

July 16, 2018

Mr. Ed Jones, Project Manager  
Washington State Department of Ecology  
3190 160<sup>th</sup> Avenue Southeast  
Bellevue, Washington 98008-5452

**BY EMAIL ONLY**

**RE:    PROGRESS REPORT, APRIL THROUGH JUNE 2018  
       REMEDIAL INVESTIGATION MONITORING AND FEASIBILITY STUDY  
       CAPITAL INDUSTRIES, INC., SEATTLE, WASHINGTON  
       AGREED ORDER NO. DE 10402  
       FARALLON PN: 457-008**

Dear Mr. Jones:

Farallon Consulting, L.L.C. (Farallon) has prepared this progress report on behalf of Capital Industries, Inc. (Capital) to summarize the activities conducted during the second quarter of 2018, April through June, as part of the ongoing Remedial Investigation (RI) monitoring and Feasibility Study (FS) being conducted at the Capital Site at 5801 3<sup>rd</sup> Avenue South in Seattle, Washington. This progress report has been prepared in accordance with Agreed Order No. DE 10402 dated April 23, 2014, entered into by potentially liable persons that include Capital; Art Brass Plating, Inc.; Blaser Die Casting Co.; and PSC Environmental Services, LLC (Burlington Environmental, LLC is a wholly owned subsidiary of PSC Environmental Services, LLC, which is a wholly owned subsidiary of Stericycle Environmental Solutions, Inc.); and by the Washington State Department of Ecology (Ecology) (Agreed Order). Capital and the other potentially liable persons listed above are collectively referred to as the West of 4<sup>th</sup> Group. The West of 4<sup>th</sup> Group site under the Agreed Order consists of Site Unit 1 (SU1) and Site Unit 2 (SU2) as depicted on Attachment A, Figure 1. The Capital Site is located in SU2.

**ACTIVITIES DURING REPORTING PERIOD**

Activities completed during this progress reporting period included:

- Continuing operation of vapor intrusion mitigation subslab depressurization systems (SSDSs) at the Pacific Foods Systems North Building at 5815 4<sup>th</sup> Avenue South and the Natus Medical Facility at 5900 First Avenue South in Seattle, Washington.<sup>1</sup>
- Processing data from the semiannual groundwater monitoring and sampling event conducted in March 2018 (Attachment B).

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<sup>1</sup> The Natus Medical Facility at 5900 First Avenue South in Seattle, Washington was previously known as the Olympic Medical Facility.



- Conducting subslab pressure field testing at the Pacific Foods North Building to assess the effectiveness of the SSDS (Attachment C).
- Processing data from the SSDS at the Natus Medical Facility (Attachment D).
- Surveying locations and elevations of replacement monitoring well CI-12-35, installed at Certain Teed Gypsum on March 23, 2018, and monitoring well CI-12-60, which was repaired on March 28, 2018. Boring logs and well construction details are provided in Attachment E.
- Submitting the *Revised Capital Industries Plant 4 Stage 1 Field Implementation Work Plan, West of 4<sup>th</sup> Group Site, Capital Industries, Inc., 5801 3<sup>rd</sup> Avenue South, Seattle, Washington* dated May 10, 2018, prepared by Farallon (Stage 1 FIWP). The Stage 1 FIWP was based on Ecology comments regarding the *Draft Capital Industries Plant 4 Field Implementation Work Plan, West of 4<sup>th</sup> Group Site, Capital Industries, Inc., 5801 3<sup>rd</sup> Avenue South, Seattle, Washington* dated March 6, 2018, prepared by Farallon.
- Installing and developing observation wells OBW-1 through OBW-5 on June 16 and 20, 2018 to facilitate groundwater monitoring associated with the planned interim action at Capital Plant 4. Boring logs and well construction details are provided in Attachment E.
- Submitting an underground injection control permit application for interim action injection locations.

These activities are summarized in the sections that follow.

## **GROUNDWATER MONITORING AND SAMPLING**

Groundwater monitoring and sampling was performed during the week of March 19, 2018 in accordance with the technical memorandum regarding FINAL West of 4<sup>th</sup> Groundwater Monitoring Program Plan, 2017 through Draft Cleanup Action Plan, W4 Joint Deliverable, Agreed Order No. DE 10402 dated March 21, 2017, from Ms. Janet Knox of Pacific Groundwater Group to Mr. Jones of Ecology. Groundwater elevation data were collected at all SU2 monitoring wells. Groundwater samples were collected from monitoring wells scheduled for sampling and analyzed for chlorinated volatile organic compounds. Groundwater samples from select monitoring wells also were analyzed for natural attenuation parameters, including nitrate, ferrous iron, sulfate, methane, total organic carbon, and ethane/ethene. The groundwater data are included on summary figures provided in Attachment B.

In general, groundwater results continue to demonstrate that the Capital area plumes associated with the commingled Capital Plant 2/Blaser Die Casting sources and the Capital Plant 4 source are stable to decreasing. However, the 2016 to 2018 data for monitoring well CI-19-30, proximate to the Lower Duwamish River, at the CertainTeed Gypsum, Inc. property (Attachment B Figure 2) indicates an increasing trend in vinyl chloride concentrations. The West of 4<sup>th</sup> Group is jointly conducting work in 2018 to refine the conceptual site model and fate and transport characteristics of the source(s) of elevated concentrations of vinyl chloride up-gradient of the CertainTeed Gypsum, Inc. property. Monitoring well CI-19-30 will continue to be monitored in September 2018 to evaluate the status of vinyl chloride.



## VAPOR INTRUSION MITIGATION AND REPORTING

The applied vacuum for the SSDS was maximized at the Pacific Food Systems North Building from the third quarter of 2016 to April 2018 to assess whether concentrations of tetrachloroethene (PCE) and trichloroethene (TCE) in indoor air can be reduced below the applicable air cleanup levels. Normal SSDS operation continued through the end of March 2018. Water accumulation at the SSDS blower location, which was a previous issue in 2017, was not observed in March or April 2018.

Farallon conducted subslab pressure field testing for the SSDS at the Pacific Food Systems North Building on April 23, 2018. Farallon installed three additional subslab monitoring points (SSMP-3 through SSMP-5) proximate to the northern wall of the Pacific Foods Systems North Building prior to conducting the subslab pressure field testing (Attachment C). Initial SSDS monitoring indicated that the SSDS was operating at a negative pressure of 6 inches of water. Pressure readings at subslab monitoring points SSMP-3 through SSMP-5 ranged from 0.018 to 0.040 inch of water, indicating that the slab was sufficiently depressurized by the SSDS. Farallon reduced the system pressure to 3.9 inches of water, which still created negative pressures at subslab monitoring points SSMP-1 through SSMP-5 ranging from 0.008 to 0.048 inch of water. A minimal negative subslab pressure measurement of 0.005 inch of water is the standard for maintaining adequate depressurization to prevent vapor intrusion from occurring.

The SSDS at the Natus Medical Facility operated continuously during the second quarter of 2018. The SSDS was operating in accordance with standard operating conditions during the inspection conducted by Farallon on March 21, 2018. During the March 2018 inspection, the SSDS blower was noted as making more noise than previously noted by the building personnel. The blower appears to be operating normally, but the increased noise may be an initial sign of blower failure. The tenant will be monitoring the system periodically to confirm that it is operating and will contact Farallon immediately if the SSDS blower fails. There were no notifications from the tenant regarding a malfunction of the blower during the second quarter of 2018.

Analytical results for SSDS influent and indoor air samples collected from the Natus Medical Facility are provided in Attachment D. TCE was detected at a concentration of 25.3 micrograms per cubic meter in the indoor air sample collected from the warehouse at the Natus Medical Facility. This concentration is higher than the concentration of TCE detected in the SSDS influent sample (i.e., 1.06 micrograms per cubic meter) and historical air sampling data, indicating that this measurement likely is the result of a chemical containing TCE being used by Natus Medical Facility personnel proximate to the sample location. Products containing TCE were not identified prior to conducting the sampling. However, TCE can be found in products in trace amounts that do not require product labeling, but can be detected during air sampling due to the low detection levels associated with U.S. Environmental Protection Agency Method TO-15 (SIM), which was used to analyze the air samples. Low concentrations of PCE and TCE were also detected in the outdoor ambient air sample and indoor air samples. The 2018 sampling event is the first event in which PCE has been detected in indoor air samples. PCE and TCE have historically been detected in outdoor air samples. PCE has not been detected in groundwater at or in the vicinity of the Natus Medical Facility. The origin of the PCE is uncertain but does not appear related to subsurface contamination based on the historical remedial investigation work.



## **MONITORING WELL MAINTENANCE**

Monitoring well CI-12-35 was installed and developed on March 23, 2018 as a replacement for the previously damaged and abandoned monitoring well CI-12-30. The monitoring well construction diagram and details are provided in Attachment E. The repaired well casing for monitoring well CI-12-60 was surveyed along with the newly installed monitoring well CI-12-35 on April 11, 2018.

## **FEASIBILITY STUDY REPORT**

A pilot study is being conducted at SU1 and an interim action is being conducted in SU2 at Capital Plant 4 as a part of the FS for the West of 4<sup>th</sup> Group site. This work will not conclude until 2019. The interim action at Capital Plant 4 is further discussed in the following section.

## **INTERIM MEASURES**

Capital issued the Stage 1 FIWP to provide Ecology a detailed framework and technical approach to Stage 1 of the interim action. Stage 1 of the interim action comprises a pilot study stage of work to evaluate in-situ chemical oxidation as a treatment technology for soil and groundwater. The Stage 1 work includes injecting a 3 percent solution of the chemical oxidant potassium permanganate at five locations at Capital Plant 4 and conducting process and performance monitoring that will determine if and how the technology can be applied more extensively to eliminate a source of PCE and TCE at Capital Plant 4. Ecology conditionally approved the Stage 1 FIWP on May 24, 2018.

Observation wells OBW-1 through OBW-5 were installed and developed on June 16 and 20, 2018 to facilitate groundwater monitoring associated with the interim action. Boring logs and well construction diagrams are provided in Attachment E.

The underground injection control permit application for the planned Stage 1 and Stage 2 in-situ chemical oxidation injection locations was submitted to Ecology for review and approval on June 27, 2018.

## **PUBLIC COMMUNICATIONS**

No public communication activities were completed by Capital during this period.

## **ANTICIPATED WORK IN THE NEXT QUARTER**

Work anticipated to be performed during the third quarter of 2018, July through September, is summarized below.

## **VAPOR INTRUSION**

Capital will conduct additional evaluation of the Pacific Food Systems North Building to assess possible sources of TCE in indoor air since the subslab pressure field testing for the SSDS indicated the system is effective at producing negative pressure below the slab of the Pacific Food Systems North Building. The results from the evaluation will determine further actions required regarding



vapor intrusion mitigation at this location. A renewed access agreement for the vapor intrusion mitigation work was issued to Pacific Food Systems in June 2018 and was executed in July 2018.

Periodic monitoring of the SSDS at the Natus Medical Facility will continue to be performed by the staff at the facility. The SSDS blower noise levels and applied vacuum will be monitored to evaluate whether a replacement blower is necessary. A renewed access agreement for the vapor intrusion mitigation work was issued to the tenant of the Natus Medical Facility and the landowner during the first quarter of 2018. The final signed access agreement was received from these parties on June 28, 2018.

### **MONITORING AND SAMPLING ACTIVITIES**

A groundwater monitoring and sampling event will be conducted in September 2018. The purpose of the ongoing groundwater monitoring is to evaluate the stability of the plumes, monitor the ongoing natural attenuation processes to refine the time frame for achieving cleanup levels, evaluate existing and potential vapor intrusion risk, and provide data to refine evaluation of the cleanup alternatives presented in the FS.

### **MONITORING WELL MAINTENANCE**

Additional monitoring well maintenance activities, including the replacement of some monuments, are planned during the third quarter of 2018, prior to the semiannual groundwater monitoring event in September 2018.

### **FEASIBILITY STUDY WORK**

The revised versions of the SU1 and SU2 FS Reports comprising the West of 4<sup>th</sup> Group FS are considered final versions of these reports. Following completion of the SU1 pilot study and Capital Plant 4 interim action in 2019, an addendum to the FS Reports will be prepared, and a final remedial alternative will be proposed for Ecology approval. A Draft Cleanup Action Plan will be prepared for SU1 and SU2 upon concurrence of the West of 4<sup>th</sup> Group and Ecology regarding the selected remedial alternative.

### **INTERIM MEASURES**

A baseline groundwater monitoring event will be performed using monitoring wells MW-6 and MW-7 and observation wells OBW-1 through OBW-5 as a part of Stage 1 of the interim action at Capital Plant 4. The baseline groundwater monitoring event is scheduled for July 2, 2018. The Stage 1 injections of the potassium permanganate solution will be conducted after the underground injection control permit is issued by Ecology. Farallon anticipates performing the Stage 1 injections near the end of July 2018. Process monitoring will be conducted during the injections and performance monitoring will begin after injections have been completed. Technical details regarding the injections and the monitoring program are provided in the Stage 1 FIWP.

The results of the Stage 1 interim action work will be used to develop a work plan for full-scale application of the technology at Capital Plant 4 (Stage 2), assuming the results of the Stage 1 work indicate that the technology can be successfully applied. A Stage 2 work plan will be submitted to



Ecology for review and comment between September and October 2018 based on the current interim action work schedule.

## **PUBLIC COMMUNICATIONS**

The project website (<http://www.farallonconsulting.com/457-capital-industries>) will be updated with an electronic copy of this progress report.

The next progress report will summarize activities completed from July through September 2018, and will be submitted on or before October 5, 2018.

## **CLOSING**

Farallon trusts that this quarterly progress report provides sufficient information for Ecology needs. If you have questions regarding this project, please contact the undersigned at (425) 295-0800.

Sincerely,

**Farallon Consulting, L.L.C.**

Jennifer L. Moore  
Senior Scientist

Jeffrey Kaspar, L.G., L.H.G.  
Principal Geologist

Attachments: Attachment A, Site Diagram  
Attachment B, Groundwater Data Figures  
Attachment C, Pacific Food Systems SSDS Diagram  
Attachment D, Natus Medical Facility Laboratory Data and SSDS Diagram  
Attachment E, Boring Logs/Well Construction Diagrams

cc: Ron Taylor, Capital Industries, Inc. (by email)  
Donald Verfurth, Gordon and Rees, L.L.P. (by email)

Email with link to electronic copy on project website:

Janet Knox, Pacific Groundwater Group  
Dana Cannon, Aspect Consulting  
Bill Carroll, Arrow Environmental  
Bill Beck, PSC Environmental Services, LLC

JM/JK:mm

**ATTACHMENT A  
SITE DIAGRAM**

PROGRESS REPORT, APRIL THROUGH JUNE 20188

Capital Industries, Inc.  
Seattle, Washington

Farallon PN: 457-008





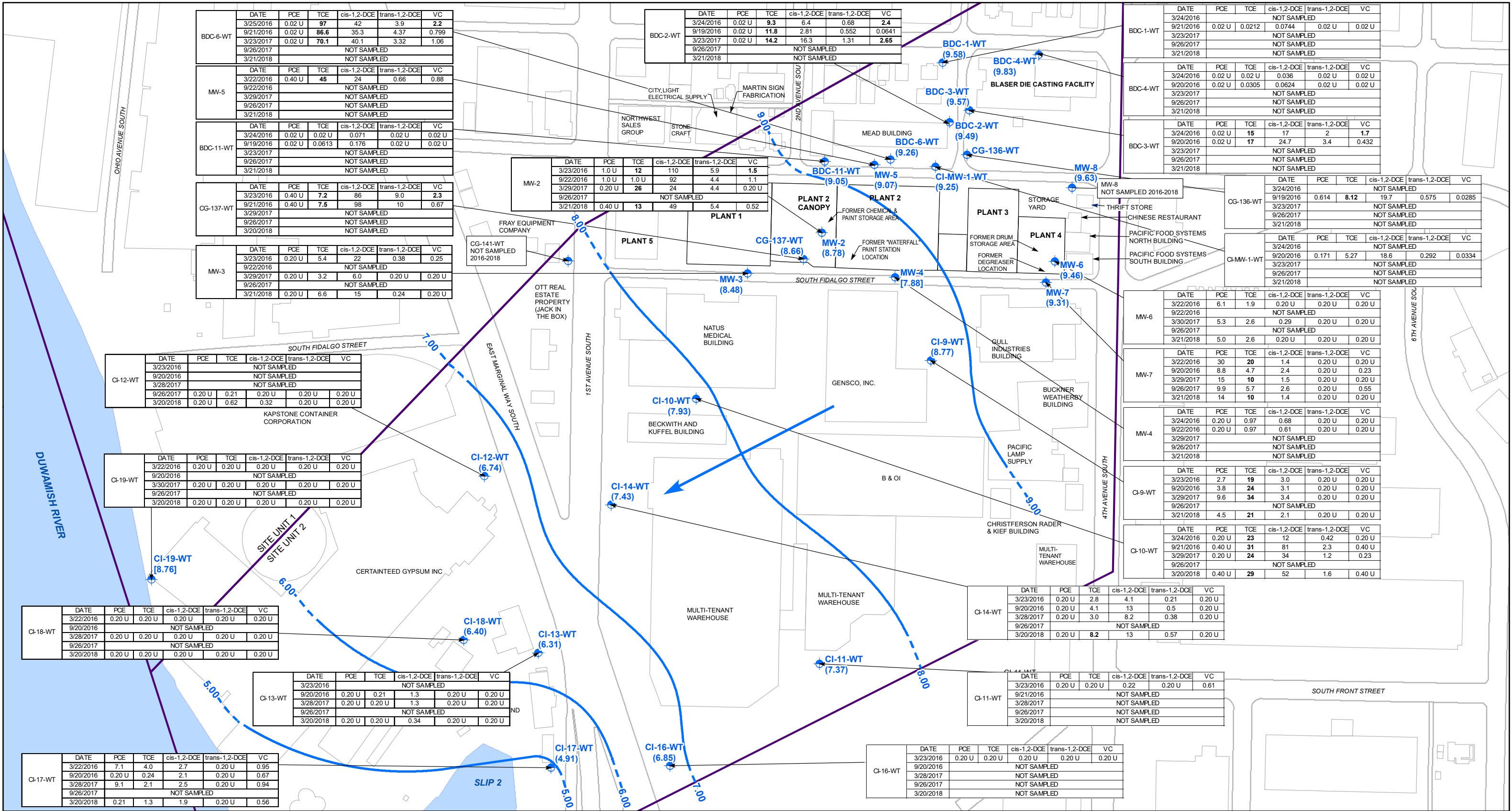


**ATTACHMENT B**  
**GROUNDWATER DATA FIGURES**

PROGRESS REPORT, APRIL THROUGH JUNE 20188

Capital Industries, Inc.  
Seattle, Washington

Farallon PN: 457-008



WATER TABLE ZONE MONITORING WELL

SITE UNIT BOUNDARY

GROUNDWATER SURFACE ELEVATION CONTOUR (DASHED WHERE INFERRED)

APPROXIMATE DIRECTION OF GROUNDWATER FLOW

GROUNDWATER LEVEL ELEVATION NAVD88, MARCH 19, 2018

GROUNDWATER LEVEL ELEVATION NOT USED IN CONTOURING

LEGEND

ALL GROUNDWATER ANALYTICAL RESULTS IN MICROGRAMS PER LITER, SAMPLE DATES LISTED

DCE = DICHOROETHENE

PCE = TETRACHLOROETHENE

TCE = TRICHLOROETHENE

VC = VINYL CHLORIDE

**BOLD** = INDICATES CONCENTRATIONS EXCEED WEST OF FOURTH GROUNDWATER PRELIMINARY CLEANUP LEVELS FOR PROTECTION OF AIR

U = INDICATES CONCENTRATIONS NOT DETECTED ABOVE THE STATED LABORATORY PRACTICAL QUANTITATION LIMIT

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Checked By: JK

Date: 5/2/2018

Disc Reference:

FIGURE 1

GROUNDWATER ANALYTICAL RESULTS FOR WATER TABLE ZONE: 2016 - 2018

REMEDIAL INVESTIGATION

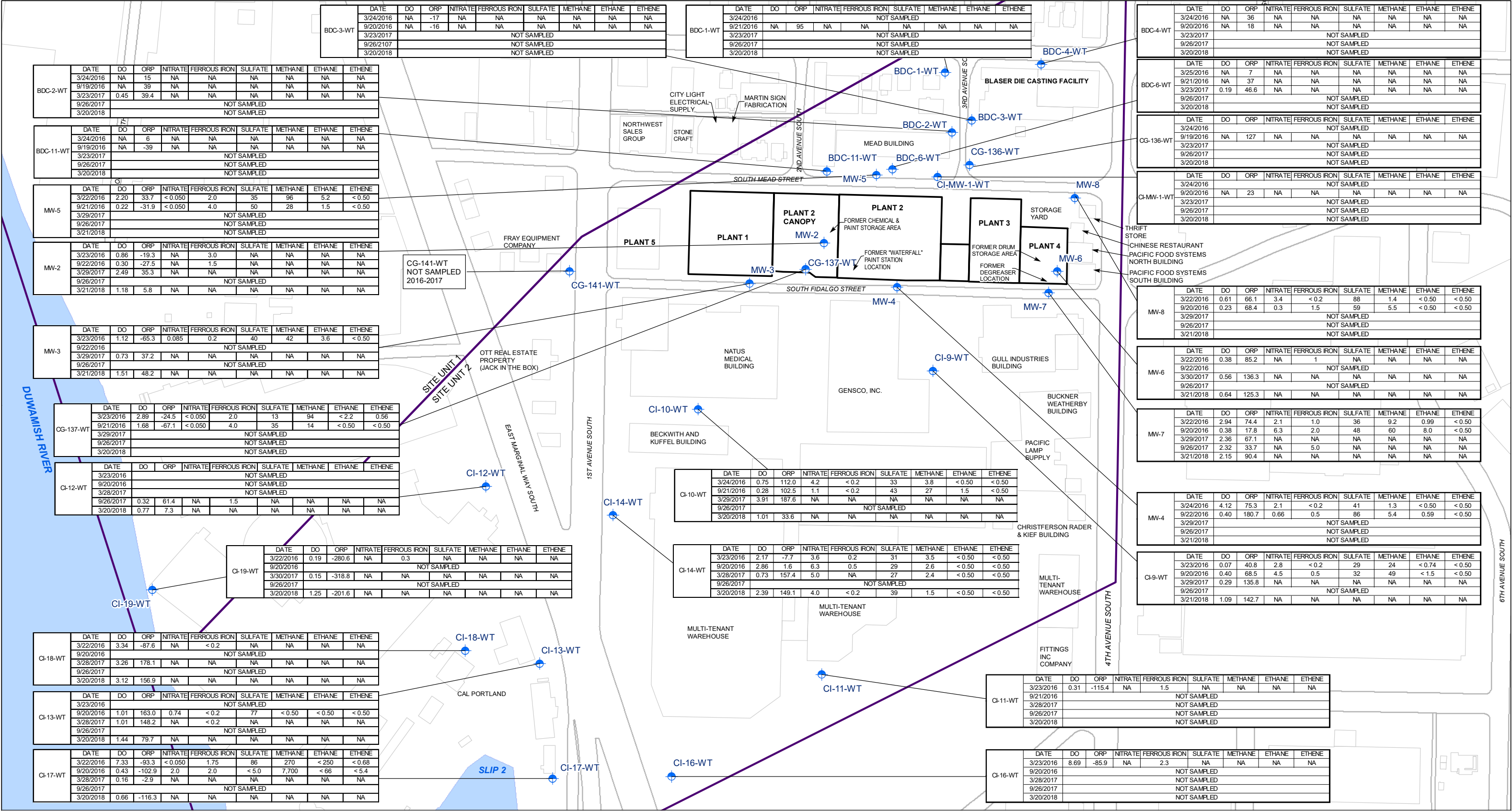
CAPITAL INDUSTRIES, INC.

SEATTLE, WASHINGTON

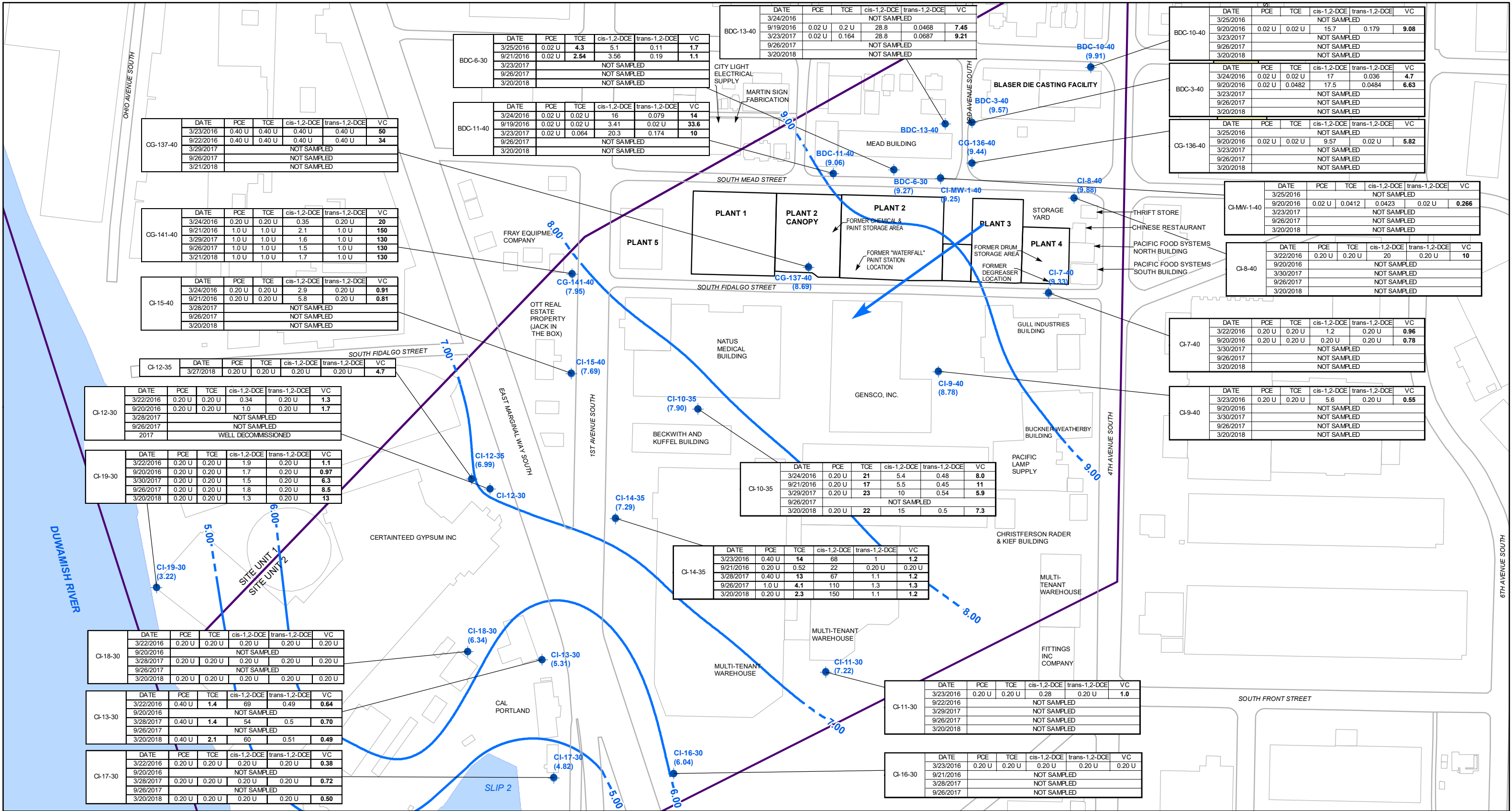
FARALLON PN: 457-007

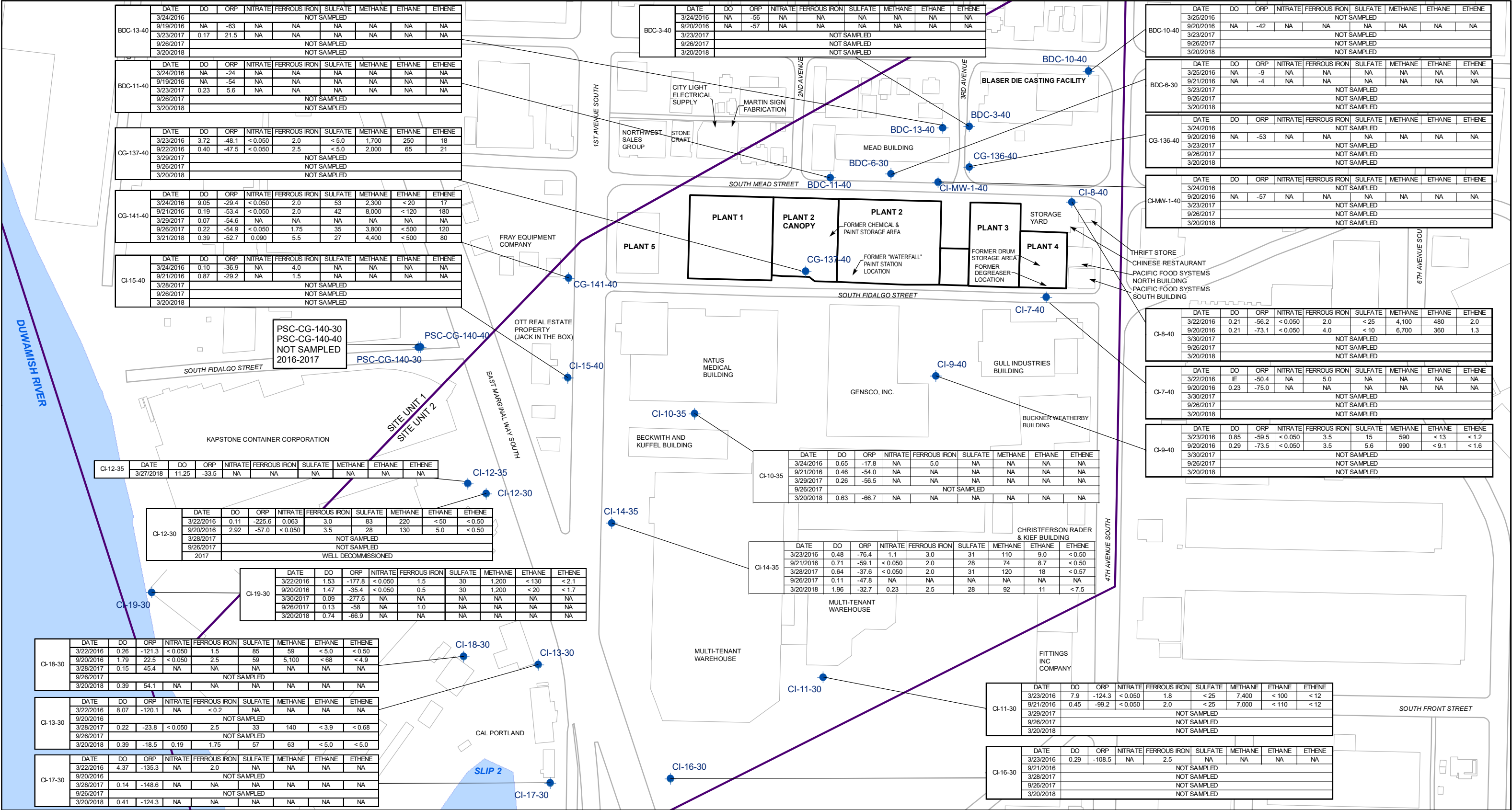
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**FIGURE 2A**  
**NATURAL ATTENUATION PARAMETERS RESULTS FOR**  
**SHALLOW ZONE: 2016 - 2018**  
**REMEDIAL INVESTIGATION**  
**CAPITAL INDUSTRIES, INC.**  
**SEATTLE, WASHINGTON**

FARALLON PN: 457-007

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Date: 5/2/2018

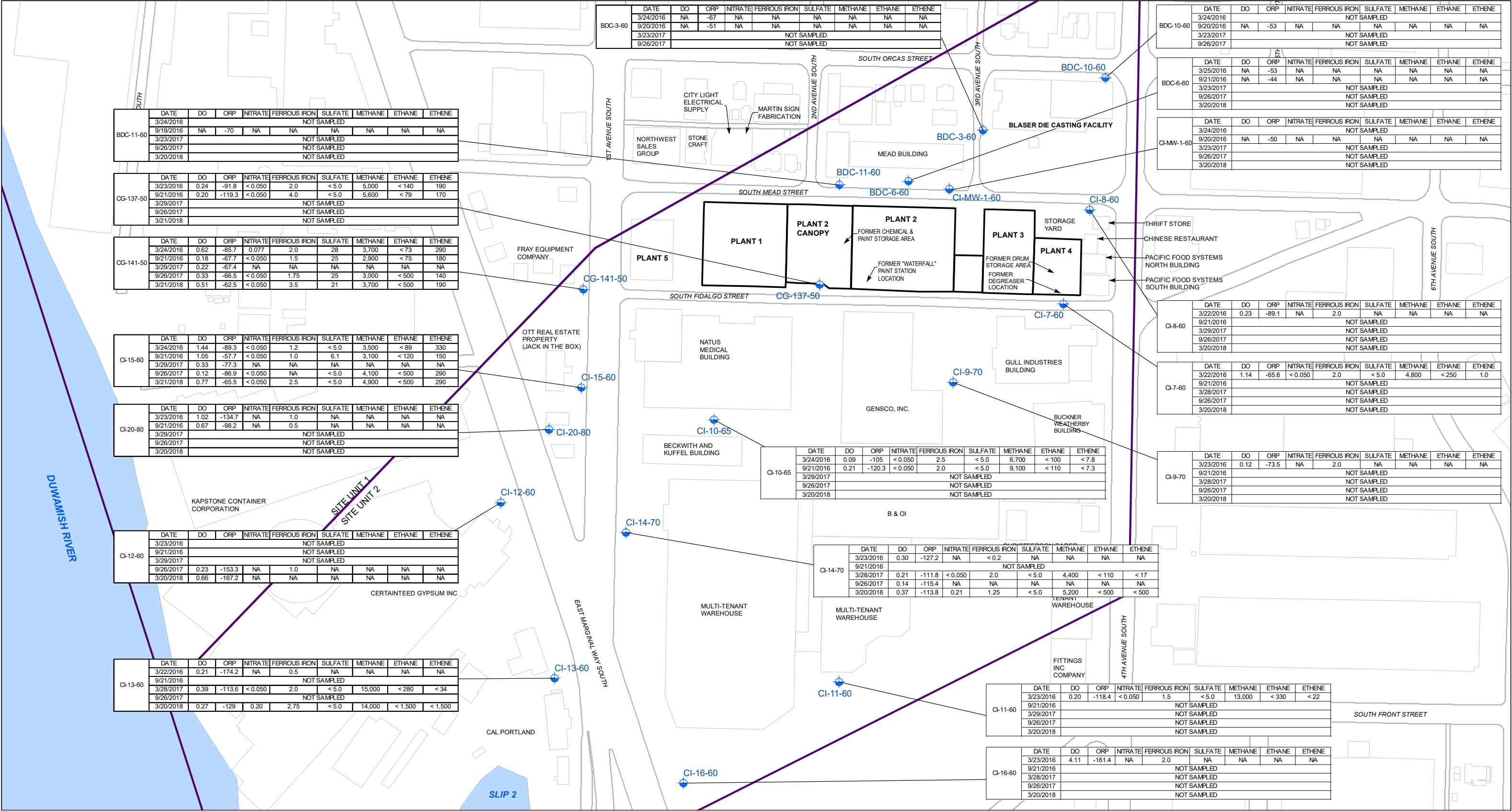
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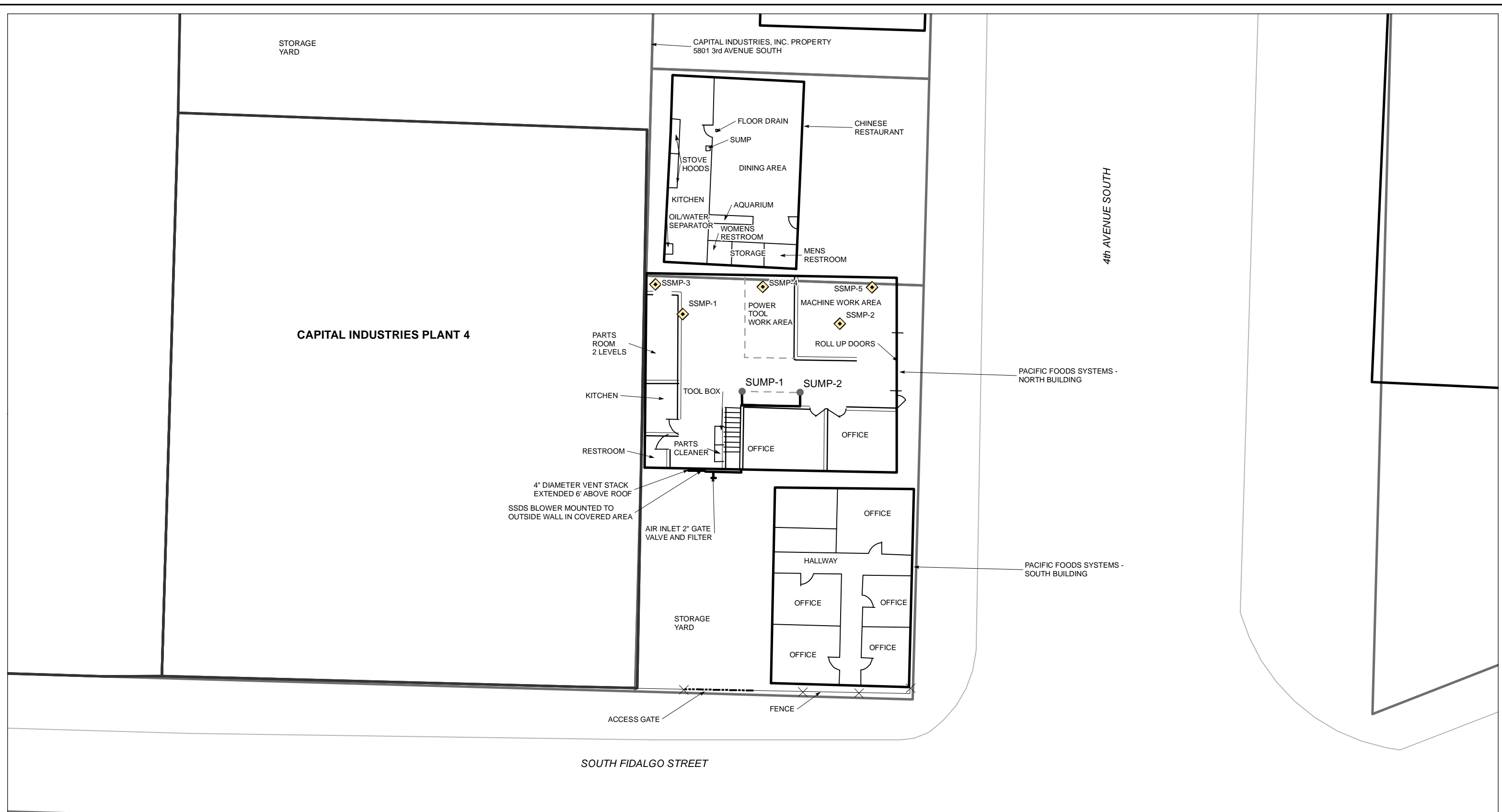


**ATTACHMENT C**  
**PACIFIC FOOD SYSTEMS SSDS DIAGRAM**




PROGRESS REPORT, APRIL THROUGH JUNE 20188

Capital Industries, Inc.  
Seattle, Washington

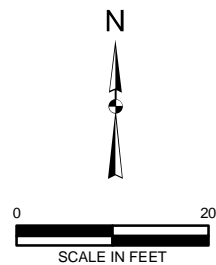
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### LEGEND

-  SSDS EXTRACTION SUMP LOCATION  
 EXISTING SUBSLAB MONITORING PORT  
 KING COUNTY PARCEL BOUNDARY

NOTES:  
SSDS = SUBSLAB DEPRESSURIZATION SYSTEM  
ALL LOCATIONS ARE APPROXIMATE.  
FIGURES WERE PRODUCED IN COLOR.  
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## FIGURE 1

SUB-SLAB DEPRESSURIZATION SYSTEM FEATURES  
PACIFIC FOOD SYSTEMS - NORTH BUILDING  
5814 4th AVENUE SOUTH  
SEATTLE, WASHINGTON

FARALLON PN: 457-007

Drawn By: pemahiser

Checked By: JK

Date: 7/12/2018

Disc Reference:

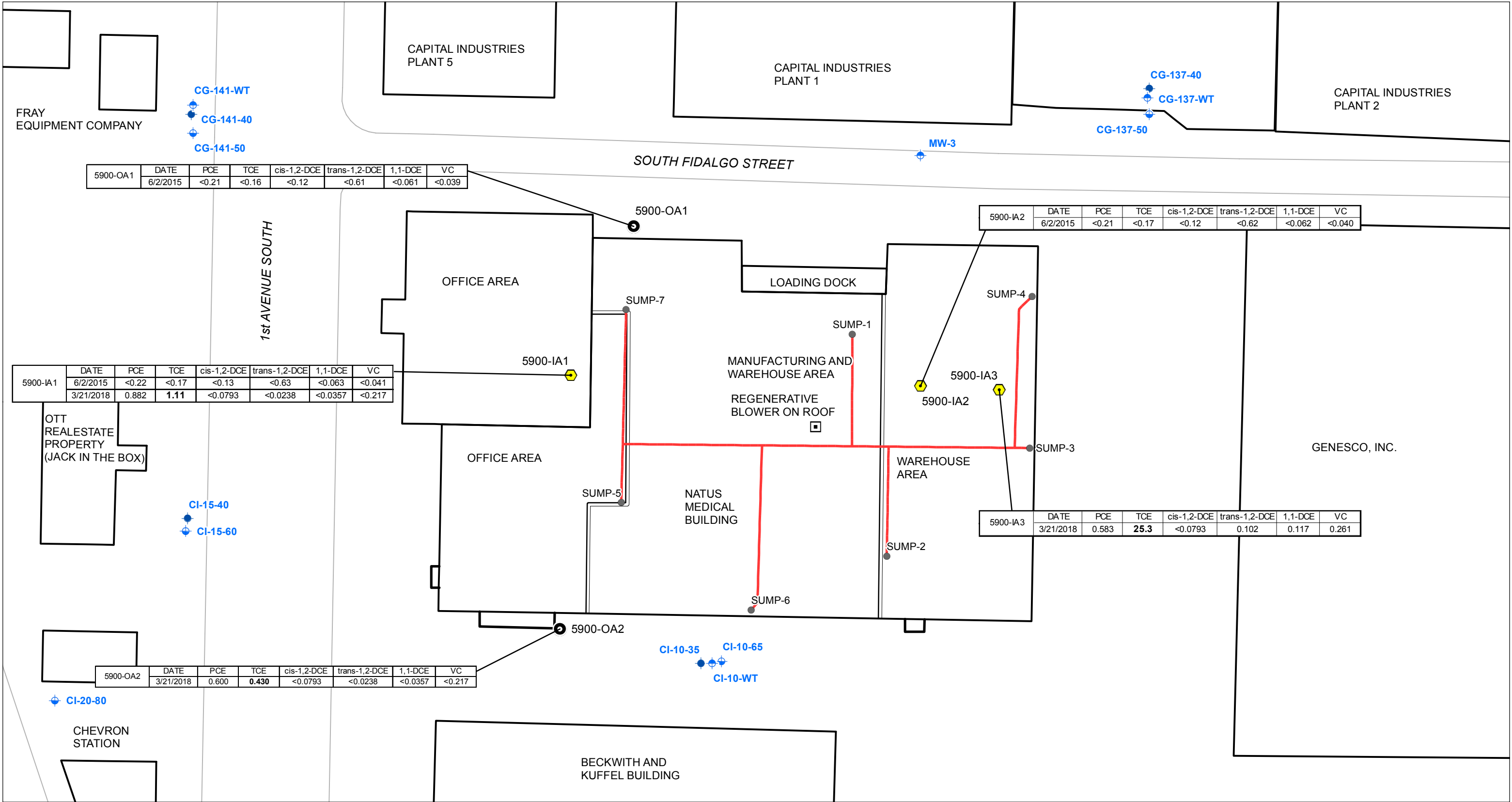
O:\Projects\457 Capital Indust\007 RemInvMonitoring\Mapfiles\Air Samples\FIGURE 1 - PACIFIC FOOD SYSTEMS - NB AIR SAMPLING.mxd



**ATTACHMENT D**  
**NATUS MEDICAL FACILITY LABORATORY DATA AND SSDS**  
**DIAGRAM**

PROGRESS REPORT, APRIL THROUGH JUNE 20188  
Capital Industries, Inc.  
Seattle, Washington

Farallon PN: 457-008



**LEGEND**

- OUTDOOR AIR SAMPLE LOCATION
- INDOOR AIR SAMPLE LOCATION
- WATER TABLE INTERVAL MONITORING WELL
- SHALLOW INTERVAL MONITORING WELL
- INTERMEDIATE INTERVAL MONITORING WELL
- SSDS EXTRACTION SUMP LOCATION

- BUILDING OUTLINE
- INTERIOR WALL
- SSDS PIPING (ON ROOF)

NOTES:

ANALYTICAL RESULTS IN MICROGRAMS PER CUBIC METER

DCE = DICHOROETHENE

PCE = TETRACHOROETHENE

SSDS = SUBSLAB DEPRESSURIZATION SYSTEM

TCE = TRICHLOROETHENE

VC = VINYL CHLORIDE

**BOLD** = INDICATES CONCENTRATIONS THAT EXCEED THE COMMERCIAL INDOOR INHALATION PATHWAY INTERIM MEASURE ACTION LEVELS (IPIMAL)

< = INDICATES CONCENTRATIONS NOT DETECTED AT OR EXCEEDING THE REPORTING LIMIT LISTED

ALL LOCATIONS ARE APPROXIMATE. FIGURES WERE PRODUCED IN COLOR. GRAYSCALE COPIES MAY NOT REPRODUCE ALL ORIGINAL INFORMATION.

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**FIGURE 1**

AIR MONITORING RESULTS  
NATUS MEDICAL BUILDING  
5900 1st AVENUE SOUTH  
CAPITAL INDUSTRIES, INC.  
SEATTLE, WASHINGTON

FARALLON PN: 457-007

Drawn By: pemahiser

Checked By: JM

Date: 7/12/2018

Disc Reference: Q:\Projects\457 CapitalIndust\007 RemInvMonitoring\Mapfiles\Air Samples\Figure 01 NatusMedical Air\_samples.mxd

**Table 1**  
**Summary of Soil Gas and Air Sampling Analytical Results**  
**Natus Medical Facility**  
**Seattle, Washington**  
**Farallon PN: 457-007**

Sample Type	Location	Location Description	Sample Identification	Sample Date	Analytical Results (micrograms per cubic meter)					
					PCE <sup>1</sup>	TCE <sup>1</sup>	cis-1,2-Dichloroethene <sup>1</sup>	trans-1,2-Dichloroethene <sup>1</sup>	1,1-Dichloroethene <sup>1</sup>	Vinyl Chloride <sup>1</sup>
Indoor Air	5900-IA1	Building Main Office	IA8-33937-060215	6/2/2015	< 0.22	< 0.17	< 0.13	< 0.63	< 0.063	< 0.041
			NATUS-OFFICE-032118	3/21/2018	0.882	1.11	< 0.0793	< 0.0238	< 0.0357	< 0.217
	5900-IA2	Building Shipping Office	IA9-34348-060215	6/2/2015	< 0.21	< 0.17	< 0.12	< 0.62	< 0.062	< 0.040
	5900-IA3	Building Warehouse	NATUS-WAREHOUSE-032118	3/21/2018	0.583	25.3	< 0.0793	0.102	0.117	0.261
Outdoor Air	5900-OA1	Outside north of the Building on a telephone pole	AA4-34322-060215	6/2/2015	< 0.21	< 0.16	< 0.12	< 0.61	< 0.061	< 0.039
	5900-OA2	Outside south of the Building on west side	NATUS-UPWIND-032118	3/21/2018	0.600	0.430	< 0.0793	< 0.0238	< 0.0357	< 0.217
SSDS Influent	SSDS Exhaust Blower	Monitoring port on influent of SSDS exhaust blower	OLY-Influent-010517	1/5/2017	1.49	9.47	2.21	0.511	0.0979	<0.217
			NATUS-INFLUENT-032118	3/21/2018	0.675	1.06	0.118	0.0948	< 0.0357	< 0.217
Commercial Indoor Air IPIMAL - Cancer					22	1.5	--	--	--	0.66
Commercial Indoor Air IPIMAL - Non-cancer					7.5	0.39	--	12	39	19

**NOTES:**

Results in **bold** denote concentrations exceeding commercial indoor air IPIMAL.

< denotes analyte not detected at or exceeding the reporting limit listed.

<sup>1</sup> Indoor and outdoor air samples analyzed by U.S. Environmental Protection Agency (EPA) Method Modified TO-15 SIM.

IPIMAL = inhalation pathway interim measure action level

PCE = tetrachloroethene

SSDS = subslab depressurization system

TCE = trichloroethene



**ATTACHMENT E**  
**BORING LOGS/WELL CONSTRUCTION DIAGRAMS**














PROGRESS REPORT, APRIL THROUGH JUNE 20188

Capital Industries, Inc.  
Seattle, Washington

Farallon PN: 457-008

# USCS Classification and Graphic Legend

Major Divisions	USCS Graphic Symbol	USCS Letter Symbol	Lithologic Description
-----------------	---------------------	--------------------	------------------------

Coarse-Grained Soil (More than 50% of material is larger than No. 200 sieve size)	GRAVEL AND GRAVELLY SOIL (More than 50% of coarse fraction retained on No. 4 sieve)	CLEAN GRAVEL (Little or no fines)		GW	Well graded GRAVEL, well graded GRAVEL with sand	
				GP	Poorly graded GRAVEL, GRAVEL with sand	
		GRAVEL WITH FINES (Appreciable amount of fines)		GP-GM	Poorly graded GRAVEL - GRAVEL with sand and silt	
				GM	Silty GRAVEL	
				GC	Clayey GRAVEL	
	SAND AND SANDY SOIL (More than 50% of coarse fraction passed through No. 4 sieve)	CLEAN SAND (Little or no fines)		SW	Well graded SAND	
				SP	Poorly graded SAND	
		SAND WITH FINES (Appreciable amount of fines)		SP-SM	Poorly graded SAND - silty SAND	
				SM	Silty SAND	
				SC	Clayey SAND	
	Fine-Grained Soil (More than 50% of material is smaller than No. 200 sieve size)	SILT AND CLAY (Liquid limit less than 50)			ML	SILT
				CL	CLAY	
				OL	Organic SILT	
SILT AND CLAY (Liquid limit greater than 50)				MH	Inorganic SILT	
				CH	Inorganic CLAY	
				OH	Organic CLAY	
		Highly Organic Soil		PT	Peat	
OTHER MATERIALS		PAVEMENT			AC	Asphalt concrete
					CO	Concrete
		OTHER			RK	Bedrock
				WD	Wood Debris	
				DB	Debris (Miscellaneous)	
				PC	Portland cement	

## Legend



Sample Interval

Grab Sample Interval

Water level at time of drilling

Water level at time of sampling

Blank Casing

Screened Casing



Cement Grout



Bentonite



Sand Pack



Well Cap

————— Solid line indicates sharp contact between units well defined.

----- Dashed line indicates gradational contact between units.

feet bgs = feet below ground surface

NE = Not Encountered

NA = Not Applicable

PID = Photoionization Detector

PN = Project Number

\*ppm = parts per million total organic vapors in isobutylene equivalents using a 10.6 electron volt lamp  
USCS = Unified Soil Classification System



# Log of Boring: CI-12-35

Page 1 of 1

**Client:** Capital Industries, Inc.  
**Project:** Capital Industries, Inc.  
**Location:** Seattle, Washington

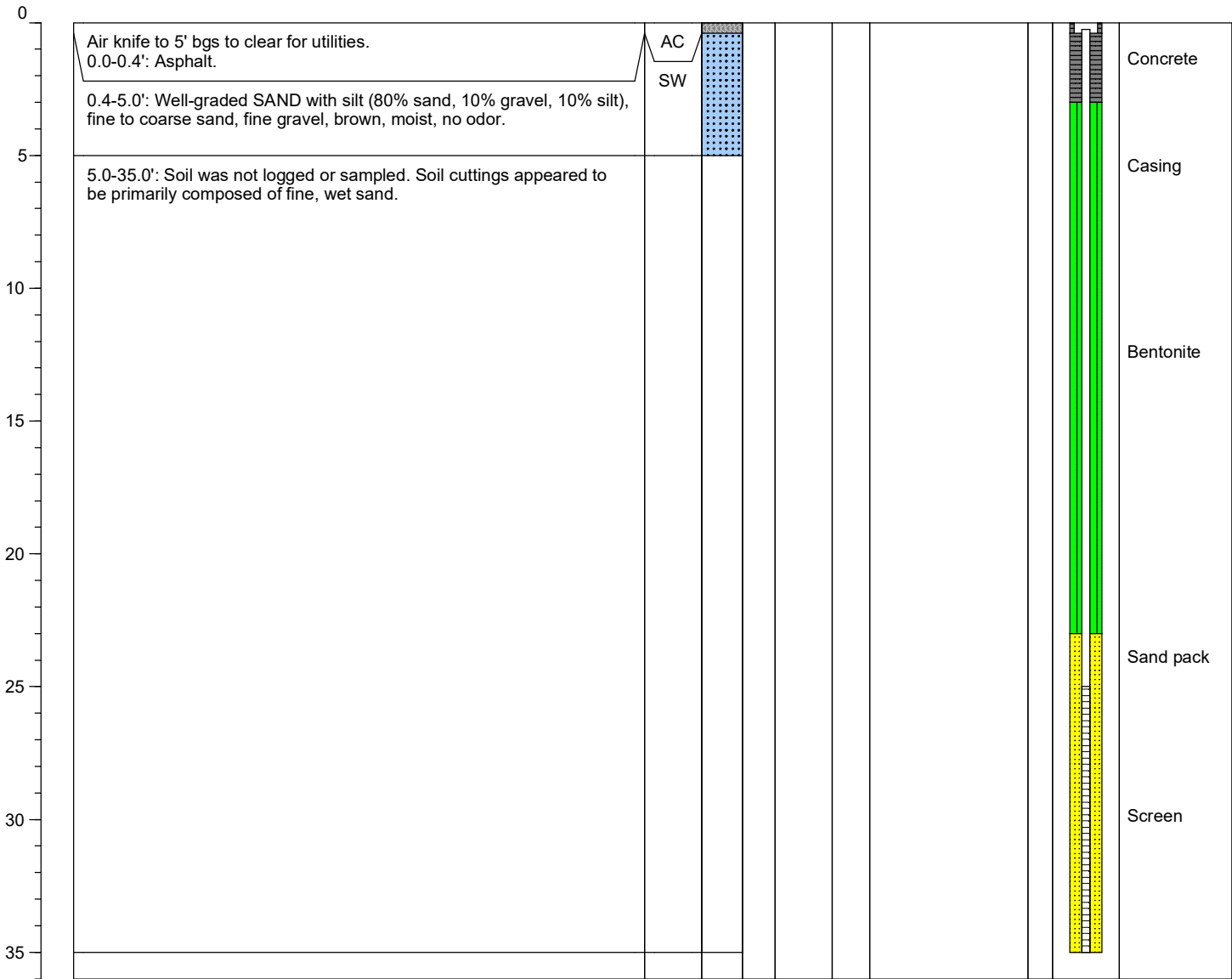
**Farallon PN:** 457-008

**Logged By:** Ryan Ostrom

**Date/Time Started:** 3/23/18 @ 0820  
**Date/Time Completed:** 3/23/18 @ 1100  
**Equipment:** LT 50  
**Drilling Company:** Holocene  
**Drilling Foreman:** RJ Ortega  
**Drilling Method:** Hollow Stem Auger

**Sampler Type:** NA  
**Drive Hammer (lbs.):** NA  
**Depth of Water ATD (ft bgs):** NA  
**Total Boring Depth (ft bgs):** 35.0  
**Total Well Depth (ft bgs):** 35.0

Depth (feet bgs.)	Sample Interval	Lithologic Description	USCS	USCS Graphic	% Recovery	Blow Counts 8/8/8	PID (ppm)	Sample ID	Sample Analyzed	Boring/Well Construction Details
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Well Construction Information				Ground Surface Elevation (ft):	16.12
<b>Monument Type:</b>	Flush	<b>Filter Pack:</b>	10/20 Sand	<b>Top of Casing Elevation (ft):</b>	15.88
<b>Casing Diameter (inches):</b>	2.0	<b>Surface Seal:</b>	Concrete	<b>Surveyed Location:</b>	X: 1269530.90
<b>Screen Slot Size (inches):</b>	0.010	<b>Annular Seal:</b>	Bentonite		Y: 203978.09
<b>Screened Interval (ft bgs):</b>	25.0-35.0	<b>Boring Abandonment:</b>	NA		



Log of Boring: OBW-1

Page 1 of 1

Client: Capital Industries, Inc.  
Project: Capital Industries, Inc.  
Location: Seattle, WA

Farallon PN: 457-008

Logged By: Greg Peters

Date/Time Started: 6/16/2018@ 1100  
Date/Time Completed: 6/16/2018@ 1144  
Equipment: GeoProbe  
Drilling Company: Holocene  
Drilling Foreman: Keven Doyle  
Drilling Method: Direct Push  
Sampler Type: NA  
Drive Hammer (lbs.): NA  
Depth of Water ATD (ft bgs): NA  
Total Boring Depth (ft bgs): 18.0  
Total Well Depth (ft bgs): 18.0

Depth (feet bgs.)	Sample Interval	Lithologic Description	USCS	USCS Graphic	% Recovery	Blow Counts 8/8/8	PID (ppm)	Sample ID	Sample Analyzed	Boring/Well Construction Details
0		0.0-0.46': Concrete.	CO							Monument
		0.46-18.0': Soil not logged or sampled.								Casing
5										Concrete
										Sand Pack
10										
15										Screen

Monument Type: Flush  
Casing Diameter (inches): 1.0  
Screen Slot Size (inches): 0.010  
Screened Interval (ft bgs): 8.0-18.0

Well Construction Information  
Filter Pack: 12/20 Sand  
Surface Seal: Concrete  
Annular Seal: Concrete  
Boring Abandonment: NA

Ground Surface Elevation (ft): 17.98  
Top of Casing Elevation (ft): 17.77  
Surveyed Location: X: 1270799.83  
Y: 204469.09





## Log of Boring: OBW-2

Page 1 of 1

**Client:** Capital Industries, Inc.  
**Project:** Capital Industries, Inc.  
**Location:** Seattle, WA

**Farallon PN:** 457-008

**Logged By:** Greg Peters

**Date/Time Started:** 6/20/2018@ 1534 **Sampler Type:** NA  
**Date/Time Completed:** 6/20/2018@ 1610 **Drive Hammer (lbs.):** NA  
**Equipment:** GeoProbe **Depth of Water ATD (ft bgs):** NA  
**Drilling Company:** Holocene **Total Boring Depth (ft bgs):** 18.0  
**Drilling Foreman:** Keven Doyle **Total Well Depth (ft bgs):** 18.0  
**Drilling Method:** Direct Push

Depth (feet bgs.)	Sample Interval	Lithologic Description	USCS	USCS Graphic	% Recovery	Blow Counts 8/8/8	PID (ppm)	Sample ID	Sample Analyzed	Boring/Well Construction Details
0		0.0-0.5': Concrete.	CO							Monument
		0.5-18.0': Soil not logged or sampled.								Casing
5										Concrete
										Sand Pack
10										
15										Screen

**Monument Type:** Flush

**Casing Diameter (inches):** 1.0

**Screen Slot Size (inches):** 0.010

**Screened Interval (ft bgs):** 8.0-18.0

### Well Construction Information

**Filter Pack:** 12/20 Sand

**Surface Seal:** Concrete

**Annular Seal:** Concrete

**Boring Abandonment:** NA

**Ground Surface Elevation (ft):** 17.63

**Top of Casing Elevation (ft):** 17.20

**Surveyed Location:** X: 1270771.16

Y: 204451.06



# Log of Boring: OBW-3

Page 1 of 1

**Client:** Capital Industries, Inc.  
**Project:** Capital Industries, Inc.  
**Location:** Seattle, WA

**Farallon PN:** 457-008

**Logged By:** Greg Peters

**Date/Time Started:** 6/16/2018@ 0828 **Sampler Type:** NA  
**Date/Time Completed:** 6/16/2018@ 1030 **Drive Hammer (lbs.):** NA  
**Equipment:** GeoProbe **Depth of Water ATD (ft bgs):** 8.0  
**Drilling Company:** Holocene **Total Boring Depth (ft bgs):** 18.0  
**Drilling Foreman:** Keven Doyle **Total Well Depth (ft bgs):** 18.0  
**Drilling Method:** Direct Push

Depth (feet bgs.)	Sample Interval	Lithologic Description	USCS	USCS Graphic	% Recovery	Blow Counts 8/8/8	PID (ppm)	Sample ID	Sample Analyzed	Boring/Well Construction Details
0		0.0-0.5': Concrete. Hand auger to 5.0 bgs to clear for utilities.	CO							Monument
		0.5-2.0': Poorly graded sand with silt (90% sand, 10% silt), fine to coarse sand, brown, moist, no odor.	SP-SM							
		2.0-4.0': Silty sand (60% sand, 40% silt), fine sand, dark brown, moist, no odor.	SM							Casing
5		4.0-5.0': Silty sand (70% sand, 30% silt), fine sand, dark brown, moist, no odor. Some mottling.	SM							Concrete
		5.0-8.0': Sandy silt (80% silt, 20% sand), fine sand, dark brown, wet, no odor. Some mottling. Water at 8.0 ft bgs	ML							Sand Pack
		8.0-10.0': Sandy silt (95% silt, 5% sand), fine to medium sand, grey, wet, no odor. Mottling.	ML							Water level
10		10.0-10.8': Sandy silt (95% silt, 5% sand), fine to medium sand, light brown, moist, no odor.	ML							
		10.8-18.0': Poorly graded sand (95% sand, 5% silt), fine to medium sand, dark grey, moist to wet, no odor.	SP							Screen
15										

**Monument Type:** Flush  
**Casing Diameter (inches):** 1.0  
**Screen Slot Size (inches):** 0.010  
**Screened Interval (ft bgs):** 8.0-18.0

## Well Construction Information

**Filter Pack:** 12/20 Sand  
**Surface Seal:** Concrete  
**Annular Seal:** Concrete  
**Boring Abandonment:** NA

**Ground Surface Elevation (ft):** 17.96  
**Top of Casing Elevation (ft):** 17.70  
**Surveyed Location:** X: 1270824.09  
Y: 204448.78



# Log of Boring: OBW-4

Page 1 of 1

**Client:** Capital Industries, Inc.  
**Project:** Capital Industries, Inc.  
**Location:** Seattle, WA

**Farallon PN:** 457-008

**Logged By:** Greg Peters

**Date/Time Started:** 6/16/2018@ 1315  
**Date/Time Completed:** 6/16/2018@ 1450  
**Equipment:** GeoProbe  
**Drilling Company:** Holocene  
**Drilling Foreman:** Keven Doyle  
**Drilling Method:** Direct Push

**Sampler Type:** NA  
**Drive Hammer (lbs.):** NA  
**Depth of Water ATD (ft bgs):** NA  
**Total Boring Depth (ft bgs):** 18.0  
**Total Well Depth (ft bgs):** 18.0

Depth (feet bgs.)	Sample Interval	Lithologic Description	USCS	USCS Graphic	% Recovery	Blow Counts 8/8/8	PID (ppm)	Sample ID	Sample Analyzed	Boring/Well Construction Details
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Well Construction Information				Ground Surface Elevation (ft):	17.81
Monument Type:	Flush	Filter Pack:	12/20 Sand	Top of Casing Elevation (ft):	17.51
Casing Diameter (inches):	1.0	Surface Seal:	Concrete	Surveyed Location:	X: 1270759.15
Screen Slot Size (inches):	0.010	Annular Seal:	Concrete		Y: 204411.76
Screened Interval (ft bgs):	8.0-18.0	Boring Abandonment:	NA		



Log of Boring: OBW-5

Client: Capital Industries, Inc.  
Project: Capital Industries, Inc.  
Location: Seattle, WA

Farallon PN: 457-008

Logged By: Greg Peters

Date/Time Started: 6/16/2018@ 1155  
Date/Time Completed: 6/16/2018@ 1245  
Equipment: GeoProbe  
Drilling Company: Holocene  
Drilling Foreman: Keven Doyle  
Drilling Method: Direct Push  
Sampler Type: NA  
Drive Hammer (lbs.): NA  
Depth of Water ATD (ft bgs): NA  
Total Boring Depth (ft bgs): 18.0  
Total Well Depth (ft bgs): 18.0

Depth (feet bgs.)	Sample Interval	Lithologic Description	USCS	USCS Graphic	% Recovery	Blow Counts 8/8/8	PID (ppm)	Sample ID	Sample Analyzed	Boring/Well Construction Details
0		0.0-0.46': Concrete.								Monument
		0.46-18.0': Soil not logged or sampled.								Casing
5										Concrete
										Sand Pack
10										
15										Screen

Monument Type: Flush  
Casing Diameter (inches): 1.0  
Screen Slot Size (inches): 0.010  
Screened Interval (ft bgs): 8.0-18.0

Well Construction Information  
Filter Pack: 12/20 Sand  
Surface Seal: Concrete  
Annular Seal: Concrete  
Boring Abandonment: NA

Ground Surface Elevation (ft): 17.93  
Top of Casing Elevation (ft): 17.66  
Surveyed Location: X: 1270811.06  
Y: 204411.27