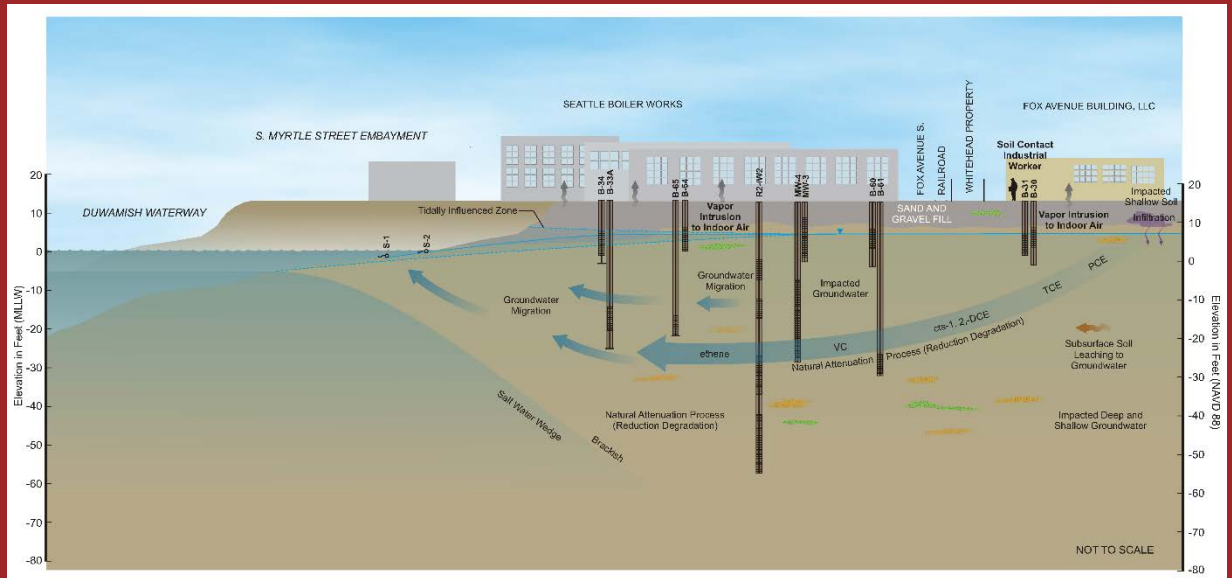


Fox Avenue Site Seattle, Washington 2017 Annual Report



Prepared for

Fox Avenue Building LLC
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April 2018

LIMITATIONS

This report has been prepared for the exclusive use of the Fox Ave Trust, their authorized agents, and regulatory agencies. It has been prepared following the described methods and information available at the time of the work. No other party should use this report for any purpose other than that originally intended, unless Floyd|Snider agrees in advance to such reliance in writing. The information contained herein should not be utilized for any purpose or project except the one originally intended. Under no circumstances shall this document be altered, updated, or revised without written authorization of Floyd|Snider.

The interpretations and conclusions contained in this report are based in part on site characterization data collected by others. Floyd|Snider cannot assure the accuracy of this information.

Table of Contents

1.0 Introduction 1-1

1.1 PURPOSE OF REPORT 1-1

1.2 GROUNDWATER PERFORMANCE CRITERIA FROM CLEANUP ACTION PLAN..... 1-1

2.0 Remedial Actions Undertaken..... 2-1

2.1 PERFORMANCE MONITORING 2-1

2.2 SUBSTRATE INJECTION 2-1

2.3 BIO-AUGMENTATION 2-2

3.0 Groundwater Monitoring Data..... 3-1

3.1 SAMPLING PROCEDURES 3-1

3.2 SUMMARY OF DATA FROM GROUNDWATER SAMPLING 3-1

3.3 QUALITY ASSURANCE REVIEW AND ENVIRONMENTAL INFORMATION
MANAGEMENT LOADING 3-1

4.0 Groundwater Monitoring Data Discussion 4-1

4.1 MAIN SOURCE AREA AND DOWNGRADIENT TO FOX AVENUE S..... 4-1

4.2 FOX AVENUE S..... 4-2

4.3 DOWNGRADIENT OF THE FOX AVENUE SITE 4-3

4.4 SEEPS..... 4-3

5.0 Conclusions and Recommendations 5-1

5.1 CONCLUSIONS..... 5-1

5.1.1 Main Source Area of the Fox Avenue Site 5-1

5.1.2 Northwest Corner Area..... 5-1

5.1.3 Loading Dock Source Area 5-1

5.1.4 Fox Avenue S..... 5-2

5.1.5 Seattle Boiler Works 5-2

5.1.6 S. Myrtle Street Area..... 5-2

5.1.7 Seeps 5-2

5.2 2018 RECOMMENDATIONS 5-2

6.0 References 6-1

List of Tables

Table 1.1	Site-Wide Cleanup Levels for Groundwater (embedded)
Table 2.1	Substrate Injection Summary (embedded)
Table 3.1	Summary of Volatile Organic Compound Data in Groundwater
Table 3.2	Summary of Performance Parameters in Groundwater
Table 4.1	Groundwater Data Summary, Main Source Area
Table 4.2	Post-Thermal Vinyl Chloride Concentrations in the Seeps (embedded)

List of Figures

Figure 1.1	Site Plan
Figure 4.1	PCE + TCE Concentrations in Groundwater – 1 st Water Bearing Zone
Figure 4.2	PCE + TCE Concentrations in Groundwater – 2 nd Water Bearing Zone
Figure 4.3	cis-DCE + VC Concentrations in Groundwater – 1 st Water Bearing Zone
Figure 4.4	cis-DCE + VC Concentrations in Groundwater – 2 nd Water Bearing Zone
Figure 4.5	Total CVOCs Concentrations in Groundwater – 1 st Water Bearing Zone
Figure 4.6	Total CVOCs Concentrations in Groundwater – 2 nd Water Bearing Zone
Figure 4.7	Main Source Area – 1 st WBZ, Baseline Total cVOCs
Figure 4.8	Main Source Area – 1 st WBZ, May 2017 Total cVOCs
Figure 4.9	Main Source Area – 2 nd WBZ, Baseline Total cVOCs
Figure 4.10	Main Source Area – 2 nd WBZ, May 2017 Total cVOCs

List of Acronyms and Abbreviations

Acronym/ Abbreviation	Definition
bgs	Below ground surface
CAP	Cleanup Action Plan
CUL	Cleanup level
CVOC	Chlorinated volatile organic compound
DCE	Dichloroethene
Ecology	Washington State Department of Ecology
ERD	Enhanced reductive dechlorination
Loading Dock	Loading Dock Source Area
µg/L	Micrograms per liter
NW Corner	Northwest Corner Area
PCE	Tetrachloroethene
RL	Remediation Level
Site	Fox Avenue Site
TCE	Trichloroethene
TOC	Total organic carbon
VOC	Volatile organic compound
WBZ	Water Bearing Zone

1.0 Introduction

1.1 PURPOSE OF REPORT

The purpose of this report, jointly prepared by Floyd|Snider, CALIBRE Systems, Inc. (CALIBRE), and Landau Associates (Landau), is to document the cleanup activities and monitoring that occurred in 2017 at the Fox Avenue Site (the Site; Figure 1.1). The work described in this report was performed in accordance with Agreed Order No. 8985 between Fox Ave LLC and the Washington State Department of Ecology (Ecology; Ecology 2012). Per the Cleanup Action Plan (CAP) for the Site, bio-polishing is to be performed following thermal treatment of the chlorinated volatile organic compounds (CVOCs) until the groundwater remediation level (RL) is met. The Main Source Area was thermally treated, as well the Loading Dock Source Area (Loading Dock). One source area, the Northwest Corner Area (NW Corner), was not thermally treated; instead, this area underwent soil vapor extraction. Thermal treatment occurred from January to May of 2013 and achieved its goal of reducing source area soil contaminant concentrations to the RL of an average of 10 milligrams per kilogram (mg/kg) or less of the sum of tetrachloroethene (PCE) and trichloroethene (TCE) concentrations. Following thermal treatment, aquifer temperatures in the Main Source Area were too elevated to implement bio-polishing until mid-2014, as summarized in the 2014 Annual Report (Floyd|Snider 2015).

1.2 GROUNDWATER PERFORMANCE CRITERIA FROM CLEANUP ACTION PLAN

At the Site, three environmental media were historically impacted from releases of solvents: soil, groundwater, and indoor air. RLs were established in the CAP for soil and groundwater that were technology-based.

The groundwater RL was set at a total CVOC concentration of 250 micrograms per liter ($\mu\text{g/L}$) as measured in wells located downgradient of Fox Avenue S., the conditional point of compliance for groundwater. Per the requirements of the CAP, the groundwater RL must be met within 10 years following the thermal remediation. Therefore, 2017 represents the fourth year toward this goal.

In addition to the RL for groundwater, cleanup levels (CULs) were established for the individual constituents found in groundwater. These CULs must be met at the seeps along the Myrtle Street Embayment within 15 years following thermal treatment (i.e., end of 2028). CULs must also be met throughout the plume upgradient of the seeps to the conditional point of compliance along Fox Avenue S. within 50 years (end of 2063). The final site-wide CULs for groundwater, as documented in the CAP, are presented in Table 1.1.

The RLs for site soil were achieved in 2013 as documented in the *Construction Completion Report* (Floyd|Snider 2013). Documentation of the achievement of indoor air CULs, both on- and offsite, is contained in the *Construction Completion Report* as well.

Table 1.1
Site-Wide Cleanup Levels for Groundwater

Chemical of Concern	Seep or Groundwater Cleanup Level (µg/L)
Benzene	51
1,1-DCE	3.2
Pentachlorophenol	3.0
PCE	3.3
TCE	30
TPH (Mineral Spirits- to Heavy Oil-Range)	500
Vinyl Chloride	2.4

Abbreviations:

DCE Dichloroethene

TPH Total petroleum hydrocarbons

2.0 Remedial Actions Undertaken

Bio-polishing actions implemented in 2017 included injection of soluble sugar substrate in selected wells and performance monitoring of groundwater in areas that had been previously treated with soluble sugar or edible oil in 2014. The following sections summarize the work completed in 2017. All work was completed in accordance with previously submitted and approved project work plans.

2.1 PERFORMANCE MONITORING

Performance monitoring included the collection of site-wide groundwater samples in May 2017 and a more limited sampling of wells on Seattle Boiler Works property in October 2017, following completion of an access agreement.

2.2 SUBSTRATE INJECTION

Soluble sugar substrate was injected in March and October 2017. Table 2.1 provides a summary of the substrate injections. The March 2017 substrate injection focused on the source area and the former Whitehead property. The October 2017 substrate injection focused on downgradient areas in Seattle Boiler Works and S. Myrtle Street.

Table 2.1
Substrate Injection Summary

Well ID	Area	Gallons Injected	Pounds of Sugar Injected
March 2017 Substrate Injections			
MW-07	Source Area and Whitehead	1,000	606
MW-09	Source Area and Whitehead	1,000	606
B-49	Source Area and Whitehead	1,189	720
R0-IW4S	Source Area and Whitehead	1,024	620
R0-IW8S	Source Area and Whitehead	871	528
October 2017 Substrate Injections			
R2-IW1	Seattle Boiler Works	2,094	1,167
R2-IW2	Seattle Boiler Works	2,042	1,146
R2-IW10	Seattle Boiler Works	2,100	1,169
R2-IW11	Seattle Boiler Works	2,100	1,177
R2-IW3	S. Myrtle Street Cul-de-Sac	1,955	1,126
R2-IW4	S. Myrtle Street Cul-de-Sac	1,963	1,130
R2-IW5	S. Myrtle Street Cul-de-Sac	2,000	1,152
Total		19,338	11,147

2.3 BIO-AUGMENTATION

Bio-augmentation, the addition of bacteria cultured to specifically degrade chlorinated compounds, was not performed in 2017.

3.0 Groundwater Monitoring Data

3.1 SAMPLING PROCEDURES

Samples from wells were collected using low-flow sampling procedures in accordance with the project work plans. In addition, the seeps in the Myrtle Street Embayment were sampled for volatile organic compounds (VOCs) during a minus low tide on May 9, 2017. All samples were analyzed for the selected list of Site VOCs. Additional performance monitoring parameters were analyzed for in selected wells. These additional parameters included redox indicators such as total and dissolved iron, sulfate, sulfide, acetylene, methane, ethene, and ethane, as well as total organic carbon (TOC) as an indicator of substrate availability.

Samples were delivered under chain-of-custody to Fremont Analytical for analysis. All investigation-derived waste from sampling was containerized and managed in accordance with the project work plans.

3.2 SUMMARY OF DATA FROM GROUNDWATER SAMPLING

2017 VOC data are presented in Table 3.1 and performance parameters are presented in Table 3.2.

3.3 QUALITY ASSURANCE REVIEW AND ENVIRONMENTAL INFORMATION MANAGEMENT LOADING

A basic quality assurance review was performed by Floyd|Snider on all of the analytical laboratory reports received. The reviews concluded that all of the laboratory data were deemed acceptable for use. All data were subsequently uploaded to Ecology's Environmental Information Management database.

4.0 Groundwater Monitoring Data Discussion

Performance data that were collected in 2017 are discussed in this section by treatment area. The 2017 data includes sampling in May and October. In total 30 wells were sampled from both Water Bearing Zones (WBZs); 26 wells were sampled in May and four in October. Overall the remediation is progressing as designed; only samples from three wells contain total CVOC concentrations above the RL of 250 µg/L, and 11 wells have contaminant concentrations less than the CULs.

Figures 4.1 and 4.2 show the site-wide results of the sum of the parent product concentrations, PCE and TCE, in the 1st and 2nd WBZ wells, respectively. Similarly, Figures 4.3 and 4.4 show the distribution of the sum of the daughter product concentrations, cis-1,2-DCE and VC, in the 1st and 2nd WBZ wells. Figures 4.5 and 4.6 show the sum of all CVOCs in the 1st and 2nd WBZ wells site-wide based on the most current data collected. The sum of CVOCs is the specific performance criterion for comparison with the RL of 250 µg/L.

4.1 MAIN SOURCE AREA AND DOWNGRADIANT TO FOX AVENUE S.

Aquifer conditions for both the 1st and 2nd WBZs were evaluated by comparing groundwater data collected from injection and monitoring wells to baseline data. Baseline data were collected prior to the July 2014 injection of substrate into the 2nd WBZ and the January 2015 injection into the 1st WBZ. These bioremediation activities in the Main Source Area followed thermal treatment that ended in May 2013. The May 2017 monitoring event occurred 28 months after the initial injection into the 1st WBZ and 34 months after the initial injection into the 2nd WBZ. A cumulative summary of Main Source Area data is presented in Table 4.1. Figures 4.7 through 4.10 shown total CVOC baseline (post-thermal and pre-injection) conditions versus May 2017 conditions for the 1st and 2nd WBZ in the Main Source Area down gradient to Fox Avenue S.

Data through May 2017 continue to indicate effective bioremediation in the Main Source Area and extending to Fox Avenue S. Total CVOC concentrations in Fox Avenue S. wells (i.e., B-20A, B-58, B-60, B-21, B-59, and B-61) have been less than the 250 µg/L Site CVOC treatment goal beginning in May 2017. In May 2017, only two 1st WBZ wells in the Main Source Area (MW-09 and MW-18S) had total CVOC concentrations greater than the Site treatment goal; all 2nd WBZ wells were below the treatment goal. Iso-concentration contours for total CVOCs in May 2017 showed a substantial reduction in the size of the high concentration core of the plumes compared to baseline in both the 1st WBZ (Figures 4.7 and 4.8) and the 2nd WBZ (Figures 4.9 and 4.10). This contrast is most pronounced in the 2nd WBZ, where total CVOC concentrations were all less than 50 µg/L. Treatment results in the 1st and 2nd WBZs are further discussed below.

Eight wells were sampled for performance monitoring of the 1st WBZ. Treatment has achieved total CVOC concentrations <250 µg/L at six of the eight wells, where baseline total CVOCs ranged from 835 to 1,952 µg/L. Total CVOC concentrations at wells MW-18S (461 µg/L) and MW-09 (621 µg/L) remained above 250 µg/L. Elevated TOC, reduced aquifer redox conditions, and complete reductive dechlorination to end products ethene and ethane continue at these two

wells; ethene/ethane are innocuous end products that indicate complete degradation of CVOCs. TOC increased at both wells in May (to more than 100 mg/L) as a result of the March 2017 sugar substrate injections; these TOC concentrations indicate adequate electron donor for continued treatment.

Nine wells were sampled in May 2017 for performance monitoring of the 2nd WBZ. A comparison of post-injection data to baseline shows a substantial decline in CVOC concentrations. Total CVOC concentrations were less than 50 µg/L at all 2nd WBZ wells in May compared to baseline concentrations ranging from 3 to 7,794 µg/L. Additionally, elevated TOC and highly reduced redox conditions (sulfate reducing to methanogenic) continue to indicate conditions conducive to enhancement of bioremediation at all 2nd WBZ wells upgradient of Fox Avenue S. Ethene/ethane were detected at six of the seven wells analyzed. At those six wells, ethane + ethane was predominant on a molar basis over the chlorinated compounds (i.e., had the greatest molar fraction, as shown on Table 4.1).

4.2 FOX AVENUE S.

In the NW Corner, wells sampled in the 1st WBZ showed CVOC concentrations near the RL. Monitoring wells NW1-1 and B-22, sampled in May 2017, showed total CVOC concentrations of 270 µg/L and 174 µg/L, respectively. Parent products PCE and TCE remain at non-detect levels at NW1-1, whereas daughter products have shown an increase in concentrations from December 2016, indicating continued degradation is occurring. In addition, the total CVOC results from monitoring well B-22 have decreased from December 2016; however, current data show residual concentration of PCE and TCE remain in this area (below the RL). Therefore, focused treatment in these areas (1st WBZ only) using wells R1-IW8, R1-IW10, R1-IW13, R1-IW14, and R1-IW15, and potentially including bio-augmentation, should be planned.

Substrate injections were completed on the former Whitehead property upgradient of the Fox Avenue transect in wells B-49, MW-07, and MW-09 in the 1st WBZ in March 2017. The nearest wells sampled downgradient were B-58, located approximately 100 feet downgradient from B-49, and B-60 and B-20A/B-21, located approximately 130 feet and 70 feet downgradient from MW-09, respectively. Based on a groundwater velocity of 2 feet per day (Floyd|Snider 2012), the full impact from these upgradient injections may not yet have been detected/measured in May 2017; however, the monitoring results at each of these downgradient wells indicate downward trends in CVOC concentrations from the previous monitoring event. The total CVOCs at well B-58 and the duplicate sample collected in May 2017 range from 168 to 188 µg/L; results at this well have been below the RL since May 2016. This well should be monitored to make sure the declining CVOC trend continues toward the CUL. For the 2nd WBZ, B-61 is at 28.5 µg/L (total CVOCs) and appears to be steadily moving toward the CUL. In the 1st WBZ at the south end of Fox Avenue, B-20A continues to remain below the RL with concentrations at 42.2 µg/L (total CVOCs) in May 2017. Results at this well have shown a cyclic pattern with total CVOCs fluctuating from 14 to 168 µg/L over the past four sampling events. In the 2nd WBZ, B-21 is below the CUL with all CVOCs at non-detect level; this is reduced from December 2017 concentrations of 38.4 µg/L (solely as vinyl chloride). Another round of substrate injections in the same wells used

in March 2017 should be considered to continue driving the CVOC concentrations toward the CUL.

4.3 DOWNGRAIENT OF THE FOX AVENUE SITE

In the Seattle Boiler Works property, four wells were sampled in October 2017, one well in the 1st WBZ (R2-IW1 at 17 feet below ground surface [bgs]) and three wells in the 2nd WBZ (R2-IW1 at 45 feet bgs, R2-IW10 at 60 feet bgs, and MW-06). To the south, along S. Myrtle Street, two wells in the 1st WBZ (R2-IW3 at 17 feet bgs and B-64) and two wells in the 2nd WBZ (R2-IW3 at 30 feet bgs and B-33a) were sampled in May 2017. Results from all eight sampled wells show compliance with the RL, and four of the wells (R2-IW10, R2-IW3 [17 and 30 feet bgs], and B-33a) had total CVOCs below 5 µg/L, meeting the CUL of <2.4 µg/L vinyl chloride. This general trend within the Seattle Boiler Works treatment areas is positive, with biological treatment successfully treating the plume. One exception is monitoring well MW-06, which has total CVOC concentrations lingering around 110 to 130 µg/L (total CVOCs) in the past three sampling events. Substrate injections were completed in selected wells upgradient of this location (R2-IW1, R2-IW2, R2-IW10, and R2-IW11) shortly after the monitoring was completed in October 2017. Continued targeted injections in the areas upgradient of MW-06, along with bio-augmentation in this well, will be considered based on future monitoring results in this area.

4.4 SEEPS

The measured CVOCs at each of the three embayment seeps showed reductions over the past year, with total CVOC concentrations ranging from 5.5 µg/L to 45 µg/L, representing reductions of 82 to 99 percent from historical concentrations. The vinyl chloride concentrations in the seeps continue to decline, ranging from 4.3 to 13.3 µg/L, as shown in Table 4.2. The declining levels of CVOCs in the seeps over the past several years demonstrate that the upgradient biological treatment is working effectively.

Table 4.2
Post-Thermal Vinyl Chloride Concentrations in the Seeps

Seep	2014 (µg/L)	2015 (µg/L)	2016 (µg/L)	2017 (µg/L)
S-2	ND	30.9	7.4	4.4
S-3	372	7.5	27.1	13.3
S-3b	136	72.8	46.4	10.9
S-4	ND	ND	ND	NS

Abbreviations:

ND Non-detect

NS Not sampled

5.0 Conclusions and Recommendations

5.1 CONCLUSIONS

Overall, the results of the third year of post-thermal bio-polishing are encouraging, with total CVOC concentrations in most wells less than the RL of 250 µg/L total CVOCs and no evidence of rebound. Almost no PCE or TCE remains in groundwater at the Site; the primary contaminants continue to be the daughter products of reductive dechlorination, namely cis-1,2-DCE and VC.

The following paragraphs present conclusions based on 2017 data in the five sub-areas of the Site.

5.1.1 Main Source Area of the Fox Avenue Site

In the Main Source Area, the combination of thermal treatment plus approximately 3 years of bio-polishing have substantially reduced contaminant concentrations at most locations in the Main Source Area. Total CVOC concentrations along Fox Avenue S. have been less than the Fox Avenue treatment goal for the last three sampling events, beginning in May 2017. Only two 1st WBZ wells (MW-09 and MW-18S), located upgradient of Fox Avenue S., had total CVOC concentrations greater than the Fox Avenue goal in May 2017. Conditions conducive to further biodegradation continue at these two wells. Total CVOC concentrations throughout the 2nd WBZ have sustainably declined from the baseline maximum of 7,794 µg/L to less than 50 µg/L at all wells, and aquifer conditions remained conducive for continued biodegradation. Additional remedial action is not necessary at this time.

5.1.2 Northwest Corner Area

Wells sampled in the NW Corner are showing good response to enhanced reductive dechlorination (ERD) treatment. Parent compounds PCE and TCE have remained at non-detect concentrations for the second consecutive monitoring event at NW1-1, and total CVOCs have been reduced at B-22. CVOC concentrations prior to the start of ERD treatment in this area were in the range of 1,500 to 2,500 µg/L; current CVOC concentrations are in the range of 175 to 270 µg/L. The current performance monitoring results indicate continued dechlorination with elevated concentrations of daughter products observed. Bioaugmentation in this area is recommended to accelerate the cleanup of the remaining plume.

5.1.3 Loading Dock Source Area

Performance monitoring data were not collected from this area in 2017. Previous monitoring results from wells sampled in the Loading Dock have demonstrated effective treatment; prior performance monitoring data from this area (May 2016) indicated all wells with concentrations less than the RL and several wells (two of the three wells sampled) also had concentrations less than the CUL. Total CVOCs have been reduced over 99 percent relative to the historical concentrations.

5.1.4 Fox Avenue S.

Wells sampled in the area along Fox Avenue S. are showing good response to treatment. The 2017 performance monitoring data from this area indicate all wells have concentrations less than the RL. Two wells (B-21 and B-60) have concentrations less than the CUL with CVOCs below the reporting limit and the remainder of the wells continue to decline. Total CVOCs have been reduced over 99 percent relative to the historical highs.

5.1.5 Seattle Boiler Works

Wells sampled in the Seattle Boiler Works area are showing good response to ERD treatment. The current performance monitoring results indicate that all wells sampled have concentrations less than the RL, and three of the four wells have concentrations approaching or less than the CUL. Injection well R2-IW1 (sampled at 17 and 45 feet bgs), located in the center of the VOC plume footprint on Seattle Boiler Works property, show current total CVOC levels at the lowest to date (less than 30 µg/L, composed of only daughter products cis-1,2-DCE and VC) representing a 99.8 percent reduction from historical concentrations. Total CVOCs at injection well R2-IW10, located on the north end of Seattle Boiler Works and sampled at 60 feet bgs, have reached the CUL with total CVOCs at 1.44 µg/L; this represents a 99.9+ percent reduction from historical concentrations. The addition of substrate in injection wells upgradient of MW-06 in October 2017 was completed to target treatment of the residual PCE and TCE concentrations in this well (MW-06).

5.1.6 S. Myrtle Street Area

Wells sampled in the S. Myrtle Street Area are showing good response to ERD treatment. Total CVOCs have been reduced by over 99 percent relative to the historical levels at a majority of the wells (current data from many of the wells has demonstrated a reduction of over 99.9 percent). The current performance monitoring results indicate that all wells sampled have concentrations less than the RL; three of the four wells sampled are below the CUL, and the fourth well (B-64) is approaching the CUL (approximately twice the CUL for vinyl chloride in May 2017).

5.1.7 Seeps

The seeps continue to show declining concentrations year to year. The only VOC present at concentrations greater than CULs was VC. Assuming continuing declines, the VC concentration in the seeps is on track for meeting the CUL within the next 10 years.

5.2 2018 RECOMMENDATIONS

Recommendations for 2018 are as follows:

1. Perform injections of substrate in late spring 2018 in the following 1st WBZ wells in the Main Source Area and also downgradient on the Whitehead property: MW-07, MW-09, B-49, R0-IW4S, and R0-IW8S.

2. Repeat the site-wide groundwater monitoring event again in May 2018 with less wells sampled in the 2nd WBZ of the Main Source Area due to the low and stable concentrations observed in this area since 2014.
3. Reduce the number of VOCs being reported by the laboratory to only those that have been detected in 2017. This would eliminate reporting of 1,2-dichloroethane, trichloroethane, 1,1,2-trichloroethane, and 1,1,2,2-tetrachloroethane.
4. Specific wells to be targeted for treatment in June 2018 will be identified after review of the data following the May 2018 groundwater sampling. The following areas are anticipated based on the most recent sampling data and past trends:
 - NW Corner
 - Seattle Boiler Works (well MW-05)
 - Along Fox Avenue S.
 - Along S. Myrtle Street
5. Perform a more limited round of sampling in November or December 2018 to assess performance in the areas injected in June 2018.

6.0 References

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**Fox Avenue Site
Seattle, Washington
2017 Annual Report**

Tables

Table 3.1
Summary of Volatile Organic Compound Data in Groundwater

Analyte				Non-Chlorinated Volatile Organic Compounds									Chlorinated Volatile Organic Compounds					Total CVOCs ¹	
				Acetone	Benzene	EB	MEK	Naphthalene	Toluene	1,2,4-TMBZ	Xylene	Xylene (ortho)	1,1-DCA	cis-1,2-DCE	PCE	trans-1,2-DCE	TCE		VC
Location	Sample ID	WBZ	Sample Date	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Monitoring Wells																			
Fox Avenue																			
B-20A	B-20a-052617	1st WBZ	05/26/2017	6.97	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	30.5	1 U	1.39	0.5 U	11.7	43.59
B-21	B-21-052617	2nd WBZ	05/26/2017	5 U	6.1	1.08	5 U	1 U	8.21	1 U	1.12	1.01	1 U	1 U	1 U	1 U	0.5 U	0.2 U	
B-58	B-58-052517	1st WBZ	05/25/2017	5 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	114	1 U	1.87	0.5 U	52.2	168.07
B-58	Dup01-052517	1st WBZ	05/25/2017	5 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	127	1 U	1.73	0.5 U	58.9	187.63
B-60	B-60-052517	1st WBZ	05/25/2017	5 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.5 U	0.2 U	
B-61	B-61-052517	2nd WBZ	05/25/2017	5 U	1 U	1 U	5 U	1 U	1.01	1 U	1 U	1 U	1 U	2.98	1 U	1 U	0.5 U	25.5	28.48
Main Source Area																			
MW-15D	MW-15D-052517	2nd WBZ	05/25/2017	5 U	1 U	1.54	5 U	1 U	7.02	9.01	2.08	1.12	1 U	5.71	1 U	1.61	0.5 U	34.7	42.02
MW-16D	MW-16D-052417	2nd WBZ	05/24/2017	5 U	1 U	2.3	5 U	1 U	1 U	29.1	1.59	1.5	1 U	1 U	3.42	1 U	0.5 U	0.2 U	3.42
MW-17D	MW-17D-052517	2nd WBZ	05/25/2017	6.11	4.23	2.01	5 U	1 U	5.06	1 U	1.49	1 U	1 U	1 U	1 U	1 U	0.5 U	0.235	0.235
MW-18S	MW-18S-052517	1st WBZ	05/25/2017	5 U	1 U	1 U	77.7	1 U	1.6	1 U	4.08	3.91	5.12	261	15.6	1 U	4.95	179	465.67
Myrtle Street																			
B-33A	B-33a-052517	2nd WBZ	05/25/2017	5 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	3	1 U	1 U	1 U	0.5 U	2.09	5.09
B-64	B-64-052517	1st WBZ	05/25/2017	5 U	1 U	1 U	5 U	1 U	1.1	1 U	1 U	1 U	1 U	11.8	1 U	1 U	0.5 U	5.66	17.46
Northwest Corner																			
B-22	B-22-052517	1st WBZ	05/25/2017	5 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	74.4	51.5	1.89	38	9.66	175.45
NW 1-1	NW1-1-052517	1st WBZ	05/25/2017	5 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	235	1 U	1.07	0.5 U	34.9	272.88
Seattle Boiler Works																			
MW-06	MW-6-101217	2nd WBZ	10/12/2017	5 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	84.4	22.3	1.11	22.1	0.2 U	129.91
Whitehead																			
B-45	B-45-052417	2nd WBZ	05/24/2017	5 U	1 U	1 U	5 U	1 U	2.09	1 U	1 U	1.68	1 U	1 U	1 U	1 U	0.5 U	0.2 U	
B-49	B-49-052417	1st WBZ	05/24/2017	7.11	1 U	1 U	21.2	1 U	1 U	1 U	1 U	1 U	1 U	79.2	4.34	1 U	2.94	38.6	125.08
MW-07	MW-7-052417	1st WBZ	05/24/2017	33.7	1 U	1 U	66.9	1 U	1 U	1 U	1 U	1 U	1 U	115	15.5	1.49	34.7	4.13	170.82
MW-08	MW-8-052417	2nd WBZ	05/24/2017	25.9	1 U	1 U	33.6	1 U	2.29	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.5 U	0.2 U	
MW-09	MW-9-052417	1st WBZ	05/24/2017	6.88	1 U	1 U	36.8	1 U	1 U	1 U	1 U	1 U	1 U	160	17.6	7.24	6.47	437	628.31
MW-10	Dup-1-052417	2nd WBZ	05/24/2017	5 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	3.3	1 U	1 U	0.5 U	5.62	8.92
	MW-10-052417	2nd WBZ	05/24/2017	5.45	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	2.62	1 U	1 U	0.5 U	0.2 U	2.62
Injection Wells																			
Main Source Area																			
R0-IW2D	R0-IW02D-052517	2nd WBZ	05/25/2017	171	1 U	1 U	162	1 U	1 U	1 U	1 U	1 U	1 U	37.8	1 U	1.53	1.47	6.87	47.67
R0-IW6D	R0-IW06D-052517	2nd WBZ	05/25/2017	446	1 U	1 U	131	1 U	1 U	1 U	1 U	1 U	1 U	15.7	1 U	1 U	1.38	15.9	32.98
R0-IW9S	R0-IW09S-052517	1st WBZ	05/25/2017	7.06	1 U	1 U	5 U	1 U	1.07	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.5 U	0.2 U	
Myrtle Street																			
R2-IW3	R2-IW3-17-052517	2nd WBZ	05/25/2017	35.9	5.86	34.3	659	1.55	506	1.89	1 U	1.13	2.95	3.39	1 U	1 U	0.5 U	0.2 U	6.34
	R2-IW3-30-052517	2nd WBZ	05/25/2017	31.3	4.41	24.5	442	2.14	481	1.44	1 U	1.07	2.87	3.51	1 U	1 U	0.5 U	0.2 U	6.38
Seattle Boiler Works																			
R2-IW1	R2-IW1-17-101217	2nd WBZ	10/12/2017	83.3	1 U	1 U	1030	1 U	683	1 U	1 U	1 U	1 U	11.1	1 U	1 U	0.5 U	15	26.1
	R2-IW1-45-101217	2nd WBZ	10/12/2017	75.9	1 U	1 U	921	1 U	718	1 U	1 U	1 U	1 U	11.5	1 U	1 U	0.5 U	17.7	29.2
R2-IW10	R2-IW10-60-101217	1st WBZ	10/12/2017	5 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1.44	1 U	1 U	0.5 U	0.2 U	1.44

Table 3.1
Summary of Volatile Organic Compound Data in Groundwater

Analyte				Non-Chlorinated Volatile Organic Compounds							Chlorinated Volatile Organic Compounds								
				Acetone	Benzene	EB	MEK	Naphthalene	Toluene	1,2,4-TMBZ	Xylene	Xylene (ortho)	1,1-DCA	cis-1,2-DCE	PCE	trans-1,2-DCE	TCE	VC	Total CVOCs ¹
Location	Sample ID	WBZ	Sample Date	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	
Seep Data																			
S-2	SP-02-052617		05/26/2017	5 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1.16	1.14	1 U	1 U	0.5 U	4.35	6.65
S-13 (Calibre S-3)	SP-03-052617		05/26/2017	5.4	6.01	2.6	5 U	3.16	1 U	1 U	1 U	1 U	2.11	10.6	1 U	1 U	0.5 U	13.3	26.01
S-3b	SP-03B-052617		05/26/2017	5 U	1 U	1 U	5 U	1.89	1 U	1 U	1 U	1 U	1 U	31.8	1 U	1.76	0.5 U	10.9	46.12

Notes:
 1 Includes sum of all chlorinated compounds detected; total result may be slightly different than total CVOC concentrations shown on figures, which only include the sum of PCE, TCE, cis-1,2-DCE, and VC.

- Abbreviations:
- CVOC Chlorinated volatile organic compound
 - DCA Dichloroethane
 - DCE Dichloroethene
 - EB Ethylbenzene
 - µg/L Micrograms per liter
 - MEK Methyl ethyl ketone
 - PCE Tetrachloroethene
 - TCE Trichloroethene
 - TMBZ Trimethylbenzene
 - VC Vinyl chloride
 - WBZ Water bearing zone

Qualifier:
 U Analyte is not detected at the associated reporting limit.

Table 3.2
Summary of Performance Parameters in Groundwater

Analyte				Conventionals			Dissolved Gases		
				Total Organic Carbon	Sulfate	Sulfide	Ethane	Ethene	Methane
Unit				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Location	Sample ID	WBZ	Date						
Monitoring Wells									
Fox Avenue									
B-20A	B-20a-052617	1st WBZ	05/26/2017		21.8				
B-58	B-58-052517	1st WBZ	05/25/2017		46.3				
B-60	B-60-052517	1st WBZ	05/25/2017		21.2				
B-61	B-61-052517	2nd WBZ	05/25/2017		6.76				
Main Source Area									
MW-15D	MW-15D-052517	2nd WBZ	05/25/2017	87.5	9.1	5	0.229	0.0207	5.04
MW-16D	MW-16D-052417	2nd WBZ	05/24/2017	54.2	3 U	0.5 U	0.105	0.005 U	13
MW-17D	MW-17D-052517	2nd WBZ	05/25/2017	153	6 U	0.8	0.0807	0.005 U	15.1
MW-18S	MW-18S-052517	1st WBZ	05/25/2017	278	29	17.4	0.00637	0.0272	5.54
Whitehead									
B-45	B-45-052417	2nd WBZ	05/24/2017	93.8	6 U	0.5 U	0.192	0.005 U	10.7
B-49	B-49-052417	1st WBZ	05/24/2017	61.2	5.22	0.6	0.005 U	0.00706	0.801
MW-07	MW-7-052417	1st WBZ	05/24/2017	350	3.66	4	0.005 U	0.005 U	0.118
MW-08	MW-8-052417	2nd WBZ	05/24/2017	160	6.42	6	0.005 U	0.0116	0.334
MW-09	MW-9-052417	1st WBZ	05/24/2017	101	1.67	1.2	0.0171	0.0278	1.82
MW-10	Dup-1-052417	2nd WBZ	05/24/2017	42.4	67.8	0.5 U	0.0254	0.005 U	11
	MW-10-052417	2nd WBZ	05/24/2017	39.1	69.1	0.5 U	0.0315	0.005 U	7.23
Injection Wells									
Main Source Area									
R0-IW2D	R0-IW02D-052517	2nd WBZ	05/25/2017	1740	6 U	0.5 U	0.0074	0.0167	6.82
R0-IW6D	R0-IW06D-052517	2nd WBZ	05/25/2017	1780	185	3.2	0.005 U	0.005 U	4.59
R0-IW9S	R0-IW09S-052517	1st WBZ	05/25/2017	146	2.42 JQ	2.8	0.005 U	0.005 U	5.89
Myrtle Street									
R2-IW3	R2-IW3-17-052517	2nd WBZ	05/25/2017	420					
	R2-IW3-30-052517	2nd WBZ	05/25/2017	332					
Seattle Boiler Works									
R2-IW1	R2-IW1-45-101217	2nd WBZ	10/12/2017	217					

Note:

Blank cells indicate analyte was not analyzed for the sample.

Abbreviations:

- mg/L Milligrams per liter
- WBZ Water bearing zone

Qualifiers:

U Analyte is not detected at the associated reporting limit.

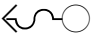




TABLE 4.1
GROUNDWATER DATA SUMMARY
MAIN SOURCE AREA
CASCADE COLUMBIA/FOX AVENUE

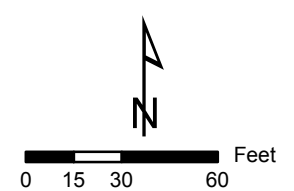
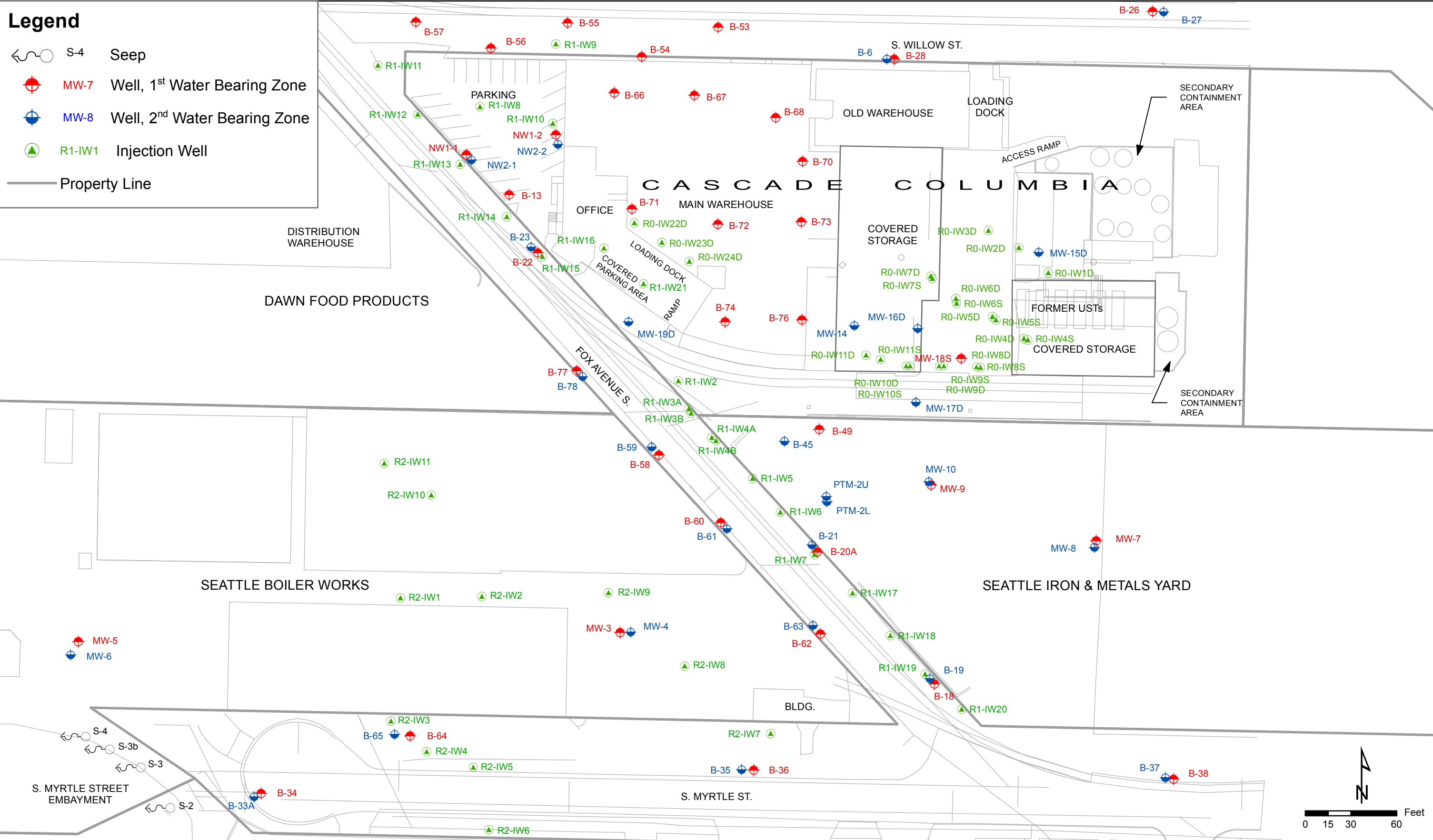
Well	Date	Elapsed Time From Injection (days) (a)	Volatile Organic Compounds							Aquifer Redox Conditions							Donor Indicators				Other		VOCs - micromoles/Liter(b)						VOCs - Molar Fraction (d)								
			cVOCs (e) (µg/L)	PCE (µg/L)	TCE (µg/L)	cDCE (µg/L)	VC (µg/L)	Ethene (µg/L)	Ethane (µg/L)	Acetylene (µg/L)	DO (mg/L)	ORP (mV)	Iron II (mg/L)	Iron (T) (mg/L)	Iron (D) (mg/L)	Sulfate (mg/L)	Sulfide (mg/L)	Methane (mg/L)	TOC (mg/L)	Acetone (µg/L)	MEK (µg/L)	pH	Temp (deg C)	Comments	PCE	TCE	cDCE	VC	Ethene/Ethane	Total Chloroethanes (d)	PCE	TCE	cDCE	VC	Ethene/Ethane	Max	
																																					PCE
MW-18S (between IWS)	5/15/2014	-258	912	145	50.1	712	4.71	<5	<5	ND	0.00	47.3	0.0		239	<0.5	0.271	89.2	29.3	<5	7.05	47.0	Slightly cloudy, low turb. no odor/no sheen, effervescent	0.87	0.38	7.3	0.08	0.00	8.7	0.10	0.04	0.85	0.01	0.00	1.00	0.85	
	10/22/2014	-98	1,952	17.7	5.23	1,870	41.4				0.20	-200.4								<5	<5	6.99	30.0	Slight sulfur odor, low turbidity, slight egg odor, no, effervescent	0.11	0.18	19	0.66		20	0.01	0.01	0.95	0.03		1.00	0.95
	5/14/2015	106	208	1.4	0.74	82.8	123				0.16	-203.3	1.2	1.45	1.51	158	3.60		154	14.1	<5	5.96	28.7	Clear, slightly yellow, effervescent, organic odor, no sheen	0.01	0.01	1	1.97		3	0.00	0.00	0.30	0.69		1.00	0.69
	9/28/2015	243	119	3.19	1.1	48.5	66	25.6	25.8	<5	0.07	-28.4	3.0	3.53	3.33	361	<0.5	2.51	125	5.36	<5	7.20	25.5	Clear, yellowish, slight diesel-like odor, no sheen, slightly effervescent	0.02	0.01	1	1.06	1.90	2	0.01	0.00	0.14	0.30	0.55	1.00	0.55
	1/4/2016	341	75	1.96	<0.500	25.3	47.7	<5	7.5	ND	0.32	-134.2	1.6	1.92	2.26	209	<0.500	2.37	82.8	<5.00	<5.00	7.28	19.8	Clear, yellow, slight petroleum-like odor, slight effervescence	0.01	0.00	0	0.76	0.27	1	0.01	0.00	0.20	0.59	0.21	1.00	0.59
	5/10/2016	468	240	4.29	0.810	26.3	209	<5	<5	<5	0.29	-96.3	1.6	4.87	4.53	152	<0.5	3.59	74.4	<5	<5	6.59	19.7	Clear, colorless, no sheen, slight organic odor, slight effervescence	0.03	0.01	0	3.34	0.00	4	0.01	0.00	0.07	0.92	0.00	1.00	0.92
	12/13/2016	685	904	3.01	2.82	387	511	<5	<5		0.34	-163.8	1.8	6.26	5.98	207			80.4	<5	<5	7.15	11.9	Clear with suspended particulates, brown/yellow tint, rotten odor, no sheen	0.02	0.02	4	8.18	0.00	12	0.00	0.00	0.33	0.67	0.00	1.00	0.67
5/25/2017	848	461	15.6	4.95	261	179	27.2	6.37	<5	2.16	-255.7	0.8			29	17.4	5.54	278	<5	77.7	6.74	14.4	Clear, slight yellow tint, rotten odor, no sheen	0.09	0.04	3	2.86	1.27	6	0.01	0.01	0.39	0.41	0.18	1.00	0.41	
B-20AS	8/20/2014	-222	1,394	<1	11.5	1,280	102	21.6	<5	<5	0.13	-101.8	3.0			10.3	<0.5	4.39	36.1	5.69	<5	6.62	39.3	Clear, low turb. no odor, no sheen	0.00	0.09	13	1.6	0.83	15	0.00	0.00	0.84	0.10	0.06	1.00	0.84
	5/13/2015	105	1,477	<1	5.23	1,410	61.5			0.08	-208.7	2.8	7.51	6.94	25.9	<0.5		39.9	<5	<5	6.86	30.7	Clear, slightly yellow, no sheen, petroleum-like odor	0.00	0.04	15	1.0		16	0.00	0.00	0.93	0.06		1.00	0.93	
	9/29/2015	244	1,151	<1	<0.5	972	179			0.25	-56.8	3.0	8.21	7.81	21.3	<0.500		31.5	<5	<5	6.88	32.4	Clear, colorless, no sheen, slight diesel-like odor	0.00	0.00	10	2.9		13	0.00	0.00	0.78	0.22		1.00	0.78	
	1/5/2016	342	(e)	89	<1.00	<0.500	36.5	32.6		0.29	13.8	2.0	14.0	14.9	37.9	<0.500		5.73	<5.00	<5.00	6.05	19.7	Clear, colorless, no odor, no sheen, effervescent	0.00	0.00	0	0.5		1	0.00	0.00	0.42	0.58		1.00	0.58	
	5/5/2016	463	165	<1	<0.5	93.5	71.5			0.31	-104.4	2.0	6.0	16.8	6.33	44.0	<0.5	1.03	9.09	<5	<5	5.25	23.2	Clear, colorless, no odor, no sheen, effervescent	0.00	0.00	1	1.1		2	0.00	0.00	0.46	0.54		1.00	0.54
	12/16/2016	688	14	<1	<0.5	3.42	10.7			0.80	4					28.9				<5	<5	5.9	18.7	Clear, colorless, no odor, no sheen, effervescent	0.00	0.00	0	0.2		0	0.00	0.00	0.17	0.83		1.00	0.83
	5/26/2017	849	42	<1	<0.500	30.5	11.7			3.47	-102					21.8				6.97	<5	6.44	19.0	reducing odor, sediment in purge water initially	0.00	0.00	0	0.2		1	0.00	0.00	0.63	0.37		1.00	0.63
B-21D	8/20/2014	-31	3.2	<1	<0.5	3.24	<0.2	<5	36.5	<5	0.21	-61.6	2.6			<1.50	<0.5	5.75	9.13	7.06	<5	6.42	33.4	Dark gray, moderately high, fermented sugar water odor, no sheen	0.00	0.00	0.03	0.00	1.3	0.03	0.00	0.00	0.03	0.00	0.97	1.00	0.97
	5/13/2015	296	290	<1	<0.5	4.06	286			0.53	-111.4	3.0	46	22.7	<1.5	4.8			21.3	<5	<5	6.49	30.9	Clear, turned dark gray, moderate turbidity, pungent, unbearable smell, no sheen	0.00	0.00	0.04	4.58		4.62	0.00	0.00	0.01	0.99		1.00	0.99
	9/29/2015	435	41	<1	<0.5	<1	41.4	77.5	77.1	<5	0.21	-117.4	3.4	30.1	21.8	20.1	<1	2.69	12.3	<5	<5	6.24	32.1	Clear, yellow to gray in oxygen, effervescent, black floating solids, no sheen, diesel-like odor	0.00	0.00	0.00	0.66	5.7	0.66	0.00	0.00	0.00	0.10	0.90	1.00	0.90
	1/5/2016	533	(e)	50	<1.00	<1.00	50.0	36.1	18.9	ND	0.13	-136.5	2.7	19.9	14.4	26.2	<0.500	3.73	9.36	<5.00	<5.00	6.43	24.1	Slight turbidity, gray solids in sample, no sheen, petroleum-like odor	0.00	0.00	0.00	0.80	2.1	1.08	0.00	0.00	0.00	0.28	0.72	1.00	0.72
	5/5/2016	684	68	88	<1	<0.5	61.8	128	22.7	<5	0.21	-80	0.5	81.8	11	<1.5	3.00	1.76	16.8	<5	<5	5.77	28.9	Clear, colorless, no odor, no sheen, effervescent	0.00	0.00	0.00	0.88	5.7	0.88	0.00	0.00	0.00	0.16	0.84	1.00	0.84
	12/16/2016	684	38	<1	<0.5	<1	38.4			1.35	-27					2.22				27.3	12.8	5.12	19.6	Clear, colorless, no odor, no sheen, effervescent	0.00	0.00	0.00	0.61	0	0.61	0.00	0.00	0.00	1.00	1.00		
	5/26/2017	1040	ND	<1	<0.5	<1	<0.2			0.79	-102									<5	<5	6.07	26.2	reducing odor, sediment in purge water initially	0.00	0.00	0.00	0.00	0.0	0.00							
B-45D (75 ft DG)	5/14/2014	-68	2,029	<1	0.830	998	1,030	35.6	10	ND	0.00	-80.9	1.8		26.1	<0.5	1.37	9.36	<5	<5	6.34	34.3	Clear, moderately low turb. no odor/no sheen, effervescent	0.00	0.01	10	16	1.7	27	0.00	0.00	0.36	0.58	0.06	1.00	0.58	
	10/22/2014	-93	17,975	1.55	3.03	2,270	10,700			0.32	-140.7	5.6	8.78	7.56	3.35	<0.5		6.1	<5	<5	6.56	31.5	Clear, low turbidity, egg odor, no sheen, effervescent	0.01	0.02	75	171		246	0.00	0.00	0.30	0.70		1.00	0.70	
	1/9/2015	172	5,092	<1	2.26	1,870	2,220	392	19.9	ND	0.42	-106.4	2.3	8.25	7.25	11.5	<0.5	1.21	7.73	<5	<5	6.57	30.5	Clear, low, slight sulfur odor, no sheen	0.00	0.02	19	52	16	71	0.00	0.00	0.22	0.59	0.18	1.00	0.59
	5/13/2015	296	3,882	<1	2.05	1,660	2,200			0.34	-142.4	2.4	12.7	11.4	2.21	<0.5			5.43	<5	<5	6.8	28.6	Clear, colorless, no sheen, petroleum-like odor	0.00	0.02	17	36		53	0.00	0.00	0.33	0.67		1.00	0.67
	9/30/2015	436	215	1.38	0.53	49	164	75.2	137	<5	0.14	-118.5	3.6	23.9	21.6	2.97	<0.5	3.23	3.87	<5	<5	6.38	27.2	Clear, colorless, no sheen, very slight diesel-like odor, slight effervescence	0.01	0.00	1	3	8	3	0.00	0.00	0.05	0.24	0.71	1.00	0.71
	1/5/2016	533	68	1.53	<0.500	6.91	59.5	<5	86.2	ND	0.10	-107.0	1.6	38.0	32.9	1.04	<0.500	3.40	3.99	<5.00	<5.00	6.34	24.1	Clear, colorless, no sheen, slight petroleum-like odor, slight effervescence	0.01	0.00	0	1	3	1	0.00	0.00	0.02	0.23	0.75	1.00	0.75
	5/11/2016	469	53	<1	<0.5	93.5	5.92	<5	49.3	<5	0.31	-103.4	2.0	12.9	10.9	63.4	<0.5	7.63	5.14	<5	<5	6.25	24.6	Clear, colorless, no odor, no sheen, slight effervescence	0.00	0.00	1	1.1	1	1	0.00	0.00	0.00	0.96	0.04	1.00	0.94
12/16/2016	684	50	2.15	0.684	1.15	45.9			1.18	-121.8	3.5								<5	<5	6.38	19.2	Clear, colorless, no odor, no sheen, slight effervescence	0.01	0.00	0	1	0	1	0.02	0.01	0.02	0.96	0.00	1.00	0.96	
5/24/2017	847	ND	<1	<0.5	<1	<0.2	<5	192	<5	3.65	-81.1	1.6			<6	<0.5	10.7	93.8	<5	<5	6.30	16.0	Clear with some suspended particles, colorless, no odor, no sheen (slight effervescent)	0.00	0.00	0	0	7	0	0.00	0.00	0.00	0.00	1.00	1.00		
B-49S (60 ft DG)	5/14/2014	-259	630	98.6	42.2	484	5.14	<5	<5	ND	0.21	-82.2	0.4		14.9	<0.5	0.532	11.4	7.89	<5	9.76	32.9	Clear, low turb. no odor/no sheen, effervescent	0.59	0.32	5.0											

**Fox Avenue Site
Seattle, Washington
2017 Annual Report**

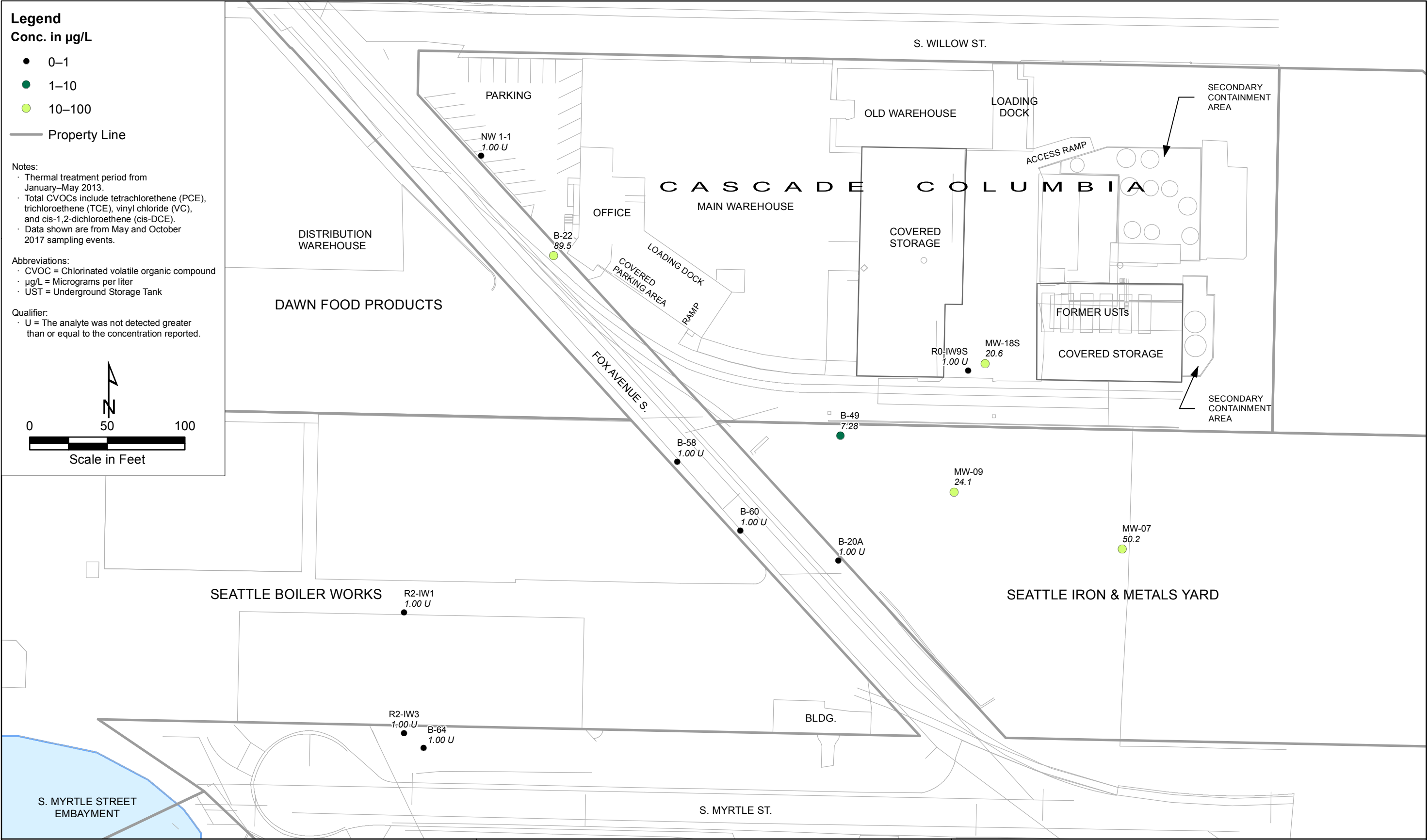
Figures

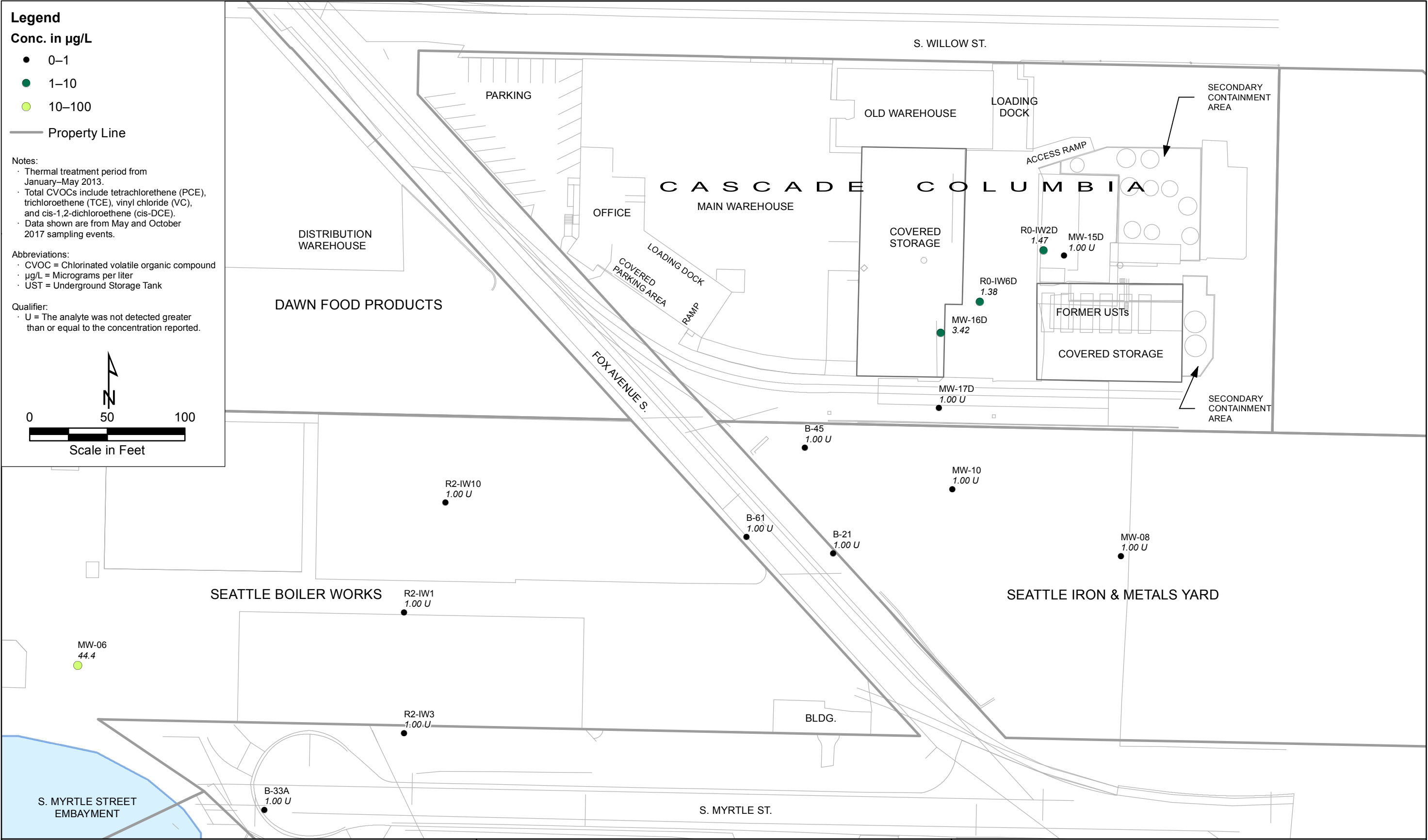
Legend

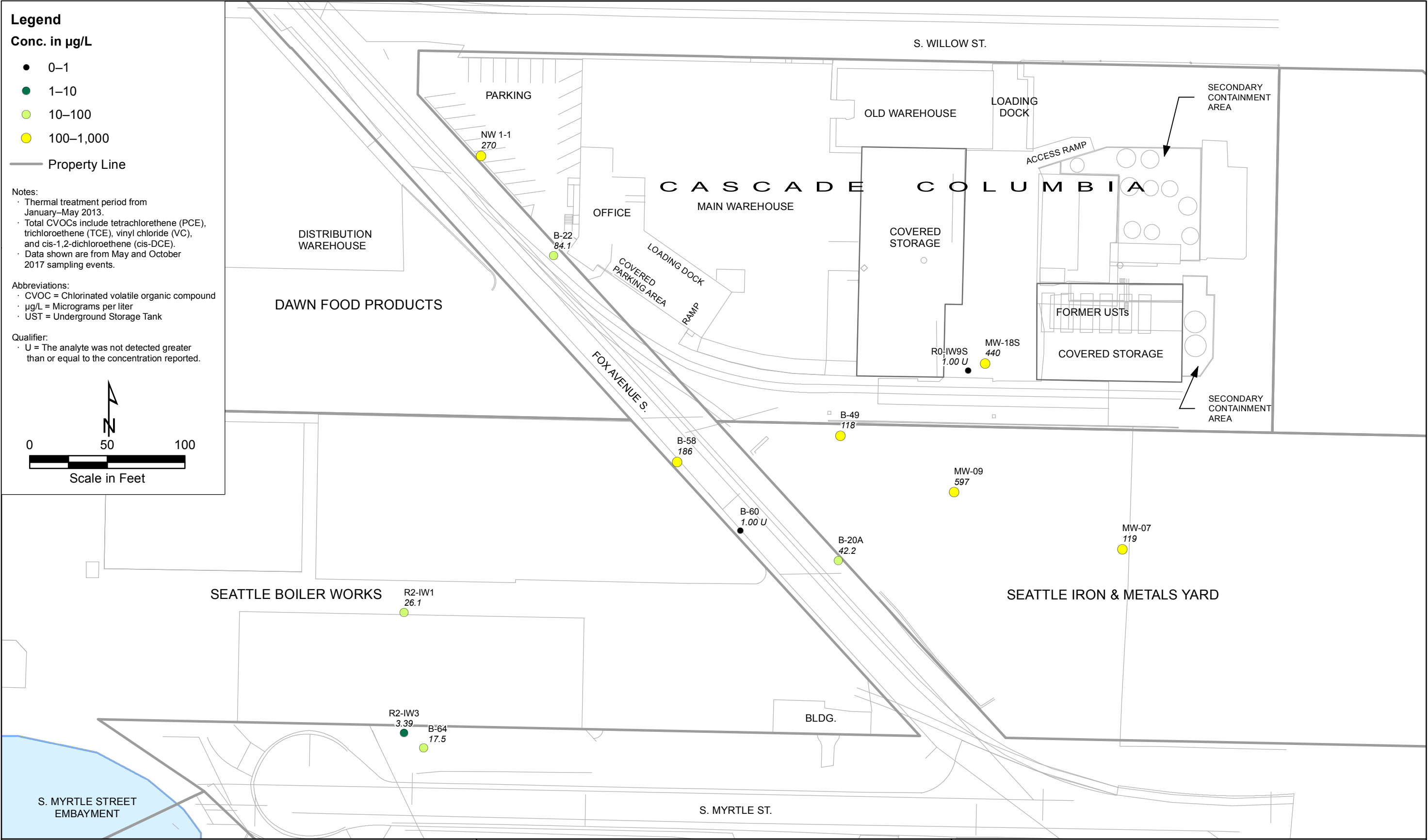
-  S-4 Seep
-  MW-7 Well, 1st Water Bearing Zone
-  MW-8 Well, 2nd Water Bearing Zone
-  R1-IW1 Injection Well
-  Property Line

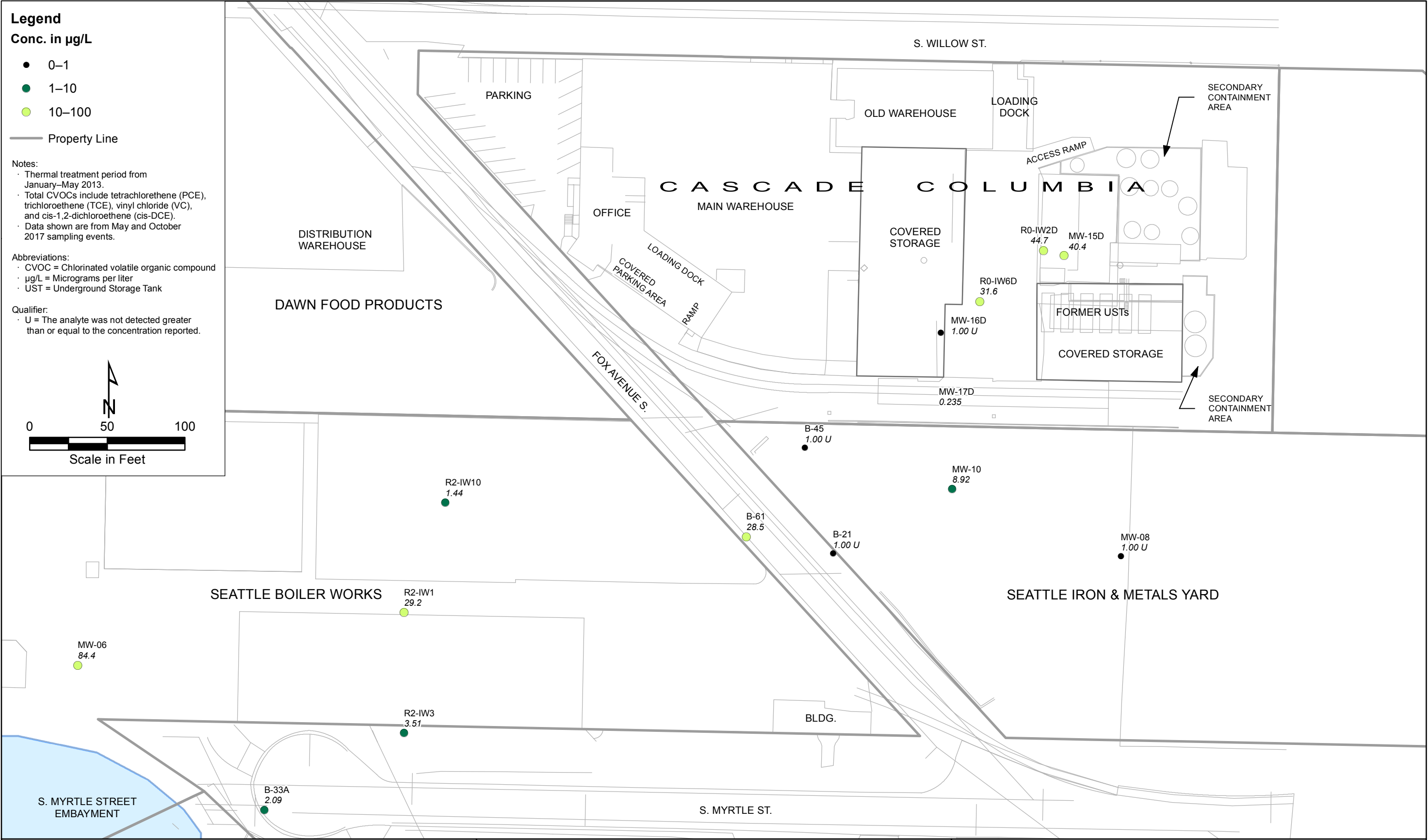


H:\GIS\Projects\FOXAVE-RAIMXD\2017 Annual Report\Figure 1.1 Site Plan.mxd
3/13/2018









Legend
Total CVOCs (µg/L)

- 0-1
- 1-10
- 10-100
- 100-1,000

Notes:

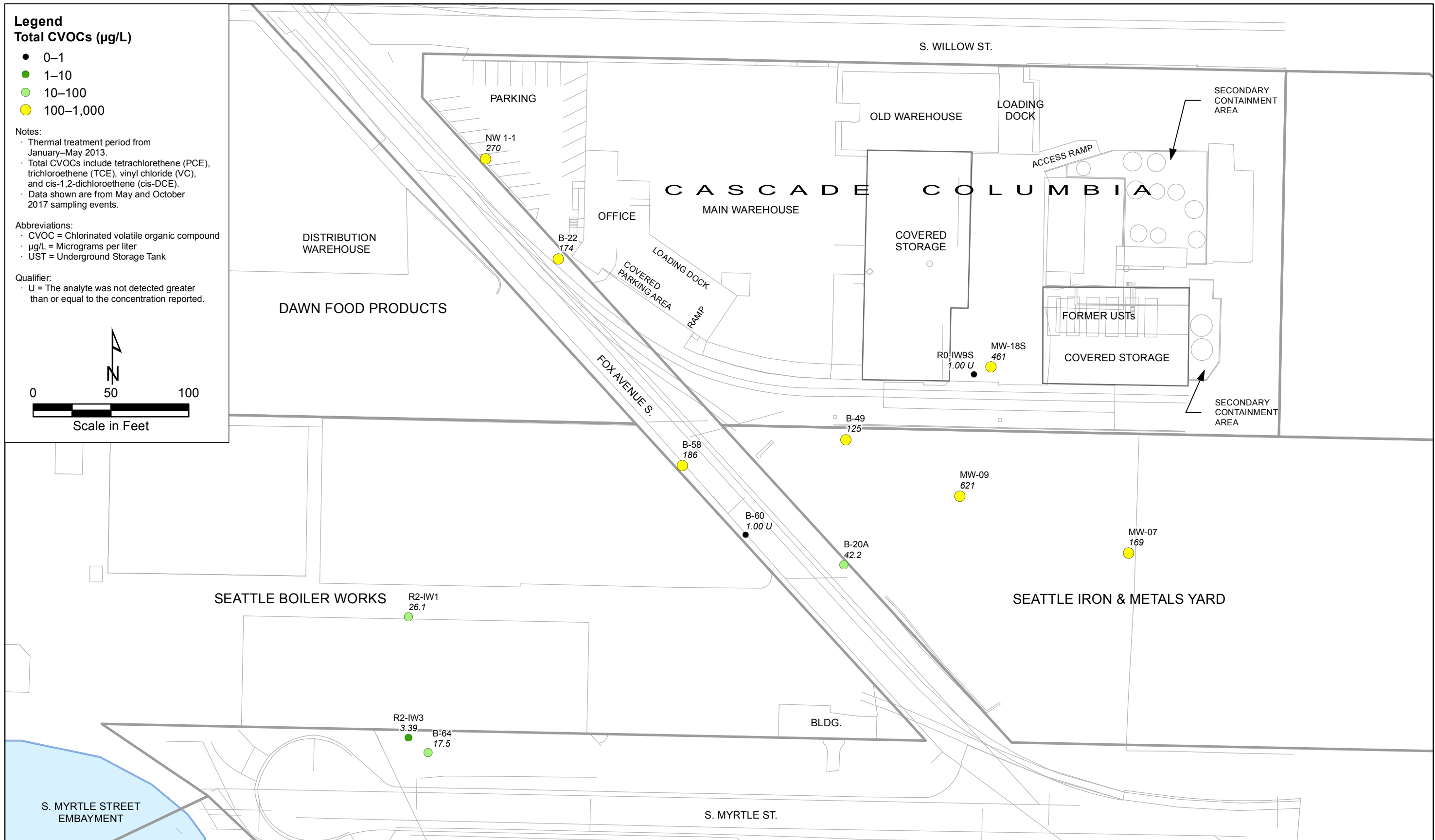
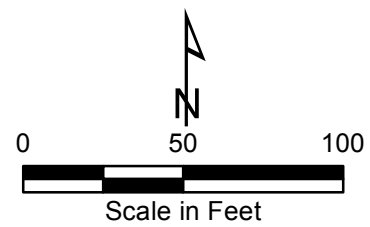
- Thermal treatment period from January-May 2013.
- Total CVOCs include tetrachlorethene (PCE), trichloroethene (TCE), vinyl chloride (VC), and cis-1,2-dichloroethene (cis-DCE).
- Data shown are from May and October 2017 sampling events.

Abbreviations:

- CVOC = Chlorinated volatile organic compound
- µg/L = Micrograms per liter
- UST = Underground Storage Tank

Qualifier:

- U = The analyte was not detected greater than or equal to the concentration reported.



Legend
Total CVOCs (µg/L)

- 0-1
- 1-10
- 10-100

Notes:

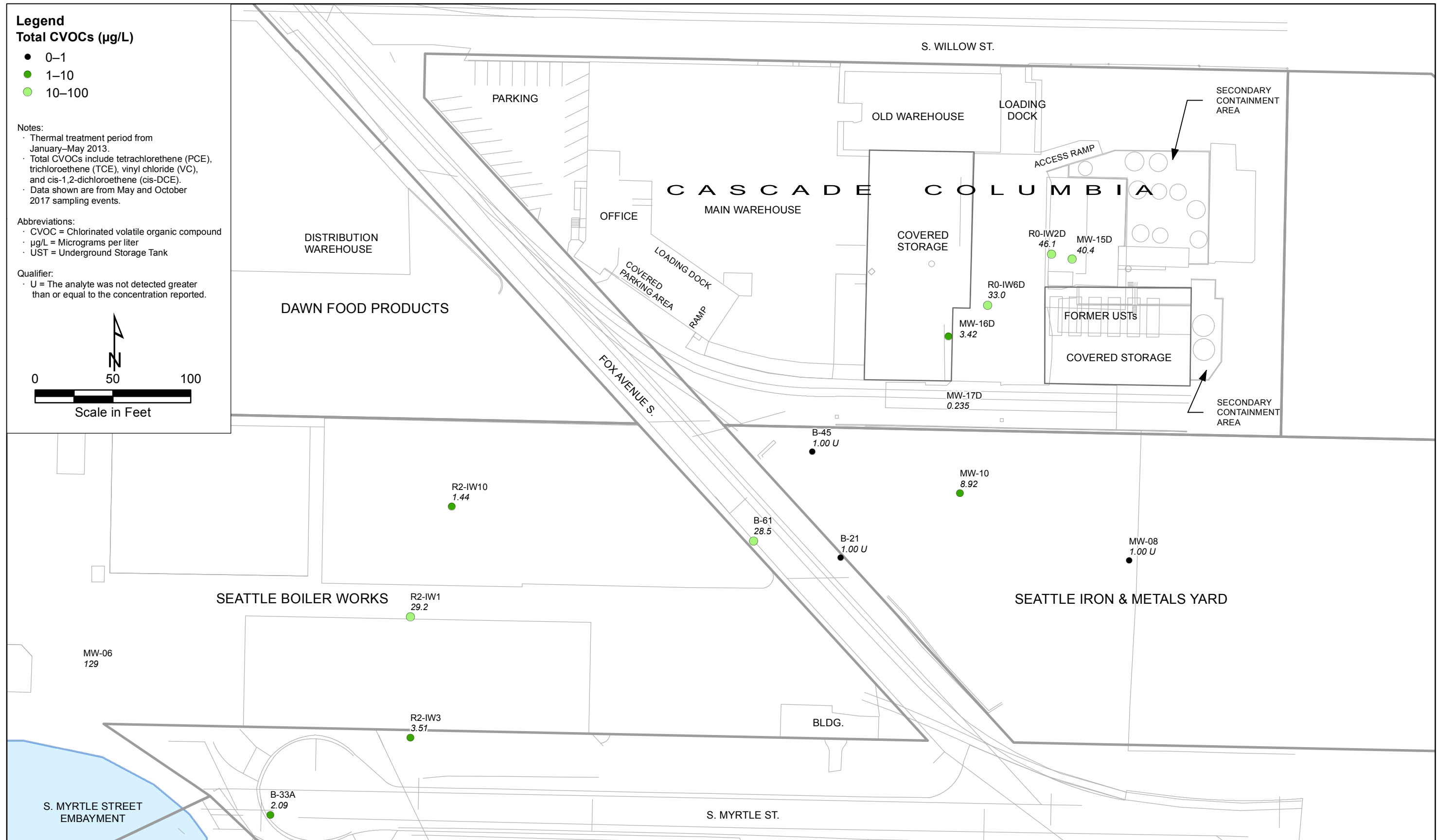
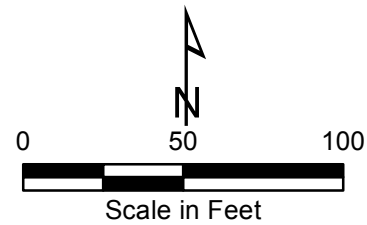
- Thermal treatment period from January-May 2013.
- Total CVOCs include tetrachlorethene (PCE), trichloroethene (TCE), vinyl chloride (VC), and cis-1,2-dichloroethene (cis-DCE).
- Data shown are from May and October 2017 sampling events.

Abbreviations:

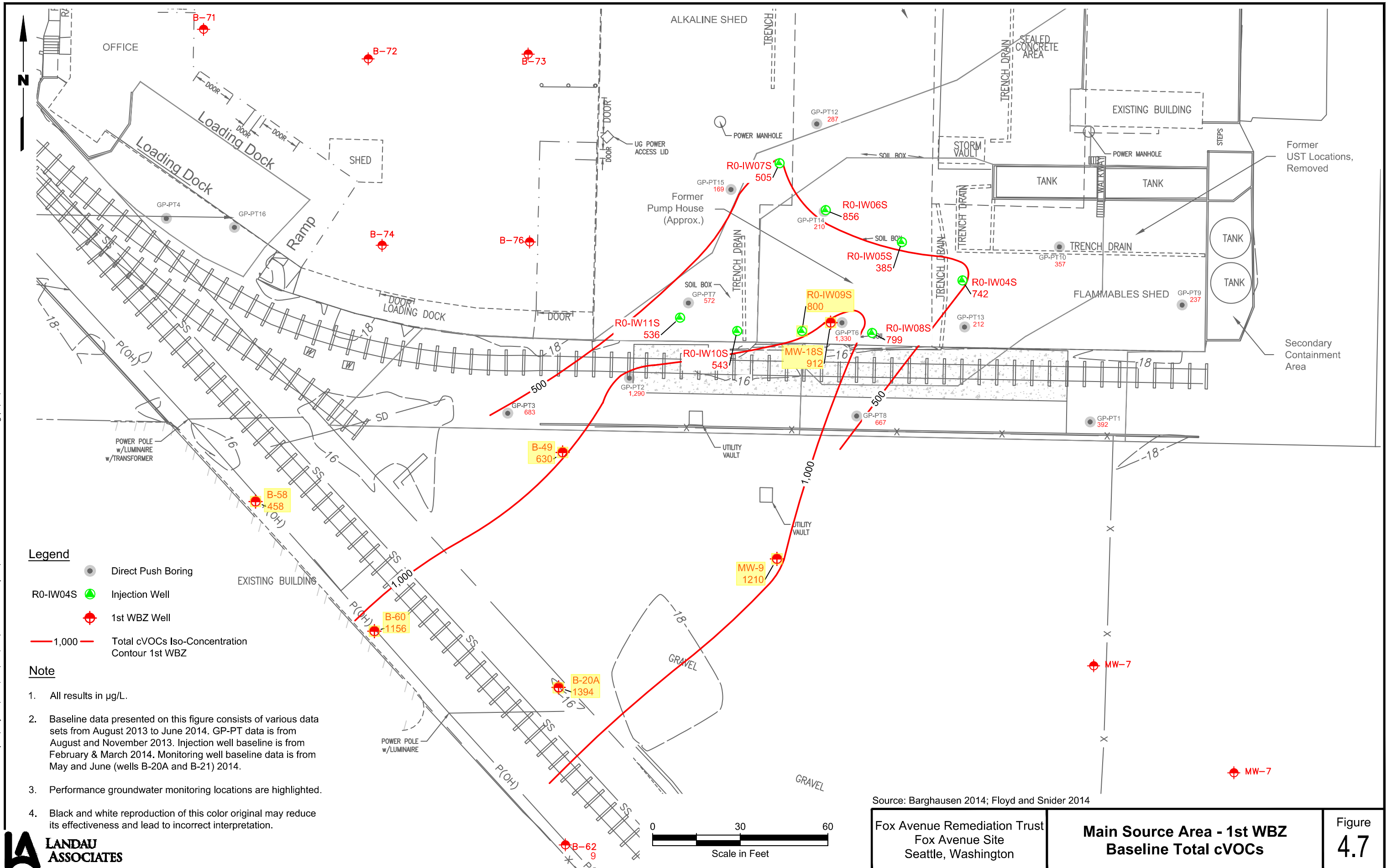
- CVOC = Chlorinated volatile organic compound
- µg/L = Micrograms per liter
- UST = Underground Storage Tank

Qualifier:

- U = The analyte was not detected greater than or equal to the concentration reported.



Landau Associates | G:\Projects\1433\001\014\005\2017 Annual Report\F047 1stWBZMainSourceBaselineVOCs.dwg | 3/19/2018 2:17 PM



- Legend**
- Direct Push Boring
 - R0-IW04S Injection Well
 - 1st WBZ Well
 - 1,000 — Total cVOCs Iso-Concentration Contour 1st WBZ

- Note**
1. All results in µg/L.
 2. Baseline data presented on this figure consists of various data sets from August 2013 to June 2014. GP-PT data is from August and November 2013. Injection well baseline is from February & March 2014. Monitoring well baseline data is from May and June (wells B-20A and B-21) 2014.
 3. Performance groundwater monitoring locations are highlighted.
 4. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Source: Barghausen 2014; Floyd and Snider 2014

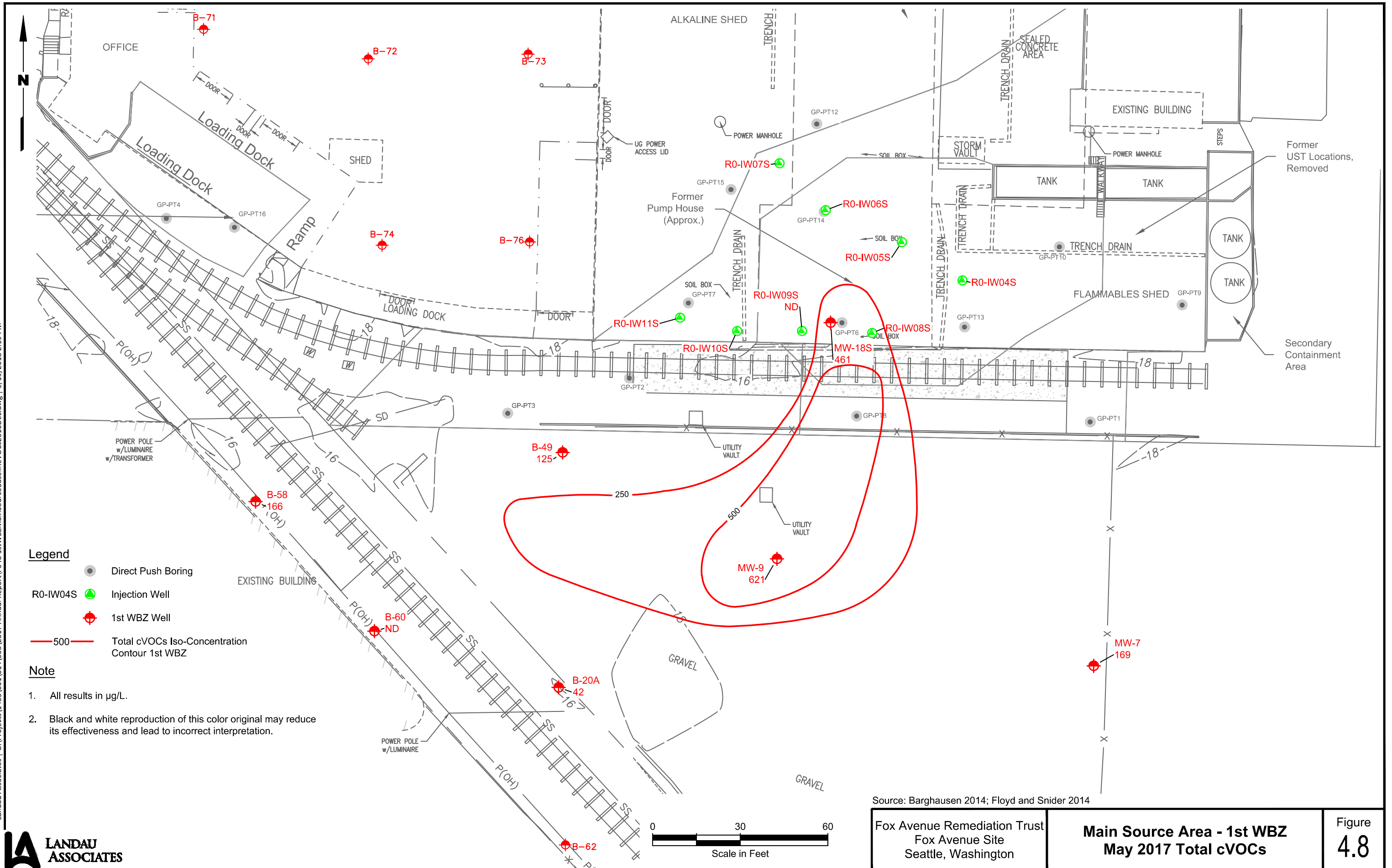
Fox Avenue Remediation Trust
 Fox Avenue Site
 Seattle, Washington

**Main Source Area - 1st WBZ
 Baseline Total cVOCs**

Figure
4.7



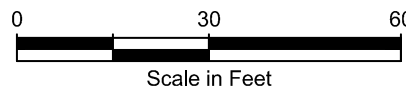
Landau Associates | G:\Projects\1433\001\014\005\2017 Annual Report\F048 1stWBZMainSourceBaselineVOCs2016Dec.dwg | 3/19/2018 2:19 PM



- Legend**
- Direct Push Boring
 - R0-IW04S ● Injection Well
 - 1st WBZ Well
 - 500 Total cVOCs Iso-Concentration Contour 1st WBZ

- Note**
1. All results in µg/L.
 2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Source: Barghausen 2014; Floyd and Snider 2014



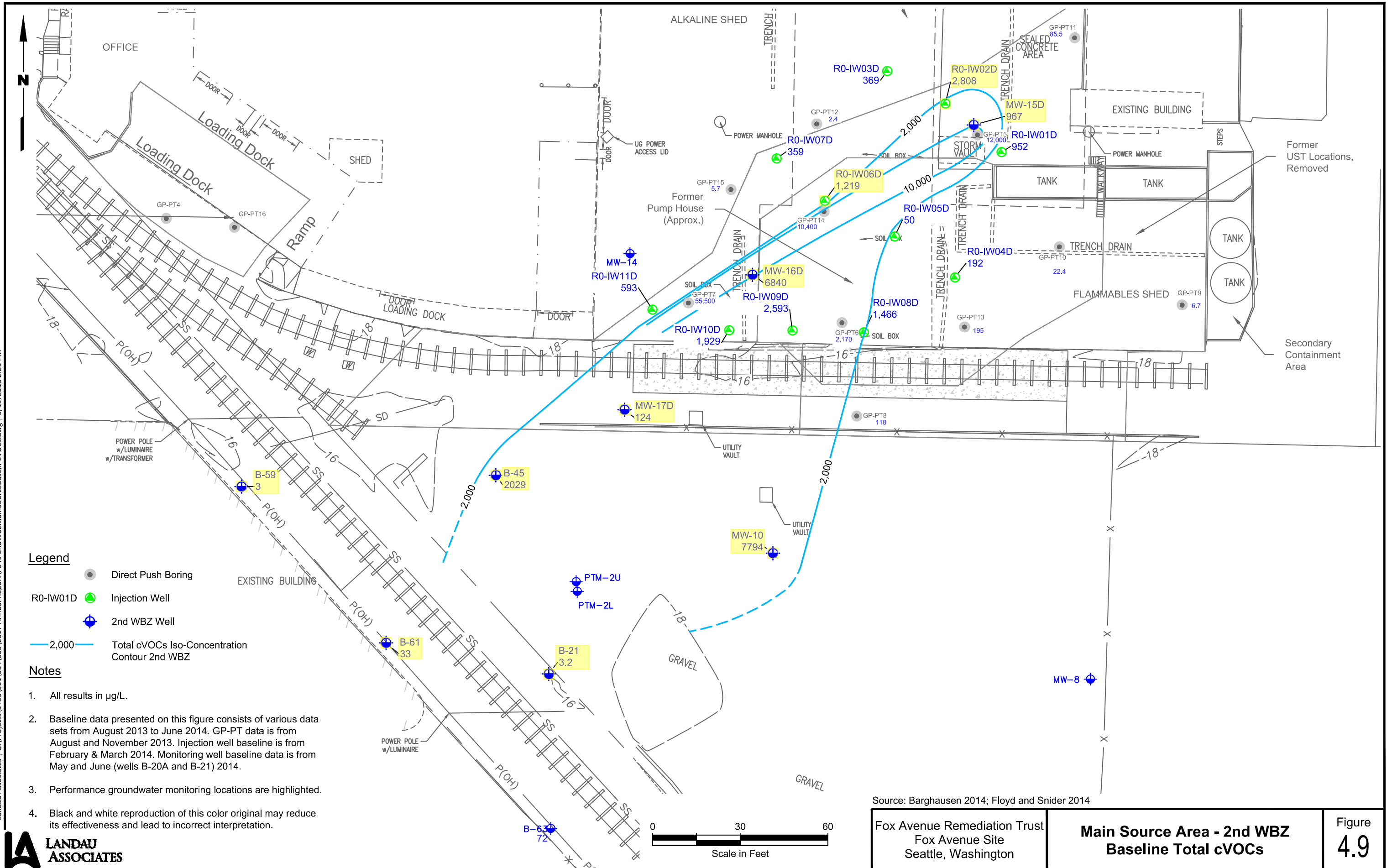
Fox Avenue Remediation Trust
 Fox Avenue Site
 Seattle, Washington

Main Source Area - 1st WBZ
May 2017 Total cVOCs

Figure
4.8



Landau Associates | G:\Projects\1433\001\014\005\2017 Annual Report\F049 2ndWBZMainSourceBaselineVOCs.dwg | 3/19/2018 2:21 PM



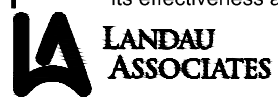
- Legend**
- Direct Push Boring
 - R0-IW01D ● Injection Well
 - 2nd WBZ Well
 - 2,000 Total cVOCs Iso-Concentration Contour 2nd WBZ

- Notes**
1. All results in µg/L.
 2. Baseline data presented on this figure consists of various data sets from August 2013 to June 2014. GP-PT data is from August and November 2013. Injection well baseline is from February & March 2014. Monitoring well baseline data is from May and June (wells B-20A and B-21) 2014.
 3. Performance groundwater monitoring locations are highlighted.
 4. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

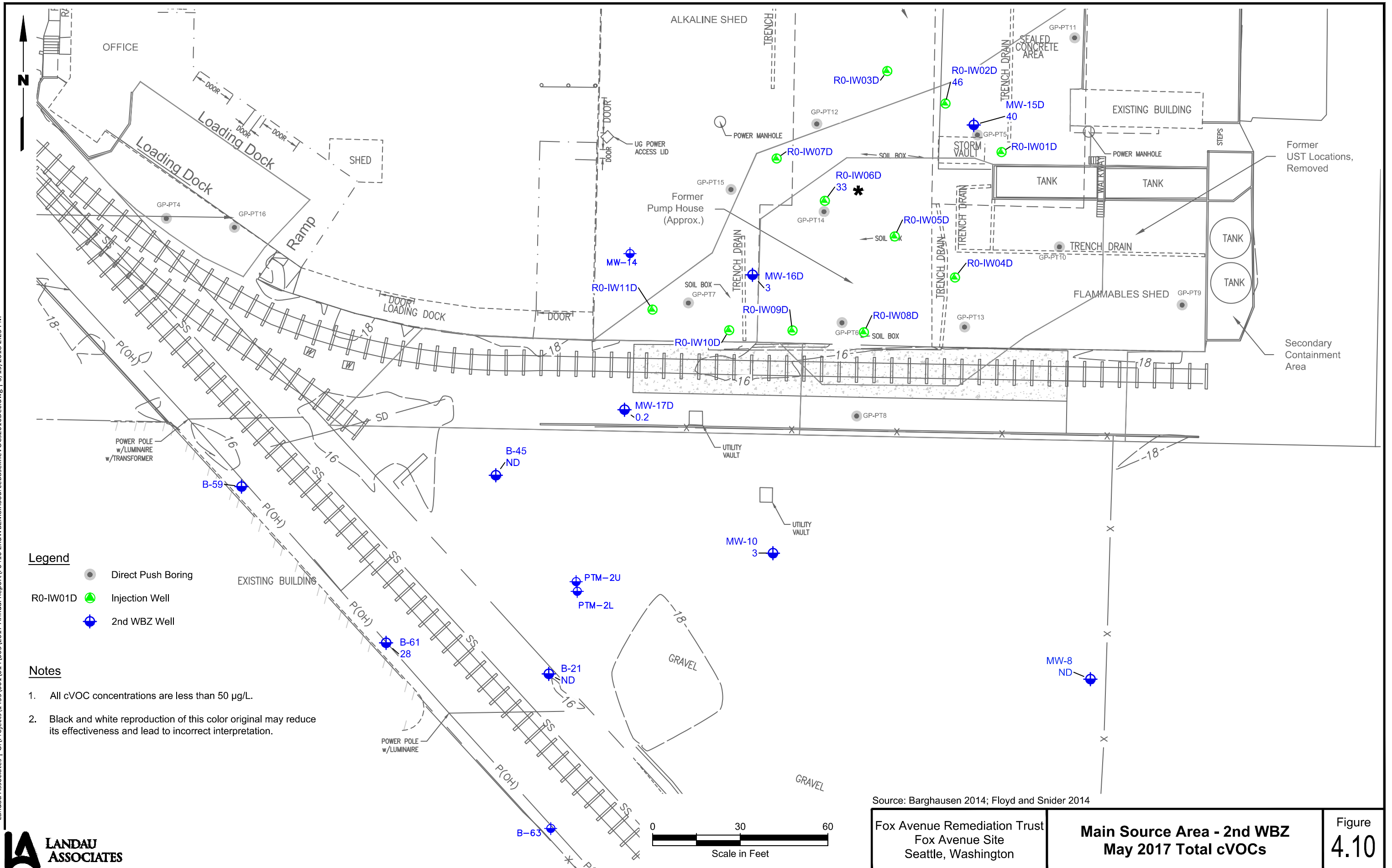


Source: Barghausen 2014; Floyd and Snider 2014

Fox Avenue Remediation Trust Fox Avenue Site Seattle, Washington	Main Source Area - 2nd WBZ Baseline Total cVOCs	Figure 4.9
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- Legend**
- Direct Push Boring
 - R0-IW01D ● Injection Well
 - 2nd WBZ Well

- Notes**
1. All cVOC concentrations are less than 50 µg/L.
 2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Source: Barghausen 2014; Floyd and Snider 2014

Fox Avenue Remediation Trust Fox Avenue Site Seattle, Washington	Main Source Area - 2nd WBZ May 2017 Total cVOCs	Figure 4.10
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