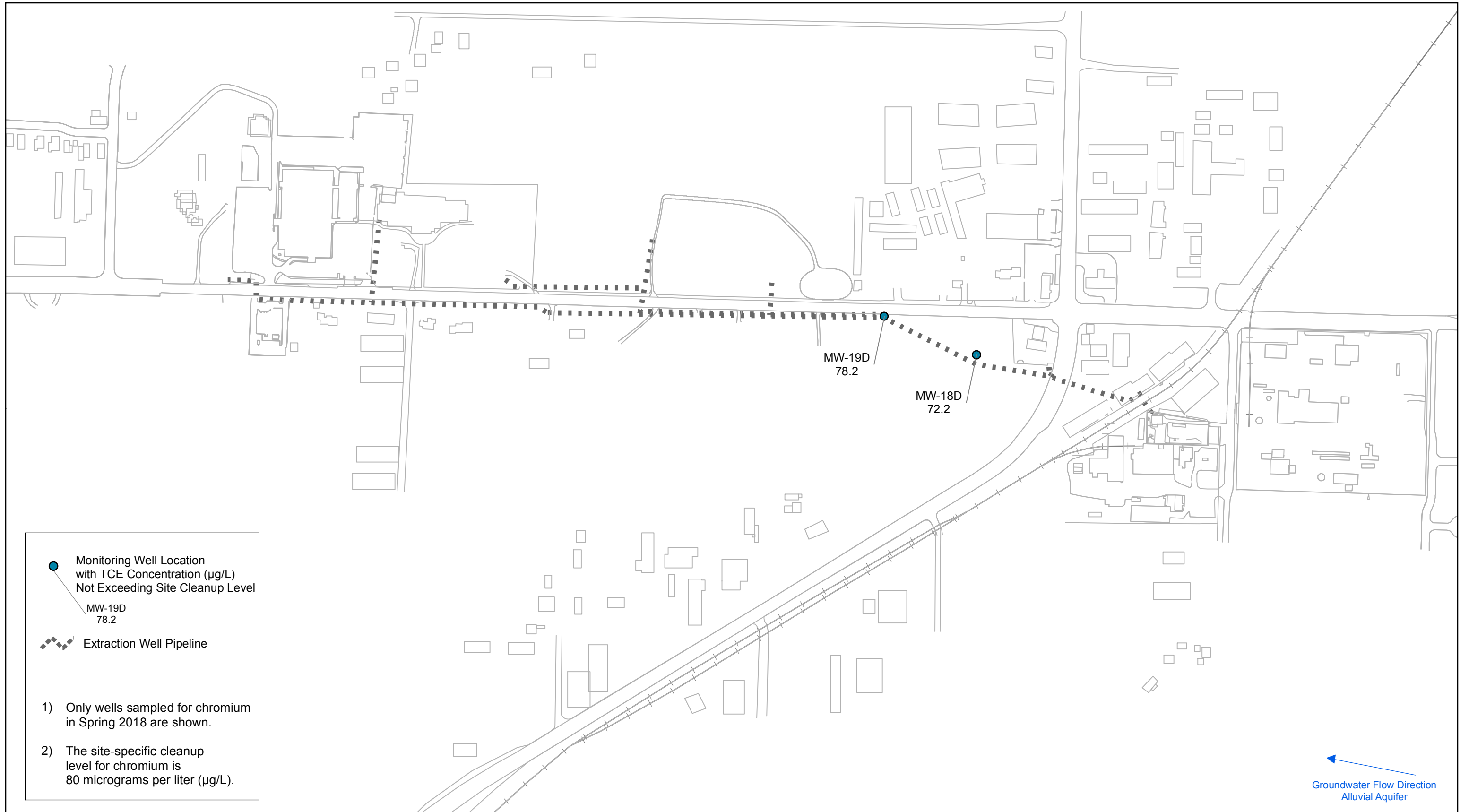



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**FIGURE 4
EXTRACTION AND MONITORING
WELL GROUPINGS**


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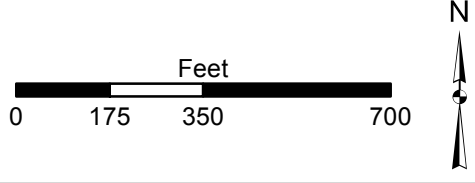
 Monitoring Well Location with TCE Concentration (µg/L) Not Exceeding Site Cleanup Level
 MW-19D
 78.2

 Extraction Well Pipeline

1) Only wells sampled for chromium in Spring 2018 are shown.
 2) The site-specific cleanup level for chromium is 80 micrograms per liter (µg/L).

 Groundwater Flow Direction Alluvial Aquifer

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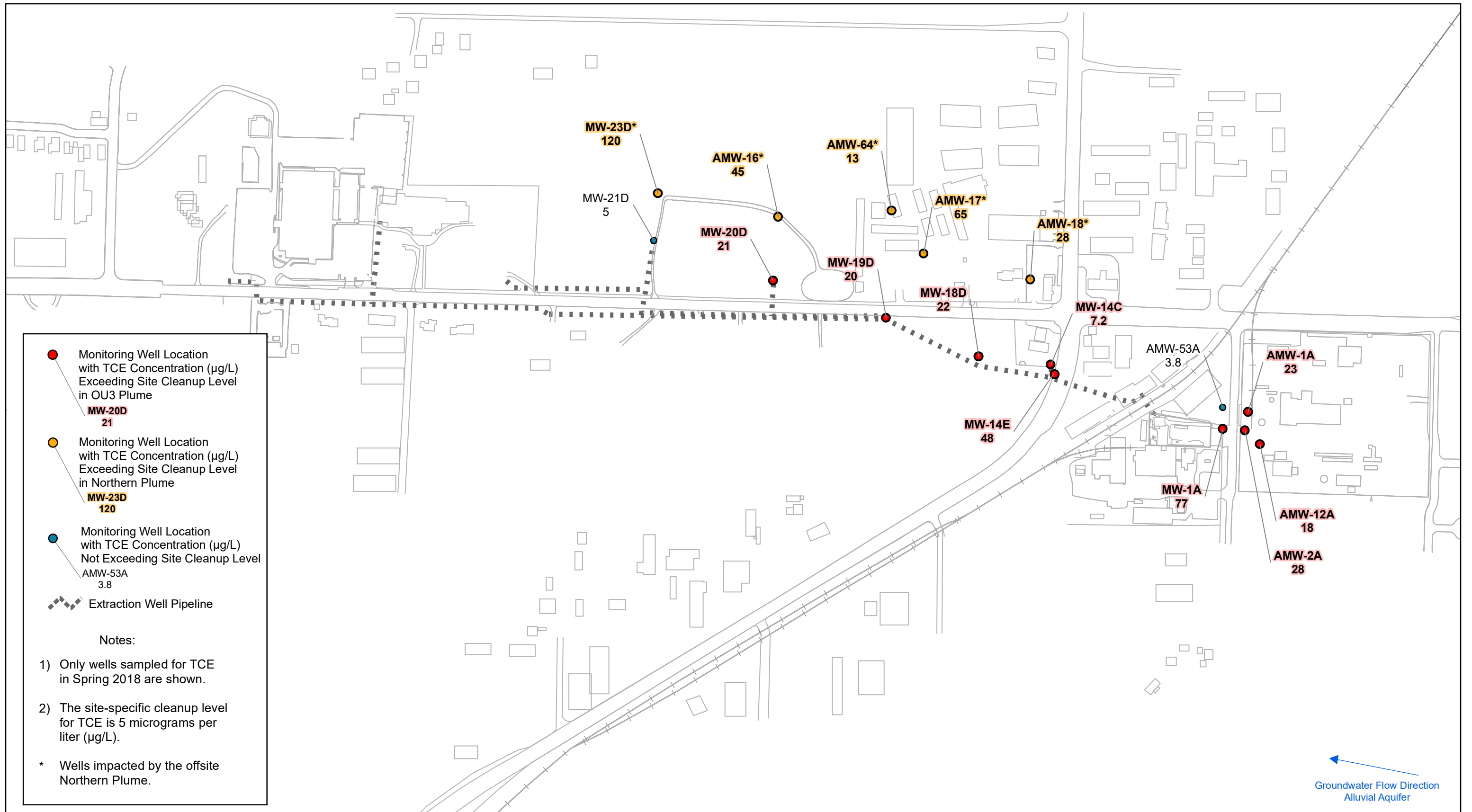


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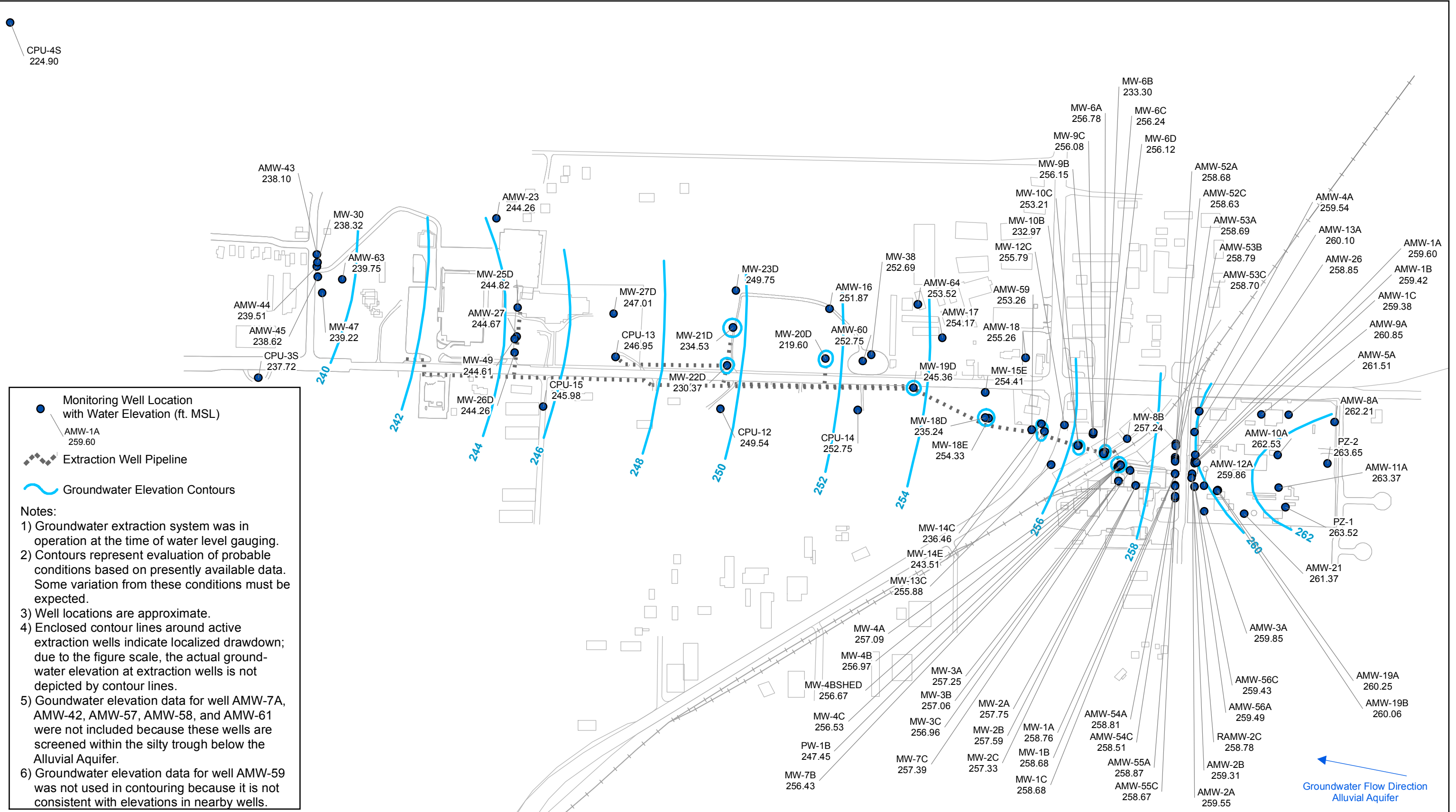
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FIGURE 5
 CHROMIUM SAMPLING RESULTS
 SPRING 2018

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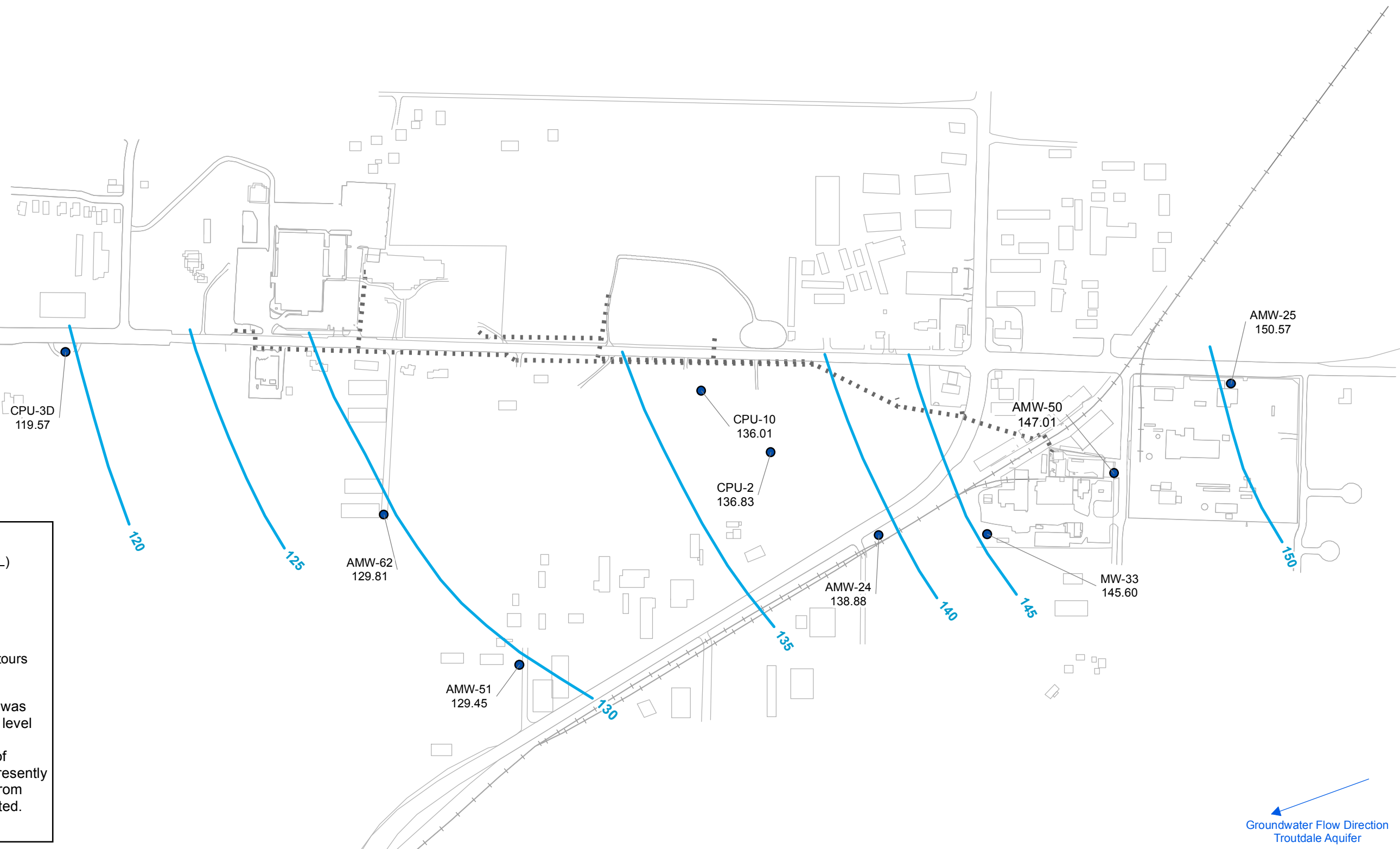


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CPU-4D
108.80

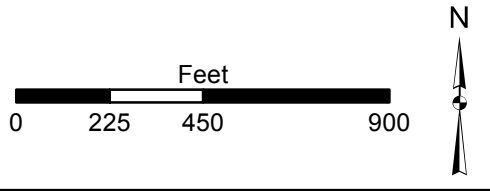


Monitoring Well Location with Water Elevation (ft. MSL)
 AMW-51 128.31
 Extraction Well Pipeline
 Groundwater Elevation Contours

Notes:
 1) Groundwater extraction system was in operation at the time of water level gauging.
 2) Contours represent evaluation of probable conditions based on presently available data. Some variation from these conditions must be expected.
 3) Well locations are approximate.

Groundwater Flow Direction
Troutdale Aquifer

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FIGURE 8
 TROUTDALE AQUIFER GROUNDWATER
 CONTOURS
 SPRING 2018

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Tables

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Table 1. Extraction and Monitoring Well Groupings

Well Group	AMW Wells	MW Wells	Other Wells
Upgradient	AMW-8A		
	AMW-1A AMW-19A AMW-2A AMW-26 AMW-3A AMW-53A AMW-4A AMW-54A AMW-12A AMW-56A	MW-1A	
		MW-2A MW-6C MW-2B MW-6D MW-3A MW-7B MW-3C MW-8B MW-4A MW-9B MW-4B MW-9C MW-4BShed MW-10B MW-4C MW-10C MW-6A MW-12C MW-6B MW-13C	PW-1B
	AMW-59 AMW-60	MW-14C MW-18E MW-14E MW-19D MW-15E MW-20D MW-18D MW-40	CPU-14 PZ-39
	AMW-16 AMW-23 AMW-17 AMW-64 AMW-18	MW-23D MW-38	
	AMW-61	MW-21D MW-22D	CPU-12
	AMW-63	MW-35 MW-41	
Troutdale Aquifer	AMW-24	MW-33	Bennett
Infiltration Gallery Wells	AMW-6A AMW-10A AMW-7A AMW-11A		

NOTES:

- Wells shown in **bold** and shaded were sampled during the Spring 2018 semiannual monitoring event.
- Only wells being sampled as part of the current monitoring plan (EA 2018a) are listed on this table (and does not include wells where sampling is on hold).
- Northern Plume wells include those currently impacted by the off-site Northern Plume.
- AMW wells were installed by Linde LLC.
- MW wells were installed by the U.S. Environmental Protection Agency or Washington Department of Ecology.
- CPU wells were installed by Clark Public Utilities.

Table 2. Summary of Chromium and Selected VOC Concentrations in Groundwater Samples—Spring 2018

Well Group	Well	Chromium (µg/L)	TCE (µg/L)	PCE (µg/L)	CFC-11 (µg/L)	1,1,1-TCA (µg/L)	1,1-DCE (µg/L)	Cis-1,2- DCE (µg/L)	BDCM (µg/L)
TCE Source (OU-2)	AMW-1A	NA	23	0.61	45	3.5	0.5 U	0.23 J	0.5 U
	AMW-2A	NA	28	0.57	10	0.87	0.5 U	0.5 U	0.5 U
	AMW-12A	NA	18	0.45 J	0.97	0.24 J	0.5 U	0.5 U	0.5 U
	AMW-53A	NA	3.8	0.55	9.9	0.73	0.5 U	0.5 U	0.19 J
	MW-1A	NA	77	1.0	6.6	1.8	0.48 J	0.81	0.5 U
Intermediate	MW-14C	NA	7.2	0.61	0.5 U	0.5 U	0.5 U	0.5 U	0.13 J
	MW-14E	NA	48	1.8	0.5 U	0.5 U	1.8	2.3	0.5 U
	MW-18D	72.2	22	1.1	0.13 J	0.5 U	0.30 J	0.23 J	0.5 U
	MW-19D	78.2	20	1.0	0.5 U	0.5 U	0.70	0.18 J	0.5 U
	MW-20D	NA	21	0.77	0.5 U	0.5 U	1.2	0.22 J	0.5 U
Northern Plume	AMW-16	NA	45	0.5 U	0.5 U	0.12 J	0.35 J	0.070 J	0.5 U
	AMW-17	NA	65	0.30 J	0.5 U	0.22 J	0.10 J	0.5 U	0.5 U
	AMW-18	NA	28	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	AMW-64	NA	13	0.5 U	0.5 U	0.11 J	0.5 U	0.22 J	0.5 U
	MW-23D	NA	120	0.5 U	0.5 U	1.0	1.4	0.5 U	0.5 U
Church of God	MW-21D	NA	5.0	0.5 U	0.5 U	0.10 J	0.44 J	0.21 J	0.5 U
Cleanup or Guidance Level		80	5	5	2,400	200	1	70	1

NOTES:

Only commonly detected VOCs are included in this table.

Results in **blue bold** exceed the established cleanup or guidance level for the compound.

The concentrations listed in the table are the maximum of the primary and duplicate samples (as applicable).

1,1,1-TCA = 1,1,1-Trichloroethane.

1,1-DCE = 1,1-Dichloroethene.

BDCM = Bromodichloromethane

CFC-11 = Trichlorofluoromethane.

Cis-1,2-DCE = cis-1,2-Dichloroethene.

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

NA = The sample was not analyzed for the specified compound.

PCE = Tetrachloroethene.

TCE = Trichloroethene.

U = Analyte not detected above the specified reporting limit.

Table 3. Wells with Analytical Results Above Cleanup Levels—Spring 2018

Well Group ^a	Chromium (80 µg/L) ^b	TCE (5 µg/L) ^b	1,1-DCE (1 µg/L) ^b
Upgradient (0)	NS	NS	NS
TCE Source (5)	NS	AMW-1A AMW-2A AMW-12A MW-1A	NR
Proximal (4)	NS	NS	NS
Intermediate (6)	NR	MW-14C MW-14E MW-18D MW-19D MW-20D	MW-14E MW-20D
Northern Plume (6)	NS	AMW-16 AMW-17 AMW-18 AMW-64 MW-23D	MW-23D
Church of God (3)	NR	NR	NR
Toe of Plume (1)	NS	NS	NS
Troutdale Aquifer (1)	NS	NS	NS

NOTES:

^a Numbers in parentheses are the total number of wells sampled during the Spring 2018 sampling event.

^b Site clean-up criteria established in the Record of Decision (EPA 2000).

1,1-DCE = 1,1-Dichloroethene.

NR = None reported above the clean-up criteria.

NS = None sampled.

TCE = Trichloroethene.

µg/L = Micrograms per liter.

Table 4. Summary of Recent Chromium Concentrations

Well Group	Well	Fall 2016 (µg/L)	Spring 2017 (µg/L)	Fall 2017 (µg/L)	Spring 2018 (µg/L)
Intermediate	MW-18D	74	79.7	72	72.2
	MW-19D	79.5	85.3	72.3	78.2

NOTES:

Only wells sampled for chromium during Spring 2018 are included in this table.

Results are for total chromium, unless otherwise noted.

Results shown in **blue bold** exceed the cleanup level of 80 µg/L.

Table 5. Summary of Recent Trichloroethene Concentrations

Well Group	Well	Fall 2016 (µg/L)	Spring 2017 (µg/L)	Fall 2017 (µg/L)	Spring 2018 (µg/L)
TCE Source	AMW-1A	0.44 J	5.2	39	23
	AMW-2A	120	170	86	28
	AMW-12A	19	23	22	18
	AMW-53A	1.1	0.66	5.4	3.8
	MW-1A	51	24	110	77
Intermediate	MW-14C	9.2	8.0	6.1	7.2
	MW-14E	63	49	37	48
	MW-18D	27	24	21	22
	MW-19D	23	22	20	20
	MW-20D	23	25	20	21
Northern Plume	AMW-16				
	AMW-17	96	70	79	65
	AMW-18	40	43	28	28
	AMW-64	24	22	15	13
	MW-23D	140	180	140	120
Church of God	MW-21D	3.4	3.6	2.4	5.0

NOTES:

Only wells sampled for TCE during Spring 2018 are included in this table.

Results shown in **blue bold** exceed the cleanup level of 5 µg/L.

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

NS = Not Sampled.

TCE = Trichloroethene.

U = Analyte not detected above the specified reporting limit.

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Table 6. Comparison of Chromium and VOC Concentrations for Normal and Duplicate Groundwater Samples—Spring 2018

Compound	Result (in µg/L)	MW-18D	AMW-2A
Total Chromium	Primary	72.2	NA
	Duplicate	71.6	NA
	RPD (%)	0.83	NA
Trichloroethene (TCE)	Primary	21	27
	Duplicate	22	28
	RPD (%)	4.7	3.6
Tetrachloroethene (PCE)	Primary	1.1	0.56
	Duplicate	1.0	0.57
	RPD (%)	9.5	1.8
Trichlorofluoromethane (CFC-11)	Primary	0.12 J	10
	Duplicate	0.13 J	9.6
	RPD (%)	8.0	4.1
1,1-Dichloroethene (1,1-DCE)	Primary	0.29 J	<0.50
	Duplicate	0.30 J	<0.50
	RPD (%)	3.4	NC
1,1,1-Trichloroethane (TCA)	Primary	<0.50	0.87
	Duplicate	<0.50	0.86
	RPD (%)	NC	1.2

NOTES:

Results are shown in micrograms per liter (µg/L).

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

NA = Not analyzed

VOC = volatile organic compound

NC = Not calculable

RPD = Relative percent difference

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Appendix A

Site Daily Operation and Maintenance Summary

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APPENDIX A SITE DAILY OPERATION AND MAINTENANCE SUMMARY

The Site System Operator performs routine tasks on the OU-3 Site-wide groundwater treatment system. A synopsis of routine and other Site activities is provided in this section.

January 2018

- January 2.** Downloaded and tabulated run-time data.
- January 4.** Collected monthly treatment system influent and effluent samples.
- January 15.** Conducted the bi-weekly inspection. Downloaded and tabulated run-time data.
- January 26.** Inspected vaults.
- January 31.** Recorded and tabulated monthly extraction well flow rates. Conducted the bi-weekly system inspection. The system was shutoff to pump water out of vaults CV-3 and CV-9. The system was down for 14 minutes. The system was also shutoff for 1 hour and 49 minutes to fluff IX resin and change filters.

February 2017

- February 2.** Downloaded and tabulated run-time data, worked on monthly reporting
- February 5.** Collected monthly treatment system influent and effluent samples.
- February 12.** Conducted the bi-weekly system inspection. Downloaded and tabulated run-time data.
- February 16.** Inspected vaults.
- February 31.** Recorded and tabulated monthly extraction well flow rates. Conducted the bi-weekly system inspection.

March 2017

- March 1.** Downloaded and tabulated run-time data, worked on monthly reporting.
- March 4.** Collected monthly treatment system influent and effluent samples.

March 16. Conducted the bi-weekly system inspection. Downloaded and tabulated run-time data. Changed data-logger and SCADA clocks to daylight savings time.

March 23. Inspected vaults.

March 30. Recorded and tabulated monthly extraction well flow rates. Conducted the bi-weekly system inspection.

April 2018

April 2. Downloaded and tabulated run-time data, worked on monthly reporting; Collected the monthly treatment system influent and effluent samples. The system was shutoff to pump water out of vault CV-9. The system was off for 15 minutes.

April 13. Conducted the bi-weekly inspection. Downloaded and tabulated run-time data.

April 24. Spring sampling event.

April 25. Collected Site water levels; replaced flow meters in wells MW-6B, MW-14E and MW-18D.

April 30. Recorded and tabulated monthly extraction well flow rates. Conducted bi-weekly system inspection.

May 2018

May 1. Downloaded and tabulated run-time data, worked on monthly reporting.

May 7. Collected treatment system influent and effluent samples.

May 15. Conducted the bi-weekly inspection. Downloaded and tabulated run-time data.

May 24. The system was shutoff for training and to test the system dial-out. The system was off for 34 minutes.

May 25. Conducted the bi-weekly system inspection.

May 30. Recorded and tabulated monthly extraction well flow rates.

June 2018

June 1. Downloaded and tabulated run-time data, worked on monthly reporting.

June 8. Collected the treatment system influent and effluent samples.

June 15. Conducted the bi-weekly system inspection. Downloaded and tabulated run-time data.

June 18. Inspected all vaults and visited the former Bennett property for modifications to well. No one was at the property and well remains unchanged.

June 25. Conducted the bi-weekly system inspection.

June 29. Recorded and tabulated monthly extraction well flow rates.

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Appendix B

Site Groundwater Extraction/Treatment System

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Appendix B.1

OU-3 Bi-weekly System Monitoring Checklists

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Name: Rick Read

Date: 01/15/18

Groundwater Treatment:						
Ion Exchange System Chromium Testing:			System pH Measurements During Inspection:			
Kit Used: DR 100 Colorimeter			Initial Calibration	7.00, 4.00	Final Calibration	7.0, 4.0
Test Location:	Chromium (ppm)	ID#	%	Location:	pH	
Well Field Influent	0.045			Well Field	5.98	
Primary	0.015	2	33%	Pre-IX	6.03	
Secondary	ND	3		IX Effluent	6.07	
Final Discharge	ND			Final Discharge	7.97	
System Flow Rates:						
Location:	GPM	Totalizer	Time			
Total Flow from Wells	127					
Well Field Influent	126	65356090	15:24			
IX Influent Flow Meter	127	30784931	15:17			
AS Influent Flow Meter	127	44684820	15:18			
COV Sewer Flow Meter						
Boomsnub Inf. Gal. Flow Meter						
Calculated Flow to BOC Inf. Gal.						
Air Stripper Monitoring:						
Pressure Readings:			TCE Concentrations:		TCE	
Location:	(In. H ₂ O)		Location:		(ppm)	
Blower	30		Air Stripper Effluent		1	
Air Stripper	28		Post Primary		ND	
			Final Discharge		ND < 5?	
Capsulhelic Gauge (In. H ₂ O)	1					
Pre-Heater Air Temperature (F°)	52					
Pre-Carbon Air Temperature (F°)	70					
Maintenance:						
Replace Bag Filter?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Leaks/Notes?			
Drain Compressor?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Flow meters in MW-14E and MW-18D not functioning.			
Replace Canister Filters?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>				
Lube Pump Motors?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>				
Inspect Infiltration Galleries?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>				
Inventory:		Sampling:				
	Quantity	Location	Lab	Date	Analytes	
Gloves	5	INF-010418	ALS	1/4/18	8260c, T.Cr	
Drums Empty 55-gal	9	EFF-010418	ALS	1/4/18	8260c, T.Cr	
Super sacks	4	EFFD-010418	ALS	1/4/18	8260c, T.Cr	
Bag Filters	2	TB-010418	ALS	1/4/18	8260c	
Canister Filters						
10 Micron 29.25 inch	0	Final Discharge pH at Time of Sampling:		7.89		
10 Micron 30 inch	0	Comments:				
20 Micron 29.25 inch	82					
20 Micron 30 inch	46					
75 Micron 30 inch	0					

Name: Rick Read

Date: 01/31/18

Groundwater Treatment:						
Ion Exchange System Chromium Testing:			System pH Measurements During Inspection:			
Kit Used: DR 100 Colorimeter			Initial Calibration	7.00, 4.00	Final Calibration	7.0, 4.0
Test Location:	Chromium (ppm)	ID#	%	Location:	pH	
Well Field Influent	0.045			Well Field	6.00	
Primary	0.015	2	33%	Pre-IX	6.03	
Secondary	ND	3		IX Effluent	6.08	
Final Discharge	ND			Final Discharge	7.97	
System Flow Rates:						
Location:	GPM	Totalizer	Time			
Total Flow from Wells	128					
Well Field Influent	127	68216922	15:24			
IX Influent Flow Meter	128	31081828	15:17			
AS Influent Flow Meter	128	45137789	15:18			
COV Sewer Flow Meter						
Boomsnub Inf. Gal. Flow Meter						
Calculated Flow to BOC Inf. Gal.						
Air Stripper Monitoring:						
Pressure Readings:			TCE Concentrations:		TCE	
Location:	(In. H₂O)		Location:		(ppm)	
Blower	30		Air Stripper Effluent		1	
Air Stripper	28		Post Primary		ND	
			Final Discharge		ND < 5?	
Capsulhelic Gauge (In. H ₂ O)	1					
Pre-Heater Air Temperature (F°)	50					
Pre-Carbon Air Temperature (F°)	70					
Maintenance:						
Replace Bag Filter?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Leaks/Notes?			
Drain Compressor?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Flow meters in MW-14E and MW-18D not functioning.			
Replace Canister Filters?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>				
Lube Pump Motors?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>				
Inspect Infiltration Galleries?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>				
Inventory:		Sampling:				
	Quantity	Location	Lab	Date	Analytes	
Gloves	5					
Drums Empty 55-gal	9					
Super sacks	4					
Bag Filters	1					
Canister Filters						
10 Micron 29.25 inch	0	Final Discharge pH at Time of Sampling:				
10 Micron 30 inch	0	Comments:				
20 Micron 29.25 inch	68	Changed filters in both influent canisters, replaced IX building bag filter and				
20 Micron 30 inch	46	Fluffed resin in both primary and polish IX canisters on 1/31/18.				
75 Micron 30 inch	0	COV collected an effluent sample on 1/16/18.				

Name: Rick Read

Date: 02/12/18

Groundwater Treatment:					
Ion Exchange System Chromium Testing:			System pH Measurements During Inspection:		
Kit Used: DR 100 Colorimeter			Initial Calibration 7.00, 4.00	Final Calibration 7.0, 4.0	
Test Location:	Chromium (ppm)	ID#	%	Location:	pH
Well Field Influent	0.044			Well Field	6.01
Primary	0.016	2	36%	Pre-IX	6.03
Secondary	ND	3		IX Effluent	6.08
Final Discharge	ND			Final Discharge	7.92
System Flow Rates:					
Location:	GPM	Totalizer	Time		
Total Flow from Wells	127				
Well Field Influent	127	70368860	17:33		
IX Influent Flow Meter	127	37305521	17:30		
AS Influent Flow Meter	127	45429560	17:31		
COV Sewer Flow Meter					
Boomsnub Inf. Gal. Flow Meter					
Calculated Flow to BOC Inf. Gal.					
Air Stripper Monitoring:					
Pressure Readings:			TCE Concentrations:		TCE
Location:	(In. H₂O)		Location:	(ppm)	
Blower	30		Air Stripper Effluent	1	
Air Stripper	28		Post Primary	ND	
			Final Discharge	ND < 5?	
Capsulhelic Gauge (In. H ₂ O)	1				
Pre-Heater Air Temperature (F°)	50				
Pre-Carbon Air Temperature (F°)	70				
Maintenance:					
Replace Bag Filter?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Leaks/Notes?		
Drain Compressor?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Flow meters in MW-14E and MW-18D not functioning.		
Replace Canister Filters?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>			
Lube Pump Motors?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>			
Inspect Infiltration Galleries?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>			
Inventory:		Sampling:			
	Quantity	Location	Lab	Date	Analytes
Gloves	5	INF-020518	ALS	2/5/18	8260c, T.Cr
Drums Empty 55-gal	9	EFF-020518	ALS	2/5/18	8260c, T.Cr
Super sacks	4	EFFD-020518	ALS	2/5/18	8260c, T.Cr
Bag Filters	1	TB-020518	ALS	2/5/18	8260c
Canister Filters					
10 Micron 29.25 inch	0	Final Discharge pH at Time of Sampling:		7.89	
10 Micron 30 inch	0	Comments:			
20 Micron 29.25 inch	68				
20 Micron 30 inch	46				
75 Micron 30 inch	0				

Name: Rick Read

Date: 02/28/18

Groundwater Treatment:						
Ion Exchange System Chromium Testing:			System pH Measurements During Inspection:			
Kit Used: DR 100 Colorimeter			Initial Calibration	7.00, 4.00	Final Calibration	7.0, 4.0
Test Location:	Chromium (ppm)	ID#	%	Location:	pH	
Well Field Influent	0.044			Well Field	6.01	
Primary	0.016	2	36%	Pre-IX	6.03	
Secondary	ND	3		IX Effluent	6.08	
Final Discharge	ND			Final Discharge	7.89	
System Flow Rates:						
Location:	GPM	Totalizer	Time			
Total Flow from Wells	127					
Well Field Influent	127	73215770	16:14			
IX Influent Flow Meter	127	37603143	16:11			
AS Influent Flow Meter	127	45826215	16:12			
COV Sewer Flow Meter						
Boomsnub Inf. Gal. Flow Meter						
Calculated Flow to BOC Inf. Gal.						
Air Stripper Monitoring:						
Pressure Readings:			TCE Concentrations:		TCE	
Location:	(In. H₂O)		Location:		(ppm)	
Blower	30		Air Stripper Effluent		1	
Air Stripper	28		Post Primary		ND	
			Final Discharge		ND < 5?	
Capsulhelic Gauge (In. H ₂ O)	1					
Pre-Heater Air Temperature (F°)	50					
Pre-Carbon Air Temperature (F°)	65					
Maintenance:						
Replace Bag Filter?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Leaks/Notes?			
Drain Compressor?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Flow meters in MW-14E and MW-18D not functioning.			
Replace Canister Filters?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>				
Lube Pump Motors?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>				
Inspect Infiltration Galleries?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>				
Inventory:		Sampling:				
	Quantity	Location	Lab	Date	Analytes	
Gloves	5					
Drums Empty 55-gal	9					
Super sacks	4					
Bag Filters	1					
Canister Filters						
10 Micron 29.25 inch	0	Final Discharge pH at Time of Sampling:				
10 Micron 30 inch	0	Comments:				
20 Micron 29.25 inch	68					
20 Micron 30 inch	46					
75 Micron 30 inch	0					

Name: Rick Read

Date: 03/16/18

Groundwater Treatment:					
Ion Exchange System Chromium Testing:			System pH Measurements During Inspection:		
Kit Used: DR 100 Colorimeter			Initial Calibration 7.00, 4.00	Final Calibration 7.0, 4.0	
Test Location:	Chromium (ppm)	ID#	%	Location:	pH
Well Field Influent	0.044			Well Field	5.98
Primary	0.016	2	36%	Pre-IX	6.02
Secondary	ND	3		IX Effluent	6.08
Final Discharge	ND			Final Discharge	7.87
System Flow Rates:					
Location:	GPM	Totalizer	Time		
Total Flow from Wells	127				
Well Field Influent	127	76059360	15:41		
IX Influent Flow Meter	127	31901345	15:39		
AS Influent Flow Meter	127	46420123	15:40		
COV Sewer Flow Meter					
Boomsnub Inf. Gal. Flow Meter					
Calculated Flow to BOC Inf. Gal.					
Air Stripper Monitoring:					
Pressure Readings:			TCE Concentrations:		TCE
Location:	(In. H₂O)		Location:	(ppm)	
Blower	30		Air Stripper Effluent	1	
Air Stripper	28		Post Primary	ND	
			Final Discharge	ND < 5?	
Capsulhelic Gauge (In. H ₂ O)	1				
Pre-Heater Air Temperature (F°)	55				
Pre-Carbon Air Temperature (F°)	70				
Maintenance:					
Replace Bag Filter?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Leaks/Notes?		
Drain Compressor?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Flow meters in MW-14E and MW-18D not functioning.		
Replace Canister Filters?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>			
Lube Pump Motors?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>			
Inspect Infiltration Galleries?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>			
Inventory:		Sampling:			
	Quantity	Location	Lab	Date	Analytes
Gloves	5	INF-030418	ALS	3/4/18	8260c, T.Cr
Drums Empty 55-gal	9	EFF-030418	ALS	3/4/18	8260c, T.Cr
Super sacks	4	EFFD-030418	ALS	3/4/18	8260c, T.Cr
Bag Filters	1	TB-030418	ALS	3/4/18	8260c
Canister Filters					
10 Micron 29.25 inch	0	Final Discharge pH at Time of Sampling:		7.92	
10 Micron 30 inch	0	Comments:			
20 Micron 29.25 inch	68				
20 Micron 30 inch	46				
75 Micron 30 inch	0				

Name: Rick Read

Date: 03/30/18

Groundwater Treatment:					
Ion Exchange System Chromium Testing:			System pH Measurements During Inspection:		
Kit Used: DR 100 Colorimeter			Initial Calibration 7.02, 4.01	Final Calibration 7.0, 4.0	
Test Location:	Chromium (ppm)	ID#	%	Location:	pH
Well Field Influent	0.044			Well Field	6.00
Primary	0.016	2	36%	Pre-IX	6.02
Secondary	ND	3		IX Effluent	6.07
Final Discharge	ND			Final Discharge	7.89
System Flow Rates:					
Location:	GPM	Totalizer	Time		
Total Flow from Wells	127				
Well Field Influent	127	78507620			10:32
IX Influent Flow Meter	127	32159470			10:30
AS Influent Flow Meter	127	47000230			10:29
COV Sewer Flow Meter					
Boomsnub Inf. Gal. Flow Meter					
Calculated Flow to BOC Inf. Gal.					
Air Stripper Monitoring:					
Pressure Readings:			TCE Concentrations:		TCE
Location:	(In. H₂O)		Location:	(ppm)	
Blower	30		Air Stripper Effluent	1	
Air Stripper	28		Post Primary	ND	
			Final Discharge	ND < 5?	
Capsulhelic Gauge (In. H ₂ O)	1				
Pre-Heater Air Temperature (F°)	50				
Pre-Carbon Air Temperature (F°)	65				
Maintenance:					
Replace Bag Filter?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Leaks/Notes? Flow meters in MW-14E and MW-18D not functioning.		
Drain Compressor?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>			
Replace Canister Filters?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>			
Lube Pump Motors?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>			
Inspect Infiltration Galleries?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>			
Inventory:			Sampling:		
	Quantity	Location	Lab	Date	Analytes
Gloves	5				
Drums Empty 55-gal	9				
Super sacks	4				
Bag Filters	1				
Canister Filters					
10 Micron 29.25 inch	0	Final Discharge pH at Time of Sampling:			
10 Micron 30 inch	0	Comments:			
20 Micron 29.25 inch	68				
20 Micron 30 inch	46				
75 Micron 30 inch	0				

Name: Rick Read

Date: 04/13/18

Groundwater Treatment:						
Ion Exchange System Chromium Testing:			System pH Measurements During Inspection:			
Kit Used: DR 100 Colorimeter			Initial Calibration	7.02, 4.01	Final Calibration	7.0, 4.0
Test Location:	Chromium (ppm)	ID#	%	Location:	pH	
Well Field Influent	0.044			Well Field	5.98	
Primary	0.016	2	36%	Pre-IX	6.02	
Secondary	ND	3		IX Effluent	6.05	
Final Discharge	ND			Final Discharge	7.90	
System Flow Rates:						
Location:	GPM	Totalizer	Time			
Total Flow from Wells	129					
Well Field Influent	130	81040530	15:04			
IX Influent Flow Meter	130	32426040	15:01			
AS Influent Flow Meter	130	47579562	15:02			
COV Sewer Flow Meter						
Boomsnub Inf. Gal. Flow Meter						
Calculated Flow to BOC Inf. Gal.						
Air Stripper Monitoring:						
Pressure Readings:			TCE Concentrations:		TCE	
Location:	(In. H ₂ O)		Location:		(ppm)	
Blower	30		Air Stripper Effluent		1	
Air Stripper	28		Post Primary		ND	
			Final Discharge		ND < 5?	
Capsulhelic Gauge (In. H ₂ O)	1					
Pre-Heater Air Temperature (F°)	53					
Pre-Carbon Air Temperature (F°)	68					
Maintenance:						
Replace Bag Filter?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Leaks/Notes?			
Drain Compressor?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Flow meters in MW-14E and MW-18D not functioning.			
Replace Canister Filters?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>				
Lube Pump Motors?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>				
Inspect Infiltration Galleries?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>				
Inventory:		Sampling:				
	Quantity	Location	Lab	Date	Analytes	
Gloves	7	INF-040218	ALS	4/2/28	8260c, T.Cr	
Drums Empty 55-gal	9	EFF-040218	ALS	4/2/28	8260c, T.Cr	
Super sacks	4	EFFD-040218	ALS	4/2/28	8260c, T.Cr	
Bag Filters	1	TB-040218	ALS	4/2/28	8260c	
Canister Filters						
10 Micron 29.25 inch	0	Final Discharge pH at Time of Sampling:		7.92		
10 Micron 30 inch	0	Comments:				
20 Micron 29.25 inch	68	Pumped CV-9 on 4/02/18. Changed 4 filter canister.				
20 Micron 30 inch	42					
75 Micron 30 inch	0					

Name: Rick Read

Date: 04/30/18

Groundwater Treatment:				
Ion Exchange System Chromium Testing:			System pH Measurements During Inspection:	
Kit Used: DR 100 Colorimeter			Initial Calibration 7.02, 4.01	Final Calibration 7.0, 4.0
Test Location:	Chromium (ppm)	ID#	%	Location: pH
Well Field Influent	0.044			Well Field 6.01
Primary	0.017	2	38%	Pre-IX 6.03
Secondary	ND	3		IX Effluent 6.07
Final Discharge	ND			Final Discharge 7.91
System Flow Rates:				
Location:	GPM	Totalizer	Time	
Total Flow from Wells	130			
Well Field Influent	130	84093260	17:27	
IX Influent Flow Meter	130	32745584	17:24	
AS Influent Flow Meter	130	48177270	17:25	
COV Sewer Flow Meter				
Boomsnub Inf. Gal. Flow Meter				
Calculated Flow to BOC Inf. Gal.				
Air Stripper Monitoring:				
Pressure Readings:		TCE Concentrations:		TCE
Location:	(In. H ₂ O)	Location:	(ppm)	
Blower	30	Air Stripper Effluent	1	
Air Stripper	28	Post Primary	ND	
		Final Discharge	ND < 5?	
Capsulhelic Gauge (In. H ₂ O)	1			
Pre-Heater Air Temperature (F°)	52			
Pre-Carbon Air Temperature (F°)	70			
Maintenance:				
Replace Bag Filter?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Leaks/Notes?	
Drain Compressor?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Flow meters in MW-14E and MW-18D and MW-6B	
Replace Canister Filters?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	replaced on 4/25/18.	
Lube Pump Motors?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>		
Inspect Infiltration Galleries?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>		
Inventory:		Sampling:		
	Quantity	Location	Lab	Date
Gloves	7			
Drums Empty 55-gal	9			
Super sacks	4			
Bag Filters	1			
Canister Filters				
10 Micron 29.25 inch	0	Final Discharge pH at Time of Sampling:		
10 Micron 30 inch	0	Comments:		
20 Micron 29.25 inch	68			
20 Micron 30 inch	42			
75 Micron 30 inch	0			

Name: Rick Read

Date: 05/15/18

Groundwater Treatment:						
Ion Exchange System Chromium Testing:			System pH Measurements During Inspection:			
Kit Used: DR 100 Colorimeter			Initial Calibration	7.02, 4.01	Final Calibration	7.0, 4.0
Test Location:	Chromium (ppm)	ID#	%	Location:	pH	
Well Field Influent	0.043			Well Field	5.98	
Primary	0.017	2	38%	Pre-IX	6.03	
Secondary	ND	3		IX Effluent	6.06	
Final Discharge	ND			Final Discharge	7.93	
System Flow Rates:						
Location:	GPM	Totalizer	Time			
Total Flow from Wells	128					
Well Field Influent	128	86761703	17:27			
IX Influent Flow Meter	128	33027734	17:24			
AS Influent Flow Meter	128	48703582	17:25			
COV Sewer Flow Meter						
Boomsnub Inf. Gal. Flow Meter						
Calculated Flow to BOC Inf. Gal.						
Air Stripper Monitoring:						
Pressure Readings:		TCE Concentrations:		TCE		
Location:	(In. H₂O)	Location:	(ppm)			
Blower	30	Air Stripper Effluent	1			
Air Stripper	28	Post Primary	ND			
		Final Discharge	ND	< 5?		
Capsulhellic Gauge (In. H ₂ O)	1					
Pre-Heater Air Temperature (F°)	58					
Pre-Carbon Air Temperature (F°)	76					
Maintenance:						
Replace Bag Filter?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Leaks/Notes?			
Drain Compressor?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>				
Replace Canister Filters?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>				
Lube Pump Motors?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>				
Inspect Infiltration Galleries?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>				
Inventory:		Sampling:				
	Quantity	Location	Lab	Date	Analytes	
Gloves	7	INF-050718	ALS	5/7/18	8260c, T.Cr	
Drums Empty 55-gal	9	EFF-050718	ALS	5/7/18	8260c, T.Cr	
Super sacks	4	EFFD-050718	ALS	5/7/18	8260c, T.Cr	
Bag Filters	1	TB-050718	ALS	5/7/18	8260c	
Canister Filters						
10 Micron 29.25 inch	0	Final Discharge pH at Time of Sampling:				
10 Micron 30 inch	0	Comments:				
20 Micron 29.25 inch	68					
20 Micron 30 inch	42					
75 Micron 30 inch	0					

Name: Rick Read

Date: 05/25/18

Groundwater Treatment:						
Ion Exchange System Chromium Testing:			System pH Measurements During Inspection:			
Kit Used: DR 100 Colorimeter			Initial Calibration	7.01, 4.01	Final Calibration	7.0, 4.0
Test Location:	Chromium (ppm)	ID#	%	Location:	pH	
Well Field Influent	0.043			Well Field	5.97	
Primary	0.017	2	38%	Pre-IX	6.02	
Secondary	ND	3		IX Effluent	6.06	
Final Discharge	ND			Final Discharge	7.91	
System Flow Rates:						
Location:	GPM	Totalizer	Time			
Total Flow from Wells	128					
Well Field Influent	128	88554175	11:46			
IX Influent Flow Meter	128	33219058	11:44			
AS Influent Flow Meter	128	49083952	11:43			
COV Sewer Flow Meter						
Boomsnub Inf. Gal. Flow Meter						
Calculated Flow to BOC Inf. Gal.						
Air Stripper Monitoring:						
Pressure Readings:			TCE Concentrations:		TCE	
Location:	(In. H₂O)		Location:	(ppm)		
Blower	30		Air Stripper Effluent	1		
Air Stripper	28		Post Primary	ND		
			Final Discharge	ND < 5?		
Capsulhelic Gauge (In. H ₂ O)	1					
Pre-Heater Air Temperature (F°)	60					
Pre-Carbon Air Temperature (F°)	80					
Maintenance:						
Replace Bag Filter?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Leaks/Notes?			
Drain Compressor?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>				
Replace Canister Filters?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>				
Lube Pump Motors?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>				
Inspect Infiltration Galleries?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>				
Inventory:		Sampling:				
	Quantity	Location	Lab	Date	Analytes	
Gloves	7					
Drums Empty 55-gal	9					
Super sacks	4					
Bag Filters	1					
Canister Filters						
10 Micron 29.25 inch	0	Final Discharge pH at Time of Sampling:				
10 Micron 30 inch	0	Comments:				
20 Micron 29.25 inch	68					
20 Micron 30 inch	42					
75 Micron 30 inch	0					

Name: Rick Read

Date: 06/15/18

Groundwater Treatment:					
Ion Exchange System Chromium Testing:			System pH Measurements During Inspection:		
Kit Used: DR 100 Colorimeter			Initial Calibration 7.01, 4.01	Final Calibration 7.0, 4.0	
Test Location:	Chromium (ppm)	ID#	%	Location:	pH
Well Field Influent	0.043			Well Field	5.98
Primary	0.017	2	38%	Pre-IX	6.03
Secondary	ND	3		IX Effluent	6.06
Final Discharge	ND			Final Discharge	7.93
System Flow Rates:					
Location:	GPM	Totalizer	Time		
Total Flow from Wells	127				
Well Field Influent	127	92307195	15:27		
IX Influent Flow Meter	127	33617455	15:28		
AS Influent Flow Meter	127	49802590	15:30		
COV Sewer Flow Meter					
Boomsnub Inf. Gal. Flow Meter					
Calculated Flow to BOC Inf. Gal.					
Air Stripper Monitoring:					
Pressure Readings:			TCE Concentrations:		TCE
Location:	(In. H₂O)		Location:	(ppm)	
Blower	30		Air Stripper Effluent	1	
Air Stripper	28		Post Primary	ND	
			Final Discharge	ND < 5?	
Capsulhelic Gauge (In. H ₂ O)	1				
Pre-Heater Air Temperature (F°)	60				
Pre-Carbon Air Temperature (F°)	80				
Maintenance:					
Replace Bag Filter?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Leaks/Notes?		
Drain Compressor?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>			
Replace Canister Filters?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>			
Lube Pump Motors?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>			
Inspect Infiltration Galleries?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>			
Inventory:		Sampling:			
	Quantity	Location	Lab	Date	Analytes
Gloves	7	INF-060818	ALS	6/8/18	8260c. T. Cr
Drums Empty 55-gal	9	EFF-060818	ALS	6/8/18	8260c. T. Cr
Super sacks	4	EFFD-060818	ALS	6/8/18	8260c. T. Cr
Bag Filters	1	TB-060818	ALS	6/8/18	8260c
Canister Filters					
10 Micron 29.25 inch	0	Final Discharge pH at Time of Sampling:			
10 Micron 30 inch	0	Comments:			
20 Micron 29.25 inch	68				
20 Micron 30 inch	42				
75 Micron 30 inch	0				

Name: Rick Read

Date: 06/29/18

Groundwater Treatment:					
Ion Exchange System Chromium Testing:			System pH Measurements During Inspection:		
Kit Used: DR 100 Colorimeter			Initial Calibration 7.01, 4.01	Final Calibration 7.0, 4.0	
Test Location:	Chromium (ppm)	ID#	%	Location:	pH
Well Field Influent	0.043			Well Field	5.98
Primary	0.017	2	38%	Pre-IX	6.03
Secondary	ND	3		IX Effluent	6.07
Final Discharge	ND			Final Discharge	7.94
System Flow Rates:					
Location:	GPM	Totalizer	Time		
Total Flow from Wells	118				
Well Field Influent	118	94760780	17:25		
IX Influent Flow Meter	118	33582546	17:22		
AS Influent Flow Meter	118	50273468	17:24		
COV Sewer Flow Meter					
Boomsnub Inf. Gal. Flow Meter					
Calculated Flow to BOC Inf. Gal.					
Air Stripper Monitoring:					
Pressure Readings:		TCE Concentrations:		TCE	
Location:	(In. H₂O)	Location:	(ppm)		
Blower	30	Air Stripper Effluent	1		
Air Stripper	28	Post Primary	ND		
		Final Discharge	ND < 5?		
Capsulhelic Gauge (In. H ₂ O)	1				
Pre-Heater Air Temperature (F°)	60				
Pre-Carbon Air Temperature (F°)	80				
Maintenance:					
Replace Bag Filter?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Leaks/Notes?		
Drain Compressor?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>			
Replace Canister Filters?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>			
Lube Pump Motors?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>			
Inspect Infiltration Galleries?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>			
Inventory:		Sampling:			
	Quantity	Location	Lab	Date	Analytes
Gloves	7				
Drums Empty 55-gal	9				
Super sacks	4				
Bag Filters	1				
Canister Filters					
10 Micron 29.25 inch	0	Final Discharge pH at Time of Sampling:			
10 Micron 30 inch	0	Comments:			
20 Micron 29.25 inch	68	Turned off MW-21D on 6/22/18.			
20 Micron 30 inch	42				
75 Micron 30 inch	0				

Appendix B.2

OU-3 System Operation Tables

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APPENDIX B.2 - TABLE 1A
OU-3 JANUARY 2018 GROUNDWATER EXTRACTION SUMMARY
BOOMSNUB/AIRCO SUPERFUND SITE

Date	Total Flow gpd¹	System Operating Hours²	System Operating Percentage
01/01/18	183,764	24.00	100.00%
01/02/18	183,776	24.00	100.00%
01/03/18	183,670	24.00	100.00%
01/04/18	183,623	24.00	100.00%
01/05/18	183,488	24.00	100.00%
01/06/18	183,378	24.00	100.00%
01/07/18	183,383	24.00	100.00%
01/08/18	183,376	24.00	100.00%
01/09/18	183,347	24.00	100.00%
01/10/18	183,412	24.00	100.00%
01/11/18	183,365	24.00	100.00%
01/12/18	183,410	24.00	100.00%
01/13/18	183,452	24.00	100.00%
01/14/18	183,457	24.00	100.00%
01/15/18	183,398	24.00	100.00%
01/16/18	183,323	24.00	100.00%
01/17/18	183,368	24.00	100.00%
01/18/18	183,417	24.00	100.00%
01/19/18	183,476	24.00	100.00%
01/20/18	183,401	24.00	100.00%
01/21/18	183,391	24.00	100.00%
01/22/18	183,310	24.00	100.00%
01/23/18	183,336	24.00	100.00%
01/24/18	183,521	24.00	100.00%
01/25/18	183,614	24.00	100.00%
01/26/18	183,675	24.00	100.00%
01/27/18	183,636	24.00	100.00%
01/28/18	183,550	24.00	100.00%
01/29/18	183,629	24.00	100.00%
01/30/18	183,619	24.00	100.00%
01/31/18	182,077	21.62	90.07%
Subtotals	5,686,640	741.62	99.68%
Daily Breakdown		Vancouver Permit Limits³	
Average Daily Flow (gallons)		183,440	230,400
Maximum Daily Flow (gallons)		183,776	230,400
Hundreds of Cubic Feet Breakdown			99.68%
Total Flow (hundreds of cubic feet)		7602	9549
Average Daily Flow (hundreds of cubic feet)		246	308
Notes:			
¹ gpd = gallons per day to the infiltration gallery.			
² Based on minutes of operation as reported by data logger.			
³ Only applies if water is being discharged to the City of Vancouver sewer.			

APPENDIX B.2 - TABLE 1B
OU-3 FEBRUARY 2018 GROUNDWATER EXTRACTION SUMMARY
BOOMSNUB/AIRCO SUPERFUND SITE

Date	Total Flow gpd ¹	System Operating Hours ²	System Operating Percentage
02/01/18	183,912	24.00	100.00%
02/02/18	183,768	24.00	100.00%
02/03/18	183,728	24.00	100.00%
02/04/18	183,642	24.00	100.00%
02/05/18	183,663	24.00	100.00%
02/06/18	183,686	24.00	100.00%
02/07/18	183,527	24.00	100.00%
02/08/18	183,533	24.00	100.00%
02/09/18	183,496	24.00	100.00%
02/10/18	183,550	24.00	100.00%
02/11/18	183,559	24.00	100.00%
02/12/18	183,478	24.00	100.00%
02/13/18	183,489	24.00	100.00%
02/14/18	183,427	24.00	100.00%
02/15/18	183,326	24.00	100.00%
02/16/18	183,246	24.00	100.00%
02/17/18	183,266	24.00	100.00%
02/18/18	183,364	24.00	100.00%
02/19/18	183,327	24.00	100.00%
02/20/18	183,361	24.00	100.00%
02/21/18	183,290	24.00	100.00%
02/22/18	183,263	24.00	100.00%
02/23/18	183,333	24.00	100.00%
02/24/18	183,199	24.00	100.00%
02/25/18	183,179	24.00	100.00%
02/26/18	183,177	24.00	100.00%
02/27/18	183,191	24.00	100.00%
02/28/18	183,150	24.00	100.00%
Subtotals	5,136,129	672.00	100.00%
Daily Breakdown		Vancouver Permit Limits³	
Average Daily Flow (gallons)		183,433	230,400
Maximum Daily Flow (gallons)		183,912	230,400
Hundreds of Cubic Feet Breakdown			
Total Flow (hundreds of cubic feet)		6866	9549
Average Daily Flow (hundreds of cubic feet)		222	308
Notes:			
¹ gpd = gallons per day to the infiltration gallery.			
² Based on minutes of operation as reported by data logger.			
³ Only applies if water is being discharged to the City of Vancouver sewer.			

APPENDIX B.2 - TABLE 1C
OU-3 MARCH 2018 GROUNDWATER EXTRACTION SUMMARY
BOOMSNUB/AIRCO SUPERFUND SITE

Date	Total Flow gpd¹	System Operating Hours²	System Operating Percentage
03/01/18	183,197	24.00	100.00%
03/02/18	183,194	24.00	100.00%
03/03/18	183,075	24.00	100.00%
03/04/18	182,989	24.00	100.00%
03/05/18	182,911	24.00	100.00%
03/06/18	182,919	24.00	100.00%
03/07/18	182,893	24.00	100.00%
03/08/18	182,785	24.00	100.00%
03/09/18	182,660	24.00	100.00%
03/10/18	182,633	24.00	100.00%
03/11/18	182,473	24.00	100.00% ⁴
03/12/18	174,820	24.00	100.00%
03/13/18	182,461	24.00	100.00%
03/14/18	182,462	24.00	100.00%
03/15/18	182,575	24.00	100.00%
03/16/18	182,474	24.00	100.00%
03/17/18	182,502	24.00	100.00%
03/18/18	182,568	24.00	100.00%
03/19/18	182,448	24.00	100.00%
03/20/18	182,398	24.00	100.00%
03/21/18	182,461	24.00	100.00%
03/22/18	182,440	24.00	100.00%
03/23/18	182,708	24.00	100.00%
03/24/18	182,756	24.00	100.00%
03/25/18	182,725	24.00	100.00%
03/26/18	182,790	24.00	100.00%
03/27/18	182,679	24.00	100.00%
03/28/18	182,597	24.00	100.00%
03/29/18	182,535	24.00	100.00%
03/30/18	182,417	24.00	100.00%
03/31/18	182,401	24.00	100.00%
Subtotals	5,654,944	744.00	100.00%
Daily Breakdown		Vancouver Permit Limits³	
Average Daily Flow (gallons)		182,418	230,400
Maximum Daily Flow (gallons)		183,197	230,400
Hundreds of Cubic Feet Breakdown			
Total Flow (hundreds of cubic feet)		7560	9241
Average Daily Flow (hundreds of cubic feet)		244	308
Notes:			
¹ gpd = gallons per day to the infiltration gallery.			
² Based on minutes of operation as reported by data logger.			
³ Only applies if water is being discharged to the City of Vancouver sewer.			
⁴ Daylight savings time ended.			

APPENDIX B.2 - TABLE 1D
OU-3 APRIL 2018 GROUNDWATER EXTRACTION SUMMARY
BOOMSNUB/AIRCO SUPERFUND SITE

Date	Total Flow gpd¹	System Operating Hours²	System Operating Percentage
04/01/18	182,503	24.00	100.00%
04/02/18	180,871	23.75	98.96%
04/03/18	183,020	24.00	100.00%
04/04/18	182,890	24.00	100.00%
04/05/18	182,881	24.00	100.00%
04/06/18	182,802	24.00	100.00%
04/07/18	182,879	24.00	100.00%
04/08/18	182,978	24.00	100.00%
04/09/18	182,951	24.00	100.00%
04/10/18	182,960	24.00	100.00%
04/11/18	182,990	24.00	100.00%
04/12/18	183,060	24.00	100.00%
04/13/18	183,077	24.00	100.00%
04/14/18	183,029	24.00	100.00%
04/15/18	183,059	24.00	100.00%
04/16/18	183,179	24.00	100.00%
04/17/18	183,125	24.00	100.00%
04/18/18	183,050	24.00	100.00%
04/19/18	182,942	24.00	100.00%
04/20/18	182,807	24.00	100.00%
04/21/18	182,740	24.00	100.00%
04/22/18	182,741	24.00	100.00%
04/23/18	182,673	24.00	100.00%
04/24/18	182,479	24.00	100.00%
04/25/18	182,887	24.00	100.00%
04/26/18	184,408	24.00	100.00%
04/27/18	184,603	24.00	100.00%
04/28/18	184,534	24.00	100.00%
04/29/18	184,452	24.00	100.00%
04/30/18	184,457	24.00	100.00%
Subtotals	5,493,023	719.75	99.97%
Daily Breakdown		Vancouver Permit Limits³	
Average Daily Flow (gallons)		183,101	230,400
Maximum Daily Flow (gallons)		184,603	230,400
Hundreds of Cubic Feet Breakdown			
Total Flow (hundreds of cubic feet)		7344	9549
Average Daily Flow (hundreds of cubic feet)		237	308
Notes:			
¹ gpd = gallons per day to the infiltration gallery.			
² Based on minutes of operation as reported by data logger.			
³ Only applies if water is being discharged to the City of Vancouver sewer.			

APPENDIX B.2 - TABLE 1E
OU-3 MAY 2018 GROUNDWATER EXTRACTION SUMMARY
BOOMSNUB/AIRCO SUPERFUND SITE

Date	Total Flow gpd¹	System Operating Hours²	System Operating Percentage
05/01/18	184,436	24.00	100.00%
05/02/18	184,298	24.00	100.00%
05/03/18	184,159	24.00	100.00%
05/04/18	184,109	24.00	100.00%
05/05/18	184,075	24.00	100.00% ⁴
05/06/18	183,917	24.00	100.00%
05/07/18	183,898	24.00	100.00%
05/08/18	183,899	24.00	100.00%
05/09/18	183,939	24.00	100.00%
05/10/18	183,932	24.00	100.00%
05/11/18	183,922	24.00	100.00%
05/12/18	183,828	24.00	100.00%
05/13/18	183,639	24.00	100.00%
05/14/18	183,532	24.00	100.00%
05/15/18	183,630	24.00	100.00%
05/16/18	183,622	24.00	100.00%
05/17/18	183,590	24.00	100.00%
05/18/18	183,526	24.00	100.00%
05/19/18	183,437	24.00	100.00%
05/20/18	183,407	24.00	100.00%
05/21/18	183,402	24.00	100.00%
05/22/18	183,215	24.00	100.00%
05/23/18	183,200	24.00	100.00%
05/24/18	178,550	23.43	97.64%
05/25/18	183,684	24.00	100.00%
05/26/18	183,722	24.00	100.00%
05/27/18	183,576	24.00	100.00%
05/28/18	183,562	24.00	100.00%
05/29/18	183,591	24.00	100.00%
05/30/18	183,653	24.00	100.00%
05/31/18	183,538	24.00	100.00%
Subtotals	5,690,489	743.43	99.92%
Daily Breakdown		Vancouver Permit Limits³	
Average Daily Flow (gallons)		183,564	230,400
Maximum Daily Flow (gallons)		184,436	230,400
Hundreds of Cubic Feet Breakdown			
Total Flow (hundreds of cubic feet)		7,608	9241
Average Daily Flow (hundreds of cubic feet)		254	308
Notes:			
¹ gpd = gallons per day to the infiltration gallery.			
² Based on minutes of operation as reported by data logger.			
³ Only applies if water is being discharged to the City of Vancouver sewer.			
⁴ Daylight Savings time ended November 5.			

APPENDIX B.2 - TABLE 1F
OU-3 JUNE 2018 GROUNDWATER EXTRACTION SUMMARY
BOOMSNUB/AIRCO SUPERFUND SITE

Date	Total Flow gpd ¹	System Operating Hours ²	System Operating Percentage
06/01/18	183,401	24.00	100.00%
06/02/18	183,213	24.00	100.00%
06/03/18	183,215	24.00	100.00%
06/04/18	183,174	24.00	100.00%
06/05/18	183,046	24.00	100.00%
06/06/18	182,974	24.00	100.00%
06/07/18	183,023	24.00	100.00%
06/08/18	183,040	24.00	100.00%
06/09/18	183,062	24.00	100.00%
06/10/18	183,092	24.00	100.00%
06/11/18	182,938	24.00	100.00%
06/12/18	182,830	24.00	100.00%
06/13/18	182,846	24.00	100.00%
06/14/18	182,822	24.00	100.00%
06/15/18	182,802	24.00	100.00%
06/16/18	182,650	24.00	100.00%
06/17/18	182,546	24.00	100.00%
06/18/18	182,551	24.00	100.00%
06/19/18	182,437	24.00	100.00%
06/20/18	182,210	24.00	100.00%
06/21/18	182,364	24.00	100.00%
06/22/18	176,290	24.00	100.00%
06/23/18	172,169	24.00	100.00%
06/24/18	172,065	24.00	100.00%
06/25/18	172,151	24.00	100.00%
06/26/18	172,092	24.00	100.00%
06/27/18	172,024	24.00	100.00%
06/28/18	172,089	24.00	100.00%
06/29/18	171,902	24.00	100.00%
06/30/18	171,902	24.00	100.00%
Subtotals	5,392,921	720.00	100.00%
Daily Breakdown		Vancouver Permit Limits³	
Average Daily Flow (gallons)		179,764	230,400
Maximum Daily Flow (gallons)		183,401	230,400
Hundreds of Cubic Feet Breakdown			
Total Flow (hundreds of cubic feet)		7210	9549
Average Daily Flow (hundreds of cubic feet)		233	308
Notes:			
¹ gpd = gallons per day to the infiltration gallery.			
² Based on minutes of operation as reported by data logger.			
³ Only applies if water is being discharged to the City of Vancouver sewer.			

**APPENDIX B.2
OU-3 EXTRACTION WELL PUMPING RATES,
BOOMSNUB/AIRCO SUPERFUND SITE**

TABLE 2A - JANUARY 31, 2018

Well ID	Status	Flow Rate (GPM) Date Pumping Ceased	Totalizer	Time
PW-1B	Active	11.5	3239150	11:05
MW-6B	Active	6.2	2655680	11:59
MW-10B	Active	10.0	2144380	11:55
MW-10C	Active	11.0	5266750	11:54
CPU-13	Off	05/2013		
MW-14C	Active	13.0	5801540	11:45
MW-14E	Active	10.0	*	11:46
AMW-59	Off	10/2006		
MW-18D	Active	17.0	*	11:52
MW-18E	Off	10/2006		
MW-19D	Active	9.0	9496470	11:38
MW-20D	Active	15.5	597805	11:20
MW-21D	Active	9.9	352092	11:27
MW-22D	Active	16.5	720570	11:31
MW-25D	Off	01/2013		
MW-26D	Off	01/2013		
MW-27D	Off	11/2009		
AMW-27	Off	01/2013		
MW-31	Off	Pre 2002		
MW-35	Off	02/2005		
MW-37	Off	Pre 2002		
AMW-42	Off	02/2005		
MW-48	Off	06/2004		
MW-49	Off	01/2013		
Note: * = flow meters not working.				

**APPENDIX B.2
OU-3 EXTRACTION WELL PUMPING RATES,
BOOMSNUB/AIRCO SUPERFUND SITE**

TABLE 2B - FEBRUARY 28, 2018

Well ID	Status	Flow Rate (GPM) Date Pumping Ceased	Totalizer	Time
PW-1B	Active	11.6	3694630	12:41
MW-6B	Active	6.2	2748200	13:35
MW-10B	Active	9.9	2534791	13:31
MW-10C	Active	11.5	5720258	13:30
CPU-13	Off	05/2013		
MW-14C	Active	13.0	6314202	13:21
MW-14E	Active	10.0	*	13:22
AMW-59	Off	10/2006		
MW-18D	Active	17.0	*	13:28
MW-18E	Off	10/2006		
MW-19D	Active	8.0	9811954	13:14
MW-20D	Active	15.0	676881	12:56
MW-21D	Active	10.1	405337	13:04
MW-22D	Active	16.6	807554	13:08
MW-25D	Off	01/2013		
MW-26D	Off	01/2013		
MW-27D	Off	11/2009		
AMW-27	Off	01/2013		
MW-31	Off	Pre 2002		
MW-35	Off	02/2005		
MW-37	Off	Pre 2002		
AMW-42	Off	02/2005		
MW-48	Off	06/2004		
MW-49	Off	01/2013		
Note: * = flow meters not working.				

APPENDIX B.2
OU-3 EXTRACTION WELL PUMPING RATES,
BOOMSNUB/AIRCO SUPERFUND SITE

TABLE 2C - MARCH 30, 2018

Well ID	Status	Flow Rate (GPM) Date Pumping Ceased	Totalizer	Time
PW-1B	Active	11.6	3694630	12:45
MW-6B	Active	6.2	2748200	13:39
MW-10B	Active	9.9	2534791	13:35
MW-10C	Active	11.5	5720258	13:34
CPU-13	Off	05/2013		
MW-14C	Active	13.0	6314202	13:25
MW-14E	Active	10.0	*	13:27
AMW-59	Off	10/2006		
MW-18D	Active	17.0	*	13:33
MW-18E	Off	10/2006		
MW-19D	Active	8.0	157554	13:19
MW-20D	Active	15.0	763506	13:01
MW-21D	Active	10.1	463664	13:09
MW-22D	Active	16.6	903418	13:13
MW-25D	Off	01/2013		
MW-26D	Off	01/2013		
MW-27D	Off	11/2009		
AMW-27	Off	01/2013		
MW-31	Off	Pre 2002		
MW-35	Off	02/2005		
MW-37	Off	Pre 2002		
AMW-42	Off	02/2005		
MW-48	Off	06/2004		
MW-49	Off	01/2013		
Notes:				
* = flow meters not working.				

**APPENDIX B.2
OU-3 EXTRACTION WELL PUMPING RATES,
BOOMSNUB/AIRCO SUPERFUND SITE**

TABLE 2D - APRIL 30, 2018

Well ID	Status	Flow Rate (GPM) Date Pumping Ceased	Totalizer	Time
PW-1B	Active	11.0	4590260	16:41
MW-6B	Active	6.2	122260	16:29
MW-10B	Active	9.9	2963659	15:35
MW-10C	Active	11.5	6218438	15:34
CPU-13	Off	05/2013		
MW-14C	Active	13.0	6877362	15:25
MW-14E	Active	10.0	6998290	15:58
AMW-59	Off	10/2006		
MW-18D	Active	17.0	7788500	16:14
MW-18E	Off	10/2006		
MW-19D	Active	8.0	504114	15:19
MW-20D	Active	15.0	784134	15:01
MW-21D	Active	10.1	477554	15:09
MW-22D	Active	16.6	926247	15:13
MW-25D	Off	01/2013		
MW-26D	Off	01/2013		
MW-27D	Off	11/2009		
AMW-27	Off	01/2013		
MW-31	Off	Pre 2002		
MW-35	Off	02/2005		
MW-37	Off	Pre 2002		
AMW-42	Off	02/2005		
MW-48	Off	06/2004		
MW-49	Off	01/2013		
Notes: Replaced flowmeters in wells MW-14E, MW-18D and MW-6B on 4/25/18.				

APPENDIX B.2
OU-3 EXTRACTION WELL PUMPING RATES,
BOOMSNUB/AIRCO SUPERFUND SITE

TABLE 2E - MAY 31, 2018

Well ID	Status	Flow Rate (GPM) Date Pumping Ceased	Totalizer	Time
PW-1B	Active	11.0	5080849	16:00
MW-6B	Active	6.2	398773.8	15:38
MW-10B	Active	9.9	3405190	15:35
MW-10C	Active	11.5	6731327	15:34
CPU-13	Off	05/2013		
MW-14C	Active	13.0	7457149	15:25
MW-14E	Active	10.0	7444280	15:26
AMW-59	Off	10/2006		
MW-18D	Active	17.0	8546683	15:33
MW-18E	Off	10/2006		
MW-19D	Active	8.0	860906	15:19
MW-20D	Active	15.0	873564	14:21
MW-21D	Active	10.1	537770	14:28
MW-22D	Active	16.6	25216	14:32
MW-25D	Off	01/2013		
MW-26D	Off	01/2013		
MW-27D	Off	11/2009		
AMW-27	Off	01/2013		
MW-31	Off	Pre 2002		
MW-35	Off	02/2005		
MW-37	Off	Pre 2002		
AMW-42	Off	02/2005		
MW-48	Off	06/2004		
MW-49	Off	01/2013		

APPENDIX B.2
OU-3 EXTRACTION WELL PUMPING RATES,
BOOMSNUB/AIRCO SUPERFUND SITE

TABLE 2F - JUNE 30, 2018

Well ID	Status	Flow Rate (GPM) Date Pumping Ceased	Totalizer	Time
PW-1B	Active	11.5	5662240	15:36
MW-6B	Active	6	636650	16:21
MW-10B	Active	10.0	4240790	16:18
MW-10C	Active	11.0	7730460	16:19
CPU-13	off	05/2013		
MW-14C	Active	13.0	8961980	16:14
MW-14E	Active	10.0	7696960	16:13
AMW-59	off	10/2006		
MW-18D	Active	16.5	7179080	16:07
MW-18E	off	10/2006		
MW-19D	Active	8.0	1154420	16:01
MW-20D	Active	16.5	26947	15:44
MW-21D	Off	06/2018	626950	15:50
MW-22D	Active	17.6	194331	15:52
MW-25D	Off	01/2013		
MW-26D	Off	01/2013		
MW-27D	Off	11/2009		
AMW-27	Off	01/2013		
MW-31	Off	Pre 2002		
MW-35	Off	02/2005		
MW-37	Off	Pre 2002		
AMW-42	Off	02/2005		
MW-48	Off	06/2004		
MW-49	Off	01/2013		
Notes:				
Well MW-21D is being impacted by the Northern Plume and was shut off on June 22, with EPA approval.				

**APPENDIX B.2 - TABLE 3
JANUARY THROUGH JUNE 2018**

**OU-3 MONTHLY SYSTEM SAMPLING ANALYTICAL RESULTS
BOOMSNUB/AIRCO SUPERFUND SITE**

Location	Sample Number	Sampling Date	TCE (µg/L)	PCE (µg/L)	Total Chromium (µg/L)	pH	
						pH	Field Reading Date
Permit #2014-04 Discharge Limits			330		7,220	5.5 to 10	
Infiltration Gallery Discharge Limits			1.9		19		
January 2018							
Influent	INF-010418	1/4/2018	11	0.62	43.9	6.03	1/15/2018
Effluent	EFF-010418	1/4/2018	0.22 J	0.5 U	1.1 J	7.89	1/4/2018
Effluent Duplicate	EFFD-010418	1/4/2018	0.24 J	0.5 U	1.2 J	NA	NA
Trip Blank	TB-010418	1/4/2018	0.5 U	0.5 U	NA	NA	NA
February 2018							
Influent	INF-020518	2/5/2018	12	0.7	42.7	6.01	2/12/2018
Effluent	EFF-020518	2/5/2018	0.22 J	0.5 U	4.2 U	7.89	2/5/2018
Effluent Duplicate	EFFD-020518	2/5/2018	0.20 J	0.5 U	4.2 U	NA	NA
Trip Blank	TB-020518	2/5/2018	0.5 U	0.5 U	NA	NA	NA
March 2018							
Influent	INF-030418	3/4/2018	13	0.93	43.7	6.02	3/16/2018
Effluent	EFF-030418	3/4/2018	0.25 J	0.5 U	0.7 J	7.92	3/4/2018
Effluent Duplicate	EFFD-030418	3/4/2018	0.22 J	0.5 U	1.9 J	NA	NA
Trip Blank	TB-030418	3/4/2018	0.5 U	0.5 U	NA	NA	NA
April 2018							
Influent	INF-040218	4/2/2018	13	0.87	42.4	6.02	4/13/2018
Effluent	EFF-040218	4/2/2018	0.27 J	0.5 U	1.2 J	7.92	4/2/2018
Effluent Duplicate	EFFD-040218	4/2/2018	0.25 J	0.5 U	1.2 J	NA	NA
Trip Blank	TB-040218	4/2/2018	0.5 U	0.5 U	NA	NA	NA
May 2018							
Influent	INF-050718	5/7/2018	12	0.68	41.9	6.03	5/15/2018
Effluent	EFF-050718	5/7/2018	0.5 U	0.5 U	0.9 J	7.93	5/15/2018
Effluent Duplicate	EFFD-050718	5/7/2018	0.22 J	0.5 U	0.3 J	NA	NA
Trip Blank	TB-050718	5/7/2018	0.5 U	0.5U	NA	NA	NA
June 2018							
Influent	INF-120417	6/8/2018	13	0.8	41	6.03	6/15/2018
Effluent	EFF-120417	6/8/2018	0.22 J	0.5 U	4.2 U	7.93	6/15/2018
Effluent Duplicate	EFFD-120417	6/8/2018	0.19 J	0.5 U	1.5 J	NA	NA
Trip Blank	TB-120417	6/8/2018	0.5 U	0.5 U	NA	NA	NA
Notes:							
J - result is an estimated concentration that is less than the Method Reporting Limit but is greater than or equal to the Method Detection Limit.							
µg/L - micrograms per liter							
NA - not analyzed							
PCE - tetrachloroethene							
TCE - trichloroethene							
U - analyte not detected above specified reporting limit							

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Appendix B.3

OU-3 Mass Removal Tables and Charts

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**APPENDIX B.3 - TABLE 1
OU-3 CHROMIUM AND TCE MASS REMOVAL ESTIMATION
BOOMSNUB/AIRCO SUPERFUND SITE**

Date	Monthly Flow (Gallons)	Influent Chromium (ug/L)	Influent TCE (ug/L)	Monthly Chromium Removal (lbs)	Monthly TCE Removal (lbs)	Cumulative Chromium Removed (lbs)	Cumulative TCE Removed (lbs)
1990 to 1995 ¹						13,751.0	
1995 to May 1999 ¹						20,538.0	
1990 to 1999 ¹							1,645.7
Ave. Jun-Dec 1999	5,303,734	634.4	160.7	27.9	7.2	20,733.6	1,696.3
Ave. for 2000	5,429,513	593.4	197.5	27.0	8.9	21,057.0	1,803.6
Ave. for 2001	5,482,077	450.6	139.2	20.7	6.4	21,305.7	1,879.9
Ave. for 2002	5,587,227	379.0	102.1	17.7	4.8	21,518.0	1,937.3
Ave. for 2003	6,279,889	281.8	74.7	14.7	3.9	21,694.7	1,984.1
Ave. for 2004	6,463,796	194.1	59.8	10.5	3.2	21,820.2	2,022.8
Ave. for 2005	6,213,535	165.5	54.8	8.6	2.8	21,923.2	2,056.8
Ave. for 2006	6,409,175	153.8	55.8	8.2	3.0	22,022.0	2,092.2
Ave. for 2007	6,366,615	108.7	40.1	5.7	2.1	22,090.9	2,117.3
Ave. for 2008	6,547,878	84.2	26.3	4.6	1.4	22,146.3	2,134.6
Ave. for 2009	6,628,721	64.6	22.3	3.6	1.2	22,189.7	2,149.4
Ave. for 2010	6,835,587	60.5	20.8	3.5	1.2	22,230.8	2,163.6
Ave. for 2011	6,585,675	54.0	17.5	3.0	1.0	22,266.5	2,175.2
Ave. for 2012	6,868,867	49.4	16.8	2.8	1.0	22,300.8	2,186.8
Ave. for 2013	5,566,626	56.1	19	2.6	0.9	22,332.0	2,197.4
Ave. for 2014	5,466,047	54.5	17	2.5	0.8	22,361.8	2,206.6
Ave. for 2015	5,471,175	51.3	15	2.3	0.7	22,389.9	2,214.9
Ave. for 2016	5,474,936	48.8	13	2.2	0.6	22,416.7	2,222.1
Jan-17	5,789,427	48.8	13	2.4	0.6	22,419.0	2,222.8
Feb-17	5,107,116	47.7	15	2.0	0.6	22,421.1	2,223.4
Mar-17	4,937,374	47.8	14	2.0	0.6	22,423.0	2,224.0
Apr-17	5,607,991	47.8	13	2.2	0.6	22,425.3	2,224.6
May-17	5,732,786	44.4	13	2.1	0.6	22,427.4	2,225.2
Jun-17	5,661,744	45.0	13	2.1	0.6	22,429.5	2,225.8
Jul-17	5,865,822	41.2	15	2.0	0.7	22,431.5	2,226.6
Aug-17	5,808,750	39.5	13	1.9	0.6	22,433.5	2,227.2
Sep-17	5,567,735	38.1	12	1.8	0.6	22,435.2	2,227.7
Oct-17	5,732,321	38.2	11	1.8	0.5	22,437.1	2,228.3
Nov-17	5,531,450	40.7	13	1.9	0.6	22,438.9	2,228.9
Dec-17	5,799,823	43.1	13	2.1	0.6	22,441.0	2,229.5
Jan-18	5,686,640	43.9	11	2.1	0.5	22,443.1	2,230.0
Feb-18	5,136,129	42.7	12	1.8	0.5	22,444.9	2,230.5
Mar-18	5,654,944	43.7	13	2.1	0.6	22,447.0	2,231.2
Apr-18	5,493,023	42.4	13	1.9	0.6	22,449.0	2,231.8
May-18	5,690,489	41.9	12	2.0	0.6	22,450.9	2,232.3
Jun-18	5,392,921	41.0	13	1.8	0.6	22,452.8	2,232.9

Notes:

June 1999 through March 2002 data provided by URS

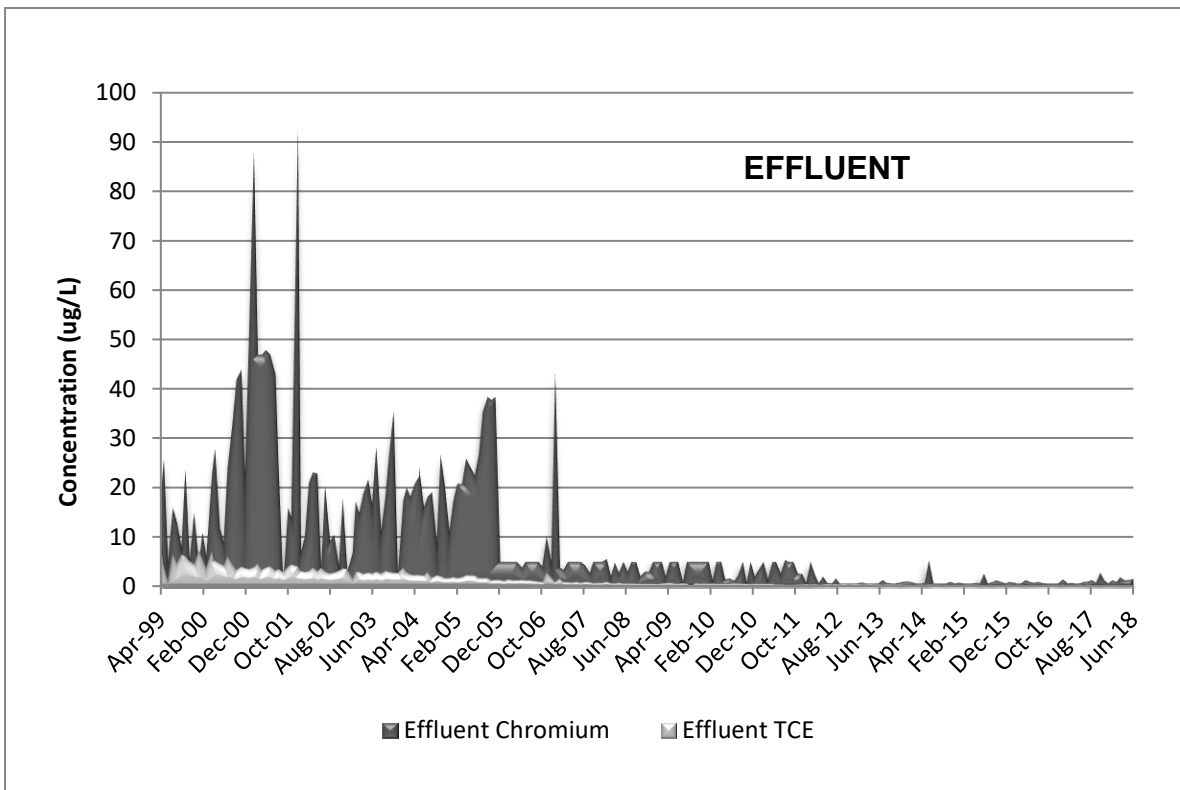
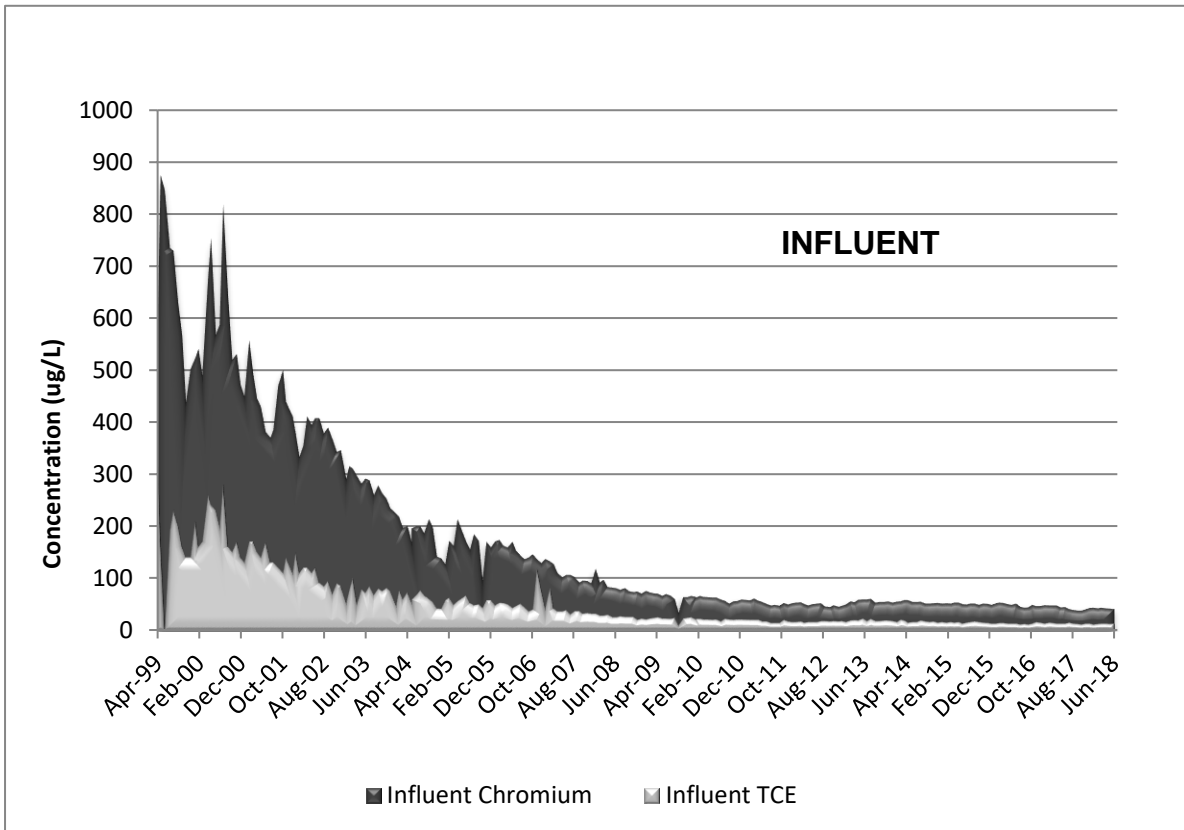
Shaded area represents the reporting period.

¹ - Provided by ICF Kaiser

lbs = pounds

ug/L = micrograms per liter

FIGURE B.3-1. OU-3 INFLUENT AND EFFLUENT CONCENTRATIONS VERSUS TIME



Appendix B.4

OU-3 Reports to the City of Vancouver and Supporting Flow Data

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EA Engineering, Science, and Technology, Inc., PBC

2200 Sixth Avenue, Suite 707
Seattle, Washington 98121
Telephone: 206-452-5350
Fax: 206-443-7646
www.eaest.com

18 July 2018
15240.58 LN1617

Mr. Nick Imbery
Industrial Pretreatment Coordinator
City of Vancouver
Marine Park Engineering Office
P.O. Box 1995
Vancouver, Washington 98668-1995

Subject: Semi-Annual Self-Monitoring Report – 30 June 2018
Boomsnub/Airco Superfund Site
Hazel Dell, Washington

Dear Mr. Imbery:

On behalf of Linde LLC, we are submitting the Semi-Annual Self-Monitoring Report for the Boomsnub/Airco Superfund Site, prepared in accordance with the City of Vancouver Industrial Wastewater Discharge Permit 2014-04. The time period covered includes January through June 2018. Flow data are being reported from the flow meter on the air stripper. During the reporting period, all discharges were made to the infiltration gallery on Linde LLC property.

Effluent samples were collected by EA Engineering, Science, and Technology, Inc., PBC on January 4, February 5, March 4, April 2, May 7 and June 8, 2018. ALS Environmental, located in Kelso, Washington, is our analytical laboratory. The analytical data for each monthly sampling event are included, along with the case narrative, sample Chain-of-Custody forms, and a list of data qualifiers. The pH values reported were based on bi-monthly field pH readings.

Please let me know if you have any questions regarding the enclosed information.

Sincerely,

A handwritten signature in black ink that reads "Jil M. Frain".

Jil M. Frain, PE
Project Manager

JF/lw

cc: Dave Sordi,

Enclosures: City of Vancouver Semi-Annual Self-Monitoring Report
List of Data Qualifiers
Laboratory Case Narratives, Chain of Custody forms, and Analytical Results

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Boomsnub Airco Superfund Site (Permit No. 2014-04)

Semi-Annual Self-Monitoring Report

Report Due Date (circle one): June 30, December 31

Lab Contracted for Analysis: ALS Environmental

Attach: Chain of Custody, Laboratory Results, Lab Report Narrative

Parameter**	Result	Daily Maximum Permit Limit	Sample Type*	Sample Date/Collected by:
Month 1 – January				
Peak Flow – gpd	0	230,400 gpd	NA	NA
Peak Chrome – mg/L	0.0012 J	7.22 mg/L	G	January 4, 2018/EA
Trichloroethene – mg/L	0.00024 J	0.33 mg/L	G	January 4, 2018/EA
pH (low/high) – SU	7.89/7.97	5.5/10.0 SU	G	January 4, 2018/EA
Month 2 – February				
Peak Flow – gpd	0	230,400 gpd	NA	NA
Peak Chrome – mg/L	0.0009 U	7.22 mg/L	G	February 5, 2018/EA
Trichloroethene – mg/L	0.00022 J	0.33 mg/L	G	February 5, 2018/EA
pH (low/high) – SU	7.89/7.92	5.5/10.0 SU	G	February 5, 2018/EA
Month 3 – March				
Peak Flow – gpd	0	230,400 gpd	NA	NA
Peak Chrome – mg/L	0.0019 J	7.22 mg/L	G	March 4, 2018/EA
Trichloroethene – mg/L	0.00025 J	0.33 mg/L	G	March 4, 2018/EA
pH (low/high) - SU	7.87/7.92	5.5/10.0 SU	G	March 4, 2018/EA
Month 4 – April				
Peak Flow – gpd	0	230,400 gpd	NA	NA
Peak Chrome – mg/L	0.0012 J	7.22 mg/L	G	April 2, 2018/EA
Trichloroethene – mg/L	0.00027 J	0.33 mg/L	G	April 2, 2018/EA
pH (low/high) - SU	7.90/7.92	5.5/10.0 SU	G	April 2, 2018/EA
Month 5 – May				
Peak Flow – gpd	0	230,400 gpd	NA	NA
Peak Chrome – mg/L	0.0013 J	7.22 mg/L	G	May 7, 2018/EA
Trichloroethene – mg/L	0.0022 J	0.33 mg/L	G	May 7, 2018/EA
pH (low/high) - SU	7.91/7.93	5.5/10.0 SU	G	May 15 & 25, 2018/EA
Month 6 – June				
Peak Flow – gpd	0	230,400 gpd	NA	NA
Peak Chrome – mg/L	0.0015 J	7.22 mg/L	G	June 8, 2018/EA
Trichloroethene – mg/L	0.0022 J	0.33 mg/L	G	June 8, 2018/EA
pH (low/high) - SU	7.93/7.94	5.5/10.0 SU	G	June 15 & 29, 2018/EA

Parameter	Value – mg/L	Limit	No. Samples
Months 1 through 3 Quarterly Average – Chrome	0.0013	0.572 mg/L	3
Months 4 through 6 Quarterly Average – Chrome	0.0013	0.572 mg/L	3

* Sample Type: Cont-Continuous; G – Grab; Comp - Composite

** If more than one sample analyzed, report the highest concentration for the month.

General Certification Statement: "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Joe M. Zi
Signature

Senior Engineer
Title

7/16/2018
Date

Inorganic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
 - i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

January 4, 2018
Laboratory Analytical Results

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Client: EA Engineering, Science, and Technology (EAEST)
Project: Boomsnub
Sample Matrix: Water

Service Request: K1800115
Date Received: 01/04/2018

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier IV validation deliverables including summary forms and all of the associated raw data for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

Sample Receipt:

Four water samples were received for analysis at ALS Environmental on 01/04/2018. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

Metals:

No significant anomalies were noted with this analysis.

Volatiles by GC/MS:

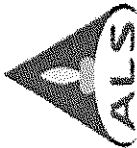
Method 8260C, 1/8/18: The upper control criterion was exceeded for 1,1,2,2-Tetrachloroethane in Duplicate Laboratory Control Sample (DLCS) KWG1800217-2. The analyte in question was not detected in the associated field samples. The error associated with elevated recovery indicated a high bias. The sample data was not significantly affected. No further corrective action was appropriate.

Approved by



Date

01/25/2018



ALS Environmental

CHAIN OF CUSTODY
46002

004

SR# K1560115
COC Set _____ of _____
COC# _____

1317 South 13th Ave, Kelso, WA 98626 Phone (360) 577-7222 / 800-695-7222 / FAX (360) 636-1068
www.alsglobal.com

Page 1 of 1

Project Name Boomsnub Project Number 1449545.2018.001
 Project Manager Jil Frain
 Company EA Engineering
 Address 2200 6th Ave, Suite 707, Seattle, WA 98121
 Phone # (206) 452-5350
 Sampler Signature Rick Read Sampler Printed Name Rick Read

CLIENT SAMPLE ID	LABID	SAMPLING Date	SAMPLING Time	Matrix	NUMBER OF CONTAINERS							Remarks	
					OH	14D	18D	1	2	3	4		
1. <u>INF-010418</u>		<u>1/4/18</u>	<u>8:25</u>	<u>H2O</u>	X								
2. <u>EFF-010418</u>		<u>↓</u>	<u>8:30</u>	<u>↓</u>	X								
3. <u>EFFD-010418</u>		<u>↓</u>	<u>8:35</u>	<u>↓</u>	X								
4. <u>TB-010418</u>		<u>↓</u>	<u>NA</u>	<u>↓</u>	X								
5.													
6.													
7.													
8.													
9.													
10.													

Report Requirements
 I. Routine Report: Method Blank, Surrogate, as required
 II. Report Dup., MS, MSD as required
 III. CLP Like Summary (no raw data)
 IV. Data Validation Report
 V. EDD

Invoice Information
 P.O.# _____
 Bill To: _____
 Turnaround Requirements
 24 hr. _____ 48 hr. _____
 5 Day Standard

Special Instructions/Comments:
VOCs - 8260c
Total Metals - Cr

Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg
Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg
 *Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other _____ (Circle One)

Relinquished By:
 Signature Rick Read
 Printed Name RICK READ
 Firm EA
 Date/Time 1/4/18 9:00

Received By:
 Signature Cody Ganes
 Printed Name CODY GANES
 Firm AGS
 Date/Time 1/4/18 1140

Relinquished By:
 Signature _____
 Printed Name _____
 Firm _____
 Date/Time _____

Received By:
 Signature _____
 Printed Name _____
 Firm _____
 Date/Time _____



PC KC

Cooler Receipt and Preservation Form

Client Boomsnub - EA Engineering Service Request K18 00115
 Received: 1/4/18 Opened: 1/4/18 By: CB Unloaded: 1/4/18 By: CB

1. Samples were received via? USPS Fed Ex UPS DHL PDX Courier Hand Delivered
 2. Samples were received in: (circle) Cooler Box Envelope Other NA
 3. Were custody seals on coolers? NA Y N If yes, how many and where? 1 Front 1 side
 If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	NA	Filed
5.0	5.1	11.6	11.7	+0.1	298	46002		<u>NA</u>	

4. Packing material: Inserts Baggies Bubble Wrap Gel Packs Wet Ice Dry Ice Sleeves
 5. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
 6. Were samples received in good condition (temperature, unbroken)? Indicate in the table below. NA Y N
 If applicable, tissue samples were received: Frozen Partially Thawed Thawed
 7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N
 8. Did all sample labels and tags agree with custody papers? Indicate major discrepancies in the table on page 2. NA Y N
 9. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
 10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? Indicate in the table below NA Y N
 11. Were VOA vials received without headspace? Indicate in the table below. NA Y N
 12. Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: _____

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: EA Engineering, Science, and Technology (EAEST)
Project: Boomsnub/1449545.2018.001
Sample Matrix: Water
Sample Name: INF - 010418
Lab Code: K1800115-001

Service Request: K1800115
Date Collected: 01/04/18 08:25
Date Received: 01/04/18 11:40
Basis: NA

Total Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Chromium	200.7	43.9	ug/L	4.2	0.9	1	01/10/18 11:54	01/05/18	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: EA Engineering, Science, and Technology (EAEST)
Project: Boomsnub/1449545.2018.001
Sample Matrix: Water
Sample Name: EFF-010418
Lab Code: K1800115-002

Service Request: K1800115
Date Collected: 01/04/18 08:30
Date Received: 01/04/18 11:40
Basis: NA

Total Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Chromium	200.7	1.1 J	ug/L	4.2	0.9	1	01/10/18 12:07	01/05/18	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: EA Engineering, Science, and Technology (EAEST)
Project: Boomsnub/1449545.2018.001
Sample Matrix: Water
Sample Name: EFFD-010418
Lab Code: K1800115-003

Service Request: K1800115
Date Collected: 01/04/18 08:35
Date Received: 01/04/18 11:40
Basis: NA

Total Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Chromium	200.7	1.2 J	ug/L	4.2	0.9	1	01/10/18 12:09	01/05/18	

Analytical Results

Client: EA Engineering, Science, and Technology
Project: Boomsnub/1449545.2018.001
Sample Matrix: Water

Service Request: K1800115
Date Collected: 01/04/2018
Date Received: 01/04/2018

Volatile Organic Compounds

Sample Name: INF - 010418
Lab Code: K1800115-001
Extraction Method: EPA 5030A
Analysis Method: 8260C

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	01/08/18	01/08/18	KWG1800217	
Trichlorofluoromethane	0.25	J	0.50	0.12	1	01/08/18	01/08/18	KWG1800217	
1,1-Dichloroethene	0.40	J	0.50	0.080	1	01/08/18	01/08/18	KWG1800217	
Methylene Chloride	ND	U	2.0	0.10	1	01/08/18	01/08/18	KWG1800217	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	01/08/18	01/08/18	KWG1800217	
cis-1,2-Dichloroethene	0.25	J	0.50	0.067	1	01/08/18	01/08/18	KWG1800217	
1,1,1-Trichloroethane (TCA)	0.080	J	0.50	0.075	1	01/08/18	01/08/18	KWG1800217	
Carbon Tetrachloride	ND	U	0.50	0.096	1	01/08/18	01/08/18	KWG1800217	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	01/08/18	01/08/18	KWG1800217	
Trichloroethene (TCE)	11		0.50	0.10	1	01/08/18	01/08/18	KWG1800217	
Bromodichloromethane	ND	U	0.50	0.091	1	01/08/18	01/08/18	KWG1800217	
Tetrachloroethene (PCE)	0.62		0.50	0.099	1	01/08/18	01/08/18	KWG1800217	
Dibromochloromethane	ND	U	0.50	0.14	1	01/08/18	01/08/18	KWG1800217	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	01/08/18	01/08/18	KWG1800217	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.22	1	01/08/18	01/08/18	KWG1800217	
Hexachlorobutadiene	ND	U	2.0	0.11	1	01/08/18	01/08/18	KWG1800217	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	114	73-122	01/08/18	Acceptable
Toluene-d8	90	65-144	01/08/18	Acceptable
4-Bromofluorobenzene	76	68-117	01/08/18	Acceptable

Comments: _____

Analytical Results

Client: EA Engineering, Science, and Technology
Project: Boomsnub/1449545.2018.001
Sample Matrix: Water

Service Request: K1800115
Date Collected: 01/04/2018
Date Received: 01/04/2018

Volatile Organic Compounds

Sample Name: EFF-010418
Lab Code: K1800115-002
Extraction Method: EPA 5030A
Analysis Method: 8260C

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	01/08/18	01/08/18	KWG1800217	
Trichlorofluoromethane	ND	U	0.50	0.12	1	01/08/18	01/08/18	KWG1800217	
1,1-Dichloroethene	ND	U	0.50	0.080	1	01/08/18	01/08/18	KWG1800217	
Methylene Chloride	ND	U	2.0	0.10	1	01/08/18	01/08/18	KWG1800217	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	01/08/18	01/08/18	KWG1800217	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	01/08/18	01/08/18	KWG1800217	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	01/08/18	01/08/18	KWG1800217	
Carbon Tetrachloride	ND	U	0.50	0.096	1	01/08/18	01/08/18	KWG1800217	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	01/08/18	01/08/18	KWG1800217	
Trichloroethene (TCE)	0.22	J	0.50	0.10	1	01/08/18	01/08/18	KWG1800217	
Bromodichloromethane	ND	U	0.50	0.091	1	01/08/18	01/08/18	KWG1800217	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	01/08/18	01/08/18	KWG1800217	
Dibromochloromethane	ND	U	0.50	0.14	1	01/08/18	01/08/18	KWG1800217	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	01/08/18	01/08/18	KWG1800217	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.22	1	01/08/18	01/08/18	KWG1800217	
Hexachlorobutadiene	ND	U	2.0	0.11	1	01/08/18	01/08/18	KWG1800217	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	111	73-122	01/08/18	Acceptable
Toluene-d8	92	65-144	01/08/18	Acceptable
4-Bromofluorobenzene	77	68-117	01/08/18	Acceptable

Comments: _____

Analytical Results

Client: EA Engineering, Science, and Technology
Project: Boomsnub/1449545.2018.001
Sample Matrix: Water

Service Request: K1800115
Date Collected: 01/04/2018
Date Received: 01/04/2018

Volatile Organic Compounds

Sample Name: EFFD-010418
Lab Code: K1800115-003
Extraction Method: EPA 5030A
Analysis Method: 8260C

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	01/08/18	01/08/18	KWG1800217	
Trichlorofluoromethane	ND	U	0.50	0.12	1	01/08/18	01/08/18	KWG1800217	
1,1-Dichloroethene	ND	U	0.50	0.080	1	01/08/18	01/08/18	KWG1800217	
Methylene Chloride	ND	U	2.0	0.10	1	01/08/18	01/08/18	KWG1800217	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	01/08/18	01/08/18	KWG1800217	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	01/08/18	01/08/18	KWG1800217	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	01/08/18	01/08/18	KWG1800217	
Carbon Tetrachloride	ND	U	0.50	0.096	1	01/08/18	01/08/18	KWG1800217	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	01/08/18	01/08/18	KWG1800217	
Trichloroethene (TCE)	0.24	J	0.50	0.10	1	01/08/18	01/08/18	KWG1800217	
Bromodichloromethane	ND	U	0.50	0.091	1	01/08/18	01/08/18	KWG1800217	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	01/08/18	01/08/18	KWG1800217	
Dibromochloromethane	ND	U	0.50	0.14	1	01/08/18	01/08/18	KWG1800217	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	01/08/18	01/08/18	KWG1800217	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.22	1	01/08/18	01/08/18	KWG1800217	
Hexachlorobutadiene	ND	U	2.0	0.11	1	01/08/18	01/08/18	KWG1800217	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	115	73-122	01/08/18	Acceptable
Toluene-d8	90	65-144	01/08/18	Acceptable
4-Bromofluorobenzene	79	68-117	01/08/18	Acceptable

Comments: _____

Analytical Results

Client: EA Engineering, Science, and Technology
Project: Boomsnub/1449545.2018.001
Sample Matrix: Water

Service Request: K1800115
Date Collected: 01/04/2018
Date Received: 01/04/2018

Volatile Organic Compounds

Sample Name: TB-010418
Lab Code: K1800115-004
Extraction Method: EPA 5030A
Analysis Method: 8260C

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	01/08/18	01/08/18	KWG1800217	
Trichlorofluoromethane	ND	U	0.50	0.12	1	01/08/18	01/08/18	KWG1800217	
1,1-Dichloroethene	ND	U	0.50	0.080	1	01/08/18	01/08/18	KWG1800217	
Methylene Chloride	ND	U	2.0	0.10	1	01/08/18	01/08/18	KWG1800217	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	01/08/18	01/08/18	KWG1800217	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	01/08/18	01/08/18	KWG1800217	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	01/08/18	01/08/18	KWG1800217	
Carbon Tetrachloride	ND	U	0.50	0.096	1	01/08/18	01/08/18	KWG1800217	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	01/08/18	01/08/18	KWG1800217	
Trichloroethene (TCE)	ND	U	0.50	0.10	1	01/08/18	01/08/18	KWG1800217	
Bromodichloromethane	ND	U	0.50	0.091	1	01/08/18	01/08/18	KWG1800217	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	01/08/18	01/08/18	KWG1800217	
Dibromochloromethane	ND	U	0.50	0.14	1	01/08/18	01/08/18	KWG1800217	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	01/08/18	01/08/18	KWG1800217	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.22	1	01/08/18	01/08/18	KWG1800217	
Hexachlorobutadiene	ND	U	2.0	0.11	1	01/08/18	01/08/18	KWG1800217	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	110	73-122	01/08/18	Acceptable
Toluene-d8	90	65-144	01/08/18	Acceptable
4-Bromofluorobenzene	77	68-117	01/08/18	Acceptable

Comments: _____

February 5, 2018
Laboratory Analytical Results

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Client: EA Engineering, Science, and Technology (EAEST)
Project: Boomsnub
Sample Matrix: Water

Service Request: K1801058
Date Received: 02/05/2018

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier IV validation deliverables including summary forms and all of the associated raw data for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

Sample Receipt:

Four water samples were received for analysis at ALS Environmental on 02/05/2018. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

Metals:

No significant anomalies were noted with this analysis.

Volatiles by GC/MS:

Method 8260C, 2/12/18: The following analytes were flagged as outside the control criterion for Continuing Calibration Verification (CCV) MS13\0212F010.D: Trichlorofluoromethane, 1,1-Dichloroethene, 1,1,1-Trichloroethane, Carbon Tetrachloride, Tetrachloroethene and Toluene-d8. In accordance with the EPA Method, 80% or more of the CCV analytes must pass within 20% of the true value. The ALS SOP allows for 40% difference for the remaining analytes. The CCV met these criteria. The quality of the sample data was not significantly affected. No further corrective action was required.

Approved by *Nest Clackson*

Date 02/26/2018



CHAIN OF CUSTODY
46002

004

1317 South 13th Ave, Kelso, WA 98626 Phone (360) 577-7222 / 800-695-7222 / FAX (360) 636-1088
www.alsglobal.com

Page 1 of 1

Project Name: **Boomsnub**
Project Manager: **Jill Frain**
Company: **EA Engineering**
Address: **2200 6th Ave Suite 707, Seattle, WA 98121**
Phone #: **206-452-5350**
Sampler Signature: **J Frain**
Sampler Printed Name: **J Frain**

CLIENT SAMPLE ID	LABID	SAMPLING		Matrix	REMARKS
		Date	Time		
1. INF-020518		2/5/18	8:25	H₂O	
2. EFF-020518			8:30		
3. EFFD-020518			8:35		
4. TB-020518			NA		
5.					
6.					
7.					
8.					
9.					
10.					

Project Number: **1524058.001**

SM 4500-H+ B / PH
8260C / VOC FP
2007 / Metals T

OH
14D
180D

NUMBER OF CONTAINERS

SR# **1801058**
COC Set **1** of **1**
COC#

Report Requirements
I. Routine Report: Method Blank, Surrogate, as required
II. Report Dup., MS, MSD as required
X III. CLP Like Summary (no raw data)
X IV. Data Validation Report
V. EDD

Invoice Information
P.O.#
Bill To:
Turnaround Requirements
24 hr. _____ 48 hr. _____
5 Day Standard
X

Report Requirements	Received By:	Relinquished By:	Received By:	Relinquished By:
Signature: Rick Read	Signature: _____	Signature: _____	Signature: _____	Signature: _____
Printed Name: RICK READ	Printed Name: _____	Printed Name: _____	Printed Name: _____	Printed Name: _____
Firm: EA	Firm: _____	Firm: _____	Firm: _____	Firm: _____
Date/Time: 2/5/18 9:00	Date/Time: _____	Date/Time: _____	Date/Time: _____	Date/Time: _____

Special Instructions/Comments: **VOCs - 8260C Total Metals - Cr**

Total Metals: Al As Sb Ba Be B Ca Cd Co **Cr** Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg
Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg

*Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other _____ (Circle One)



Cooler Receipt and Preservation Form

Client FA Eng Service Request K18 01058
 Received: 2/5/18 Opened: 2/5/18 By: R Unloaded: 2/5/18 By: R

- Samples were received via? USPS Fed Ex UPS DHL PDX Courier Hand Delivered
- Samples were received in: (circle) Cooler Box Envelope Other NA
- Were custody seals on coolers? NA Y N If yes, how many and where? one, front
 If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	Filed
0.8	0.8	7.6	7.5	-0.1	365	NA	NA	

- Packing material: Inserts Baggies Bubble Wrap Gel Packs Wet Ice Dry Ice Sleeves
- Were custody papers properly filled out (ink, signed, etc.)? NA Y N
- Were samples received in good condition (temperature, unbroken)? *Indicate in the table below.* NA Y N
 If applicable, tissue samples were received: Frozen Partially Thawed Thawed
- Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N
- Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA Y N
- Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
- Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y N
- Were VOA vials received without headspace? *Indicate in the table below.* NA Y N
- Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: _____

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: EA Engineering, Science, and Technology (EAEST)
Project: Boomsnub/1524058.001
Sample Matrix: Water
Sample Name: INF-020518
Lab Code: K1801058-001

Service Request: K1801058
Date Collected: 02/05/18 08:25
Date Received: 02/05/18 10:30
Basis: NA

Total Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Chromium	200.7	42.7	ug/L	4.2	0.9	1	02/13/18 12:45	02/09/18	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: EA Engineering, Science, and Technology (EAEST)
Project: Boomsnub/1524058.001
Sample Matrix: Water
Sample Name: EFF-020518
Lab Code: K1801058-002

Service Request: K1801058
Date Collected: 02/05/18 08:30
Date Received: 02/05/18 10:30
Basis: NA

Total Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Chromium	200.7	ND U	ug/L	4.2	0.9	1	02/13/18 12:33	02/09/18	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: EA Engineering, Science, and Technology (EAEST)
Project: Boomsnub/1524058.001
Sample Matrix: Water
Sample Name: EFFD-020518
Lab Code: K1801058-003

Service Request: K1801058
Date Collected: 02/05/18 08:35
Date Received: 02/05/18 10:30
Basis: NA

Total Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Chromium	200.7	ND U	ug/L	4.2	0.9	1	02/13/18 12:47	02/09/18	

Analytical Results

Client: EA Engineering, Science, and Technology
Project: Boomsnub/1524058.001
Sample Matrix: Water

Service Request: K1801058
Date Collected: 02/05/2018
Date Received: 02/05/2018

Volatile Organic Compounds

Sample Name: INF-020518
Lab Code: K1801058-001
Extraction Method: EPA 5030B
Analysis Method: 8260C

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	02/12/18	02/12/18	KWG1800859	
Trichlorofluoromethane	0.30	J	0.50	0.12	1	02/12/18	02/12/18	KWG1800859	*
1,1-Dichloroethene	0.44	J	0.50	0.080	1	02/12/18	02/12/18	KWG1800859	*
Methylene Chloride	ND	U	2.0	0.10	1	02/12/18	02/12/18	KWG1800859	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	02/12/18	02/12/18	KWG1800859	
cis-1,2-Dichloroethene	0.25	J	0.50	0.067	1	02/12/18	02/12/18	KWG1800859	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	02/12/18	02/12/18	KWG1800859	*
Carbon Tetrachloride	ND	U	0.50	0.096	1	02/12/18	02/12/18	KWG1800859	*
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	02/12/18	02/12/18	KWG1800859	
Trichloroethene (TCE)	12		0.50	0.10	1	02/12/18	02/12/18	KWG1800859	
Bromodichloromethane	0.11	J	0.50	0.091	1	02/12/18	02/12/18	KWG1800859	
Tetrachloroethene (PCE)	0.70		0.50	0.099	1	02/12/18	02/12/18	KWG1800859	*
Dibromochloromethane	ND	U	0.50	0.14	1	02/12/18	02/12/18	KWG1800859	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	02/12/18	02/12/18	KWG1800859	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.22	1	02/12/18	02/12/18	KWG1800859	
Hexachlorobutadiene	ND	U	2.0	0.11	1	02/12/18	02/12/18	KWG1800859	

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	110	73-122	02/12/18	Acceptable
Toluene-d8	122	65-144	02/12/18	Acceptable
4-Bromofluorobenzene	104	68-117	02/12/18	Acceptable

Comments: _____

Analytical Results

Client: EA Engineering, Science, and Technology
Project: Boomsnub/1524058.001
Sample Matrix: Water

Service Request: K1801058
Date Collected: 02/05/2018
Date Received: 02/05/2018

Volatile Organic Compounds

Sample Name: EFF-020518
Lab Code: K1801058-002
Extraction Method: EPA 5030B
Analysis Method: 8260C

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	02/12/18	02/12/18	KWG1800859	
Trichlorofluoromethane	ND	U	0.50	0.12	1	02/12/18	02/12/18	KWG1800859	*
1,1-Dichloroethene	ND	U	0.50	0.080	1	02/12/18	02/12/18	KWG1800859	*
Methylene Chloride	ND	U	2.0	0.10	1	02/12/18	02/12/18	KWG1800859	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	02/12/18	02/12/18	KWG1800859	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	02/12/18	02/12/18	KWG1800859	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	02/12/18	02/12/18	KWG1800859	*
Carbon Tetrachloride	ND	U	0.50	0.096	1	02/12/18	02/12/18	KWG1800859	*
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	02/12/18	02/12/18	KWG1800859	
Trichloroethene (TCE)	0.22	J	0.50	0.10	1	02/12/18	02/12/18	KWG1800859	
Bromodichloromethane	ND	U	0.50	0.091	1	02/12/18	02/12/18	KWG1800859	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	02/12/18	02/12/18	KWG1800859	*
Dibromochloromethane	ND	U	0.50	0.14	1	02/12/18	02/12/18	KWG1800859	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	02/12/18	02/12/18	KWG1800859	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.22	1	02/12/18	02/12/18	KWG1800859	
Hexachlorobutadiene	ND	U	2.0	0.11	1	02/12/18	02/12/18	KWG1800859	

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	110	73-122	02/12/18	Acceptable
Toluene-d8	121	65-144	02/12/18	Acceptable
4-Bromofluorobenzene	104	68-117	02/12/18	Acceptable

Comments: _____

Analytical Results

Client: EA Engineering, Science, and Technology
Project: Boomsnub/1524058.001
Sample Matrix: Water

Service Request: K1801058
Date Collected: 02/05/2018
Date Received: 02/05/2018

Volatile Organic Compounds

Sample Name: EFFD-020518
Lab Code: K1801058-003
Extraction Method: EPA 5030B
Analysis Method: 8260C

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	02/12/18	02/12/18	KWG1800859	
Trichlorofluoromethane	ND	U	0.50	0.12	1	02/12/18	02/12/18	KWG1800859	*
1,1-Dichloroethene	ND	U	0.50	0.080	1	02/12/18	02/12/18	KWG1800859	*
Methylene Chloride	ND	U	2.0	0.10	1	02/12/18	02/12/18	KWG1800859	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	02/12/18	02/12/18	KWG1800859	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	02/12/18	02/12/18	KWG1800859	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	02/12/18	02/12/18	KWG1800859	*
Carbon Tetrachloride	ND	U	0.50	0.096	1	02/12/18	02/12/18	KWG1800859	*
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	02/12/18	02/12/18	KWG1800859	
Trichloroethene (TCE)	0.20	J	0.50	0.10	1	02/12/18	02/12/18	KWG1800859	
Bromodichloromethane	ND	U	0.50	0.091	1	02/12/18	02/12/18	KWG1800859	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	02/12/18	02/12/18	KWG1800859	*
Dibromochloromethane	ND	U	0.50	0.14	1	02/12/18	02/12/18	KWG1800859	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	02/12/18	02/12/18	KWG1800859	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.22	1	02/12/18	02/12/18	KWG1800859	
Hexachlorobutadiene	ND	U	2.0	0.11	1	02/12/18	02/12/18	KWG1800859	

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	109	73-122	02/12/18	Acceptable
Toluene-d8	121	65-144	02/12/18	Acceptable
4-Bromofluorobenzene	104	68-117	02/12/18	Acceptable

Comments: _____

Analytical Results

Client: EA Engineering, Science, and Technology
Project: Boomsnub/1524058.001
Sample Matrix: Water

Service Request: K1801058
Date Collected: 02/05/2018
Date Received: 02/05/2018

Volatile Organic Compounds

Sample Name: TB-020518
Lab Code: K1801058-004
Extraction Method: EPA 5030B
Analysis Method: 8260C

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	02/12/18	02/12/18	KWG1800859	
Trichlorofluoromethane	ND	U	0.50	0.12	1	02/12/18	02/12/18	KWG1800859	*
1,1-Dichloroethene	ND	U	0.50	0.080	1	02/12/18	02/12/18	KWG1800859	*
Methylene Chloride	0.13	J	2.0	0.10	1	02/12/18	02/12/18	KWG1800859	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	02/12/18	02/12/18	KWG1800859	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	02/12/18	02/12/18	KWG1800859	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	02/12/18	02/12/18	KWG1800859	*
Carbon Tetrachloride	ND	U	0.50	0.096	1	02/12/18	02/12/18	KWG1800859	*
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	02/12/18	02/12/18	KWG1800859	
Trichloroethene (TCE)	ND	U	0.50	0.10	1	02/12/18	02/12/18	KWG1800859	
Bromodichloromethane	ND	U	0.50	0.091	1	02/12/18	02/12/18	KWG1800859	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	02/12/18	02/12/18	KWG1800859	*
Dibromochloromethane	ND	U	0.50	0.14	1	02/12/18	02/12/18	KWG1800859	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	02/12/18	02/12/18	KWG1800859	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.22	1	02/12/18	02/12/18	KWG1800859	
Hexachlorobutadiene	ND	U	2.0	0.11	1	02/12/18	02/12/18	KWG1800859	

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	108	73-122	02/12/18	Acceptable
Toluene-d8	121	65-144	02/12/18	Acceptable
4-Bromofluorobenzene	102	68-117	02/12/18	Acceptable

Comments: _____

March 4, 2018
Laboratory Analytical Results

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Client: EA Engineering, Science, and Technology (EAEST)
Project: Boomsnub
Sample Matrix: Water

Service Request: K1801991
Date Received: 03/05/2018

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier IV validation deliverables including summary forms and all of the associated raw data for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

Sample Receipt:

Four water samples were received for analysis at ALS Environmental on 03/05/2018. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

Metals:

No significant anomalies were noted with this analysis.

Volatiles by GC/MS:

Method 8260C, 3/9/18: The following analytes were flagged as outside the control criterion for Continuing Calibration Verification (CCV) MS27\0309F004.D: Vinyl Chloride, Trichlorofluoromethane, 1,1-Dichloroethene, Carbon Tetrachloride and Toluene-d8. In accordance with the EPA Method, 80% or more of the CCV analytes must pass within 20% of the true value. The ALS SOP allows for 40% difference for the remaining analytes. The CCV met these criteria. The quality of the sample data was not significantly affected. No further corrective action was required.

Method 8260C, 3/9/18: The upper control criterion was exceeded for Dibromofluoromethane in all field samples. No target analytes were detected in the samples with the exception of INF-030418. The error associated with an elevated recovery equated to a high bias. The quality of the sample data was not significantly affected. No further corrective action was appropriate.

Method 8260C, 3/9/18: The control criteria were exceeded for Dibromofluoromethane in INF-030418. Since the problem may indicate a potential bias the sample was re-analyzed four days past the recommended hold time. The surrogates met control criteria for the re-analysis. Note the reanalysis confirmed an error with the original results. The data from the reanalysis is reported and flagged to indicate the problem.

Method 8260C, 3/9/18: The upper control criterion was exceeded for Dibromofluoromethane in Method Blank KWG1801341-4. No target analytes were detected in the Method Blank. Since the apparent problem equates to a high bias, the data quality was not significantly affected. No further corrective action was appropriate.

Approved by Kelley Anzoy

Date 04/04/2018



ALS Environmental



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46002

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Page 1 of 1

SR# K1801991
COC Set 1 of 1
COC# _____

Project Name: Boomsnub
Project Number: 1524058.01
Project Manager: J. J. Frain
Company: EA Engineering
Address: 2200 6th Ave Suite 707, Seattle WA, 98121
Phone #: (206) 452-5350
email: jfrain@eaest.com
Sampler Signature: Rick Read
Sampler Printed Name: RICK READ

CLIENT SAMPLE ID	LABID	SAMPLING Date	SAMPLING Time	Matrix	NUMBER OF CONTAINERS				Remarks
					SM 4500-H+ B / pH	8260C / VOC FP	14D	180D	
1. INF-030418		3/4/18	16:20	H2O	X	X			
2. EFF-030418		16:25			X	X			
3. EFFD-030418		16:30			X	X			
4. TB-030418		NA			X				
5.									
6.									
7.									
8.									
9.									
10.									

Report Requirements
 I. Routine Report: Method Blank, Surrogate, as required
 II. Report Dup., MS, MSD as required
 III. CLP Like Summary (no raw data)
 IV. Data Validation Report
 V. EDD

Invoice Information
 P.O.# _____
 Bill To: _____
Turnaround Requirements
 24 hr
 5 Day
 Standard
 Requested Report Date _____

Special Instructions/Comments:
 VOCs-8260c
 Total Metals - Cr

Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg
 (Circle which metals are to be analyzed)

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg
 *Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other _____ (Circle One)

Relinquished By:
 Signature: Rick Read
 Printed Name: RICK READ
 Firm: EA
 Date/Time: 3/5/18 8:00

Received By:
 Signature: [Signature]
 Printed Name: [Name]
 Firm: [Firm]
 Date/Time: 3/5/18 0800

Relinquished By:
 Signature
 Printed Name
 Firm
 Date/Time

Received By:
 Signature
 Printed Name
 Firm
 Date/Time

Relinquished By:
 Signature
 Printed Name
 Firm
 Date/Time



PC KC

Cooler Receipt and Preservation Form

Client EA Eng. Service Request K1801991
 Received: 3/5/18 Opened: 3/5/18 By: [Signature] Unloaded: 3/5/18 By: [Signature]

- Samples were received via? USPS Fed Ex UPS DHL PDX Courier Hand Delivered
- Samples were received in: (circle) Cooler Box Envelope Other NA
- Were custody seals on coolers? NA Y N If yes, how many and where? 2, front
 If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	File #
<u>2.7</u>	<u>2.8</u>	<u>4.5</u>	<u>4.6</u>	<u>+0.1</u>	<u>323</u>	<u>NA</u>	<u>NA</u>	

- Packing material: Inserts Baggies Bubble Wrap Gel Packs Wet Ice Dry Ice Sleeves
- Were custody papers properly filled out (ink, signed, etc.)? NA Y N
- Were samples received in good condition (temperature, unbroken)? *Indicate in the table below.* NA Y N
 If applicable, tissue samples were received: Frozen Partially Thawed Thawed
- Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N
- Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA Y N
- Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
- Were the pH-preserved bottles (see SMO GEN SOP) received at the appropriate pH? *Indicate in the table below* NA Y N
- Were VOA vials received without headspace? *Indicate in the table below.* NA Y N
- Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: _____

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: EA Engineering, Science, and Technology (EAEST)
Project: Boomsnub/1524058.01
Sample Matrix: Water
Sample Name: INF-030418
Lab Code: K1801991-001

Service Request: K1801991
Date Collected: 03/04/18 16:20
Date Received: 03/05/18 08:00
Basis: NA

Total Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Chromium	200.7	43.7	ug/L	4.2	0.9	1	03/19/18 14:26	03/08/18	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: EA Engineering, Science, and Technology (EAEST)
Project: Boomsnub/1524058.01
Sample Matrix: Water
Sample Name: EFF-030418
Lab Code: K1801991-002

Service Request: K1801991
Date Collected: 03/04/18 16:25
Date Received: 03/05/18 08:00
Basis: NA

Total Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Chromium	200.7	1.7 J	ug/L	4.2	0.9	1	03/19/18 14:45	03/08/18	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: EA Engineering, Science, and Technology (EAEST)
Project: Boomsnub/1524058.01
Sample Matrix: Water
Sample Name: EFFD-030418
Lab Code: K1801991-003

Service Request: K1801991
Date Collected: 03/04/18 16:30
Date Received: 03/05/18 08:00

Basis: NA

Total Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Chromium	200.7	1.9 J	ug/L	4.2	0.9	1	03/19/18 14:48	03/08/18	

Analytical Results

Client: EA Engineering, Science, and Technology
Project: Boomsnub/1524058.01
Sample Matrix: Water

Service Request: K1801991
Date Collected: 03/04/2018
Date Received: 03/05/2018

Volatile Organic Compounds

Sample Name: INF-030418
Lab Code: K1801991-001
Extraction Method: EPA 5030B
Analysis Method: 8260C

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	03/09/18	03/09/18	KWG1801341	*
Trichlorofluoromethane	0.33	J	0.50	0.12	1	03/09/18	03/09/18	KWG1801341	*
1,1-Dichloroethene	0.45	J	0.50	0.080	1	03/09/18	03/09/18	KWG1801341	*
Methylene Chloride	ND	U	2.0	0.10	1	03/09/18	03/09/18	KWG1801341	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	03/09/18	03/09/18	KWG1801341	
cis-1,2-Dichloroethene	0.29	J	0.50	0.067	1	03/09/18	03/09/18	KWG1801341	
1,1,1-Trichloroethane (TCA)	0.090	J	0.50	0.075	1	03/09/18	03/09/18	KWG1801341	
Carbon Tetrachloride	ND	U	0.50	0.096	1	03/09/18	03/09/18	KWG1801341	*
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	03/09/18	03/09/18	KWG1801341	
Trichloroethene (TCE)	13		0.50	0.10	1	03/09/18	03/09/18	KWG1801341	
Bromodichloromethane	0.12	J	0.50	0.091	1	03/09/18	03/09/18	KWG1801341	
Tetrachloroethene (PCE)	0.93		0.50	0.099	1	03/09/18	03/09/18	KWG1801341	
Dibromochloromethane	ND	U	0.50	0.14	1	03/09/18	03/09/18	KWG1801341	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	03/09/18	03/09/18	KWG1801341	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.22	1	03/09/18	03/09/18	KWG1801341	
Hexachlorobutadiene	ND	U	2.0	0.11	1	03/09/18	03/09/18	KWG1801341	

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	130	73-122	03/09/18	Outside Control Limits
Toluene-d8	114	65-144	03/09/18	Acceptable
4-Bromofluorobenzene	96	68-117	03/09/18	Acceptable

Comments: _____

Analytical Results

Client: EA Engineering, Science, and Technology
Project: Boomsnub/1524058.01
Sample Matrix: Water

Service Request: K1801991
Date Collected: 03/04/2018
Date Received: 03/05/2018

Volatile Organic Compounds

Sample Name: EFF-030418
Lab Code: K1801991-002
Extraction Method: EPA 5030B
Analysis Method: 8260C

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	03/09/18	03/09/18	KWG1801341	*
Trichlorofluoromethane	ND	U	0.50	0.12	1	03/09/18	03/09/18	KWG1801341	*
1,1-Dichloroethene	ND	U	0.50	0.080	1	03/09/18	03/09/18	KWG1801341	*
Methylene Chloride	ND	U	2.0	0.10	1	03/09/18	03/09/18	KWG1801341	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	03/09/18	03/09/18	KWG1801341	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	03/09/18	03/09/18	KWG1801341	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	03/09/18	03/09/18	KWG1801341	
Carbon Tetrachloride	ND	U	0.50	0.096	1	03/09/18	03/09/18	KWG1801341	*
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	03/09/18	03/09/18	KWG1801341	
Trichloroethene (TCE)	0.25	J	0.50	0.10	1	03/09/18	03/09/18	KWG1801341	
Bromodichloromethane	ND	U	0.50	0.091	1	03/09/18	03/09/18	KWG1801341	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	03/09/18	03/09/18	KWG1801341	
Dibromochloromethane	ND	U	0.50	0.14	1	03/09/18	03/09/18	KWG1801341	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	03/09/18	03/09/18	KWG1801341	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.22	1	03/09/18	03/09/18	KWG1801341	
Hexachlorobutadiene	ND	U	2.0	0.11	1	03/09/18	03/09/18	KWG1801341	

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	129	73-122	03/09/18	Outside Control Limits
Toluene-d8	113	65-144	03/09/18	Acceptable
4-Bromofluorobenzene	99	68-117	03/09/18	Acceptable

Comments: _____

Analytical Results

Client: EA Engineering, Science, and Technology
Project: Boomsnub/1524058.01
Sample Matrix: Water

Service Request: K1801991
Date Collected: 03/04/2018
Date Received: 03/05/2018

Volatile Organic Compounds

Sample Name: EFFD-030418
Lab Code: K1801991-003
Extraction Method: EPA 5030B
Analysis Method: 8260C

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	03/09/18	03/09/18	KWG1801341	*
Trichlorofluoromethane	ND	U	0.50	0.12	1	03/09/18	03/09/18	KWG1801341	*
1,1-Dichloroethene	ND	U	0.50	0.080	1	03/09/18	03/09/18	KWG1801341	*
Methylene Chloride	ND	U	2.0	0.10	1	03/09/18	03/09/18	KWG1801341	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	03/09/18	03/09/18	KWG1801341	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	03/09/18	03/09/18	KWG1801341	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	03/09/18	03/09/18	KWG1801341	
Carbon Tetrachloride	ND	U	0.50	0.096	1	03/09/18	03/09/18	KWG1801341	*
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	03/09/18	03/09/18	KWG1801341	
Trichloroethene (TCE)	0.22	J	0.50	0.10	1	03/09/18	03/09/18	KWG1801341	
Bromodichloromethane	ND	U	0.50	0.091	1	03/09/18	03/09/18	KWG1801341	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	03/09/18	03/09/18	KWG1801341	
Dibromochloromethane	ND	U	0.50	0.14	1	03/09/18	03/09/18	KWG1801341	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	03/09/18	03/09/18	KWG1801341	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.22	1	03/09/18	03/09/18	KWG1801341	
Hexachlorobutadiene	ND	U	2.0	0.11	1	03/09/18	03/09/18	KWG1801341	

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	132	73-122	03/09/18	Outside Control Limits
Toluene-d8	113	65-144	03/09/18	Acceptable
4-Bromofluorobenzene	97	68-117	03/09/18	Acceptable

Comments: _____

Analytical Results

Client: EA Engineering, Science, and Technology
Project: Boomsnub/1524058.01
Sample Matrix: Water

Service Request: K1801991
Date Collected: 03/04/2018
Date Received: 03/05/2018

Volatile Organic Compounds

Sample Name: TB-030418
Lab Code: K1801991-004
Extraction Method: EPA 5030B
Analysis Method: 8260C

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	03/09/18	03/09/18	KWG1801341	*
Trichlorofluoromethane	ND	U	0.50	0.12	1	03/09/18	03/09/18	KWG1801341	*
1,1-Dichloroethene	ND	U	0.50	0.080	1	03/09/18	03/09/18	KWG1801341	*
Methylene Chloride	ND	U	2.0	0.10	1	03/09/18	03/09/18	KWG1801341	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	03/09/18	03/09/18	KWG1801341	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	03/09/18	03/09/18	KWG1801341	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	03/09/18	03/09/18	KWG1801341	
Carbon Tetrachloride	ND	U	0.50	0.096	1	03/09/18	03/09/18	KWG1801341	*
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	03/09/18	03/09/18	KWG1801341	
Trichloroethene (TCE)	ND	U	0.50	0.10	1	03/09/18	03/09/18	KWG1801341	
Bromodichloromethane	ND	U	0.50	0.091	1	03/09/18	03/09/18	KWG1801341	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	03/09/18	03/09/18	KWG1801341	
Dibromochloromethane	ND	U	0.50	0.14	1	03/09/18	03/09/18	KWG1801341	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	03/09/18	03/09/18	KWG1801341	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.22	1	03/09/18	03/09/18	KWG1801341	
Hexachlorobutadiene	ND	U	2.0	0.11	1	03/09/18	03/09/18	KWG1801341	

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	128	73-122	03/09/18	Outside Control Limits
Toluene-d8	110	65-144	03/09/18	Acceptable
4-Bromofluorobenzene	98	68-117	03/09/18	Acceptable

Comments: _____

April 2, 2018
Laboratory Analytical Results

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Client: EA Engineering, Science, and Technology (EAEST)
Project: Boomsnub
Sample Matrix: Water

Service Request: K1802969
Date Received: 04/02/2018

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier IV validation deliverables including summary forms and all of the associated raw data for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

Sample Receipt:

Four water samples were received for analysis at ALS Environmental on 04/02/2018. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

Metals:

No significant anomalies were noted with this analysis.

Volatiles by GC/MS:

Method 8260C, 4/4/18: The following analyte was flagged as outside the control criterion for Continuing Calibration Verification (CCV) MS27\0404F003.D: Toluene-d8. In accordance with the EPA Method, 80% or more of the CCV analytes must pass within 20% of the true value. The ALS SOP allows for 40% difference for the remaining analytes. The CCV met these criteria. The quality of the sample data was not significantly affected. No further corrective action was required.

Method 8260C, 4/4/18: The upper control criterion was exceeded for Dibromofluoromethane in Method Blank KWG1801793-4. No target analytes were detected in the Method Blank. Since the apparent problem equates to a high bias, the data quality was not significantly affected. No further corrective action was appropriate.

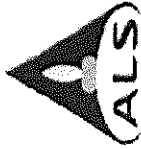
Method 8260C, 4/4/18: The control criterion was exceeded for Dibromofluoromethane in all field samples. No associated target analytes were detected in the sample. The error associated with an elevated recovery equated to a high bias. The quality of the sample data was not significantly affected. No further corrective action was appropriate.

Method 8260C, 4/5-12/18: Manual integration of one or more chromatographic peaks was required to correct the integration performed by the automated data processing program. The manual integration was performed in accordance with ALS policy, which is consistent with the National Environmental Laboratory Accreditation Program (NELAP), Department of Defense (DOD), and other certifying agencies. Refer to the raw data for the compounds impacted by the manual integration.



Approved by _____

Date 04/30/2018



ALS Environmental

CHAIN OF CUSTODY
87369

004

SR# 1802969
COC Set 1 of 1
COC#

1317 South 13th Ave, Kelso, WA 98626 Phone (360) 577-7222 / 800-695-7222 / FAX (360) 636-1068
www.alsglobal.com

Page 1 of 1

Project Name: Boomsnub
Project Manager: J. I. Frain
Company: EA Engineering
Address: 2300 6th Ave., Suite 707, Seattle, WA 98121
Phone #: (206) 452-5350
email: jfrain@east.com
Sampler Signature: Rick Read
Sampler Printed Name: RICK READ

CLIENT SAMPLE ID	LABID	SAMPLING		Matrix	REMARKS	NUMBER OF CONTAINERS			
		Date	Time			SM 4500-H+B / PH	8260C / VOC FP	14D	180D
1. INF-040218		4/2/18	8:10	H ₂ O		X	X		
2. EFF-040218		8:15				X	X		
3. EFFD-040218		8:20				X	X		
4. TB-040218		NA				X			
5.									
6.									
7.									
8.									
9.									
10.									

Report Requirements
I. Routine Report: Method Blank, Surrogate, as required
II. Report Dup., MS, MSD as required
X III. CLP Like Summary (no raw data)
IV. Data Validation Report
X V. EDD

Invoice Information
P.O.#
Bill To:
Turnaround Requirements
24 hr. _____
5 Day _____
Standard X

Special Instructions/Comments: VOCs - 8260C
Total Metals - Cr
Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg
Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg
Circle which metals are to be analyzed
*Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other _____ (Circle One)

Relinquished By: Rick Read
Signature: Rick Read
Printed Name: RICK READ
Firm: EA
Date/Time: 4/2/18 8:40

Received By: J. Frain
Signature: J. Frain
Printed Name: J. Frain
Firm: ALS
Date/Time: 4/2/18 1110

Relinquished By: Signature Printed Name Firm Date/Time
Received By: Signature Printed Name Firm Date/Time



PC KC

Cooler Receipt and Preservation Form

Client EA Engineering Service Request K18 02969
 Received: 4/2/18 Opened: 4/2/18 By: CG Unloaded: 4/2/18 By: CG

1. Samples were received via? USPS Fed Ex UPS DHL PDX Courier Hand Delivered
 2. Samples were received in: (circle) Cooler Box Envelope Other NA
 3. Were custody seals on coolers? NA Y N If yes, how many and where? 1 Front
 If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	NA	Filed
0.3	0.1	6.5	6.3	-0.2	379	87369		NA	

4. Packing material: Inserts Baggies Bubble Wrap Gel Packs Wet Ice Dry Ice Sleeves
 5. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
 6. Were samples received in good condition (temperature, unbroken)? Indicate in the table below. NA Y N
 If applicable, tissue samples were received: Frozen Partially Thawed Thawed
 7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N
 8. Did all sample labels and tags agree with custody papers? Indicate major discrepancies in the table on page 2. NA Y N
 9. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
 10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? Indicate in the table below NA Y N
 11. Were VOA vials received without headspace? Indicate in the table below. NA Y N
 12. Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: Temp okay, sampled same day, evidence of cooling.

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: EA Engineering, Science, and Technology (EAEST)
Project: Boomsnub/1524058.001
Sample Matrix: Water
Sample Name: INF-040218
Lab Code: K1802969-001

Service Request: K1802969
Date Collected: 04/02/18 08:10
Date Received: 04/02/18 11:10

Basis: NA

Total Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Chromium	200.7	42.4	ug/L	4.2	0.6	1	04/05/18 13:07	04/04/18	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: EA Engineering, Science, and Technology (EAEST)
Project: Boomsnub/1524058.001
Sample Matrix: Water
Sample Name: EFF-040218
Lab Code: K1802969-002

Service Request: K1802969
Date Collected: 04/02/18 08:15
Date Received: 04/02/18 11:10
Basis: NA

Total Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Chromium	200.7	1.2 J	ug/L	4.2	0.6	1	04/05/18 13:22	04/04/18	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: EA Engineering, Science, and Technology (EAEST)
Project: Boomsnub/1524058.001
Sample Matrix: Water
Sample Name: EFFD-040218
Lab Code: K1802969-003

Service Request: K1802969
Date Collected: 04/02/18 08:20
Date Received: 04/02/18 11:10
Basis: NA

Total Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Chromium	200.7	1.2 J	ug/L	4.2	0.6	1	04/05/18 13:25	04/04/18	

Analytical Results

Client: EA Engineering, Science, and Technology
Project: Boomsnub/1524058.001
Sample Matrix: Water

Service Request: K1802969
Date Collected: 04/02/2018
Date Received: 04/02/2018

Volatile Organic Compounds

Sample Name: INF-040218
Lab Code: K1802969-001
Extraction Method: EPA 5030B
Analysis Method: 8260C

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	04/04/18	04/04/18	KWG1801793	
Trichlorofluoromethane	0.32	J	0.50	0.12	1	04/04/18	04/04/18	KWG1801793	
1,1-Dichloroethene	0.49	J	0.50	0.080	1	04/04/18	04/04/18	KWG1801793	
Methylene Chloride	ND	U	2.0	0.10	1	04/04/18	04/04/18	KWG1801793	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	04/04/18	04/04/18	KWG1801793	
cis-1,2-Dichloroethene	0.27	J	0.50	0.067	1	04/04/18	04/04/18	KWG1801793	
1,1,1-Trichloroethane (TCA)	0.12	J	0.50	0.075	1	04/04/18	04/04/18	KWG1801793	
Carbon Tetrachloride	ND	U	0.50	0.096	1	04/04/18	04/04/18	KWG1801793	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	04/04/18	04/04/18	KWG1801793	
Trichloroethene (TCE)	13		0.50	0.10	1	04/04/18	04/04/18	KWG1801793	
Bromodichloromethane	ND	U	0.50	0.091	1	04/04/18	04/04/18	KWG1801793	
Tetrachloroethene (PCE)	0.87		0.50	0.099	1	04/04/18	04/04/18	KWG1801793	
Dibromochloromethane	ND	U	0.50	0.14	1	04/04/18	04/04/18	KWG1801793	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	04/04/18	04/04/18	KWG1801793	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.22	1	04/04/18	04/04/18	KWG1801793	
Hexachlorobutadiene	ND	U	2.0	0.11	1	04/04/18	04/04/18	KWG1801793	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	134	73-122	04/04/18	Outside Control Limits
Toluene-d8	112	65-144	04/04/18	Acceptable
4-Bromofluorobenzene	84	68-117	04/04/18	Acceptable

Comments: _____

Analytical Results

Client: EA Engineering, Science, and Technology
Project: Boomsnub/1524058.001
Sample Matrix: Water

Service Request: K1802969
Date Collected: 04/02/2018
Date Received: 04/02/2018

Volatile Organic Compounds

Sample Name: EFF-040218
Lab Code: K1802969-002
Extraction Method: EPA 5030B
Analysis Method: 8260C

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	04/04/18	04/04/18	KWG1801793	
Trichlorofluoromethane	ND	U	0.50	0.12	1	04/04/18	04/04/18	KWG1801793	
1,1-Dichloroethene	ND	U	0.50	0.080	1	04/04/18	04/04/18	KWG1801793	
Methylene Chloride	ND	U	2.0	0.10	1	04/04/18	04/04/18	KWG1801793	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	04/04/18	04/04/18	KWG1801793	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	04/04/18	04/04/18	KWG1801793	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	04/04/18	04/04/18	KWG1801793	
Carbon Tetrachloride	ND	U	0.50	0.096	1	04/04/18	04/04/18	KWG1801793	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	04/04/18	04/04/18	KWG1801793	
Trichloroethene (TCE)	0.27	J	0.50	0.10	1	04/04/18	04/04/18	KWG1801793	
Bromodichloromethane	ND	U	0.50	0.091	1	04/04/18	04/04/18	KWG1801793	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	04/04/18	04/04/18	KWG1801793	
Dibromochloromethane	ND	U	0.50	0.14	1	04/04/18	04/04/18	KWG1801793	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	04/04/18	04/04/18	KWG1801793	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.22	1	04/04/18	04/04/18	KWG1801793	
Hexachlorobutadiene	ND	U	2.0	0.11	1	04/04/18	04/04/18	KWG1801793	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	132	73-122	04/04/18	Outside Control Limits
Toluene-d8	112	65-144	04/04/18	Acceptable
4-Bromofluorobenzene	82	68-117	04/04/18	Acceptable

Comments: _____

Analytical Results

Client: EA Engineering, Science, and Technology
Project: Boomsnub/1524058.001
Sample Matrix: Water

Service Request: K1802969
Date Collected: 04/02/2018
Date Received: 04/02/2018

Volatile Organic Compounds

Sample Name: EFFD-040218
Lab Code: K1802969-003
Extraction Method: EPA 5030B
Analysis Method: 8260C

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	04/04/18	04/04/18	KWG1801793	
Trichlorofluoromethane	ND	U	0.50	0.12	1	04/04/18	04/04/18	KWG1801793	
1,1-Dichloroethene	ND	U	0.50	0.080	1	04/04/18	04/04/18	KWG1801793	
Methylene Chloride	ND	U	2.0	0.10	1	04/04/18	04/04/18	KWG1801793	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	04/04/18	04/04/18	KWG1801793	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	04/04/18	04/04/18	KWG1801793	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	04/04/18	04/04/18	KWG1801793	
Carbon Tetrachloride	ND	U	0.50	0.096	1	04/04/18	04/04/18	KWG1801793	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	04/04/18	04/04/18	KWG1801793	
Trichloroethene (TCE)	0.25	J	0.50	0.10	1	04/04/18	04/04/18	KWG1801793	
Bromodichloromethane	ND	U	0.50	0.091	1	04/04/18	04/04/18	KWG1801793	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	04/04/18	04/04/18	KWG1801793	
Dibromochloromethane	ND	U	0.50	0.14	1	04/04/18	04/04/18	KWG1801793	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	04/04/18	04/04/18	KWG1801793	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.22	1	04/04/18	04/04/18	KWG1801793	
Hexachlorobutadiene	ND	U	2.0	0.11	1	04/04/18	04/04/18	KWG1801793	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	134	73-122	04/04/18	Outside Control Limits
Toluene-d8	110	65-144	04/04/18	Acceptable
4-Bromofluorobenzene	87	68-117	04/04/18	Acceptable

Comments: _____

Analytical Results

Client: EA Engineering, Science, and Technology
Project: Boomsnub/1524058.001
Sample Matrix: Water

Service Request: K1802969
Date Collected: 04/02/2018
Date Received: 04/02/2018

Volatile Organic Compounds

Sample Name: TB-040218
Lab Code: K1802969-004
Extraction Method: EPA 5030B
Analysis Method: 8260C

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	04/04/18	04/04/18	KWG1801793	
Trichlorofluoromethane	ND	U	0.50	0.12	1	04/04/18	04/04/18	KWG1801793	
1,1-Dichloroethene	ND	U	0.50	0.080	1	04/04/18	04/04/18	KWG1801793	
Methylene Chloride	0.17	J	2.0	0.10	1	04/04/18	04/04/18	KWG1801793	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	04/04/18	04/04/18	KWG1801793	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	04/04/18	04/04/18	KWG1801793	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	04/04/18	04/04/18	KWG1801793	
Carbon Tetrachloride	ND	U	0.50	0.096	1	04/04/18	04/04/18	KWG1801793	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	04/04/18	04/04/18	KWG1801793	
Trichloroethene (TCE)	ND	U	0.50	0.10	1	04/04/18	04/04/18	KWG1801793	
Bromodichloromethane	ND	U	0.50	0.091	1	04/04/18	04/04/18	KWG1801793	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	04/04/18	04/04/18	KWG1801793	
Dibromochloromethane	ND	U	0.50	0.14	1	04/04/18	04/04/18	KWG1801793	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	04/04/18	04/04/18	KWG1801793	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.22	1	04/04/18	04/04/18	KWG1801793	
Hexachlorobutadiene	ND	U	2.0	0.11	1	04/04/18	04/04/18	KWG1801793	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	132	73-122	04/04/18	Outside Control Limits
Toluene-d8	114	65-144	04/04/18	Acceptable
4-Bromofluorobenzene	85	68-117	04/04/18	Acceptable

Comments: _____

May 7, 2018
Laboratory Analytical Results

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Client: EA Engineering, Science, and Technology (EAEST)
Project: Boomsnub
Sample Matrix: Water

Service Request: K1804215
Date Received: 05/07/2018

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier IV validation deliverables including summary forms and all of the associated raw data for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

Sample Receipt:

Four water samples were received for analysis at ALS Environmental on 05/07/2018. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

Metals:

No significant anomalies were noted with this analysis.

Volatiles by GC/MS:

No significant anomalies were noted with this analysis.



Approved by _____

Date 05/21/2018

Project Name: **Boomsnab**
 Project Manager: **Jill Frain**
 Company: **EA Engineering**
 Address: **200 6th Ave Suite 707, Seattle, WA 98121**
 Phone #: **(206) 452-5350**
 email: **jfrain@eaest.com**
 Sampler Signature: *Rick Reao*
 Sampler Printed Name: **RICK REAO**

CLIENT SAMPLE ID	LABID	SAMPLING Date	SAMPLING Time	Matrix	NUMBER OF CONTAINERS										Remarks		
					OH	14D	180D	200 T / Metals T	SM 4500-H+	B / pH	9260C / VOC FP	1	2	3		4	
1. TR-050718		5/7/18	8:15	H ₂ O	X												
2. INF-050718		8:20			X												
3. EFF-050718		8:25			X												
4. EFFD-050718		8:30			X												
5.																	
6.																	
7.																	
8.																	
9.																	
10.																	

Report Requirements
 I. Routine Report: Method Blank, Surrogate, as required
 II. Report Dup., MS, MSD as required
 III. CLP Like Summary (no raw data)
 IV. Data Validation Report
 V. EDD

Turnaround Requirements
 24 hr _____
 5 Day _____
 Standard 48 hr _____

Invoice Information
 P.O.# _____
 Bill To: _____

Requested Report Date
 Received By: *Rick Reao*
 Signature: *Rick Reao*
 Printed Name: **RICK REAO**
 Firm: **EA**
 Date/Time: **5/7/18 8:40**

Special Instructions/Comments:
 VOCs - 8260c
 Total Metals - Cr

Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg
 (Circle which metals are to be analyzed) **Cr**

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg
 (Circle One)

Relinquished By:
 Signature: *Rick Reao*
 Printed Name: **RICK REAO**
 Firm: **EA**
 Date/Time: **5/7/18 1340**

Received By:
 Signature: _____
 Printed Name: _____
 Firm: _____
 Date/Time: _____



PC KC

Cooler Receipt and Preservation Form

Client EA Eng. Service Request K18 04215
 Received: 5/7/18 Opened: 5/7/18 By: [Signature] Unloaded: 5/7/18 By: [Signature]

1. Samples were received via? USPS Fed Ex UPS DHL PDX Courier Hand Delivered
 2. Samples were received in: (circle) Cooler Box Envelope Other NA
 3. Were custody seals on coolers? NA Y N If yes, how many and where? one from
 If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	NA	Filed
4.1	4.0	7.1	7.0	-0.1	386	NA		NA	

4. Packing material: Inserts Baggies Bubble Wrap Gel Packs Wet Ice Dry Ice Sleeves
 5. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
 6. Were samples received in good condition (temperature, unbroken)? Indicate in the table below. NA Y N
 If applicable, tissue samples were received: Frozen Partially Thawed Thawed
 7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N
 8. Did all sample labels and tags agree with custody papers? Indicate major discrepancies in the table on page 2. NA Y N
 9. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
 10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? Indicate in the table below NA Y N
 11. Were VOA vials received without headspace? Indicate in the table below. NA Y N
 12. Was CI2/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: _____

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: EA Engineering, Science, and Technology (EAEST)
Project: Boomsnub/1524058.001
Sample Matrix: Water
Sample Name: INF-050718
Lab Code: K1804215-002

Service Request: K1804215
Date Collected: 05/07/18 08:20
Date Received: 05/07/18 13:40
Basis: NA

Total Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Chromium	200.7	41.9	ug/L	4.2	0.9	1	05/17/18 12:30	05/16/18	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: EA Engineering, Science, and Technology (EAEST)
Project: Boomsnub/1524058.001
Sample Matrix: Water
Sample Name: EFF-050718
Lab Code: K1804215-003

Service Request: K1804215
Date Collected: 05/07/18 08:25
Date Received: 05/07/18 13:40
Basis: NA

Total Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Chromium	200.7	0.9 J	ug/L	4.2	0.9	1	05/17/18 12:44	05/16/18	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: EA Engineering, Science, and Technology (EAEST)
Project: Boomsnub/1524058.001
Sample Matrix: Water
Sample Name: EFFD-050718
Lab Code: K1804215-004

Service Request: K1804215
Date Collected: 05/07/18 08:30
Date Received: 05/07/18 13:40

Basis: NA

Total Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Chromium	200.7	1.3 J	ug/L	4.2	0.9	1	05/17/18 12:54	05/16/18	

Analytical Results

Client: EA Engineering, Science, and Technology
Project: Boomsnub/1524058.001
Sample Matrix: Water

Service Request: K1804215
Date Collected: 05/07/2018
Date Received: 05/07/2018

Volatile Organic Compounds

Sample Name: TB-050718
Lab Code: K1804215-001
Extraction Method: EPA 5030B
Analysis Method: 8260C

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	05/10/18	05/10/18	KWG1802390	
Trichlorofluoromethane	ND	U	0.50	0.12	1	05/10/18	05/10/18	KWG1802390	
1,1-Dichloroethene	ND	U	0.50	0.080	1	05/10/18	05/10/18	KWG1802390	
Methylene Chloride	ND	U	2.0	0.10	1	05/10/18	05/10/18	KWG1802390	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	05/10/18	05/10/18	KWG1802390	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	05/10/18	05/10/18	KWG1802390	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	05/10/18	05/10/18	KWG1802390	
Carbon Tetrachloride	ND	U	0.50	0.096	1	05/10/18	05/10/18	KWG1802390	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	05/10/18	05/10/18	KWG1802390	
Trichloroethene (TCE)	ND	U	0.50	0.10	1	05/10/18	05/10/18	KWG1802390	
Bromodichloromethane	ND	U	0.50	0.091	1	05/10/18	05/10/18	KWG1802390	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	05/10/18	05/10/18	KWG1802390	
Dibromochloromethane	ND	U	0.50	0.14	1	05/10/18	05/10/18	KWG1802390	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	05/10/18	05/10/18	KWG1802390	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.22	1	05/10/18	05/10/18	KWG1802390	
Hexachlorobutadiene	ND	U	2.0	0.11	1	05/10/18	05/10/18	KWG1802390	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	111	73-122	05/10/18	Acceptable
Toluene-d8	101	65-144	05/10/18	Acceptable
4-Bromofluorobenzene	98	68-117	05/10/18	Acceptable

Comments: _____

Analytical Results

Client: EA Engineering, Science, and Technology
Project: Boomsnub/1524058.001
Sample Matrix: Water

Service Request: K1804215
Date Collected: 05/07/2018
Date Received: 05/07/2018

Volatile Organic Compounds

Sample Name: INF-050718
Lab Code: K1804215-002
Extraction Method: EPA 5030B
Analysis Method: 8260C

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	05/10/18	05/10/18	KWG1802390	
Trichlorofluoromethane	0.32	J	0.50	0.12	1	05/10/18	05/10/18	KWG1802390	
1,1-Dichloroethene	0.35	J	0.50	0.080	1	05/10/18	05/10/18	KWG1802390	
Methylene Chloride	ND	U	2.0	0.10	1	05/10/18	05/10/18	KWG1802390	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	05/10/18	05/10/18	KWG1802390	
cis-1,2-Dichloroethene	0.28	J	0.50	0.067	1	05/10/18	05/10/18	KWG1802390	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	05/10/18	05/10/18	KWG1802390	
Carbon Tetrachloride	ND	U	0.50	0.096	1	05/10/18	05/10/18	KWG1802390	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	05/10/18	05/10/18	KWG1802390	
Trichloroethene (TCE)	12		0.50	0.10	1	05/10/18	05/10/18	KWG1802390	
Bromodichloromethane	ND	U	0.50	0.091	1	05/10/18	05/10/18	KWG1802390	
Tetrachloroethene (PCE)	0.68		0.50	0.099	1	05/10/18	05/10/18	KWG1802390	
Dibromochloromethane	ND	U	0.50	0.14	1	05/10/18	05/10/18	KWG1802390	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	05/10/18	05/10/18	KWG1802390	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.22	1	05/10/18	05/10/18	KWG1802390	
Hexachlorobutadiene	ND	U	2.0	0.11	1	05/10/18	05/10/18	KWG1802390	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	113	73-122	05/10/18	Acceptable
Toluene-d8	99	65-144	05/10/18	Acceptable
4-Bromofluorobenzene	97	68-117	05/10/18	Acceptable

Comments: _____

Analytical Results

Client: EA Engineering, Science, and Technology
Project: Boomsnub/1524058.001
Sample Matrix: Water

Service Request: K1804215
Date Collected: 05/07/2018
Date Received: 05/07/2018

Volatile Organic Compounds

Sample Name: EFF-050718
Lab Code: K1804215-003
Extraction Method: EPA 5030B
Analysis Method: 8260C

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	05/10/18	05/10/18	KWG1802390	
Trichlorofluoromethane	ND	U	0.50	0.12	1	05/10/18	05/10/18	KWG1802390	
1,1-Dichloroethene	ND	U	0.50	0.080	1	05/10/18	05/10/18	KWG1802390	
Methylene Chloride	ND	U	2.0	0.10	1	05/10/18	05/10/18	KWG1802390	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	05/10/18	05/10/18	KWG1802390	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	05/10/18	05/10/18	KWG1802390	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	05/10/18	05/10/18	KWG1802390	
Carbon Tetrachloride	ND	U	0.50	0.096	1	05/10/18	05/10/18	KWG1802390	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	05/10/18	05/10/18	KWG1802390	
Trichloroethene (TCE)	ND	U	0.50	0.10	1	05/10/18	05/10/18	KWG1802390	
Bromodichloromethane	ND	U	0.50	0.091	1	05/10/18	05/10/18	KWG1802390	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	05/10/18	05/10/18	KWG1802390	
Dibromochloromethane	ND	U	0.50	0.14	1	05/10/18	05/10/18	KWG1802390	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	05/10/18	05/10/18	KWG1802390	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.22	1	05/10/18	05/10/18	KWG1802390	
Hexachlorobutadiene	ND	U	2.0	0.11	1	05/10/18	05/10/18	KWG1802390	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	111	73-122	05/10/18	Acceptable
Toluene-d8	98	65-144	05/10/18	Acceptable
4-Bromofluorobenzene	98	68-117	05/10/18	Acceptable

Comments: _____

Analytical Results

Client: EA Engineering, Science, and Technology
Project: Boomsnub/1524058.001
Sample Matrix: Water

Service Request: K1804215
Date Collected: 05/07/2018
Date Received: 05/07/2018

Volatile Organic Compounds

Sample Name: EFFD-050718
Lab Code: K1804215-004
Extraction Method: EPA 5030B
Analysis Method: 8260C

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	05/10/18	05/10/18	KWG1802390	
Trichlorofluoromethane	ND	U	0.50	0.12	1	05/10/18	05/10/18	KWG1802390	
1,1-Dichloroethene	ND	U	0.50	0.080	1	05/10/18	05/10/18	KWG1802390	
Methylene Chloride	ND	U	2.0	0.10	1	05/10/18	05/10/18	KWG1802390	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	05/10/18	05/10/18	KWG1802390	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	05/10/18	05/10/18	KWG1802390	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	05/10/18	05/10/18	KWG1802390	
Carbon Tetrachloride	ND	U	0.50	0.096	1	05/10/18	05/10/18	KWG1802390	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	05/10/18	05/10/18	KWG1802390	
Trichloroethene (TCE)	0.22	J	0.50	0.10	1	05/10/18	05/10/18	KWG1802390	
Bromodichloromethane	ND	U	0.50	0.091	1	05/10/18	05/10/18	KWG1802390	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	05/10/18	05/10/18	KWG1802390	
Dibromochloromethane	ND	U	0.50	0.14	1	05/10/18	05/10/18	KWG1802390	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	05/10/18	05/10/18	KWG1802390	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.22	1	05/10/18	05/10/18	KWG1802390	
Hexachlorobutadiene	ND	U	2.0	0.11	1	05/10/18	05/10/18	KWG1802390	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	113	73-122	05/10/18	Acceptable
Toluene-d8	103	65-144	05/10/18	Acceptable
4-Bromofluorobenzene	96	68-117	05/10/18	Acceptable

Comments: _____

June 8, 2018
Laboratory Analytical Results

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Client: EA Engineering, Science, and Technology (EAEST)
Project: Boomsnub
Sample Matrix: Water

Service Request: K1805439
Date Received: 06/08/2018

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier IV validation deliverables including summary forms and all of the associated raw data for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

Sample Receipt:

Four water samples were received for analysis at ALS Environmental on 06/08/2018. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

Metals:

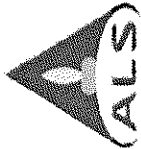
No significant anomalies were noted with this analysis.

Volatiles by GC/MS:

No significant anomalies were noted with this analysis.

Approved by _____

Date 07/12/2018



87369

CHAIN OF CUSTODY
87369

004

1317 South 13th Ave, Kelso, WA 98626 Phone (360) 577-7222 / 800-695-7222 / FAX (360) 636-1068
www.alsglobal.com

Project Name: **Boomsnub** Project Number: **1524058.001**

Project Manager: **Jil Frain**

Company: **EA Engineering**

Address: **2200 6th Ave, Suite 707, Seattle, WA 98121**

Phone # **(206) 452-5350** email: **Jfrain@east.com**

Sampler Signature: *Rick Read* Sampler Printed Name: **RICK READ**

CLIENT SAMPLE ID	LABID	SAMPLING		Matrix	REMARKS
		Date	Time		
1. TB-060818		6/8/18	7:55	H ₂ O	
2. INF-060818			8:00		
3. EFF-060818			8:05		
4. EFFD-060818			8:10		
5.					
6.					
7.					
8.					
9.					
10.					

SM 4500-H+ B / PH	SM 2600 / VOC FP	200.7 / Metals T
OH	14D	180D

NUMBER OF CONTAINERS	1	2	3	4	5	6	7	8	9	10

Report Requirements

- I. Routine Report: Method Blank, Surrogate, as required
- II. Report Dup., MS, MSD as required
- III. CLP Like Summary (no raw data)
- IV. Data Validation Report
- V. EDD

Invoice Information

P.O.# _____
Bill To: _____

Turnaround Requirements
 24 hr. _____
 5 Day _____
 Standard _____
 Requested Report Date _____

Circle which metals are to be analyzed

Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg
 Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg

Special Instructions/Comments: **VOCs-8260c**
Total Metals-Cr

*Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other _____ (Circle One)

Relinquished By:
 Signature: *Rick Read*
 Printed Name: **RICK READ**
 Firm: **EA**

Received By:
 Signature: *Cody Graves*
 Printed Name: **CODY GRAVES**
 Firm: **ALS**
 Date/Time: **6/8/18 12:40**

Relinquished By:
 Signature: _____
 Printed Name: _____
 Firm: _____

Received By:
 Signature: _____
 Printed Name: _____
 Firm: _____

Relinquished By:
 Signature: _____
 Printed Name: _____
 Firm: _____

Received By:
 Signature: _____
 Printed Name: _____
 Firm: _____

SR# **41805439**
 COC Set 1 of 1
 COC# _____



PC KC

Cooler Receipt and Preservation Form

Client BOOMSLUB Service Request K18 05439
 Received: 6/18/18 Opened: 6/18/18 By: BR Unloaded: 6/18/18 By: BR

1. Samples were received via? USPS FedEx UPS DHL PDX Courier Hand Delivered
 2. Samples were received in: (circle) Cooler Box Envelope Other
 3. Were custody seals on coolers? NA Y N If yes, how many and where? Front, side
 If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	Filed
5.4	5.5	6.7	6.8	+0.1	298	NA		NA

4. Packing material: Inserts Baggies Bubble Wrap Gel Packs Wet Ice Dry Ice Sleeves
 5. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
 6. Were samples received in good condition (temperature, unbroken)? Indicate in the table below.
 If applicable, tissue samples were received: Frozen Partially Thawed Thawed
 7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N
 8. Did all sample labels and tags agree with custody papers? Indicate major discrepancies in the table on page 2. NA Y N
 9. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
 10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? Indicate in the table below NA Y N
 11. Were VOA vials received without headspace? Indicate in the table below. NA Y N
 12. Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: _____

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: EA Engineering, Science, and Technology (EAEST)
Project: Boomsnub/1524058.001
Sample Matrix: Water
Sample Name: INF-060818
Lab Code: K1805439-002

Service Request: K1805439
Date Collected: 06/08/18 08:00
Date Received: 06/08/18 12:40
Basis: NA

Total Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Chromium	200.7	41.0	ug/L	4.2	0.9	1	06/19/18 14:35	06/13/18	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: EA Engineering, Science, and Technology (EAEST)
Project: Boomsnub/1524058.001
Sample Matrix: Water
Sample Name: EFF-060818
Lab Code: K1805439-003

Service Request: K1805439
Date Collected: 06/08/18 08:05
Date Received: 06/08/18 12:40
Basis: NA

Total Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Chromium	200.7	ND U	ug/L	4.2	0.9	1	06/19/18 14:48	06/13/18	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client: EA Engineering, Science, and Technology (EAEST)
Project: Boomsnub/1524058.001
Sample Matrix: Water
Sample Name: EFFD-060818
Lab Code: K1805439-004

Service Request: K1805439
Date Collected: 06/08/18 08:10
Date Received: 06/08/18 12:40
Basis: NA

Total Metals

<u>Analyte Name</u>	<u>Analysis Method</u>	<u>Result</u>	<u>Units</u>	<u>MRL</u>	<u>MDL</u>	<u>Dil.</u>	<u>Date Analyzed</u>	<u>Date Extracted</u>	<u>Q</u>
Chromium	200.7	1.5 J	ug/L	4.2	0.9	1	06/19/18 14:50	06/13/18	

Analytical Results

Client: EA Engineering, Science, and Technology
Project: Boomsnub/1524058.001
Sample Matrix: Water

Service Request: K1805439
Date Collected: 06/08/2018
Date Received: 06/08/2018

Volatile Organic Compounds

Sample Name: TB-060818
Lab Code: K1805439-001
Extraction Method: EPA 5030B
Analysis Method: 8260C

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	06/21/18	06/21/18	KWG1803091	
Trichlorofluoromethane	ND	U	0.50	0.12	1	06/21/18	06/21/18	KWG1803091	
1,1-Dichloroethene	ND	U	0.50	0.080	1	06/21/18	06/21/18	KWG1803091	
Methylene Chloride	0.20	J	2.0	0.10	1	06/21/18	06/21/18	KWG1803091	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	06/21/18	06/21/18	KWG1803091	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	06/21/18	06/21/18	KWG1803091	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	06/21/18	06/21/18	KWG1803091	
Carbon Tetrachloride	ND	U	0.50	0.096	1	06/21/18	06/21/18	KWG1803091	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	06/21/18	06/21/18	KWG1803091	
Trichloroethene (TCE)	ND	U	0.50	0.10	1	06/21/18	06/21/18	KWG1803091	
Bromodichloromethane	ND	U	0.50	0.091	1	06/21/18	06/21/18	KWG1803091	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	06/21/18	06/21/18	KWG1803091	
Dibromochloromethane	ND	U	0.50	0.14	1	06/21/18	06/21/18	KWG1803091	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	06/21/18	06/21/18	KWG1803091	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.22	1	06/21/18	06/21/18	KWG1803091	
Hexachlorobutadiene	ND	U	2.0	0.11	1	06/21/18	06/21/18	KWG1803091	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	96	73-122	06/21/18	Acceptable
Toluene-d8	110	65-144	06/21/18	Acceptable
4-Bromofluorobenzene	98	68-117	06/21/18	Acceptable

Comments: _____

Analytical Results

Client: EA Engineering, Science, and Technology
Project: Boomsnub/1524058.001
Sample Matrix: Water

Service Request: K1805439
Date Collected: 06/08/2018
Date Received: 06/08/2018

Volatile Organic Compounds

Sample Name: INF-060818
Lab Code: K1805439-002
Extraction Method: EPA 5030B
Analysis Method: 8260C

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	06/21/18	06/21/18	KWG1803091	
Trichlorofluoromethane	0.29	J	0.50	0.12	1	06/21/18	06/21/18	KWG1803091	
1,1-Dichloroethene	0.45	J	0.50	0.080	1	06/21/18	06/21/18	KWG1803091	
Methylene Chloride	ND	U	2.0	0.10	1	06/21/18	06/21/18	KWG1803091	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	06/21/18	06/21/18	KWG1803091	
cis-1,2-Dichloroethene	0.26	J	0.50	0.067	1	06/21/18	06/21/18	KWG1803091	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	06/21/18	06/21/18	KWG1803091	
Carbon Tetrachloride	ND	U	0.50	0.096	1	06/21/18	06/21/18	KWG1803091	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	06/21/18	06/21/18	KWG1803091	
Trichloroethene (TCE)	13		0.50	0.10	1	06/21/18	06/21/18	KWG1803091	
Bromodichloromethane	ND	U	0.50	0.091	1	06/21/18	06/21/18	KWG1803091	
Tetrachloroethene (PCE)	0.80		0.50	0.099	1	06/21/18	06/21/18	KWG1803091	
Dibromochloromethane	ND	U	0.50	0.14	1	06/21/18	06/21/18	KWG1803091	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	06/21/18	06/21/18	KWG1803091	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.22	1	06/21/18	06/21/18	KWG1803091	
Hexachlorobutadiene	ND	U	2.0	0.11	1	06/21/18	06/21/18	KWG1803091	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	102	73-122	06/21/18	Acceptable
Toluene-d8	112	65-144	06/21/18	Acceptable
4-Bromofluorobenzene	95	68-117	06/21/18	Acceptable

Comments: _____

Analytical Results

Client: EA Engineering, Science, and Technology
Project: Boomsnub/1524058.001
Sample Matrix: Water

Service Request: K1805439
Date Collected: 06/08/2018
Date Received: 06/08/2018

Volatile Organic Compounds

Sample Name: EFF-060818
Lab Code: K1805439-003
Extraction Method: EPA 5030B
Analysis Method: 8260C

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	06/21/18	06/21/18	KWG1803091	
Trichlorofluoromethane	ND	U	0.50	0.12	1	06/21/18	06/21/18	KWG1803091	
1,1-Dichloroethene	ND	U	0.50	0.080	1	06/21/18	06/21/18	KWG1803091	
Methylene Chloride	ND	U	2.0	0.10	1	06/21/18	06/21/18	KWG1803091	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	06/21/18	06/21/18	KWG1803091	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	06/21/18	06/21/18	KWG1803091	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	06/21/18	06/21/18	KWG1803091	
Carbon Tetrachloride	ND	U	0.50	0.096	1	06/21/18	06/21/18	KWG1803091	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	06/21/18	06/21/18	KWG1803091	
Trichloroethene (TCE)	0.22	J	0.50	0.10	1	06/21/18	06/21/18	KWG1803091	
Bromodichloromethane	ND	U	0.50	0.091	1	06/21/18	06/21/18	KWG1803091	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	06/21/18	06/21/18	KWG1803091	
Dibromochloromethane	ND	U	0.50	0.14	1	06/21/18	06/21/18	KWG1803091	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	06/21/18	06/21/18	KWG1803091	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.22	1	06/21/18	06/21/18	KWG1803091	
Hexachlorobutadiene	ND	U	2.0	0.11	1	06/21/18	06/21/18	KWG1803091	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	100	73-122	06/21/18	Acceptable
Toluene-d8	108	65-144	06/21/18	Acceptable
4-Bromofluorobenzene	94	68-117	06/21/18	Acceptable

Comments: _____

Analytical Results

Client: EA Engineering, Science, and Technology
Project: Boomsnub/1524058.001
Sample Matrix: Water

Service Request: K1805439
Date Collected: 06/08/2018
Date Received: 06/08/2018

Volatile Organic Compounds

Sample Name: EFFD-060818
Lab Code: K1805439-004
Extraction Method: EPA 5030B
Analysis Method: 8260C

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	06/21/18	06/21/18	KWG1803091	
Trichlorofluoromethane	ND	U	0.50	0.12	1	06/21/18	06/21/18	KWG1803091	
1,1-Dichloroethene	ND	U	0.50	0.080	1	06/21/18	06/21/18	KWG1803091	
Methylene Chloride	ND	U	2.0	0.10	1	06/21/18	06/21/18	KWG1803091	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	06/21/18	06/21/18	KWG1803091	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	06/21/18	06/21/18	KWG1803091	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	06/21/18	06/21/18	KWG1803091	
Carbon Tetrachloride	ND	U	0.50	0.096	1	06/21/18	06/21/18	KWG1803091	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	06/21/18	06/21/18	KWG1803091	
Trichloroethene (TCE)	0.19	J	0.50	0.10	1	06/21/18	06/21/18	KWG1803091	
Bromodichloromethane	ND	U	0.50	0.091	1	06/21/18	06/21/18	KWG1803091	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	06/21/18	06/21/18	KWG1803091	
Dibromochloromethane	ND	U	0.50	0.14	1	06/21/18	06/21/18	KWG1803091	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	06/21/18	06/21/18	KWG1803091	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.22	1	06/21/18	06/21/18	KWG1803091	
Hexachlorobutadiene	ND	U	2.0	0.11	1	06/21/18	06/21/18	KWG1803091	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	102	73-122	06/21/18	Acceptable
Toluene-d8	109	65-144	06/21/18	Acceptable
4-Bromofluorobenzene	94	68-117	06/21/18	Acceptable

Comments: _____

Appendix C

Summary of Water Level Gauging Data and Groundwater Surface Elevations—Spring 2018

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Appendix C. Summary of Water Level Gauging Data and Groundwater Surface Elevations—Spring 2018

Well ID	Well Type	Total Depth (ft btoc)	Top of Screen (ft btoc)	Bottom of Screen (ft btoc)	Screen Length (ft)	TOC Elevation (ft MSL)	Depth to Water (ft btoc)	Groundwater Surface Elevation (ft MSL)
AMW-1A	M	34.86	24.56	34.56	10	284.09	24.49	259.60
AMW-1B	M	56.49	46.49	56.49	10	284.11	24.69	259.42
AMW-1C	M	79	69	79	10	284.06	24.68	259.38
AMW-2A	M	34.51	24.51	34.51	10	284.03	24.48	259.55
AMW-2B	M	59	47	57	10	284.11	24.80	259.31
RAMW-2C	M	70.55	60.55	70.55	10	283.23	24.45	258.78
AMW-3A	M	34	24.5	34.5	10	283.92	24.07	259.85
AMW-4A	M	34.2	23.9	33.9	10	283.74	24.20	259.54
AMW-5A	M	34.5	24.5	34.5	10	284.14	22.63	261.51
AMW-7A	M/D	34.25	24.25	34.25	10	285.02	20.58	264.44
AMW-8A	M	34.5	24.5	34.5	10	285.49	23.28	262.21
AMW-9A	M	34.5	24.5	34.5	10	283.92	23.07	260.85
AMW-10A	M/D	31.5	21	31	10	284.01	21.48	262.53
AMW-11A	M/D	34	23.5	33.5	10	283.21	19.84	263.37
AMW-12A	M	34.85	24.35	34.35	10	283.74	23.88	259.86
AMW-13A	M	34.3	23.8	33.8	10	283.88	23.78	260.10
AMW-16	M	92.13	81.13	91.13	10	266.11	14.24	251.87
AMW-17	M/D	90.55	81	91	10	260.42	6.25	254.17
AMW-18	M	103.65	92.65	102.65	10	278.8	23.54	255.26
AMW-19A	M	35	25	35	10	283.94	23.69	260.25
AMW-19B	M	54.5	44.5	54.5	10	283.97	23.91	260.06
AMW-21	M	35	25	35	10	284.45	23.08	261.37
AMW-23	M	85	75	85	10	278.26	34.00	244.26
AMW-24	M/D	200	190	200	10	264.72	125.84	138.88
AMW-25	M/D	225	215	225	10	282.94	132.37	150.57
AMW-26	M/D	34.5	24.2	34.2	10	283.02	24.17	258.85
AMW-27	M	88	78	88	10	272.6	27.93	244.67
AMW-43	M/D	85	72	85	13	247.71	9.61	238.10

Appendix C. Summary of Water Level Gauging Data and Groundwater Surface Elevations—Spring 2018

Well ID	Well Type	Total Depth (ft btoc)	Top of Screen (ft btoc)	Bottom of Screen (ft btoc)	Screen Length (ft)	TOC Elevation (ft MSL)	Depth to Water (ft btoc)	Groundwater Surface Elevation (ft MSL)
AMW-44	M/D	81	71	81	10	247.82	8.31	239.51
AMW-45	M/D	77	67	77	10	244.87	6.25	238.62
AMW-50	M/D	195.19	185.19	195.19	10	282.78	135.77	147.01
AMW-51	M/D	195.7	185.7	195.7	10	258.44	128.99	129.45
AMW-52A	M	34.55	24.55	34.55	10	280.4	21.72	258.68
AMW-52C	M	73.63	63.63	73.63	10	280.38	21.75	258.63
AMW-53A	M	32.63	22.33	32.33	10	281.05	22.36	258.69
AMW-53B	M	54.55	44.55	54.55	10	281.2	22.41	258.79
AMW-53C	M	74.21	64.21	74.21	10	281.41	22.71	258.70
AMW-54A	M	34.3	24.3	34.3	10	283.31	24.50	258.81
AMW-54C	M	74.74	64.74	74.74	10	283.12	24.61	258.51
AMW-55A	M	30.83	20.83	30.83	10	282.11	23.24	258.87
AMW-55C	M	68.45	58.45	68.45	10	282.71	24.04	258.67
AMW-56A	M	35.24	25.24	35.24	10	283.67	24.18	259.49
AMW-56C	M	67.4	57.4	67.4	10	283.67	24.24	259.43
AMW-57	M	75.38	70.08	75.08	5	285.68	24.01	261.67
AMW-58	M	114.73	109.43	114.43	5	280.08	56.13	223.95
AMW-59	M/D	140.04	134.74	139.74	5	269.37	16.11	253.26
AMW-60	M	109.5	104.2	109.2	5	266.45	13.70	252.75
AMW-61	M	97.16	91.86	96.86	5	273.78	42.86	230.92
AMW-62	M/D	196.03	185.73	195.73	10	258.66	128.85	129.81
AMW-63	M	86.43	76.13	86.13	10	257.42	17.67	239.75
AMW-64	M	98.7	88.4	98.4	10	266.13	12.61	253.52
CPU-2	M	197.2	186.2	196.2	10	259.57	122.74	136.83
CPU-3S	M	72.72	65.72	70.72	5	246.77	9.05	237.72
CPU-3D	M/D	219.38	212.38	217.38	5	246.77	127.20	119.57
CPU-4S	M	69.3	62.3	67.3	5	234.1	9.20	224.90
CPU-4D	M	210	203	208	5	234.05	125.25	108.80

Appendix C. Summary of Water Level Gauging Data and Groundwater Surface Elevations—Spring 2018

Well ID	Well Type	Total Depth (ft btoc)	Top of Screen (ft btoc)	Bottom of Screen (ft btoc)	Screen Length (ft)	TOC Elevation (ft MSL)	Depth to Water (ft btoc)	Groundwater Surface Elevation (ft MSL)
CPU-10	M	197.9	186.9	196.9	10	261.24	125.23	136.01
CPU-12	M	72.2	61.12	71.12	10	275.23	25.69	249.54
CPU-13	E	82.7	71.7	81.7	10	278.99	32.04	246.95
CPU-14	M	71.43	60.43	70.43	10	257.56	4.81	252.75
CPU-15	M	89.49	78.49	88.49	10	275.87	29.89	245.98
MW-1A	M	38.57	28.27	38.27	10	285.49	26.73	258.76
MW-1B	M	59.79	54.49	59.49	5	285.47	26.79	258.68
MW-1C	M	77.44	72.14	77.14	5	285.45	26.77	258.68
MW-2A	M	37.39	32.09	37.09	5	282.57	24.82	257.75
MW-2B	M	57.94	52.64	57.64	5	282.49	24.90	257.59
MW-2C	M	86.94	81.64	86.64	5	282.43	25.10	257.33
MW-3A	M	32.6	22.3	32.3	10	280.21	22.96	257.25
MW-3B	M	56.69	51.39	56.39	5	280.33	23.27	257.06
MW-3C	M	83.69	78.39	83.39	5	280.35	23.39	256.96
MW-4A	M	37.1	26.8	36.8	10	280.3	23.21	257.09
MW-4B	M	45	39.7	44.7	5	280.15	23.18	256.97
MW-4BSHED	M	58.2	52.9	57.9	5	280.47	23.80	256.67
MW-4C	M	80	74.7	79.7	5	279.9	23.37	256.53
MW-6A	M	31.5	18.25	28.25	10	278.77	21.99	256.78
MW-6B	E	59	45.75	55.75	10	273.32	40.02	233.30
MW-6C	M	84.8	71.55	81.55	10	278.65	22.41	256.24
MW-6D	M	113.7	100.45	110.45	10	278.9	22.78	256.12
MW-7B	M	57.7	47	57	10	280.02	23.59	256.43
MW-7C	M	80.5	69	79	10	279.94	22.55	257.39
MW-8B	M	60	46.9	56.9	10	280.7	23.46	257.24
MW-9B	M	58	44.9	54.9	10	275.42	19.27	256.15
MW-9C	M	76.5	65	75	10	275.44	19.36	256.08
MW-10B	E	61.5	48	58	10	273.24	40.27	232.97

Appendix C. Summary of Water Level Gauging Data and Groundwater Surface Elevations—Spring 2018

Well ID	Well Type	Total Depth (ft btoc)	Top of Screen (ft btoc)	Bottom of Screen (ft btoc)	Screen Length (ft)	TOC Elevation (ft MSL)	Depth to Water (ft btoc)	Groundwater Surface Elevation (ft MSL)
MW-10C	E	81.5	70	80	10	273.25	20.04	253.21
MW-12C	M	82.7	71.2	81.2	10	274.31	18.52	255.79
MW-13C	M	76.53	65.03	75.03	10	271.97	16.09	255.88
MW-14C	E	81.5	70	80	10	271.22	34.76	236.46
MW-14E	E	126	115	125	10	268.95	25.44	243.51
MW-15E	M	107.22	96.22	106.22	10	265.73	11.32	254.41
MW-18D	E	94.4	73.4	93.4	20	262.74	27.50	235.24
MW-18E	M	123.69	112.69	122.69	10	261.77	7.44	254.33
MW-19D	E	92.2	76.2	91.2	15	257.98	12.62	245.36
MW-20D	E	87	76	86	10	269.43	49.83	219.60
MW-21D	E	75.4	64.4	74.4	10	265.98	31.45	234.53
MW-22D	E	65.2	54	64	10	269.02	38.65	230.37
MW-23D	M	88.06	71.86	86.86	15	265.33	15.58	249.75
MW-25D	E	79.05	67.85	77.85	10	272.13	27.31	244.82
MW-26D	E	94.2	83	93	10	272.86	28.60	244.26
MW-27D	M	76.27	65.07	75.07	10	273.23	26.22	247.01
MW-30	M/D	63	51	61	10	246.75	8.43	238.32
MW-33	M/D	215	205	215	10	272.55	126.95	145.60
MW-38	M	81.92	76.92	81.92	5	263.92	11.23	252.69
MW-47	M/D	83	72.7	82.7	10	246.39	7.17	239.22
MW-49	E	81.5	71.2	81.2	10	271.68	27.07	244.61
PW-1B	E	58	48	58	10	276.56	29.11	247.45
PZ-1	PZ	38.79	23.79	38.79	15	284.15	20.63	263.52
PZ-2	PZ	42.97	27.97	42.97	15	286.54	22.89	263.65

NOTES :

Water levels were measured on 24 and 25 April 2018.

Groundwater surface elevation is determined by subtracting the depth to water from the top-of-casing elevation.

btc	=	Below top of casing.
E	=	Extraction well.
E/M	=	Extraction well (inactive) with pump pulled; sampled using monitoring well techniques.
ft	=	Feet.
M	=	Monitoring well.
M/D	=	Monitoring well with dedicated pump.
MSL	=	Mean sea level.
NA	=	Not applicable.
NM	=	Not measured.
PZ	=	Piezometer.
TOC	=	Top of casing.

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Appendix D
**Groundwater Purge
and Sampling Forms**

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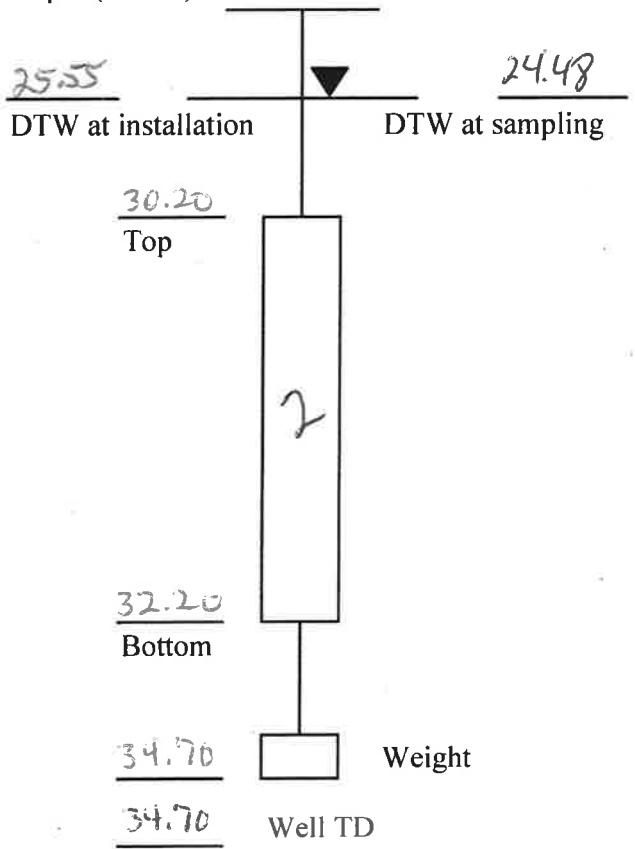


Passive Diffusion Bag Sampling Form

Well Identification: <u>AMW-1A</u>	Site Location: <u>Boomsnub</u>
Depth (BTOC)	Project Number: <u>1524058</u>
<u>25.39'</u> DTW at installation	Well Diameter: <u>2"</u>
<u>24.49</u> DTW at sampling	PDB Installation Date: <u>10/2/17</u> Time: <u>1341</u>
<u>30.83</u> Top	Sample Information
<u>32.83</u> Bottom	Sample No: <u>1817014</u>
<u>34.83</u> Well TD	Sample Date: <u>4/24/18</u> Time: <u>1540</u>
<u>34.83</u> Weight	Sampling Personnel: <u>NB, RQ</u>
	Analyses: <u>8260C</u>
	Biofilm Present (Y/N): <u>N</u>
	New PDB Deployed (Y/N): <u>Y</u>
	Well Condition at Sampling
	Well Monument Locked and in Good Condition? <u>yes</u>
	Inside Well Head and Outside Well Casing (D = Dry, WAC = Water Above Casing, WBC=Water Below Casing) : <u>WBC</u>
	Well Casing Plug Locked and in Good Condition? <u>yes</u>
	Comments: _____



Passive Diffusion Bag Sampling Form

Well Identification: <u>AMW-2A</u>	Site Location: <u>Boomsnub</u>
Depth (BTOC) <u>25.55</u>  <u>24.48</u>	Project Number: <u>1524058</u>
DTW at installation	Well Diameter: <u>2"</u>
DTW at sampling	PDB Installation Date: <u>10/2/17</u> Time: <u>1459</u> <u>2 PDB</u>
30.20 Top	Sample Information
32.20 Bottom	Sample No: <u>1817016(DUP)</u> <u>1817015</u>
34.70 Weight	Sample Date: <u>4/24/18</u> Time: <u>1600</u>
34.70 Well TD	Sampling Personnel: <u>MB, AR</u>
	Analyses: <u>8260c</u>
	Biofilm Present (Y/N): <u>N</u>
	New PDB Deployed (Y/N): <u>Y(2)</u>
	Well Condition at Sampling
	Well Monument Locked and in Good Condition? <u>yes</u>
	Inside Well Head and Outside Well Casing (D = Dry, WAC = Water Above Casing, WBC=Water Below Casing) : <u>D</u>
	Well Casing Plug Locked and in Good Condition? <u>yes</u>
	Comments: _____



Passive Diffusion Bag Sampling Form

Well Identification: <u>AMW-12A</u>	Site Location: <u>Boomsnub</u>
Depth (BTOC)	Project Number: <u>1524058</u>
<u>24.57</u> DTW at installation	Well Diameter: <u>4"</u>
<u>23.88</u> DTW at sampling	PDB Installation Date: <u>10/2/17</u> Time: <u>1446</u>
<u>30.85</u> Top	Sample Information
<u>32.85</u> Bottom	Sample No: <u>1817017</u> Time: <u>1610</u>
<u>34.85</u> Weight	Sample Date: <u>4/24/18</u>
<u>34.85</u> Well TD	Sampling Personnel: <u>MB, RR</u>
	Analyses: <u>8260C</u>
	Biofilm Present (Y/N): <u>N</u>
	New PDB Deployed (Y/N): <u>Y</u>
	Well Condition at Sampling
	Well Monument Locked and in Good Condition? <u>yes</u>
	Inside Well Head and Outside Well Casing (D = Dry, WAC = Water Above Casing, WBC=Water Below Casing): _____
	Well Casing Plug Locked and in Good Condition? _____
	Comments: _____



Passive Diffusion Bag Sampling Form

Well Identification: <u>AMW-16</u>	Site Location: <u>Boomsnub</u>
Depth (BTOC)	Project Number: <u>1524058 1</u>
<u>15.27</u> DTW at installation	Well Diameter: <u>4"</u>
<u>14.24</u> DTW at sampling	PDB Installation Date: <u>10/3/17</u> Time: <u>1132</u>
Diagram: <p>The diagram shows a vertical well casing with a weight at the bottom. A horizontal line with a downward-pointing triangle indicates the water table level. The distance from the top of the casing to the water table is 15.27 (DTW at installation). The distance from the top of the casing to the weight is 87.28 (Top). The distance from the top of the casing to the bottom of the casing is 89.28 (Bottom). The distance from the top of the casing to the weight is 91.28 (Weight). The distance from the top of the casing to the bottom of the casing is 91.28 (Well TD).</p>	Sample Information
	Sample No: <u>1817010</u> Time: <u>1235</u>
	Sample Date: <u>4/24/18</u>
	Sampling Personnel: <u>MS, RR</u>
	Analyses: <u>8260C</u>
	Biofilm Present (Y/N): <u>N</u>
	New PDB Deployed (Y/N): <u>Y</u>
	Well Condition at Sampling
	Well Monument Locked and in Good Condition? <u>yes</u>
	Inside Well Head and Outside Well Casing (D = Dry, WAC = Water Above Casing, WBC=Water Below Casing): <u>D</u>
	Well Casing Plug Locked and in Good Condition? <u>yes</u>
	Comments: _____



Passive Diffusion Bag Sampling Form

Well Identification: <u>AMW-17</u>	Site Location: <u>Boomsnub</u>
Depth (BTOC) <u>7.45</u> DTW at installation	Project Number: <u>1524059 1</u>
<p><u>6.25'</u> DTW at sampling</p> <p><u>87.00</u> Top</p> <p><u>89.00</u> Bottom</p> <p><u>90.55</u> Weight</p> <p><u>90.55</u> Well TD</p>	Well Diameter: <u>4"</u>
	PDB Installation Date: <u>10/3/17</u> Time: <u>1424</u>
Sample Information	
Sample No: <u>1817012</u>	Time: <u>1500</u>
Sample Date: <u>4/24/18</u>	
Sampling Personnel: <u>MB, RL</u>	
Analyses: <u>8260L</u>	
Biofilm Present (Y/N): <u>N</u>	
New PDB Deployed (Y/N): <u>Y</u>	
Well Condition at Sampling	
Well Monument Locked and in Good Condition?	<u>yes</u>
Inside Well Head and Outside Well Casing (D = Dry, WAC = Water Above Casing, WBC=Water Below Casing) :	<u>D</u>
Well Casing Plug Locked and in Good Condition?	<u>yes</u>
Comments:	



Passive Diffusion Bag Sampling Form

Well Identification: <u>AMW -18</u>		Site Location: <u>Boomsnub</u>	
Depth (BTOC)		Project Number: <u>1524059 1</u>	
<u>24.76</u>	▼	Well Diameter: <u>4"</u>	
DTW at installation	DTW at sampling	PDB Installation Date: <u>10/3/17</u> Time: <u>1403</u>	
Sample Information			
Sample No: <u>1817011</u>		Sample Date: <u>4/24/18</u> Time: <u>1445</u>	
Sampling Personnel: <u>MB, RR</u>		Analyses: <u>8260C</u>	
Analyses: <u>8260C</u>		Biofilm Present (Y/N): <u>N</u>	
Biofilm Present (Y/N): <u>N</u>		New PDB Deployed (Y/N): <u>Y</u>	
Well Condition at Sampling			
Well Monument Locked and in Good Condition?		<u>yes</u>	
Inside Well Head and Outside Well Casing (D = Dry, WAC = Water Above Casing, WBC=Water Below Casing) :			
		<u>D</u>	
Well Casing Plug Locked and in Good Condition?		<u>yes</u>	
Comments: _____			

The diagram shows a vertical well casing with a weight at the bottom. A triangle indicates the water level. Handwritten values are: Top = 99.50, Bottom = 101.50, Weight = 103.00, and Well TD = 103.65. The DTW at installation is 24.76 and at sampling is 23.54.



Passive Diffusion Bag Sampling Form

Well Identification: <u>AMW-53A</u>	Site Location: <u>Boomsnub</u>
Depth (BTOC) <u>23.42</u> DTW at installation	Project Number: <u>1524058</u>
<u>28.36</u> DTW at sampling	Well Diameter: <u>4"</u>
<u>26.63</u> Top	PDB Installation Date: <u>10/3/17</u> Time: <u>1620</u>
Sample Information	Sample No: <u>1817019</u>
<u>28.63</u> Bottom	Sample Date: <u>4/24/18</u> Time: <u>1632</u>
<u>32.63</u> Weight	Sampling Personnel: <u>MB, RP</u>
<u>32.63</u> Well TD	Analyses: <u>8260C</u>
	Biofilm Present (Y/N): <u>N</u>
	New PDB Deployed (Y/N): <u>Y</u>
	Well Condition at Sampling
	Well Monument Locked and in Good Condition? <u>yes</u>
	Inside Well Head and Outside Well Casing (D = Dry, WAC = Water Above Casing, WBC = Water Below Casing): <u>WBC</u>
	Well Casing Plug Locked and in Good Condition? <u>yes</u>
	Comments: _____



Passive Diffusion Bag Sampling Form

Well Identification: <u>AMW-64</u>	Site Location: <u>Boomsnub</u>
Depth (BTOC) <u>12.65</u> DTW at installation	Project Number: <u>15240589 1</u>
<u>12.61</u> DTW at sampling	Well Diameter: <u>4^{1/8}</u>
<u>92.90</u> Top	PDB Installation Date: <u>10/3/17</u> Time: <u>1233</u>
Sample Information	Sample No: <u>1817013</u>
Analyses: <u>8260C</u>	Sample Date: <u>4/24/18</u> Time: <u>1515</u>
Biofilm Present (Y/N): <u>N</u>	Sampling Personnel: <u>MB, RL</u>
New PDB Deployed (Y/N): <u>Y</u>	
Well Condition at Sampling	
Well Monument Locked and in Good Condition? <u>yes</u>	
Inside Well Head and Outside Well Casing (D = Dry, WAC = Water Above Casing, WBC=Water Below Casing): <u>WBC</u>	
Well Casing Plug Locked and in Good Condition? <u>yes</u>	
Comments: _____	

Well TD	Weight
<u>98.50</u>	<u>98.50</u>
<u>94.90</u> Bottom	
<u>92.90</u> Top	



Passive Diffusion Bag Sampling Form

Well Identification: <u>MW-1A</u>	Site Location: <u>Boomsnub</u>
Depth (BTOC) <u>27.75</u> DTW at installation	Project Number: <u>1524058</u>
DTW at sampling <u>26.73</u>	Well Diameter: <u>2"</u>
32.60 Top	PDB Installation Date: <u>10/3/17</u> Time: <u>1355</u>
34.60 Bottom	Sample Information
38.60 Weight	Sample No: <u>1817018</u>
38.60 Well TD	Sample Date: <u>4/24/18</u> Time: <u>1620</u>
	Sampling Personnel: <u>MB, RL</u>
	Analyses: <u>8260C</u>
	Biofilm Present (Y/N): <u>N</u>
	New PDB Deployed (Y/N): <u>Y</u>
	Well Condition at Sampling
	Well Monument Locked and in Good Condition? <u>yes</u>
	Inside Well Head and Outside Well Casing (D = Dry, WAC = Water Above Casing, WBC=Water Below Casing) : <u>D</u>
	Well Casing Plug Locked and in Good Condition? <u>yes</u>
	Comments: _____



Ground Water Purge and Sampling Form

Well Identification	MW-14C	Site Location: Boomsnub (Spring 2018)	Date: 4/24/18
Well Diameter (inches)	4	Project Number: 1524058	Personnel: RR, MB
Well Monument Locked and Good Condition?	Y	Purge Method: <input type="checkbox"/> Low Flow <input type="checkbox"/> Conventional <input type="checkbox"/> None	(Extraction)
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	D	Purge Equipment: <input checked="" type="checkbox"/> Extraction Well <input type="checkbox"/> Redi-flo Pump (Ded) <input type="checkbox"/> None	
Well Casing Plug Locked and Good Condition?	Y	Sampling Equipment: <input checked="" type="checkbox"/> Extraction Well <input type="checkbox"/> Redi-flo Pump <input type="checkbox"/> Passive Diffusion Bag	
PID Reading in Well (ppm)	—	Weather Conditions: Sunny 70's, Windy	
Well Total Depth (ft btoc)	81.5	Water volume per ft: 2"=.16, 4"=.64, 6"=1.44 gallons	

Time	1037	
Depth to Ground water (ft btoc)	34.76	
Total Groundwater Purged (gallons, liters)	—	
Purge Rate (gpm) ft ³ /min, ml/min	13.0	
pH +/- 0.1	6.04	
Conductivity (mS/cm) +/- 3%	.212	
Turbidity (NTU) +/- 10%	0.6	
Dissolved Oxygen (mg/L) +/- 0.3 mg/l	8.20	
Temperature (°C) +/- 10%	14.7	
ORP/eH (mV) +/- 10 mV	150.2	
Color of Purged Water (gray, brown, red, clear)	clear	

Sample Identification: 1817002	# of bottles: 3	Comments: 7336510 gal
Time Sampled: 1040	VOCs by 8260C	
Purge water disposed To: Boomsnub	Total Chromium by 200.7	



Ground Water Purge and Sampling Form

Well Identification		MW-14E	Site Location: Boomsnub (Spring 2018)	Date: 4/24/18
Well Diameter (inches)		4'	Project Number: 1524058	Personnel: RR, MB
Well Monument Locked and Good Condition?		Y	Purge Method: <input type="checkbox"/> Low Flow <input type="checkbox"/> Conventional <input type="checkbox"/> None	<u>Extraction</u>
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)		D	Purge Equipment: <input checked="" type="checkbox"/> Extraction Well <input type="checkbox"/> Redi-flo Pump (Ded) <input type="checkbox"/> None	
Well Casing Plug Locked and Good Condition?		Y	Sampling Equipment: <input checked="" type="checkbox"/> Extraction Well <input type="checkbox"/> Redi-flo Pump <input type="checkbox"/> Passive Diffusion Bag	
PID Reading in Well (ppm)		—	Weather Conditions: Sunny 70's windy.	
Well Total Depth (ft btoc)		126.00	Water volume per ft: 2"=.16, 4"=.64, 6"=1.44 gallons	

Time		1044	
Depth to Ground water (ft btoc)		25.44	
Total Groundwater Purged (gallons, liters)		—	
Purge Rate (gpm, ft ³ /min, ml/min)		28.0	
pH +/- 0.1		6.69	
Conductivity (mS/cm) +/- 3%		.358	
Turbidity (NTU) +/- 10%		0.4	
Dissolved Oxygen (mg/L) +/- 0.3 mg/l		6.86	
Temperature (°C) +/- 10%		14.1	
ORP/eH (mV) +/- 10 mV		139.3	
Color of Purged Water (gray, brown, red, clear)		clear	

Sample Identification: 1817603	# of bottles	3	Comments: Flow meter broken
Time Sampled: 1050		—	VOCs by 8260C
Purge water disposed To: Boomsnub		—	Total Chromium by 200.7



Ground Water Purge and Sampling Form

Well Identification	MW-18D	Site Location: Boomsnub (Spring 2018)	Date: 4/24/18
Well Diameter (inches)	4"	Project Number: 1524058	Personnel: RR, MB
Well Monument Locked and Good Condition?	Y	Purge Method: <input type="checkbox"/> Low Flow <input type="checkbox"/> Conventional <input type="checkbox"/> None	<u>Extraction</u>
Inside Well Head and Outside Well Casing (D=dry, WAC=Water above Casing, WBC=Water Below Casing)	D	Purge Equipment: <input checked="" type="checkbox"/> Extraction Well <input type="checkbox"/> Redi-flo Pump (Ded) <input type="checkbox"/> None	
Well Casing Plug Locked and Good Condition?	Y	Sampling Equipment: <input checked="" type="checkbox"/> Extraction Well <input type="checkbox"/> Redi-flo Pump <input type="checkbox"/> Passive Diffusion Bag	
PID Reading in Well (ppm)	—	Weather Conditions: Sunny, 70's, Dry, Windy	
Well Total Depth (ft btoc)	94.4	Water volume per ft: 2"=.16, 4"=.64, 6"=1.44 gallons	

Time	1105																			
Depth to Ground water (ft btoc)	27.50																			
Total Groundwater Purged (gallons, liters)	—																			
Purge Rate (gpm, ft ³ /min, ml/min)	17.0																			
pH +/- 0.1	6.75																			
Conductivity (mS/cm) +/- 3%	267																			
Turbidity (NTU) +/- 10%	0.7																			
Disssolved Oxygen (mg/L) +/- 0.3 mg/l	5.54																			
Temperature (°C) +/- 10%	16.1																			
ORP/eH (mV) +/- 10 mV	114.7																			
Color of Purged Water (gray, brown, red, clear)	clear																			

Sample Identification: 1817005/1817004	# of bottles	Comments: Totalizer broken.
Time Sampled: 1125 / 1110	12	VOCs by 8260C
	4	Total Chromium by 200.7

Purge water disposed To: Boomsnub



Ground Water Purge and Sampling Form

Well Identification	MU-195	Site Location: Boomsnub (Spring 2018)	Date: 4/24/18
Well Diameter (inches)	4"	Project Number: 1524058	Personnel: RR, MB
Well Monument Locked and Good Condition?	Y	Purge Method: <input type="checkbox"/> Low Flow <input type="checkbox"/> Conventional <input type="checkbox"/> None	
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	D	Purge Equipment: <input checked="" type="checkbox"/> Extraction Well <input type="checkbox"/> Redi-flo Pump (Ded) <input type="checkbox"/> None	
Well Casing Plug Locked and Good Condition?	Y	Sampling Equipment: <input checked="" type="checkbox"/> Extraction Well <input type="checkbox"/> Redi-flo Pump <input type="checkbox"/> Passive Diffusion Bag	
PID Reading in Well (ppm)	—	Weather Conditions: Sunny, 70's, Dry	
Well Total Depth (ft btoc)	92.2	Water volume per ft: 2"=.16, 4"=.64, 6"=1.44 gallons	

Time	11:25		
Depth to Ground water (ft btoc)	12.62		
Total Groundwater Purged (gallons, liters)	—		
Purge Rate (gpm, ft ³ /min, ml/min)	7.8		
pH +/- 0.1	6.71		
Conductivity (mS/cm) +/- 3%	.262		
Turbidity (NTU) +/- 10%	0.6		
Disssolved Oxygen (mg/L) +/- 0.3 mg/l	5.22		
Temperature (°C) +/- 10%	14.9		
ORP/eH (mV) +/- 10 mV	130.4		
Color of Purged Water (gray, brown, red, clear)	clear		

Sample Identification: 1817006	# of bottles	Comments: Totalizer = 423440 gal
Time Sampled: 1130	3	VOCs by 8260C
	1	Total Chromium by 200.7
Purge water disposed To: Boomsnub		



Ground Water Purge and Sampling Form

Well Identification	MW-20D	Site Location: Boomsnub (Spring 2018)	Date: 4/24/18
Well Diameter (inches)	4"	Project Number: 1524058	Personnel: RR, MB
Well Monument Locked and Good Condition?	yes	Purge Method: <input type="checkbox"/> Low Flow <input type="checkbox"/> Conventional <input type="checkbox"/> None	
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	D	Purge Equipment: <input checked="" type="checkbox"/> Extraction Well <input type="checkbox"/> Redi-flo Pump (Ded) <input type="checkbox"/> None	
Well Casing Plug Locked and Good Condition?	yes	Sampling Equipment: <input checked="" type="checkbox"/> Extraction Well <input type="checkbox"/> Redi-flo Pump <input type="checkbox"/> Passive Diffusion Bag	
PID Reading in Well (ppm)	—	Weather Conditions: Sunny, 70's	
Well Total Depth (ft btoc)	87.0	Water volume per ft: 2"=.16, 4"=.64, 6"=1.44 gallons	

Time	1140																			
Depth to Ground water (ft btoc)	49.83																			
Total Groundwater Purged (gallons, liters)	—																			
Purge Rate (gpm, ft ³ /min, ml/min)	15.0																			
pH +/- 0.1	6.74																			
Conductivity (mS/cm) +/- 3%	.283																			
Turbidity (NTU) +/- 10%	0.2																			
Disssolved Oxygen (mg/L) +/- 0.3 mg/l	7.55																			
Temperature (°C) +/- 10%	15.6																			
ORP/eH (mV) +/- 10 mV	106.2																			
Color of Purged Water (gray, brown, red, clear)	clear																			

Sample Identification: 181700X7	# of bottles	Comments: Totalizer: 837094 ft ³
Time Sampled: 1145	3	VOCs by 8260C
	—	Total Chromium by 200.7

Purge water disposed To: Boomsnub



Ground Water Purge and Sampling Form

Well Identification	MW-21D	Site Location: Boomsnub (Spring 2018)	Date: 4/24/18
Well Diameter (inches)	4"	Project Number: 1524058	Personnel: RR, MB
Well Monument Locked and Good Condition?	Yes	Purge Method: <input type="checkbox"/> Low Flow <input type="checkbox"/> Conventional <input type="checkbox"/> None <input checked="" type="checkbox"/> Extraction	
Inside Well Head and Outside Well Casing (D=dry, WAC=Water above Casing, WBC=Water Below Casing)	D	Purge Equipment: <input checked="" type="checkbox"/> Extraction Well <input type="checkbox"/> Redi-flo Pump (Ded) <input type="checkbox"/> None	
Well Casing Plug Locked and Good Condition?	Yes	Sampling Equipment: <input checked="" type="checkbox"/> Extraction Well <input type="checkbox"/> Redi-flo Pump <input type="checkbox"/> Passive Diffusion Bag	
PID Reading in Well (ppm)	—	Weather Conditions: Sunny 70's Windy	
Well Total Depth (ft btoc)	75.4	Water volume per ft: 2"=.16, 4"=.64, 6"=1.44 gallons	

Time	11:57																			
Depth to Ground water (ft btoc)	31.45																			
Total Groundwater Purged (gallons, liters)	—																			
Purge Rate (gpm, ft ³ /min, ml/min)	9.0																			
pH +/- 0.1	7.07																			
Conductivity (mS/cm) +/- 3%	1226																			
Turbidity (NTU) +/- 10%	0.2																			
Disssolved Oxygen (mg/L) +/- 0.3 mg/l	6.82																			
Temperature (°C) +/- 10%	15.1																			
ORP/eH (mV) +/- 10 mV	143.8																			
Color of Purged Water (gray, brown, red, clear)	clear																			

Sample Identification: 1817008	# of bottles	Comments: Totalizer: 513039 ft ³
Time Sampled: 1200	3	VOCs by 8260C
	—	Total Chromium by 200.7
Purge water disposed To: Boomsnub		



Passive Diffusion Bag Sampling Form

Well Identification: <u>MW -23D</u>	Site Location: <u>Boomsnub</u>
Depth (BTOC) <u>16.37</u> DTW at installation	Project Number: <u>1524059 1</u>
<u>15.58</u> DTW at sampling	Well Diameter: <u>4"</u>
<u>78.65</u> Top	PDB Installation Date: <u>10/3/17</u> Time: <u>1148</u>
 <u>80.65</u> Bottom	Sample Information
<u>88.16</u> Weight	Sample No.: <u>1817009</u>
<u>88.16</u> Well TD	Sample Date: <u>4/24/18</u> Time: <u>1215</u>
	Sampling Personnel: <u>MB, RR</u>
	Analyses: <u>8260C</u>
	Biofilm Present (Y/N): <u>N</u>
	New PDB Deployed (Y/N): <u>Y</u>
	Well Condition at Sampling
	Well Monument Locked and in Good Condition? <u>yes</u>
	Inside Well Head and Outside Well Casing (D = Dry, WAC = Water Above Casing, WBC=Water Below Casing) : <u>D</u>
	Well Casing Plug Locked and in Good Condition? <u>yes</u>
	Comments: _____

Appendix E

Chain-of-Custody Documentation for Groundwater Samples

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CHAIN OF CUSTODY

88890

004

SR# K1803843

COC Set 1 of 1

COC# _____

1317 South 13th Ave, Kelso, WA 98626 Phone (360) 577-7222 / 800-695-7222 / FAX (360) 636-1068
www.alsglobal.com

Project Name <u>Bearnsrub</u>		Project Number <u>1524058 3</u>		NUMBER OF CONTAINERS 14D 180D	3260C / VOC FP	200.7 / Metals T	1	2	3	4	5	6	Remarks
Project Manager <u>J. I Fraim</u>													
Company <u>EA Engineering</u>													
Address <u>2200 6th Ave, Ste 707, Seattle, WA 98121</u>													
Phone # <u>206-452-5350</u>		email <u>jfraim@eaest.com</u>											
Sampler Signature <u>Mark Blinstrub</u>		Sampler Printed Name <u>Mark Blinstrub</u>											
CLIENT SAMPLE ID	LABID	SAMPLING Date	SAMPLING Time	Matrix									
1. <u>1817011</u>		<u>4/24/18</u>	<u>1145</u>	<u>W</u>	<u>3</u>	<u>X</u>							
2. <u>1817012</u>			<u>1500</u>		<u>3</u>	<u>X</u>							
3. <u>1817013</u>			<u>1515</u>		<u>3</u>	<u>X</u>							
4. <u>1817014</u>			<u>1540</u>		<u>3</u>	<u>X</u>							
5. <u>1817015</u>			<u>1550</u>		<u>3</u>	<u>X</u>							
6. <u>1817016</u>			<u>1600</u>		<u>3</u>	<u>X</u>							
7. <u>1817017</u>			<u>1610</u>		<u>3</u>	<u>X</u>							
8. <u>1817018</u>			<u>1620</u>		<u>3</u>	<u>X</u>							
9. <u>1817019</u>			<u>1632</u>	<u>✓</u>	<u>3</u>	<u>X</u>							
10.													

Report Requirements <input type="checkbox"/> I. Routine Report: Method Blank, Surrogate, as required <input type="checkbox"/> II. Report Dup., MS, MSD as required <input type="checkbox"/> III. CLP Like Summary (no raw data) <input checked="" type="checkbox"/> IV. Data Validation Report <input checked="" type="checkbox"/> V. EDD	Invoice Information P.O.# <u>17440</u> Bill To: <u>EA Seattle</u>	Circle which metals are to be analyzed Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg	
	Turnaround Requirements <input type="checkbox"/> 24 hr. <input type="checkbox"/> 48 hr. <input checked="" type="checkbox"/> 5 Day <input checked="" type="checkbox"/> Standard	Special Instructions/Comments: _____ *Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other _____ (Circle One)	
	Requested Report Date _____		

Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature <u>Mark Blinstrub</u>	Signature <u>DAVID DEAN</u>	Signature	Signature	Signature	Signature
Printed Name <u>Mark Blinstrub</u>	Printed Name <u>ALS-K</u>	Printed Name	Printed Name	Printed Name	Printed Name
Firm <u>EA Engineering</u>	Firm <u>125-18 0820</u>	Firm	Firm	Firm	Firm
Date/Time <u>4/25/18 0820</u>	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time



Cooler Receipt and Preservation Form

PC KC

Client EA ENGINEERS

Received: 4-25-18 Opened: 4-25-18 By: DSP Service Request K1803843 Unloaded: 4-25-18 By: ASP

1. Samples were received via? USPS Fed Ex UPS DHL PDX Courier Hand Delivered
 2. Samples were received in: (circle) Cooler Box Envelope Other
 3. Were custody seals on coolers? NA Y N
If present, were custody seals intact? Y N
- If yes, how many and where? 2 TOP FRONT of Side
If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	Filed
-1.7	-1.7	55	55	0.0	376	NA	NA	NA

4. Packing material: Inserts Baggies Bubble Wrap Get Packs Wet Ice Dry Ice Sleeves
5. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
6. Were samples received in good condition (temperature, unbroken)? NA Y N
If applicable, tissue samples were received: Frozen Partially Thawed Thawed
7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N
8. Did all sample labels and tags agree with custody papers? Indicate major discrepancies in the table on page 2. NA Y N
9. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
10. Were the pH-preserved bottles (see SMO GEN SOP) received at the appropriate pH? Indicate in the table below NA Y N
11. Were VOA vials received without headspace? Indicate in the table below NA Y N
12. Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count	Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: Sample time for 1817011 on label is 1445 (1145 on COC)
It appears that the label has the correct time due to the sampling times
of the other samples

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Appendix F

Analytical Results Summary for Groundwater Samples

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Groundwater Analysis for Metals and VOCs

Sample Name	AMW-1A	Sampling Method	PDB
Sample Date	4/24/2018		
Sample Type	N		
Sample ID	1817014		

SW8260C	1,1,1-TRICHLOROETHANE	3.5		ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.50	U	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPRO	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	45		ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.23	J	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.61		ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	23		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sample Name	AMW-2A	Sampling Method	PDB
Sample Date	4/24/2018		
Sample Type	N		
Sample ID	1817016		

SW8260C	1,1,1-TRICHLOROETHANE	0.87		ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.50	U	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPRO	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	10		ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.56		ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	27		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4
SW8260C	1,1,1-TRICHLOROETHANE	0.86		ug/l	71-55-6

Groundwater Analysis for Metals and VOCs

Sample Name	AMW-2A	Sampling Method	PDB
Sample Date	4/24/2018		
Sample Type	FD		
Sample ID	1817016		

SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.50	U	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPRO	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	9.6		ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.57		ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	28		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sample Name	AMW-12A	Sampling Method	PDB
Sample Date	4/24/2018		
Sample Type	N		
Sample ID	1817017		

SW8260C	1,1,1-TRICHLOROETHANE	0.24	J	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.50	U	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPRO	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.97		ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.45	J	ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	18		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sample Name	AMW-16	Sampling Method	PDB
Sample Date	4/24/2018		
Sample Type	N		
Sample ID	1817010		

SW8260C	1,1,1-TRICHLOROETHANE	0.12	J	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.35	J	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPRO	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.070	J	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.50	U	ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	45		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sample Name	AMW-17	Sampling Method	PDB
Sample Date	4/24/2018		
Sample Type	N		
Sample ID	1817012		

SW8260C	1,1,1-TRICHLOROETHANE	0.22	J	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.10	J	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPRO	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.30	J	ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	65		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sample Name	AMW-18	Sampling Method	PDB
Sample Date	4/24/2018		
Sample Type	N		
Sample ID	1817011		

SW8260C	1,1,1-TRICHLOROETHANE	0.50	U	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.50	U	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPRO	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.50	U	ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	28		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sample Name	AMW-53A	Sampling Method	PDB
Sample Date	4/24/2018		
Sample Type	N		
Sample ID	1817019		

SW8260C	1,1,1-TRICHLOROETHANE	0.73		ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.50	U	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPRO	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.19	J	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	9.9		ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.55		ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	3.8		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sample Name	AMW-64	Sampling Method	PDB
Sample Date	4/24/2018		
Sample Type	N		
Sample ID	1817013		

SW8260C	1,1,1-TRICHLOROETHANE	0.11	J	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.50	U	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPRO	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.22	J	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.50	U	ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	13		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sample Name	MW-1A	Sampling Method	PDB
Sample Date	4/24/2018		
Sample Type	N		
Sample ID	1817018		

SW8260C	1,1,1-TRICHLOROETHANE	1.8		ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.48	J	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPRO	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	6.6		ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.81		ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	1.0		ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	77		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sample Name	MW-14C	Sampling Method	EXTRACTION WEL
Sample Date	4/24/2018		
Sample Type	N		
Sample ID	1817002		

SW8260C	1,1,1-TRICHLOROETHANE	0.50	U	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.50	U	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPRO	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.13	J	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.61		ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	7.2		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sample Name	MW-14E	Sampling Method	EXTRACTION WEL
Sample Date	4/24/2018		
Sample Type	N		
Sample ID	1817003		

SW8260C	1,1,1-TRICHLOROETHANE	0.50	U	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	1.8		ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPRO	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	2.3		ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	1.8		ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.25	J	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	48		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sample Name	MW-18D	Sampling Method	EXTRACTION WEL
Sample Date	4/24/2018		
Sample Type	N		
Sample ID	1817005		

E200.7	CHROMIUM	72.2		ug/l	7440-47-3
SW8260C	1,1,1-TRICHLOROETHANE	0.50	U	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.29	J	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPRO	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.12	J	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	1.1		ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	21		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sample Name	MW-18D	Sampling Method	EXTRACTION WEL
Sample Date	4/24/2018		
Sample Type	FD		
Sample ID	1817005		

E200.7	CHROMIUM	71.6		ug/l	7440-47-3
SW8260C	1,1,1-TRICHLOROETHANE	0.50	U	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.30	J	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPRO	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.13	J	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.23	J	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	1.0		ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	22		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sample Name	MW-19D	Sampling Method	EXTRACTION WEL
Sample Date	4/24/2018		
Sample Type	N		
Sample ID	1817006		

E200.7	CHROMIUM	78.2		ug/l	7440-47-3
SW8260C	1,1,1-TRICHLOROETHANE	0.50	U	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.70		ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPRO	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.18	J	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	1.0		ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	20		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sample Name	MW-20D	Sampling Method	EXTRACTION WEL
Sample Date	4/24/2018		
Sample Type	N		
Sample ID	1817007		

SW8260C	1,1,1-TRICHLOROETHANE	0.50	U	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	1.2		ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPRO	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.22	J	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.77		ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	21		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sample Name	MW-21D	Sampling Method	EXTRACTION WEL
Sample Date	4/24/2018		
Sample Type	N		
Sample ID	1817008		

SW8260C	1,1,1-TRICHLOROETHANE	0.10	J	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.44	J	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPRO	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.21	J	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.50	U	ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	5.0		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sample Name	MW-23D	Sampling Method	PDB
Sample Date	4/24/2018		
Sample Type	N		
Sample ID	1817009		

SW8260C	1,1,1-TRICHLOROETHANE	1.0		ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	1.4		ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPRO	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	2.0	U	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.50	U	ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	120		ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sample Name	TRIP BLANK 1	Sampling Method	
Sample Date	4/24/2018		
Sample Type	TB		
Sample ID	1817001		

SW8260C	1,1,1-TRICHLOROETHANE	0.50	U	ug/l	71-55-6
SW8260C	1,1,2,2-TETRACHLOROETHANE	0.50	U	ug/l	79-34-5
SW8260C	1,1-DICHLOROETHYLENE	0.50	U	ug/l	75-35-4
SW8260C	1,2-DIBROMO-3-CHLOROPRO	2.0	U	ug/l	96-12-8
SW8260C	1,2-DICHLOROETHANE	0.50	U	ug/l	107-06-2
SW8260C	BROMODICHLOROMETHANE	0.50	U	ug/l	75-27-4
SW8260C	CARBON TETRACHLORIDE	0.50	U	ug/l	56-23-5
SW8260C	CFC-11	0.50	U	ug/l	75-69-4
SW8260C	CHLORODIBROMOMETHANE	0.50	U	ug/l	124-48-1
SW8260C	CIS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-59-2
SW8260C	DICHLOROMETHANE	0.15	J	ug/l	75-09-2
SW8260C	HEXACHLORO-1,3-BUTADIENE	2.0	U	ug/l	87-68-3
SW8260C	TETRACHLOROETHENE	0.50	U	ug/l	127-18-4
SW8260C	TRANS-1,2-DICHLOROETHENE	0.50	U	ug/l	156-60-5
SW8260C	TRICHLOROETHYLENE	0.50	U	ug/l	79-01-6
SW8260C	VINYL CHLORIDE	0.50	U	ug/l	75-01-4

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Appendix G

Northern Plume Monitoring Summary

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APPENDIX G NORTHERN PLUME MONITORING SUMMARY

1. INTRODUCTION

This summary presents the analytical results from the latest round of sampling of monitoring wells in the area of the Northern Plume. This plume is north of the Boomsnub/Airco Superfund Site (Site) Operable Unit (OU)-3 trichloroethene (TCE) and chromium plumes, which are referred to collectively as the OU-3 plume. Previous sampling results for wells in the Northern Plume area were reported in Appendix G of the *Boomsnub/Airco Superfund Site Progress and Groundwater Monitoring Reports*¹. Northern Plume monitoring well locations are shown on Figure G-1.

Monitoring data indicate that the OU-3 TCE and chromium plumes have shown significant decreases in concentration and size since 1995². In 2007 and 2008, however, routine monitoring data showed an unexpected increase in the TCE concentration in groundwater samples from well AMW-18, located north of the boundary of the OU-3 Plume.

In May 2008, a direct push drilling and sampling investigation was performed to evaluate the depth and concentration of TCE in groundwater in the vicinity of well AMW-18, and to evaluate possible source areas for the TCE detected in this well. The source of the TCE groundwater contamination in this area was not identified; however, based on the data, it was concluded that the source was not from the same source as the OU-3 plume³.

Well AMW-17 is located approximately 400 feet downgradient of well AMW-18. TCE concentrations in this well had been below the Site-specific cleanup level of 5 micrograms per liter ($\mu\text{g/L}$) since 1999. However, in Fall 2010, TCE in groundwater from this well increased to a concentration exceeding the cleanup level, indicating the apparent arrival of the Northern Plume at the AMW-17 location.

The U.S. Environmental Protection Agency (EPA) and Linde LLC (Linde) performed a joint investigation of the Northern Plume area in May 2011 to get a better understanding of the source, extent, and concentrations of volatile organic compounds (VOCs) in this plume. Results were provided in a separate report⁴. The report concluded that the Northern Plume contamination is not the result of actions by Linde or its predecessors. Therefore, EPA is leading efforts to characterize and remediate the Northern Plume.

A new monitoring well (AMW-64) was installed in February 2012, at the request of the EPA, to monitor the Northern Plume northwest of well AMW-17. Analytical results for groundwater

¹ *Boomsnub/Airco Superfund Site Progress and Groundwater Monitoring Reports: April-June 2016; July-December 2016; April-June 2017; and July-December 2017.*

² *2016 Annual Status Report for the Boomsnub/Airco Superfund Site*, Revision 0. March 2016.

³ *AMW-18 Area Investigation Report, Boomsnub/Airco Superfund Site*. Revision 0. August 2008.

⁴ *Northern Plume Investigation Report, Hazel Dell, Washington*. Revision 1. December 2011.

samples collected from this well shortly after installation indicated TCE concentrations above the Site cleanup level.

Well MW-38 is located approximately 400 feet west-southwest (generally downgradient) of well AMW-17. Well MW-38 was installed as part of a groundwater treatment pilot study in 1998; this well has not been sampled historically as part of the OU-3 monitoring. However, beginning in October 2010, well MW-38 was sampled as part of the Northern Plume investigation/monitoring. TCE concentrations detected in groundwater samples from well MW-38 during October 2010 through October 2012 were above the Site-specific cleanup level, but on a decreasing trend (based on four groundwater samples). However, in October 2013, the TCE concentration increased approximately one order of magnitude, indicating the apparent arrival of the Northern Plume at well MW-38.

Well AMW-16 is located approximately 600 feet west-northwest (downgradient) of well AMW-17. Well AMW-16 is located near the northern edge of the historic OU-3 TCE plume. TCE concentrations in groundwater from this well had been on a decreasing trend since the well was first sampled in 1995. TCE concentrations had been below the Site-specific cleanup level since 2005. However, in Spring 2014, TCE in groundwater from this well increased to a concentration exceeding the cleanup level, indicating the apparent arrival of the Northern Plume at the AMW-16 location.

Well MW-23D is located approximately 500 feet west-northwest (downgradient) of well AMW-16. Well MW-23D is located near the northern edge of the historic OU-3 TCE plume. TCE concentrations in groundwater from this well had been on a decreasing trend since the late 1990s. TCE concentrations had been below the Site-specific cleanup level since 2006. However, during the Fall 2015 sampling event, TCE in groundwater from this well increased to a concentration exceeding the cleanup level, indicating the apparent arrival of the Northern Plume at the MW-23D location.

The Northern Plume continues to be monitored along with the OU-3 plume to evaluate potential impacts to the Site and treatment system. Wells AMW-16, AMW-17, AMW-18, AMW-64, and MW-23D are currently being sampled on a semiannual basis, using passive diffusion bag samplers.

Well construction details, along with water level measurements during the Spring 2018 sampling event, are summarized in Table G-1. Water levels measured during Spring 2018 were approximately the same to one foot lower than those measured during Fall 2017.

2. ANALYTICAL RESULTS

A summary of the VOCs detected in Spring (April) 2018 Northern Plume area monitoring well groundwater samples is provided in Table G-2. TCE concentrations exceeded the Superfund Site cleanup level of 5 µg/L in groundwater samples from all five Northern Plume impacted monitoring wells. The highest TCE concentration was detected in groundwater from well MW- 23D (120 µg/L). Additional detected VOCs were at concentrations below the respective cleanup levels, with one exception. In well MW-23D, the concentration of 1,1-dichloroethene (1,1-DCE; 1.4 µg/L) exceeded the Superfund Site cleanup level of 1.0 µg/L (Table G-2).

Historical VOC analytical results for Northern Plume wells are summarized in Tables G-3 (well AMW-16), G-4 (well AMW-17), G-5 (well AMW-18), G-6 (well AMW-64), and G-8 (well MW- 23D). Historical VOC analytical results are also included for Church of God well MW-21D which was monitored to determine if the Northern Plume is impacting the treatment system (Table G7). The Spring 2018 TCE results for these six wells are also indicated on Figure G-1. No quality assurance/quality control issues were noted which would impact the analytical results.

2.1 Well AMW-16

TCE was detected at a concentration of 45 µg/L in the groundwater sample collected from well AMW-16 in Spring 2018 (Table G-3). This is an increase from the concentration detected during the previous sampling event in Fall 2017 (41 µg/L), and remains above the TCE cleanup level of 5 µg/L. Three other VOCs were detected at concentrations lower than, or similar to, the previous results and below their respective cleanup levels: 1,1,1-trichloroethane (1,1,1-TCA); 1,1-DCE; and cis-1,2-dichloroethene (cis-1,2-DCE).

2.2 Well AMW-17

TCE was detected at a concentration of 65 µg/L in the groundwater sample collected from well AMW-17 in Spring 2018 (Table G-4). This is a decrease from the concentrations detected during the previous sampling event in Fall 2017 (79 µg/L), and remains above the TCE cleanup level. Three other VOCs were detected at concentrations similar to previous results and below their respective cleanup levels: tetrachloroethene; 1,1,1-TCA; and 1,1-DCE.

2.3 Well AMW-18

The TCE concentration in groundwater collected from well AMW-18, remained the same as Fall 2017 at 28 µg/L (Table G-5). TCE concentration in this well remains above the TCE cleanup level and tends to fluctuate but has remained relatively constant over the last six years. No other VOCs were detected.

2.4 Well AMW-64

TCE was detected at a concentration of 13 µg/L in the groundwater sample collected from well AMW-64 in Spring 2018 (Table G-6). This is a decrease from the concentration detected during the previous sampling event in Fall 2017 (15 µg/L), and remains above the TCE cleanup level. Two other VOCs were detected at concentrations lower than their respective cleanup levels: 1,1-TCA and cis-1,2-DCE.

2.5 Well MW-21D

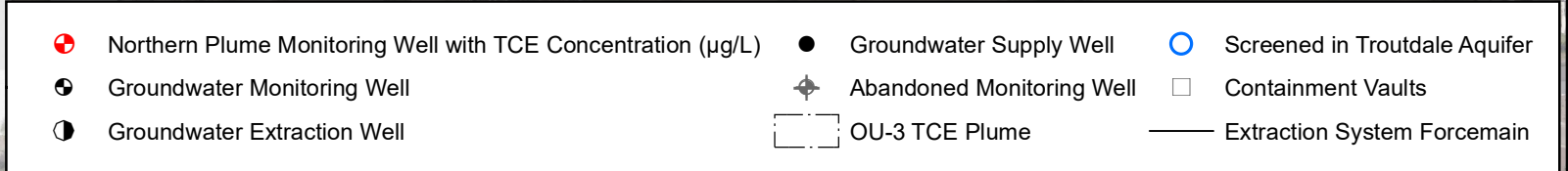
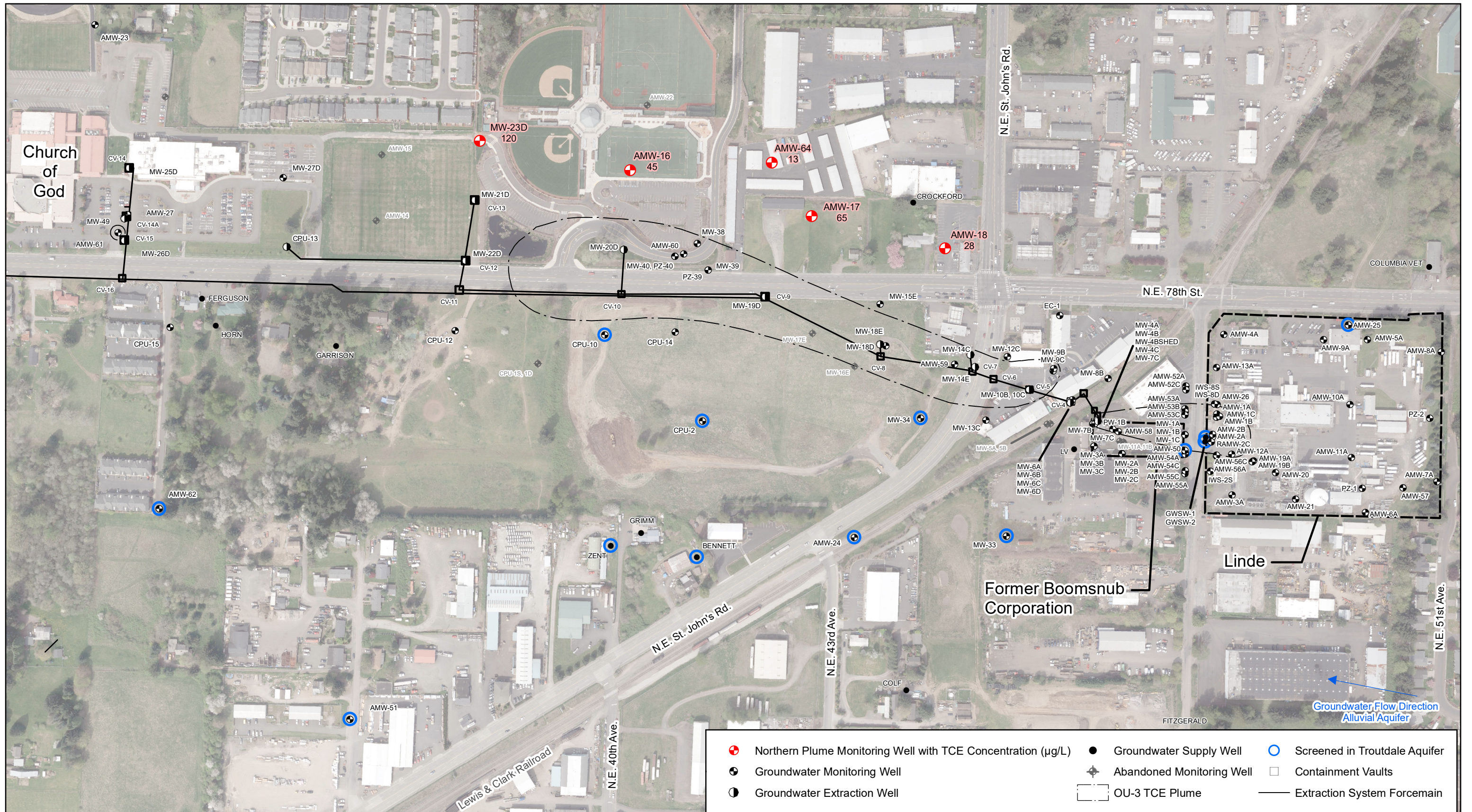
Extraction well MW-21D is not monitored as a Northern Plume well but is being sampled on a semiannual basis to monitor TCE for Northern Plume impacts on the treatment system (Table G-7). Well MW-21D is located at the west end of the Northern Plume approximately 250 feet south of monitoring well MW-23D. TCE concentrations in this well had been below the Site-specific cleanup level since 2013. However, during the Spring 2018 sampling, TCE in groundwater from this well increased to a concentration at the cleanup level (5 µg/L), indicating that the Northern Plume is being pulled into the treatment system at the MW-21D location. Three other VOCs were detected at concentrations lower than their respective cleanup levels: 1,1,1-TCA; 1,1-DCE; and cis-1,2-DCE. On June 22, well MW-21D was shut off with EPA approval, because it appears to be impacted by the Northern Plume.

2.6 Well MW-23D

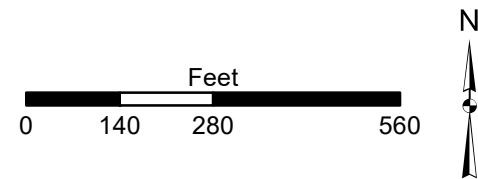
TCE was detected at a concentration of 120 µg/L in the groundwater sample collected from well MW-23D in Spring 2018 (Table G-8). This is lower than the concentration detected during the previous sampling event in Fall 2017 (140 µg/L), and remains above the TCE cleanup level. Additionally, 1,1-DCE was detected at 1.4 µg/L, a concentration exceeding the cleanup level of 1 µg/L, similar to previous results. 1,1-TCA was the only other VOC detected and was at a concentration below the respective cleanup level.

2.7 Well MW-38

Monitoring well MW-38 is sampled on an annual basis and was not sampled during the Spring 2018 event.



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 File Name: Fig_G1_TCE_NorthPlume_Spring18

**FIGURE G-1
 NORTHERN PLUME MONITORING WELL
 LOCATIONS AND TRICHLOROETHENE
 CONCENTRATIONS, SPRING 2018**

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Table G-1. Summary of Water Level Gauging Data and Groundwater Surface Elevations - 24 and 25 April 2018

Well ID	Well Type	Total Depth (ft btoc)	Screened Interval (ft btoc)	Screen Length (ft)	PDB Sampler Interval (ft btoc)	TOC Elevation (ft MSL)	Depth to Water (ft btoc)	Groundwater Surface Elevation (ft MSL)
AMW-16	M	92.13	81.13 – 91.13	10	87.28 – 89.28	266.11	14.24	251.87
AMW-17	M/D	90.55	81 – 91	10	87 – 89	260.42	6.25	254.17
AMW-18	M	103.65	92.65 – 102.65	10	99.5 – 101.5	278.80	23.54	255.26
AMW-64	M	98.7	88.4 – 98.4	10	92.9 – 94.9	266.13	12.61	253.52
MW-23D	M	88.06	71.86 – 86.86	15	78.65 – 80.65	265.33	15.58	249.75
<p>NOTES:</p> <p>btoc = Below top of casing</p> <p>ft = Feet</p> <p>E = Extraction Well</p> <p>M = Monitoring well</p> <p>M/D = Monitoring well with dedicated pump</p> <p>MSL = Mean sea level</p> <p>NA = Not applicable</p> <p>PDB = Passive diffusion bag</p> <p>TOC = Top of casing</p> <p>Groundwater surface elevation is determined by subtracting the depth to water from the top-of-casing elevation.</p>								

Table G-2. Volatile Organic Compounds Detected in Groundwater Samples (in µg/L) Spring 2018 Sampling Event

Well ID	Date Sampled	TCE	PCE	1,1,1-TCA	1,1-DCE	Cis-1,2-DCE	CFC-11
AMW-16	24-Apr-2018	45	0.5 U	0.12 J	0.35 J	0.07 J	0.5 U
AMW-17	24-Apr-2018	65	0.3 J	0.22 J	0.1 J	0.5 U	0.5 U
AMW-18	24-Apr-2018	28	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
AMW-64	24-Apr-2018	13	0.5 U	0.11 J	0.5 U	0.22 J	0.5 U
MW-23D	24-Apr-2018	120	0.5 U	1.00	1.40	0.5 U	0.5 U
Cleanup Level		5	5	200	1	70	2,400

NOTES:
 Only detected compounds are shown.
 Results shown in **blue bold** exceed the Boomsnub/Airco Site-specific cleanup level.
 CFC-11 = Trichlorofluoromethane
 cis-1,2-DCE = cis-1,2-Dichloroethene
 1,1-DCE = 1,1-Dichloroethene
 J = The result is an estimated concentration that is less than the method reporting limit but greater than or equal to the method detection limit.
 PCE = Tetrachloroethene
 1,1,1-TCA = 1,1,1-Trichloroethane
 TCE = Trichloroethene
 U = The analyte was not detected above the specified reporting limit.
 µg/L = Micrograms per liter

Table G-3. Historical VOC Concentrations in Well AMW-16 Groundwater Samples (in µg/L)

Date Sampled	TCE	PCE	1,1,1-TCA	1,1-DCE	Cis-1,2-DCE	CFC-11
Apr-95	87	1 U	7.7	16.6	23.4	365 J
Oct-95	68.7	1 U	7.2	16.8	29.5	345 J
May-96	73.8	1 U	5.8	12.2	24.5	243
Oct-96	65.2	1 U	5	8.8	29.5	70.7
May-97	50.4	1 U	3.1	4.8	29.2	88.6 J
Oct-97	52	0.4 U	2	0.4 U	--	50
May-98	47	0.6 U	2 U	2	15	20
Sep-98	37	0.6 UJ	2 U	3	14	14
May-00	31	0.5 U	3.5	1.8	4.5	15
Oct-00	23	0.5 U	2.3	1.4	2.9	6.4
Oct-01	13	0.5 U	2.4	0.99	0.84	1.3
Oct-02	9	0.5 U	1.2	0.97	0.56	0.58
Oct-03	7	0.5 U	0.69	0.91	0.59	0.53
Oct-04	5.1	0.5 U	0.63	0.64	0.5	0.29 J
Oct-05	5	0.5 U	0.38 J	0.49 J	0.52	0.33 J
Oct-06	3.6	0.5 U	0.17 J	0.38 J	0.36 J	0.26 J
Oct-07	2.7	0.5 U	0.12 J	0.26 J	0.31 J	0.5 U
Oct-08	2.7	0.5 U	0.1 J	0.22 J	0.27 J	0.12 J
Oct-09	2.2	0.5 U	0.09 J	0.25 J	0.23 J	0.23 J
Oct-10	1.7	0.5 U	0.5 U	0.5 U	0.19 J	0.5 U
Oct-11	1.6	0.5 U	0.13 J	0.14 J	0.12 J	0.5 U
Apr-12	0.17 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Oct-12	1.8	0.5 U	2.2	0.66	0.23 J	0.5 U
Apr-13	2	0.5 U	2.8	1.4	0.16 J	0.5 U
Oct-13	4.4	0.5 U	1.9	2	0.15 J	0.5 U
Apr-14	27	0.5 U	1.1	1.2	0.11 J	0.5 U
Oct-14	72	0.5 U	1.1	1.3	0.15 J	0.5 U
Apr-15	94	0.5 U	0.53	0.85	0.11 J	0.5 U
Oct-15	80	0.5 U	0.34 J	0.65	0.12 J	0.5 U
Apr-16	71	0.5 U	0.20 J	0.47 J	0.1 J	0.5 U
Oct-16	67	0.5 U	0.19 J	0.48 J	0.08 J	0.5 U
Apr-17	53	0.5 U	0.16 J	0.43 J	0.09 J	0.5 U
Oct-17	41	0.083 J	0.15 J	0.36 J	0.5 U	0.5 U
Apr-18	45	0.5 U	0.12 J	0.35 J	0.07 J	0.5 U
Cleanup Level	5	5	200	1	70	2,400

NOTES:
 Results shown in **blue bold** exceed the Boomsnub/Airco Site-specific cleanup level.
 Only detected compounds are included in this table.
 Concentrations presented are the highest of the sample and duplicate results, where applicable.
 -- = Not available

Table G-3. Historical VOC Concentrations in Well AMW-16 Groundwater Samples (in µg/L)

NOTES CONTINUED:

CFC-11 = Trichlorofluoromethane

cis-1,2-DCE = cis-1,2-Dichloroethene

1,1-DCE = 1,1-Dichloroethene

J = The result is an estimated concentration that is less than the method reporting limit but greater than or equal to the method

PCE = Tetrachloroethene

1,1,1-TCA = 1,1,1-Trichloroethane

TCE = Trichloroethene

U = The analyte was not detected above the specified reporting limit.

UJ = The analyte was not detected, but the associated limit of quantitation is estimated.

µg/L = Micrograms per liter

VOC = Volatile organic compound

Table G-4. Historical VOC Concentrations in Well AMW-17 Groundwater Samples (in µg/L)

Date Sampled	TCE	PCE	1,1,1-TCA	1,1-DCE	Cis-1,2-DCE	CFC-11
Apr-95	66.9	1 U	5.8	1.6 J	21	10.6
Oct-95	42.5	1 U	36.1	5.4	12.7	19.2 J
May-96	39.6	1 U	52.6	9.7	9.2	10.1
Oct-96	20.5	1 U	169	25.9	3.5	19.7
May-97	17.3	1 U	89.6	23.8	2.1	23.3
Oct. 97	12	0.4 U	67	9	--	14
May-98	7	0.6 U	48	9	0.7 U	9
Sep-98	8	0.6 U	52	9	0.7 U	6
May-99	5	0.6 UJ	12 J	8.0 J	0.7 UJ	5 J
Oct-99	3.4	0.5 U	3	1.2	0.5 U	0.5
Oct-01	2.7	0.5 U	4.2	1.8	0.39 J	0.52
Oct-02	2.3	0.5 U	2.2	0.74	0.22 J	0.35 J
Oct-03	2.2	0.5 U	1.1	0.45 J	0.12 J	0.25 J
Oct-04	1.8	0.5 U	0.9	0.32 J	0.5 U	0.19 J
Oct-05	1.9	0.5 U	0.85	0.29 J	0.5 U	0.5 U
Oct-06	1.5	0.5 U	0.69	0.23 J	0.5 U	0.5 U
Oct-07	1.5	0.5 U	1.1	0.5 U	0.5 U	0.5 U
Oct-08	1.2	0.09 J	0.2 J	0.5 U	0.5 U	0.5 U
Jan-09	1.1	0.09 J	0.17 J	0.5 U	0.5 U	0.5 U
May-09	1.3	0.08 J	0.31 J	0.13 J	0.5 U	0.5 U
Oct-09	1.2	0.07 J	0.8	0.22 J	0.5 U	0.5 U
Apr-10	1.1	0.09 J	1	0.33 J	0.5 U	0.5 U
Oct-10	28	0.21 J	2.6	1.4	0.5 U	0.5 U
Apr-11	29	0.27 J	1.3	0.89	0.5 U	0.5 U
Oct-11	140	0.68	2.3	1	0.5 U	0.5 U
Mar-12	160	0.81	1.5	0.82	0.5 U	0.5 U
Apr-12	160	0.85	1.3	0.76	0.5 U	0.5 U
Jul-12	210	1	2.3	1.1	0.5 U	0.5 U
Oct-12	210	0.90	2.5	1.2	0.5 U	0.5 U
Jan-13	220	0.87	1.8	1.1	0.5 U	0.5 U
Apr-13	240	0.83	2	1	0.5 U	0.5 U
Jul-13	230	0.82	2	0.94	0.5 U	0.5 U
Oct-13	180	0.59	1.4	0.69	0.5 U	0.5 U
Jan-14	180	0.54	0.97	0.55	0.5 U	0.5 U
Apr-14	130	0.46 J	0.82	0.34 J	0.5 U	0.5 U
Jul-14	150	0.67	1.1	0.54	0.5 U	0.5 U
Oct-14	120	0.57	0.86	0.41 J	0.5 U	0.5 U
Apr-15	120	0.49 J	0.75	0.33 J	0.5 U	0.5 U
Oct-15	110	0.40 J	0.57	0.29 J	0.5 U	0.5 U
Apr-16 upper ^a	63	0.34 J	0.35 J	0.17 J	0.5 U	0.5 U

Table G-4. Historical VOC Concentrations in Well AMW-17 Groundwater Samples (in µg/L)

Date Sampled	TCE	PCE	1,1,1-TCA	1,1-DCE	Cis-1,2-DCE	CFC-11
Apr-16 lower ^a	64	0.35 J	0.34 J	0.17 J	0.5 U	0.5 U
Oct-16 upper ^a	74	0.35 J	0.28 J	0.15 J	0.5 U	0.5 U
Oct-16 lower ^a	96	0.44 J	0.34 J	0.27 J	0.5 U	0.5 U
Apr-17	70	0.38 J	0.39 J	0.12 J	0.5 U	0.5 U
Oct-17	79	0.37 J	0.25 J	0.12 J	0.5 U	0.5 U
Apr-18	65	0.3 J	0.22 J	0.1 J	0.5 U	0.5 U
Cleanup Level	5	5	200	1	70	2,400

NOTES:

Results shown in **blue bold** exceed the Boomsnub/Airco Site-specific cleanup level.

Only detected compounds are included in this table.

Concentrations presented are the highest of the sample and duplicate results, where applicable.

^a = Two samplers were deployed in April and October 2016 - one near the top of the screened interval (upper) and one near the bottom (lower).

-- = Not available

CFC-11 = Trichlorofluoromethane

cis-1,2-DCE = cis-1,2-Dichloroethene

1,1-DCE = 1,1-Dichloroethene

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

PCE = Tetrachloroethene

1,1,1-TCA = 1,1,1-Trichloroethane

TCE = Trichloroethene

U = The analyte was not detected above the specified reporting limit.

UJ = The analyte was not detected, but the associated limit of quantitation is estimated.

µg/L = Micrograms per liter

VOC = Volatile organic compound

Table G-5. Historical VOC Concentrations in Well AMW-18 Groundwater Samples (in µg/L)

Date Sampled	TCE	PCE	1,1,1-TCA	1,1-DCE	Cis-1,2-DCE	CFC-11
Apr-95	0.73 J	1 U	2.9	0.87 J	1 U	1 UJ
Oct-95	0.3 J	1 U	1	0.53 J	1 U	1 U
May-96	1 U	1 U	0.52 J	1 U	1 U	1 U
Oct-96	0.31 J	1 U	0.48 J	1 U	1 U	1 U
May-97	0.43 J	1 U	0.44 J	1 U	1 U	1 UJ
Oct. 97	0.3 U	0.4 U	0.4 U	0.4 U	--	0.5 U
May-98	0.5 U	0.6 U	2 U	1 U	0.7 U	2 U
Oct-01	1.1	0.15 J	0.19 J	0.12 J	0.5 U	0.5 U
Oct-02	1.1	0.26 J	0.25 J	0.5 U	0.5 U	0.5 U
Oct-03	0.95	0.29 J	0.17 J	0.5 U	0.5 U	0.5 U
Oct-04	0.64	0.28 J	0.17 J	0.5 U	0.5 U	0.5 U
Oct-05	0.62	0.24 J	0.78	0.13 J	0.5 U	0.5 U
Oct-06	5.1	0.43 J	2.4	0.78	0.5 U	0.5 U
Oct-07	330	1.6	6.5	2.7	0.5 U	0.5 U
Dec-07	410	2.1	7.5	2.9	0.5 U	0.5 U
Jan-08 upper ^a	430	1.9	6.9	2.6	1 U	1.0 U
Jan-08 lower ^a	460	1.9	6.9	2.7	1 U	1 U
May-08	460	2.3	6	2.4	0.5 U	0.5 U
Jul-08	410	1.4	4.8	1.7	1 U	1 U
Oct-08 ^b	390	1.4	4.5	1.4	1 U	1 U
Jan-09	300	1.5	3.2	1.3	0.5 U	0.5 U
May-09	320	1.4	2.6	1.1	0.5 U	0.5 U
Oct-09	210	0.75	1.8	0.75	0.5 U	0.5 U
Apr-10	200	0.66	2.1	0.61	0.5 U	0.5 U
Oct-10	130	0.47 J	0.85	0.35 J	0.5 U	0.5 U
Apr-11	75	0.31 J	0.71	0.18 J	0.5 U	0.5 U
Oct-11	68	0.29 J	0.56	0.18 J	0.5 U	0.22 J
Mar-12	52	0.2 J	0.37 J	0.09 J	0.5 U	1
Apr-12	52	0.19 J	0.29 J	0.09 J	0.5 U	0.53
Jul-12	53	0.22 J	0.3 J	0.5 U	0.5 U	0.6
Oct-12	39	0.15 J	0.16 J	0.5 U	0.5 U	0.43 J
Jan-13	48	0.17 J	0.1 J	0.5 U	0.5 U	0.4 J
Apr-13	44	0.15 J	0.08 J	0.5 U	0.5 U	0.26 J
Jul-13	36	0.2 J	0.11 J	0.5 U	0.5 U	0.19 J
Oct-13	34	0.15 J	0.11 J	0.5 U	0.5 U	0.15 J
Jan-14	36	0.11 J	0.09 J	0.5 U	0.5 U	0.5 U
Apr-14	27	0.5 U	0.08 J	0.5 U	0.5 U	0.5 U
Jul-14	30	0.18 J	0.16 J	0.5 U	0.5 U	0.5 U
Oct-14	34	0.12 J	0.16 J	0.5 U	0.5 U	0.5 U

Table G-5. Historical VOC Concentrations in Well AMW-18 Groundwater Samples (in µg/L)

Date Sampled	TCE	PCE	1,1,1-TCA	1,1-DCE	Cis-1,2-DCE	CFC-11
Apr-15	34	0.11 J	0.18 J	0.5 U	0.5 U	0.5 U
Oct-15	42	0.11 J	0.17 J	0.5 U	0.5 U	0.5 U
Apr-16	40	0.14 J	0.1 J	0.5 U	0.5 U	0.5 U
Oct-16	40	0.1 J	0.09 J	0.5 U	0.5 U	0.5 U
Apr-17	43	0.14 J	0.13 J	0.5 U	0.5 U	0.5 U
Oct-17	28	0.13 J	0.081 J	0.5 U	0.5 U	0.062 J
Apr-18	28	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Cleanup Level	5	5	200	1	70	2,400

NOTES:

Results shown in **blue bold** exceed the Boomsnub/Airco Site-specific cleanup level.

Only detected compounds are included in this table.

Concentrations presented are the highest of the sample and duplicate results.

^a = Two samplers were deployed in January 2008 - one near the top of the screened interval (upper) and one near the bottom (lower).

-- = Not available

CFC-11 = Trichlorofluoromethane

cis-1,2-DCE = cis-1,2-Dichloroethene

1,1-DCE = 1,1-Dichloroethene

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

PCE = Tetrachloroethene

1,1,1-TCA = 1,1,1-Trichloroethane

TCE = Trichloroethene

U = The analyte was not detected above the specified reporting limit.

UJ = The analyte was not detected, but the associated limit of quantitation is estimated.

µg/L = Micrograms per liter

VOC = Volatile organic compound

Table G-6. Historical VOC Concentrations in Well AMW-64 Groundwater Samples (in µg/L)

Date Sampled	TCE	PCE	1,1,1-TCA	1,1-DCE	Cis-1,2-DCE	CFC-11
Mar-12	190	0.27 J	3.5	2.7	0.11 J	0.5 U
Apr-12	160	0.31 J	1.7	2.5	0.43 J	0.5 U
Jul-12	170	0.4 J	2.4	2.7	0.68	0.5 U
Oct-12	110	0.27 J	1.2	1.5	1	0.5 U
Jan-13	110	0.24 J	0.79	1.7	1.2	0.5 U
Apr-13	94	0.23 J	0.57	1.4	1.4	0.5 U
Jul-13	84	0.26 J	0.33 J	1.1	1.5 *	0.5 U
Oct-13	75	0.29 J	0.24 J	1	1.5	0.5 U
Jan-14	Not Sampled (well inaccessible)					
Apr-14	61	0.18 J	0.1 J	0.59	1.6 *	0.5 U
Jul-14	67	0.26 J	0.16 J	0.65	1.8 *	0.5 U
Oct-14	55	0.2 J	0.16 J	0.46 J	1.6 *	0.5 U
Apr-15	53	0.21 J	0.12 J	0.35 J	1.3 *	0.5 U
Oct-15	45	0.21 J	0.09 J	0.2 J	1.2 *	0.5 U
Apr-16	28	0.18 J	0.5 U	0.11 J	0.65	0.5 U
Oct-16	24	0.18 J	0.5 U	0.09 J	0.61	0.5 U
Apr-17	22	0.17 J	0.13 J	0.5 U	0.39 J	0.5 U
Oct-17	15	0.15 J	0.5 U	0.034 J	0.35 J	0.5 U
Apr-18	13	0.5 U	0.11 J	0.5 U	0.22 J	0.5 U
Cleanup Level	5	5	200	1	70	2,400

NOTES:

Results shown in **blue bold** exceed the Boomsnub/Airco Site-specific cleanup level.

Concentrations presented are the highest of the sample and duplicate results, where applicable.

* Trans-1,2-dichloroethene was also detected during the following events: July 2013 at 0.28 J µg/L, April 2014 at 0.30 J µg/L, July 2014 at 0.32 J µg/L, October 2014 at 0.21 J µg/L, April 2015 at 0.15 J µg/L, and October 2015 at 0.080 J µg/L.

CFC-11 = Trichlorofluoromethane

cis-1,2-DCE = cis-1,2-Dichloroethene

1,1-DCE = 1,1-Dichloroethene

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

PCE = Tetrachloroethene

1,1,1-TCA = 1,1,1-Trichloroethane

TCE = Trichloroethene

U = The analyte was not detected above the specified reporting limit.

µg/L = Micrograms per liter

VOC = Volatile organic compound

Table G-7. Historical VOC Concentrations in Well MW-21D Groundwater Samples (in µg/L)

Date Sampled	TCE	PCE	1,1,1-TCA	1,1-DCE	Cis-1,2-DCE	CFC-11
19-Jan-95	2,500 J	200 U	200 U	46 J	--	--
3-Feb-95	3,000 J	33 J	38 J	78	--	--
2-Mar-95	2,400	28	40	50	--	--
24-Apr-95	1,960	35.5	46.3	57.7 J	2.9	6.1
23-May-95	2,200 J	31	--	--	--	--
21-Jun-95	1,900	27	--	--	--	--
25-Jul-95	1,800	24	--	--	--	--
31-Aug-95	1,700	14	--	--	--	--
19-Sep-95	1,500	22	--	--	--	--
12-Oct-95	1,760	24.8	34.6	52.7	2.8	18.8 J
7-Nov-95	1,600	21	--	--	--	--
17-Jan-96	2,500	23	--	--	--	--
16-Feb-96	2,400	33	--	--	--	--
29-Mar-96	2,200	24	--	--	--	--
30-Apr-96	1,800	17	--	--	--	--
16-May-96	1,680	26.3	25.8	50.7	3.1	24.3 J
14-Jun-96	1,900	18	--	--	--	--
16-Jul-96	1,100	13	--	--	--	--
16-Aug-96	1,100	12	--	--	--	--
16-Sep-96	1,000	11	--	--	--	--
24-Oct-96	958	13.8	15.6	19	10 U	90.4
2-Dec-96	1,000	12	--	--	--	--
31-Dec-96	980	14	--	--	--	--
24-Feb-97	750	10	--	--	--	--
26-Mar-97	880	15	--	--	--	--
24-Apr-97	720	12	--	--	--	--
10-May-97	540	2.9 J	20 U	1.7 J	20 U	127
9-Jun-97	570	8	--	--	--	--
10-Jul-97	500	10	--	--	--	--
12-Aug-97	490	9	--	--	--	--
11-Sep-97	460	8	--	--	--	--
8-Oct-97	280	4	8	13	1	91
21-Jan-98	380	6	--	--	--	--
4-May-98	340	2	6	21	0.7 U	150
6-Oct-98	320 J	3	10	21	0.7 U	120
5-May-99	240	0.6 UJ	14	46	0.7 U	180
2-Jun-99	220	2.7	13	18	1.5	68
11-Oct-99	230	1.8	43	18	1.7	88
10-Dec-99	180	1.6	20 J	17	1.3	74
14-Mar-00	110	1.2	18	12	1.2	39
15-May-00	130	2.5 U	23	19	ND	75 D

Table G-7. Historical VOC Concentrations in Well MW-21D Groundwater Samples (in µg/L)

Date Sampled	TCE	PCE	1,1,1-TCA	1,1-DCE	Cis-1,2-DCE	CFC-11
28-Jun-00	130	1.8	16 J	16 J	1.4	70
18-Oct-00	120	1.8	15	13	1.9	53
14-Dec-00	86	1.2	13	10	1.6	53
14-Feb-01	99	1.2	13	13	2.2	65
30-May-01	85	1.3	15	12	2.3	64
9-Oct-01	69	1.2	11	9	2.1	39
11-Dec-01	73	1 U	10	7.9	1.9	45
12-Feb-02	90	9.69	9.5	6.59	1.6	51
14-May-02	70	1.1	14	8.4	2.2	41
7-Oct-02	75	1	15	8.9	2.3	39
7-Oct-02	63	1	14	8.2	2.1	34
2-Dec-02	47	0.85	12	7	1.8	24
5-Feb-03	56	0.82	17	11	2	37 J
6-May-03	48	0.87	15	12	1.8	27
7-Oct-03	58	0.65	14	7.9	1.4	24
4-May-04	30	0.6	8.2	6.2	1.5	12
5-Oct-04	25	0.48 J	5.9	4.6	1.2	8.5
24-Apr-05	24	0.42 J	5.1	4.6	1.3	8.2
4-Oct-05	21	0.33 J	3.7	3.4	1	6.4
24-Apr-06	18	0.32 J	2.6	3	0.87	5.4
4-Oct-06	16	0.34 J	2.2	2.7	0.77	3.9
4-Oct-06	15	0.33 J	2	2.6	0.75	3.8
1-May-07	16 J	0.28 J	2.1	2.7	0.79	4.9 J
2-Oct-07	12	0.23 J	1.5	2.2	0.58	3.2
6-May-08	14	0.21 J	1.4	2.2	0.69	3.3
20-Oct-08	11	0.22 J	0.8	2.1	0.55	2.7
20-Oct-08	11	0.23 J	0.82	2.2	0.56	2.8
5-May-09	11	0.18 J	0.86	2.1	0.63	2.5
12-Oct-09	11	0.21 J	0.59 J	2.1 J	0.58	2.3 J
12-Oct-09	9.9	0.18 J	0.53 J	1.7 J	0.49 J	1.9 J
26-Apr-10	7.3	0.15 J	0.31 J	1.3	0.39 J	1.1
11-Oct-10	7	0.16 J	0.29 J	1	0.41 J	0.9
18-Apr-11	7.3	0.19 J	0.21 J	1.3	0.49 J	0.74
5-Oct-11	6.2	0.13 J	0.25 J	1.1	0.48 J	0.59
24-Apr-12	5.4	0.15 J	0.16 J	0.99	0.48 J	0.44 J
16-Oct-12	5.2	0.13 J	0.20 J	1	0.61	0.32 J
16-Oct-12	5.3	0.13 J	0.18 J	1	0.61	0.32 J
22-Apr-13	4.3	0.10 J	0.12 J	0.85	0.44 J	0.25 J
14-Oct-13	3.5	0.13 J	0.13 J	0.71	0.32 J	0.18 J
21-Apr-14	2.9	0.5 U	0.5 U	0.5	0.29 J	0.14 J
13-Oct-14	2.4	0.11 J	0.08 J	0.43 J	0.29 J	0.5 U

Table G-7. Historical VOC Concentrations in Well MW-21D Groundwater Samples (in µg/L)

Date Sampled	TCE	PCE	1,1,1-TCA	1,1-DCE	Cis-1,2-DCE	CFC-11
27-Apr-15	3.2	0.10 J	0.09 J	0.51	0.33 J	0.5 U
12-Oct-15	2.8	0.5 U	0.5 U	0.44 J	0.26 J	0.5 U
25-Apr-16	2.5	0.5 U	0.09 J	0.45 J	0.27 J	0.5 U
10-Oct-16	2.4	0.5 U	0.10 J	0.36 J	0.25 J	0.5 U
24-Apr-17	2.2	0.11 J	0.18 J	0.41 J	0.25 J	0.5 U
2-Oct-17	2.4	0.11 J	0.17 J	0.42 J	0.24 J	0.075 J
24-Apr-18	5	0.5 U	0.10 J	0.44 J	0.21 J	0.5 U
Cleanup Level	5	5	200	1	70	2,400

NOTES:

Results shown in **blue bold** exceed the Boomsnub/Airco Site-specific cleanup level.

Only detected compounds are included in this table.

Concentrations presented are the highest of the sample and duplicate results, where applicable.

-- = Not analyzed

CFC-11 = Trichlorofluoromethane

cis-1,2-DCE = cis-1,2-Dichloroethene

1,1-DCE = 1,1-Dichloroethene

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

ND = Analyte not detected, method detection limit not provided.

PCE = Tetrachloroethene

1,1,1-TCA = 1,1,1-Trichloroethane

TCE = Trichloroethene

U = The analyte was not detected above the specified reporting limit.

UJ = The analyte was not detected, but the associated limit of quantitation is estimated.

µg/L = Micrograms per liter

VOC = Volatile organic compound

Table G-8. Historical VOC Concentrations in Well MW-23D Groundwater Samples (in µg/L)

Date Sampled	TCE	PCE	1,1,1-TCA	1,1-DCE	Cis-1,2-DCE	CFC-11
Apr-95	5.7	1 U	37.6	56.8	6.4	1.5 J
Oct-95	53.4	1 U	24.8	55.1	12.8	3.4
May-96	49.1	1 U	24.6	52.6	8.4	25.9 J
Oct-96	43.3	1 U	20	32.6	10	95.5
May-97	61.3 J	1 U	14.4	36.4	10.7	224 J
Oct-97	51	0.4 U	14	30 D	--	89
May-98	42	0.6 U	10	28	23	35
Oct-98	67	3 J	3	1 U	3	3
May-99	35 J	0.6 UJ	6 J	45 J	27 J	16 J
Oct-99	15	0.5 U	4.7	8.4	5.3	5.4
May-00	37	0.5 U	2.5	8.1	29	2.1
Oct-00	34	0.5 U	1.2	4.4	14	1.1
May-01	0.5 U	0.5 U	0.71	0.5 U	0.5 U	0.5 U
Oct-01	24	0.5 U	0.88	3.5	5	0.96
May-02	22	0.5 U	1.2	4.4	4.3	1.5
Oct-02	16	0.5 U	1.4	2.8	1.7	0.64
May-03	13	0.5 U	2.4	2.7	1.2	0.49 J
Oct-03	11	0.5 U	2.3	3.2	0.9	0.47 J
May-04	9	0.5 U	1.6	2.5	0.6	0.33 J
Oct-04	7.8	0.5 U	1.1	2.4	0.5	0.25 J
Apr-05	5.9	0.5 U	0.74	2	0.57	0.21 J
Oct-05	6	0.5 U	0.66	2	0.62	0.2 J
Oct-06	4.4	0.5 U	0.36 J	1.6	0.58	0.5 U
Oct-07	3.5	0.5 U	0.3 J	1.1	0.58	0.14 J
Oct-08	2.6	0.5 U	0.43 J	1.4	0.46 J	0.2 J
Oct-09	2.5	0.5 U	0.19 J	0.77	0.29 J	0.15 J
Oct-10	1.9	0.5 U	0.13 J	0.49 J	0.24 J	0.5 U
Oct-11	1.6	0.5 U	0.14 J	0.5	0.18 J	0.13 J
Oct-12	1.4	0.5 U	0.27 J	0.54	0.27 J	0.29 J
Oct-13	1.2	0.5 U	0.42 J	0.66	0.16 J	0.25 J
Oct-14	1.4	0.5 U	2.4	2.7	0.16 J	0.24 J
Oct-15	130	0.5 U	2.7	2.7	0.12 J	0.14 J
Apr-16 upper ^a	140	0.5 U	2.1	2.3	0.08 J	0.12 J
Apr-16 lower ^a	62	0.5 U	2.5	2.3	0.10 J	0.21 J
Oct-16 upper ^a	140	0.5 U	2.5	2.9	0.08 J	0.13 J
Oct-16 lower ^a	84	0.5 U	3.6	3.3	0.12 J	0.22 J
Apr-17	180	0.5 U	3.3	3.1	0.14 J	0.17 J
Oct-17	140	0.078 J	1.9	1.8	0.14 J	0.1 J
Apr-18	120	0.5 U	1	1.4	0.5 U	0.5 U

Table G-8. Historical VOC Concentrations in Well MW-23D Groundwater Samples (in µg/L)

	TCE	PCE	1,1,1-TCA	1,1-DCE	Cis-1,2-DCE	CFC-11
Cleanup Level	5	5	200	1	70	2,400
<p>NOTES:</p> <p>Results shown in blue bold exceed the Boomsnub/Airco Site-specific cleanup level.</p> <p>Only detected compounds are included in this table.</p> <p>Concentrations presented are the highest of the sample and duplicate results, where applicable.</p> <p>^a = Two samplers were deployed in April and October 2016 - one near the top of the screened interval (upper) and one near the bottom (lower).</p> <p>-- = Not available</p> <p>CFC-11 = Trichlorofluoromethane</p> <p>cis-1,2-DCE = cis-1,2-Dichloroethene</p> <p>1,1-DCE = 1,1-Dichloroethene</p> <p>J = The result is an estimated concentration that is less than the method reporting limit but greater than or equal to the method detection limit.</p> <p>PCE = Tetrachloroethene</p> <p>1,1,1-TCA = 1,1,1-Trichloroethane</p> <p>TCE = Trichloroethene</p> <p>U = The analyte was not detected above the specified reporting limit.</p> <p>UJ - The analyte was not detected, but the associated limit of quantitation is estimated.</p> <p>µg/L = Micrograms per liter</p> <p>VOC = Volatile organic compound</p>						