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FINAL CAPITAL INDUSTRIES PLANT 4
SOIL VAPOR EXTRACTION PILOT STUDY WORK PLAN

West of 4th Group Site
Capital Industries, Inc.
5801 3rd Avenue South
Seattle, Washington

Submitted by:
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Farallon PN: 457-008

For:
West of 4th Avenue Group
Site Unit 2 Joint Deliverable
Capital Industries, Inc.
Blaser Die Casting Co.
Stericycle Environmental Solutions, Inc.
Seattle, Washington

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ACRONYMS AND ABBREVIATIONS

bgs	below ground surface
CI	Capital Industries, Inc.
cis-1,2-DCE	cis-1,2-dichloroethene
COCs	constituents of concern
CVOCs	chlorinated volatile organic compounds
Ecology	Washington State Department of Ecology
Farallon	Farallon Consulting, L.L.C.
HASP	Health and Safety Plan
ISCO	in-situ chemical oxidation
PCE	tetrachloroethene
PCULs	preliminary cleanup levels
RCW	Revised Code of Washington
RI	Remedial Investigation
RI Report	*Revised Draft Remedial Investigation Report, Capital Industries, Inc., 5801 3rd Avenue South, Seattle, Washington, Agreed Order No. DE 5348* dated October 2012, prepared by Farallon Consulting, L.L.C.
Site	The West of 4th Group Site consisting of Site Unit 1 and Site Unit 2
SU2	Site Unit 2
SU2 FS Report	*West of 4th Site Unit 2 Feasibility Study, Seattle, Washington* dated August 11, 2016, prepared by West of Fourth Group and Pacific Groundwater Group
SVE	soil vapor extraction
TCE	trichloroethene

WAC	Washington Administrative Code
West of 4th Group	Art Brass Plating, Inc.; Blaser Die Casting Co.; Capital Industries, Inc.; and PSC Environmental Services, LLC
Work Plan	*Final Capital Industries Plant 4 Soil Vapor Extraction Pilot Study Work Plan, West of 4th Group Site, Capital Industries, Inc., 5801 3rd Avenue South, Seattle, Washington* dated April 5, 2019, prepared by Farallon Consulting, L.L.C. (this document)

1.0 INTRODUCTION

Farallon Consulting, L.L.C. (Farallon) has prepared this Final Capital Industries Plant 4 Soil Vapor Extraction (SVE) Pilot Study Work Plan (Work Plan) on behalf of Art Brass Plating, Inc.; Blaser Die Casting Co.; Capital Industries, Inc. (CI); and Burlington Environmental, LLC[1] (collectively referred to herein as the West of 4th Group), which are the potentially liable parties at the West of 4th Group Site (herein referred to as the Site). The Site consists of Site Unit 1 and Site Unit 2 (SU2) as depicted on Figure 1. The Art Brass Plating, Inc. property is located at Site Unit 1. The CI and Blaser Die Casting Co. properties are located at SU2. The CI property comprises five buildings identified as Plants 1 through 5 (Figure 2). This Work Plan was prepared as a part of an interim action at CI Plant 4 that is being conducted on behalf of CI.

This Work Plan has been prepared in accordance with the requirements of Agreed Order No. DE 10402 entered into by the West of 4th Group and the Washington State Department of Ecology (Ecology) in April 2014; the First Amendment to Agreed Order No. DE 10402 dated November 20, 2017; and the Washington State Model Toxics Control Act Cleanup Regulation as established in Chapter 173-340 of the Washington Administrative Code (WAC 173-340).

1.1 OBJECTIVES

The purpose of the Work Plan is to provide the details for implementation of the SVE pilot study as a part of an interim action at CI Plant 4 (Figure 2) in SU2 as discussed in the *West of 4th Site Unit 2 Feasibility Study, Seattle, Washington* dated August 11, 2016, prepared by West of Fourth Group and Pacific Groundwater Group (SU2 FS Report); and in the letter regarding Capital Industries Plant 4 Interim Action Soil Vapor Extraction Pilot Test Schedule, Capital Industries, Inc., 5801 Third Avenue South, Seattle, Washington dated February 22, 2019, from Ms. Jennifer L. Moore and Mr. Jeffrey Kaspar of Farallon to Mr. Ed Jones of Ecology. Feasible cleanup technologies were evaluated based on the existing data for the Site. A previous in-situ chemical oxidation (ISCO) pilot study using potassium permanganate demonstrated that ISCO at CI Plant 4 was not a viable technology for the interim action (Farallon 2019a). CI has selected SVE as the next most-viable cleanup technology for further evaluation and pilot testing. SVE is a proven technology used to remediate unsaturated soil impacted by volatile organic compounds. SVE is the process of inducing a pressure and concentration gradient to the subsurface to cause volatile organic compounds such as chlorinated volatile organic compounds (CVOCs) to desorb from the soil and flow with the vapor stream to a common collection point for discharge or treatment.

[1] Burlington Environmental, LLC, is a wholly owned subsidiary of PSC Environmental Services, LLC, which is a wholly owned subsidiary of Stericycle Environmental Solutions, Inc.

The interim action objectives are tied to the remedial action objectives for the Site as described in the SU2 FS Report, and include:

- Reducing concentrations of CVOCs in soil beneath CI Plant 4 to concentrations less than the preliminary cleanup levels (PCULs) for the Site to reduce inhalation risks to acceptable levels (Table 1); and
- Reducing concentrations of CVOCs in shallow groundwater that allegedly originated from CI Plant 4 to concentrations less than the PCULs for the Site.

1.2 ORGANIZATION

This Work Plan summarizes pertinent background information and provides details for implementation of the SVE pilot study at SU2. This Work Plan is organized into the following sections:

- **Section 1**, **Introduction**, presents an overview of the Site, and the objectives and organization of the Work Plan;
- **Section 2**, **Background**, presents background information, including a summary of relevant investigations and a description of the constituents of concern (COCs) that will be targeted during the interim action;
- **Section 3**, **Preliminary Cleanup Levels**, presents the revised PCULs for the Site;
- **Section 4**, **Conceptual Site Model**, presents a description of the Site features, geology, and hydrogeology; the nature and extent of contamination; and groundwater geochemistry;
- **Section 5**, **Interim Action**, presents a description of the interim action, including a discussion of the cleanup technology, applicable permits, health and safety, utility clearance, SVE well installation, pilot study equipment, and pilot study procedures;
- **Section 6**, **Interim Action Documentation**, presents a description of documents that will be generated during the interim action activities;
- **Section 7**, **Schedule and Reporting**, summarizes the schedule for implementation of the interim action and associated reporting deliverables that will be submitted to Ecology; and
- **Section 8**, **References**, lists the documents cited in this Work Plan.

2.0 BACKGROUND

The following section presents background information, including a summary of relevant investigations and a description of the COCs that will be targeted during the interim action.

2.1 PREVIOUS INVESTIGATIONS AT CI PLANT 4

Former operations at the CI property allegedly have resulted in releases of tetrachloroethene (PCE) and/or trichloroethene (TCE) to soil and groundwater. Details of historical CI operations and the results from prior environmental investigations, including a Remedial Investigation (RI) conducted by Farallon, are presented in the *Revised Draft Remedial Investigation Report, Capital Industries, Inc., 5801 3rd Avenue South, Seattle, Washington, Agreed Order No. DE 5348* dated October 2012, prepared by Farallon (2012) (RI Report). A hot solvent degreaser historically was present in the south-central portion of CI Plant 4/Plant 4 canopy (Figure 2). The hot solvent degreaser was used in CI Plant 4 from approximately 1987 to 1992 and was removed in 1993. Prior to 1987, manual degreasing was conducted at CI Plant 4. CI reportedly stored TCE at the CI Plant 4 canopy area and the solvent was manually applied to the metal surfaces of fabricated products prior to painting at the CI Plant 4 paint booths. Two drum storage areas were present in the west-central portion of the CI Plant 4 canopy area (Figure 2). The southernmost drum storage area was constructed in 1978, was in use until 1985, and currently is used as the paint storage area. The northernmost drum storage area was constructed in 1978 and currently is still in use.

During subsurface investigations conducted by Farallon (2012) at CI Plant 4 during the RI, neither TCE nor PCE was detected in soil samples collected from the boring/monitoring well locations at concentrations that accounted for the impacts to groundwater quality that occurred at and down-gradient of CI Plant 4. Concentrations of CVOCs detected in groundwater samples collected from the Water Table and/or Shallow Intervals (i.e., at depths of from 0 to 20 feet below ground surface [bgs] and from 20 to 40 feet bgs, respectively) near the suspected source areas previously identified at the CI property suggest there may be areas where concentrations of CVOCs in soil are greater than those detected during the RI. Therefore, Ecology required that additional investigation be conducted at CI Plant 4.

Farallon (2016) conducted passive soil gas and bulk soil sampling at CI Plant 4 and in the South Fidalgo Street right-of-way to assess the lateral and vertical distribution of PCE and TCE in soil beneath CI Plant 4 to resolve data gaps associated with the RI of the Site previously described in the revised data gap memorandum for SU 2 (Farallon 2015).

The soil gas survey results indicated that the highest concentrations of PCE in soil gas were present in an area extending from the east-central portion to the south-southwestern portion of CI Plant 4 (Figure 3A). High concentrations of TCE in soil gas were observed in correlation with the areas with the highest concentrations of PCE in soil gas. Elevated concentrations of TCE also were detected in the west-central portion of CI Plant 4 proximate to the current and former drum storage areas (Figure 3B). The highest concentrations of cis-1,2-dichloroethene (cis-1,2-DCE) in soil gas

were detected in the east-central portion of CI Plant 4 and correlate with the locations of the PCE and TCE soil gas plumes observed in this area (Figure 3C).

The PCE, TCE, and cis-1,2-DCE soil gas data indicated potential releases proximate to the current and former drum storage areas in the west-central portion of CI Plant 4, where manual degreasing occurred; at the former degreaser unit area in the south-central portion of CI Plant 4; and in the east-central portion of CI Plant 4. Soil sampling at these locations was conducted on October 17, 2015 to supplement existing soil data from the RI and further evaluate the nature and extent of COCs in soil. Based on the results, concentrations of PCE, TCE, and cis-1,2-DCE detected in soil gas in the east-central portion of CI Plant 4 could be the result of a release on the east-adjacent Pacific Food Systems property or encroachment of contamination from CI Plant 4. The specific source of CVOCs in soil gas on the Pacific Food Systems property is undetermined.

PCE was detected at concentrations exceeding the PCUL for air quality protection and/or the revised PCUL[2] for surface water quality protection in soil samples collected from borings P4-B6, P4-B7, P4-B8, and P4-B11 (Table 2; Figure 3A). TCE was detected at concentrations exceeding the PCUL for air quality protection and/or the revised PCUL for surface water quality protection in soil samples collected from borings P4-B1, P4-B3 through P4-B9, and P4-B14 (Table 2; Figure 3B). Cis-1,2-DCE, trans-1,2-dichloroethene, and vinyl chloride were not detected at concentrations exceeding the applicable PCULs in the soil samples collected at and proximate to CI Plant 4 (Table 2; Figures 3A through 3C).

TCE concentrations ranging from 0.082 to 2.4 milligrams per kilogram were detected in soil samples collected at a depth of approximately 2 feet bgs in performance borings B3-01, B3-02, and B3-03 during the ISCO pilot study, proximate to the current drum storage area in the northwestern portion of CI Plant 4 (Table 2; Figure 4). These TCE concentrations are higher than TCE concentrations previously detected at CI Plant 4 (Table 2; Figures 3A through 3C).

Four additional borings, P4-15 through P4-18, were advanced during a second round of performance borings for the ISCO pilot study to further assess the lateral and vertical distribution of TCE discovered during the first round of performance borings. TCE concentrations were only detected in a soil sample collected from boring P4-16 at a depth of approximately 1 foot bgs (Table 2; Figure 4), indicating that the lateral and vertical limits of TCE-affected soil proximate to the current and former drum storage areas could be estimated using the collective soil analytical results obtained in 2015 and during the ISCO pilot study.

The soil analytical results indicate that the highest concentrations of CVOCs are present in shallow soil beneath the building slab and attenuate with depth. PCE and TCE were detected at relatively low concentrations at CI Plant 4, which confirms that there was not a significant or extensive release of PCE or TCE at CI Plant 4. The groundwater data from the RI Report, post-RI sampling,

[2] Certain PCULs were revised in January 2017 to accommodate U.S. Environmental Protection Agency (EPA) revisions to surface water quality criteria.

and baseline and performance monitoring for the ISCO pilot study also support the conclusions drawn from the soil data. Current concentrations of COCs in the Water Table Interval are not indicative of a major residual source of PCE or TCE in the vadose zone below CI Plant 4 (Table 3; Figure 5). PCE and TCE were not detected in the Shallow or Intermediate Groundwater Intervals (i.e., at depths of 20 to 40 feet bgs and greater than 40 feet bgs, respectively), indicating the release(s) of PCE and TCE that did occur were of insufficient mass and/or volume to affect deeper groundwater. However, PCE, TCE, and vinyl chloride are present at concentrations exceeding the PCULs for protection of surface water quality in monitoring and observation wells inside and immediately down-gradient of CI Plant 4. Groundwater modeling documented in the SU2 FS Report indicated that CVOC concentrations in groundwater associated with the CI Plant 4 area will attenuate to concentrations less than the PCULs protective of surface water quality prior to reaching a surface water receptor.

Sufficient data were collected at CI Plant 4 to evaluate potential cleanup technologies for soil and groundwater in the SU2 FS Report. The potential active cleanup technologies evaluated and the media potentially remediated included:

- ISCO (soil and groundwater);
- Soil excavation and off-Site disposal (soil);
- SVE/air sparging (soil and groundwater);
- Enhanced anaerobic biodegradation (groundwater); and
- In-situ chemical reduction (groundwater).

ISCO was the preferred cleanup technology for soil and groundwater due to the ability to implement the technology with minimal interference with operations at CI Plant 4, and ISCO's ability to rapidly treat the low levels of CVOCs in soil and groundwater (West of Fourth Group and Pacific Groundwater Group 2016). An ISCO pilot study was conducted in the third quarter of 2018, the results of which indicated that ISCO was not a viable technology for the interim action due to oxidant distribution issues and high natural oxidant demand.

SVE has been selected as the next cleanup technology to be pilot tested for the interim action at CI Plant 4. Of the remaining cleanup alternatives evaluated, SVE will have the least impact on operations for CI and has a high probability of meeting the interim action objectives, and the cost is most likely proportional to the benefit of implementing the technology. Air sparging will not be conducted as a part of the pilot study based on the 2018 groundwater data from the CI Plant 4 ISCO pilot study and groundwater modeling documented in the SU2 FS Report, which indicate that active groundwater treatment likely will not be a component of the final cleanup action.

2.2 CONSTITUENTS OF CONCERN FOR INTERIM ACTION

The COCs for soil are PCE and TCE. These COCs are a current and future risk to the soil-to-groundwater and soil-to-indoor air pathways.

3.0 PRELIMINARY CLEANUP LEVELS

The PCULs for the Site are based on potential exposure pathways and were established in the technical memorandum regarding Revised Preliminary Cleanup Standards, W4 Joint Deliverable, Seattle, Washington dated September 12, 2014, from Farallon to Mr. Jones of Ecology (Farallon 2014). The PCULs were updated on January 17, 2017 to reflect updates to human health criteria in the Clean Water Act promulgated by EPA on November 15, 2016.

The current PCULs for the Site are summarized in Table 1 of this Work Plan.

4.0 CONCEPTUAL SITE MODEL

The following section presents a summary of the conceptual site model elements pertinent to the SVE pilot study discussed herein.

4.1 GEOLOGY

Soil conditions at CI Plant 4 consisted of approximately 1 foot of silty sand underlain by silt with sand to depths ranging from approximately 6 to 7.5 feet bgs, underlain by fine sand with trace silt to the maximum depth explored of 18 feet bgs. Groundwater generally was encountered at a depth of between 8 to 9 feet bgs. The silty sand layer near the ground surface pinches out in the South Fidalgo Street right-of-way.

4.2 HYDROGEOLOGY

The hydrogeologic units at the Site are:

- Water Table Interval: The Water Table Interval extends to a depth of up to 20 feet bgs.
- Shallow Interval: The Shallow Interval ranges in depth from 20 to 40 feet bgs.
- Intermediate Interval: The Intermediate Interval includes groundwater monitored at the Site at depths below 40 feet bgs.

Groundwater in these three hydrogeologic units flows to the west and southwest toward the Duwamish River with little seasonal fluctuation. A downward vertical gradient is present between the Water Table and Shallow Intervals. The vertical gradients between the Shallow and Intermediate Intervals fluctuate between upward and downward in monitoring well clusters east of East Marginal Way. The vertical gradient between the Shallow and Intermediate Intervals in monitoring well clusters west of East Marginal Way, proximate to the Duwamish River, generally is upward.

Tidal studies were documented in the RI reports prepared for Art Brass Plating, Inc. (Aspect Consulting 2012) and CI (Farallon 2012). Water levels in the western portions of the Site are tidally influenced by Puget Sound. This tidal influence is demonstrated in localized, transient flow reversals similar to those observed at other sites near the Duwamish River. Tidal flow reversals diminish to 0.5 foot or less, 800 feet east-northeast of the Duwamish River.

4.3 NATURE AND EXTENT OF CONTAMINATION

The following subsections present the nature and extent of contamination observed in soil gas, soil, and groundwater.

4.3.1 Soil Gas

PCE and TCE were present in soil gas in an area extending from the east-central portion to the south-southwestern portion of CI Plant 4 (Figures 3A through 3C). Another area of TCE contamination in soil gas is present in the west-central portion of CI Plant 4, proximate to the current and former drum storage areas. The highest concentration of cis-1,2-DCE in soil gas was detected in the east-central portion of CI Plant 4 and correlates with the locations of some of the highest concentrations of PCE and TCE (Figure 3C).

4.3.2 Soil

The highest concentrations of PCE and TCE observed in the borings advanced at and proximate to CI Plant 4 occurred at depths ranging between 1 and 4 feet bgs. Additional soil samples with concentrations of PCE and TCE exceeding the PCULs were collected in the silty material at borings P4-B1, P4-B4 through P4-B8, and P4-B14, which are predominately in the southeastern portion of CI Plant 4 and the northern right-of-way of South Fidalgo Street. The vertical extent of soil contamination exceeding the PCULs appears to be less than 10 feet bgs (Table 2; Figures 3A through 3C and 4).

4.3.3 Groundwater

PCE and TCE in the Water Table Interval allegedly originated from a former degreaser unit that was present in the southern portion of CI Plant 4. CVOCs in groundwater within the Water Table, Shallow, and Intermediate Intervals, including PCE, TCE, and vinyl chloride, migrate to the southwest in SU2, toward Slip 2 at the Lower Duwamish Waterway (Aspect Consulting 2014). Groundwater is not included in the interim action because the 2018 groundwater data from the CI Plant 4 ISCO pilot study and groundwater modeling documented in the SU2 FS Report indicate that active groundwater treatment likely will not be a component of the final cleanup action.

5.0 INTERIM ACTION

This section presents a description of the SVE pilot study, including a discussion of the cleanup technology, permitting, health and safety, utility clearance, pilot study approach, SVE well installation, and pilot test activities.

5.1 CLEANUP TECHNOLOGY

SVE was selected as a viable cleanup technology and retained for further evaluation for removal of CVOCs from soil and soil gas beneath CI Plant 4. SVE is the process of inducing a pressure and concentration gradient to the subsurface to cause volatile organic compounds such as CVOCs to desorb from the soil and flow with the vapor stream to a common collection point for discharge or treatment.

A pilot study is necessary to evaluate the feasibility and effectiveness of SVE as a cleanup technology. The pilot test will also provide information required for full-scale design, including the anticipated radius of influence, optimum vacuum and airflow rate, SVE blower sizing, and whether treatment of the SVE effluent will be necessary to comply with local air agency regulations. The pilot study area selected is proximate to boring B3-04, where the highest TCE concentration of 13 milligrams per kilogram was detected in the soil sample collected at a depth of 4 feet bgs. The SVE extraction well and corresponding observation wells will be placed proximate to boring B3-04 (Figure 4). Specific details are presented in Section 5.5, SVE Extraction Well Installation.

5.2 PERMITTING

If the pilot study is successful, a public comment period and State Environmental Policy Act checklist will be needed for this new interim action technology. Farallon will prepare a State Environmental Policy Act checklist for submittal to Ecology prior to submittal of the SVE System Design and Implementation Work Plan.

Discharge of CVOC emissions to the atmosphere for this pilot study is regulated by Puget Sound Clean Air Agency for new emissions sources under the Notice of Construction permitting process. For groundwater and soil remediation projects, Notice of Construction is not required for sites that emit less than 15 pounds of vinyl chloride, 500 pounds of PCE, and 1,000 pounds of toxic air contaminants per year in accordance with Puget Sound Clean Air Agency Regulation 6.03.c.(94). Based on the short duration of the SVE pilot study, low extraction flow rate, and anticipated extracted vapor concentration, a Notice of Construction is not required for the pilot study. The pilot study results will be used to determine whether a Notice of Construction is required for a full-scale implementation of SVE.

The SVE pilot test equipment is portable and temporary; therefore, no construction or electrical permits are anticipated for the pilot study activities.

5.3 HEALTH AND SAFETY

A Health and Safety Plan (HASP) is required for all field activities (WAC 173-340-810). Farallon and all subcontractors, if any, will be required to provide HASPs for their own employees that are appropriate to their role in the interim action and in accordance with the laws under which their work is regulated. Farallon's HASP will comply with the requirements of the Occupational Safety and Health Act of 1970 and the Washington Industrial Safety and Health Act (Chapter 49.17 of the Revised Code of Washington [49.17 RCW]). Farallon's draft project-specific HASP is provided as Appendix A of this Work Plan. Ecology approval of the HASP is not required.

Farallon and subcontractor personnel will be required to have 40-Hour Hazardous Waste Operations and Emergency Response training as hazardous waste operators in accordance with Part 1910.120 of Title 29 of the Code of Federal Regulations.

5.4 UTILITY CLEARANCE

Public and private utility locate services were employed prior to the ISCO pilot study and the subsurface utilities beneath CI Plant 4 were mapped. The SVE extraction well will be advanced in a location that has already been cleared for subsurface utilities.

5.5 SVE EXTRACTION AND OBSERVATION WELL INSTALLATION

One extraction well (SVE-1) and five observation wells (OP-1 through OP-5) will be installed in CI Plant 4 (Figure 4). The extraction and observation wells will be installed 1 to 2 weeks before the SVE pilot study begins. Farallon will contract with a drilling company to install extraction well SVE-1 and observation wells OP-1 through OP-5 to a depth of 4.5 feet bgs using a vacuum excavator. A vacuum excavator will be used because the depth required for the extraction and observation wells is shallow and the borings typically are cleared for subsurface utilities using a vacuum excavator or hand tools to a minimum depth of 5 feet bgs prior to drilling. The screened interval for extraction well SVE-1 targets the less-permeable soil matrix with the highest concentrations of TCE in soil, reducing possible preferential airflow pathways through the more-permeable soil from 5 feet bgs to the top of the Water Table Interval with concentrations of PCE and TCE less than PCULs.

Extraction well SVE-1 will be constructed using 4-inch-diameter Schedule 40 polyvinyl chloride and screened from 2.5 to 4.5 feet bgs with a 0.010-inch slotted screen in accordance with the Minimum Standards for Construction and Maintenance of Wells as established in WAC 173-160. A silica sand pack will be placed in the boring annulus space from the bottom of the boring to a depth of 2 feet bgs, followed by a 0.5-foot section of hydrated bentonite chips to form a seal. The remaining annulus space will be backfilled with concrete to the ground surface. The extraction well will be set in a 12-inch flush-mounted monument (Figure 6).

Five semi-permanent observation wells, OP-1 through OP-5, will be constructed in a similar manner to extraction well SVE-1; however, the well casing will be 1 inch in diameter (Figure 6).

The observation wells will be spaced around extraction well SVE-1, approximately 10, 15, 20, 25, and 30 feet in different directions, as feasible pending building or tenant use constraints within the CI Plant 4 permit (Figure 4).

Soil cuttings generated during installation of the proposed SVE extraction and observation wells will be placed in a labeled U.S. Department of Transportation-approved steel drum and stored at CI Plant 4 pending disposal.

5.6 PILOT TEST EQUIPMENT

The SVE pilot study equipment will consist of the following:

- A 1-horsepower skid-mounted regenerative blower at a minimum (equivalent to a Rotron DR 404) capable of 50 inches of water-column vacuum and flow rates of up to 105 standard cubic feet per minute;
- A moisture separator with a vacuum indicator, vacuum relief valve, and drain valve;
- A manifold consisting of a series of valves, vacuum indicators, and a flowmeter capable of monitoring extraction airflow rates ranging from 0.66 to 100 standard cubic feet per minute and vacuum ranging from 0.1 to 80 inches of water column; and
- Rubberized flexible couplers, flexible hosing, and/or Schedule 40 polyvinyl chloride fittings to connect equipment from the SVE extraction well to a vapor discharge point outside CI Plant 4.

The observation wells will have vacuum-tight fittings terminating in a ball valve for connection to a vacuum gauge to monitor observed vacuum throughout the pilot study activities. A process and instrumentation diagram is provided on Figure 6.

In accordance with the minimal requirements of ASTM Standard E2121-13, the temporary SVE vent stack will be placed in the north parking lot of CI Plant 4, at a height of 15 feet above the ground surface and at least 10 feet from any building opening, to mitigate impacts to potential receptors (Figure 4). The roof of CI Plant 4 is over 25 feet above the ground surface, so it is impracticable to design the test equipment for the SVE pilot study so that the temporary SVE vent stack would be above the roof line. There are no other buildings immediately downwind of the area where the temporary vent stack will be installed.

5.7 SVE PILOT STUDY PROCEDURES

The SVE pilot study will consist of an initial SVE step test to evaluate the optimal vacuum pressure required to achieve an airflow rate that will be used in the longer-duration constant vacuum test. The pilot study will consist of two pilot test components conducted over a 2-day period. On the afternoon prior to the SVE pilot study, Farallon Engineers will set up the temporary SVE equipment and conduct preliminary testing of the equipment to ensure satisfactory operation.

The pilot study work schedule is as follows:

- **Day 1.** SVE step test.
- **Day 2.** SVE constant vacuum test and breakdown of equipment and SVE pilot test materials.

Prior to implementing the SVE step test, baseline vacuum readings will be collected from observations wells. The SVE step test will be conducted during the first day of pilot testing. The SVE step test is conducted by incrementally increasing the vacuum applied to the SVE extraction well. The maximum amount of vacuum that can be applied to the SVE extraction well is based on the distance from the top of the exposed well screen to the top of the groundwater table, or the available equipment. Based on the blower curve for a 1-horsepower regenerative blower, the anticipated maximum vacuum applied to the SVE extraction well will be 50 inches of water column. The incremental steps will be applied at 30, 70, and 100 percent of the maximum vacuum rating for the blower. During each stage of the step test, the following parameters will be monitored on 15-minute intervals, at a minimum, until criteria stabilize (less than 5 percent difference between events) or for a maximum duration of 2 to 3 hours at each vacuum step:

- Vacuum applied to the SVE extraction well;
- Extraction flow rate from the SVE extraction well;
- Extracted vapor temperature;
- Extracted vapor stream volatile organic compound measurements with a photoionization detector; and
- Vacuum at the observation wells.

Vacuum readings will be recorded as gauge pressure readings.

Based on the results of the SVE step test, Farallon will determine the ideal vacuum and extraction flow rate to complete the SVE constant vacuum test, which is the second component of the SVE pilot study. Optimum vacuum and flow rate will be determined from the observed vacuum and flow rates from the extraction well, CVOC vapor recovery, response observed at observation wells, and influence on groundwater levels. Optimum flow rate also will be determined from the radius-of-influence determined in the step-test.

The SVE constant vacuum test will occur immediately following the step test and operate for approximately 24 hours (Days 1 and 2). The monitored test parameters cited above for the step test will also be monitored and recorded at 15-minute intervals during the SVE constant vacuum test. The monitoring time interval may be modified during the pilot test based on field observations. The longer-duration SVE constant vacuum test will help evaluate steady-state emissions concentrations and site-specific SVE operational airflow and vacuum.

Vapor samples will be collected in Summa canisters and/or Tedlar bags during the pilot study and sent to the Fremont Analytical of Seattle, Washington for laboratory analysis. Vapor samples will

be collected at the end of each step test, at peak concentration of extraction vapor as measured with the photoionization detector, and at the end of the SVE constant vacuum test. Samples will be analyzed for PCE and TCE by EPA Method TO-15 (Summa canisters) or 8260C (Tedlar bags).

Condensate water collected in the moisture separator will be transferred to a labeled U.S. Department of Transportation-approved steel drum and stored at CI Plant 4, where it can be secured pending receipt of the waste-profiling results. A water sample will be collected from the drum for waste profiling. The analytical results of the water sample will be used to develop a waste profile for disposal.

6.0 INTERIM ACTION DOCUMENTATION

This section summarizes the interim action documents that will be generated during the interim action activities.

6.1 PROJECT DOCUMENTS AND REPORTING

6.1.1 Health and Safety Plan

This Work Plan includes a draft HASP for the field activities in accordance with WAC 173-340-810. The HASP complies with the requirements of the Occupational Safety and Health Act of 1970 and the Washington Industrial Safety and Health Act (49.17 RCW).

6.1.2 SVE Pilot Study Work Plan

The Work Plan provides details regarding the design and implementation of the SVE pilot study for the interim action at CI Plant 4 in SU2. The SVE pilot study will be focused on vadose zone soil with concentrations of CVOCs that exceed PCULs.

6.1.3 SVE Pilot Study Completion Report

The SVE Pilot Study Completion Report will provide the laboratory analytical data and field observations resulting from the SVE pilot study and a recommendation regarding future implementation of a full-scale SVE system. Based on the results of the meeting between Farallon and Ecology that will follow the SVE pilot study, this report may be incorporated into the SVE System Design and Implementation Work Plan as an appendix.

6.1.4 SVE System Design and Implementation Work Plan

The SVE System Design and Implementation Work Plan will provide details regarding full-scale implementation of the SVE interim action if the pilot study is successful. The SVE System Design and Implementation Work Plan will include the final SVE engineering design details and system layout, performance and confirmation monitoring plan, criteria for evaluating effectiveness of the interim action, and reporting requirements. The SVE System Design and Implementation Work Plan will include updated copies of the following supporting documents.

6.1.5 Quarterly Status Reports

Quarterly status reports will be submitted to Ecology in the standard Quarterly Progress Reports prepared by CI. The Quarterly Progress Reports will include a summary of the interim action activities conducted. If necessary, more-frequent progress reporting via email messages or meetings with Ecology will be conducted to refine the scope of work based on performance monitoring data for the interim action.

6.1.6 Interim Action Completion Report

An Interim Action Completion Report will be submitted to Ecology once the performance monitoring data indicate that the interim action objectives are achieved during operation of the full-scale SVE system. The Interim Action Completion Report will include a summary of the overall interim action results and conclusions. The Interim Action Completion Report will summarize:

- Interim action objectives;
- Background information relevant to the successful completion of the interim action;
- SVE pilot study design and implementation activities;
- Results of the SVE pilot study;
- Final design of the full-scale SVE system based on the results of the SVE pilot study;
- Performance and confirmation monitoring data; and
- Conclusions regarding the effectiveness of SVE in reducing COC concentrations in vadose zone soil and whether further action is required during the cleanup action.

7.0 SCHEDULE AND REPORTING

This section summarizes the schedule for implementation of the interim action and associated reporting deliverables that will be produced. The anticipated interim action schedule is presented as a timeline in Appendix B. The milestones associated with implementation of the interim action and the potential schedule to achieve those milestones are provided below.

Milestones	**Anticipated Schedule**
Submittal of Draft SVE Pilot Study Work Plan	Within 45 Days of Ecology authorization to proceed with a pilot test of the SVE cleanup technology.
Submittal of Final SVE Pilot Study Work Plan	Within 15 days of receipt of Ecology comments on the Draft SVE Pilot Study Work Plan, assuming Ecology comments are minimal.
Completion of SVE Pilot Study	Within 30 days of Ecology approval of the Final SVE Pilot Study Work Plan, which includes time required to obtain laboratory analytical data.
Data Submittal and Ecology Meeting	Analytical data, pressures, and flow rates will be submitted to Ecology within 15 days of receipt of the final laboratory analytical data. A subsequent meeting will be scheduled to discuss the results of the SVE pilot study.
State Environmental Policy Act Checklist and Public Comment Period	Initiated upon Ecology approval of the use of SVE technology for the interim action.
Submittal of Draft SVE Pilot Study Completion Report	Within 45 days following receipt of the final laboratory analytical data. This document may be generated as an appendix to the Draft SVE System Design and Implementation Work Plan based on the results of the meeting with Ecology
Submittal of Final SVE Pilot Study Completion Report	Within 15 days of receipt of Ecology comments on the Draft SVE Pilot Study Completion Report, assuming Ecology comments are minimal.
Submittal of Draft SVE System Design and Implementation Work Plan	Within 60 days of Ecology approval to proceed with SVE implementation.

Submittal of Final SVE System Design and Implementation Work Plan	Within 30 days of receipt of Ecology comments on the Draft SVE System Design and Implementation Work Plan, assuming Ecology comments are minimal.

If the SVE technology is technically feasible, the remaining details regarding the construction and start-up schedule will be provided based on the SVE system design details and discussions with CI regarding an implementation schedule that can be completed without significant impacts to CI Plant 4 operations. The implementation schedule for the full-scale SVE system will be provided in the SVE System Design and Implementation Work Plan.

8.0 REFERENCES

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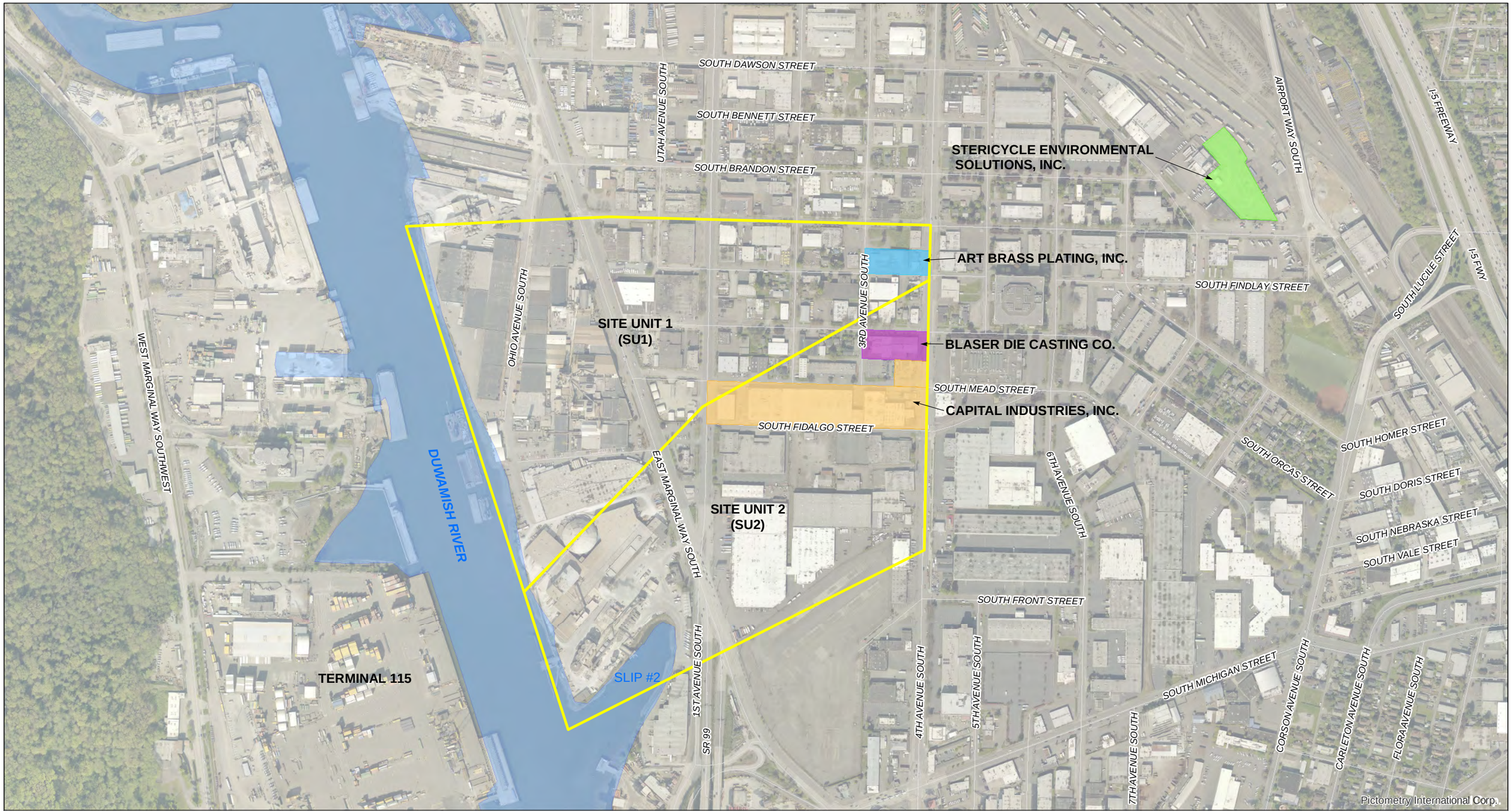
West of Fourth Group and Pacific Groundwater Group. 2016. *West of 4th Site Unit 2 Feasibility Study, Seattle, Washington*. August 11.

FIGURES

FINAL CAPITAL INDUSTRIES PLANT 4
SOIL VAPOR EXTRACTION PILOT STUDY WORK PLAN
West of 4th Group Site
5801 3rd Avenue South
Seattle, Washington

Farallon PN: 457-008



LEGEND

- ART BRASS PLATING, INC.
- BLASER DIE CASTING CO.
- CAPITAL INDUSTRIES, INC.
- STERICYCLE ENVIRONMENTAL SOLUTIONS, INC.
- SITE UNIT BOUNDARY

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FIGURE 1

SITE DIAGRAM
WEST OF 4TH GROUP SITE
CAPITAL INDUSTRIES, INC.
5801 3RD AVENUE SOUTH
SEATTLE, WASHINGTON

FARALLON PN: 457-008

Drawn By: tperrin | Checked By: JK | Date: 5/7/2018 | Disc Reference:

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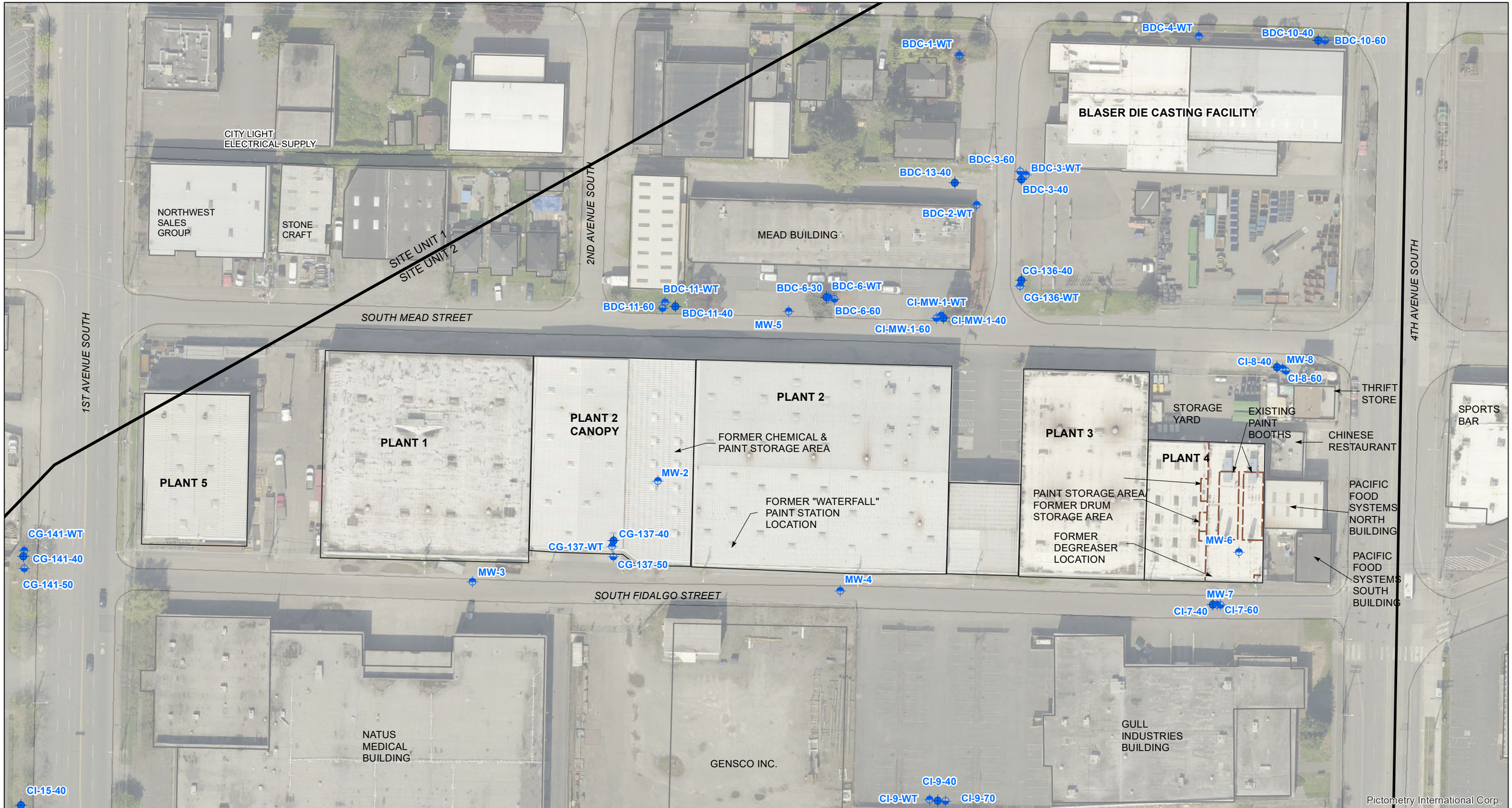

LEGEND

- WATER TABLE INTERVAL MONITORING WELL
- SHALLOW INTERVAL MONITORING WELL
- INTERMEDIATE INTERVAL MONITORING WELL
- PLANT 4 CURRENT INTERIOR FEATURE
- SITE UNIT BOUNDARY
- BUILDING

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

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FIGURE 2

PROPERTY DIAGRAM
WEST OF 4TH GROUP SITE
CAPITAL INDUSTRIES, INC.
5801 3RD AVENUE SOUTH
SEATTLE, WASHINGTON

FARALLON PN: 457-008

Drawn By: tperrin | Checked By: JK | Date: 3/13/2019 | Disc Reference:

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PLANT 3

POWER LINE TO PLANT 4 CONTROL ROOM

STORAGE YARD

FORMER THRIFT STORE 5801 4TH AVE S

4TH AVENUE SOUTH

SPORTS BAR

ELECTRICAL CONTROL ROOM

CHINESE RESTAURANT 5807 4TH AVE S

EXISTING PAINT BOOTHS

INTERIOR WALL

P4-4

P4-9

P4-2

P4-3

DRUM STORAGE AREA

PLANT 4

PAINT STORAGE AREA/ FORMER DRUM STORAGE AREA

P4-1

P4-7

P4-8

PACIFIC FOOD SYSTEMS NORTH BUILDING 5815 4TH AVE S

SECONDARY CONTAINMENT FOR SOLVENT STILL

STORAGE YARD

P4-6

P4-5

OVERHEAD GAS LINE

P4-13

P4-14

RESTROOM

PACIFIC FOOD SYSTEMS SOUTH BUILDING 5815 4TH AVE S

P4-12

P4-11

P4-10

SOUTH FIDALGO STREET

P4-4	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	1.0	0.0010 U	**0.060**	0.0022	0.0010 U	0.0010 U
	3.0	0.0011 U	0.0090	0.0011 U	0.0011 U	0.0011 U
	5.0	0.0010 U	0.010	0.0010 U	0.0010 U	0.0010 U
	8.0	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U

P4-2	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	1.0	0.00099 U	0.0039	0.00099 U	0.00099 U	0.00099 U
	3.0	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U
	5.0	0.00096 U	0.002	0.00096 U	0.00096 U	0.00096 U
	8.0	0.0015 U	0.0015 U	0.0015 U	0.0015 U	0.0015 U

P4-3	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	1.0	0.00089 U	0.0069	0.00089 U	0.00089 U	0.00089 U
	3.0	0.0010 U	0.0028	0.0010 U	0.0010 U	0.0010 U
	5.0	0.0011 U	0.0028	0.0011 U	0.0011 U	0.0011 U
	6.3	0.0012 U	0.0053	0.0012 U	0.0012 U	0.0012 U
	8.0	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U

P4-1	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	1.0	0.0085	**0.045**	0.00098 U	0.00098 U	0.00098 U
	3.0	0.0013	0.0068	0.00099 U	0.00099 U	0.00099 U
	5.0	0.0031	0.015	0.0010 U	0.0010 U	0.0010 U
	7.8	0.0036	0.0068	0.0016 U	0.0016 U	0.0016 U

P4-5	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	1.0	0.012	0.013	0.00099 U	0.00099 U	0.00099 U
	3.0	0.0087	0.010	0.0010 U	0.0010 U	0.0010 U
	5.0	0.016	0.016	0.0010 U	0.0010 U	0.0010 U
	6.0	0.023	0.023	0.0012 U	0.0012 U	0.0012 U
	8.0	0.0094	0.0074	0.0011 U	0.0011 U	0.0011 U

P4-13	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	1.0	0.0029	0.004	0.0010 U	0.0010 U	0.0010 U
	3.0	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U
	5.0	0.00097 U	0.00097 U	0.00097 U	0.00097 U	0.00097 U
	8.0	0.0016	0.0018	0.0011 U	0.0011 U	0.0011 U

P4-14	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	1.0	0.018	0.0095	0.0011 U	0.0011 U	0.0011 U
	3.0	0.0095	0.0069	0.0010 U	0.0010 U	0.0010 U
	5.0	0.016	0.0092	0.00096 U	0.00096 U	0.00096 U
	8.0	0.0076	0.0040	0.0014 U	0.0014 U	0.0014 U

P4-12	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	1.0	0.028	0.0028	0.0012 U	0.0012 U	0.0012 U
	2.8	0.0059	0.0011 U	0.0011 U	0.0011 U	0.0011 U
	5.0	0.0089	0.0011	0.0010 U	0.0010 U	0.0010 U
	8.0	0.0014	0.0011 U	0.0011 U	0.0011 U	0.0011 U

P4-9	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	1.0	0.021	0.020	0.0010 U	0.0010 U	0.0010 U
	2.0	0.0098	0.0059	0.0010 U	0.0010 U	0.0010 U
	5.0	0.0036	0.0028	0.0010 U	0.0010 U	0.0010 U
	8.0	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U

P4-7	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	1.0	**0.26**	**0.48**	0.0055	0.0013	0.00094 U
	3.0	0.0073	0.019	0.0010 U	0.0010 U	0.0010 U
	5.0	0.026	**0.057**	0.0013	0.0010 U	0.0010 U
	6.9	0.0010 U	0.0017	0.0010 U	0.0010 U	0.0010 U
	8.0	0.0059	0.0094	0.0012 U	0.0012 U	0.0012 U

P4-8	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	1.0	**0.33**	**0.36**	0.0081	0.0015	0.00094 U
	3.0	0.035	**0.076**	0.0053	0.0011 U	0.0011 U
	5.0	0.050	**0.12**	0.0088	0.00098 U	0.00098 U
	8.0	0.025	0.022	0.0015 U	0.0015 U	0.0015 U

P4-6	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	1.0	**0.64**	**0.32**	0.0010 U	0.0010 U	0.0010 U
	3.0	0.040	**0.036**	0.0010 U	0.0010 U	0.0010 U
	5.7	0.066	**0.044**	0.00096 U	0.00096 U	0.00096 U
	8.0	0.015	0.0055	0.0014 U	0.0014 U	0.0014 U

P4-10	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	1.0	0.019	0.00094 U	0.00094 U	0.00094 U	0.00094 U
	3.0	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U
	5.0	0.0015	0.00099 U	0.00099 U	0.00099 U	0.00099 U
	8.0	0.0031	0.0015 U	0.0015 U	0.0015 U	0.0015 U

P4-11	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	1.0	0.054	0.0031	0.0010 U	0.0010 U	0.0010 U
	3.0	0.005	0.0010 U	0.0010 U	0.0010 U	0.0010 U
	5.0	0.0059	0.0011 U	0.0011 U	0.0011 U	0.0011 U
	8.0	0.0039	0.0010 U	0.0010 U	0.0010 U	0.0010 U

3396.253
2252.423
1493.826
990.718
657.052
435.763
289.001
191.668
127.116
84.304
55.911
37.081
24.592
16.310
10.817
7.174
4.758
3.155
2.093
1.388
0.920

PCE ug/m^3

LEGEND

- DIRECT-PUSH SOIL BORING
- PLANT 4 CURRENT INTERIOR FEATURE
- HYDRANT
- WATER DISTRIBUTION MAIN
- WATER SERVICE LINE
- HYDRANT LATERAL
- COMBINED SANITARY SEWER/ STORMWATER MANHOLE
- COMBINED SANITARY SEWER/STORMWATER MAIN LINE AND FLOW DIRECTION
- SANITARY SEWER LATERAL AND FLOW DIRECTION
- STORMWATER CATCH BASIN
- STORMWATER SIDE SEWER/LATERAL

NOTES:
SOIL RESULTS ARE IN MILLIGRAMS PER KILOGRAM

BOLD = INDICATES CONCENTRATIONS EXCEED WEST OF 4th GROUP SOIL INVESTIGATION PRELIMINARY CLEANUP LEVELS
U = INDICATES CONCENTRATIONS NOT DETECTED ABOVE THE STATED LABORATORY PRACTICAL QUANTITATION LIMIT
CI = CAPITAL INDUSTRIES
PCE = TETRACHLOROETHENE
TCE = TRICHLOROETHENE
cis-1,2-DCE = CIS-1,2-DICHLOROETHENE
trans-1,2-DCE = TRANS-1,2-DICHLOROETHENE
VC = VINYL CHLORIDE

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FIGURE 3A

CI PLANT 4 SOIL ANALYTICAL RESULTS AND TETRACHLOROETHENE SOIL GAS RESULTS
WEST OF 4TH GROUP SITE
CAPITAL INDUSTRIES, INC.
5801 3RD AVENUE SOUTH
SEATTLE, WASHINGTON

FARALLON PN: 457-008

Drawn By: tperrin | Checked By: JK | Date: 3/13/2019 | Disc Reference:
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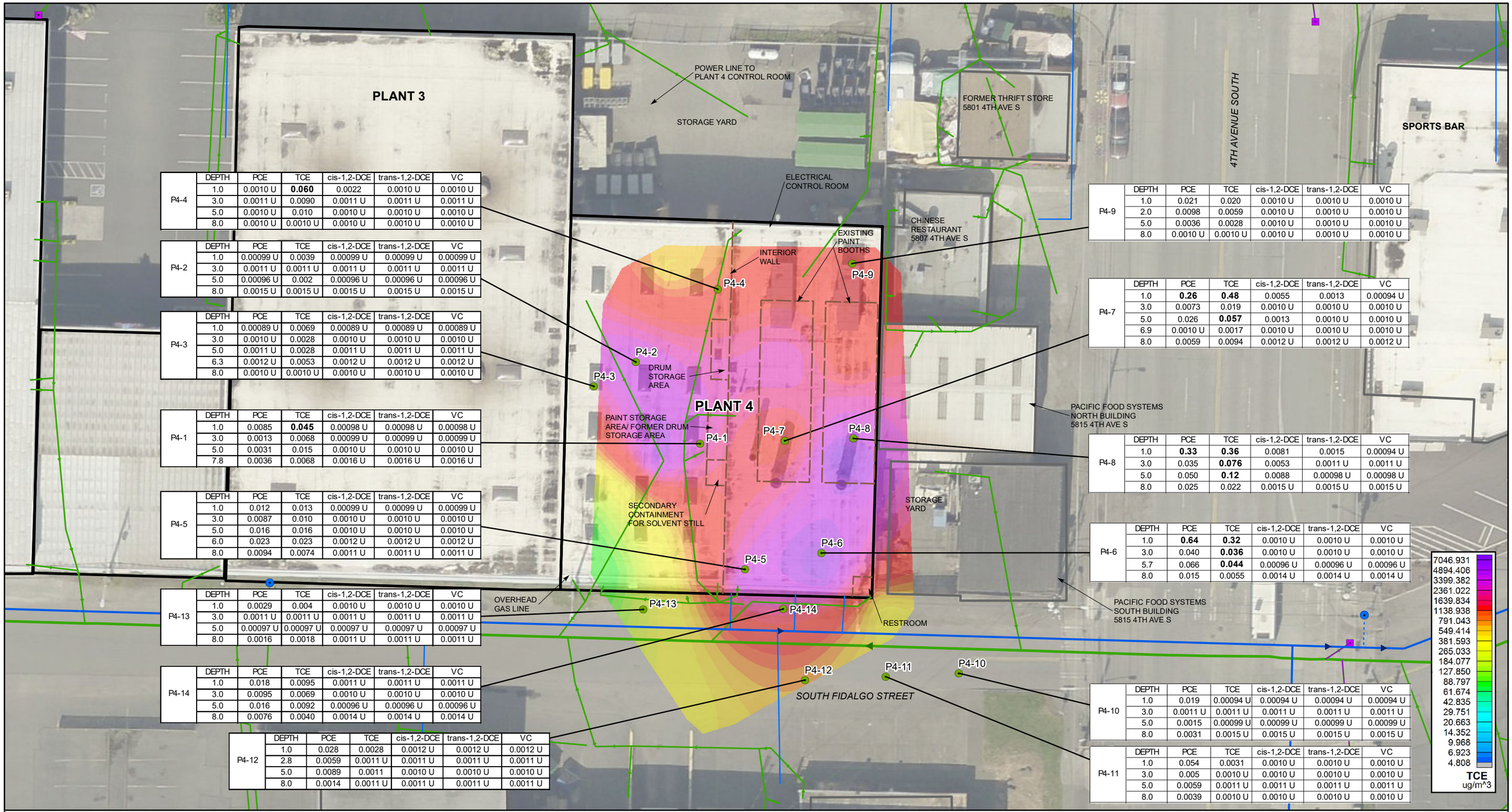

P4-4	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	1.0	0.0010 U	**0.060**	0.0022	0.0010 U	0.0010 U
	3.0	0.0011 U	0.0090	0.0011 U	0.0011 U	0.0011 U
	5.0	0.0010 U	0.010	0.0010 U	0.0010 U	0.0010 U
	8.0	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U

P4-2	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	1.0	0.00099 U	0.0039	0.00099 U	0.00099 U	0.00099 U
	3.0	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U
	5.0	0.00096 U	0.002	0.00096 U	0.00096 U	0.00096 U
	8.0	0.0015 U	0.0015 U	0.0015 U	0.0015 U	0.0015 U

P4-3	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	1.0	0.00089 U	0.0069	0.00089 U	0.00089 U	0.00089 U
	3.0	0.0010 U	0.0028	0.0010 U	0.0010 U	0.0010 U
	5.0	0.0011 U	0.0028	0.0011 U	0.0011 U	0.0011 U
	6.3	0.0012 U	0.0053	0.0012 U	0.0012 U	0.0012 U
	8.0	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U

P4-1	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	1.0	0.0085	**0.045**	0.00098 U	0.00098 U	0.00098 U
	3.0	0.0013	0.0068	0.00099 U	0.00099 U	0.00099 U
	5.0	0.0031	0.015	0.0010 U	0.0010 U	0.0010 U
	7.8	0.0036	0.0068	0.0016 U	0.0016 U	0.0016 U

P4-5	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	1.0	0.012	0.013	0.00099 U	0.00099 U	0.00099 U
	3.0	0.0087	0.010	0.0010 U	0.0010 U	0.0010 U
	5.0	0.016	0.016	0.0010 U	0.0010 U	0.0010 U
	6.0	0.023	0.023	0.0012 U	0.0012 U	0.0012 U
	8.0	0.0094	0.0074	0.0011 U	0.0011 U	0.0011 U

P4-13	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	1.0	0.0029	0.004	0.0010 U	0.0010 U	0.0010 U
	3.0	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U
	5.0	0.00097 U	0.00097 U	0.00097 U	0.00097 U	0.00097 U
	8.0	0.0016	0.0018	0.0011 U	0.0011 U	0.0011 U

P4-14	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	1.0	0.018	0.0095	0.0011 U	0.0011 U	0.0011 U
	3.0	0.0095	0.0069	0.0010 U	0.0010 U	0.0010 U
	5.0	0.016	0.0092	0.00096 U	0.00096 U	0.00096 U
	8.0	0.0076	0.0040	0.0014 U	0.0014 U	0.0014 U

P4-12	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	1.0	0.028	0.0028	0.0012 U	0.0012 U	0.0012 U
	2.8	0.0059	0.0011 U	0.0011 U	0.0011 U	0.0011 U
	5.0	0.0089	0.0011	0.0010 U	0.0010 U	0.0010 U
	8.0	0.0014	0.0011 U	0.0011 U	0.0011 U	0.0011 U

P4-9	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	1.0	0.021	0.020	0.0010 U	0.0010 U	0.0010 U
	2.0	0.0098	0.0059	0.0010 U	0.0010 U	0.0010 U
	5.0	0.0036	0.0028	0.0010 U	0.0010 U	0.0010 U
	8.0	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U

P4-7	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	1.0	**0.26**	**0.48**	0.0055	0.0013	0.00094 U
	3.0	0.0073	0.019	0.0010 U	0.0010 U	0.0010 U
	5.0	0.026	**0.057**	0.0013	0.0010 U	0.0010 U
	6.9	0.0010 U	0.0017	0.0010 U	0.0010 U	0.0010 U
	8.0	0.0059	0.0094	0.0012 U	0.0012 U	0.0012 U

P4-8	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	1.0	**0.33**	**0.36**	0.0081	0.0015	0.00094 U
	3.0	0.035	**0.076**	0.0053	0.0011 U	0.0011 U
	5.0	0.050	**0.12**	0.0088	0.00098 U	0.00098 U
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P4-6	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	1.0	**0.64**	**0.32**	0.0010 U	0.0010 U	0.0010 U
	3.0	0.040	**0.036**	0.0010 U	0.0010 U	0.0010 U
	5.7	0.066	**0.044**	0.00096 U	0.00096 U	0.00096 U
	8.0	0.015	0.0055	0.0014 U	0.0014 U	0.0014 U

P4-10	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	1.0	0.019	0.00094 U	0.00094 U	0.00094 U	0.00094 U
	3.0	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U
	5.0	0.0015	0.00099 U	0.00099 U	0.00099 U	0.00099 U
	8.0	0.0031	0.0015 U	0.0015 U	0.0015 U	0.0015 U

P4-11	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	1.0	0.054	0.0031	0.0010 U	0.0010 U	0.0010 U
	3.0	0.005	0.0010 U	0.0010 U	0.0010 U	0.0010 U
	5.0	0.0059	0.0011 U	0.0011 U	0.0011 U	0.0011 U
	8.0	0.0039	0.0010 U	0.0010 U	0.0010 U	0.0010 U

LEGEND

- DIRECT-PUSH SOIL BORING
- PLANT 4 CURRENT INTERIOR FEATURE
- HYDRANT
- WATER DISTRIBUTION MAIN
- WATER SERVICE LINE
- HYDRANT LATERAL
- COMBINED SANITARY SEWER/ STORMWATER MANHOLE
- COMBINED SANITARY SEWER/STORMWATER MAIN LINE AND FLOW DIRECTION
- SANITARY SEWER LATERAL AND FLOW DIRECTION
- STORMWATER CATCH BASIN
- STORMWATER SIDE SEWER/LATERAL

SOIL RESULTS ARE IN MILLIGRAMS PER KILOGRAM

BOLD = INDICATES CONCENTRATIONS EXCEED WEST OF 4th GROUP SOIL INVESTIGATION PRELIMINARY CLEANUP LEVELS
U = INDICATES CONCENTRATIONS NOT DETECTED ABOVE THE STATED LABORATORY PRACTICAL QUANTITATION LIMIT
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PCE = TETRACHLOROETHENE
TCE = TRICHLOROETHENE
cis-1,2-DCE = CIS-1,2-DICHLOROETHENE
trans-1,2-DCE = TRANS-1,2-DICHLOROETHENE
VC = VINYL CHLORIDE

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FIGURE 3B

CI PLANT 4 SOIL ANALYTICAL RESULTS AND TRICHLOROETHENE SOIL GAS RESULTS
WEST OF 4TH GROUP SITE
CAPITAL INDUSTRIES, INC.
5801 3RD AVENUE SOUTH
SEATTLE, WASHINGTON

FARALLON PN: 457-008

Drawn By: tperrin | Checked By: JK | Date: 3/13/2019 | Disc Reference:
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PLANT 3

POWER LINE TO PLANT 4 CONTROL ROOM

STORAGE YARD

ELECTRICAL CONTROL ROOM

FORMER THRIFT STORE 5801 4TH AVE S

4TH AVENUE SOUTH

SPORTS BAR

CHINESE RESTAURANT 5807 4TH AVE S

EXISTING PAINT BOOTHS

INTERIOR WALL

PLANT 4

DRUM STORAGE AREA

PAINT STORAGE AREA/ FORMER DRUM STORAGE AREA

SECONDARY CONTAINMENT FOR SOLVENT STILL

PACIFIC FOOD SYSTEMS NORTH BUILDING 5815 4TH AVE S

STORAGE YARD

PACIFIC FOOD SYSTEMS SOUTH BUILDING 5815 4TH AVE S

OVERHEAD GAS LINE

RESTROOM

SOUTH FIDALGO STREET

P4-1 P4-2 P4-3 P4-4 P4-5 P4-6 P4-7 P4-8 P4-9 P4-10 P4-11 P4-12 P4-13 P4-14

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-4	1.0	0.0010 U	**0.060**	0.0022	0.0010 U	0.0010 U
	3.0	0.0011 U	0.0090	0.0011 U	0.0011 U	0.0011 U
	5.0	0.0010 U	0.010	0.0010 U	0.0010 U	0.0010 U
	8.0	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-2	1.0	0.00099 U	0.0039	0.00099 U	0.00099 U	0.00099 U
	3.0	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U
	5.0	0.00096 U	0.002	0.00096 U	0.00096 U	0.00096 U
	8.0	0.0015 U	0.0015 U	0.0015 U	0.0015 U	0.0015 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-3	1.0	0.00089 U	0.0069	0.00089 U	0.00089 U	0.00089 U
	3.0	0.0010 U	0.0028	0.0010 U	0.0010 U	0.0010 U
	5.0	0.0011 U	0.0028	0.0011 U	0.0011 U	0.0011 U
	6.3	0.0012 U	0.0053	0.0012 U	0.0012 U	0.0012 U
	8.0	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-1	1.0	0.0085	**0.045**	0.00098 U	0.00098 U	0.00098 U
	3.0	0.0013	0.0068	0.00099 U	0.00099 U	0.00099 U
	5.0	0.0031	0.015	0.0010 U	0.0010 U	0.0010 U
	7.8	0.0036	0.0068	0.0016 U	0.0016 U	0.0016 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-5	1.0	0.012	0.013	0.00099 U	0.00099 U	0.00099 U
	3.0	0.0087	0.010	0.0010 U	0.0010 U	0.0010 U
	5.0	0.016	0.016	0.0010 U	0.0010 U	0.0010 U
	6.0	0.023	0.023	0.0012 U	0.0012 U	0.0012 U
	8.0	0.0094	0.0074	0.0011 U	0.0011 U	0.0011 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-13	1.0	0.0029	0.004	0.0010 U	0.0010 U	0.0010 U
	3.0	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U
	5.0	0.00097 U	0.00097 U	0.00097 U	0.00097 U	0.00097 U
	8.0	0.0016	0.0018	0.0011 U	0.0011 U	0.0011 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-14	1.0	0.018	0.0095	0.0011 U	0.0011 U	0.0011 U
	3.0	0.0095	0.0069	0.0010 U	0.0010 U	0.0010 U
	5.0	0.016	0.0092	0.00096 U	0.00096 U	0.00096 U
	8.0	0.0076	0.0040	0.0014 U	0.0014 U	0.0014 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-12	1.0	0.028	0.0028	0.0012 U	0.0012 U	0.0012 U
	2.8	0.0059	0.0011 U	0.0011 U	0.0011 U	0.0011 U
	5.0	0.0089	0.0011	0.0010 U	0.0010 U	0.0010 U
	8.0	0.0014	0.0011 U	0.0011 U	0.0011 U	0.0011 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-9	1.0	0.021	0.020	0.0010 U	0.0010 U	0.0010 U
	2.0	0.0098	0.0059	0.0010 U	0.0010 U	0.0010 U
	5.0	0.0036	0.0028	0.0010 U	0.0010 U	0.0010 U
	8.0	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-7	1.0	**0.26**	**0.48**	0.0055	0.0013	0.00094 U
	3.0	0.0073	0.019	0.0010 U	0.0010 U	0.0010 U
	5.0	0.026	**0.057**	0.0013	0.0010 U	0.0010 U
	6.9	0.0010 U	0.0017	0.0010 U	0.0010 U	0.0010 U
	8.0	0.0059	0.0094	0.0012 U	0.0012 U	0.0012 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-8	1.0	**0.33**	**0.36**	0.0081	0.0015	0.00094 U
	3.0	0.035	**0.076**	0.0053	0.0011 U	0.0011 U
	5.0	0.050	**0.12**	0.0088	0.00098 U	0.00098 U
	8.0	0.025	0.022	0.0015 U	0.0015 U	0.0015 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-6	1.0	**0.64**	**0.32**	0.0010 U	0.0010 U	0.0010 U
	3.0	0.040	**0.036**	0.0010 U	0.0010 U	0.0010 U
	5.7	0.066	**0.044**	0.00096 U	0.00096 U	0.00096 U
	8.0	0.015	0.0055	0.0014 U	0.0014 U	0.0014 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-10	1.0	0.019	0.00094 U	0.00094 U	0.00094 U	0.00094 U
	3.0	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U
	5.0	0.0015	0.00099 U	0.00099 U	0.00099 U	0.00099 U
	8.0	0.0031	0.0015 U	0.0015 U	0.0015 U	0.0015 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-11	1.0	0.054	0.0031	0.0010 U	0.0010 U	0.0010 U
	3.0	0.005	0.0010 U	0.0010 U	0.0010 U	0.0010 U
	5.0	0.0059	0.0011 U	0.0011 U	0.0011 U	0.0011 U
	8.0	0.0039	0.0010 U	0.0010 U	0.0010 U	0.0010 U

970.510
831.572
712.525
610.520
523.118
448.229
384.061
329.079
281.968
241.602
207.014
177.378
151.985
130.227
111.584
95.609
81.922
70.194
60.145
51.535
44.157

cis-1,2-DCE
ug/m^3

LEGEND

- DIRECT-PUSH SOIL BORING
- PLANT 4 CURRENT INTERIOR FEATURE
- HYDRANT
- WATER DISTRIBUTION MAIN
- WATER SERVICE LINE
- HYDRANT LATERAL
- COMBINED SANITARY SEWER/ STORMWATER MANHOLE
- COMBINED SANITARY SEWER/STORMWATER MAIN LINE AND FLOW DIRECTION
- SANITARY SEWER LATERAL AND FLOW DIRECTION
- STORMWATER CATCH BASIN
- STORMWATER SIDE SEWER/LATERAL

NOTES:
SOIL RESULTS ARE IN MILLIGRAMS PER KILOGRAM

BOLD = INDICATES CONCENTRATIONS EXCEED WEST OF 4th GROUP SOIL INVESTIGATION PRELIMINARY CLEANUP LEVELS
U = INDICATES CONCENTRATIONS NOT DETECTED ABOVE THE STATED LABORATORY PRACTICAL QUANTITATION LIMIT
CI = CAPITAL INDUSTRIES
PCE = TETRACHLOROETHENE
TCE = TRICHLOROETHENE
cis-1,2-DCE = CIS-1,2-DICHLOROETHENE
trans-1,2-DCE = TRANS-1,2-DICHLOROETHENE
VC = VINYL CHLORIDE

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FIGURE 3C

CI PLANT 4 SOIL ANALYTICAL RESULTS AND CIS-1,2,DICHLOROETHENE SOIL GAS RESULTS
WEST OF 4TH GROUP SITE
CAPITAL INDUSTRIES, INC.
5801 3RD AVENUE SOUTH
SEATTLE, WASHINGTON

FARALLON PN: 457-008

Drawn By: tperrin | Checked By: JK | Date: 3/13/2019 | Disc Reference:

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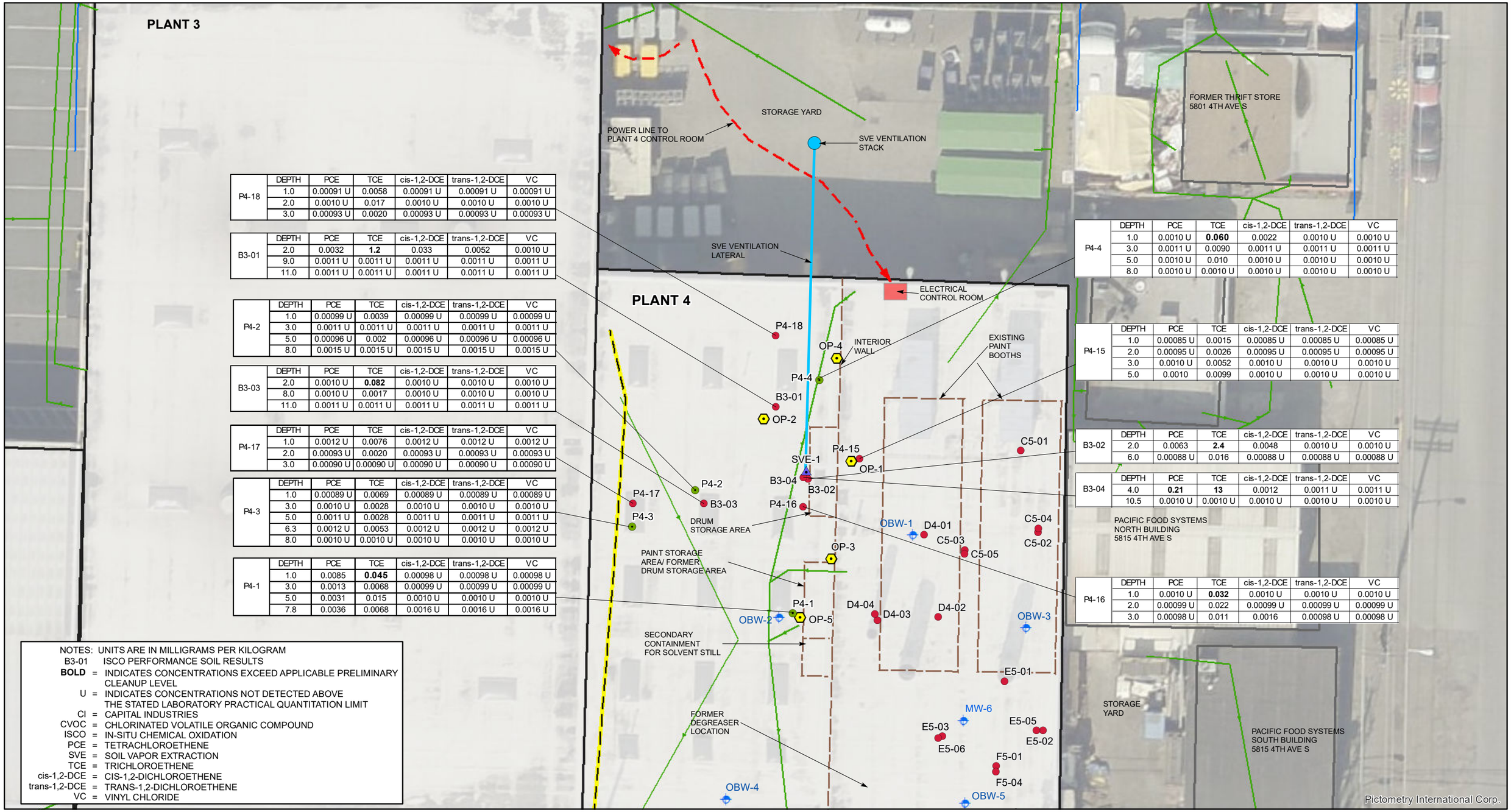

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-18	1.0	0.00091 U	0.0058	0.00091 U	0.00091 U	0.00091 U
	2.0	0.0010 U	0.017	0.0010 U	0.0010 U	0.0010 U
	3.0	0.00093 U	0.0020	0.00093 U	0.00093 U	0.00093 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
B3-01	2.0	0.0032	**1.2**	0.033	0.0052	0.0010 U
	9.0	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U
	11.0	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-2	1.0	0.00099 U	0.0039	0.00099 U	0.00099 U	0.00099 U
	3.0	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U
	5.0	0.00096 U	0.002	0.00096 U	0.00096 U	0.00096 U
	8.0	0.0015 U	0.0015 U	0.0015 U	0.0015 U	0.0015 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
B3-03	2.0	0.0010 U	**0.082**	0.0010 U	0.0010 U	0.0010 U
	8.0	0.0010 U	0.0017	0.0010 U	0.0010 U	0.0010 U
	11.0	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-17	1.0	0.0012 U	0.0076	0.0012 U	0.0012 U	0.0012 U
	2.0	0.00093 U	0.0020	0.00093 U	0.00093 U	0.00093 U
	3.0	0.00090 U	0.00090 U	0.00090 U	0.00090 U	0.00090 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-3	1.0	0.00089 U	0.0069	0.00089 U	0.00089 U	0.00089 U
	3.0	0.0010 U	0.0028	0.0010 U	0.0010 U	0.0010 U
	5.0	0.0011 U	0.0028	0.0011 U	0.0011 U	0.0011 U
	6.3	0.0012 U	0.0053	0.0012 U	0.0012 U	0.0012 U
	8.0	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-1	1.0	0.0085	**0.045**	0.00098 U	0.00098 U	0.00098 U
	3.0	0.0013	0.0068	0.00099 U	0.00099 U	0.00099 U
	5.0	0.0031	0.015	0.0010 U	0.0010 U	0.0010 U
	7.8	0.0036	0.0068	0.0016 U	0.0016 U	0.0016 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-4	1.0	0.0010 U	**0.060**	0.0022	0.0010 U	0.0010 U
	3.0	0.0011 U	0.0090	0.0011 U	0.0011 U	0.0011 U
	5.0	0.0010 U	0.010	0.0010 U	0.0010 U	0.0010 U
	8.0	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-15	1.0	0.00085 U	0.0015	0.00085 U	0.00085 U	0.00085 U
	2.0	0.00095 U	0.0026	0.00095 U	0.00095 U	0.00095 U
	3.0	0.0010 U	0.0052	0.0010 U	0.0010 U	0.0010 U
	5.0	0.0010	0.0099	0.0010 U	0.0010 U	0.0010 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
B3-02	2.0	0.0063	**2.4**	0.0048	0.0010 U	0.0010 U
	6.0	0.00088 U	0.016	0.00088 U	0.00088 U	0.00088 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
B3-04	4.0	**0.21**	**13**	0.0012	0.0011 U	0.0011 U
	10.5	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-16	1.0	0.0010 U	**0.032**	0.0010 U	0.0010 U	0.0010 U
	2.0	0.00099 U	0.022	0.00099 U	0.00099 U	0.00099 U
	3.0	0.00098 U	0.011	0.0016	0.00098 U	0.00098 U

NOTES: UNITS ARE IN MILLIGRAMS PER KILOGRAM
B3-01 ISCO PERFORMANCE SOIL RESULTS
BOLD = INDICATES CONCENTRATIONS EXCEED APPLICABLE PRELIMINARY CLEANUP LEVEL
U = INDICATES CONCENTRATIONS NOT DETECTED ABOVE THE STATED LABORATORY PRACTICAL QUANTITATION LIMIT
CI = CAPITAL INDUSTRIES
CVOC = CHLORINATED VOLATILE ORGANIC COMPOUND
ISCO = IN-SITU CHEMICAL OXIDATION
PCE = TETRACHLOROETHENE
SVE = SOIL VAPOR EXTRACTION
TCE = TRICHLOROETHENE
cis-1,2-DCE = CIS-1,2-DICHLOROETHENE
trans-1,2-DCE = TRANS-1,2-DICHLOROETHENE
VC = VINYL CHLORIDE

LEGEND

- DIRECT-PUSH SOIL BORING
- ISCO PERFORMANCE BORING
- PROPOSED SVE EXTRACTION WELL
- PROPOSED OBSERVATION WELL
- WATER TABLE INTERVAL MONITORING WELL
- SHALLOW INTERVAL MONITORING WELL
- INTERMEDIATE INTERVAL MONITORING WELL
- SVE VENTILATION LATERAL AND STACK
- ELECTRICAL LINE
- OVERHEAD GAS LINE
- PLANT 4 CURRENT INTERIOR FEATURES
- COMBINED SANITARY SEWER/STORMWATER MAIN LINE AND FLOW DIRECTION
- SANITARY SEWER LATERAL AND FLOW DIRECTION
- STORMWATER CATCH BASIN
- STORMWATER SIDE SEWER/LATERAL

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

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FIGURE 4

TCE DELINEATION AND SVE PILOT TEST PLAN
FOR CI PLANT 4
WEST OF 4TH GROUP SITE
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SEATTLE, WASHINGTON

FARALLON PN: 457-008

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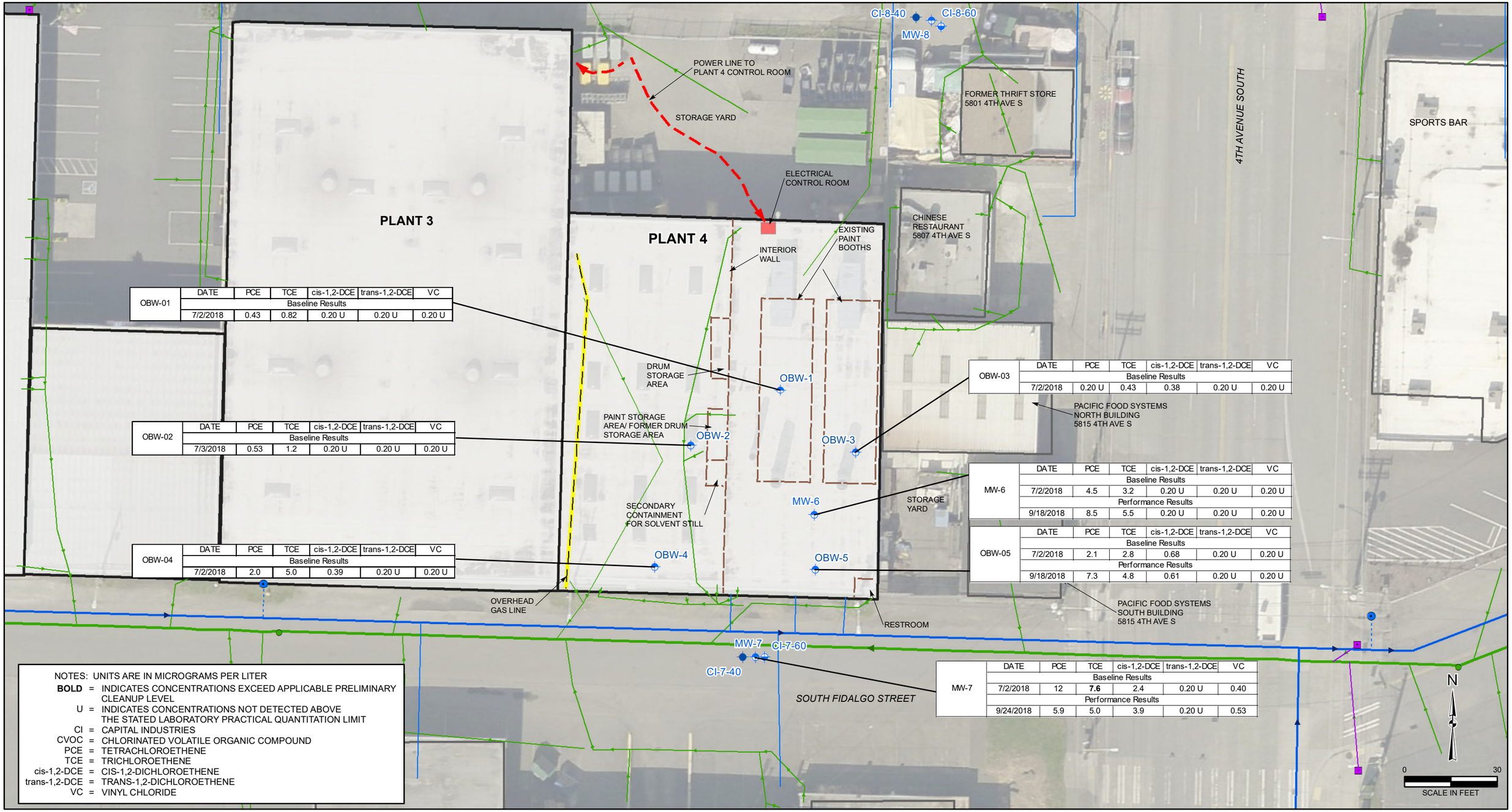

OBW-01	DATE	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	Baseline Results					
	7/2/2018	0.43	0.82	0.20 U	0.20 U	0.20 U

OBW-02	DATE	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	Baseline Results					
	7/3/2018	0.53	1.2	0.20 U	0.20 U	0.20 U

OBW-04	DATE	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	Baseline Results					
	7/2/2018	2.0	5.0	0.39	0.20 U	0.20 U

OBW-03	DATE	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	Baseline Results					
	7/2/2018	0.20 U	0.43	0.38	0.20 U	0.20 U

MW-6	DATE	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	Baseline Results					
	7/2/2018	4.5	3.2	0.20 U	0.20 U	0.20 U
	Performance Results					
	9/18/2018	8.5	5.5	0.20 U	0.20 U	0.20 U

OBW-05	DATE	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	Baseline Results					
	7/2/2018	2.1	2.8	0.68	0.20 U	0.20 U
	Performance Results					
	9/18/2018	7.3	4.8	0.61	0.20 U	0.20 U

MW-7	DATE	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	Baseline Results					
	7/2/2018	12	**7.6**	2.4	0.20 U	0.40
	Performance Results					
	9/24/2018	5.9	5.0	3.9	0.20 U	0.53

NOTES: UNITS ARE IN MICROGRAMS PER LITER
BOLD = INDICATES CONCENTRATIONS EXCEED APPLICABLE PRELIMINARY CLEANUP LEVEL
U = INDICATES CONCENTRATIONS NOT DETECTED ABOVE THE STATED LABORATORY PRACTICAL QUANTITATION LIMIT
CI = CAPITAL INDUSTRIES
CVOC = CHLORINATED VOLATILE ORGANIC COMPOUND
PCE = TETRACHLOROETHENE
TCE = TRICHLOROETHENE
cis-1,2-DCE = CIS-1,2-DICHLOROETHENE
trans-1,2-DCE = TRANS-1,2-DICHLOROETHENE
VC = VINYL CHLORIDE

LEGEND

- WATER TABLE INTERVAL MONITORING WELL
- SHALLOW INTERVAL MONITORING WELL
- INTERMEDIATE INTERVAL MONITORING WELL
- ELECTRICAL LINE
- OVERHEAD GAS LINE
- PLANT 4 CURRENT INTERIOR FEATURE
- HYDRANT
- WATER DISTRIBUTION MAIN
- WATER SERVICE LINE
- HYDRANT LATERAL
- COMBINED SANITARY SEWER/ STORMWATER MANHOLE
- COMBINED SANITARY SEWER/STORMWATER MAIN LINE AND FLOW DIRECTION
- SANITARY SEWER LATERAL AND FLOW DIRECTION
- STORMWATER CATCH BASIN
- STORMWATER SIDE SEWER/LATERAL

NOTES:
ALL LOCATIONS ARE APPROXIMATE.
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FIGURE 5

2018 CI PLANT 4 GROUNDWATER CVOC RESULTS
WEST OF 4TH GROUP SITE
CAPITAL INDUSTRIES, INC.
5801 3RD AVENUE SOUTH
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FARALLON PN: 457-008

Drawn By: tperrin
Checked By: JM
Date: 4/1/2019
Disc Reference:
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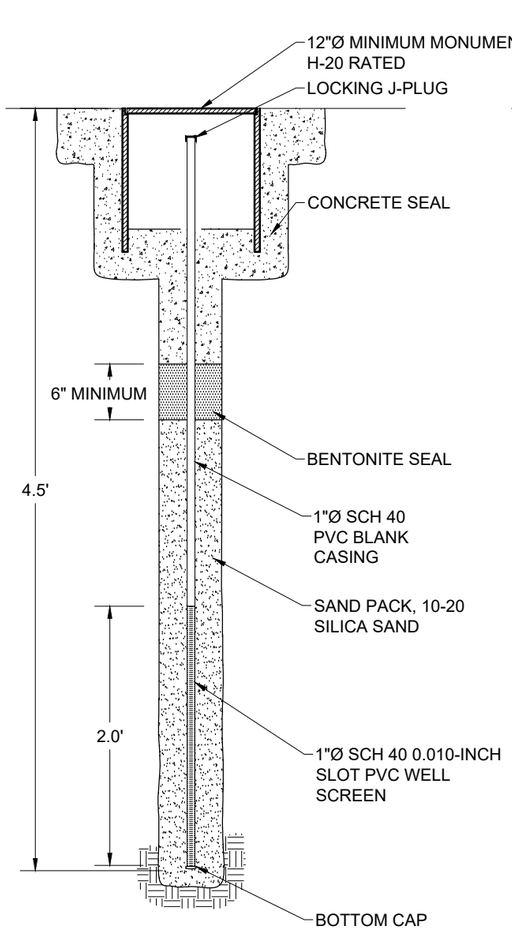
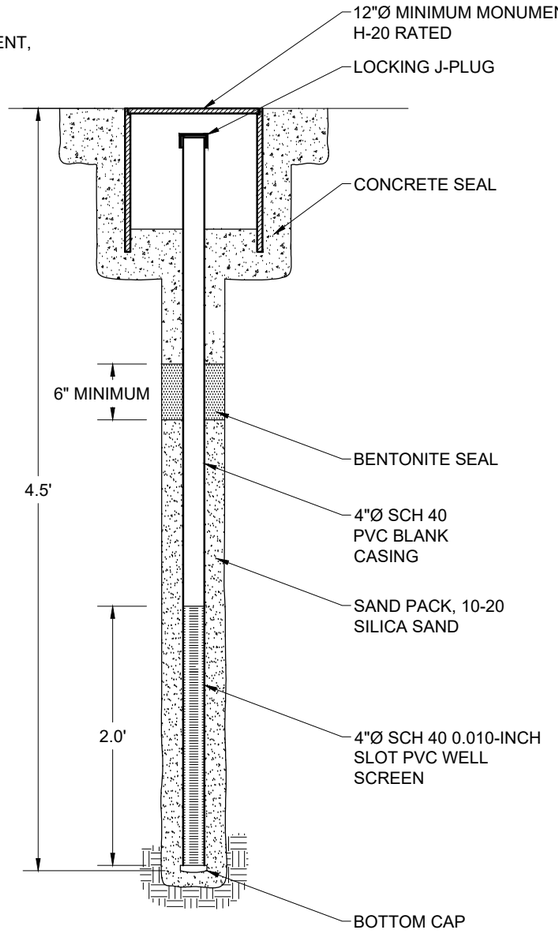


OBSERVATION WELL

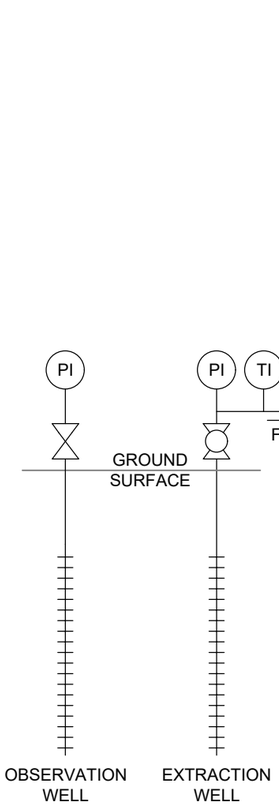
NOT TO SCALE



NOTES:
PVC = POLYVINYL CHLORIDE
SCH = SCHEDULE

EXTRACTION WELL

NOT TO SCALE



LEGEND:

- PI — PRESSURE INDICATOR
- VRV — VACUUM RELIEF VALVE
- TI — TEMPERATURE INDICATOR
- PID — PHOTOIONIZATION DETECTOR
- SP — SAMPLING PORT
- AF — AIR FILTER
- GATE VALVE
- BALL VALVE
- FLOWMETER (ROTAMETER)

PROCESS AND INSTRUMENTATION DIAGRAM

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FIGURE 6

PROCESS AND INSTRUMENTATION DIAGRAM
WEST OF 4TH GROUP SITE
CAPITAL INDUSTRIES, INC.
5801 3RD AVENUE SOUTH
SEATTLE, WASHINGTON

FARALLON PN: 457-008

Drawn By: ROL Checked By: SS Date: 05/15/2019 Disk Reference: 457-008 SVE PT

TABLES

FINAL CAPITAL INDUSTRIES PLANT 4
SOIL VAPOR EXTRACTION PILOT STUDY WORK PLAN
West of 4th Group Site
5801 3rd Avenue South
Seattle, Washington

Farallon PN: 457-008

Table 1
Summary of Preliminary Cleanup Levels Updated January 17, 2017
West of 4th Group Site
Seattle, Washington
Farallon PN: 457-008

Constituent of Concern	Carcinogen or Non-Carcinogen	Preliminary Cleanup Levels													
		Soil					Groundwater				Air		Surface Water		Sediment
		Puget Sound Background Concentrations for Metals[1]	Soil Cleanup Level Protective of Direct Contact Pathway (Unrestricted Land Use)[2]	Soil Cleanup Level Protective of Direct Contact Pathway (Industrial Land Use)[2]	Soil Cleanup Level Protective of Air Quality Based on Protection of Groundwater as Potable Drinking Water[3]	Soil Cleanup Level Protective of Groundwater Concentrations Protective of Surface Water Quality[4]	Groundwater Cleanup Level Protective of Air Quality Water Table Zone (Unrestricted Land Use)[5]	Groundwater Cleanup Level Protective of Air Quality Water Table Zone (Industrial Land Use)[5]	Groundwater Cleanup Level Protective of Surface Water[6]	Groundwater Cleanup Level Protective of Sediment[7]	Air Cleanup Level Protective of Inhalation Pathway (Unrestricted Land Use)[2]	Air Cleanup Level Protective of Inhalation Pathway (Industrial Land Use)[2]	Surface Water Cleanup Level Protective of Human Health[8]	Surface Water Cleanup Level Protective of Aquatic Life	Sediment Cleanup Level[9]
		(milligrams/kilogram)					(micrograms/liter)				(micrograms/cubic meter)		(micrograms/liter)		(milligrams/kilogram)
Tetrachloroethene	Carcinogen	--	476	21,000	0.08	0.044	116	482	2.9	36,000	9.6	40	2.9	--	190
Trichloroethene	Carcinogen	--	12	1,750	0.03	0.006	6.9	37	0.7	4,760,000	0.37	2	0.7	194 [12]	8,950
cis-1,2-dichloroethene	Non-Carcinogen	--	160	7,000	--	--	--	--	--	--	--	--	--	--	--
trans-1,2-dichloroethene	Non-Carcinogen	--	1,600	70,000	0.59	6	559	1,224	1,000	--	27.4	60	1,000	--	--
1,1-dichloroethene	Non-Carcinogen	--	4,000	175,000	0.055	0.025	538	1,176	3.2	--	91.4	200	3.2	--	--
Vinyl chloride	Carcinogen	--	0.67	87.5	0.002	0.001	1.3	12.7	0.18	543,000	0.28	2.8	0.18	210 [13]	202
1,4-dioxane	Carcinogen	--	10	1,310	0.004	0.32	2,551	25,510	78	--	0.5	5	78	--	--
Arsenic	Carcinogen	20	20	87.5	Not Applicable	0.082	Not Applicable	Not Applicable	0.14 / 5 [10]	241	Not Applicable	Not Applicable	0.14 / 5 [10]	36 [14]	7
Barium	Non-Carcinogen	--	16,000	700,000	Not Applicable	824	Not Applicable	Not Applicable	--	--	Not Applicable	Not Applicable	--	--	--
Cadmium	Non-Carcinogen	1	80	3,500	Not Applicable	1.2	Not Applicable	Not Applicable	8.8	760	Not Applicable	Not Applicable	--	8.8 [15]	5.1
Copper	Non-Carcinogen	36	3,200	140,000	Not Applicable	1.1	Not Applicable	Not Applicable	3.1 [11]	18,000	Not Applicable	Not Applicable	--	3.1 [15]	390
Iron	Non-Carcinogen	58,700	58,700	2,450,000	Not Applicable	--	Not Applicable	Not Applicable	--	--	Not Applicable	Not Applicable	1,000	--	--
Manganese	Non-Carcinogen	1,200	11,200	490,000	Not Applicable	--	Not Applicable	Not Applicable	100	--	Not Applicable	Not Applicable	100	--	--
Nickel	Non-Carcinogen	48	1,600	70,000	Not Applicable	11	Not Applicable	Not Applicable	8.2	2,200	Not Applicable	Not Applicable	100	8.2 [15]	15.9
Zinc	Non-Carcinogen	85	24,000	1,050,000	Not Applicable	101	Not Applicable	Not Applicable	81	6,600	Not Applicable	Not Applicable	1,000	81 [15]	410

NOTES:

Preliminary cleanup levels presented represent the most-stringent cleanup levels for the constituent of concern listed in the media indicated.

-- denotes no value is available. In the case of applicable or relevant and appropriate requirements (ARARs), the reference sources do not publish values for the noted chemicals. In the case of calculated values, one or more input parameters are not available.

Not Applicable denotes the constituent of concern will not affect the medium of potential concern due to an incomplete pathway.

[1] Background metals concentrations from *Natural Background Soil Metals Concentrations in Washington State* dated October 1994, Washington State Department of Ecology (Ecology) Publication No. 94-115. Arsenic background from Washington State Model Toxics Control Act Cleanup Regulation (MTCA) Table 740-1, *Method A Soil Cleanup Levels for Unrestricted Land Uses.*

[2] Cleanup level is based on standard MTCA Method B (unrestricted land use) or Method C (industrial land use) values from the Cleanup and Risk Calculations tables (CLARC).

[3] Soil cleanup levels for protection of air quality are calculated using MTCA Equation 747-1, where the potable Method B groundwater cleanup level was used as C_w. Concentrations of hazardous substances in soil that meet the potable groundwater protection standard currently are considered sufficiently protective of the air pathway for unrestricted and industrial land uses.

[4] Soil cleanup levels for protection of surface water quality are calculated using MTCA Equation 747-1, where the groundwater cleanup level protective of surface water in this table was used as C_w.

[5] Groundwater cleanup levels protective of the air pathway for unrestricted land use (residential and commercial sites) and industrial land use were derived using the following equation: Gwcul = Aircul/GIVF.

[6] Human health and marine aquatic ecologic receptors were considered. See Surface Water Cleanup Levels Protective of Human Health and Aquatic Life (Columns N and O) in this table. The more-stringent value of the two receptors has been listed for the Groundwater Cleanup Level Protective of Surface Water.

[7] Groundwater screening levels based on the transfer of contaminants from groundwater to sediment were calculated by dividing the sediment screening level by the associated partition coefficients. Koc and Kd values are from MTCA. Fraction of carbon assumed at 0.02 based on Lower Duwamish Waterway Feasibility Study (AECOM 2012).

[8] The most-stringent exposure pathway for human health receptors is for consumption of fish. Listed values are based on ARARs contained in CLARC, with the following exceptions: (1) 1,4-dioxane is derived from MTCA Method B default values; (2) PCE, TCE, trans-1,2-DCE, vinyl chloride, nickel, and zinc are based on the U.S. Environmental Protection Agency (EPA) revised CWA [Clean Water Act]-Human *Health Criteria Applicable to Washington* dated November 15, 2016, "Organisms Only."

[9] Sediment has not been confirmed to be affected by groundwater discharge to surface water. Sediment cleanup levels were derived from the Lower Duwamish Waterway Superfund Site Record of Decisions (EPA 2014), which does not contain values for nickel, TCE, PCE, or vinyl chloride. These constituents also are not listed in the Sediment Management Standards (Chapter 173-204 of the Washington Administrative Code [WAC 173-204]). EPA Region III BTAG [Biological Technical Assistance Group] Marine Sediment Screening Benchmarks dated July 2006 have been listed for nickel, TCE, and PCE. EPA Region III has no value listed for vinyl chloride; therefore, the older Region 5 benchmarks were used (EPA 2003).

[10] Arsenic cleanup level of 5 micrograms per liter (µg/l) based on background concentrations for the State of Washington (MTCA Table 720-1).

[11] The surface water cleanup level for copper previously had been tabulated as 2.4 µg/l; however, this value is based on an approach using a site-specific water-effects ratio that has not been determined. This value was replaced with 3.1 µg/l from the National Recommended Water Quality Criteria - Aquatic Life Criteria Table published by EPA under Section 304 of the CWA.

[12] Based on the Oak Ridge National Laboratory Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Aquatic Biota.

[13] DeRooij, C. et al. 2004. *Euro Chlor Risk Assessment for the Marine Environment Osparcom Region: North Sea – Environmental Monitoring and Assessment.*

[14] WAC 173-201A-240.

[15] National Recommended Water Quality Criteria - Aquatic Life Criteria Table published by EPA under Section 304 of the CWA.

Table updated on August 14, 2015 based on revisions to EPA Aquatic Water Quality Criteria; on July 20, 2016 based on Ecology comments on the Draft FS Reports for SU1 and SU2 (i.e., footnotes clarified, sediment values, and surface water CULs protective of aquatic life added); and January 17, 2017 based on EPA revisions to the CWA Human Health criteria dated November 15, 2016.

Kd = distribution coefficient
Koc = soil organic carbon-water partition coefficient
PCE = tetrachloroethene
t-1,2-DCE = trans-1,2-dichloroethene
TCE = trichloroethene

Table 2
Summary of Soil Analytical Results for CVOCs for CI Plant 4
West of 4th Group Site
Seattle, Washington
Farallon PN: 457-008

Sample Location	Sample Identification	Sampled By	Sample Date	Sample Depth (feet)[1]	Analytical Results (milligrams per kilogram)[2]				
					PCE	TCE	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Vinyl Chloride
P4-1	P4-B1-1.0	Farallon	10/17/2015	1.0	0.0085	**0.045**	< 0.00098	< 0.00098	< 0.00098
	P4-B1-3.0	Farallon	10/17/2015	3.0	0.0013	0.0068	< 0.00099	< 0.00099	< 0.00099
	P4-B1-5.0	Farallon	10/17/2015	5.0	0.0031	0.015	< 0.0010	< 0.0010	< 0.0010
	P4-B1-7.8	Farallon	10/17/2015	7.8	0.0036	0.0068	< 0.0016	< 0.0016	< 0.0016
P4-2	P4-B2-1.0	Farallon	10/17/2015	1.0	< 0.00099	0.0039	< 0.00099	< 0.00099	< 0.00099
	P4-B2-3.0	Farallon	10/17/2015	3.0	< 0.0011	< 0.0011	< 0.0011	< 0.0011	< 0.0011
	P4-B2-5.0	Farallon	10/17/2015	5.0	< 0.00096	0.0020	< 0.00096	< 0.00096	< 0.00096
	P4-B2-8.0	Farallon	10/17/2015	8.0	< 0.0015	< 0.0015	< 0.0015	< 0.0015	< 0.0015
P4-3	P4-B3-1.0	Farallon	10/17/2015	1.0	< 0.00089	0.0069	< 0.00089	< 0.00089	< 0.00089
	P4-B3-3.0	Farallon	10/17/2015	3.0	< 0.0010	0.0028	< 0.0010	< 0.0010	< 0.0010
	P4-B3-5.0	Farallon	10/17/2015	5.0	< 0.0011	0.0028	< 0.0011	< 0.0011	< 0.0011
	P4-B3-6.3	Farallon	10/17/2015	6.3	< 0.0012	0.0053	< 0.0012	< 0.0012	< 0.0012
	P4-B3-8.0	Farallon	10/17/2015	8.0	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
P4-4	P4-B4-1.0	Farallon	10/17/2015	1.0	< 0.0010	**0.060**	0.0022	< 0.0010	< 0.0010
	P4-B4-3.0	Farallon	10/17/2015	3.0	< 0.0011	0.0090	< 0.0011	< 0.0011	< 0.0011
	P4-B4-5.0	Farallon	10/17/2015	5.0	< 0.0010	0.010	< 0.0010	< 0.0010	< 0.0010
	P4-B4-8.0	Farallon	10/17/2015	8.0	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
P4-5	P4-B5-1.0	Farallon	10/17/2015	1.0	0.012	0.013	< 0.00099	< 0.00099	< 0.00099
	P4-B5-3.0	Farallon	10/17/2015	3.0	0.0087	0.010	< 0.0010	< 0.0010	< 0.0010
	P4-B5-5.0	Farallon	10/17/2015	5.0	0.016	0.016	< 0.0010	< 0.0010	< 0.0010
	P4-B5-6.0	Farallon	10/17/2015	6.0	0.023	0.023	< 0.0012	< 0.0012	< 0.0012
	P4-B5-8.0	Farallon	10/17/2015	8.0	0.0094	0.0074	< 0.0011	< 0.0011	< 0.0011
Preliminary Cleanup Levels for Soil					**0.08[3]/0.044[4]**	**0.03[3]/0.006[4]**	**160[5]**	**0.59[3]/6[4]**	**0.002[3]/0.001[4]**

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Sample Location	Sample Identification	Sampled By	Sample Date	Sample Depth (feet)[1]	Analytical Results (milligrams per kilogram)[2]				
					PCE	TCE	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Vinyl Chloride
P4-6	P4-B6-1.0	Farallon	10/17/2015	1.0	**0.64**	**0.32**	< 0.0010	< 0.0010	< 0.0010
	P4-B6-3.0	Farallon	10/17/2015	3.0	0.040	**0.036**	< 0.0010	< 0.0010	< 0.0010
	P4-B6-5.7	Farallon	10/17/2015	5.7	0.066	**0.044**	< 0.00096	< 0.00096	< 0.00096
	P4-B6-8.0	Farallon	10/17/2015	8.0	0.015	0.0055	< 0.0014	< 0.0014	< 0.0014
P4-7	P4-B7-1.0	Farallon	10/17/2015	1.0	**0.26**	**0.48**	0.0055	0.0013	< 0.00094
	P4-B7-3.0	Farallon	10/17/2015	3.0	0.0073	0.019	< 0.0010	< 0.0010	< 0.0010
	P4-B7-5.0	Farallon	10/17/2015	5.0	0.026	**0.057**	0.0013	< 0.0010	< 0.0010
	P4-B7-6.9	Farallon	10/17/2015	6.9	< 0.0010	0.0017	< 0.0010	< 0.0010	< 0.0010
	P4-B7-8.0	Farallon	10/17/2015	8.0	0.0059	0.0094	< 0.0012	< 0.0012	< 0.0012
P4-8	P4-B8-1.0	Farallon	10/17/2015	1.0	**0.33**	**0.36**	0.0081	0.0015	< 0.00094
	P4-B8-3.0	Farallon	10/17/2015	3.0	0.035	**0.076**	0.0053	< 0.0011	< 0.0011
	P4-B8-5.0	Farallon	10/17/2015	5.0	0.050	**0.12**	0.0088	< 0.00098	< 0.00098
	P4-B8-8.0	Farallon	10/17/2015	8.0	0.025	0.022	< 0.0015	< 0.0015	< 0.0015
P4-9	P4-B9-1.0	Farallon	10/17/2015	1.0	0.021	0.020	< 0.0010	< 0.0010	< 0.0010
	P4-B9-2.0	Farallon	10/17/2015	2.0	0.0098	0.0059	< 0.0010	< 0.0010	< 0.0010
	P4-B9-5.0	Farallon	10/17/2015	5.0	0.0036	0.0028	< 0.0010	< 0.0010	< 0.0010
	P4-B9-8.0	Farallon	10/17/2015	8.0	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
P4-10	P4-B10-1.0	Farallon	10/17/2015	1.0	0.019	< 0.00094	< 0.00094	< 0.00094	< 0.00094
	P4-B10-3.0	Farallon	10/17/2015	3.0	< 0.0011	< 0.0011	< 0.0011	< 0.0011	< 0.0011
	P4-B10-5.0	Farallon	10/17/2015	5.0	0.0015	< 0.00099	< 0.00099	< 0.00099	< 0.00099
	P4-B10-8.0	Farallon	10/17/2015	8.0	0.0031	< 0.0015	< 0.0015	< 0.0015	< 0.0015
Preliminary Cleanup Levels for Soil					**0.08[3]/0.044[4]**	**0.03[3]/0.006[4]**	**160[5]**	**0.59[3]/6[4]**	**0.002[3]/0.001[4]**

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					PCE	TCE	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Vinyl Chloride
P4-11	P4-B11-1.0	Farallon	10/17/2015	1.0	0.054	0.0031	< 0.0010	< 0.0010	< 0.0010
	P4-B11-3.0	Farallon	10/17/2015	3.0	0.0050	< 0.0010	< 0.0010	< 0.0010	< 0.0010
	P4-B11-5.0	Farallon	10/17/2015	5.0	0.0059	< 0.0011	< 0.0011	< 0.0011	< 0.0011
	P4-B11-8.0	Farallon	10/17/2015	8.0	0.0039	< 0.0010	< 0.0010	< 0.0010	< 0.0010
P4-12	P4-B12-1.0	Farallon	10/17/2015	1.0	0.028	0.0028	< 0.0012	< 0.0012	< 0.0012
	P4-B12-2.8	Farallon	10/17/2015	2.8	0.0059	< 0.0011	< 0.0011	< 0.0011	< 0.0011
	P4-B12-5.0	Farallon	10/17/2015	5.0	0.0089	0.0011	< 0.0010	< 0.0010	< 0.0010
	P4-B12-8.0	Farallon	10/17/2015	8.0	0.0014	< 0.0011	< 0.0011	< 0.0011	< 0.0011
P4-13	P4-B13-1.0	Farallon	10/17/2015	1.0	0.0029	0.0040	< 0.0010	< 0.0010	< 0.0010
	P4-B13-3.0	Farallon	10/17/2015	3.0	< 0.0011	< 0.0011	< 0.0011	< 0.0011	< 0.0011
	P4-B13-5.0	Farallon	10/17/2015	5.0	< 0.00097	< 0.00097	< 0.00097	< 0.00097	< 0.00097
	P4-B13-8.0	Farallon	10/17/2015	8.0	0.0016	0.0018	< 0.0011	< 0.0011	< 0.0011
P4-14	P4-B14-1.0	Farallon	10/17/2015	1.0	0.018	0.0095	< 0.0011	< 0.0011	< 0.0011
	P4-B14-3.0	Farallon	10/17/2015	3.0	0.0095	0.0069	< 0.0010	< 0.0010	< 0.0010
	P4-B14-5.0	Farallon	10/17/2015	5.0	0.016	0.0092	< 0.00096	< 0.00096	< 0.00096
	P4-B14-8.0	Farallon	10/17/2015	8.0	0.0076	0.0040	< 0.0014	< 0.0014	< 0.0014
P4-15	P4-15-1.0-092018	Farallon	9/20/2018	1.0	< 0.00085	0.0015	< 0.00085	< 0.00085	< 0.00085
	P4-15-2.0-092018	Farallon	9/20/2018	2.0	< 0.00095	0.0026	< 0.00095	< 0.00095	< 0.00095
	P4-15-3.0-092018	Farallon	9/20/2018	3.0	< 0.0010	0.0052	< 0.0010	< 0.0010	< 0.0010
	P4-15-5.0-092018	Farallon	9/20/2018	5.0	0.0010	0.0099	< 0.0010	< 0.0010	< 0.0010
P4-16	P4-16-1.0-091918	Farallon	9/19/2018	1.0	< 0.0010	**0.032**	< 0.0010	< 0.0010	< 0.0010
	P4-16-2.0-091918	Farallon	9/19/2018	2.0	< 0.00099	0.022	< 0.00099	< 0.00099	< 0.00099
	P4-16-3.0-091918	Farallon	9/19/2018	3.0	< 0.00098	0.011	0.0016	< 0.00098	< 0.00098
Preliminary Cleanup Levels for Soil					**0.08[3]/0.044[4]**	**0.03[3]/0.006[4]**	**160[5]**	**0.59[3]/6[4]**	**0.002[3]/0.001[4]**

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West of 4th Group Site
Seattle, Washington
Farallon PN: 457-008

Sample Location	Sample Identification	Sampled By	Sample Date	Sample Depth (feet)[1]	Analytical Results (milligrams per kilogram)[2]				
					PCE	TCE	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Vinyl Chloride
P4-17	P4-17-1.0-091918	Farallon	9/19/2018	1.0	< 0.0012	0.0076	< 0.0012	< 0.0012	< 0.0012
	P4-17-2.0-091918	Farallon	9/19/2018	2.0	< 0.00093	0.0020	< 0.00093	< 0.00093	< 0.00093
	P4-17-3.0-091918	Farallon	9/19/2018	3.0	< 0.00090	< 0.00090	< 0.00090	< 0.00090	< 0.00090
P4-18	P4-18-1.0-091918	Farallon	9/19/2018	1.0	< 0.00091	0.0058	< 0.00091	< 0.00091	< 0.00091
	P4-18-2.0-091918	Farallon	9/19/2018	2.0	< 0.0010	0.017	< 0.0010	< 0.0010	< 0.0010
	P4-18-3.0-091918	Farallon	9/19/2018	3.0	< 0.00093	0.0020	< 0.00093	< 0.00093	< 0.00093
B3-02	B3-02-2.0-082318	Farallon	8/23/2018	2.0	0.0063	**2.4**	0.0048	< 0.0010	< 0.0010
	B3-02-6.0-082318	Farallon	8/23/2018	6.0	< 0.00088	0.016	< 0.00088	< 0.00088	< 0.00088
B3-04	B3-04-4.0-091918	Farallon	9/19/2018	4.0	**0.21**	**13**	0.0012	< 0.0011	< 0.0011
	B3-04-10.5-091918	Farallon	9/19/2018	10.5	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
Preliminary Cleanup Levels for Soil					**0.08[3]/0.044[4]**	**0.03[3]/0.006[4]**	**160[5]**	**0.59[3]/6[4]**	**0.002[3]/0.001[4]**

NOTES:

Results in **bold** denote reporting limits that exceed the most conservative preliminary cleanup level protective of indoor air.

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

[1]Depth in feet below ground surface.

[2]Analyzed by U.S. Environmental Protection Agency Method 8260B.

[3]Soil cleanup levels for protection of air quality. These are preliminary values only. Values calculated using Washington State Model Toxics Control Act Cleanup Regulation (MTCA) Equation 747-1 where the potable Method B groundwater cleanup level was used as C_w. Concentrations of hazardous substances in soil that meet the potable groundwater protection standard currently are considered sufficiently protective of the air pathway for unrestricted and industrial land uses.

[4]Soil cleanup levels for protection of surface water quality. These are preliminary values only. Values are calculated using MTCA Equation 747-1 where the groundwater cleanup level protective of surface water in this table was used as C_w.

[5]Cleanup level is based on standard MTCA Method B (unrestricted land use) values from the Cleanup and Risk Calculation tables, <https://fortress.wa.gov/ecy/clarc/Reporting/ChemicalQuery.aspx>

PCE = tetrachloroethene

TCE = trichloroethene

CVOCs = chlorinated volatile organic compounds

Table 3
Summary of Groundwater Analytical Results for CI Plant 4
West of 4th Group Site
Seattle, Washington
Farallon PN: 457-008

Sample Location	Sample Date	Sample Identification	Analytical Results (micrograms per liter)[1]				
			PCE	TCE	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Vinyl Chloride
Baseline Groundwater Results							
OBW-01	7/2/2018	OBW-01-070218	0.43	0.82	< 0.20	< 0.20	< 0.20
OBW-02	7/3/2018	OBW-02-070218	0.53	1.2	< 0.20	< 0.20	< 0.20
OBW-03	7/2/2018	OBW-03-070218	< 0.20	0.43	0.38	< 0.20	< 0.20
OBW-04	7/2/2018	OBW-04-070218	2.0	5.0	0.39	< 0.20	< 0.20
OBW-05	7/2/2018	OBW-05-070218	2.1	2.8	0.68	< 0.20	< 0.20
MW-6	7/2/2018	MW-06-070218	4.5	3.2	< 0.20	< 0.20	< 0.20
MW-7	7/2/2018	MW-07-070218	12	**7.6**	2.4	< 0.20	0.40
Performance Groundwater Results							
OBW-05	9/18/2018	OBW-5-091818	7.3	4.8	0.61	< 0.20	< 0.20
MW-6	9/18/2018	MW6-091818	8.5	5.5	< 0.20	< 0.20	< 0.20
	9/18/2018	MW60-091818	8.3	5.1	< 0.20	< 0.20	< 0.20
MW-7	9/24/2018	MW-7-092418	5.9	5.0	3.9	< 0.20	0.53
Preliminary Cleanup Levels-Water Table Zone			**116[2]**	**6.9[2]**	**NR[3]**	**559[2]**	**1.3[2]**

NOTES:

Results in **bold** denote concentrations exceeding applicable cleanup levels.

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

[1]Analyzed by U.S. Environmental Protection Agency Method 8260C.

[2]Groundwater cleanup levels protective of the air pathway for unrestricted land use (residential and commercial sites) and industrial land use were derived using the following equation: Gwcul = Aircul/GIVF.

[3]NR denotes "not researched," which indicates that no regulatory standards or toxicity information are available for the constituent of concern to derive a cleanup level for the medium of potential concern.

PCE = tetrachloroethene
TCE = trichloroethene
CVOCs = chlorinated volatile organic compounds

APPENDIX A
HEALTH AND SAFETY PLAN

FINAL CAPITAL INDUSTRIES PLANT 4
SOIL VAPOR EXTRACTION PILOT STUDY WORK PLAN
West of 4th Group Site
5801 3rd Avenue South
Seattle, Washington

Farallon PN: 457-008

FARALLON CONSULTING

Washington
Issaquah | Bellingham | Seattle
Oregon
Portland | Bend | Baker City
California
Oakland | Folsom | Irvine

HEALTH AND SAFETY PLAN

REMEDIAL INVESTIGATION MONITORING, VAPOR MITIGATION SYSTEM OPERATIONS, AND SOIL VAPOR EXTRACTION PILOT STUDY
5801 3RD AVENUE SOUTH
SEATTLE, WASHINGTON

Submitted by:
Farallon Consulting, L.L.C.
975 5th Avenue Northwest
Issaquah, Washington 98027

Farallon PN: 457-008

For:
Capital Industries, Inc.
PO Box 80983
Seattle, Washington 98108

March 13, 2018

HEALTH AND SAFETY PLAN
REVIEW AND APPROVAL

Client: Capital Industries, Inc.
Facility Name: Capital Industries, Inc.
Type of Work: Groundwater Monitoring, Operation and Maintenance, and Soil Vapor Extraction Pilot Test
Project Number: 457-008
Start Date: March 1, 2019
End Date: December 31, 2019

Plan Expiration Date: August 30, 2019 (Last day of expected field work or no longer than 6 months)

APPROVED BY:

Jennifer L. Moore Project Manager	*Signature*	March 13, 2019 *Date*
Joseph Rounds Health and Safety Coordinator	*Signature*	March 13, 2019 *Date*
Jeffrey Kaspar Principal-in-Charge	*Signature*	March 13, 2019 *Date*

This Health and Safety Plan (HASP) was written for the use of Farallon Consulting, L.L.C. (Farallon) and its employees. It may be used also by trained and experienced Farallon subcontractors as a guidance document. However, Farallon does not guarantee the health or safety of any person entering this site.

Due to the potentially hazardous nature of the site and the activities occurring thereon, it is not possible to discover, evaluate, or provide protection for all possible hazards that may be encountered. Strict adherence to the health and safety guidelines set forth herein will reduce, but does not eliminate, the potential for injury. The health and safety guidelines in this HASP were prepared specifically for this site, its conditions, purposes, dates of field work, and personnel, and must be amended if conditions change.

Farallon claims no responsibility for the use of this HASP by others. This HASP will provide useful information to subcontractors and will assist them in developing their own HASP, but it should not be construed as a substitute for their own HASP. Subcontractors should sign this HASP (see Attachment 1, *Health and Safety Plan Acknowledgment and Agreement Form*) as an acknowledgement of hazard information and as notice that this HASP does not satisfy their requirement to develop their own HASP.

CONTENTS

ATTACHMENTS

1.0 SITE-SPECIFIC INFORMATION

Information specifically pertaining to the project site, the scope of work for the project, and related safety concerns are discussed in this section.

1.1 BACKGROUND INFORMATION

Farallon Consulting, L.L.C. (Farallon) has prepared this Health and Safety Plan (HASP) for work being conducted for Capital Industries, Inc. (CI) at the property at 5801 3rd Avenue South in Seattle, Washington. A remedial investigation was completed and approved by the Washington State Department of Ecology (Ecology) in December 2012. A feasibility study currently is being conducted on behalf of Art Brass Plating, Inc.; Blaser Die Casting Co.; CI; and PSC Environmental Services, LLC (collectively referred to herein as the West of 4th Group) in accordance with the requirements of Agreed Order No. DE 10402 entered into by the West of 4th Group and Ecology in April 2014. For the purposes of the remedial investigation and feasibility study, the Site is defined as the area south of South Mead Street, north of South Front Street, east of 1st Avenue South, and west of 4th Avenue South in Seattle, Washington. The CI property comprises five buildings identified as Plants 1 through 5 on the Site. Ongoing work being conducted by Farallon at the Site includes:

- Semiannual groundwater monitoring;
- Vapor intrusion mitigation monitoring at two properties proximate to the CI property (i.e., the Natus Medical Facility at 5900 1st Avenue South and the Pacific Food Systems North Building at 5815 4th Avenue South);
- Operation and maintenance of vapor intrusion mitigation systems at the Natus Medical Facility and the Pacific Food Systems North Building;
- Observation of subcontractors installing and/or maintaining monitoring wells on behalf of CI;
- A soil vapor extraction (SVE) pilot test to evaluate treatment of soil for the interim action at CI Plant 4, including installation of an SVE pilot test well and associated observation monitoring points to evaluate the efficacy of the technology and parameters required to apply the technology full-scale; and
- Performance and compliance soil monitoring associated with the interim action at CI Plant 4.

1.2 SCOPE OF WORK

This HASP was prepared for the use of Farallon personnel while performing the following tasks at the Site:

- **Task 7E: Monitoring Well Maintenance.** Farallon will remove the existing monuments and replace them with durable well vaults with interior drainage. This includes work to complete typical maintenance and replacement of other wellhead protection components in the monitoring well network such as monitoring well monuments, lids, locking well

caps, seals, and bolts, which periodically are worn down or damaged due to heavy traffic or age.

- **Task 7F through 7G: March and September 2019 Groundwater Monitoring Events.** Farallon will perform semiannual groundwater monitoring and sampling across the Site. The current scope of work can be referenced in the technical memorandum regarding FINAL West of 4th Groundwater Monitoring Program Plan 2017 through Draft Cleanup Action Plan, W4 Join Deliverable, Agreed Order No. DE 10402 dated March 21, 2017, from Ms. Janet Knox of Pacific Groundwater Group to Mr. Ed Jones of Ecology (Scope of Work).
- **Task 8B: Interim Action Implementation.** Farallon will conduct an SVE pilot test to evaluate treatment of soil for the interim action at CI Plant 4. This will include installation of an SVE pilot test well and associated observation monitoring points to evaluate the efficacy of the technology and parameters required to apply the technology full-scale.
- **Task 13: Vapor Intrusion Mitigation Work – Vapor Intrusion Monitoring.** Farallon will conduct routine ambient air sampling events at the Natus Medical Facility and the Pacific Food Systems North Building. This sampling includes inspections of the buildings to document current use and chemical products present, air sampling using Summa canisters, and data evaluation. Details of the monitoring work are presented in the technical memorandum regarding Revised Vapor Intrusion Assessment, Monitoring, and Mitigation Plan, W4 Joint Deliverable, Seattle, Washington dated February 2, 2015, from Farallon to Mr. Jones of Ecology (Revised VI Assessment).
- **Task 13: Vapor Intrusion Mitigation Work – Vapor Intrusion Mitigation System Operations and Maintenance.** Farallon periodically inspects and adjusts operation of two subslab depressurization systems at the Natus Medical Facility and the Pacific Food Systems North Building. Details of the monitoring work are presented in the Revised VI Assessment.

The tasks will be conducted in a manner consistent with the methods and assumptions outlined in the Scope of Work.

1.3 SITE-SPECIFIC SAFETY CONCERNS

This phase of the project involves semiannual groundwater monitoring, monitoring well maintenance, vapor mitigation system operations and maintenance, and the SVE pilot test interim action implementation. Specific hazards that the field employee(s) will encounter on this project include, but are not limited to:

- Working around heavy equipment;
- Working with hand tools and small mechanical equipment;
- Pedestrian traffic;
- Truck traffic;
- Pinch points;

- Work exclusion zone safety;
- Slips, trips, and falls;
- Loud noise;
- Chemical exposure related to soil and groundwater that is contaminated with chlorinated solvents; and
- Environmental hazards, including exposure to sun, heat, and cold.

2.0 DRUG AND ALCOHOL POLICY

It is Farallon's policy to maintain a drug-free workplace. Farallon has a responsibility to all of its staff members to provide a safe and inoffensive work environment, and a responsibility to its clients to provide accurate and consistent service. For these reasons, Farallon prohibits the following behavior by staff members in the field:

- Use of tobacco in any form by any person at any time in sensitive or hazardous areas that may pose a health and safety or environmental risk. The Site Health and Safety Officer (SHSO) may designate an area away from hazards that is safe for tobacco use.
- Possession or consumption of alcohol and/or marijuana, or being under the influence of alcohol and/or marijuana during field activities.
- Abuse of prescription and/or over-the-counter drugs in such a manner as to negatively impact performance or field safety.
- Possession, use, sale, or being under the influence of illicit drugs while in the field or during any work hours.

Violation of any of the above codes of conduct is grounds for immediate removal from the project Site and discipline in accordance with Farallon company policy. If an incident occurs as a result of an employee's actions, drug and alcohol testing will be performed in accordance with Farallon company policy.

3.0 WEAPONS POLICY

Farallon employees, contractors, subcontractors, and their employees working at the Site are to ensure that they do not bring weapons onto the work site. Weapons include but are not limited to guns, knives, and explosives. Tools that are used during the course of field events, including but not limited to box knives, are exempt from this weapons policy. All vehicles and persons can be subjected to search while working at the property.

Failure to comply with the weapons policy can result in disciplinary action for the individual(s) involved in accordance with Farallon company policy.

4.0 INCIDENT PREPAREDNESS AND RESPONSE

Farallon employees and subcontractors working at the Site must be prepared to respond appropriately to an incident involving injury, illness, death, spills, or utility breaches. This section outlines the degree of preparedness required for employees at a work site, and describes the actions to be taken in the event of a health and safety incident.

4.1 HEALTH AND SAFETY PREPAREDNESS

All individuals working at the Site are required to be familiar with the contents of this HASP. Additionally, the items on the following health and safety preparedness list should be reviewed prior to the commencement of work and during daily health and safety meetings:

- The directions to the hospital (provided in Attachment 2);
- The locations of first aid kits, personal eye washes, and fire extinguishers (located in Site vehicles);
- The locations of the keys to Site vehicles; and
- Hand sign language providing for the immediate stoppage of work (such as a horizontal hand movement in front of the neck).

Additional topics for daily health and safety meetings are included in Attachment 3, Potential Topics for Daily Health and Safety Meeting. Participation in daily health and safety meetings should be documented in Attachment 4, Daily Health and Safety Briefing Log.

4.2 INJURY OR ILLNESS

If an injury or illness occurs, the following actions should be taken, regardless of the severity of the injury or illness:

- Stop work.
- Determine whether emergency response staff (e.g., fire, ambulance) are necessary. If so, dial 911 on a cell phone or the closest available telephone. Describe the location of the injured person and provide other details as requested. If an individual requires non-emergency medical care at a hospital, follow the directions to the nearest hospital, which are provided in Attachment 2. IF EMERGENCY MEDICAL CARE IS NEEDED, CALL 911.
- Administer first aid to the individual immediately, using the first aid kit provided in the Site vehicle. Use the bloodborne pathogens kit and personal eyewash, as needed.
- Notify the SHSO immediately. The SHSO is responsible for preparing and submitting an Incident Report form to Farallon's Health and Safety Coordinator (HSC) within 24 hours of the incident, and for notifying the employee's supervisor and the Principal-in-Charge. The Incident Report form is provided in Attachment 5.

- ***All incidents must be reported to the HSC within 24 hours; however, the actual investigation need not be completed within 24 hours***. **A telephone message that includes the date, time, and general incident circumstances should be left at one of the following numbers if the HSC cannot be reached directly**:
    - HSC work phone: (425) 295-0800
    - HSC cell phone: (206) 484-2748
    - If the HSC cannot be located, contact the Principal-in-Charge
- The SHSO will assume responsibility during a medical emergency until emergency response personnel arrive at the Site.

4.3 REPORTING PROCEDURES FOR MINOR CUTS, SCRATCHES, BRUISES, ETC.

Every occupational illness or injury is to be reported immediately by the employee to the SHSO. The SHSO is to complete the Incident Report form provided in Attachment 5, and report the incident to the HSC.

4.4 NEAR MISSES

A near miss is defined as an incident in which no personal injury is sustained and no property damage is incurred, but in which injury and/or property damage could have occurred under slightly different timing or location.

In the event of a near miss, the following actions are to be taken:

- Stop work if there is immediate danger of injury or property damage;
- Report the near miss to the SHSO as soon as practicable;
- Resume work upon satisfactory resolution of the near-miss condition, if work was stopped, and document the corrective action(s) taken by the SHSO; and
- Complete and submit the Near Miss Report and Safety Observation Report form in Attachment 6 to the HSC within 2 business days.

4.5 MEDICAL INCIDENTS NOT REQUIRING AMBULANCE SERVICE

Medical incidents not requiring ambulance services include injuries and conditions such as minor lacerations and sprains. In the event of an injury, an illness, or a condition that does not require ambulance service, the following actions are to be taken:

- Stop work.
- Administer first aid as necessary to stabilize the individual for transport to the hospital.
- The SHSO is to facilitate prompt transportation of the individual to the hospital. Directions to the nearest hospital are provided in Attachment 2.

- A representative of Farallon or the subcontractor is to drive the individual to the medical facility and remain at the facility until the individual is able to return to the work site, or arrangements for further care have been established.
- If the driver is not familiar with the route to the hospital, a second person who is familiar with the route is to accompany the driver and the injured employee to the hospital.
- If it is necessary for the SHSO to accompany the injured employee to a medical facility, provisions must be made for another employee who is trained and certified in first aid to act as the temporary SHSO before work at the work site can resume.
- If the injured employee is able to return to the work site the same day, he/she is to bring a statement from the doctor that provides the following information:
    - Date of incident
    - Employee's name
    - Diagnosis
    - Date he/she is able to return to work, and whether regular or light duty
    - Date he/she is to return to the doctor for a follow-up appointment, if necessary
    - Signature and address of doctor
- The SHSO is to complete the Incident Report form provided in Attachment 5, and report the incident to the HSC.
- If the injured employee is unable to return to the work site the same day, the employee who transported him/her should bring the statement from the doctor back to the work site. The information on this statement should be reported to the HSC immediately.

4.6 EMERGENCY CASES REQUIRING AMBULANCE SERVICE

In the event of an injury or illness that requires emergency response and transport to a hospital by ambulance the following actions should be taken:

- **Dial 911** to request ambulance service;
- Notify the SHSO;
- Administer first aid until the ambulance service arrives;
- One designated company representative should accompany the injured employee to the medical facility and remain there until final diagnosis, treatment plan, and other relevant information has been obtained; and
- The SHSO is to complete the Incident Report form provided in Attachment 5, and report the incident to the HSC immediately.

4.7 EMPLOYEE DEATH, OR HOSPITALIZATION OF ONE OR MORE EMPLOYEES

The procedures outlined in Section 6.2 should be followed in the event of an employee injury or illness. If an employee fatality occurs, the HSC, local emergency personnel, and the coroner must be notified **immediately**. **The HSC will initiate the required State of Washington Department of Labor and Industries and Occupational Safety and Health Administration (OSHA) notifications within 8 hours of a fatality or the hospitalization of one or more employees.**

4.8 RESPONSE TO SPILLS OR UTILITY BREACHES

The location of underground utilities (e.g., product, sewer, telephone, fiber optic) and facilities (e.g., underground storage tanks, septic tanks, utility vaults) is to be noted prior to commencement of intrusive subsurface work activities. Use the public and private locate services as required and complete the Utility Clearance Log (Attachment 7). If a utility line or tank is breached or a spill or release occurs, the event is to be documented on the Incident Report form provided in Attachment 5 as soon as possible. The date, time, name of the person(s) involved, actions taken, and discussions with other affected parties are to be included. The SHSO, Project Manager (PM), and client are to be notified immediately. The PM is to notify the regulatory authority and/or utility company, as necessary.

In the event of a spill or release, the following actions should be taken:

- Stay upwind of the spill or release.
- Don appropriate personal protective equipment (PPE).
- Turn off equipment and other sources of ignition.
- Turn off pumps and shut valves to stop the flow or leak.
- Plug the leak or collect drippings, if possible.
- Use sorbent pads to collect the product and impede its flow, if possible.
- Dial 911 or telephone the local fire department immediately if a fire or another emergency situation develops.
- Inform the Farallon PM of the situation.
- Determine whether the client would like Farallon to repair the damage or would rather use an emergency repair contractor.
- Advise the client of spill discharge notification requirements, and establish who will complete and submit the required forms. ***Do not report or submit information to an agency without the client's consent.*** Document each interaction with the client and regulators, and note in writing names, titles, authorizations, refusals, decisions, and commitments to any action.

- Do not transport or approve transportation of contaminated soils or product until proper manifests have been completed and approved. Be aware that soil and/or product may meet criteria for hazardous waste.
- Do not sign manifests as a generator of wastes. Contact the PM to discuss waste transportation.

4.9 NOTIFICATIONS

A spill or release requires completion of an Incident Report form (provided in Attachment 5) per Farallon's Health and Safety program. **The PM must involve the client and/or generator in the incident reporting process. The client and/or generator is under obligation to report the incident to the appropriate government agency(ies). If the spill extends into waterways, the Coast Guard and the National Response Center must be notified immediately by the client or with client permission (1-800-424-8802).**

4.10 SHUTOFF VALVES AND/OR SWITCHES FOR UTILITIES AND PRODUCTS

Before starting work, locate, discuss, and list on the Daily Health and Safety Briefing Log the locations of utility and product line shutoff valves and switches on the work site. Review the location of shutoff valves and switches with other field personnel before beginning work.

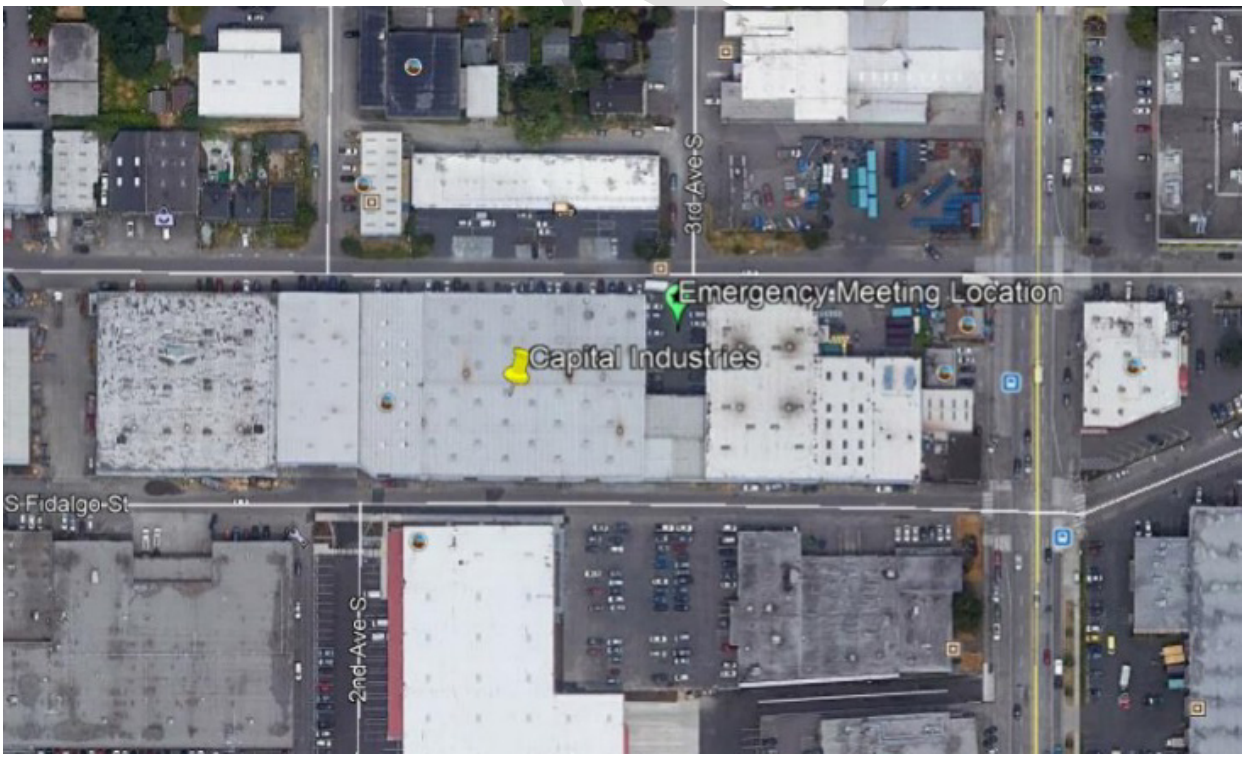
5.0 EMERGENCY RESPONSE AND EVACUATION PLAN

Farallon personnel and subcontractors working on the Site are to be aware of Site-specific emergency and evacuation procedures, including alarm systems and evacuation plans and routes. If an incident occurs that requires emergency response, such as a fire or spill, **CALL 911 and request assistance**. Farallon staff, subcontractors, and/or others working in an area where an emergency occurs are to evacuate to a safe location away from the incident area, preferably upwind, and take attendance.

For this project, the emergency evacuation gathering location is the visitor parking lot on the southern side of South Mead Street across from its intersection with 3rd Avenue South (see the green marker below).

If the emergency causes the route to be obstructed, Farallon personnel and subcontractors are to move to an open area upwind of the hazard area, and remain there until instructed by emergency response personnel (e.g., police, fire, ambulance personnel, paramedics) to do otherwise.

Subcontractors have the responsibility to account for their own employees and provide requested information to emergency response personnel immediately upon request. Farallon staff, subcontractors, and/or contractors may not reenter the scene of the emergency without specific approval from emergency response personnel.



6.0 LOCAL EMERGENCY CONTACT NAMES AND TELEPHONE NUMBERS

Local emergency response personnel can be contacted at the following numbers. Directions and a map to the hospital are included in Attachment 2.

Emergency Contact	Name and Location	Telephone No.
Hospital	Swedish Cherry Hill Campus 500 17th Avenue Seattle, Washington 98122	(206) 320-2000
Police	Seattle Police Department South Precinct 3001 South Myrtle Street Seattle, Washington 98108	**911** or (206) 386-1850
Fire	Seattle Fire Department, Station 27 1000 South Myrtle Street Seattle, Washington 98108	**911**
National Response Center		**1-800-424-8802**
Washington State Department of Ecology		**(360) 407-6300**
Poison Control		**1-800-222-1222**

7.0 PROJECT PERSONNEL AND RELEVANT INFORMATION

The following section provides contact information for the project and the HSC and client-specific health and safety requirements. Farallon field personnel training and medical surveillance dates are included in Attachment 8.

7.1 PROJECT PERSONNEL CONTACT INFORMATION

Questions about this project that are posed by neighbors, the press, or other interested parties should be directed to the Principal-in-Charge at Farallon: (425) 295-0800.

PERSONNEL TITLE PERSONNEL NAME PERSONNEL CONTACT INFORMATION	GENERAL PROJECT RESPONSIBILITIES
Health and Safety Coordinator Joseph Rounds Office: (425) 295-0800 Cell: (206) 484-2748	Provide support in implementing HASP. Provide immediate support upon notice of any incident.
Principal-in-Charge Jeff Kaspar Office: (425) 295-0800 Cell: (425) 417-7238	Provide immediate support upon notice of any incident.
Project Manager Jennifer Moore Office: (425) 295-0800 Cell: (425) 420-0014	Provide immediate support upon notice of any incident.
Client Contact Ron Taylor Office: (206) 765-8585	Provide known analytical data from work performed by others. Provide notice of Site hazards. Provide access to Site. Provide information regarding available emergency supplies at the Site.

8.0 POTENTIAL CHEMICAL EXPOSURE

Farallon employees working at the Site may become exposed to the chemicals listed in the table below. These chemicals are present either due to current Site activities or due to the presence of contamination. This table should be reviewed prior to the start of work and questions directed to the SHSO. Air monitoring may be required at the Site based on the scope of work for the project. The Farallon Project Manager and SHSO will let the Farallon Field Scientists know if air monitoring will be required for the scope of work.

The air monitoring table and forms are included in Attachment 9.

POTENTIAL AIRBORNE CHEMICALS ON SITE FOR THIS PROJECT REVIEW THIS TABLE AND CONTACT THE SHSO WITH ANY QUESTION						
Chemical (or Class)	**OSHA PEL ACGIH TLV**	**Other Pertinent Limits**	**Properties**	**Routes of Exposure or Irritation**	**Acute Health Effects**	**Chronic Health Effects/ Target Organs**
1,2-Dichloroethene (dichloroethylene)	PEL – TWA 200 ppm TLV – TWA 200 ppm	IDLH – 1,000 ppm	Solvent odor.	Inhalation; skin absorption; ingestion; eye contact.	Typical solvent symptoms.	Liver, kidney, CNS symptoms.
1,1-Dichloroethene (vinylidene chloride)	No PEL TLV – 5 ppm	NIOSH considers this compound to be a carcinogen.	Colorless liquid or gas (above 89°F) with a mild, sweet, chloroform-like odor.	Inhalation; skin absorption; ingestion; eye contact.	Irritation to eyes, skin, throat; dizziness; headache; nausea; dyspnea (breathing difficulty).	Liver, kidney dysfunction; pneumonitis; potential occupational liver and kidney carcinogen. **Target Organs:** Eyes, skin, respiratory system, CNS, liver, kidneys.
Tetrachloroethene (perchloroethylene)	PEL – 100 ppm TLV – 25 ppm	PEL C – 200 ppm TLV STEL – 100 ppm IDLH – 150 ppm NIOSH considers this compound to be a carcinogen.	Colorless liquid with a mild, chloroform-like odor.	Inhalation; skin absorption; ingestion; eye contact.	Irritation to eyes, skin, nose, throat, respiratory system; nausea; flushed face, neck; vertigo (an illusion of movement); dizziness; lack of coordination; headache; skin erythema (redness).	Somnolence (sleepiness, unnatural drowsiness); liver damage; potential occupational liver carcinogen. **Target Organs:** Eyes, skin, respiratory system, liver, kidneys, CNS.

POTENTIAL AIRBORNE CHEMICALS ON SITE FOR THIS PROJECT REVIEW THIS TABLE AND CONTACT THE SHSO WITH ANY QUESTION						
Chemical (or Class)	**OSHA PEL ACGIH TLV**	**Other Pertinent Limits**	**Properties**	**Routes of Exposure or Irritation**	**Acute Health Effects**	**Chronic Health Effects/ Target Organs**
Vinyl chloride	PEL - 1 ppm TLV - 1 ppm	NIOSH considers this material to be a carcinogen.	Liquid with a pleasant odor at high concentrations.	Inhalation; dermal; eye contact.	Weakness; abdominal pain; pallor or cyanosis of extremities; liquid frostbite.	Gastrointestinal bleeding; enlarged liver; potential occupational liver carcinogen; damage to CNS, blood, respiratory system, lymphatic system.
Trichloroethene (trichloroethylene)	PEL - 100 ppm TLV - 50 ppm	PEL Ceiling - 200 ppm NIOSH considers trichloroethylene to be a carcinogen.	Colorless liquid (unless dyed blue) with a chloroform-like odor.	Inhalation; dermal; ingestion; eye contact.	Irritation to eyes, skin; headache; vertigo (an illusion of movement); visual disturbance; fatigue; giddiness; tremor; somnolence (sleepiness, unnatural drowsiness); nausea; vomiting; dermatitis.	Cardiac arrhythmias; paresthesia; liver injury; potential occupational carcinogen of liver, kidney.

NOTES:
°F = degrees Fahrenheit
ACGIH = American Conference of Governmental Industrial Hygienists
AIHA = American Industrial Hygiene Association
AIHA WEEL = AIHA-set workplace environmental exposure limits
C = ceiling limit
CNS = central nervous system
CVS = cardiovascular system
IDLH = immediately dangerous to life or health
mg/m3 = milligrams per cubic meter
NIOSH = National Institute for Occupation Safety and Health
OSHA = Occupation Safety and Health Administration
PEL = permissible exposure limit
ppm = parts per million
RBC = red blood cells
REL = recommended exposure limit set by NIOSH
Skin = skin absorption
STEL = short-term exposure limit
TLV = threshold limit value set by ACGIH
TWA = time-weighted average

9.0 POTENTIAL SITE HAZARDS AND APPROPRIATE PRECAUTIONS

Activities listed may be associated with work performed by others. The information contained in this section is for the use of Farallon personnel and not intended for use by others. The following tables list potential hazards and appropriate precautions associated with planned field work.

The following are a few basic guidelines to remember while performing field work at the Site:

- No eating, drinking, or smoking on the Site;
- No wearing contact lenses on the Site;
- No facial hair that will interfere with proper respirator fit when respirators are required; and
- A safety meeting will be held every day, even if only one person is working on the project on a given day.

9.1 ENVIRONMENTAL DRILLING

Job Steps	Personal Protective Equipment	Potential Hazards	Critical Actions
Clear drilling locations.	Reflective vest, steel-toed and -shank shoes, hard hat, safety glasses with side shields, and work gloves.	Traffic hazards. Overhead or underground installations. Product releases. Property damage. Occupant inconvenience.	• Refer to Utility Clearance Log (**Attachment 7**). • Coordinate with Site Manger (or designee) to minimize potential conflicts. • Review proposed locations against available construction drawings and known utilities, tanks, product lines, etc. • Mark out the proposed borehole locations. • Call underground utility locating service for public line location clearance and obtain a list of utilities being contacted. If necessary, coordinate private line locator for private property. • Develop a traffic control plan with the client and local agencies, as applicable, which may include use of cones, barrier tape, jersey barriers, etc.

Job Steps	Personal Protective Equipment	Potential Hazards	Critical Actions
Mobilize with equipment/supplies suitable for drilling.	Reflective vest, steel-toed and -shank shoes, hard hat, safety glasses with side shields, and work gloves.	Vehicle accident. Lifting hazards. Delay or improper performance of work due to improper equipment on Site.	• Begin each work day with tailgate safety meeting. • Follow safe driving procedures. • Employ safe lifting procedures. • Verify that subcontractors are aware of their responsibilities for labor, equipment, and supplies. • Review permit conditions.
Visually clear proposed drilling locations.	Reflective vest, steel-toed and -shank shoes, hard hat, safety glasses with side shields, and work gloves.	Underground or overhead installations.	• Complete Utilities and Structures checklist on the Utility Clearance Log (provided in **Attachment 7**) and adjust drilling locations as necessary.
Set up necessary traffic control.	Reflective vest, steel-toed and -shank shoes, hard hat, safety glasses with side shields, and work gloves.	Struck by vehicle during placement. Vehicle accident resulting from improper placement of traffic control equipment.	• Use buddy system for implementing traffic control plan, such as setting out cones and tape to define the safety area.
Assist with setup of rig.	Reflective vest, steel-toed and -shank shoes, hard hat, safety glasses with side shields, and work gloves.	Vehicle accident during rig movement. Damage caused by rig while accessing set-up location. Contact with overhead installations. Soft terrain. Unexpected rig movement.	• All staff should know the location of the kill switch for the drilling rig. • Verify a clear pathway to the drilling location and clearance for raising mast. • Provide hand signals and guidance to the driver, as needed, to place rig. • Visually inspect rig (e.g., fire extinguisher on board, no oil or other fluid leaks, cabling and associated equipment in good condition, pressurized hoses secured with whip-checks or adequate substitute, jacks in good condition). • Use wooden blocks under jacks to spread load, if necessary. Chock wheels.
Set up exclusion zone(s) and work stations (drilling and logging and/or sample collection).	Reflective vest, steel-toed and -shank shoes, hard hat, safety glasses with side shields, and work gloves.	Struck by vehicle during setup. Slip or fall hazards.	• Implement exclusion zone setup. Set up work stations with clear walking paths to and from rig. Use safety tape and cone(s).

Job Steps	Personal Protective Equipment	Potential Hazards	Critical Actions
Clear upper 5 feet of drilling location using post-hole digger or hand auger.	Reflective vest, steel-toed and -shank shoes, hard hat, safety glasses with side shields, ear plugs or muffs, and work gloves. Respirator with organic vapor cartridges, chemical-resistant gloves, and chemical-resistant apron as required.	Back strain. Exposure to chemical hazards. Hitting an underground utility. Repetitive motion.	• Keep full-face respirator with organic vapor cartridges readily accessible. • Initiate air quality monitoring in accordance with the air monitoring protocol presented in **Attachment 9**. • Stand upwind to avoid exposure when possible. • Use the organic vapor monitor aggressively to track the airborne concentration of contaminants close to potential sources such as the core when it is raised from the hole, the core when opened, etc. • Evaluate any soil samples inside a resealable plastic bag at arm's length. DO NOT EVALUATE THE SAMPLE IN THE OPEN, IN ORDER TO AVOID UNNECESSARY EXPOSURE. • Use correct lifting techniques and tools. • Complete the Pre-Drilling section of the Borehole Clearance Review form.
Drilling.	Reflective vest, steel-toed and -shank shoes, hard hat, safety glasses with side shields, ear plugs or muffs, work gloves. Respirator with organic vapor cartridges, chemical-resistant gloves, chemical-resistant apron as required.	Back strain. Heat or cold. Eye injury. Noise. Exposure to chemical hazards. Breaching an underground utility. Trip or fall. Equipment failure.	• Stand clear of operating equipment. • Use correct lifting techniques. • Monitor air quality in accordance with the air monitoring protocol presented in **Attachment 9**. • Monitor drilling progress. • Keep work area clear of tripping or slipping hazards. • Perform periodic visual inspections of drill rig.

Job Steps	Personal Protective Equipment	Potential Hazards	Critical Actions
Collect samples in accordance with sampling plan.	Reflective vest, steel-toed and -shank shoes, hard hat, safety glasses with side shields, ear plugs or muffs, work gloves. Respirator with organic vapor cartridges, chemical-resistant gloves, chemical-resistant apron as required.	Back strain. Heat or cold. Eye injury. Noise. Exposure to chemical hazards. Breaching an underground utility. Trip or fall. Equipment failure.	• Stand clear of operating equipment. • Use correct lifting techniques. • Monitor air quality in accordance with the air monitoring protocol presented in **Attachment 9**. • Monitor drilling progress. • Keep work area clear of tripping or slipping hazards. • Perform periodic visual inspections of drill rig.
Manage cuttings.	Reflective vest, steel-toed and -shank shoes, hard hat, safety glasses with side shields, ear plugs or muffs, work gloves. Respirator with organic vapor cartridges, chemical-resistant gloves, chemical-resistant apron as required.	Back strain. Heat or cold. Eye injury. Noise. Exposure to chemical hazards. Breaching an underground utility. Trip or fall. Equipment failure.	• Stand clear of operating equipment. • Use correct lifting techniques. • Monitor air quality in accordance with the air monitoring protocol presented in **Attachment 9**. • Monitor drilling progress. • Keep work area clear of tripping or slipping hazards. • Perform periodic visual inspections of drill rig.
Backfill borehole.	Reflective vest, steel-toed and -shank shoes, hard hat, safety glasses with side shields, ear plugs or muffs, work gloves. Respirator with organic vapor cartridges, chemical-resistant gloves, chemical-resistant apron as required.	Back strain. Trip hazards. Eye injury from splashing or release of pressurized grout.	• Mix grout to specification and completely fill the hole. • Use proper lifting techniques. • Keep work area clear of tripping hazards. • Verify presence of and/or authorization by required grouting inspectors.

Job Steps	Personal Protective Equipment	Potential Hazards	Critical Actions
Develop well.	Reflective vest, steel-toed and -shank shoes, hard hat, safety glasses with side shields, ear plugs or muffs, work gloves. Respirator with organic vapor cartridges, chemical-resistant gloves, chemical-resistant apron as required.	Physical injury from mechanical failure, drill rig, or air compressor. Trip hazards. Exposure to contaminants. Electric shock.	• Verify that equipment is in good working order and that pressurized hoses are whip-checked. • Keep full-face respirator with organic cartridges readily accessible. • Keep work area orderly. • Any generators must be equipped with a ground fault circuit interrupter (GFCI).
Gauge water levels and product thickness in wells, where applicable.	Reflective vest, steel-toed and -shank shoes, hard hat, safety glasses with side shields, ear plugs or muffs, work gloves. Respirator with organic vapor cartridges, chemical-resistant gloves, chemical-resistant apron as required.	Back strain. Inhalation or dermal exposure to chemical hazards. Repetitive motion.	• Have full-face respirator with organic cartridges readily accessible. • Conduct air quality monitoring in accordance with the protocol presented in **Attachment 9.** • Maintain a safe distance from the well head. • Bend at knees rather than at the waist.
Purge well(s) and collect purge water.	Reflective vest, steel-toed and -shank shoes, hard hat, safety glasses with side shields, ear plugs or muffs, work gloves. Respirator with organic vapor cartridges, chemical-resistant gloves, chemical-resistant apron as required.	Back strain. Inhalation or dermal exposure to chemical hazards. Slip or fall. Contaminated water spill.	• Use proper lifting techniques. • Use PPE, and adhere to air monitoring guidelines as presented in **Attachment 9**. • Keep work area clear of tripping or slipping hazards. • Store purge water in appropriate containers.
Collect groundwater samples in accordance with sampling plan.	Reflective vest, steel-toed and -shank shoes, hard hat, safety glasses with side shields, ear plugs or muffs, work gloves. Respirator with organic vapor cartridges, chemical-resistant gloves, chemical-resistant apron as required.	Cross-contamination. Back strain. Inhalation or dermal exposure to chemical hazards. Slip or fall. Improper labeling or storage of samples. Injury from broken sample bottle (cuts or acid burns).	• Decontaminate sampling equipment between each well (unless disposable). • Use proper lifting techniques. • Have full-face respirator with organic cartridges within 3 to 5 feet of working location, and readily accessible. • Label samples in accordance with sampling plan. • Keep samples stored in appropriate containers, at correct temperature, and away from work area. • Handle bottles carefully.

Job Steps	Personal Protective Equipment	Potential Hazards	Critical Actions
Dispose of or store any purge water on the Site.	Reflective vest, steel-toed and -shank shoes, hard hat, safety glasses with side shields, ear plugs or muffs, work gloves. Respirator with organic vapor cartridges, chemical-resistant gloves, chemical-resistant apron as required.	Back strain. Exposure to contaminants.	• Use suitable equipment to transport water (e.g., pumps, drum dollies). • Have full-face respirator with organic cartridges within 3 to 5 feet of working location, and readily accessible. • Label storage containers properly, and locate in an isolated area away from traffic and other Site functions. • Coordinate off-Site disposal (where applicable).
Clean the Site; demobilize.	Reflective vest, steel-toed and -shank shoes, hard hat, safety glasses with side shields, ear plugs or muffs, work gloves. Respirator with organic vapor cartridges, chemical-resistant gloves, chemical-resistant apron as required.	Traffic. Lifting hazards.	• Use buddy system to remove traffic control, as necessary. • Leave the Site clear of refuse and debris. • Clearly mark or barricade any borings that need topping off or curing at a later time. • Notify Site personnel of departure, final well locations, and any cuttings and/or purge water left on the Site. • Use proper lifting techniques.
Package and deliver samples to laboratory.		Back strain. Traffic accidents.	• Handle and pack bottles carefully (e.g., bubble wrap bags). • Use proper lifting techniques. • Apply safe driving practices.
Typical work.	Steel-toed and -shank shoes, hard hat, safety glasses with side shields, hearing protection, reflective safety vest, leather gloves for non-chemical aspects of work. Chemical-resistant gloves and apron if chemical exposure is suspected.	Weather-related incidents: automobile accidents, slips or falls.	• Check weather reports daily. Project visits are not to be performed during inclement weather. Sampling may be performed during light rain mist. Wear raincoats. • Drive at speed limit or less, as needed, to keep a safe distance from vehicle in front. Avoid short stops.

Job Steps	Personal Protective Equipment	Potential Hazards	Critical Actions
Typical work.		Cold stress.	• For temperatures below 40°F, adequate insulating clothing must be worn. If the temperature is below 20°F, workers will be allowed to enter a heated shelter at regular intervals. Warm, sweet drinks should be available. Coffee intake should be limited. • No one should begin work or return to work from a heated shelter with wet clothes. • Workers should be aware of signs of cold stress, such as heavy shivering, pain in fingers or toes, drowsiness, or irritability. Onset of any of these signs is an indication that immediate return to a heated shelter is needed. • Refer to ACGIH TLV Booklet for the section on Cold Stress.
Typical work.		Heat stress.	• Discuss health effects and symptoms during daily health and safety meetings. • Drink water regularly (at least one cup every 20 to 30 minutes, depending upon level of effort and the PPE worn). • Refer to ACGIH TLV booklet for heat stress guidance, especially regarding PPE, type of work, and frequency of breaks. • Breaks should be taken in an area cooler than the work area. • Monitor temperature and relative humidity using a wetbulb globe temperature meter.
A safety meeting will be held every day, even if only one person is working on the project on a given day.			• Topics are to always include the work scheduled for the day and restatement of hazards and the means to avoid them. Other topics may include sampling in general, and advances in technology and how they may be applied to the project. • Use the *Daily Health and Safety Briefing Log* in **Attachment 4** to log the topics discussed.

9.2 MONITORING WELL SAMPLING/GAUGING

Job Steps	Personal Protective Equipment	Potential Hazard	Critical Actions
Mobilize with equipment/supplies suitable for sampling.	Reflective vest, steel-toed and -shank shoes, hard hat, safety glasses with side shields, ear plugs or muffs, work gloves.	Vehicle accident. Lifting hazards. Delay or unsafe performance of work due to lack of necessary equipment on the Site. Cross-contamination of wells.	• Follow safe driving procedures. • Use proper lifting techniques. • Review work plan to determine equipment/supply needs. • Verify that all sampling/gauging equipment has been decontaminated. • Bring ice for sample storage. • Review the HASP. • Gather the necessary PPE.
Set up necessary traffic control.	Reflective vest, steel-toed and -shank shoes, hard hat, safety glasses with side shields, ear plugs or muffs, work gloves.	Struck by vehicle during placement. Vehicle accident as a result of improper traffic-control equipment placement.	• Use buddy system for placing traffic control. Refer to the traffic control plan section of the HASP (which may include specific requirements based on encroachment permit).
Set up exclusion zone(s).	Reflective vest, steel-toed and -shank shoes, hard hat, safety glasses with side shields, ear plugs or muffs, work gloves.	Struck by vehicle. Slip or fall hazards to workers.	• Face incoming traffic. • Implement exclusion zone setup instructions of the HASP (e.g., barricades, caution tape, cones). • Set up work area free of trip hazards.
Gauge water levels and product thickness (where applicable) in wells.	Reflective vest, steel-toed and -shank shoes, hard hat, safety glasses with side shields, ear plugs or muffs, work gloves. Respirator with organic vapor cartridges, chemical-resistant gloves, chemical-resistant apron as required.	Back strain. Inhalation of, or dermal exposure to, chemical hazards. Repetitive motion.	• Wear required PPE. • Initiate air quality monitoring in accordance with the HASP. • Maintain a safe distance from wellhead. • Bend at knees rather than at waist.

Job Steps	Personal Protective Equipment	Potential Hazard	Critical Actions
Purge well(s) and collect purge water.	Reflective vest, steel-toed and -shank shoes, hard hat, safety glasses with side shields, ear plugs or muffs, work gloves. Respirator with organic vapor cartridges, chemical-resistant gloves, chemical-resistant apron as required.	Cross-contamination. Back strain. Inhalation of, or dermal exposure to, chemical hazards. Slip or fall. Contaminated water spill.	• Decontaminate purging equipment between each sampling location. • Use proper lifting techniques. • Use PPE and conduct monitoring in accordance with the HASP. • Keep work area clear of tripping or slipping hazards. • Store purge water in appropriate containers.
Collect samples in accordance with sampling plan.	Reflective vest, steel-toed and -shank shoes, hard hat, safety glasses with side shields, ear plugs or muffs, work gloves. Respirator with organic vapor cartridges, chemical-resistant gloves, chemical-resistant apron as required.	Cross-contamination. Back strain. Inhalation of, or dermal exposure to, chemical hazards. Slip or fall. Improper labeling or storage. Injury from broken sample bottle (e.g., cut or acid burn).	• Decontaminate sampling equipment between each well (unless disposable equipment). • Use proper lifting techniques. • Use PPE in accordance with the HASP. • Label samples in accordance with sampling plan. • Keep samples stored in suitable containers, at correct temperature, and away from work area. • Handle bottles carefully.
Dispose of or store purge water on the Site.	Reflective vest, steel-toed and -shank shoes, hard hat, safety glasses with side shields, ear plugs or muffs, work gloves. Respirator with organic vapor cartridges, chemical-resistant gloves, chemical-resistant apron as required.	Back strain. Exposure to contaminants. Damage or injury from improper use of on-Site treatment system equipment. Improper storage or disposal.	• Use suitable equipment to transport water (e.g., pumps, drum dollies). • Wear PPE in accordance with the HASP. • Review any necessary instructions for use of on-Site treatment systems. • Label storage containers properly and locate in an isolated area away from traffic and other Site functions. • Coordinate off-Site disposal, where applicable.

Job Steps	Personal Protective Equipment	Potential Hazard	Critical Actions
Clean the Site; demobilize.	Reflective vest, steel-toed and -shank shoes, hard hat, safety glasses with side shields, ear plugs or muffs, work gloves.	Traffic. Safety hazard left on the Site. Lifting hazard.	• Use buddy system to remove traffic control, as necessary. • Leave the Site clear of refuse and debris. • Notify business personnel of departure, and of any purge water left on the Site. • Use proper lifting techniques.
Package and deliver samples to laboratory.		Bottle breakage. Back strain.	• Handle and pack bottles carefully (e.g., bubble wrap bags). • Use proper lifting techniques.

9.3 AIR SPARGE, GROUNDWATER EXTRACTION, AND/OR SOIL VAPOR EXTRACTION PILOT TESTING

Job Steps	Personal Protective Equipment	Potential Hazard	Critical Actions
Mobilize with equipment/supplies suitable for testing.	Reflective vest, steel-toed and -shank shoes, hard hat, safety glasses with side shields, ear plugs or muffs, work gloves.	Vehicle accident. Lifting hazards. Delay or unsafe performance of work due to lack of necessary equipment on Site.	• Follow safe driving procedures. • Employ safe lifting procedures. • Verify that subcontractors are aware of their responsibilities for labor, equipment, and supplies. • Review the HASP and permit conditions. • Gather the necessary PPE.
Set up necessary traffic control.	Reflective vest, steel-toed and -shank shoes, hard hat, safety glasses with side shields, ear plugs or muffs, work gloves.	Being struck by vehicle during placement. Vehicle accident resulting from improper placement of traffic control equipment.	• Use buddy system to place traffic control. Refer to traffic control plan section of the HASP, which may include specific requirements based on permits.

Job Steps	Personal Protective Equipment	Potential Hazard	Critical Actions
Unload and set up test equipment.	Reflective vest, steel-toed and -shank shoes, hard hat, safety glasses with side shields, ear plugs or muffs, work gloves.	Being struck by vehicle. Tripping hazards. Accident when maneuvering equipment. Lifting hazards. Electrical hazards. Adverse impacts to business operations.	• Place equipment away from pump islands or other high traffic areas. • Store hoses and electrical cords neatly and protect with traffic control equipment (e.g., cones, barricades). • Provide hand signals and guidance to driver as needed when placing test equipment trailers or other large equipment. • Visually inspect equipment (e.g., fire extinguisher on board/available on the Site, no damaged hoses or electrical lines, pressurized hoses secured with whip-checks or adequate substitute, all vapor and/or water hoses firmly connected, equipment grounded). • Use proper lifting techniques. • Use GFCI on generators or other electrical equipment. • Inspect cords.
Set up exclusion zone(s) and work station.	Reflective vest, steel-toed and -shank shoes, hard hat, safety glasses with side shields, ear plugs or muffs, work gloves.	Being struck by vehicle during set up. Slip or fall hazards.	• Implement exclusion zone setup instructions of the HASP. • Set up work station with clear walking paths to all testing locations. • Face oncoming traffic.
Gauge water levels and product thickness, where applicable.	Reflective vest, steel-toed and -shank shoes, hard hat, safety glasses with side shields, ear plugs or muffs, work gloves.	Back strain. Inhalation of, or dermal exposure to, chemical hazards. Repetitive motion. Traffic hazards.	• Wear any additional PPE needed. • Initiate air quality monitoring in accordance with the HASP. • Maintain a safe distance from wellheads. • Bend at knees rather than at waist. • Decontaminate equipment between each measurement. • Face oncoming traffic.

Job Steps	Personal Protective Equipment	Potential Hazard	Critical Actions
Commence testing.	Reflective vest, steel-toed and -shank shoes, hard hat, safety glasses with side shields, ear plugs or muffs, work gloves.	Explosion. Fire. Tripping hazards. Unauthorized release of contaminants. Exposure to contaminants (e.g., inhalation, dermal contact). Noise. Electrical hazards.	• Follow equipment-specific operation instructions. Monitor influent vapor and oxygen concentrations, if applicable. • Keep work area tidy and free of loose equipment. • Monitor treatment system and collect data to ensure discharge is within permit parameters and capacity of any storage containers (concentrations and flow rates). • Wear PPE, including ear protection as necessary, in accordance with the HASP. • Use GFCI on generators and other electrical equipment. • Inspect cords.
Collect samples in accordance with sampling plan.	Reflective vest, steel-toed and -shank shoes, hard hat, safety glasses with side shields, ear plugs or muffs, work gloves.	Cross-contamination. Improper sample labeling or storage. Exposure to Site contaminants. Repetitive motion. Body position.	• Label samples in accordance with sampling plan. Keep samples stored in suitable containers, at correct temperature, and away from work area. • Perform air monitoring. • Wear suitable PPE.
Store waste (e.g., water, carbon canisters) according to Site-specific requirements.	Reflective vest, steel-toed and -shank shoes, hard hat, safety glasses with side shields, ear plugs or muffs, work gloves.	Back strain. Traffic hazards. Improper storage or disposal. Damage or injury from improper use of on-Site treatment system equipment.	• Use suitable equipment to transport waste containers (e.g., pumps, drum dollies). • Have appropriate storage containment and labeling available on the Site. • Place materials in an isolated location away from traffic and other Site functions. • Label waste. • Coordinate proper disposal off the Site, where applicable. • Review instructions for use of on-Site treatment systems.

Job Steps	Personal Protective Equipment	Potential Hazard	Critical Actions
Clean the Site; demobilize.	Reflective vest, steel-toed and -shank shoes, hard hat, safety glasses with side shields, ear plugs or muffs, work gloves.	Traffic hazard. Lifting hazards. Safety hazard left on the Site.	• Use buddy system to remove traffic control, as necessary. • Use proper lifting techniques. • Leave the Site clear of refuse and debris. • Notify business personnel of location of any stored waste and of departure.
Package and deliver samples to laboratory.	Reflective vest, steel-toed and -shank shoes, hard hat, safety glasses with side shields, ear plugs or muffs, work gloves.	Bottle breakage. Back strain.	• Handle and pack bottles carefully (e.g., bubble wrap bags). • Use proper lifting techniques.

9.4 CONTRACTOR OBSERVATION

Job Steps	Personal Protective Equipment (PPE)	Potential Hazards	Critical Actions
Set up exclusion zone(s).	Reflective vest, steel-toed and -shank shoes, hard hat, safety glasses with side shields, ear plugs or ear muffs, work gloves.	Struck by vehicle. Slip or fall hazards to workers.	• Face incoming traffic. • Implement exclusion zone setup instructions of the HASP (e.g., barricades, caution tape, cones). • Set up work area free of trip hazards.
Typical work. Observe and document contractor activities.	Steel-toe and -shank shoes, hard hat, safety glasses with side shields, hearing protection, reflective safety vest, leather gloves for non-chemical aspects of work. Chemical-resistant gloves and apron if chemical exposure is suspected.	Weather-related incidents: automobile accidents, slips, or falls.	• Check weather reports daily. Project visits are not to be performed during inclement weather. Sampling may be performed during light rain mist. Wear raincoats. • Drive at speed limit or less, as needed, to keep a safe distance from vehicle in front. Avoid short stops.

Job Steps	Personal Protective Equipment (PPE)	Potential Hazards	Critical Actions
Typical work. Observation of work performed by contractor(s).		Cold stress.	• For temperatures below 40 °F, adequate insulating clothing must be worn. If the temperature is below 20°F, workers will be allowed to enter a heated shelter at regular intervals. Warm, sweet drinks should be available. Coffee intake should be limited. • No one should begin work or return to work from a heated shelter with wet clothes. Workers should be aware of signs of cold stress such as heavy shivering, pain in fingers or toes, drowsiness, or irritability. Onset of these signs is an indication that immediate return to a heated shelter is needed. • Refer to Cold Stress section in ACGIH TLV Booklet.
Clean the Site; demobilize.	Reflective vest, steel-toe and -shank shoes, hard hat, safety glasses with side shields, ear plugs or muffs, work gloves. Respirator with organic vapor cartridges, chemical-resistant gloves, chemical-resistant apron as required.	Traffic Lifting hazards	• Use buddy system to remove traffic control. • Leave Site clear of refuse and debris. Clearly mark or barricade any borings that need topping off or curing at a later time. Notify Site personnel of departure, final well locations, and any cuttings and/or purge water left on the Site. • Use proper lifting techniques.
No eating, drinking, or smoking on the Site. No contact lenses to be worn on the Site. No facial hair that would interfere with respirator fit.			
A safety meeting will be held every day, even if only one person is working on the project on a given day.			• Topics are to always include the work scheduled for the day and restatement of hazards and the means to avoid them. Other topics may include sampling in general, and advances in technology and how they may be applied to the project. Use the *Daily Health and Safety Briefing Log* in **Attachment 4** to log the topics discussed.

9.5 SUBSLAB DEPRESSURIZATION SYSTEM OPERATION AND MAINTENANCE

Job Steps	Personal Protective Equipment	Potential Hazard	Critical Actions
Mobilize with proper equipment/supplies for operation and maintenance.	Safety glasses or goggles, hard hat, steel-toed and -shank boots, hearing protection, gloves.	Vehicle accident. Lifting hazards. Delay or improper performance of work due to improper equipment on Site.	• Follow safe driving procedures. • Employ safe lifting procedures. • Ensure subcontractors are aware of their responsibilities for labor, equipment, and supplies. • Review HASP and permit conditions and gather necessary PPE.
Unload and set up test equipment.	Safety glasses or goggles, hard hat, steel-toed and -shank boots, hearing protection, gloves.	Struck by vehicle. Trip hazards. Accident when maneuvering equipment. Lifting hazard. Electrical hazard. Adverse impacts to station sales.	• Place equipment away from pump islands or other high traffic areas. • Store hoses and electrical cords neatly and protect with traffic control equipment (e.g., cones, barricades). • Provide hand signals and guidance to driver, as needed, when placing testing equipment trailers or other large equipment. • Visually inspect equipment (e.g., fire extinguisher on board/available on the Site, no damaged hoses or electrical lines, pressurized hoses secured with whip-checks or adequate substitute, vapor and/or water hoses firmly connected, equipment grounded). • Use proper lifting techniques. • Use GFCI on generators or other electrical equipment. • Inspect cords.

Job Steps	Personal Protective Equipment	Potential Hazard	Critical Actions
Commence performing operation and maintenance.	Safety glasses or goggles, hard hat, steel-toed and -shank boots, hearing protection, gloves.	Explosion or fire. Trip hazards. Unauthorized release of contaminants. Eye injury from pressurized air or shrapnel from burst piping. Burn from heated piping or motors. Clothing caught on turning vanes on compressor and shaft. Exposure to contaminants (e.g., inhalation, dermal contact). Noise. Electrical hazards.	• Follow equipment-specific operation instructions. • Ensure that connections with barbed fittings on pressure gauges are secure. • Be conscious of amount of torque on polyvinyl chloride connections to avoid breaking. • Monitor pressure conditions; do not exceed pressure ratings for any component involved. • Watch proximity to heated piping and contact with mufflers, motors, manifolds. • Monitor influent vapor and oxygen concentrations, if applicable. • Keep work area tidy and free of loose equipment. • Monitor treatment system and collect data to ensure discharge is within permit parameters and capacity of storage containers (e.g., concentrations, flow rates). • Wear PPE in accordance with HASP (including ear protection, as necessary). • Ensure lockout/tagout of all electrical equipment that may be handled. • Use GFCI. • Inspect cords.
Shut down system (if necessary).	Safety glasses or goggles, hard hat, steel-toed and -shank boots, hearing protection, gloves.	Unauthorized release of contaminants from back pressure. Eye injury from pressurized air or shrapnel from burst piping. Burn from heated piping or motors. Exposure to contaminants (e.g., inhalation, dermal contact).	

Job Steps	Personal Protective Equipment	Potential Hazard	Critical Actions
Collect samples in accordance with sampling plan.	Safety glasses or goggles, hard hat, steel-toed and -shank boots, hearing protection, gloves.	Cross-contamination, improper sample labeling or storage, exposure to Site contaminants. Repetitive motion. Cuts from colorimetric tubes. Body position.	• Label samples in accordance with sampling plan. Keep samples stored in proper containers, at correct temperature, and away from work area. • Perform air monitoring and wear proper PPE.
Clean the Site; demobilize.	Safety glasses or goggles, hard hat, steel-toed and -shank boots, hearing protection, gloves.	Traffic hazard. Lifting hazards. Safety hazard left on the Site.	• Use buddy system, as necessary, to remove traffic control. • Use proper lifting techniques. • Leave the Site clean of refuse and debris. • Notify station personnel of departure and location of any stored waste.

9.6 VAPOR INTRUSION MONITORING

Job Steps	Personal Protective Equipment (PPE)	Potential Hazards	Critical Actions
Mobilize with equipment/supplies suitable for drilling.	Reflective vest, steel-toe and -shank shoes, hard hat, safety glasses with side shields, and work gloves.	Vehicle accident. Lifting hazards. Delay or improper performance of work due to improper equipment on the Site.	• Begin each work day with tailgate safety meeting. • Follow safe driving procedures. • Employ safe lifting procedures. • Verify that subcontractors are aware of their responsibilities for labor, equipment, and supplies. • Review permit conditions.

Job Steps	Personal Protective Equipment (PPE)	Potential Hazards	Critical Actions
Unload and set up test equipment.	Safety glasses or goggles, hard hat, steel-toed and -shank boots, hearing protection, gloves.	Struck by vehicle. Trip hazards. Accident when maneuvering equipment. Lifting hazard. Electrical hazard. Adverse impacts to station sales.	• Place equipment away from pump islands or other high traffic areas. • Store hoses/electrical cords neatly and protect with traffic control equipment (e.g., cones, barricades). • Provide hand signals and guidance to driver when placing testing equipment trailers or large equipment. • Visually inspect equipment (e.g., fire extinguisher available on the Site, no damaged hoses or electrical lines, pressurized hoses secured with whip-checks or adequate substitute, all vapor or water hoses firmly connected, equipment grounded). • Use proper lifting techniques. • Use GFCI on generators or electrical equipment. • Inspect cords.
Collect samples in accordance with sampling plan.	Reflective vest, steel-toe and -shank shoes, hard hat, safety glasses with side shields, ear plugs or ear muffs, work gloves. Respirator with organic vapor cartridges, chemical-resistant gloves, chemical-resistant apron as required.	Back strain. Heat or cold. Eye injury. Noise. Exposure to chemical hazards. Breaching an underground utility. Trip or fall. Equipment failure.	• Stand clear of operating equipment. • Use correct lifting techniques. Monitor air quality in accordance with the air monitoring protocol presented in Attachment 9. Monitor drilling progress. • Keep work area clear of tripping or slipping hazards. • Perform periodic visual inspections of drill rig.
Clean the Site; demobilize.	Safety glasses or goggles, hard hat, steel-toed and -shank boots, hearing protection, gloves.	Traffic hazard. Lifting hazards. Safety hazard left on the Site.	• Use buddy system to remove traffic control. • Use proper lifting techniques. • Leave the Site clean of refuse and debris. • Notify station personnel of departure and location of any stored waste.

10.0 WASTE CHARACTERISTICS

Waste anticipated to be generated on the Site:

Type(s): ☒ Liquid ☒ Solid ☐ Sludge ☐ Other _____

The approximate volume for each anticipated waste stream:

Waste: Decontamination/Purge Water Approximate Volume: One 55-gallon drum

Waste: Soil Cuttings Approximate Volume: One 55-gallon drum

Characteristics:

☐ Corrosive ☐ Flammable/Ignitable ☐ Radioactive ☒ Toxic

☐ Reactive ☐ Unknown ☐ Other *(specify)* _____

11.0 TRAFFIC CONTROL

Project work will require Farallon personnel or subcontractors to enter rights-of-way or areas of uncontrolled traffic access, such as parking lots open to the public. When work is to be performed in these areas, traffic control will be implemented.

Semiannual groundwater monitoring requires Farallon personnel to access monitoring wells MW-3, MW-4, and MW-7 in South Fidalgo Street and requires the implementation of traffic control. The specific control devices and layout to be used are shown in Figure 1 of Attachment 10.

Implementation of the interim action requires Farallon personnel and subcontractors to occasionally access the MW-7 monitoring well cluster in South Fidalgo Street and requires the implementation of traffic control. The specific control devices and layout to be used are shown in Figure 2 of Attachment 10.

Work on certain portions of the Site will be conducted in areas of uncontrolled traffic access, but without the requirement of a traffic control plan. Traffic control/warning devices will be placed around the work area to prevent undesirable interface between pedestrian traffic and automotive traffic and to project workers and equipment. These devices may include:

- Cones;
- Tubular markers;
- Barricades;
- Temporary fencing; and
- Barricade tape.

The traffic control/warning devices will be placed around the work area in such a way that traffic access is inhibited (i.e., place cones less than 8 feet apart so cars cannot easily drive through work area without moving a cone). Barricade tape or temporary fencing will be used to inhibit access to the work area in locations where pedestrians will be encountered.

Work on the Site also will be conducted in areas where access is primarily controlled. An exclusion zone will be placed around the work area to prevent undesirable interface between pedestrian traffic and project workers and equipment. These devices may include:

- Cones;
- Tubular markers; and
- Barricade tape.

Cones and/or tubular markers and barricade tape will be used to inhibit access to the work area in locations where pedestrian traffic will be encountered.

ATTACHMENT 1
HEALTH AND SAFETY PLAN ACKNOWLEDGEMENT AND AGREEMENT FORM

HEALTH AND SAFETY PLAN
Remedial Investigation Monitoring, Vapor Mitigation System Operations, and Soil Vapor Extraction Pilot Study
5801 Third Avenue South
Seattle, Washington

Farallon PN: 457-008

HEALTH AND SAFETY PLAN ACKNOWLEDGMENT AND AGREEMENT FORM

(All Farallon and subcontractor personnel must sign on a daily basis.)

This Health and Safety Plan (HASP) has been developed for the purpose of informing Farallon employees of the hazards they are likely to encounter on the project site, and the precautions they should take to avoid those hazards. Subcontractors and other parties at the site must develop their own HASP to address the hazards faced by their own employees. Farallon will make a copy of this HASP available to subcontractors and other interested parties to fully disclose hazards we may be aware of, and to satisfy Farallon's responsibilities under the Occupational Safety and Health Administration (OSHA) Hazard Communication standard. Similarly, subcontractors and others on site are required to inform Farallon of any hazards they are aware of or that their work on site might possibly pose to Farallon employees, including but not limited to Material Safety Data Sheets for chemicals brought on site. This plan should NOT be understood by contractors to provide information pertaining to all of the hazards that a contractor's employees may be exposed to as a result of their work.

All parties conducting site activities are required to coordinate their activities and practices with the project Site Health and Safety Officer (SHSO). Your signature below affirms that you have read and understand the hazards discussed in this HASP, and that you understand that subcontractors and other parties working on site must develop their own HASP for their employees. Your signature also affirms that you understand that you could be prohibited by the SHSO or other Farallon personnel from working on this project for not complying with any aspect of this HASP. The SHSO will be noted on the sheet below on a daily basis.

HEALTH AND SAFETY PLAN ACKNOWLEDGMENT AND AGREEMENT FORM					
Check for SHSO	**Name**	**Title**	**Signature**	**Company**	**Date**

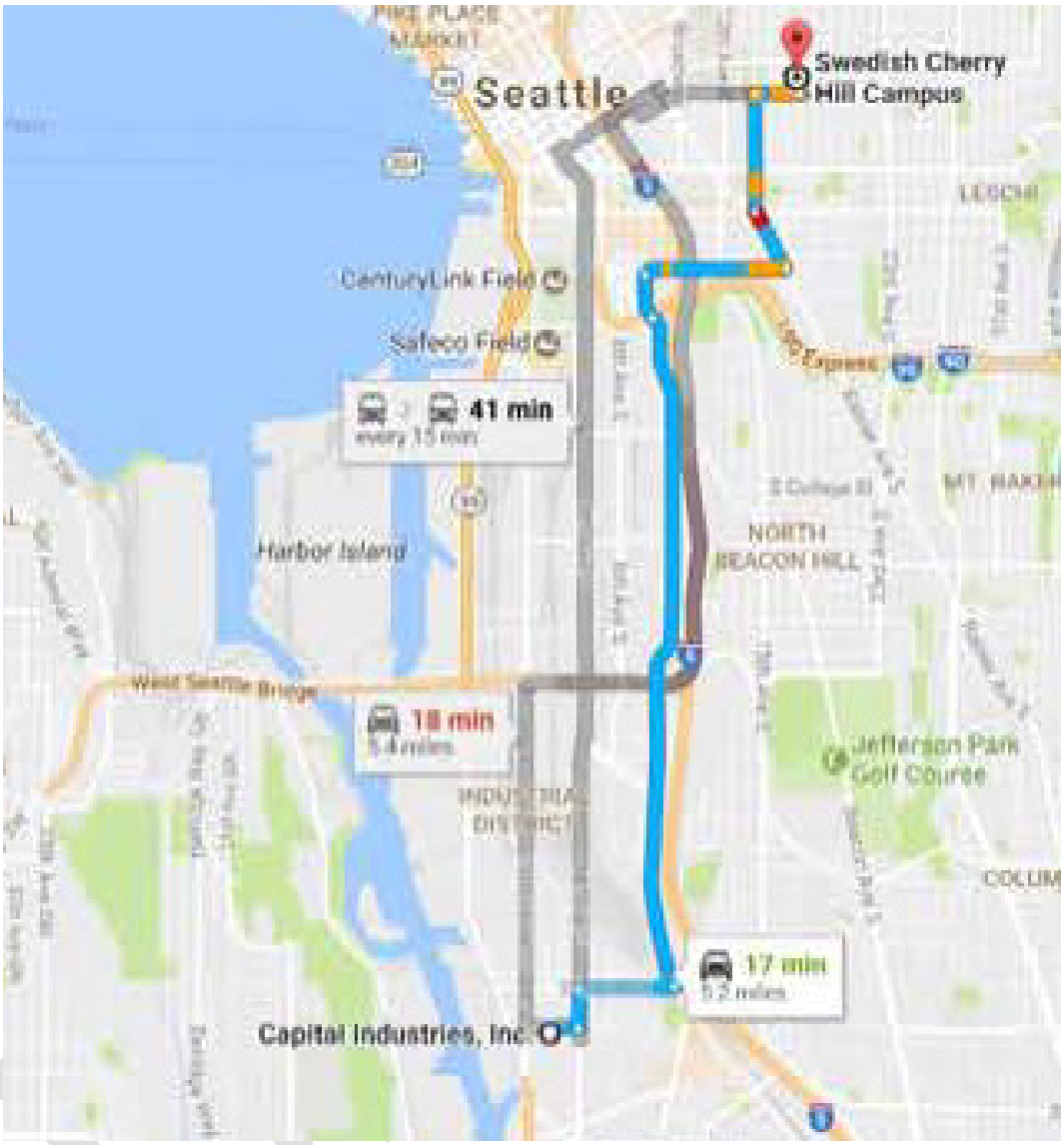
HEALTH AND SAFETY PLAN ACKNOWLEDGMENT AND AGREEMENT FORM					
Check for SHSO	**Name**	**Title**	**Signature**	**Company**	**Date**

ATTACHMENT 2
DIRECTIONS TO HOSPITAL

HEALTH AND SAFETY PLAN
Remedial Investigation Monitoring, Vapor Mitigation
System Operations, and Soil Vapor Extraction Pilot Study
5801 Third Avenue South
Seattle, Washington

Farallon PN: 457-008

DIRECTIONS TO HOSPITAL



Capital Industries, Inc.

5801 3rd Avenue South, Seattle, WA 98108

1. Head east on S Mead St toward 3rd Ave S

28 s (0.1 mi)

Take Airport Way S to 14th Ave S

13 min (4.4 mi)

2. Turn left onto 4th Ave S

0.2 mi

3. Turn right at the 3rd cross street onto S Lucile St

0.4 mi

4. Sharp left onto Airport Way S

2.8 mi

5. Continue straight onto 7th Ave S

0.2 mi

6. Turn right onto S Dearborn St

0.6 mi

7. Use any lane to turn left onto Rainier Ave S

0.3 mi

Continue on 14th Ave S. Drive to 17th Ave

3 min (0.7 mi)

8. Slight right onto 14th Ave S

0.5 mi

9. Turn right onto E Jefferson St

0.2 mi

10. Turn left at the 3rd cross street onto 17th Ave

52 ft

Swedish Cherry Hill Campus

500 17th Avenue, Seattle, WA 98122

ATTACHMENT 3
POTENTIAL TOPICS FOR DAILY HEALTH AND SAFETY MEETING

HEALTH AND SAFETY PLAN
Remedial Investigation Monitoring, Vapor Mitigation
System Operations, and Soil Vapor Extraction Pilot Study
5801 Third Avenue South
Seattle, Washington

Farallon PN: 457-008

POTENTIAL TOPICS FOR DAILY HEALTH AND SAFETY MEETING

- ☐ Emergency response plan, emergency vehicle (full of fuel) and muster point
- ☐ Route to medical aid (hospital or other facility)
- ☐ Work hours. Is night work planned?
- ☐ Hand signals around heavy equipment
- ☐ Traffic control
- ☐ Pertinent legislation and regulations
- ☐ Above- and below-ground utilities (energized or de-energized)
- ☐ Material Safety Data Sheets
- ☐ Reporting an incident: to whom, what, why, and when to report
- ☐ Fire extinguisher and first aid kit locations
- ☐ Excavations, trenching, sloping, and shoring
- ☐ Personal protective equipment and training
- ☐ Safety equipment and training
- ☐ Emergency telephone location(s) and telephone numbers (in addition to 911)
- ☐ Eye wash stations and washroom locations
- ☐ Energy lock-out/tag-out procedures. Location of "kill switches," etc.
- ☐ Weather restrictions
- ☐ Site security. Site hazards. Is special waste present?
- ☐ Traffic and people movement
- ☐ Working around machinery (both static and mobile)
- ☐ Sources of ignition, static electricity, etc.
- ☐ Stings, bites, large animals, and other nature-related injuries and conditions
- ☐ Working above grade
- ☐ Working at isolated sites
- ☐ Decontamination procedures (for both personnel and equipment)
- ☐ How to prevent falls, trips, sprains, and lifting injuries
- ☐ Right to refuse unsafe work
- ☐ Adjacent property issues (e.g., residence, business, school, daycare center)

ATTACHMENT 4
DAILY HEALTH AND SAFETY BRIEFING LOG

HEALTH AND SAFETY PLAN
Remedial Investigation Monitoring, Vapor Mitigation System Operations, and Soil Vapor Extraction Pilot Study
5801 Third Avenue South
Seattle, Washington

Farallon PN: 457-008

DAILY HEALTH AND SAFETY BRIEFING LOG

PROJECT INFORMATION	
Farallon PN:	Project Name:
Site Address:	City/State:
MEETING INFORMATION	
Conducted By:	Weather:
Major Job Task:	Date:

DAILY EQUIPMENT CHECKLIST

☐ Site Check In	☐ First Aid Kit Location(s)	☐ Ear Plugs (if required)
☐ Proper ID/Safety Credentials	☐ Fire Extinguisher Location(s)	☐ Hand Protection (if required)
☐ Hard Hat	☐ Eye Wash Station	☐ Face Shield (if required)
☐ Safety Glasses	☐ Traffic Control (if needed)	☐ Respirator (if required)
☐ Orange Reflective Vest (H or X back BNSF)		☐ _____
☐ Safety Toe Boots (lace up and leather BNSF)		☐ _____

HEALTH AND SAFETY BRIEFING

☐ Head Count (No. of employees:)	☐ Chemical/Contaminant Hazards
☐ Emergency Response	☐ Health Hazards
☐ Who will...? (Provide names below.) Call 911: Alternate to call 911: Provide First Aid/CPR:	☐ Environmental Hazards ☐ Physical Hazards ☐ Slips, Trips, and Falls ☐ Utility Locates
☐ Emergency Exits/Rally Points/Hospital Route	☐ Utility/Product Shut-Off Valves/Switches
☐ Site Security and Exclusion Zone	☐ Near Miss Reporting (reminder to look)
☐ Vehicle/Equipment-Specific Safety Practices	☐ Incident Reporting (procedures and forms)
☐ Stop Work Authority	☐ Traffic Control
☐ Excavation Safety (if applicable)	☐ HASP Reviewed and Signed

OTHER SITE-SPECIFIC HEALTH AND SAFETY ISSUES DISCUSSED

1)
2)
3)
4)
5)

DAILY HEALTH AND SAFETY BRIEFING ATTENDEES

NAME	COMPANY	SIGNATURE

ATTACHMENT 5
INCIDENT REPORT FORM

HEALTH AND SAFETY PLAN
Remedial Investigation Monitoring, Vapor Mitigation
System Operations, and Soil Vapor Extraction Pilot Study
5801 Third Avenue South
Seattle, Washington

Farallon PN: 457-008

FARALLON CONSULTING

Washington
Issaquah | Bellingham | Seattle

Oregon
Portland | Bend | Baker City

California
Oakland | Folsom | Irvine

INCIDENT REPORT FORM

This report must be completed by the employee or Health and Safety Coordinator (HSC) immediately upon learning of the incident. The completed report must be reviewed and signed by Project Principal, within 24 hours of the incident, even if the employee is not available to review and sign. The employee or employee's doctor must submit a copy of the doctor's report to Joe Rounds within 24 hours of the initial exam and any subsequent exams. After hours or weekends, please call Joe Rounds: Mobile (206) 484-2748. Document the incident with photographs if possible. For environmental releases, discuss possible regulatory spill reporting with the Project Principal.

EMPLOYEE INFORMATION

Employee Name:	Employee Title:
Employment Status: ☐ Full-Time ☐ Part-Time ☐ Hourly-As-Needed	Years Employed at Farallon Consulting, L.L.C. (Farallon)?

INCIDENT TYPE

☐ Fatality	☐ Industrial Non-Recordable	☐ Spill/Leak	☐ General Liability
☐ Lost Workday (LW)	☐ Non-Industrial	☐ Product Integrity	☐ Vandalism/Criminal Activity
☐ Restricted Duty	☐ Off-the-Job Injury	☐ Equipment	☐ Notice of Violation
☐ OSHA Medical or Illness w/o LW	☐ Motor Vehicle Accident	☐ Business Interruption	☐ Other
☐ First Aid	☐ Fire		

INCIDENT DESCRIPTION

Date of incident, injury, or onset of illness: Click or tap to enter a date.	Time of incident, injury or onset of illness: ☐AM ☐ PM
Brief description of incident. Provide full incident details on Page 2.	
Describe the equipment, materials, or chemicals that directly harmed the party (e.g., the machine employee struck against or which struck employee; the vapor inhaled, or material swallowed; what the employee was lifting, pulling, etc.):	
Date employer notified: Click or tap to enter a date.	Time employer notified: ☐ AM ☐ PM
To whom reported?	

INJURY OR ILLNESS INFORMATION

Exact Location of Incident (address, geographical location, floor, building, etc.):	
County:	On Employer's premises? ☐ Yes ☐ No
Describe the specific injury or illness (e.g., puncture, cut, contusion, strain, fracture, skin rash, etc.):	
Body part(s) affected (e.g., back, left wrist, right eye, etc.):	
Name and address of Health Care Provider:	Phone No.:
Treated in Emergency Room: ☐ Yes ☐ No	Hospitalized Overnight as Inpatient: ☐ Yes ☐ No

Injury/Illness Severity	**Time Loss (Check all that apply.)**	**Workday Phase**
☐ No treatment required.	☐ No time loss.	☐ Performing normal work duties.
	☐ Return to work the next day.	☐ During meal period.
☐ First aid only.	☐ Restricted activity.	☐ During rest period.
	Begin date:	☐ Entering/leaving work area or site.
☐ Professional medical treatment.	Return date:	☐ Chronic exposure.
	☐ Lost workday, not at work.	☐ Other, specify:
☐ Fatality. Enter date: Click or tap to enter a date.	Begin date:	
	Return date:	

MOTOR VEHICLE ACCIDENT (MVA)			
Professional Driver? ☐ Yes ☐ No	Total Years Driving:		Company Vehicle? ☐ Yes ☐ No
Vehicle Type:	Vehicle Owner (not Farallon):		Vehicle License Plate:
No. of Vehicles Towed:	No. of Injuries:	No. of Fatalities:	
Insurance information for other driver(s):			
Witness Name:	Address:	Phone No.:	
Witness Name:	Address:	Phone No.:	

THIRD PARTY PROPERTY DAMAGE (INCLUDING UTILITIES – PLEASE PROVIDE PHOTOS)		
Owner Name for Damaged Property:	Address:	Phone No.:
Description of Damage:		
Property Owner Insurance information:		
Witness Name:	Address:	Phone No.:
Witness Name:	Address:	Phone No.:

Detailed Description of Events
(Use space below to provide full detailed description of incident. Include Specific Activity During Incident (Lifting, Pushing, Walking, etc.)

SIGNATURES OF EMPLOYEE AND REVIEWERS			
Name (print):	**Signature:**	**Title:**	**Date:**
Employee:			
Employee's Group Manager:			
Regional Operations Manager:			
Farallon Corporate Health and Safety Coordinator:			
Entered into Database By:		**Date:**	

ATTACHMENT 6
NEAR MISS AND SAFETY OBSERVATION REPORT

HEALTH AND SAFETY PLAN
Remedial Investigation Monitoring, Vapor Mitigation
System Operations, and Soil Vapor Extraction Pilot Study
5801 Third Avenue South
Seattle, Washington

Farallon PN: 457-008

NEAR MISS AND SAFETY OBSERVATION REPORT

This report is to be filled out by any employee involved in or witnessing a near miss, or making a safety observation. A near miss is an occurrence that did not result in any personal injury, property damage, environmental release, or production interruption, but could have under slightly different circumstances. A safety observation is witnessing any activity that places a person or property at risk of injury, accident, or damage but does not fit the definition of a near miss. These are very important indicators of potentially harmful future accidents, and provide valuable insights to preventing personal injury and/or property damage.

PROJECT INFORMATION	
Farallon PN:	Project Name:
Site Address:	City/State:
NEAR MISS/SAFETY OBSERVATION INFORMATION	
Employee Completing Report:	
Date: Click or tap to enter a date.	Time: ☐AM ☐ PM
Near Miss Category: Choose an item.	
Exact Location:	
Description of Potential Incident or Hazard:	
Corrective Action Taken:	
Lessons Learned:	
SIGNATURES AND NOTIFICATIONS	
Date employer notified: Click or tap to enter a date.	Time employer notified: ☐ AM ☐ PM
To whom reported?	
Employee Signature:	Date:
HSC Signature:	Date:
Entered into Database By:	Date:

ATTACHMENT 7
UTILITY CLEARANCE LOGS

HEALTH AND SAFETY PLAN
Remedial Investigation Monitoring, Vapor Mitigation System Operations, and Soil Vapor Extraction Pilot Study
5801 Third Avenue South
Seattle, Washington

Farallon PN: 457-008

UTILITY CLEARANCE LOG

Project Name: _____ **Project Number:** _____

Location: _____ **Date of Work:** _____

Instructions. This log must be completed by a Farallon staff member **before** any Farallon-directed excavation (e.g., test pit excavation) or drilling operation.

DRILLING OR EXCAVATION WORK MAY NOT COMMENCE UNTIL UTILITY LOCATES HAVE BEEN COMPLETED (see the One-Call Utility Locate Request Procedure on the following page)

Farallon is responsible for having underground utilities and structures located and marked when drilling or directing test pit excavation operations. Any drilling or excavation within 2 feet of a marked utility must be done with hand tools.

Owners of underground utilities are required by law to mark underground facilities on public and private property. Owners of underground utilities are **not required** to mark existing service laterals or appurtenances. Utility owners in Washington are required to subscribe to the One-Call service.

Private utility locate services must be hired to locate service laterals and other buried utilities (e.g., on-Site electric distribution lines, irrigation pipes) on private property.

Re-mark after 10 days or maintain as appropriate.

Utility Locate Checklist

☐ Attach map showing drilling and/or excavation sites and known utilities

☐ Attach copy of One-Call Utility Notification Ticket (http://www.searchandstatus.com/)

One-Call Utility Notification Ticket Number: _____

☐ Attach copy of Side Sewer Card (available for City of Seattle; check municipality for availability)

☐ Attach copy of Private Locate Receipt

☐ Photograph all excavation and/or drilling locations and download to project file

☐ Review utilities with Site Contact:

Name:_____ Phone: _____

Utilities and Structures

Utility Type	Utility Name	Public Utilities Marked (Y/N)	Private Utilities/Laterals Marked (Y/N)	Marking Method (flags, wooden stakes, paint on pavement, etc.)
Petroleum product lines				
Natural gas line				
Water line				
Sewer line				
Storm drain				
Telephone cable				
Electric power line				
Product tank				
Septic tank/drain field				
Other				

Farallon Consulting, L.L.C.

Field Team Leader: _____ Date: _____

Electric = **RED**	*Gas-Oil-Steam =* **YELLOW**	*Comm-CATV =* **ORANGE**	*Water =* **BLUE/PURPLE**	*Sewer =* **GREEN**	*Temp Survey =* **PINK**

ONE-CALL UTILITY LOCATE REQUEST PROCEDURE

THE ONE-CALL UTILITY NOTIFICATION CENTER REQUIRES 48 HOURS NOTICE TO MARK UTILITIES BEFORE YOU CAN DIG OR DRILL

Washington: 1-800-424-5555
Oregon: 1-800-332-2344

Washington state law states that "before commencing **any** excavation," the excavator or driller must provide notice to all owners of underground utilities by use of the One-Call locator service, and that the excavator or driller shall not dig or drill until all known utilities are marked. To fully comply with the law, you **must** take the following steps:

1. **Call before you dig or drill:** Notify the One-Call Utility Notification Center (OCUNC) a minimum of 48 hours (2 full business days) before digging or drilling. Provide the following **required** information:
    a. Your name and phone number, company name and mailing address, and Farallon Account Number 25999.
    b. The type of work being done.
    c. Who the work is being done for.
    d. The county and city where the work is being done.
    e. The address or street where the work is being done.
    f. Marking Instructions: "Generally locate entire site including rights-of-way and easements."

    Provide the following information <u>if applicable or requested</u>:

    a. The name and phone number of an alternate contact person.
    b. If the work is being done within 10 feet of any overhead power lines.
    c. The nearest cross street.
    d. The distance and direction of the work site from the intersection.
    e. Township, range, section, and quarter section of the work site.
2. **Record the utilities that will be notified:** OCUNC will tell you the utilities that are on or adjacent to the work site, based on their database. Record the name(s) of the utility on the reverse side of this form.
3. **After the 48-hour waiting period, confirm that the utility locations have been marked:** Before digging or drilling, walk the work site and confirm that the utility companies have marked the utility locations in the field.
4. **If a locate appears to be missing:** If a utility locate appears to be missing and the utility company has not notified you that there are no utilities in the area, call OCUNC and:
    a. Provide the OCUNC locate number.
    b. Clearly state which utility has not been marked. The call is being recorded.
    c. Ask for a contact person at that utility.
    d. Call the contact person for the missing utility locate: Determine why there is no utility locate in the field.

Electric = **RED**	*Gas-Oil-Steam =* **YELLOW**	*Comm-CATV =* **ORANGE**	*Water =* **BLUE/PURPLE**	*Sewer =* **GREEN**	*Temp Survey =* **PINK**

e. **Record the reason(s) for the missing locate(s):** There are valid reasons that locates do not appear in the field (e.g., there are no utilities located on the work site or the utility has been abandoned). However, IF THEY ARE LATE, **YOU MUST WAIT** TO DRILL OR DIG. If the utility fails to mark a locate within the required 48 hours (2 full business days), the utility is liable for delay costs.

5. **Hand dig within 2 feet of a marked utility:** When digging or drilling within 2 feet of any marked utility, the utility must be exposed first by using hand tools.

6. **Record reason(s) for missing locate(s)**: There may be reasons that locates do not appear in the field (e.g., no utilities are located on the site, utility has been abandoned). Record the reason given. IF THEY ARE LATE – YOU WAIT TO DRILL OR DIG. If the utility failed to mark within the required two days, they are liable for delay costs.

FARALLON CONSULTING, L.L.C.
975 5th Avenue Northwest
Issaquah, Washington
98027

TELEPHONE CONVERSATION
Date: _____ **Time:** _____
Project Name: _____
Job No.: _____
Phone No.: **1-800-424-5555 WA, 1-800-332-2344 OR**
_____
Prepared By/Initials: _____
Call: ☐ **Placed** ☐ **Received**

Contact/Title: _____

Agency/Region: One-Call Utility Notification Center

PROJECT: _____

1. Your name and the Farallon Account No. #25999: _____

2. What is the type of work being conducted (e.g., environmental drilling, test pit excavation)?

_____

3. Who is the property owner? _____

4. County and city were work is being done? _____

5. Address or street where work is taking place? _____

_____

6. Nearest cross street? _____

7. Distance and direction of the work site from the intersection? _____

8. Marking Instructions (generally locate on entire Site, including rights-of-way and easements): _____

_____

_____

9. What time and date will the locate be completed? _____

10. Utility Locate Request Number? _____

11. Utilities that will be notified? _____

_____

12. Any Overhead Concerns? _____

_____

_____

cc:_____**Page**_____**of**_____

Note: Bold indicates required information.

ATTACHMENT 8
FARALLON FIELD PERSONNEL TRAINING DATES

HEALTH AND SAFETY PLAN
Remedial Investigation Monitoring, Vapor Mitigation
System Operations, and Soil Vapor Extraction Pilot Study
5801 Third Avenue South
Seattle, Washington

Farallon PN: 457-008

Health and Safety
Certifications and Training

Name	Medical Monitoring		Annual/Biennial	Resp. Clearance	Respirator Fit Test	CPR	First Aid	Fire Extinguisher Training	Expiration Dates		Harassment Training	GHS Training		8 Hour Supervisor	40 Hour Training Taken (Initial)	8 Hour Refresher
	Date of Last Exam	Next Exam Due							BNSF E-Railsafe (Bi-annual)	BNSF Contractor Orientation (Annual)			Lead Awareness			
Bailey, Amber	04/19/17	04/19/19	B	04/19/17	04/14/17	11/02/18	11/02/18	06/16/16	12/06/19	11/28/19	06/04/18		04/14/17	10/30/17	11/22/13	02/07/19
Banfield, Chantal	10/15/18	10/15/20	B	10/15/18		11/02/18	11/02/18	06/14/17	06/14/19	11/13/19	10/16/18				10/11/18	01/25/19
Bowser, Matthew	04/12/17	04/12/19	B	04/12/17	04/18/17	11/02/18	11/02/18	05/16/16	07/21/19	07/30/19	05/11/18		04/14/17	10/30/17	06/11/15	01/29/19
Brown, Stuart	05/11/17	05/11/19	B	08/23/18	05/11/17	01/11/17	01/11/17	06/28/11			05/09/18		05/11/17	06/28/11	09/08/08	01/25/19
Burns, Anastasia	04/26/18	04/25/20	B	04/26/18	07/01/16	11/02/18	11/02/18	05/16/16	01/25/20	04/25/19	05/08/18			10/30/17	09/15/14	01/26/18
Charney, Ryan								02/11/19			02/11/19			02/06/18	01/03/15	
Cordell, Phil	08/27/18	08/27/20	B	08/27/18		04/05/17	04/05/17	09/17/18			09/11/18			06/20/08	11/15/05	01/25/19
Denning, Arik	07/06/18	07/06/20	B	07/06/18	07/06/18			07/31/18			07/18/18				04/06/14	01/25/19
Emahiser, Parker	04/18/17	04/18/19	B	04/18/17	05/09/17	12/21/17	12/21/17	05/16/16			06/07/18		05/08/17		02/17/13	01/25/19
Ferreira, Gabriela	03/19/18	03/18/20	B	03/19/18		01/04/18	01/04/18	03/26/18			05/10/18				09/18/15	01/31/19
Fisco, Gavin	08/08/18	08/07/20	B	08/08/18	08/08/18	09/26/16	09/26/16	05/18/16			05/17/18			12/12/14	05/04/07	01/25/19
Garvin, Paul	03/13/18	03/12/20	B	03/13/18		09/22/17	09/22/17	08/29/16	12/04/19	01/29/19	07/13/18			10/30/17	06/22/12	01/25/19
Luiten, Russell	04/19/17	04/19/19	B	04/19/17	04/12/17	11/02/18	11/02/18	05/17/16	11/15/19	12/29/18	09/13/18		04/14/17	12/19/17	6/2012?	01/25/19
Ostrom, Ryan	04/11/17	04/11/19	B	04/11/17	02/12/15	11/02/18	11/02/18	06/06/16	11/15/19	07/31/18	05/07/18		04/14/17	10/30/17	05/09/13	01/25/19
Pehlivan, Yusuf	05/03/17	05/03/19	B	05/13/17	05/03/17	10/19/17	10/19/17	05/04/17			06/29/18		05/02/17	02/02/13	10/17/09	01/25/19
Peters, Greg	06/07/17	06/07/19	B	06/07/19	06/07/17	11/02/18	11/02/18	06/12/17	01/31/20	01/30/19	05/08/18		06/08/17		03/12/17	01/25/19
Rayl, Katie	10/17/17	10/17/19	B	10/17/17	10/17/17	10/10/16	10/10/16	10/26/17			05/08/18		10/26/17		11/19/14	01/25/19
Roskamp, Melissa	12/20/18	12/19/20	B	12/20/18							01/02/19				07/26/13	01/25/19
Scott, Ken	01/18/18	01/18/20	B	01/18/18	04/14/17	11/02/18	11/02/18	09/02/16	04/19/19	04/04/19	05/09/18		04/14/17	02/17/05	09/01/95	01/25/19
Taylor, Brenden	04/24/18	04/23/20	B	04/24/18		03/01/18	03/01/18	08/23/16		05/11/17	05/22/18			04/17/09	07/18/06	01/25/19
Thompson, Lisa	11/30/18	11/29/20	B	11/30/18		10/07/18	10/07/18		12/11/20	12/12/19	11/28/18				12/07/18	02/05/19
Turpen, Nate	06/14/17	06/14/19	B	06/14/17		01/16/18	01/16/18	06/14/17	10/24/19	11/19/19	07/06/18		06/13/17		06/09/17	01/25/19
Wishnoff, Benjamin						11/24/15	04/16/16	06/24/16			06/29/18			06/09/15	05/29/07	01/25/19

ATTACHMENT 9
AIR MONITORING TABLE AND FORMS

HEALTH AND SAFETY PLAN
Remedial Investigation Monitoring, Vapor Mitigation
System Operations, and Soil Vapor Extraction Pilot Study
5801 Third Avenue South
Seattle, Washington

Farallon PN: 457-008

ACTION LEVEL TABLE FOR AIR MONITORING

The Air Monitoring table (following page) presents protocol for monitoring ambient air for constituents of concern and other parameters that may affect worker safety. Please note the following with respect to use of this table:

- The Level for Respirator Use indicates the concentration at which a respirator must be donned. It does not require that the job stop. The respirator is a piece of equipment that is to be used while determining why a concentration has reached that level. Implement engineering controls such as water mist, spray foam, plastic cover, etc. to reduce the concentration.
- The Level for Work Stoppage indicates the concentration at which work on the job must stop. Determine why a concentration has reached that level, and how it can be decreased. Site evacuation is not necessary at this level. Stopping work does not imply that the concentration level will decrease. Implement engineering controls to reduce the concentration; resume work when it is safe to do so.
- These values can be modified under particular Site conditions and with specific knowledge of the contaminant(s). Should such conditions arise, contact Farallon's Health and Safety Officer at (425) 295-0800.

AIR MONITORING

Chemical (or Class)	Monitoring Equipment	Task	Monitoring Frequency and Location	Level for Respirator Use	Level for Work Stoppage
Volatile Organic Vapors	Flame ionization detector (FID)/photoionization detector (PID) as appropriate for chemicals of concern. Read manual to determine. Draeger Tube for vinyl chloride (Model 1/a; Part Number 67 28031). Draeger Tube for benzene (Model 0.5/a).	From start of mobilization to completion and demobilization.	Sampling should be continuous during the project while disturbing potentially contaminated soil, uncovering and/or removing tanks and piping, or drilling —at least every 15 minutes in the breathing zone. Sample at the exclusion zone boundaries every 30 minutes. Continuously sample during each soil and groundwater sampling interval. If 10 parts per million (ppm) in breathing zone, collect a Draeger Tube for benzene and/or vinyl chloride (depending upon contaminants of concern).	20 ppm above background sustained in breathing zone for 2 minutes, and no benzene and/or vinyl chloride tube discoloration. If a color change appears on the tube for benzene or vinyl chloride at 10 ppm on FID/PID, don respirator. If no Draeger Tube is available, the level for respirator use is to be 5 ppm.	50 ppm above background in breathing zone and no vinyl chloride or benzene tube discoloration. Stop work if tube indicates > 1 ppm for benzene or vinyl chloride. If no Draeger Tube is available, stop work at 25 ppm.
Metals (Dust and Particulates)	XRF Spectrometer as appropriate for metals of concerns. Read manual to determine. Laboratory analysis for specific metals known to potentially be at levels exceeding respiratory protection requirements.	From start of mobilization to completion and demobilization.	Sampling should be continuous during the project while disturbing potentially contaminated soil at least every 15 minutes in the breathing zone. Sample at the exclusion zone boundaries every 30 minutes. Continuously during each sampling interval or excavation lift (as possible).	1 mg/m3 for mercury. Any detectable concentration of cadmium less than the PEL of 0.005 mg/m3. 0.5 mg/m3 for lead.	2.5 mg/m3 for mercury. Any concentration exceeding 0.005 mg/m3 for cadmium. 50 mg/m3 for lead.

AIR MONITORING EQUIPMENT CALIBRATION/CHECK LOG

Date	Instrument/ Model No.	Serial No.	Battery Check OK?	Zero Adjust OK?	Calibration Gas (ppm)	Reading (ppm)	Leak Check	Performed By	Comments

AIR MONITORING LOG

Date	Time	Location	Source/Area/ Breathing Zone	Instrument	Concentration/Units	Sampled by

ATTACHMENT 10
TRAFFIC CONTROL PLAN

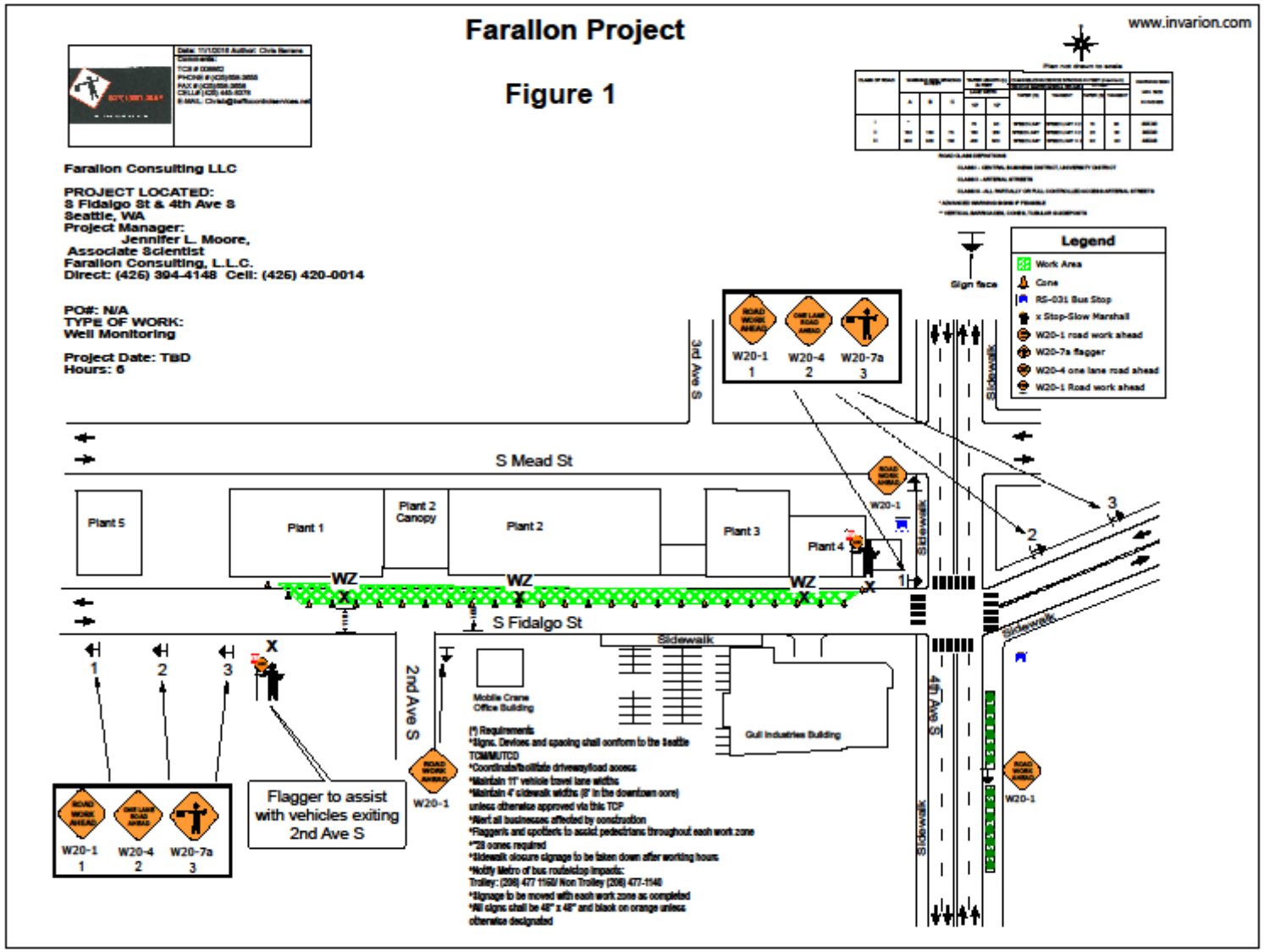
HEALTH AND SAFETY PLAN
Remedial Investigation Monitoring, Vapor Mitigation System Operations, and Soil Vapor Extraction Pilot Study
5801 Third Avenue South
Seattle, Washington

Farallon PN: 457-008

Farallon Project

Figure 1

www.invarion.com



Farallon Project

Figure 2

Farallon Consulting LLC

PROJECT LOCATED:
S Fidalgo St & 4th Ave S
Seattle, WA
Project Manager:
Anastasia Burns,
G.I.T., Staff Level Geologist
Farallon Consulting, L.L.C.
975 6th Avenue Northwest
Issaquah, Washington 98027
aburns@farallonconsulting.com
Cell: (425) 902-7479

PO#: N/A
TYPE OF WORK:
Well Monitoring

Project Date: TBD
Hours: 6

Not drawn to actual scale
Signs not spaced according to scale

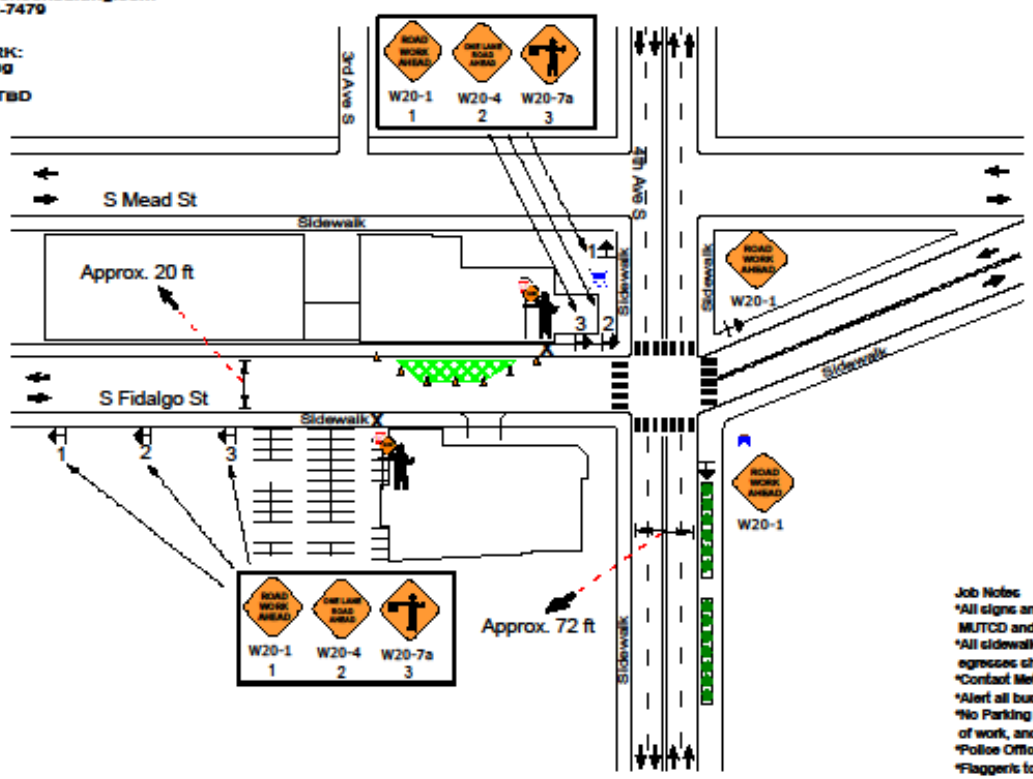
CHANNELIZING DEVICES SPACING (FEET)		
MPH	TAPER	TANGENT
50/70	40	80
35/45	30	60
25/30	20	40

ROAD TYPE	SPEED	SUGGESTED ADVANCE WARNING SIGN PLACEMENT DISTANCE BETWEEN SIGNS			
		A	B	C	D
[illegible]	25/30	200'	200'	200'	X
[illegible]	35/40	350'	350'	350'	X
RURAL	45/60	500'	500'	500'	500'
[illegible]	60/65	800'	800'	800'	800'
[illegible]	65/70	1500'	1500'	1500'	1500'

WORK AREA

Sign face

Legend
- Bus Stop RS-031
- Work Area
- Cone
- one lane road ahead W20-4
- road work ahead W20-1
- flagger W20-7a
- Stop-Slow Marshall x



Job Notes
- *All signs and spacing to conform to the MUTCD and city of Seattle in street manual
- *All sidewalks, driveways, exits and egresses shall be clear unless otherwise indicated
- *Contact Metro at (206) 477-1140 for other restrictions
- *Alert all businesses affected by construction
- *No Parking signs shall be placed 72 hours in advance of work, and placed in/or around possible work zone areas
- *Police Officer on-site if needed
- *Flaggers to assist pedestrians
- **28 cones required

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APPENDIX B
ANTICIPATED INTERIM ACTION SCHEDULE

FINAL CAPITAL INDUSTRIES PLANT 4
SOIL VAPOR EXTRACTION PILOT STUDY WORK PLAN
West of 4th Group Site
5801 3rd Avenue South
Seattle, Washington

Farallon PN: 457-008

Anticipated Interim Action Schedule
Capital Industries Plant 4
Seattle, Washington
Farallon PN: 457-008

Week Beginning	Q1 2019						Q2 2019							Q3 2019						Q4 2019							Q1 2020						Q2 2020							Q3 2020						Q4 2020					
	12-Jan-19	26-Jan-19	9-Feb-19	23-Feb-19	9-Mar-19	23-Mar-19	6-Apr-19	20-Apr-19	4-May-19	18-May-19	1-Jun-19	15-Jun-19	29-Jun-19	13-Jul-19	27-Jul-19	10-Aug-19	24-Aug-19	7-Sep-19	21-Sep-19	5-Oct-19	19-Oct-19	2-Nov-19	16-Nov-19	30-Nov-19	14-Dec-19	28-Dec-19	11-Jan-20	25-Jan-20	8-Feb-20	22-Feb-20	7-Mar-20	21-Mar-20	4-Apr-20	18-Apr-20	2-May-20	16-May-20	30-May-20	13-Jun-20	27-Jun-20	11-Jul-20	25-Jul-20	8-Aug-20	22-Aug-20	5-Sep-20	19-Sep-20	3-Oct-20	17-Oct-20	31-Oct-20	14-Nov-20	28-Nov-20	12-Dec-20
Project Management																																																		
Project Management																																																		
SVE Pilot Study Work Plan																																																		
Draft Work Plan							*																																										
Ecology Review																																																		
Final Work Plan										*																																							
Ecology Review																																																		
SVE Pilot Study																																																	
Implementation of SVE Pilot Study																																																	
SVE Pilot Study Completion Report																																																	
Data Submittal and Ecology Meeting															*																																		
Draft SVE Pilot Study Completion Report																	*																																	
Ecology Review																																																	
Final SVE Pilot Study Completion Report																			*																														
Ecology Review																																																	
SVE System Design and Implementation Work Plan																																																	
State Environmental Policy Act Checklist and Public Comment Period																		*																														
Draft SVE System Design and Implementation Work Plan																				*																													
Ecology Review																																																	
Final SVE System Design and Implementation Work Plan																																																	
Ecology Review																																																	
Quarterly Progress Reports																																																	
Quarterly Progress Report																																																	

NOTES:

* denotes project milestone