



***Soil Vapor Extraction Work Plan
and Design
Former Cascade Cleaners
Cascade Plaza
Everett, Washington***

**Prepared for:
Regency Centers Corporation**

**June 2, 2021
Regen-574**



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A handwritten signature in blue ink, appearing to read 'John Foxwell', positioned above a horizontal line.

*John Foxwell, L.Hg
Principal*



Exp 12/13/2022

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1.0 Introduction

This Soil Vapor Extraction Work Plan and Design (SVE Work Plan) summarizes the proposed construction, operation, and maintenance of a soil vapor extraction system (SVE) to be installed at the former Classic Cleaner facility located at unit B004, Cascade Plaza Shopping Center, in Everett, Washington (Figure 1 and Figure 2). The Site address is 7601 Evergreen Way, Everett, WA 98203.

The Cascade Cleaners “Site” includes the Property and any area where a hazardous substance, other than a consumer product in consumer use, has been deposited, stored, disposed of, placed, or otherwise come to be located. The Site was enrolled in the Washington Department of Ecology (Ecology) Voluntary Cleanup Program (VCP) on June 24, 2013 due to the discovery of release(s) from historical dry-cleaning operations by Cascade Cleaners at unit B004 (now occupied by Domino’s Pizza). A feasibility study (FS) and cleanup action plan (CAP) were submitted to Ecology on October 31, 2019. The FS/CAP report identified the remedial action area and recommended SVE as the cleanup action alternative for the Site. Ecology reviewed the FS/CAP and approved the document in an email dated July 15, 2020.

This SVE Work Plan has been prepared by Apex Companies, LLC (Apex) on behalf of the current Site owner, Regency Centers Corporation (Regency).

1.1 Purpose

Based on previous investigations completed at the Site, soil and soil vapor are the primary media of concern on the Site. The identified soil impacts are limited to a shallow, localized area beneath the building slab where the former dry-cleaning equipment was historically located. The purpose of the work described in this Plan is to implement the recommended SVE system which will reduce the concentrations of Halogenated Volatile Organic Compound (HVOC) contamination in sub-slab vapor and soil. The scope of work includes the construction of an SVE system, and continued operation and maintenance of the SVE system until remedial action objectives (RAOs) are met or the HVOC mass has been removed to the extent practicable. These activities are discussed in further detail within this Work Plan.

1.2 Work Plan Organization

This Work Plan is divided into the following main sections:

- Site Background – A description of the Site; including geology, hydrogeology, a summary of past environmental work, and current environmental conditions at the Site;
- SVE Pilot Test Results – Results of the SVE Pilot Test, which provide the basis for the proposed system design;

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- SVE System Design, Installation, and Maintenance – The approach and scope of the proposed field work, procedures for well and system construction, design analysis of the proposed system, the analytical program, and monitoring plan;
 - Remediation Monitoring – A description of the monitoring that will be used to document compliance;
 - Reporting – A description of the reporting to be completed to document the installation of the SVE remedial system; and
 - Schedule – A schedule for system installation, startup, and reporting.

2.0 Site Background

2.1 Site Location and Description

The Site is located at Cascade Plaza, which is a single-story shopping center constructed on two parcels, totaling approximately 19.26 acres within the City of Everett, Washington. The two parcels that comprise Cascade Plaza were historically a woodland that was first developed in the 1940s as residential properties and then in the 1950s redeveloped as a drive-in movie theater. The current shopping mall was constructed in the 1980s. The entirety of Cascade Plaza is covered with five retail/office buildings, a retail gas station, cement and asphalt surfaces, and small landscaped areas. The five buildings have historically housed various retail stores, offices, restaurants, an automobile rental agency, and a dry-cleaning facility. Classic Cleaners operated in unit B004 from the early 1980s through 1999. Unit B004 is currently occupied by a Domino's Pizza franchise, and the current layout of unit B004 is shown on Figure 2. The Site is developed for commercial use and residential development is present east of the Site. There are no dry-cleaning activities currently conducted on the Site.

2.2 Site Geology/Hydrogeology

2.2.1 Site Geology

The Site is in the Puget Lowland physiographic province of Washington State. The Puget Lowland is a broad, low-lying trough located between the Cascade Range to the east, the Olympic Mountains to the northwest, and the Willapa Hills to the southwest. The landscape largely results from repeated cycles of glacial scour and deposition. The Site is located within an area that has been geologically mapped as Vashon Till, which is characterized as a non-sorted, non-stratified mixture of clay, silt, sand, gravel, and cobble up to boulder-size (Yount et al, 1993).

Based on subsurface investigations completed to date, the Site is generally underlain by silty sand and gravel, and gravelly silty sand. Surficial coarse sand and gravel (apparent engineered fill) have been encountered to depths of approximately two feet beneath the concrete slab of the building. Relatively shallow refusal in dense

soil has been encountered in select borings beneath the building slab, at depths ranging from 3 feet to 7 feet below ground surface (bgs) (Apex, 2019).

2.2.2 Site Hydrogeology

Based on historical water level measurements collected at the Site, the water level ranges from 7.62 feet to 10.58 feet bgs. The groundwater flow direction is consistently to the northeast, with a gradient generally ranging from 0.008 to 0.01 ft/ft (Apex, 2019). The Site is currently used for commercial purposes and is supplied by municipal water.

2.3 Nature and Extent of Contamination

Soil and groundwater investigations and groundwater monitoring have been completed at the Site since 1997 and Apex has been conducting site investigation and monitoring activities since 2013. The FS/CAP report (Apex, 2019) compiled available sampling data for the purposes of defining the Site and corresponding remedial action area. Sampling locations and results are summarized on Figures 3 to 5. The approximate extent of the remedial action area is shown on Figure 6. Halogenated volatile organic compounds (HVOCs), including tetrachloroethene (PCE) and associated breakdown compounds trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2-DCE), and vinyl chloride (VC) are the chemicals of potential concern on the Site. The nature and extent of contamination has been well defined and is described below.

Soil. Detected PCE concentrations are limited to the area of the former dry cleaning equipment. Only three shallow soil samples, HB-1 (8"), SVE-1 (5'), and SVE-1 (8'), exceed the MTCA Method A PCE soil cleanup level of 0.05 milligrams per kilogram (mg/kg). The PCE exceedance in sample OBS-1 at 5 feet bgs is not representative based on the qualifiers assigned and follow-up investigation (see Section 3.3). PCE was the only compound detected above the MTCA Method A cleanup level; therefore, PCE is the only contaminant of concern in the soil. Soil results are summarized on Figure 3.

Groundwater. Historically, one depth-discrete groundwater sample collected in 2002 near the former dry-cleaning machine exceeded the MTCA Method A groundwater cleanup level by a factor of less than two (HB-4 GW, 9.36 µg/L). Site-wide groundwater monitoring completed from 1999 to 2016 from wells MW-1 through MW-4 indicated that PCE and other HVOCs have not been detected in the wells at concentrations above MTCA Method A cleanup levels. Groundwater results are summarized on Figure 4.

Soil Vapor and Ambient Air. PCE in soil vapor has been detected inside unit B004 at concentrations above the applicable screening level; however, ambient air inside the building and outside ambient air have not contained concentrations exceeding cleanup levels. Based on the vapor intrusion investigation conducted to date, the residual PCE in soil vapor is likely associated with the remnant of a small, shallow, localized soil source within the footprint of the tenant space. Vapor and ambient air results are summarized on Figure 5.

2.4 Proposed Remedial Action Area

The remedial action area was defined based on locations where detected concentrations of PCE exceed MTCA Method A cleanup levels in soil and groundwater, and MTCA Method B cleanup levels in soil vapor. The remedial action area includes shallow soil and groundwater from the ground surface to approximately 8 feet bgs across the area shown on Figure 6.

3.0 Well Installation and SVE Pilot Test

One SVE extraction well (SVE-1) and one observation well (OBS-1) were installed at the Site on November 20, 2020. A subsequent SVE pilot test was performed between January 8 and February 12, 2021. A follow up soil boring activity was performed on May 14, 2021. Soil borings and well construction were completed by Cascade Drilling, Inc. of Woodinville, WA. Equipment for the SVE pilot test was provided and operated by Clearcreek Contractors Inc (Clearcreek) of Everett, Washington. Apex observed and documented the well installation, SVE pilot test implementation, and boring exploration.

3.1 Preparatory Activities

The following activities were conducted prior to starting work to prepare the Site and workers for construction activities.

3.1.1 Utility Locating

The Washington Utility Notification Center was notified of the proposed drilling activities at least 48 hours prior to beginning construction. In addition, a private utility locator was retained to locate underground utilities and piping that might not be located through the One-Call system at the vapor extraction and observation well locations.

3.1.2 Health and Safety

A health and safety plan (HASP) was prepared prior to commencing construction activities. The HASP was prepared in general accordance with the Occupational Safety and Health Administration (OSHA) and the Washington Administrative Code (WAC). A copy of the HASP was maintained on-site during the field activities. Prior to performing any on-site work, Apex prepared a Job Safety Analysis (JSA) guiding task-specific activities, risks, and safety protocols for each task. All field staff supporting the project were required to review and follow the HASP and JSAs. Daily tailgate health and safety meetings were conducted every morning prior to the start of each day's activities.

3.2 Well Installation

One SVE extraction well (SVE-1) and one observation well (OBS-1) were installed at the Site on November 20, 2020, at the locations shown on Figure 2. The wells were installed by Cascade Drilling, Inc. using a combination of vacuum excavation and hand auger for SVE-1 and hollow stem auger for OBS-1. Soil lithology was logged, and the soil cores were screened for VOCs using a photoionization detector (PID) and for separate-phase oils using a sheen test. Soil lithology and field screening results are shown on the well logs included in Appendix A.

The SVE well (SVE-1) was installed in close proximity to the location of the former dry-cleaning machine in the tenant space (unit B004). The well has a total depth of 8 feet bgs with a well screen that extends from approximately 3 feet to 8 feet bgs. The SVE well was constructed with four-inch-diameter, Schedule 40 polyvinyl chloride (PVC) casing and 0.010 inch slotted screen. Filter material (10/20 Silica Sand) was installed in the borehole annulus from the bottom of the well to one foot above the top of the well screen, and the well was sealed to a depth of 1 foot bgs with 3/8-inch hydrated bentonite chips. The surface completion consists of a flush-mount monument with a secured, locked lid embedded in the concrete floor.

The observation well (OBS-1) was installed at the east parking lot adjacent to the tenant space (unit B004). The well has a total depth of 9 feet bgs and is screened from approximately 3 feet to 9 feet bgs. The observation well was constructed with one-inch-diameter, Schedule 40 PVC casing and 0.010 inch slotted screen. Filter material (10/20 Silica Sand) was installed in the borehole from the bottom of the well extending to one foot above the top of the well screen, and the well was sealed to a depth of 1 foot bgs with 3/8-inch hydrated bentonite chips. The surface completion consists of a concrete surface seal and a flush-mount monument with a secured, locked lid.

3.3 Soil Sampling during Well Installation

Soil samples were collected at the Site during well installations and shipped to Pace Analytical National (formerly ESC Laboratories) for analysis. The laboratory analytical report is provided in Appendix C. Sampling results are discussed as below.

During the installation of wells SVE-1 and OBS-1, soils were field screened continuously throughout the boring. Because there were no field screening indications of contamination during drilling, soil samples were collected and analyzed from a depth of 5 feet bgs and from the terminus of the borings (8 and 9 ft bgs, respectively), and are summarized as below:

- SVE-1 (5') and SVE-1 (8') from well SVE-1; and
- OBS-1 (5') and OBS-1 (9') from well OBS-1.

Soil samples were analyzed for VOCs by Environmental Protection Agency (EPA) Method 8260B. Concentrations of PCE were detected in each sample. However, each sample was qualified as estimated, with a likely high bias based on the response of the calibration standard. Samples SVE-1 (5'), SVE-1 (8') and OBS-1 (5') exceeded the MTCA Method A screening level for unrestricted use. The MTCA exceedance in OBS-1 (5') was not expected. This is the only sample detected above the MTCA cleanup level, away from the former dry cleaning equipment. No other VOCs were detected above method reporting limits (MRLs). The results, in addition to historical soil results collected from the Site, are shown on Table 1. The sample locations and soil results for PCE are shown on Figure 3.

The laboratory analytical data were reviewed for the Site to determine usability. The laboratory quality assurance/quality control (QA/QC) samples provided in the data package were used to evaluate laboratory contamination or background interferences, sample preparation efficiency, and instrumentation performance and included method blanks, laboratory control samples (LCS), matrix spikes (MS/MSD), and surrogates. A summary of data quality parameters is provided below.

- The minimum reporting limits were consistent with method standards and were below screening level values.
- Samples were received by the laboratory on ice below 6 degrees Celsius (°C) and were analyzed within the method recommended holding time of 14 days from the time of sampling. No discrepancies were found between the chain of custody and sample containers, and the chain of custody document was properly filled out and relinquished by the Apex field personnel.
- Method blank samples were not detected for target analytes and did not indicate potential laboratory contamination.
- LCS and LCSD analyte recoveries were within laboratory control limits.
- Tetrachloroethene was recovered above the upper control limit for the MS and MSD. The source of the matrix spike was from another analytical report; therefore, the control limit exceedance does not indicate matrix interferences for soil samples collected at this Site. Results are accepted based on the recovery of tetrachloroethene in the LCS.
- Surrogate recoveries were within laboratory control limits.
- The response of tetrachloroethene was above the upper control limit for the continuing calibration verification. These results are 'J+' flagged as estimated values that may be biased high.

Based on the review of the laboratory report, data are acceptable for use with qualifiers as described above.

3.3.1 OBS-1 Confirmation Sampling

Pilot wells (SVE-1 and OBS-1) were installed as part of the SVE pilot test. Soil samples were collected during the well installation. The detected concentration of PCE in exterior sample OBS-1 (5') exceeded the MTCA Method A Soil Cleanup Level. The location of this concentration exceedance away from the localized area of PCE contamination near the former dry cleaning equipment is inconsistent with the understanding of the extent of contamination.

A follow-up direct-push boring was completed on May 14, 2021 to confirm if the PCE concentration detected at OBS-1 (5') was representative. Soil boring (SB-1) was completed within 2 feet of OBS-1 at the locations shown on Figure 3. Soil samples were field screened at 5-foot intervals using a PID. Field screening indications of contamination (PID, sheen, and odor) were not observed. Three soil samples (SB-1-2, SB-1-5 and SB-1-8) were collected from boring SB-1 at depths of approximately 2, 5, and 8 feet bgs, respectively, using EPA 5035 sample preservation methods. The soil samples were then placed in laboratory prepared containers, labeled, and stored in a chilled cooler for transport to an accredited laboratory (Pace Analytical National) under chain of custody procedures. After sampling, the boring was backfilled with granular bentonite and patched with a concrete surface seal.

Soil samples were analyzed for VOCs by EPA Method 5035/8260. PCE concentrations were not detected at samples SB-1-5 and SB-1-8. PCE was detected within the shallow soil immediately below the pavement surface at a concentration of 0.0038 mg/kg (sample SB-1-2), which is below the MTCA Method A soil cleanup level of 0.05 mg/kg. No other VOCs were detected in the soil samples. Soil sampling data and applicable cleanup levels are listed in Table 1.

This OBS-1 confirmation sampling activity has confirmed that the unexpected PCE exceedance at OBS-1 (5') is not representative for the site condition. This data point will be removed from the dataset and will not be evaluated further.

3.4 Waste Management

Investigation derived waste consisted of soil cuttings from the well installations and personal protective equipment (PPE). The wastes were handled as follows.

Two 55-gallon drums consist of soil cuttings were generated from the well installation event. The drums are stored on-site maintained in a designated area. According to the soil results, the soil can be characterized as non-hazardous using a Contained-In Determination. Apex is in the process of seeking approval for a Contained-In Determination from Ecology. PPE and miscellaneous debris were disposed of as a solid waste.

3.5 SVE Pilot Test and Analysis

On January 8 and February 12, 2021, Apex conducted an SVE pilot test to evaluate air permeability and vacuum radius of influence. The test consisted of operating a vacuum truck under a variety of flow conditions while collecting extraction flow rate and vacuum pressure data at both the extraction and observation well. The vacuum truck (equipped with a Model 59 URAI blower with maximum vacuum of 15 inches of Hg) was connected to SVE-1 with a vacuum relief valve and the monitoring instrumentation. The vacuum truck operation and the relief valve were adjusted for each phase of the pilot test to create a range of vacuum and flow conditions applied to SVE-1 (600 cubic feet per minute [cfm] to 800 cfm). A DS-300 flow meter was installed on the 4-inch pipe connecting to well SVE-1 to allow measurement of the differential gas pressure measurements (upstream high flow pressure and static line pressure). Additionally, magnehelic gauges were connected to both SVE-1 and OBS-1 to measure vacuum pressure induced within each well during each phase of the pilot test, and an anemometer was used to measure the in-line flow velocity generated by the blower during the test. During the pilot test, a vacuum pressure reading ranging from 0.04 inches of water to 0.34 inches of water was observed at well OBS-1, and a range of 6 inches of water to 150 inches of water was observed at well SVE-1. The photolog documenting the SVE pilot test is included in Appendix C.

The flow and pressure data collected from SVE-1 and OBS-1 were used in an analytical model (Air2D) developed by the U.S. Geological Survey (USGS) to determine the intrinsic air permeability of the geologic formation in the vicinity of well SVE-1. The model utilizes the extraction flow rate, the system vacuum pressure at the wellhead, the induced vacuum measurements from an observation well (OBS-1), as well as other physical parameters such as screen depth and distance between the two wells. Using the derived intrinsic permeability of $1.6 \times 10^{-7} \text{ cm}^2$, the Air2D model was also used to assess the site-specific relationship between air flow (and the resultant vacuum pressure) and the associated radius of influence (ROI). In accordance with the U.S. Army Corps of Engineers (USACE) design guidance (USACE, 2002), the ROI is defined as the distance at which the soil vapor velocity in the pore space is at least 0.001 centimeters per second (cm/sec).

The pilot test and Air2D modeling suggest an effective ROI of at least 28-feet is feasible at the Site using readily available regenerative blower equipment. While the pilot test utilized only one extraction and one observation well, lithology across the Site is generally consistent (Apex, 2019) and any affect from anisotropy is expected to be minimal. Based on these results, a relatively small dedicated system blower would be able to generate a sufficiently large ROI to entirely encompass the treatment area (as described in the system design discussed below).

4.0 Design Analysis – Soil Vapor Extraction

The layout and size of SVE system components is generally dependent on the surface cover, soil type, depth to groundwater (the thickness of the vadose zone), and horizontal and vertical extent of the target VOCs. This section presents the design of the SVE system. The SVE system design is based on the recommendations

provided in the USACE *Soil Vapor Extraction Engineer Manual* (USACE, 2002). The proposed layout of the system is shown on Figure 6, a schematic of the proposed SVE system components is shown on Figure 7, and construction details and specifications for the system installation are shown on Figures 8 and 9.

After the SVE system is installed and activated, an SVE Installation Report will be prepared. The report will provide a description of the field activities, SVE system installation details, system operating parameters, monitoring program, and analytical results.

4.1 System Layout and Specifications

Chemical Profile. The chemicals of concern (COC) is PCE. PCE is a VOC that is readily suitable for removal via vapor extraction.

Soil Profile. The ground surface in the treatment area is completely covered by either the site building, asphalt concrete, or Portland Cement concrete. The underlying soil profile consists of fine to medium-grained sand with silt. The intrinsic air permeability of shallow subsurface soils was determined to be about 1.6×10^{-7} cm² based on the results of the pilot testing described in Section 3. This is consistent with the vacuum pressures that were observed in well OBS-1 during each of the various vacuums applied during the pilot testing (at a distance of 32 feet from the extraction well).

Design Basis. Design guidance for SVE systems (USACE, 2002) recommends that pore-space air velocities be greater than 0.001 cm/sec within the target treatment zone. The pore-space air velocity is dependent upon the air permeability, the air flow rate extracted from each well, and the distance from the extraction well. The ROI for a fixed intrinsic air permeability will increase with larger extraction rates, and the Air2D model described above is used to define the relationship between flow rate and ROI for the site conditions. An iterative evaluation of the pressure gradients and resultant flow velocities driven by various air extraction rates was completed using a spreadsheet-based solution to the equations provided in the design guidance (shown on Table 2). This evaluation was used to identify the total air extraction rate that could be economically handled with readily available equipment while minimizing the number of extraction points that would be needed to cover the target area. Based on an air permeability of 1.6×10^{-7} cm², a minimum air velocity within the treatment area of 0.001 cm/sec can be achieved at a radius of 28 feet with the following design parameters:

- Air flow rate of about 64 cfm per extraction well;
- Vacuum pressure of about 34 inches of water; and
- Well screen length of 5 feet.

The ROI induced by these conditions is estimated to be 28 feet and exceeds the minimum needed to cover the target treatment area, as shown on Figure 6.

Blower Selection. The Rotron EN404 is capable of providing the flow and vacuum pressure conditions noted above. The Rotron EN404 is a sealed, explosion-proof blower with a 1-horsepower (hp) motor that operates on either single-phase 120V-30A or three-phase 230V-20A power. Ancillary equipment associated with the blower will include a moisture separator (knockout drum) and intrinsic controls (such as power controls, flow meter, and knockout drum high level alarm).

Equipment Shed. The SVE blower will be housed in an insulated skid-mounted pre-engineered shed (approximately 4 feet x 6 feet) with an intrinsically explosion-proof space heater (set to maintain the shed temperature above freezing temperatures) and explosion-proof lighting. The system control panel will be housed in a weatherproof enclosure on the exterior of the shed and will be equipped with a lock to prevent unauthorized access. System piping will connect to the equipment shed with a detachable fitting (i.e., collared screw fitting or cam-lock type). The system discharge will be passed through a pair of VentSorb PE carbon drums in series – located adjacent to the equipment shed. While operating, the system should generate a noise level of no more than 60 dba at a distance of 10 feet. If noise levels exceed this threshold, additional insulation or other sound attenuation measures will be installed.

Piping Selection and Layout. Piping has been sized for ease of installation and so that the pressure drop (due to friction losses) through the pipe is less than 0.01 inch of water per foot of pipe. As shown on Figure 8 and Table 2, the selected piping is 4-inch diameter Schedule 80 PVC. The concentrations of vapors in the operating airflow are not expected to adversely affect the PVC material during the operating life of the system. The piping layout is conceptually shown on Figures 6 and 7; actual locations of the piping may be modified to avoid utility conflicts and other obstructions.

The SVE piping will connect the system equipment to well SVE-1. A monument will be built around the existing SVE-1 well casing (2-foot square adjacent to the existing wall) to allow access to the well and provide space for the piping connections (as shown on Figure 8). One gate valve and sampling port will be installed on the vertical pipe extending from the wellhead to allow for air flow adjustment.

Piping will be routed from beneath the floor vertically to the space above the drop-tile ceiling, to the building exterior through the rear wall of the building, and then to the proximity of the system equipment shed. The pipe penetration through the exterior building wall will be sealed. Each piping run will be sloped either toward the well or toward the system equipment (no local depressions in the piping) to prevent the accumulation of moisture (such as from condensation) in the piping.

Any subsurface piping will be bedded such that no voids or protrusions might potentially damage the piping. Trenches in paved areas will be backfilled with compacted crushed rock (3/4-inch-minus) and trenches in unpaved areas will be backfilled with soil excavated from the trench. Trench backfill will be compacted to a visibly non-yielding state and surfaced to match the surrounding area. Surface repairs will be consistent with the surrounding pavement profile (asphalt or PCC concrete).

Vapor Discharge Layout. The proposed location of the discharge stack is shown on Figure 6 and will be attached to the adjacent site building, terminating 3 feet above the building roofline.

Sub-slab Soil Vapor Monitoring Points. Two (2) sub-slab soil vapor sample points will be installed at locations within the treatment area created by the SVE system to assess operating conditions and the effectiveness of the SVE system (the proposed locations are shown on Figure 6; the actual locations may be adjusted to accommodate obstructions or to minimize interference with business operations). The sub-slab soil vapor monitoring points will be installed by drilling through the flooring and concrete slab and installing a Vapor Pins® soil vapor point beneath the floor slab. The water dam method will be used to ensure adequate seal between the Vapor Pins® and concrete.

4.2 System Operation

System Startup. Initial startup of the system will include powering up the SVE blower and verifying proper operation of the equipment (including measurement of the induced vacuum at the SVE wellhead, observation well, and at each system monitoring point). Vacuum measurements are to be regularly monitored to verify system performance (e.g., changes in vacuum pressure may indicate problems in system operation) and to verify that the blower is not overloaded (excessive input vacuums may overstress the blower). Vacuum pressures at the SVE wellhead will be balanced by adjusting flow control valves at the wellhead (with the primary flow attributed to SVE-1 and the secondary flow to the vapor pit such that measurable vacuum is maintained in the observation well OBS-1). The vacuum pressure will be monitored with a Magnehelic pressure gauge and will be measured while the system is in operation.

Vacuum pressure data will be evaluated to confirm the ROI of the vapor extraction well. Adjustments to the system will be made as appropriate (such as adjusting the air flow rate) to provide operation consistent with the design goals.

Startup Monitoring. After system construction, the system will be operated for an initial period of approximately 12 hours (or until equilibrium conditions are verified using PID measurements) to verify that the system components are operating correctly and the flow and vacuum conditions across the system are within design parameters. Following the initial startup of the system, VOCs will be measured prior to the vapor carbon drums using a PID. Samples of the treated system effluent will also be collected and analyzed for VOCs. One vapor sample will be collected at the initiation of operation and a second laboratory sample will be collected after one month of operation. The data from the startup monitoring will be used to assess the operation of the system and the mass loading rate.

Routine System Monitoring. Routine monitoring of the SVE system will be performed on Site and through remote monitoring of the control system. The control system will provide notification for alarm conditions (including pressures outside of setpoints, high knockout drum levels, and power interruptions). An alarm condition light will be visible from outside of the enclosure. On-site monitoring activities will be performed on

a periodic basis (initially on a monthly schedule, reducing to a quarterly schedule if warranted). Routine monthly monitoring will consist of PID and pressure monitoring at observation wells and sub-slab soil vapor monitoring points. System effluent samples will be collected on a periodic basis (initially on a monthly schedule, reducing to a quarterly schedule if warranted) to corroborate the PID data.

Shutdown Criteria. System shutdown will be evaluated based on the results of the system monitoring (described above). System shutdown will be considered when SVE influent concentrations (representative of mass removal) reach an asymptotic and negligible state. When mass removal remains constant and negligible for a period of three months, the system will be turned off and sub-slab soil vapor sampling will be completed at the Site. Sampling will be completed at 2 weeks and 6 weeks after initial shutdown to evaluate contaminant rebound.

5.0 Remediation Monitoring Program

The remediation monitoring program includes system monitoring, remedial confirmation sampling for soil vapor and ambient air, and a final round of groundwater monitoring. The scope of each component of the monitoring program is summarized below.

Remediation System Monitoring. Samples of remediation system vapor will be collected before and after treatment. These data will be used to estimate mass removal and compliance with air permit exemption criteria. Samples of the air discharged will be collected after initial operation and one day of constant operation (from before carbon treatment), and then on a quarterly basis (from before and after the carbon treatment). Samples will be analyzed for select HVOCs (PCE, trichloroethene [TCE], cis-1,2- dichloroethylene [DCE], trans-1,2-DCE, 1,1-DCE, and vinyl chloride).

Soil Vapor Monitoring. After system shutdown, two rounds of soil vapor samples will be collected to confirm the Method B SLs have been achieved and concentration rebound is not occurring. The vapor samples will be analyzed for select HVOCs (PCE, TCE, cis-1,2-DCE, trans-1,2-DCE, 1,1-DCE, and vinyl chloride) using EPA Method TO-15.

Ambient Monitoring. After system shutdown, a final round of ambient air sampling (AA-1 through AA-8) will be completed to document compliance with cleanup levels. The air samples will be analyzed for select HVOCs (PCE, TCE, cis-1,2-DCE, trans-1,2-DCE, 1,1-DCE, and vinyl chloride) using EPA Method TO-15 Selective Ion Monitoring (SIM).

Groundwater Monitoring. After system shutdown, one more round of groundwater sampling will be conducted at onsite wells (MW-1 through MW-4) to document compliance with cleanup levels. The groundwater samples will be analyzed for select HVOCs (PCE, TCE, cis-1,2-DCE, trans-1,2-DCE, 1,1-DCE, and vinyl chloride) using by EPA Method 8260B.

6.0 SVE Construction Report

After the SVE system is installed and activated, an SVE Construction Report will be prepared. The report will provide a description of the field activities, SVE system installation details, system operating parameters, monitoring program, and analytical results.

The report will be prepared in general accordance with the following outline:

- 1) Introduction;
- 2) Background (Site History, Setting, and Operations);
- 3) Geology and Hydrogeology;
- 4) Summary of Previous Investigations;
- 5) Methods and Procedures;
- 6) Startup and System Operation;
- 7) Monitoring and Performance;
- 8) Future Activities; and
- 9) References.

Information provided in appendices will include:

- Photographs of Facility activities, as applicable;
- Field methods and sampling procedures;
- Boring logs and well construction information; and
- Analytical data, including a QA review.

7.0 Schedule

It is anticipated that the SVE system construction and startup will require approximately one month to complete. Barring delays beyond the control of Apex, this work plan can be implemented within 120 days of approval. An SVE System Installation Report will be submitted within 60 days of completion of the scope of work.

8.0 References

Apex, 2019. *Feasibility Study/Cleanup Action Plan (FS/CAP), Cascade Plaza*. October 31, 2019.

U.S. Army Corps of Engineers (USACE), 2002. *Soil Vapor Extraction and Bioventing Engineering Manual (EM 1110-1-4001)*. June 2002.

Yount et al, 1993. *Geologic Map of Surficial Deposits in the Seattle 30' X 60' Quadrangle, Washington*.

Table 1 – Soil Sampling Analytical Results
Classic Cleaners - Cascade Plaza
Everett, Washington

Sample Location (Depth)	Sample Date	HVOC concentrations (mg/kg)					
		PCE	TCE	cis-1,2-DCE	Vinyl Chloride	Chloroform	1,1,2 -TCA
MTCA CUL (mg/kg)		0.05 ^a	0.03 ^a	160 ^b	240 ^b	800 ^b	2 ^a
HB-1 (8")	6/9/1997	0.32	<0.05	<0.05	<0.05	<0.05	<0.05
HB-2 (8")	6/9/1997	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
HB-3 (8")	6/9/1997	0.13	<0.05	<0.05	<0.05	<0.05	<0.05
HB-3 (3')	6/9/1997	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
B-1 (5')	6/9/1997	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
B-1 (7.5')	6/9/1997	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
B-1 (10')	6/9/1997	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
B-2 (5')	6/9/1997	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
B-2 (7.5')	6/9/1997	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
B-2 (10')	6/9/1997	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
B-3 (5')	6/9/1997	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
B-3 (7.5')	6/9/1997	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
B-3 (10')	6/9/1997	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
MW-1 (10')	7/30/1997	ND*	ND*	ND*	ND*	ND*	ND*
MW-2 (10')	7/30/1997	ND*	ND*	ND*	ND*	ND*	ND*
MW-3 (10')	7/30/1997	ND*	ND*	ND*	ND*	ND*	ND*
Core 1 (1')	5/6/1999	<0.0094	<0.0094	<0.0094	<0.0094	<0.0094	<0.0094
Core 2 (1')	5/6/1999	<0.0092	<0.0092	<0.0092	<0.0092	<0.0092	<0.0092
Core 3 (1')	5/6/1999	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009
MW-4/S-3 (12.5')	5/7/1999	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
HB-4 (1')	12/10/2002	0.0013	<1.28	<1.28	<1.28	<1.28	<1.28
HB-5 (1')	12/10/2002	0.00919	<1.12	<1.12	<1.12	<1.12	<1.12
HB-6 (3')	12/10/2002	0.00514	<1.21	<1.21	<1.21	<1.21	<1.21
B-4 (1'-2')	9/22/2014	0.0097	<0.00028	<0.00028	<0.00028	NA	NA
B-4 (3')	9/22/2014	0.0029	<0.00035	<0.00035	<0.00035	NA	NA
B-5 (2'-3')	9/22/2014	0.006	<0.0003	<0.0003	<0.0003	NA	NA
B-5 (4.5')	9/22/2014	0.0013	<0.00027	<0.00027	<0.00027	NA	NA
B-6 (2'-3')	9/22/2014	0.00057	<0.0003	<0.0003	<0.0003	NA	NA
B-6 (4')	9/22/2014	0.0016	<0.00033	<0.00033	<0.00033	NA	NA
B-7 (0-1')	9/22/2014	0.00095	<0.00029	<0.00029	<0.00029	NA	NA
B-7 (7')	9/22/2014	0.00065	<0.00037	<0.00037	<0.00037	NA	NA
B-7 (1')	4/27/2016	0.0129	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
B-8 (1')	4/27/2016	0.0225	<0.0044	<0.0044	<0.0044	<0.0044	<0.0044
B-8 (4')	4/27/2016	0.0167	<0.0051	<0.0051	<0.0051	<0.0051	<0.0051
B-8 (9')	4/27/2016	0.0024 J	<0.0048	<0.0048	<0.0048	<0.0048	<0.0048
B-9 (1')	4/27/2016	0.0011 J	<0.0024	<0.0024	<0.0024	<0.00024	<0.00024
VP-1 (1')	4/27/2016	0.0130	<0.0052	<0.0052	<0.0052	<0.0052	<0.0052
VP-1 (3')	4/27/2016	0.0024 J	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056
VP-2 (1')	4/27/2016	0.0029 J	<0.0044	<0.0044	<0.0044	<0.0044	<0.0044
VP-2 (4')	4/27/2016	0.0067	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056
SVE-1-(5')	11/20/2020	0.0758 J+	<0.00121	<0.00303	<0.00303	NA	NA
SVE-1-(8')	11/20/2020	0.0523 J+	<0.00115	<0.00288	<0.00288	NA	NA
OBS-1-(5')	11/20/2020	0.143 J+	<0.00166	<0.00415	<0.00415	NA	NA
OBS-1-(9')	11/20/2020	0.00956 J+	<0.00148	<0.00296	<0.00296	NA	NA
SB-1-2	5/14/2021	0.00380	<0.00112	<0.00281	<0.00281	<0.00281	<0.00281
SB-1-5	5/14/2021	<0.00299	<0.00120	<0.00299	<0.00299	<0.00299	<0.00299
SB-1-8	5/14/2021	<0.00378	<0.00151	<0.00378	<0.00378	<0.00378	<0.00378

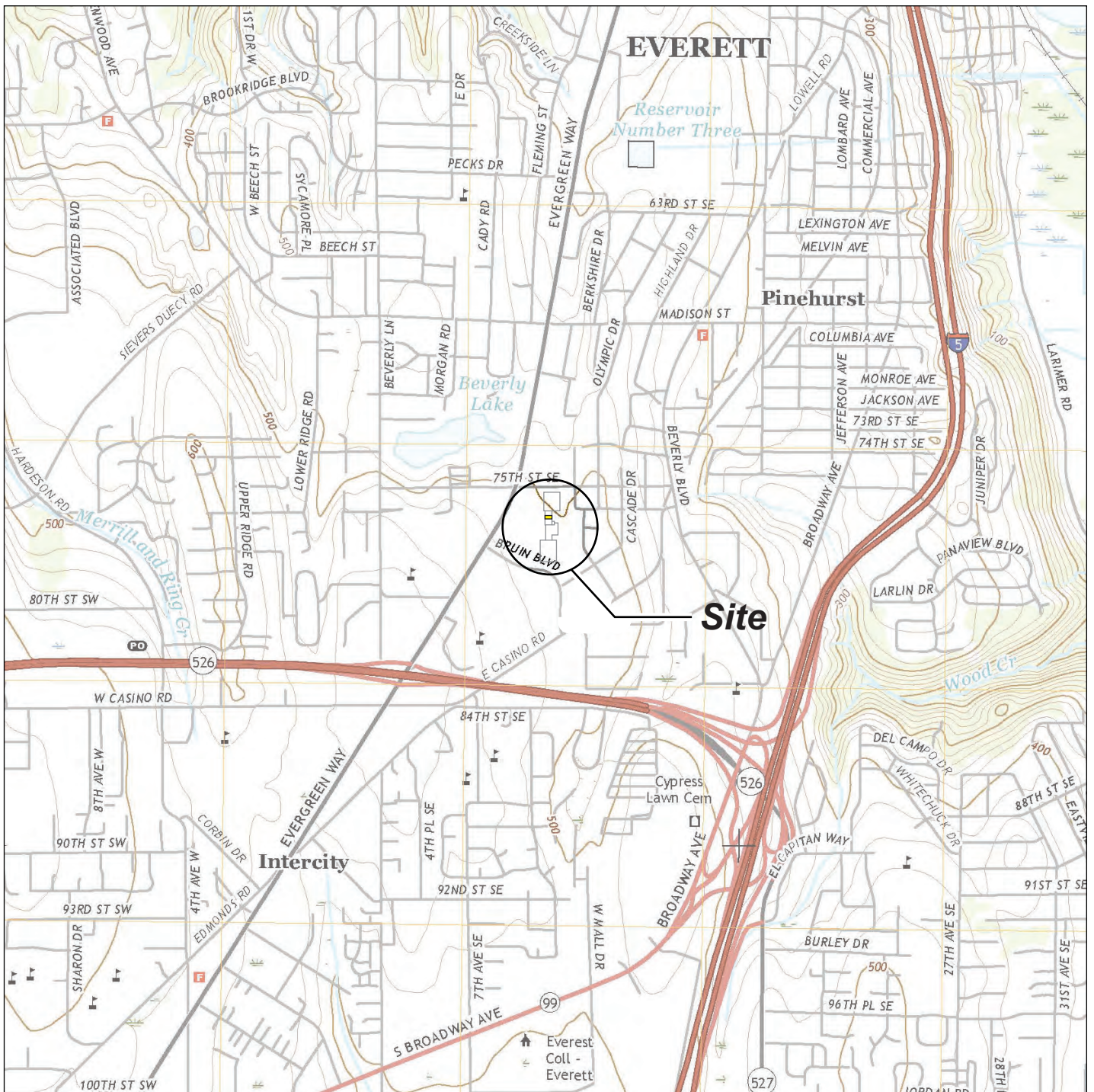
Notes:

1. HVOC = Halogenated volatile organic compound.
2. PCE = Tetrachloroethene.
3. TCE = Trichloroethene.
4. DCE = Dichloroethene.
5. TCA = Trichloroethane.
6. MTCA CUL = Model Toxics Control Act Cleanup Level.
7. mg/kg = milligram per kilogram.
8. a = MTCA Method A Unrestricted Land Use Table Value.
9. b = MTCA Method B Non-Carcinogen CUL Standard Formula Value (Unrestricted Land Use).
10. ND* = Not detected at a concentration above the method detection limit, which is not available for this report.
11. < = Not detected at a concentration above the method reporting limit or practical quantitation limit.
12. Bold = analyte was detected at a concentration above the method detection limit.
13. Shaded = concentration exceeds the CUL.
14. J = Estimated value. Concentration detected between the method reporting limit and method detection limit.
15. J+ = Result is estimated and may be biased high.
16. Strikethrough denotes concentration that is not representative. See Section 3.3.1 of Soil Vapor Extraction Work Plan and Design (Apex, 2021).

Table 2 - Blower Selection, Piping Sizing, and Radius of Influence Calculation
Classic Cleaners - Cascade Plaza
Everett, Washington

Soil Vapor Extraction														Length of Piping = 100 ft		Number of fittings = 4				EN-101	EN303	EN404	EN454	EN513	EN633	EN833	EN656	EN6	EN707	EN757	EN808	EN858	EN909	EN979	EN14	Modeled Radius of Influence [ft]
Air Flow	Mass Flow	Modeled	Modeled	Head Losses [”H2O], Including Fittings						Head	Vaccum		Design	Blower Vaccum	Blower Vaccum	Blower Vaccum	Blower Vaccum	Blower Vaccum	Blower Vaccum	Blower Vaccum	Blower Vaccum	Blower Vaccum	Blower Vaccum	Blower Vaccum	Blower Vaccum	Blower Vaccum	Blower Vaccum	Blower Vaccum	Blower Vaccum							
Per Well [CFM]	Per Well [g/sec]	Well Vacuum [atm]	Well Vacuum [”H2O]	Well		Vent Piping		Discharge	Loss [”H2O]	Needed at Blower [”H2O]	Number of Wells	System Flow Rate [CFM]	Blower Vaccum [”H2O]	Blower Vaccum [”H2O]	Blower Vaccum [”H2O]	Blower Vaccum [”H2O]	Blower Vaccum [”H2O]	Blower Vaccum [”H2O]	Blower Vaccum [”H2O]	Blower Vaccum [”H2O]	Blower Vaccum [”H2O]	Blower Vaccum [”H2O]	Blower Vaccum [”H2O]	Blower Vaccum [”H2O]	Blower Vaccum [”H2O]	Blower Vaccum [”H2O]	Blower Vaccum [”H2O]	Blower Vaccum [”H2O]	Blower Vaccum [”H2O]							
45.8	25	0.060	24.4	1.20	0.04	6.45	0.21	0.03	0.92	1.42	25.8	1	45.8		15.8 (Low)	44.3 (High)	51.6 (High)	38.8 (High)	116.4 (High)	155.0 (High)	71.0 (High)	86.8 (High)	87.0 (High)	77.0 (High)	95.0 (High)	98.0 (High)	112.0 (High)	89.0 (High)	106.0 (High)	26						
55.7	30	0.073	29.7	1.75	0.05	9.36	0.31	0.04	1.11	0.36	30.1	1	55.7		6.8 (Low)	39.3 (High)	47.9 (High)	27.3 (Low)	101.4 (High)	155.0 (High)	71.0 (High)	83.8 (High)	87.0 (High)	77.0 (High)	95.0 (High)	98.0 (High)	112.0 (High)	89.0 (High)	106.0 (High)	28						
57.7	31	0.075	30.5	1.87	0.06	10.01	0.33	0.05	1.15	0.39	30.9	1	57.7		4.8 (Low)	38.2 (High)	47.1 (High)	24.9 (Low)	98.2 (High)	155.0 (High)	71.0 (High)	83.2 (High)	87.0 (High)	77.0 (High)	95.0 (High)	98.0 (High)	112.0 (High)	89.0 (High)	106.0 (High)	28						
59.8	32	0.078	31.8	2.00	0.06	10.69	0.35	0.05	1.20	0.42	32.2	1	59.8		2.5 (Low)	36.9 (High)	46.2 (High)	22.3 (Low)	94.8 (High)	155.0 (High)	71.0 (High)	82.5 (High)	87.0 (High)	77.0 (High)	95.0 (High)	98.0 (High)	112.0 (High)	89.0 (High)	106.0 (High)	28						
61.8	33	0.080	32.6	2.13	0.07	11.40	0.38	0.05	1.24	0.44	33.0	1	61.8		0.4 (Low)	35.6 (High)	45.3 (High)	19.8 (Low)	91.6 (High)	155.0 (High)	70.6 (High)	81.9 (High)	87.0 (High)	77.0 (High)	95.0 (High)	98.0 (High)	112.0 (High)	89.0 (High)	106.0 (High)	28						
63.8	34	0.083	33.8	2.26	0.07	12.12	0.40	0.06	1.28	0.13	33.9	1	63.8			34.3 (OK)	44.4 (High)	17.3 (Low)	88.4 (High)	155.0 (High)	69.9 (High)	81.2 (High)	87.0 (High)	77.0 (High)	95.0 (High)	98.0 (High)	112.0 (High)	89.0 (High)	106.0 (High)	28						
65.91	35	0.085	34.6	2.40	0.07	12.88	0.43	0.06	1.32	0.13	34.7	1	65.9			32.8 (Low)	43.4 (High)	14.6 (Low)	84.9 (High)	155.0 (High)	69.2 (High)	80.6 (High)	87.0 (High)	77.0 (High)	95.0 (High)	98.0 (High)	112.0 (High)	89.0 (High)	106.0 (High)	28						
76.38	40	0.098	39.9	3.18	0.10	17.05	0.56	0.08	1.53	0.18	40.1	1	76.4			25.0 (Low)	38.1 (Low)	1.2 (Low)	67.6 (High)	153.1 (High)	65.7 (High)	76.9 (High)	87.0 (High)	77.0 (High)	95.0 (High)	98.0 (High)	112.0 (High)	89.0 (High)	106.0 (High)	29						
98.35	50	0.124	50.5	5.14	0.16	27.55	0.91	0.13	1.97	0.28	50.8	1	98.3			7.0 (Low)	24.6 (Low)		32.1 (Low)	123.2 (High)	57.9 (High)	68.6 (High)	82.5 (High)	77.0 (High)	88.7 (High)	98.0 (High)	112.0 (High)	89.0 (High)	106.0 (High)	31						
235.74	100	0.270	109.9	27.06	0.83	145.06	4.80	0.66	4.71	1.50	111.4	1	235.7																	36						
471.28	150	0.452	184.0	100.92	3.11	540.91	17.91	2.47	9.43	5.58	189.6	1	471.3																	39						
1328.82	200	0.741	301.7	723.30	22.29	3876.91	128.40	17.70	26.58	40.00	341.7	1	1328.8																	41						

- Notes:
- Mass flow calculation as derived from Air2D model.
 - Modeled pressure/radius for screened vapor well from depths of 4 to 8 feet bgs.
 - Modeled pressure from Air2D pressure output sheet for each flow rate, included in attachment.
 - Head loss calculations for pipe lengths derived from layout drawing. Head loss calculated from equation for friction loss in circular duct:
$$\Delta P = (0.109136 \cdot Q^{1.5}) / (d^{5.02}) \text{ [inches/100 feet]}$$
 - Blower vacuum is the sum of the calculated head loss and the modeled vacuum at the well.
 - Resultant blower flow rates read from blower curves for identified blower model.
 - Radius of influence from Air2D flow output sheet for each flow rate, determined as pore space velocity of 0.001 cm/sec.
 - Piping selection based on balancing differential head loss and piping size over the length of each line.
 - Highlighted head losses exceed 20 percent of blower vacuum.
 - Dashed line brackets selected operating condition.



Note: Base map prepared from USGS 7.5-minute quadrangle of Everett, WA, dated 2017 as provided by USGS.gov.

0 2,000 4,000
Approximate Scale in Feet



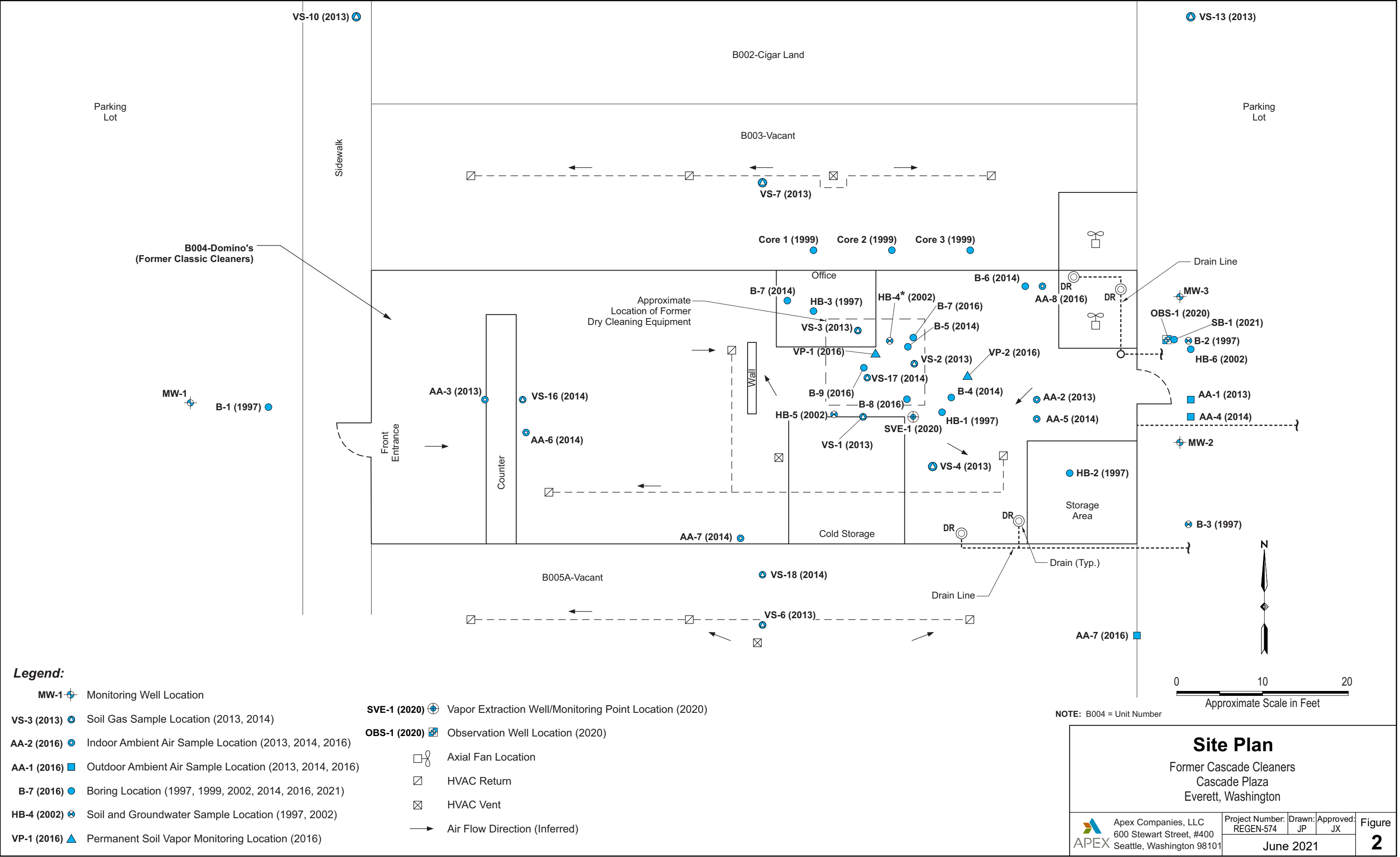
Site Location Map

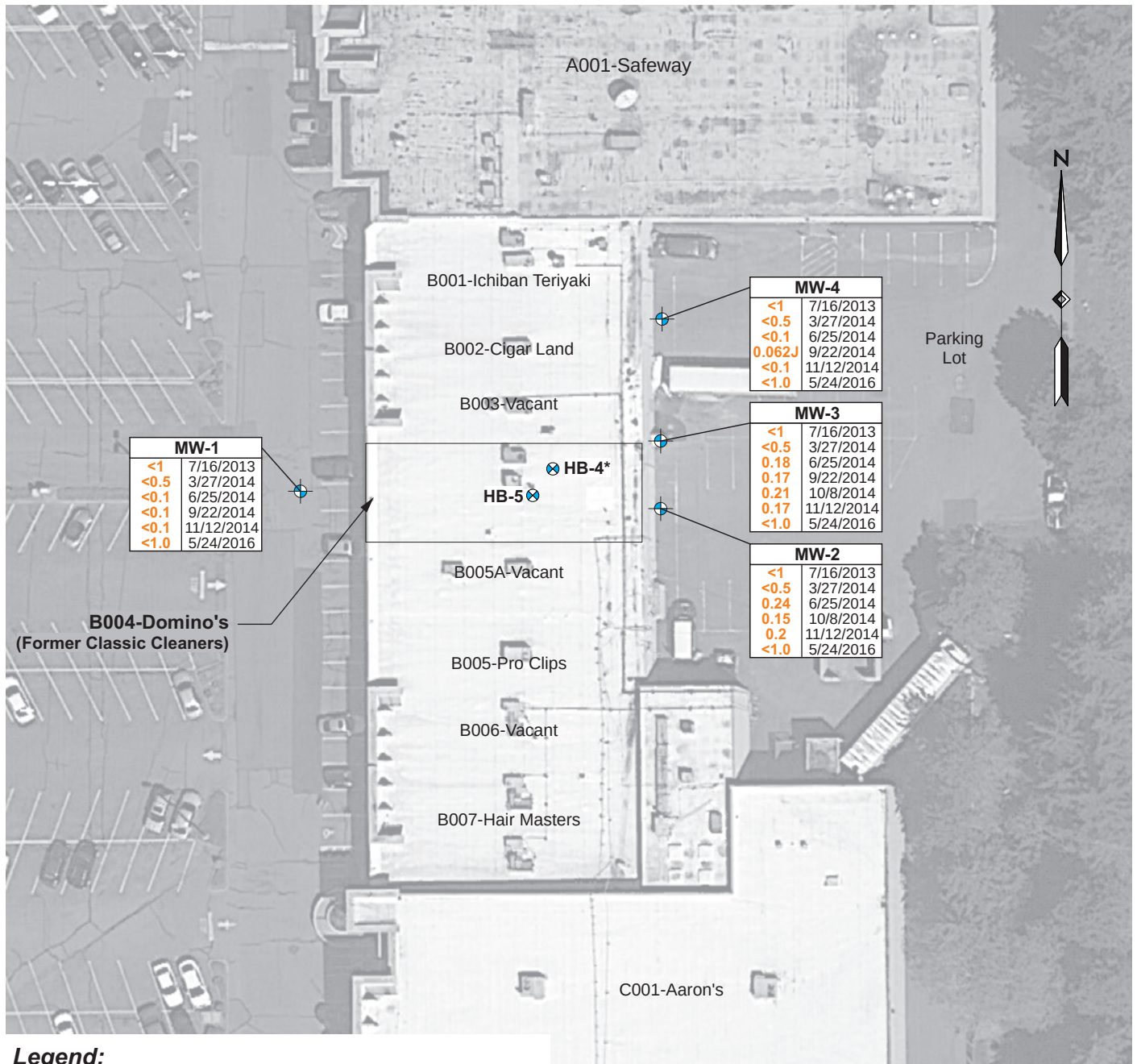
Former Cascade Cleaners
Cascade Plaza
Everett, Washington

 Apex Companies, LLC
600 Stewart Street, #400
Seattle, Washington 98101

Project Number: REGEN-574	Drawn: JP	Approved: JX
June 2021		

Figure
1





Legend:

MW-1 Monitoring Well Location

HB-5 Groundwater Sample Location (2002)

HB-4* HB-4 is the only Interior Sample Location Ever to Exceed the 5 µg/L Cleanup Level (9.36 µg/L) - This was a Discrete Groundwater Sample

MW-1		Location Identification
<1	7/16/2013	Tetrachloroethene Concentration in micrograms per Liter (µg/L)
<0.5	3/27/2014	
<0.1	6/25/2014	
<0.1	9/22/2014	
<0.1	11/12/2014	
<1.0	5/24/2016	Sampling Date

Screening Level	Tetrachloroethene (PCE)	Unit
MTCA Method A Groundwater Cleanup Level	5	µg/L
Updated Vapor Intrusion Screening Level	22.9	µg/L

NOTES: Base map prepared from Google Earth Pro imagery. Aerial dated May 13, 2018.

B004 = Unit Number

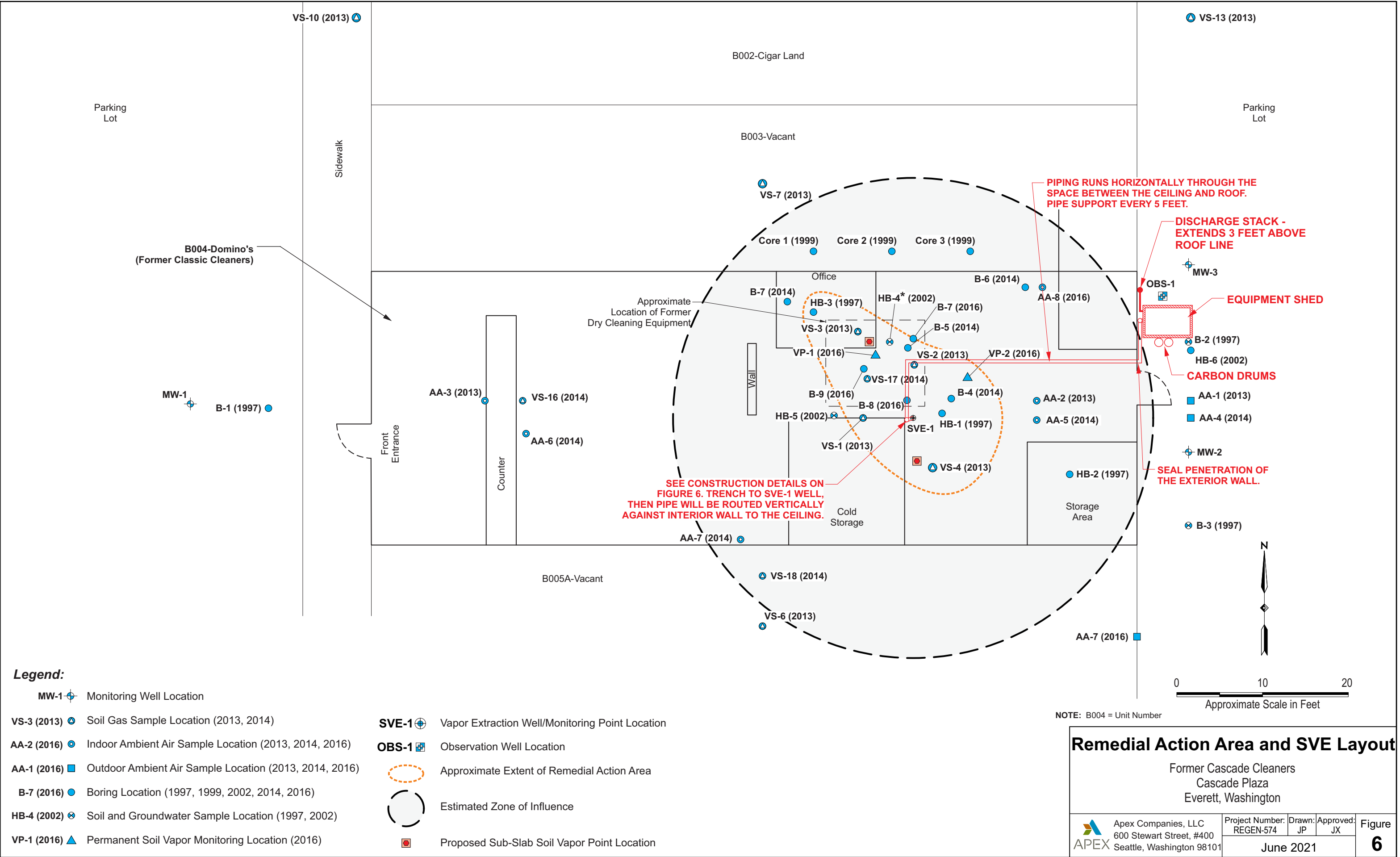
0 50 100
Approximate Scale in Feet

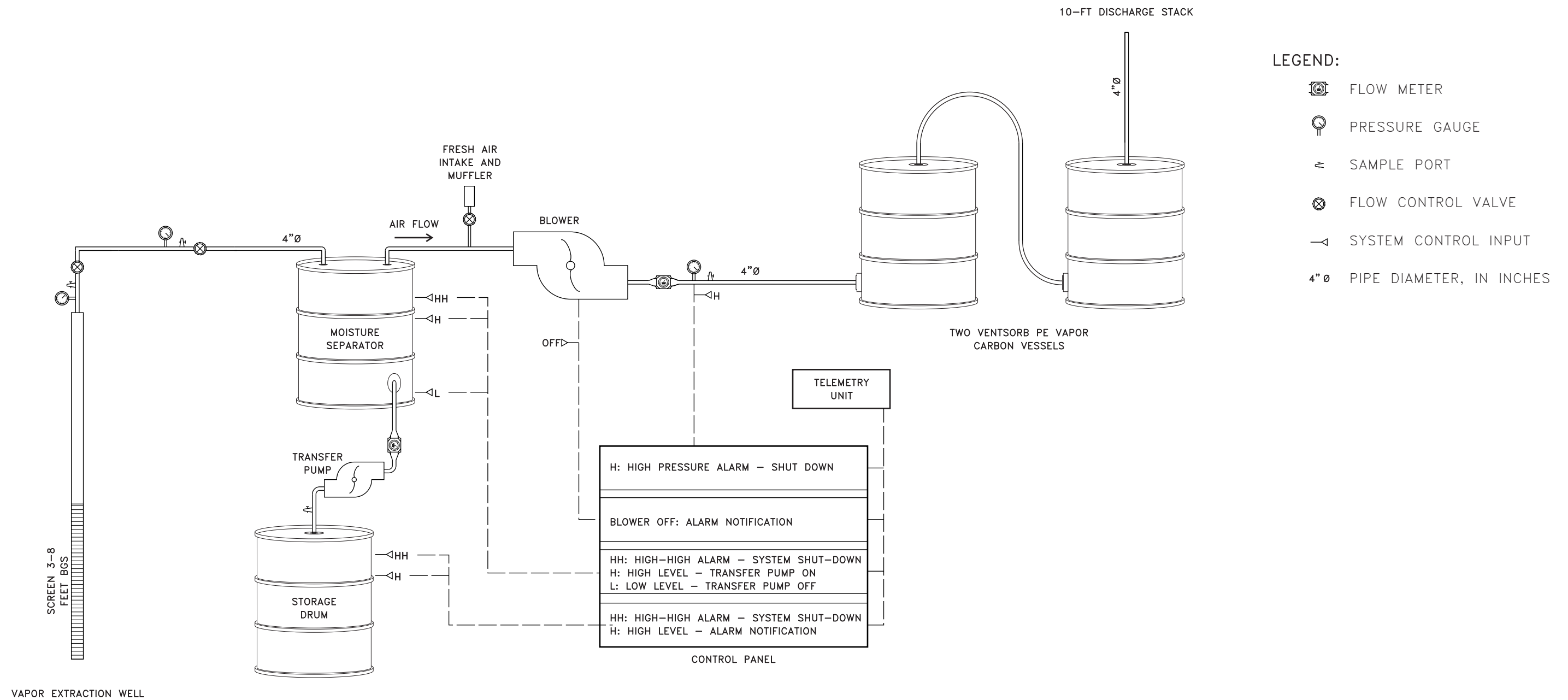
Groundwater Results

Former Cascade Cleaners
Cascade Plaza
Everett, Washington

Apex Companies, LLC
600 Stewart Street, #400
Seattle, Washington 98101

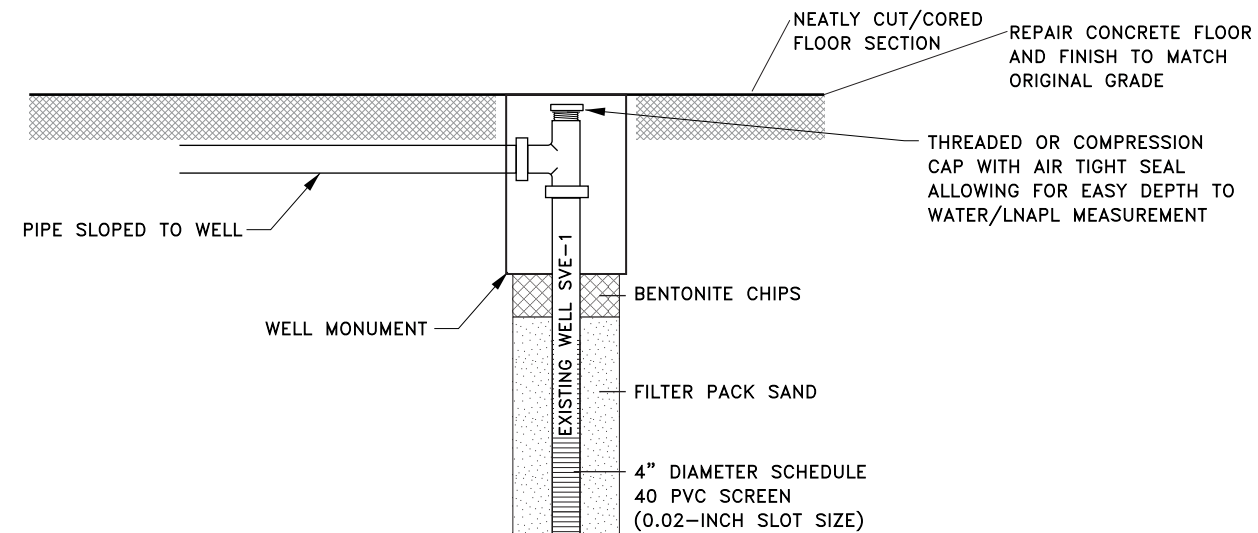
Project Number: REGEN-574	Drawn: JP	Approved: JX	Figure 4
June 2021			



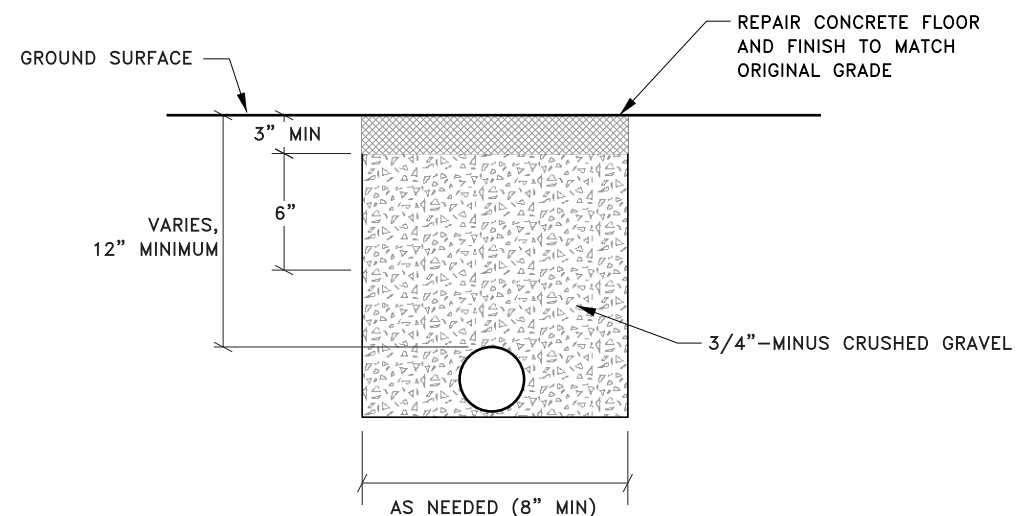


SVE System Schematic

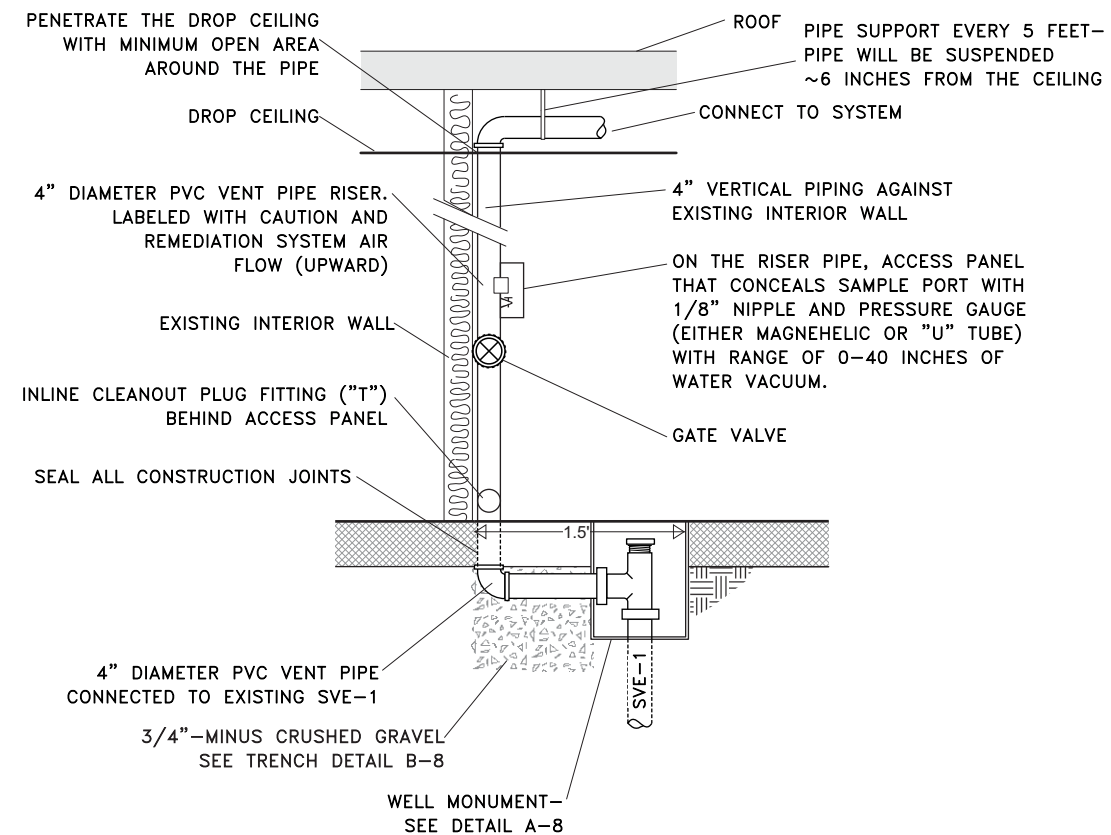
Former Cascade Cleaners
Cascade Plaza
Everett, Washington



A VAPOR WELL MONUMENT INSTALLATION DETAIL
8 NOT TO SCALE



B VAPOR PIPING TRENCH DETAIL
8 NOT TO SCALE



C VAPOR PIT AND PIPING RISER DETAIL
8 NOT TO SCALE

NOTES:

1) PIPES, COUPLINGS, AND FITTINGS SHALL BE SCHEDULE 80 PVC AT THE DIAMETERS SHOWN ON THE FIGURES. MATERIALS USED FOR THE INSTALLATION (I.E., SOLVENT CEMENT) SHALL CONFORM TO THE MANUFACTURER'S RECOMMENDATIONS. COUPLINGS TO INDIVIDUAL VAPOR EXTRACTION WELL CASINGS SHALL BE SIZED TO MATCH THE WELL CASING (NOMINALLY 4-INCH DIAMETER).

2) THE PLACEMENT OF PCC AND INSTALLATION OF ANY ASSOCIATED STEEL REINFORCEMENT SHALL CONFORM TO THE PLACEMENT SPECIFICATIONS IN CHAPTER 26 OF THE UBC.

3) PROPERTY AND SURFACE STRUCTURES REMOVED OR DISTURBED DURING OR AS A RESULT OF CONSTRUCTION SHALL BE RESTORED TO A CONDITION EQUAL IN APPEARANCE AND QUALITY TO THAT BEFORE THE WORK BEGAN. IMPROVED SURFACES SHALL BE OF THE SAME MATERIAL AND MATCH THE APPEARANCE OF THE REMOVED SURFACE.

4) THE CONTRACTOR SHALL REMOVE ALL GARBAGE AND MISCELLANEOUS DEBRIS FROM THE SITE.

Construction Details

Former Cascade Cleaners
Cascade Plaza
Everett, Washington

EQUIPMENT:

- 1) Vapor Extraction Blower Unit: The vapor extraction blower unit shall be selected from readily available models manufactured specifically for this purpose. They shall meet the following specifications:
- a) Vapor extraction system assembly shall include blower unit, moisture knock-out tank (with a minimum usable capacity of 40 gallons), ancillary components (switches, gauges, sample ports, etc, as shown on the drawings), and any other components necessary for proper operation of the unit.

b) Vapor extraction unit shall consist of a regenerative blower capable of a flow rate of at least 75 scfm at a vacuum pressure of 13 inches of water.
- 2) Pipes, couplings, and fittings shall be Schedule 80 PVC at the diameters shown on the Figures. Materials used for the installation (i.e., solvent cement) shall conform to the manufacturer’s recommendations. Couplings to individual vapor extraction well casings shall be sized to match the well casing (nominally 4-inch diameter).
- 3) Pressure Sensors: Pressure sensors are to be installed upstream and downstream of the blower unit that meets the following criteria:
- a. Acceptable pressure range shall be compatible with vacuum range of the blower.

b. Includes a direct-read pressure gauge.

c. The pressure sensor shall interact with the control system to stop the system and provide an alert if the pressure is above high set point (over-pressurization) or below low set point (under-pressurization), as appropriate
- 4) Knockout Tank Level Sensor: Within the moisture knockout tank, a high-level float sensor shall be installed that interacts with the control system to stop the system and provide an alert if tank is full.
- 5) Flow Meter: An air flow meter is to be installed in the locations shown on the Drawings. The optimal range of the flow meter must be consistent with the design flow rates (nominally less than 150 scfm).
- 6) The control system will interact with meters and sensors as described above and provide notification for alarm conditions (including pressures outside of setpoints, high knockout drum level alarm, and power outage). Manual controls shall be provided for each operating component (i.e., blower motor). Startup of the blower motor shall be controlled by the system to not overstress the electrical supply.
- 7) Electrical fixtures within enclosed spaces shall be intrinsically explosion-proof. Control panel is not to be installed within enclosed spaces so as to not require explosion-proof rating (unless approved by Engineer and for no additional cost). Panel must be housed in weatherproof enclosure with lock to prevent unauthorized access. Alarm condition light to be visible from outside of enclosure.
- 8) Telemetry for system to include dial-out notification of alarm condition in hard-copy (i.e., fax or email), such as provided by Sensaphone Cell682 or equivalent. Notification to include type of fault, date, and time. Delivery of notification to Engineer and O&M subcontractor. Telemetry to allow dial-in inspection of system status.
- 9) Vapor treatment to be provided by two VentSorb PE 55-gallon drums with AP4-60 virgin grade vapor phase carbon (or approved equivalent). Drums will be connected in series with quick-disconnect flexible hoses (6-inch diameter).

CONCRETE WORK:

- 1) The placement of PCC and installation of any associated steel reinforcement shall conform to the placement specifications in Chapter 26 of the UBC.

SYSTEM FINISHING AND SITE CLEANUP:

- 1) Pavement and other property and surface structures removed or disturbed during or as a result of construction shall be restored to a condition equal in appearance and quality to that before the work began. Improved surfaces shall be of the same material and match the appearance of the removed surface.
- 2) The Contractor shall remove all garbage and miscellaneous debris from the site.

Specifications Former Cascade Cleaners Cascade Plaza Everett, Washington				
Apex Companies, LLC 600 Stewart Street, #400 Seattle, Washington 98101	Project Number:	Drawn:	Approved:	Figure
	REGEN-574	JP	JX	
June 2021				9

Appendix A

Boring Logs

Sample Descriptions

Classification of soils in this report is based on visual field and laboratory observations which include density/consistency, moisture condition, and grain size, and should not be construed to imply field nor laboratory testing unless presented herein. Visual-manual classification methods of ASTM D 2488 were used as an identification guide.

Soil descriptions consist of the following:

MAJOR CONSTITUENT with additional remarks; color, moisture, minor constituents, density/consistency.

Density/Consistency

Soil density/consistency in borings is related primarily to the Standard Penetration Resistance. Soil density/consistency in test pits and push probe explorations is estimated based on visual observation and is presented parenthetically on test pit and push probe exploration logs.

SAND and GRAVEL	Standard Penetration Resistance in Blows/Foot	SILT or CLAY	Standard Penetration Resistance in Blows/Foot	Approximate Shear Strength in TSF
<u>Density</u>		<u>Density</u>		
Very loose	0 - 4	Very soft	0 - 2	<0.125
Loose	4 - 10	Soft	2 - 4	0.125 - 0.25
Medium dense	10 - 30	Medium stiff	4 - 8	0.25 - 0.5
Dense	30 - 50	Stiff	8 - 15	0.5 - 1.0
Very dense	>50	Very Stiff	15 - 30	1.0 - 2.0
		Hard	>30	>2.0

Moisture

Dry	Little perceptible moisture.
Sl. Moist	Some perceptible moisture, probably below optimum.
Moist	Probably near optimum moisture content.
Wet	Much perceptible moisture, probably above optimum.

Minor Constituents

Minor Constituents	Estimated Percentage
Not identified in description	0 - 5
Slightly (clayey, silty, etc.)	5 - 12
Clayey, silty, sandy, gravelly	12 - 30
Very (clayey, silty, etc.)	30 - 50

Sampling Symbols

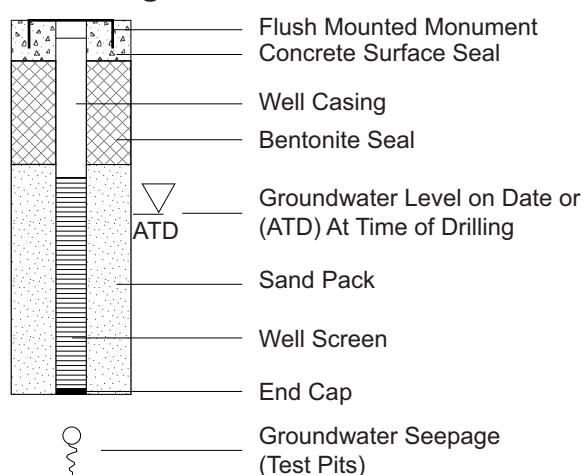
BORING AND PUSH-PROBE SYMBOLS

	Recovery
	No Recovery
	Temporarily Screened Interval
PID	Photoionization Detector Reading
W	Water Sample
	Sample Submitted for Chemical Analysis
NS	No Sheen
SS	Slight Sheen
MS	Moderate Sheen
HS	Heavy Sheen
BF	Biogenic Film

TEST PIT SOIL SAMPLES

	Grab (Jar)
	Bag
	Shelby Tube

Groundwater Observations and Monitoring Well Construction



Key to Exploration Logs

Former Cascade Cleaners
Cascade Plaza
Everett, Washington

Apex Companies, LLC
600 Stewart Street, #400
Seattle, Washington 98101

Project Number: REGEN-520	Drawn: JP	Approved: JX	Figure Key
May 2021			

APEX Apex Companies, LLC 600 Stewart Street, #400 Seattle, Washington 98101					Former Cascade Cleaners Cascade Plaza Everett, Washington					Boring Number: SVE-1 Project Number: REGEN-520 Logged By: J. Guillotte Date: November 20, 2020 Site Conditions: Clear, Cool Drilling Contractor: Cascade Drilling Drilling Equipment: Vac Truck Sampler Type: Hand Auger Depth to Water (ATD): -- Surface Elevation: Not Measured Boring Details and Notes:																			
Depth, feet					Core Interval/Recovery					Laboratory Sample ID					PID					Sheen					Lithologic Description				
5					Hand Auger					SVE-1-(5')					<5					NS					Ceramic tile on concrete over sandy SILT; light brown, fine to medium-grained.				
										SVE-1-(8')					<5					NS					Encountered marble-sized gravel.				
										SVE-1-(8')					<5					NS					Becomes reddish light brown.				
										SVE-1-(8')					<5					NS					10% gravel.				
10																				Bottom of Boring at 8.0' BGS.									



Apex Companies, LLC
600 Stewart Street, #400
Seattle, Washington 98101

Former Cascade Cleaners
Cascade Plaza
Everett, Washington

Boring Number: **SB-1**

Project Number: **REGEN-520**

Logged By: H. Hiscox

Date: May 14, 2021

Site Conditions: --

Drilling Contractor: Cascade Drilling

Drilling Equipment: Geoprobe

Sampler Type: --

Depth to Water (ATD): --

Surface Elevation: Not Measured

Boring Details and Notes:

Lithologic Description

Concrete (4") over sandy CLAY; dark brown/dark red,
dry, fine to medium-grained.

Silty CLAY; dark brown, slightly moist, fine-grained.

Sandy CLAY; dark brown, dry, fine-grained.

Bottom of Boring at 10.0' BGS.

SB-1-(2')

<5

NS

SB-1-(6')

<5

NS

SB-1-(8')

<5

NS

Appendix B

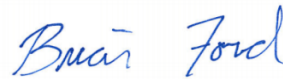
Lab Analytical Report

Apex Companies, LLC - Portland, OR

Sample Delivery Group: L1289130
Samples Received: 11/21/2020
Project Number: REGEN-520
Description: Cascade Cleaners

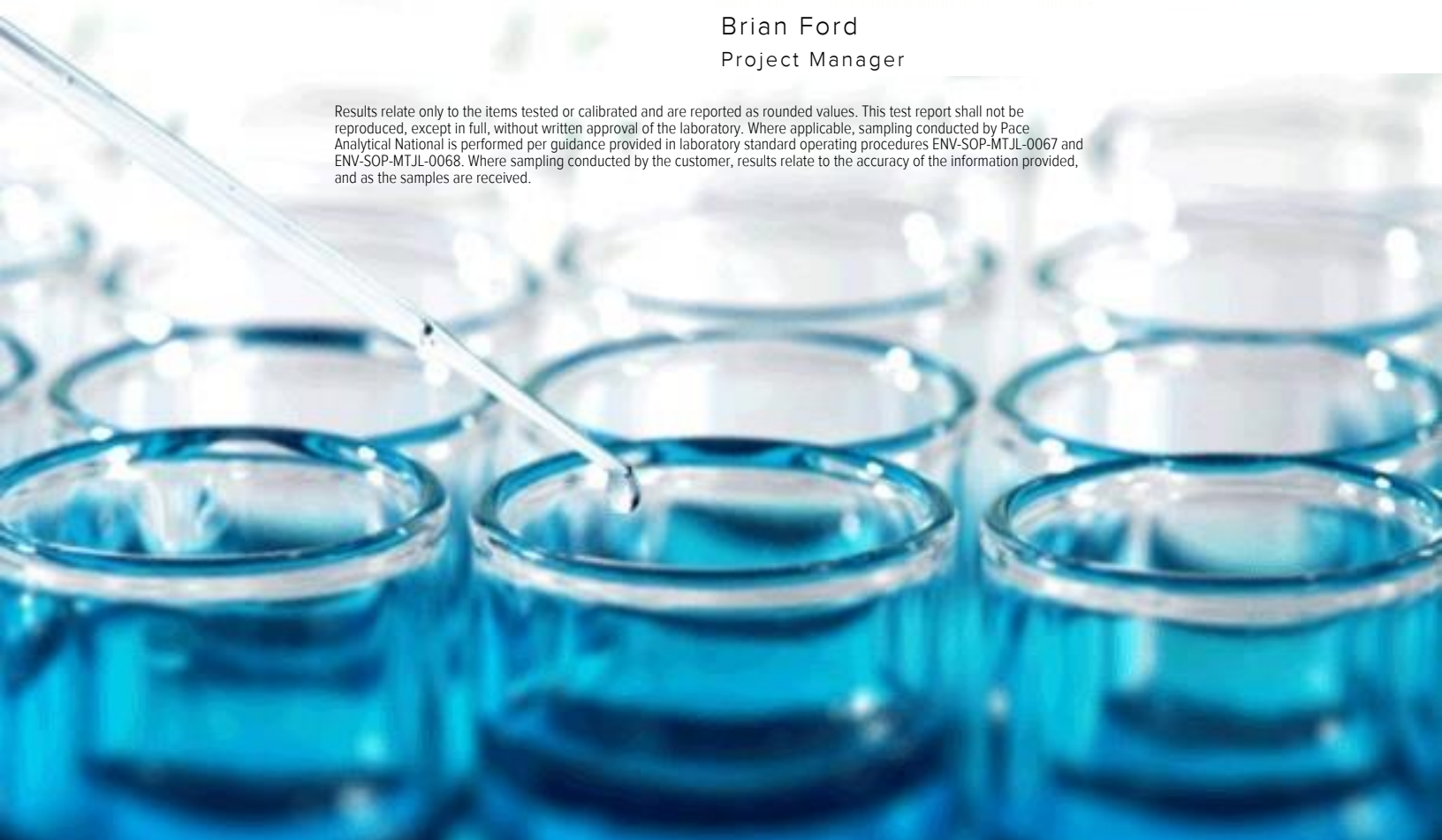
Report To: Jie Xu
600 Stewart St.
Ste 400
Seattle, WA 98101

Entire Report Reviewed By:



Brian Ford
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.





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Cn: Case Narrative	4	
Sr: Sample Results	5	³ Ss
SVE-1-(5') L1289130-01	5	
OBS-1-(5') L1289130-02	6	⁴ Cn
SVE-1-(8') L1289130-05	7	⁵ Sr
OBS-1-(9') L1289130-06	8	
Qc: Quality Control Summary	9	⁶ Qc
Total Solids by Method 2540 G-2011	9	
Volatile Organic Compounds (GC/MS) by Method 8260D	10	⁷ Gl
Gl: Glossary of Terms	11	
Al: Accreditations & Locations	12	⁸ Al
Sc: Sample Chain of Custody	13	⁹ Sc

SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



SVE-1-(5') L1289130-01 Solid

Collected by J. Guillotte
Collected date/time 11/20/20 03:12
Received date/time 11/21/20 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Total Solids by Method 2540 G-2011	WG1584500	1	12/01/20 23:29	12/01/20 23:38	KBC	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1584264	1	11/20/20 03:12	11/30/20 21:20	BMB	Mt. Juliet, TN

¹ Cp

² Tc

³ Ss

OBS-1-(5') L1289130-02 Solid

Collected by J. Guillotte
Collected date/time 11/20/20 07:20
Received date/time 11/21/20 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Total Solids by Method 2540 G-2011	WG1584500	1	12/01/20 23:29	12/01/20 23:38	KBC	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1584264	1	11/20/20 07:20	11/30/20 21:39	BMB	Mt. Juliet, TN

⁴ Cn

⁵ Sr

⁶ Qc

SVE-1-(8') L1289130-05 Solid

Collected by J. Guillotte
Collected date/time 11/20/20 04:00
Received date/time 11/21/20 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Total Solids by Method 2540 G-2011	WG1584500	1	12/01/20 23:29	12/01/20 23:38	KBC	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1584264	1	11/20/20 04:00	11/30/20 21:57	BMB	Mt. Juliet, TN

⁷ Gl

⁸ Al

⁹ Sc

OBS-1-(9') L1289130-06 Solid

Collected by J. Guillotte
Collected date/time 11/20/20 07:55
Received date/time 11/21/20 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Total Solids by Method 2540 G-2011	WG1584500	1	12/01/20 23:29	12/01/20 23:38	KBC	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1584264	1	11/20/20 07:55	11/30/20 22:16	BMB	Mt. Juliet, TN

ACCOUNT:

Apex Companies, LLC - Portland, OR

PROJECT:

REGEN-520

SDG:

L1289130

DATE/TIME:

12/02/20 18:28

PAGE:

3 of 14



All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Brian Ford
Project Manager

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	90.8		1	12/01/2020 23:38	WG1584500

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
cis-1,2-Dichloroethene	U		0.000890	0.00303	1	11/30/2020 21:20	WG1584264
Tetrachloroethene	0.0758	C5	0.00109	0.00303	1	11/30/2020 21:20	WG1584264
Trichloroethene	U		0.000708	0.00121	1	11/30/2020 21:20	WG1584264
Vinyl chloride	U		0.00141	0.00303	1	11/30/2020 21:20	WG1584264
(S) Toluene-d8	103			75.0-131		11/30/2020 21:20	WG1584264
(S) 4-Bromofluorobenzene	109			67.0-138		11/30/2020 21:20	WG1584264
(S) 1,2-Dichloroethane-d4	91.6			70.0-130		11/30/2020 21:20	WG1584264

¹ Cp² Tc³ Ss⁴ Cn⁵ Sr⁶ Qc⁷ Gl⁸ Al⁹ Sc



Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	76.1		1	12/01/2020 23:38	WG1584500

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
cis-1,2-Dichloroethene	U		0.00122	0.00415	1	11/30/2020 21:39	WG1584264
Tetrachloroethene	0.143	C5	0.00149	0.00415	1	11/30/2020 21:39	WG1584264
Trichloroethene	U		0.000970	0.00166	1	11/30/2020 21:39	WG1584264
Vinyl chloride	U		0.00193	0.00415	1	11/30/2020 21:39	WG1584264
(S) Toluene-d8	101			75.0-131		11/30/2020 21:39	WG1584264
(S) 4-Bromofluorobenzene	109			67.0-138		11/30/2020 21:39	WG1584264
(S) 1,2-Dichloroethane-d4	91.6			70.0-130		11/30/2020 21:39	WG1584264

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	93.5		1	12/01/2020 23:38	WG1584500

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
cis-1,2-Dichloroethene	U		0.000845	0.00288	1	11/30/2020 21:57	WG1584264
Tetrachloroethene	0.0523	C5	0.00103	0.00288	1	11/30/2020 21:57	WG1584264
Trichloroethene	U		0.000672	0.00115	1	11/30/2020 21:57	WG1584264
Vinyl chloride	U		0.00134	0.00288	1	11/30/2020 21:57	WG1584264
(S) Toluene-d8	102			75.0-131		11/30/2020 21:57	WG1584264
(S) 4-Bromofluorobenzene	109			67.0-138		11/30/2020 21:57	WG1584264
(S) 1,2-Dichloroethane-d4	91.3			70.0-130		11/30/2020 21:57	WG1584264

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	91.6		1	12/01/2020 23:38	WG1584500

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
cis-1,2-Dichloroethene	U		0.000870	0.00296	1	11/30/2020 22:16	WG1584264
Tetrachloroethene	0.00956	C5	0.00106	0.00296	1	11/30/2020 22:16	WG1584264
Trichloroethene	U		0.000692	0.00118	1	11/30/2020 22:16	WG1584264
Vinyl chloride	U		0.00137	0.00296	1	11/30/2020 22:16	WG1584264
(S) Toluene-d8	104			75.0-131		11/30/2020 22:16	WG1584264
(S) 4-Bromofluorobenzene	112			67.0-138		11/30/2020 22:16	WG1584264
(S) 1,2-Dichloroethane-d4	92.7			70.0-130		11/30/2020 22:16	WG1584264

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Method Blank (MB)

(MB) R3599386-1 12/01/20 23:38

	MB Result	<u>MB Qualifier</u>	MB MDL	MB RDL
Analyte	%		%	%
Total Solids	0.00100			

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

L1289128-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1289128-01 12/01/20 23:38 • (DUP) R3599386-3 12/01/20 23:38

	Original Result	DUP Result	Dilution	DUP RPD	<u>DUP Qualifier</u>	DUP RPD Limits
Analyte	%	%		%		%
Total Solids	80.7	81.1	1	0.524		10

Laboratory Control Sample (LCS)

(LCS) R3599386-2 12/01/20 23:38

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	<u>LCS Qualifier</u>
Analyte	%	%	%	%	
Total Solids	50.0	50.0	100	85.0-115	



Method Blank (MB)

(MB) R3598789-2 11/30/20 15:11

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
cis-1,2-Dichloroethene	U		0.000734	0.00250
Tetrachloroethene	U		0.000896	0.00250
Trichloroethene	U		0.000584	0.00100
Vinyl chloride	U		0.00116	0.00250
(S) Toluene-d8	101			75.0-131
(S) 4-Bromofluorobenzene	108			67.0-138
(S) 1,2-Dichloroethane-d4	91.6			70.0-130

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Laboratory Control Sample (LCS)

(LCS) R3598789-1 11/30/20 14:14

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
cis-1,2-Dichloroethene	0.125	0.128	102	73.0-125	
Tetrachloroethene	0.125	0.164	131	70.0-136	
Trichloroethene	0.125	0.152	122	76.0-126	
Vinyl chloride	0.125	0.120	96.0	63.0-134	
(S) Toluene-d8			104	75.0-131	
(S) 4-Bromofluorobenzene			107	67.0-138	
(S) 1,2-Dichloroethane-d4			91.3	70.0-130	

L1290253-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1290253-06 11/30/20 18:30 • (MS) R3598789-3 11/30/20 23:13 • (MSD) R3598789-4 11/30/20 23:32

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
cis-1,2-Dichloroethene	0.102	U	0.127	0.119	125	117	1	10.0-149			6.50	37
Tetrachloroethene	0.102	U	0.173	0.162	170	159	1	10.0-156	J5	J5	6.57	39
Trichloroethene	0.102	U	0.159	0.147	156	144	1	10.0-156			7.84	38
Vinyl chloride	0.102	U	0.114	0.112	112	110	1	10.0-160			1.77	37
(S) Toluene-d8					100	101		75.0-131				
(S) 4-Bromofluorobenzene					111	113		67.0-138				
(S) 1,2-Dichloroethane-d4					92.8	91.3		70.0-130				



Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

(dry)	Results are reported based on the dry weight of the sample. [this will only be present on a dry report basis for soils].
MDL	Method Detection Limit.
MDL (dry)	Method Detection Limit.
RDL	Reported Detection Limit.
RDL (dry)	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
C5	The reported concentration is an estimate. The continuing calibration standard associated with this data responded high. Data is likely to show a high bias concerning the result.
J5	The sample matrix interfered with the ability to make any accurate determination; spike value is high.

1	Cp
2	Tc
3	Ss
4	Cn
5	Sr
6	Qc
7	Gi
8	Al
9	Sc



Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico ¹	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky ^{1 6}	90010	South Carolina	84004
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1 4}	2006
Louisiana ¹	LA180010	Texas	T104704245-18-15
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

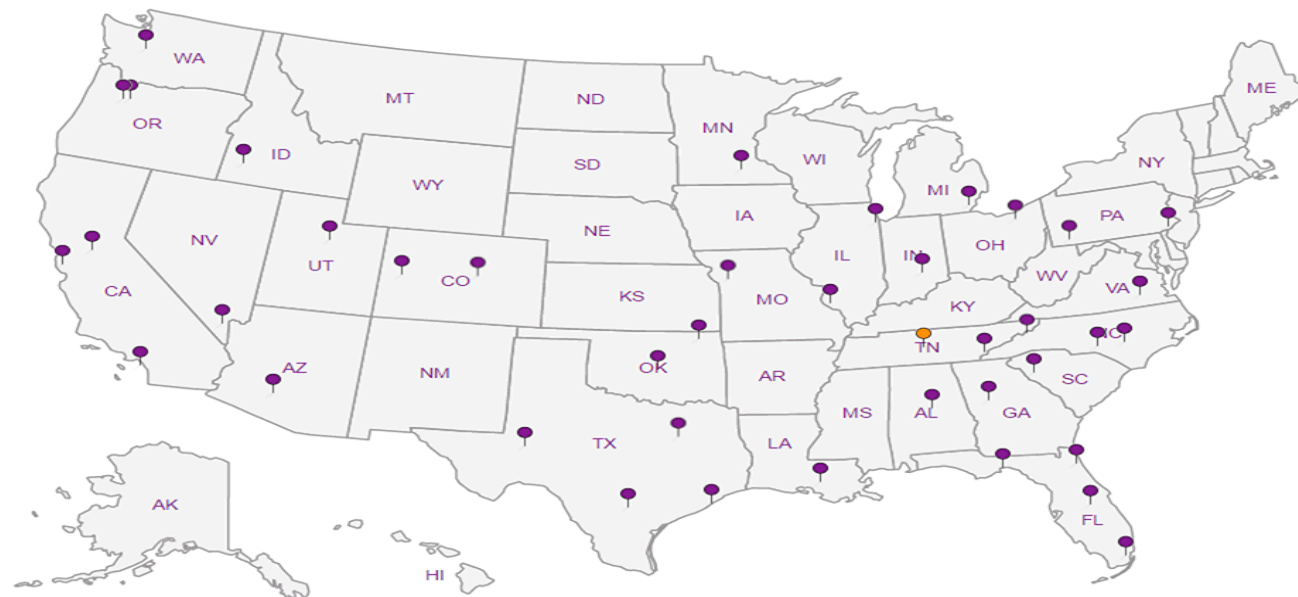
Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP, LLC EMLAP	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ⁶ Wastewater n/a Accreditation not applicable

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.



L1289130 ASHCREPOR add off hold

R5

Please add to L1289130, do not create a new SDG. Hold#11-187.

V8260C, TS, TERRACORE

SVE-1-(8')

OBS-1-(9')

Time estimate: oh

Time spent: oh

Members



Brian Ford

May 18, 2021

Apex Companies, LLC - Portland, OR

Sample Delivery Group: L1353606
Samples Received: 05/15/2021
Project Number: REGEN-250
Description: Cascade

Report To: Jie Xu
600 Stewart St.
Ste 400
Seattle, WA 98101

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Entire Report Reviewed By:



Brian Ford
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.

Pace Analytical National

12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 www.pacenational.com

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¹ Cp
² Tc
³ Ss
⁴ Cn
⁵ Sr
⁶ Qc
⁷ Gl
⁸ Al
⁹ Sc

SAMPLE SUMMARY

SB-1-2 L1353606-01 Solid

Collected by
H Hiscox

Collected date/time
05/14/21 09:30

Received date/time
05/15/21 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Total Solids by Method 2540 G-2011	WG1671809	1	05/17/21 10:17	05/17/21 10:27	KDW	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1672295	1	05/17/21 20:47	05/17/21 22:09	DWR	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1672625	1	05/14/21 09:30	05/18/21 13:52	JAH	Mt. Juliet, TN

¹Cp

²Tc

³Ss

SB-1-5 L1353606-02 Solid

Collected by
H Hiscox

Collected date/time
05/14/21 09:35

Received date/time
05/15/21 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Total Solids by Method 2540 G-2011	WG1671809	1	05/17/21 10:17	05/17/21 10:27	KDW	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1672295	1	05/17/21 20:47	05/17/21 22:28	DWR	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1672625	1	05/14/21 09:35	05/18/21 12:36	JAH	Mt. Juliet, TN

⁴Cn

⁵Sr

⁶Qc

⁷Gl

SB-1-8 L1353606-03 Solid

Collected by
H Hiscox

Collected date/time
05/14/21 09:40

Received date/time
05/15/21 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Total Solids by Method 2540 G-2011	WG1671809	1	05/17/21 10:17	05/17/21 10:27	KDW	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1672295	1	05/14/21 09:40	05/17/21 22:47	DWR	Mt. Juliet, TN

⁸Al

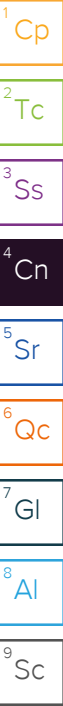
⁹Sc

CASE NARRATIVE

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.



Brian Ford
Project Manager



Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	89.0		1	05/17/2021 10:27	WG1671809

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Acetone	U	C3 J3	0.0410	0.0562	1	05/17/2021 22:09	WG1672295
Acrylonitrile	U	J3	0.00406	0.0140	1	05/17/2021 22:09	WG1672295
Benzene	U		0.000525	0.00112	1	05/17/2021 22:09	WG1672295
Bromobenzene	U		0.00101	0.0140	1	05/17/2021 22:09	WG1672295
Bromodichloromethane	U		0.000814	0.00281	1	05/17/2021 22:09	WG1672295
Bromoform	U		0.00131	0.0281	1	05/17/2021 22:09	WG1672295
Bromomethane	U		0.00221	0.0140	1	05/17/2021 22:09	WG1672295
n-Butylbenzene	U		0.00590	0.0140	1	05/17/2021 22:09	WG1672295
sec-Butylbenzene	U		0.00324	0.0140	1	05/17/2021 22:09	WG1672295
tert-Butylbenzene	U		0.00219	0.00562	1	05/17/2021 22:09	WG1672295
Carbon tetrachloride	U		0.00101	0.00562	1	05/17/2021 22:09	WG1672295
Chlorobenzene	U		0.000236	0.00281	1	05/17/2021 22:09	WG1672295
Chlorodibromomethane	U		0.000687	0.00281	1	05/17/2021 22:09	WG1672295
Chloroethane	U		0.00191	0.00562	1	05/17/2021 22:09	WG1672295
Chloroform	U		0.00116	0.00281	1	05/17/2021 22:09	WG1672295
Chloromethane	U		0.00489	0.0140	1	05/17/2021 22:09	WG1672295
2-Chlorotoluene	U		0.000972	0.00281	1	05/17/2021 22:09	WG1672295
4-Chlorotoluene	U		0.000506	0.00562	1	05/17/2021 22:09	WG1672295
1,2-Dibromo-3-Chloropropane	U		0.00438	0.0281	1	05/17/2021 22:09	WG1672295
1,2-Dibromoethane	U		0.000728	0.00281	1	05/17/2021 22:09	WG1672295
Dibromomethane	U		0.000843	0.00562	1	05/17/2021 22:09	WG1672295
1,2-Dichlorobenzene	U		0.000477	0.00562	1	05/17/2021 22:09	WG1672295
1,3-Dichlorobenzene	U		0.000674	0.00562	1	05/17/2021 22:09	WG1672295
1,4-Dichlorobenzene	U		0.000786	0.00562	1	05/17/2021 22:09	WG1672295
Dichlorodifluoromethane	U		0.00181	0.00281	1	05/17/2021 22:09	WG1672295
1,1-Dichloroethane	U		0.000552	0.00281	1	05/17/2021 22:09	WG1672295
1,2-Dichloroethane	U		0.000729	0.00281	1	05/17/2021 22:09	WG1672295
1,1-Dichloroethene	U		0.000681	0.00281	1	05/17/2021 22:09	WG1672295
cis-1,2-Dichloroethene	U		0.000825	0.00281	1	05/17/2021 22:09	WG1672295
trans-1,2-Dichloroethene	U		0.00117	0.00562	1	05/17/2021 22:09	WG1672295
1,2-Dichloropropane	U		0.00160	0.00562	1	05/17/2021 22:09	WG1672295
1,1-Dichloropropene	U		0.000909	0.00281	1	05/17/2021 22:09	WG1672295
1,3-Dichloropropane	U		0.000563	0.00562	1	05/17/2021 22:09	WG1672295
cis-1,3-Dichloropropene	U		0.000850	0.00281	1	05/17/2021 22:09	WG1672295
trans-1,3-Dichloropropene	U		0.00128	0.00562	1	05/17/2021 22:09	WG1672295
2,2-Dichloropropane	U		0.00155	0.00281	1	05/17/2021 22:09	WG1672295
Di-isopropyl ether	U		0.000461	0.00112	1	05/17/2021 22:09	WG1672295
Ethylbenzene	U		0.000828	0.00281	1	05/17/2021 22:09	WG1672295
Hexachloro-1,3-butadiene	U	C3	0.00674	0.0281	1	05/17/2021 22:09	WG1672295
Isopropylbenzene	U		0.000477	0.00281	1	05/17/2021 22:09	WG1672295
p-Isopropyltoluene	U		0.00286	0.00562	1	05/17/2021 22:09	WG1672295
2-Butanone (MEK)	U		0.0713	0.112	1	05/17/2021 22:09	WG1672295
Methylene Chloride	U		0.00746	0.0281	1	05/17/2021 22:09	WG1672295
4-Methyl-2-pentanone (MIBK)	U		0.00256	0.0281	1	05/17/2021 22:09	WG1672295
Methyl tert-butyl ether	U		0.000393	0.00112	1	05/17/2021 22:09	WG1672295
Naphthalene	U	J4	0.00616	0.0158	1	05/18/2021 13:52	WG1672625
n-Propylbenzene	U		0.00107	0.00562	1	05/17/2021 22:09	WG1672295
Styrene	U		0.000257	0.0140	1	05/17/2021 22:09	WG1672295
1,1,1,2-Tetrachloroethane	U		0.00106	0.00281	1	05/17/2021 22:09	WG1672295
1,1,2,2-Tetrachloroethane	U		0.000781	0.00281	1	05/17/2021 22:09	WG1672295

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result (dry) mg/kg	Qualifier	MDL (dry) mg/kg	RDL (dry) mg/kg	Dilution	Analysis date / time	Batch
1,1,2-Trichlorotrifluoroethane	U		0.000847	0.00281	1	05/17/2021 22:09	WG1672295
Tetrachloroethene	0.00380		0.00101	0.00281	1	05/17/2021 22:09	WG1672295
Toluene	U		0.00146	0.00562	1	05/17/2021 22:09	WG1672295
1,2,3-Trichlorobenzene	U	C4 J4	0.00823	0.0140	1	05/17/2021 22:09	WG1672295
1,2,4-Trichlorobenzene	U	C3	0.00494	0.0140	1	05/17/2021 22:09	WG1672295
1,1,1-Trichloroethane	U		0.00104	0.00281	1	05/17/2021 22:09	WG1672295
1,1,2-Trichloroethane	U		0.000671	0.00281	1	05/17/2021 22:09	WG1672295
Trichloroethene	U		0.000656	0.00112	1	05/17/2021 22:09	WG1672295
Trichlorofluoromethane	U	C3	0.000929	0.00281	1	05/17/2021 22:09	WG1672295
1,2,3-Trichloropropane	U		0.00182	0.0140	1	05/17/2021 22:09	WG1672295
1,2,4-Trimethylbenzene	0.00261	J	0.00199	0.00631	1	05/18/2021 13:52	WG1672625
1,2,3-Trimethylbenzene	U	C3 J4	0.00177	0.00562	1	05/17/2021 22:09	WG1672295
1,3,5-Trimethylbenzene	U		0.00253	0.00631	1	05/18/2021 13:52	WG1672625
Vinyl chloride	U		0.00130	0.00281	1	05/17/2021 22:09	WG1672295
Xylenes, Total	U		0.000989	0.00730	1	05/17/2021 22:09	WG1672295
(S) Toluene-d8	109			75.0-131		05/17/2021 22:09	WG1672295
(S) Toluene-d8	103			75.0-131		05/18/2021 13:52	WG1672625
(S) 4-Bromofluorobenzene	89.6			67.0-138		05/17/2021 22:09	WG1672295
(S) 4-Bromofluorobenzene	113			67.0-138		05/18/2021 13:52	WG1672625
(S) 1,2-Dichloroethane-d4	81.6			70.0-130		05/17/2021 22:09	WG1672295
(S) 1,2-Dichloroethane-d4	93.1			70.0-130		05/18/2021 13:52	WG1672625

¹ Cp² Tc³ Ss⁴ Cn⁵ Sr⁶ Qc⁷ Gl⁸ Al⁹ Sc

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	83.6		1	05/17/2021 10:27	WG1671809

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Acetone	U	C3 J3	0.0437	0.0598	1	05/17/2021 22:28	WG1672295
Acrylonitrile	U	J3	0.00432	0.0150	1	05/17/2021 22:28	WG1672295
Benzene	U		0.000559	0.00120	1	05/17/2021 22:28	WG1672295
Bromobenzene	U		0.00108	0.0150	1	05/17/2021 22:28	WG1672295
Bromodichloromethane	U		0.000868	0.00299	1	05/17/2021 22:28	WG1672295
Bromoform	U		0.00140	0.0299	1	05/17/2021 22:28	WG1672295
Bromomethane	U		0.00236	0.0150	1	05/17/2021 22:28	WG1672295
n-Butylbenzene	U		0.00628	0.0150	1	05/17/2021 22:28	WG1672295
sec-Butylbenzene	U		0.00345	0.0150	1	05/17/2021 22:28	WG1672295
tert-Butylbenzene	U		0.00233	0.00598	1	05/17/2021 22:28	WG1672295
Carbon tetrachloride	U		0.00107	0.00598	1	05/17/2021 22:28	WG1672295
Chlorobenzene	U		0.000251	0.00299	1	05/17/2021 22:28	WG1672295
Chlorodibromomethane	U		0.000732	0.00299	1	05/17/2021 22:28	WG1672295
Chloroethane	U		0.00203	0.00598	1	05/17/2021 22:28	WG1672295
Chloroform	U		0.00123	0.00299	1	05/17/2021 22:28	WG1672295
Chloromethane	U		0.00521	0.0150	1	05/17/2021 22:28	WG1672295
2-Chlorotoluene	U		0.00104	0.00299	1	05/17/2021 22:28	WG1672295
4-Chlorotoluene	U		0.000538	0.00598	1	05/17/2021 22:28	WG1672295
1,2-Dibromo-3-Chloropropane	U		0.00467	0.0299	1	05/17/2021 22:28	WG1672295
1,2-Dibromoethane	U		0.000775	0.00299	1	05/17/2021 22:28	WG1672295
Dibromomethane	U		0.000897	0.00598	1	05/17/2021 22:28	WG1672295
1,2-Dichlorobenzene	U		0.000509	0.00598	1	05/17/2021 22:28	WG1672295
1,3-Dichlorobenzene	U		0.000718	0.00598	1	05/17/2021 22:28	WG1672295
1,4-Dichlorobenzene	U		0.000838	0.00598	1	05/17/2021 22:28	WG1672295
Dichlorodifluoromethane	U		0.00193	0.00299	1	05/17/2021 22:28	WG1672295
1,1-Dichloroethane	U		0.000588	0.00299	1	05/17/2021 22:28	WG1672295
1,2-Dichloroethane	U		0.000777	0.00299	1	05/17/2021 22:28	WG1672295
1,1-Dichloroethene	U		0.000725	0.00299	1	05/17/2021 22:28	WG1672295
cis-1,2-Dichloroethene	U		0.000878	0.00299	1	05/17/2021 22:28	WG1672295
trans-1,2-Dichloroethene	U		0.00124	0.00598	1	05/17/2021 22:28	WG1672295
1,2-Dichloropropane	U		0.00170	0.00598	1	05/17/2021 22:28	WG1672295
1,1-Dichloropropene	U		0.000968	0.00299	1	05/17/2021 22:28	WG1672295
1,3-Dichloropropane	U		0.000599	0.00598	1	05/17/2021 22:28	WG1672295
cis-1,3-Dichloropropene	U		0.000906	0.00299	1	05/17/2021 22:28	WG1672295
trans-1,3-Dichloropropene	U		0.00136	0.00598	1	05/17/2021 22:28	WG1672295
2,2-Dichloropropane	U		0.00165	0.00299	1	05/17/2021 22:28	WG1672295
Di-isopropyl ether	U		0.000491	0.00120	1	05/17/2021 22:28	WG1672295
Ethylbenzene	U		0.000882	0.00299	1	05/17/2021 22:28	WG1672295
Hexachloro-1,3-butadiene	U	C3	0.00718	0.0299	1	05/17/2021 22:28	WG1672295
Isopropylbenzene	U		0.000509	0.00299	1	05/17/2021 22:28	WG1672295
p-Isopropyltoluene	U		0.00305	0.00598	1	05/17/2021 22:28	WG1672295
2-Butanone (MEK)	U		0.0760	0.120	1	05/17/2021 22:28	WG1672295
Methylene Chloride	U		0.00795	0.0299	1	05/17/2021 22:28	WG1672295
4-Methyl-2-pentanone (MIBK)	U		0.00273	0.0299	1	05/17/2021 22:28	WG1672295
Methyl tert-butyl ether	U		0.000419	0.00120	1	05/17/2021 22:28	WG1672295
Naphthalene	U	C3	0.00584	0.0150	1	05/17/2021 22:28	WG1672295
n-Propylbenzene	U		0.00114	0.00598	1	05/17/2021 22:28	WG1672295
Styrene	U		0.000274	0.0150	1	05/17/2021 22:28	WG1672295
1,1,1,2-Tetrachloroethane	U		0.00113	0.00299	1	05/17/2021 22:28	WG1672295
1,1,2,2-Tetrachloroethane	U		0.000832	0.00299	1	05/17/2021 22:28	WG1672295

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result (dry) mg/kg	Qualifier	MDL (dry) mg/kg	RDL (dry) mg/kg	Dilution	Analysis date / time	Batch
1,1,2-Trichlorotrifluoroethane	U		0.000902	0.00299	1	05/17/2021 22:28	WG1672295
Tetrachloroethene	U		0.00107	0.00299	1	05/17/2021 22:28	WG1672295
Toluene	U		0.00156	0.00598	1	05/17/2021 22:28	WG1672295
1,2,3-Trichlorobenzene	U	C4 J4	0.00877	0.0150	1	05/17/2021 22:28	WG1672295
1,2,4-Trichlorobenzene	U	C3	0.00526	0.0150	1	05/17/2021 22:28	WG1672295
1,1,1-Trichloroethane	U		0.00110	0.00299	1	05/17/2021 22:28	WG1672295
1,1,2-Trichloroethane	U		0.000714	0.00299	1	05/17/2021 22:28	WG1672295
Trichloroethene	U		0.000699	0.00120	1	05/17/2021 22:28	WG1672295
Trichlorofluoromethane	U	C3	0.000990	0.00299	1	05/17/2021 22:28	WG1672295
1,2,3-Trichloropropane	U		0.00194	0.0150	1	05/17/2021 22:28	WG1672295
1,2,4-Trimethylbenzene	U		0.00228	0.00722	1	05/18/2021 12:36	WG1672625
1,2,3-Trimethylbenzene	U	C3 J4	0.00189	0.00598	1	05/17/2021 22:28	WG1672295
1,3,5-Trimethylbenzene	U		0.00239	0.00598	1	05/17/2021 22:28	WG1672295
Vinyl chloride	U		0.00139	0.00299	1	05/17/2021 22:28	WG1672295
Xylenes, Total	U		0.00105	0.00778	1	05/17/2021 22:28	WG1672295
(S) Toluene-d8	107			75.0-131		05/17/2021 22:28	WG1672295
(S) Toluene-d8	103			75.0-131		05/18/2021 12:36	WG1672625
(S) 4-Bromofluorobenzene	89.8			67.0-138		05/17/2021 22:28	WG1672295
(S) 4-Bromofluorobenzene	110			67.0-138		05/18/2021 12:36	WG1672625
(S) 1,2-Dichloroethane-d4	84.3			70.0-130		05/17/2021 22:28	WG1672295
(S) 1,2-Dichloroethane-d4	98.6			70.0-130		05/18/2021 12:36	WG1672625

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	80.7		1	05/17/2021 10:27	WG1671809

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result (dry)	Qualifier	MDL (dry)	RDL (dry)	Dilution	Analysis	Batch
	mg/kg		mg/kg	mg/kg		date / time	
Acetone	U	C3 J3	0.0553	0.0757	1	05/17/2021 22:47	WG1672295
Acrylonitrile	U	J3	0.00547	0.0189	1	05/17/2021 22:47	WG1672295
Benzene	U		0.000707	0.00151	1	05/17/2021 22:47	WG1672295
Bromobenzene	U		0.00136	0.0189	1	05/17/2021 22:47	WG1672295
Bromodichloromethane	U		0.00110	0.00378	1	05/17/2021 22:47	WG1672295
Bromoform	U		0.00177	0.0378	1	05/17/2021 22:47	WG1672295
Bromomethane	U		0.00298	0.0189	1	05/17/2021 22:47	WG1672295
n-Butylbenzene	U		0.00795	0.0189	1	05/17/2021 22:47	WG1672295
sec-Butylbenzene	U		0.00436	0.0189	1	05/17/2021 22:47	WG1672295
tert-Butylbenzene	U		0.00295	0.00757	1	05/17/2021 22:47	WG1672295
Carbon tetrachloride	U		0.00136	0.00757	1	05/17/2021 22:47	WG1672295
Chlorobenzene	U		0.000318	0.00378	1	05/17/2021 22:47	WG1672295
Chlorodibromomethane	U		0.000927	0.00378	1	05/17/2021 22:47	WG1672295
Chloroethane	U		0.00257	0.00757	1	05/17/2021 22:47	WG1672295
Chloroform	U		0.00156	0.00378	1	05/17/2021 22:47	WG1672295
Chloromethane	U		0.00659	0.0189	1	05/17/2021 22:47	WG1672295
2-Chlorotoluene	U		0.00131	0.00378	1	05/17/2021 22:47	WG1672295
4-Chlorotoluene	U		0.000681	0.00757	1	05/17/2021 22:47	WG1672295
1,2-Dibromo-3-Chloropropane	U		0.00590	0.0378	1	05/17/2021 22:47	WG1672295
1,2-Dibromoethane	U		0.000981	0.00378	1	05/17/2021 22:47	WG1672295
Dibromomethane	U		0.00114	0.00757	1	05/17/2021 22:47	WG1672295
1,2-Dichlorobenzene	U		0.000643	0.00757	1	05/17/2021 22:47	WG1672295
1,3-Dichlorobenzene	U		0.000908	0.00757	1	05/17/2021 22:47	WG1672295
1,4-Dichlorobenzene	U		0.00106	0.00757	1	05/17/2021 22:47	WG1672295
Dichlorodifluoromethane	U		0.00244	0.00378	1	05/17/2021 22:47	WG1672295
1,1-Dichloroethane	U		0.000743	0.00378	1	05/17/2021 22:47	WG1672295
1,2-Dichloroethane	U		0.000983	0.00378	1	05/17/2021 22:47	WG1672295
1,1-Dichloroethene	U		0.000917	0.00378	1	05/17/2021 22:47	WG1672295
cis-1,2-Dichloroethene	U		0.00111	0.00378	1	05/17/2021 22:47	WG1672295
trans-1,2-Dichloroethene	U		0.00157	0.00757	1	05/17/2021 22:47	WG1672295
1,2-Dichloropropane	U		0.00215	0.00757	1	05/17/2021 22:47	WG1672295
1,1-Dichloropropene	U		0.00122	0.00378	1	05/17/2021 22:47	WG1672295
1,3-Dichloropropane	U		0.000758	0.00757	1	05/17/2021 22:47	WG1672295
cis-1,3-Dichloropropene	U		0.00115	0.00378	1	05/17/2021 22:47	WG1672295
trans-1,3-Dichloropropene	U		0.00173	0.00757	1	05/17/2021 22:47	WG1672295
2,2-Dichloropropane	U		0.00209	0.00378	1	05/17/2021 22:47	WG1672295
Di-isopropyl ether	U		0.000621	0.00151	1	05/17/2021 22:47	WG1672295
Ethylbenzene	U		0.00112	0.00378	1	05/17/2021 22:47	WG1672295
Hexachloro-1,3-butadiene	U	C3	0.00908	0.0378	1	05/17/2021 22:47	WG1672295
Isopropylbenzene	U		0.000643	0.00378	1	05/17/2021 22:47	WG1672295
p-Isopropyltoluene	U		0.00386	0.00757	1	05/17/2021 22:47	WG1672295
2-Butanone (MEK)	0.107	J	0.0961	0.151	1	05/17/2021 22:47	WG1672295
Methylene Chloride	U		0.0101	0.0378	1	05/17/2021 22:47	WG1672295
4-Methyl-2-pentanone (MIBK)	U		0.00345	0.0378	1	05/17/2021 22:47	WG1672295
Methyl tert-butyl ether	U		0.000530	0.00151	1	05/17/2021 22:47	WG1672295
Naphthalene	U	C3	0.00739	0.0189	1	05/17/2021 22:47	WG1672295
n-Propylbenzene	U		0.00144	0.00757	1	05/17/2021 22:47	WG1672295
Styrene	U		0.000347	0.0189	1	05/17/2021 22:47	WG1672295
1,1,1,2-Tetrachloroethane	U		0.00144	0.00378	1	05/17/2021 22:47	WG1672295
1,1,2,2-Tetrachloroethane	U		0.00105	0.00378	1	05/17/2021 22:47	WG1672295

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

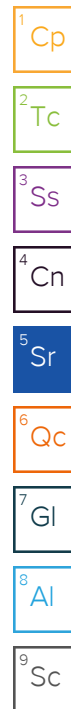
7 Gl

8 Al

9 Sc

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result (dry) mg/kg	Qualifier	MDL (dry) mg/kg	RDL (dry) mg/kg	Dilution	Analysis date / time	Batch
1,1,2-Trichlorotrifluoroethane	U		0.00114	0.00378	1	05/17/2021 22:47	WG1672295
Tetrachloroethene	U		0.00136	0.00378	1	05/17/2021 22:47	WG1672295
Toluene	U		0.00197	0.00757	1	05/17/2021 22:47	WG1672295
1,2,3-Trichlorobenzene	U	C4 J4	0.0111	0.0189	1	05/17/2021 22:47	WG1672295
1,2,4-Trichlorobenzene	U	C3	0.00666	0.0189	1	05/17/2021 22:47	WG1672295
1,1,1-Trichloroethane	U		0.00140	0.00378	1	05/17/2021 22:47	WG1672295
1,1,2-Trichloroethane	U		0.000904	0.00378	1	05/17/2021 22:47	WG1672295
Trichloroethene	U		0.000884	0.00151	1	05/17/2021 22:47	WG1672295
Trichlorofluoromethane	U	C3	0.00125	0.00378	1	05/17/2021 22:47	WG1672295
1,2,3-Trichloropropane	U		0.00245	0.0189	1	05/17/2021 22:47	WG1672295
1,2,4-Trimethylbenzene	U		0.00239	0.00757	1	05/17/2021 22:47	WG1672295
1,2,3-Trimethylbenzene	U	C3 J4	0.00239	0.00757	1	05/17/2021 22:47	WG1672295
1,3,5-Trimethylbenzene	U		0.00303	0.00757	1	05/17/2021 22:47	WG1672295
Vinyl chloride	U		0.00176	0.00378	1	05/17/2021 22:47	WG1672295
Xylenes, Total	U		0.00133	0.00984	1	05/17/2021 22:47	WG1672295
(S) Toluene-d8	108			75.0-131		05/17/2021 22:47	WG1672295
(S) 4-Bromofluorobenzene	89.0			67.0-138		05/17/2021 22:47	WG1672295
(S) 1,2-Dichloroethane-d4	82.0			70.0-130		05/17/2021 22:47	WG1672295



Method Blank (MB)

(MB) R3655661-1 05/17/21 10:27

	MB Result	<u>MB Qualifier</u>	MB MDL	MB RDL
Analyte	%		%	%
Total Solids	0.000			

L1353592-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1353592-03 05/17/21 10:27 • (DUP) R3655661-3 05/17/21 10:27

	Original Result	DUP Result	Dilution	DUP RPD	<u>DUP Qualifier</u>	DUP RPD Limits
Analyte	%	%		%		%
Total Solids	84.3	84.4	1	0.0334		10

Laboratory Control Sample (LCS)

(LCS) R3655661-2 05/17/21 10:27

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	<u>LCS Qualifier</u>
Analyte	%	%	%	%	
Total Solids	50.0	50.0	100	85.0-115	

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R3655669-3 05/17/21 19:50

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Acetone	U		0.0365	0.0500
Acrylonitrile	U		0.00361	0.0125
Benzene	U		0.000467	0.00100
Bromobenzene	U		0.000900	0.0125
Bromodichloromethane	U		0.000725	0.00250
Bromoform	U		0.00117	0.0250
Bromomethane	U		0.00197	0.0125
n-Butylbenzene	U		0.00525	0.0125
sec-Butylbenzene	U		0.00288	0.0125
tert-Butylbenzene	U		0.00195	0.00500
Carbon tetrachloride	U		0.000898	0.00500
Chlorobenzene	U		0.000210	0.00250
Chlorodibromomethane	U		0.000612	0.00250
Chloroethane	U		0.00170	0.00500
Chloroform	U		0.00103	0.00250
Chloromethane	U		0.00435	0.0125
2-Chlorotoluene	U		0.000865	0.00250
4-Chlorotoluene	U		0.000450	0.00500
1,2-Dibromo-3-Chloropropane	U		0.00390	0.0250
1,2-Dibromoethane	U		0.000648	0.00250
Dibromomethane	U		0.000750	0.00500
1,2-Dichlorobenzene	U		0.000425	0.00500
1,3-Dichlorobenzene	U		0.000600	0.00500
1,4-Dichlorobenzene	U		0.000700	0.00500
Dichlorodifluoromethane	U		0.00161	0.00250
1,1-Dichloroethane	U		0.000491	0.00250
1,2-Dichloroethane	U		0.000649	0.00250
1,1-Dichloroethene	U		0.000606	0.00250
cis-1,2-Dichloroethene	U		0.000734	0.00250
trans-1,2-Dichloroethene	U		0.00104	0.00500
1,2-Dichloropropane	U		0.00142	0.00500
1,1-Dichloropropene	U		0.000809	0.00250
1,3-Dichloropropane	U		0.000501	0.00500
cis-1,3-Dichloropropene	U		0.000757	0.00250
trans-1,3-Dichloropropene	U		0.00114	0.00500
2,2-Dichloropropane	U		0.00138	0.00250
Di-isopropyl ether	U		0.000410	0.00100
Ethylbenzene	U		0.000737	0.00250
Hexachloro-1,3-butadiene	U		0.00600	0.0250
Isopropylbenzene	U		0.000425	0.00250

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R3655669-3 05/17/21 19:50

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
p-Isopropyltoluene	U		0.00255	0.00500
2-Butanone (MEK)	U		0.0635	0.100
Methylene Chloride	U		0.00664	0.0250
4-Methyl-2-pentanone (MIBK)	U		0.00228	0.0250
Methyl tert-butyl ether	U		0.000350	0.00100
Naphthalene	U		0.00488	0.0125
n-Propylbenzene	U		0.000950	0.00500
Styrene	U		0.000229	0.0125
1,1,1,2-Tetrachloroethane	U		0.000948	0.00250
1,1,2,2-Tetrachloroethane	U		0.000695	0.00250
Tetrachloroethene	U		0.000896	0.00250
Toluene	U		0.00130	0.00500
1,1,2-Trichlorotrifluoroethane	U		0.000754	0.00250
1,2,3-Trichlorobenzene	U		0.00733	0.0125
1,2,4-Trichlorobenzene	U		0.00440	0.0125
1,1,1-Trichloroethane	U		0.000923	0.00250
1,1,2-Trichloroethane	U		0.000597	0.00250
Trichloroethene	U		0.000584	0.00100
Trichlorofluoromethane	U		0.000827	0.00250
1,2,3-Trichloropropane	U		0.00162	0.0125
1,2,3-Trimethylbenzene	U		0.00158	0.00500
1,2,4-Trimethylbenzene	U		0.00158	0.00500
1,3,5-Trimethylbenzene	U		0.00200	0.00500
Vinyl chloride	U		0.00116	0.00250
Xylenes, Total	U		0.000880	0.00650
(S) Toluene-d8	106			75.0-131
(S) 4-Bromofluorobenzene	89.1			67.0-138
(S) 1,2-Dichloroethane-d4	74.6			70.0-130

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3655669-1 05/17/21 18:33 • (LCSD) R3655669-2 05/17/21 18:53

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Acetone	0.625	0.489	0.718	78.2	115	10.0-160		J3	37.9	31
Acrylonitrile	0.625	0.752	0.539	120	86.2	45.0-153		J3	33.0	22
Benzene	0.125	0.117	0.110	93.6	88.0	70.0-123			6.17	20
Bromobenzene	0.125	0.116	0.118	92.8	94.4	73.0-121			1.71	20
Bromodichloromethane	0.125	0.111	0.111	88.8	88.8	73.0-121			0.000	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3655669-1 05/17/21 18:33 • (LCSD) R3655669-2 05/17/21 18:53

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	<u>LCS Qualifier</u>	<u>LCSD Qualifier</u>	RPD %	RPD Limits %
Bromoform	0.125	0.112	0.104	89.6	83.2	64.0-132			7.41	20
Bromomethane	0.125	0.130	0.126	104	101	56.0-147			3.12	20
n-Butylbenzene	0.125	0.123	0.114	98.4	91.2	68.0-135			7.59	20
sec-Butylbenzene	0.125	0.118	0.118	94.4	94.4	74.0-130			0.000	20
tert-Butylbenzene	0.125	0.108	0.111	86.4	88.8	75.0-127			2.74	20
Carbon tetrachloride	0.125	0.101	0.100	80.8	80.0	66.0-128			0.995	20
Chlorobenzene	0.125	0.115	0.115	92.0	92.0	76.0-128			0.000	20
Chlorodibromomethane	0.125	0.115	0.115	92.0	92.0	74.0-127			0.000	20
Chloroethane	0.125	0.114	0.117	91.2	93.6	61.0-134			2.60	20
Chloroform	0.125	0.0997	0.0940	79.8	75.2	72.0-123			5.89	20
Chloromethane	0.125	0.123	0.119	98.4	95.2	51.0-138			3.31	20
2-Chlorotoluene	0.125	0.118	0.118	94.4	94.4	75.0-124			0.000	20
4-Chlorotoluene	0.125	0.119	0.123	95.2	98.4	75.0-124			3.31	20
1,2-Dibromo-3-Chloropropane	0.125	0.116	0.108	92.8	86.4	59.0-130			7.14	20
1,2-Dibromoethane	0.125	0.120	0.118	96.0	94.4	74.0-128			1.68	20
Dibromomethane	0.125	0.122	0.108	97.6	86.4	75.0-122			12.2	20
1,2-Dichlorobenzene	0.125	0.117	0.110	93.6	88.0	76.0-124			6.17	20
1,3-Dichlorobenzene	0.125	0.113	0.112	90.4	89.6	76.0-125			0.889	20
1,4-Dichlorobenzene	0.125	0.113	0.114	90.4	91.2	77.0-121			0.881	20
Dichlorodifluoromethane	0.125	0.137	0.136	110	109	43.0-156			0.733	20
1,1-Dichloroethane	0.125	0.117	0.110	93.6	88.0	70.0-127			6.17	20
1,2-Dichloroethane	0.125	0.108	0.0993	86.4	79.4	65.0-131			8.39	20
1,1-Dichloroethene	0.125	0.104	0.0994	83.2	79.5	65.0-131			4.52	20
cis-1,2-Dichloroethene	0.125	0.104	0.102	83.2	81.6	73.0-125			1.94	20
trans-1,2-Dichloroethene	0.125	0.101	0.0983	80.8	78.6	71.0-125			2.71	20
1,2-Dichloropropane	0.125	0.117	0.112	93.6	89.6	74.0-125			4.37	20
1,1-Dichloropropene	0.125	0.107	0.101	85.6	80.8	73.0-125			5.77	20
1,3-Dichloropropane	0.125	0.122	0.124	97.6	99.2	80.0-125			1.63	20
cis-1,3-Dichloropropene	0.125	0.111	0.108	88.8	86.4	76.0-127			2.74	20
trans-1,3-Dichloropropene	0.125	0.119	0.121	95.2	96.8	73.0-127			1.67	20
2,2-Dichloropropane	0.125	0.129	0.126	103	101	59.0-135			2.35	20
Di-isopropyl ether	0.125	0.120	0.114	96.0	91.2	60.0-136			5.13	20
Ethylbenzene	0.125	0.112	0.110	89.6	88.0	74.0-126			1.80	20
Hexachloro-1,3-butadiene	0.125	0.0891	0.0942	71.3	75.4	57.0-150			5.56	20
Isopropylbenzene	0.125	0.107	0.102	85.6	81.6	72.0-127			4.78	20
p-Isopropyltoluene	0.125	0.107	0.108	85.6	86.4	72.0-133			0.930	20
2-Butanone (MEK)	0.625	0.809	0.647	129	104	30.0-160			22.3	24
Methylene Chloride	0.125	0.108	0.103	86.4	82.4	68.0-123			4.74	20
4-Methyl-2-pentanone (MIBK)	0.625	0.698	0.667	112	107	56.0-143			4.54	20
Methyl tert-butyl ether	0.125	0.121	0.110	96.8	88.0	66.0-132			9.52	20

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3655669-1 05/17/21 18:33 • (LCSD) R3655669-2 05/17/21 18:53

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Naphthalene	0.125	0.0913	0.0842	73.0	67.4	59.0-130			8.09	20
n-Propylbenzene	0.125	0.126	0.128	101	102	74.0-126			1.57	20
Styrene	0.125	0.113	0.110	90.4	88.0	72.0-127			2.69	20
1,1,1,2-Tetrachloroethane	0.125	0.107	0.100	85.6	80.0	74.0-129			6.76	20
1,1,2,2-Tetrachloroethane	0.125	0.141	0.141	113	113	68.0-128			0.000	20
Tetrachloroethene	0.125	0.116	0.116	92.8	92.8	70.0-136			0.000	20
Toluene	0.125	0.118	0.114	94.4	91.2	75.0-121			3.45	20
1,1,2-Trichlorotrifluoroethane	0.125	0.110	0.110	88.0	88.0	61.0-139			0.000	20
1,2,3-Trichlorobenzene	0.125	0.0676	0.0691	54.1	55.3	59.0-139	J4	J4	2.19	20
1,2,4-Trichlorobenzene	0.125	0.0906	0.0811	72.5	64.9	62.0-137			11.1	20
1,1,1-Trichloroethane	0.125	0.104	0.0961	83.2	76.9	69.0-126			7.90	20
1,1,2-Trichloroethane	0.125	0.117	0.115	93.6	92.0	78.0-123			1.72	20
Trichloroethene	0.125	0.104	0.101	83.2	80.8	76.0-126			2.93	20
Trichlorofluoromethane	0.125	0.0787	0.0790	63.0	63.2	61.0-142			0.380	20
1,2,3-Trichloropropane	0.125	0.128	0.124	102	99.2	67.0-129			3.17	20
1,2,3-Trimethylbenzene	0.125	0.0876	0.0858	70.1	68.6	74.0-124	J4	J4	2.08	20
1,2,4-Trimethylbenzene	0.125	0.116	0.112	92.8	89.6	70.0-126			3.51	20
1,3,5-Trimethylbenzene	0.125	0.104	0.106	83.2	84.8	73.0-127			1.90	20
Vinyl chloride	0.125	0.119	0.116	95.2	92.8	63.0-134			2.55	20
Xylenes, Total	0.375	0.344	0.341	91.7	90.9	72.0-127			0.876	20
(S) Toluene-d8				101	103	75.0-131				
(S) 4-Bromofluorobenzene				94.4	94.6	67.0-138				
(S) 1,2-Dichloroethane-d4				93.8	89.2	70.0-130				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R3655902-2 05/18/21 11:17

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Naphthalene	U		0.00488	0.0125
1,2,4-Trimethylbenzene	U		0.00158	0.00500
1,3,5-Trimethylbenzene	U		0.00200	0.00500
(S) Toluene-d8	104			75.0-131
(S) 4-Bromofluorobenzene	108			67.0-138
(S) 1,2-Dichloroethane-d4	98.4			70.0-130

Laboratory Control Sample (LCS)

(LCS) R3655902-1 05/18/21 10:20

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Naphthalene	0.125	0.165	132	59.0-130	J4
1,2,4-Trimethylbenzene	0.125	0.142	114	70.0-126	
1,3,5-Trimethylbenzene	0.125	0.134	107	73.0-127	
(S) Toluene-d8			97.9	75.0-131	
(S) 4-Bromofluorobenzene			119	67.0-138	
(S) 1,2-Dichloroethane-d4			102	70.0-130	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

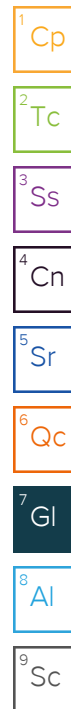
The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

(dry)	Results are reported based on the dry weight of the sample. [this will only be present on a dry report basis for soils].
MDL	Method Detection Limit.
MDL (dry)	Method Detection Limit.
RDL	Reported Detection Limit.
RDL (dry)	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
C3	The reported concentration is an estimate. The continuing calibration standard associated with this data responded low. Method sensitivity check is acceptable.
C4	The reported concentration is an estimate. The continuing calibration standard associated with this data responded low. Data is likely to show a low bias concerning the result.
J	The identification of the analyte is acceptable; the reported value is an estimate.
J3	The associated batch QC was outside the established quality control range for precision.
J4	The associated batch QC was outside the established quality control range for accuracy.



ACCREDITATIONS & LOCATIONS

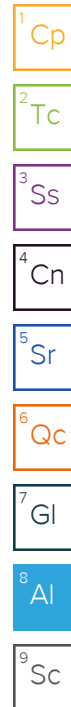
Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey--NELAP	TN002
California	2932	New Mexico ¹	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	923	North Dakota	R-140
Idaho	TN00003	Ohio--VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky ^{1 6}	KY90010	South Carolina	84004002
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1 4}	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas ⁵	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA -- ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA -- ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA--Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ⁶ Wastewater n/a Accreditation not applicable

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.



Company Name/Address: Apex Companies, LLC - Portland, OR				Billing Information: Accounts Payable 3015 SW First Ave. Portland, OR 97201-4707				Analysis / Container / Preservative				Chain of Custody Page 1 of 2							
600 Stewart St. Ste 400 Seattle, WA 98101				Email To: Jie.Xu@apexcos.com;kelsi.evans@apexcos.com;				Pres Chk				Pace Analytical® 12065 Lebanon Rd Mount Juliet, TN 37122 Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace Terms and Conditions found at: https://info.pacelabs.com/hubs/pas-standard-terms.pdf							
Report to: Jie Xu				Project Description: Cascade				City/State Collected: Everett, WA				Please Circle: PT MT CT ET							
Phone: 503-924-4704				Client Project # REGEN-250				Lab Project # ASHCREPOR-CASCADE				SDG # 41353606 D250							
Collected by (print): H. H. Scox				Site/Facility ID #				P.O. # REGEN-574				Tabl							
Collected by (signature): 				Rush? (Lab MUST Be Notified) ☒ Same Day ☐ Five Day ☒ Next Day ☐ 5 Day (Rad Only) ☐ Two Day ☐ 10 Day (Rad Only) ☐ Three Day				Quote #				Acctnum: ASHCREPOR Template: T186717 Prelogin: P844618 PM: 110 - Brian Ford PB:							
Immediately Packed on Ice N ☐ Y ☒				Date Results Needed				No. of Cntrs				Shipped Via:							
Sample ID				Comp/Grab		Matrix *		Depth		Date		Time		Remarks		Sample # (lab only)			
* SB-1-2				G		SS		2		5/14/21		930		2		-01			
* SB-1-5				G		SS		6		935		2		X		-02			
* SB-1-8				G		SS		8		940		2		X		-03			
SB-2-2				G		SS		2		900		2		X		on Hold			
SB-2-6				G		SS		6		908		2		X		on Hold			
SB-2-8				G		SS		8		915		2		X		on Hold			
SB-3-2				G		SS		2		950		2		X		on Hold			
SB-3-6				G		SS		6		1008		2		X		on Hold			
SB-3-9				G		SS		9		1005		2		X		on Hold			
SB-4-2				G		SS		2		1010		2		X		on Hold			
* Matrix: SS - Soil AIR - Air F - Filter GW - Groundwater B - Bioassay WW - WasteWater DW - Drinking Water OT - Other				Remarks: Samples marked "on Hold" hold analysis until (SB-1-2, SB-1-5, SB-1-8) are complete * 24HR TAT				Flow _____ Other _____				Sample Receipt Checklist COC Seal Present/Intact: ☒ NP Y N COC Signed/Accurate: ☒ Y N Bottles arrive intact: ☒ Y N Correct bottles used: ☒ Y N Sufficient volume sent: ☒ Y N If Applicable VOA Zero Headspace: ☒ Y N Preservation Correct/Checked: ☒ Y N RAD Screen <0.5 mR/hr: ☒ Y N							
Samples returned via: UPS _____ FedEx _____ Courier _____				Tracking # 9186 2508 1386				Received by: (Signature) 				Trip Blank Received: Yes/No HCL/MeOH TBR							
Relinquished by: (Signature) 				Date: 5/14/21				Time: 1300				Bottles Received: 2.6L 2.6L 36				If preservation required by Login: Date/Time			
Relinquished by: (Signature)				Date:				Time:				Received for lab by: (Signature) 				Date: 5/14/21			
Relinquished by: (Signature)				Date:				Time:				Time: 9:30				Condition: NCF / OK			

Company Name/Address:

Apex Companies, LLC - Portland, OR

600 Stewart St.

Ste 400

Seattle, WA 98101

Report to:

Jie Xu

Project Description:

Cascade

Phone: 503-924-4704

Client Project #

REGEN-250

Collected by (print):

H. Hiscox

Collected by (signature):

Immediately

Packed on Ice N ☐ Y ☒

Sample ID

Comp/Grab

Matrix *

Depth

Date

Time

No.
of
Cntrs

Billing Information:

Accounts Payable

3015 SW First Ave.

Portland, OR 97201-4707

Pres
Chk

Email To:

Jie.Xu@apexcos.com;kelsi.evans@apexcos.com;

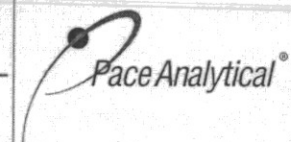
Please Circle:

PT MT CT ET

Analysis / Container / Preservative

Chain of Custody

Page 2 of 3



12065 Lebanon Rd Mount Juliet, TN 37122
Submitting a sample via this chain of custody
constitutes acknowledgment and acceptance of the
Pace Terms and Conditions found at:
<https://info.pacelabs.com/hubs/pas-standard-terms.pdf>

SDG #

Table #

Acctnum: ASHCREPOR

Template: T186717

Prelogin: P844618

PM: 110 - Brian Ford

PB:

Shipped Via:

Remarks

Sample # (lab only)

SB-4-6

G

SS

6

5/14/21

1070

2

X

X

on Hold

SB-4-8

G

SS

6

1024

2

X

X

on Hold

SB-5-2

G

SS

2

1032

2

X

X

on Hold

SB-5-6

G

SS

6

1043

2

X

X

on Hold

SB-5-8

G

SS

8

1048

2

X

X

on Hold

SB-6-2

G

SS

2

1102

2

X

X

on Hold

SB-6-6

G

SS

6

1112

2

X

X

on Hold

SB-6-8

G

SS

8

1117

2

X

X

on Hold

* Matrix:

SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other

Remarks:

Hold samples until SB-1 results

* 24 hr TAT

Samples returned via:

UPS FedEx Courier

Tracking #

Relinquished by: (Signature)

Date:

5/14/21

Time:

1300

Received by: (Signature)

Trip Blank Received: YES No

HCL/MeOH

TBR

Relinquished by: (Signature)

Date:

Time:

Received by: (Signature)

Temp: °C Bottles Received:

26.0-26.4 36

Relinquished by: (Signature)

Date:

Time:

Received for lab by: (Signature)

Date:

5/14/21

Time:

9:30

Hold:

Condition:

NCF / OK

Sample Receipt Checklist

COC Seal Present/Intact: ☒ Y ☐ NCOC Signed/Accurate: ☒ Y ☐ NBottles arrive intact: ☒ Y ☐ NCorrect bottles used: ☒ Y ☐ NSufficient volume sent: ☒ Y ☐ N

If Applicable

VOA Zero Headspace: ☒ Y ☐ NPreservation Correct/Checked: ☒ Y ☐ NRAD Screen <0.5 mR/hr: ☒ Y ☐ N

If preservation required by Login: Date/Time

Appendix C

Photolog

Photograph 1
Description: SVE-1 test well for the SVE pilot test.



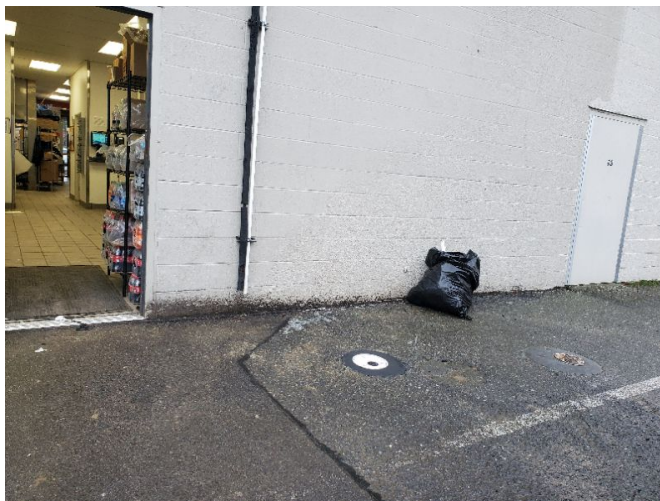
Photograph 2
Description: Well connection, manifold, and vacuum piping.



Photograph 3
Description: Vacuum truck for SVE pilot test and proposed SVE system shed located north of the tenant backdoor.



Photograph 4
Description: Well OBS-1
and MW-3



Photograph 5
Description: Vacuum and temperature gauges set up
on the PVC pipe near the SVE-1 well head.

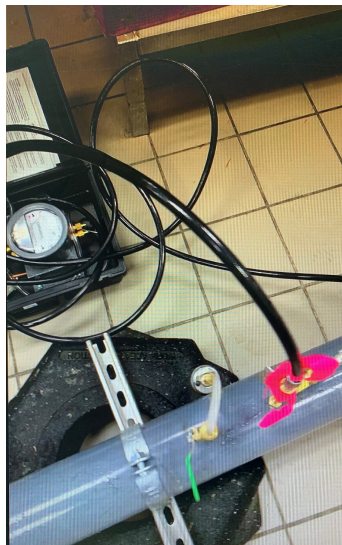


Photograph 6
Description: DS-300 flow meter setup for
the differential gas pressure
measurements.



Photograph 7

Description: DS-300 flow meter connection with the 4-inch PVC pipe for differential gas pressure measurements.



Photograph 8

Description: Vacuum measurement at OBS-1 while conducting the SVE pilot test.



Photograph

Description: