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Interim Remedial Measure Work Plan

1153-69 West Fayette Street

City of Syracuse, Onondaga County, New York

BCP Site No. C734164

Prepared for:

1153 Owner LLC

PO Box 515

Syracuse, New York 13205

May 2025

Revised July 2025

C&S Project No. AB2.002.002



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Syracuse, New York 13205

Prepared by:
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Syracuse, New York 13212

I, H. Nevin Bradford, certify that I am currently a New York State Registered Professional Engineer and that this Interim Remedial Measure Work Plan was prepared in accordance with applicable statutes and regulations and in substantial conformance with the Department of Environmental Remediation Technical Guidance for Site Investigation and Remediation (DER-10) and DER Green Remediation (DER-31).

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State of New York Professional Engineer No. 086008



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ACRONYMS

AAR – Alternatives Analysis Report	NYSDOH – New York State Department of Health
AMSL – Above Mean Sea Level	PID – Photo-ionization Detector
ASP – Analytical Services Protocol	PM – Particulate Matter
BCA – Brownfield Cleanup Agreement	PPE – Personal Protective Equipment
BCP – Brownfield Cleanup Program	PPM – Parts per Million
BGS – Below Ground Surface	PPMW – Parts per Million by Weight
BMP – Best Management Practice	PVC – Polyvinyl Chloride
C&S – C&S Engineers, Inc.	PVE – Pore Volume Exchange
CAMP – Community Air Monitoring Plan	QA / QC – Quality Assurance / Quality Control
CFM – Cubic Feet Per Minute	QAPP – Quality Assurance Project Plan
CO₂ – Carbon Dioxide	RAO – Remedial Action Objective
COC – Certificate of Completion	RAWP – Remedial Action Work Plan
DD – Decision Document	RCRA – Resource Conservation and Recovery Act
DER – Department of Environmental Remediation	RI – Remedial Investigation
DNAPL – Dense Non-Aqueous Phase Liquid	RIWP – Remedial Investigation Work Plan
DUSR – Data Usability and Summary Report	ROI – Radius of Influence
EE – Environmental Easement	SCG – Standards, Criteria, Guidance
ELAP – Environmental Laboratory Accreditation Program	SEFA – Spreadsheets for Environmental Footprint Analysis
FER – Final Engineering Report	SIM – Select Ion Monitoring
GHG – Greenhouse Gas	Site – 1153-69 West Fayette Street, Syracuse, NY
GRT – Green Remediation Technique	SMP – Site management Plan
HAP – Hazardous Air Pollutant	SO_x – Sulfur Oxides
HASP – Health and Safety Plan	SVE – Soil Vapor Extraction
HFM – Historic Fill Material	SVI – Soil Vapor Intrusion
IDW – Investigation Derived Waste	TREC – TREC Environmental Inc.
IRM – Interim Remedial Measure	µg/m³ – Microgram per Cubic Meter
IRMWP – Interim Remedial Measures Work Plan	USEPA – United States Environmental Protection Agency
MMBtu – Metric Million British Thermal Unit	UST – Underground Storage Tank
NO_x – Nitrogen Oxides	VOC – Volatile Organic Compound
NYCRR – New York Codes, Rules, and Regulations	Volunteer – 1153 Owner LLC
NYSDEC – New York State Department of Environmental Conservation	

1.0 INTRODUCTION

C&S Engineers, Inc. (C&S) has prepared this Interim Remedial Measure Work Plan (IRMWP) on behalf of the Volunteers for Brownfield Cleanup Program (BCP) Site No. C734164, 1153 Owner LLC, (hereafter known as "Volunteer"), for the 1153-69 West Fayette Street BCP Site located at 1153-69 West Fayette Street in the City of Syracuse, Onondaga County, New York (the "Site").

On January 9, 2024 (Revised January 26, 2024), the Volunteer submitted a BCP Application to investigate and remediate the Site. A fully executed Brownfield Cleanup Agreement (BCA) was provided on June 21, 2024. A Remedial Investigation Work Plan (RIWP) was subsequently approved by the New York State Department of Environmental Conservation (NYSDEC) on December 10, 2024, and the Remedial Investigation (RI) commenced on November 22, 2024, with approval from NYSDEC to commence field work prior to the final RIWP approval. The RI was conducted to assess the nature and extent of contamination at the Site and is discussed in further detail in **Section 1.4**. The RI Report was submitted to NYSDEC on April 30, 2025 and is currently under review.

1.1 Site Description

The Site is located at 1153-69 West Fayette Street in the City of Syracuse, Onondaga County, New York. The Site includes one tax parcel, Tax ID No. 099.-03-02.1, and is approximately 2.65 acres in size. The Site is developed with a 92,113 square foot six-story building with an adjoining 11,060 square foot single-story building. The buildings were historically used for manufacturing purposes but have most recently been used as mixed office space, storage space, and commercial space. An oil house (located on the west side of the building) and an exterior coal silo (located on the south side of the building) were identified on historic maps. The oil house has since been replaced with the western addition to the building and the coal silo remains on the Site. The buildings are currently vacant. The six-story building is in good condition. The single-story building is in deteriorating condition and requires rehabilitation to ensure safe future Site use.

The Site is located on the west side of the City of Syracuse. Harbor Brook flows through the Site within a box culvert located beneath the eastern portion of the Site. Onondaga Creek is 0.76 miles east of the Site and Onondaga Lake is 1.25 miles northwest. The Site is bounded to the north by West Fayette Street followed by forested land, Syracuse City School District Supply Center, and a rail line, to the south by commercial stores and George Fowler High School, to the west by residences and the George Fowler High School baseball diamond, and to the east by the Lofts at 1117 BCP Site (C734160) and commercial stores. Properties surrounding the Site are a mix of residential, commercial, and industrial in nature.

Figure 1 shows the location of the Site and **Figure 2** shows the Site boundaries and identified pertinent site features.

1.2 Site History

The Site was once occupied by residential houses, a machine shop, and a lumber shed from at least 1892. Around 1911, the Site began operating as the Kemp & Burpee Manufacturing Company, a large manufacturing facility that produced manure spreaders. These operations included a machine shop, a forge shop, and several painting shops on and near the eastern side of the Site. Between 1916 and 1946, the Site operated as the Brown-Lipe Gear Company, manufacturer of bicycle and automobile gears. Around 1920, the six-story industrial building with a single-story addition that exists today was constructed on the western portion of the Site. From 1943 to 1950, the Site was taken over by the United States government during World War II to manufacture trucks and tank clutches for the United States Army. Sometime between 1938 and 1951, all industrial buildings on the Site except for the existing buildings were demolished and replaced with a parking lot. Between 1956 and 1960, a single-story addition was added to the western side of the buildings. The eastern portion of the Site operated as a parking lot. The industrial facility operated as the Morris Distributing Company (wholesale electrical supplies) between approximately 1951 and 1988. This operation was equipped with an oil house that was located on the west side of the original structure, in an area that is now occupied by the western addition. A coal silo was also present outside the south side of the building dating to at least 1951. The coal storage structure still remains on the Site. In the 1990s, the facility housed a variety of industrial and commercial companies including Command Services (computer sales and services), Tegmen (electronic circuit manufacturer), Selco Graphics (printing), and PEACE Inc. (non-profit organization). Since the early 2000s, a variety of commercial tenants have occupied the facility. The buildings are currently vacant.

1.3 Site Geology and Hydrogeology

1.3.1 Site Geology

The Site contains historic fill material (HFM) from grade to approximately seven to 14 feet below ground surface (bgs). The observed HFM is shallowest on the west and south sides of the Site and deepest in the center and the northeast corner of the Site. Per 6 New York Codes, Rules, and Regulations (NYCRR) Part 375, HFM is defined as: *non-indigenous or non-native material, historically deposited or disposed in the general area of, or on, a site to create useable land by filling water bodies, wetlands or topographic depressions, which is in no way connected with the subsequent operations at the location of the emplacement, and which was contaminated prior to emplacement.* The HFM contains brick, coal, cinder, ash, wood, and slag.

Native soil is located below the HFM and consists of dark brown fine to coarse sand and silty clay.

The *Geologic Map of New York, Finger Lakes Sheet* (Lawrence V. Rickard and Donald W. Fisher, 1970) identifies the local bedrock beneath and in the immediate vicinity of the site as the Syracuse Formation of the Upper Silurian period. The primary rock type is dolostone and the secondary rock type is shale. Bedrock was not encountered or investigated during the RI.

1.3.2 Site Hydrogeology

During the RI, groundwater was encountered between 5.5 and 13 feet bgs at seven permanent groundwater monitoring wells. The Site is located at approximately 398 feet above mean sea level (AMSL) and slopes downward slightly to the southwest. Harbor Brook flows in a general northerly direction through the Site within a box culvert located beneath the eastern portion of the Site. Onondaga Creek is 0.76 miles east of the Site and Onondaga Lake is 1.25 miles northwest.

Groundwater contours indicate a generally northwesterly flow direction. On average, the groundwater table was approximately 0.64 feet higher in December 2024 compared to February 2025, due to February being a drier month than December. The average groundwater gradient was 0.012 feet per feet in December 2024 and 0.013 feet per feet in February 2025.

1.4 Summary of Remedial Investigation

The RI was conducted to assess the nature and extent of contamination at the Site and consisted of the following:

- Buried Utilities Evaluation – This task consisted of using various geophysical screening methods to determine if buried features, such as dry wells, underground storage tanks (USTs), vaults, etc. were present on the exterior of the Site.
- Soil Evaluation – This task consisted of assessing the Site's surface soil, HFM, and underlying native soil.
- Groundwater Evaluation – Groundwater monitoring wells were installed on Site to assess groundwater quality and determine groundwater flow.
- Soil Vapor Intrusion (SVI) Assessment – Sub-slab soil vapor and indoor air samples were collected from the existing one-story building. Crawl space air and indoor air samples were collected from the existing six-story building. Soil vapor implants were installed throughout the Site exterior to assess overall site conditions and the potential for off-site migration. An outdoor air sample was collected from an upwind ambient location for comparison purposes.
 - a) Based on the results of the initial SVI assessment, an additional assessment was conducted using passive soil gas samplers to identify the source of carbon tetrachloride in soil vapor and delineate the extent of impacts.

1.4.1 Summary of SVI Assessments

To provide a framework to aid in determining appropriate actions in response to SVI risk, the New York State Department of Health (NYSDOH) has developed decision matrices to be used as a risk

management tool for data assessment. They are designed to be applied on a case-by-case basis, for identifying actions that should be taken to address current and potential exposures related to SVI. These decision matrices were developed to apply to specific volatile chemicals of interest, but are also intended to be generic, and, as such, may be modified based on site-specific conditions and contaminants. The results of the SVI assessments conducted during the RI were compared to the appropriate decision matrices and the findings are summarized below.

Initial SVI Assessment

- During the initial SVI assessment, three sub-slab soil vapor samples, two crawl space air samples, five indoor air samples, seven soil vapor samples, and one outdoor air sample were collected. Three collocated sub-slab / indoor air samples were collected from the single-story building while two collocated crawl space air / indoor air samples were collected from the six-story building. The seven soil vapor samples were collected from soil vapor implants positioned near the periphery of the Site to assess the potential for on-site or off-site migration. The outdoor air sample was collected at an exterior up-wind location.
- To provide a framework to aid in determining appropriate actions in response to SVI risk, NYSDOH has developed decision matrices to be used as a risk management tool for data assessment. They are designed to be applied on a case-by-case basis, for identifying actions that should be taken to address current and potential exposures related to SVI. These decision matrices were developed to apply to specific volatile chemicals of interest, but are also intended to be generic, and, as such, may be modified based on site-specific conditions and contaminants. **Table 1-1** summarizes the results.

Table 1-1: NYSDOH Decision Matrices Results

Analyte	Decision Matrix	Result
Carbon Tetrachloride	A	Mitigate (at SSV-103)
1,1-Dichloroethene		No further action
Cis-1,2-Dichloroethene		No further action
Trichloroethene		No further action
Methylene Chloride	B	No further action
Tetrachloroethene		No further action
1,1,1-Trichloroethane		No further action
Vinyl Chloride	C	No further action
Benzene	D	No further action
Ethylbenzene		No further action
Cyclohexane		No further action
2,2,4-Trimethylpentane		No further action
1,2,4-Trimethylbenzene		No further action
1,3,5-Trimethylbenzene		No further action
o-Xylene		No further action
p/m-Xylene	E	No further action

Analyte	Decision Matrix	Result
Heptane	F	No further action
Hexane		No further action
Toluene		No further action

- The concentration of carbon tetrachloride observed at SSV-103 was 667 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) while the concentration at IA-103 was $0.472 \mu\text{g}/\text{m}^3$, warranting mitigation based on NYSDOH Decision Matrix A. The concentration observed at SSV-103 was substantially higher than any other sub-slab location. However, the concentration observed at IA-103 was comparable to other indoor air locations and the ambient air sample.
- Based on this information, a retest was conducted at SSV-103 to confirm the concentration observed. An additional sub-slab vapor sample was collected 2-3 feet east of the original SSV-103 location. Although the concentration of carbon tetrachloride was substantially lower than the original test ($90.6 \mu\text{g}/\text{m}^3$), the concentration was still high enough to warrant mitigation based on NYSDOH Decision Matrix A.

Table 1 summarizes the initial SVI assessment results. **Figure 3a** shows the sample locations.

Additional SVI Assessment

- Based on the results of the initial SVI assessment, an additional assessment was conducted using passive soil gas samplers to identify the source of carbon tetrachloride in soil vapor and delineate the extent of impacts. Fifteen additional sub-slab soil vapor samples were collected as a part of this assessment.
- The results of the additional SVI assessment indicated that the source of carbon tetrachloride was concentrated around PSG-104, which was located 7.5 feet north of SSV-103. PSG-104 had a carbon tetrachloride concentration of $2,230 \mu\text{g}/\text{m}^3$ and PSG-112, which was located 22.5 feet northwest of SSV-103, had a concentration of $618 \mu\text{g}/\text{m}^3$. Carbon tetrachloride concentrations immediately west of SSV-103 ranged from 166 to $197 \mu\text{g}/\text{m}^3$ but were non-detect further to the west. Carbon tetrachloride was not detected at sampling locations to the east and south.
- The impacts appear to be limited to an approximate 500 square foot area. Carbon tetrachloride was not identified in nearby sub-surface soil or groundwater, indicating impacts appear to be limited to soil vapor. The review of historical documentation and generation of analytical data from the RI does not support the likelihood of dense non-aqueous phase liquid (DNAPL) within the groundwater underlying the Site. The presence of carbon tetrachloride in soil vapor may be associated with an isolated release / spill that occurred in the general vicinity of PSG-104.

Table 2 summarizes the additional SVI assessment results. **Figure 3b** shows the sample locations.



Considering that the area of carbon tetrachloride is confined to a localized area and appears to be present in a gaseous phase within sub-slab soil vapor, with minimal associated soil or groundwater impact, the Volunteer wishes to employ soil vapor extraction methods as an interim remedial measure to remove the vapor-phase carbon tetrachloride in this localized area of the site.

This IRMWP has been prepared to address the carbon tetrachloride impacts identified in sub-slab soil vapor beneath the northwest portion of the single-story section of the building. The purpose of the proposed Interim Remedial Measure (IRM) is to remediate the soil vapor impacts in the one-story building during construction, prior to issuance of the Decision Document (DD) for the Site.

2.0 REMEDIAL ACTION OBJECTIVES

Remedial Action Objectives (RAOs) are medium-specific objectives for the protection of public health and the environment and are developed based on contaminant-specific Standards, Criteria, and Guidance (SCG) established by NYSDEC and / or NYSDOH. This IRMWP was developed in consideration of the following SCG:

- *NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York*, October 2006.

The site-specific RAOs are based on the anticipated use of the site for commercial use. The RAOs for soil vapor used in this IRMWP are:

- RAOs for Public Health Protection
 - Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at a Site.

3.0 PROPOSED INTERIM REMEDIAL MEASURE

To mitigate the soil vapor carbon tetrachloride impacts observed during the RI, the proposed IRM includes the installation and operation of a Soil Vapor Extraction (SVE) system. The SVE system design and installation activities are described in further detail in the following sections.

3.1 SVE System Design

The results of the RI indicate that the carbon tetrachloride soil vapor impacts are limited to an approximate 500 square foot area. Based on field observations made during the RI, the groundwater table is approximately 10 feet bgs in this area. To remediate the impacted area and prevent migration of soil vapor beyond the area of current impact and into the on-site buildings, the SVE system will incorporate the following design components:

- Two SVE wells will be installed in the northwestern portion of the single-story building. Based on the nature of the sub-slab soil / HFM, it is expected that each SVE well will achieve a minimum radius of influence (ROI) of 15 feet. The ROIs from the two SVE wells will overlap by approximately 9 feet, providing sufficient coverage of the impacted area.
- The SVE system design is based on the extraction of three pore volume exchanges (PVE) per day. Most literature recommends at least one PVE per day for successful remediation. Based on the small area of impact and timeframe constraints, a more aggressive approach will be used for the SVE system.
- The operational flow rate required to achieve three PVE per day was calculated using the equation below:

$$Q = \frac{\pi r^2 b n_a}{t_{ex}}$$

Where: Q = Volumetric Flow Rate
 R = ROI
 B = Vadose Zone Thickness
 N_a = Air-Filled Soil Porosity
 T_{ex} = Time Required for One PVE

- Using an assumed ROI of 15 feet (estimate based on the nature of the sub-slab soil / HFM), a vadose zone thickness of 10 feet, an estimated soil porosity of 30%, and 8 hours as the time required for one PVE, the volumetric flow rate required for the system is 4.4 cubic feet per minute (cfm) per SVE well. Therefore, the volumetric flow rate for the entire system (taking into account a design factor of 1.5) is 13.2 cfm.
- Based on the highest concentration of carbon tetrachloride observed and the area of impact, the estimated total carbon tetrachloride mass is 315 milligrams. Carbon

tetrachloride was not detected in sub-surface soil in the area of impact, indicating that majority of the contamination has already volatilized into the soil vapor and should be readily removed upon system startup.

3.2 SVE System Installation

3.2.1 Utility Clearance

During the RI, TREC Environmental Inc. (TREC) conducted a geophysical survey across the Site. The survey included the use of a Mala Easy Locator High Dynamic Range ground penetrating radar unit to locate and record the locations of utilities and anomalies. The survey line spacing used was determined based on the particular unit in use at the time. The purpose of the evaluation was to identify the locations of public / private utilities, as well as to identify buried features, such as dry wells, USTs, vaults, etc. The geophysical survey did not identify any utilities beneath the single-story building slab.

Prior to SVE well installation, a qualified drilling sub-contractor will notify Dig Safely New York, to arrange for identification and marking of buried utilities at the Site that are registered with that organization. The drilling subcontractor will also confer with the property owner to identify the location of any private buried utilities in the area that are not registered with Dig Safely New York. The utility mark-out process requires a minimum notification of 72 hours in advance.

3.2.2 SVE Well Installation

Two SVE wells will be installed in the northwestern portion of the single-story building, in the vicinity of the observed carbon tetrachloride impacts. SVE-101 will be installed between PSG-104 and SSV-103 and SVE-102 will be installed between PSG-104 and PSG-112. These locations will ensure the greatest remedial effect is at PSG-104 while also preventing migrations to the northwest and southeast. The SVE well locations are shown in the design drawings, provided in **Appendix A**.

In locations where SVE wells will be constructed, a rotary drill will be used to advance 4-1/4-inch hollow stem augers.

The SVE wells will be set approximately 8 feet bgs (above the groundwater table) and will be constructed with 5 feet of 2-inch Schedule 40 polyvinyl chloride (PVC) 0.020-slot well screen connected to an appropriate length of Schedule 40 PVC riser to complete the well so the riser is at grade. The annulus will be sand packed with coarse quartz sand to approximately one foot above the screened section. The remainder of the borehole annulus will be filled with a bentonite-cement slurry or bentonite chips followed by concrete to grade to seal each well location. The slab penetration will be sealed around the perimeter of the PVC riser with an elastomeric sealant (or similar).

The two SVE wells will be manifolded to each other horizontally via Schedule 40 PVC elbows and solid PVC piping. The horizontal manifold will be at ground level (i.e., supported on the concrete floor) and cordoned off to prevent site workers from entering the area (i.e., prevent tripping hazard). The horizontal manifold will be equipped with a 2-inch PVC union ball valve that will allow segregation of flow to each SVE well. The manifold will be labelled with a sign that reads "SOIL VAPOR EXTRACTION SYSTEM: DO NOT TURN OFF OR ALTER." The SVE well details are shown in the design drawings, provided in **Appendix A**.

3.2.3 SVE System Piping

The horizontal well manifold will be equipped with a Schedule 40 PVC 2-inch tee and the combined flow from the two SVE wells will be directed to a regenerative blower, discussed in further detail in **Section 3.2.4**. Ten feet of 2-inch steel pipe will be connected to the blower effluent before transitioning to 2-inch PVC pipe to help dissipate heat from the blower unit. The piping will follow existing building walls and ultimately discharge vertically outside the building and above the roofline. The exhaust will be at least 10 feet horizontally away from operable openings and 4 feet above operable openings below the point of exhaust.

The piping on the negative pressure side of the blower will be at ground level and cordoned off to prevent site workers from entering the area (i.e., prevent tripping hazard). The piping on the positive side of the blower will be secured to building walls, approximately 10 feet above grade. Vertical piping will be supported every 10 feet and horizontal pipe will be supported every 4 feet.

To ensure system efficacy would not be negatively impacted, the pressure loss through the PVC pipe was calculated taking into account the following:

- Proposed Length of Perforated PVC Pipe Pre-Manifold = 10 feet
- Proposed Length of Solid PVC Pipe Pre-Manifold = 21 feet
- Proposed Length of Solid PVC Pipe Post-Manifold = 65 feet
- Flow Rate Pre-Manifold = 6.6 CFM
- Flow Rate Post-Manifold = 13.2 CFM
- Number of Tee Fittings = 1
- Number of 90-Degree Elbows = 7
- Equivalent Length of Pipe from Fittings = 17.6 feet

The total pressure loss is approximately 0.328 inches of water column across the entire system and is not anticipated to negatively impact the efficacy of the system. The pressure loss calculations are provided in **Appendix B**.

3.2.4 SVE System Equipment

A FPZ 0.33 HP SCL 06B-.33-115/230 NP regenerative blower (or similar) will be installed for the SVE system. The blower is capable of achieving the 13.2 cfm flow rate required for the system at a pressure of approximately 33 inches of water column. The blower has a maximum flow rate of

39 cfm and a maximum vacuum rating of 36 inches of water column. The blower inlet and outlet connections are 1-inch, therefore, reducing couplings will be used to connect the system piping to the blower. The blower will be mounted to the floor inside the building to provide adequate insulation, protection from weather, and to reduce the noise in the community. The blower will be labelled with a sign that reads "SOIL VAPOR EXTRACTION SYSTEM: DO NOT TURN OFF OR ALTER."

A vacuum gauge will be mounted on the horizontal manifold (prior to the ball valve) for each SVE well. The vacuum gauge will be PRM Filtration Part No. PGCNBTY630452J60WCV (or similar) and will be capable of measuring to -60 inches of water column.

Sampling ports will be mounted on the horizontal manifold (prior to the ball valve) for each SVE well and on the positive pressure side of the blower. The sampling ports will be used to take airflow measurements and photo-ionization detector (PID) readings during the system startup and system monitoring. The SVE well sampling ports will also be used for intermittent air sampling to evaluate the effectiveness of the system. The sampling ports will be PRM Filtration Part No. MGPVC025SAMPLEPORT (or similar).

The SVE system equipment details and locations are shown in the design drawings, provided in **Appendix A**. Specification sheets for the blower, vacuum gauge and sampling ports are provided in **Appendix C**.

3.3 SVE System Start-Up

Following system installation, the system will be started with the designed vacuum and flow rate to maximize the radius of influence. Pressure field extension (PFE) testing will be conducted to confirm there is adequate vacuum beneath the slab. PFE testing will include the following:

- Test port locations will be chosen at 15 feet away from the SVE wells to characterize PFE across the expanse of the targeted slab. Holes will be drilled through the slab at the test port locations.
- Measurements will be made to quantify the air pressure difference under the slab at the test port locations relative to the indoor air. Measurements will be made with a digital micromanometer capable of reading to 0.001-inch water column. A negative pressure difference of at least 0.004-inch water column is desired.
- If PFE goals are not achieved, further evaluation will be conducted to identify problems (i.e., openings between soil and indoor or outdoor air, unexpected blockage to airflow).

Once PFE goals are achieved, system monitoring will be conducted hourly on the first day and will consist of the following:

- Vapor-phase VOC concentrations will be measured with a PID at each SVE well, at the blower outlet, and in the vicinity of the system discharge on the outside of the building;
- Air flow measurements will be obtained using an anemometer at each SVE well and at the blower outlet; and
- Vacuum readings will be recorded at each SVE well.

On the second day of operation, system monitoring will be conducted once. If system parameters are steady for two consecutive days, additional monitoring events will be conducted weekly after start-up in parallel with weekly sampling events, described in **Section 3.4**.

3.4 SVE System Monitoring and Sampling

A designated site representative will record vacuum readings at each SVE well daily in addition to the weekly monitoring and sampling events described below.

The effectiveness of the SVE system will be monitored by collecting air samples from each of the SVE wells weekly following SVE system start-up. Prior to sampling, system monitoring will be conducted:

- Vapor-phase VOC concentrations will be measured with a PID at each SVE well, at the blower outlet, and in the vicinity of the system discharge on the outside of the building;
- Air flow measurements will be obtained using an anemometer at each SVE well and at the blower outlet; and
- Vacuum readings will be recorded at each SVE well.

Following this monitoring, grab air samples will be collected as follows:

- The regenerative blower will be shut down temporarily to facilitate sample collection.
- Samples will be collected in Tedlar bags filled using an air sample pump connected to the sample ports. Flexible Tygon tubing will be used to connect the sample port to the sample pump inlet and the sample pump outlet to the Tedlar bag.
- Care will be taken to provide adequate sample volume for laboratory analysis requirements.
- Tedlar bags will be labeled with a unique sample designation number. The sample number and location will be recorded on the field log.

- The Tedlar bags will be returned to their sampling boxes for safe storage and shipping. Field data will be verified and correctly entered into field books prior to shipment and the bags will be shipped to the laboratory under a chain-of-custody.
- Each sample will be analyzed for carbon tetrachloride via United States Environmental Protection Agency (USEPA) Method TO-15 Select Ion Monitoring (SIM) to achieve low level laboratory reporting limits of $0.20 \mu\text{g}/\text{m}^3$ or less.

If sub-slab carbon tetrachloride concentrations are below $6 \mu\text{g}/\text{m}^3$ for three consecutive sampling events, the SVE system will be shut down for a period of at least 30 days and end-point sampling will be conducted.

3.5 SVE System End Point Sampling

Once sub-slab carbon tetrachloride concentrations are reduced to $6 \mu\text{g}/\text{m}^3$ or lower for three consecutive sampling events, NYSDEC and NYSDOH will review the data to determine if the SVE system has effectively reduced carbon tetrachloride to appropriate concentrations. NYSDEC and NYSDOH will then determine if the SVE system can be shut down. After a minimum of 30 days has elapsed, end-point sampling will be conducted using Summa™ canisters. The following samples will be collected in the following sequence:

- One sub-slab soil vapor sample and one indoor air sample will be collected from location SSV-201. This general area is where the highest concentrations of carbon tetrachloride were observed during the RI. One outdoor air sample will also be collected during this sampling event.
- If the results of the testing at SSV-201 indicate that "No Further Action" is necessary based on NYSDOH Decision Matrix A, four additional sub-slab soil vapor samples will be collected at locations SSV-202 through SSV-205 to ensure that carbon tetrachloride impacts have not migrated. Indoor and outdoor air samples will not be collected during this sampling event.
- Based on the results obtained for carbon tetrachloride and other Site-related VOCs, a soil vapor intrusion sampling event may be warranted during the upcoming 2025-2026 heating season.

The end point sampling locations are shown on **Figure 4**. Sampling procedures are outlined below.

3.5.1 Indoor Air Sampling

One indoor air sample will be collected using a Summa™ canister (6-Liter capacity) equipped with a critical orifice flow regulation device sized to allow an air sample to be collected over a 24-hour

sampling period. Care will be taken to deploy the canister away from the direct influence of any forced air emanating from air conditioning units, central air conditioning vents, furnaces or heaters. A building questionnaire and product inventory will be prepared.

3.5.2 Sub-Slab Soil Gas Sampling

Sub-slab sampling points will be installed to collect soil gas immediately below the slab. Sub-slab gas samples will be collected using a 6-Liter Summa™ canister fitted with a flow orifice pre-calibrated to collect a 6-Liter sample over a 24-hour period.

The sub-slab vapor points will be installed by advancing a small diameter hole (approximately 3/8-inches in diameter) through the floor slab to determine thickness. The holes will be drilled using a hammer drill. The hole will extend through the slab and terminate at the interface with underlying material. A length of vinyl tubing will be placed into the hole extend to the bottom of the slab. The cored slab annulus will be sealed with clay placed around the tubing.

To ensure there is no connection between the sub-slab and indoor air, helium short-circuit testing will be performed at each sampling point. The Helium will be introduced into a dome next to the above grade sampling train and Summa™ canister. The helium concentration will be read using a helium meter that is capable of reading down to 1-2%. If helium is detected by the meter, the clay seal will be replaced and the tracer test will be re-performed.

Prior to sub-slab soil gas sample collection, the monitoring point and above grade tubing will be purged at a rate not exceeding 200 ml/min. The tube will be purged to remove the volume of air in the tube.

3.5.3 Ambient Air Sampling

One ambient air sample will be collected in the same manner as the indoor air sample. The sampling device will be located upwind of the structure and will be placed approximately three to five feet off the ground for sample collection purposes. The outdoor air sample will be collected using a Summa canister equipped with a laboratory calibrated regulator over a 24-hour period.

3.5.4 Sample Canister Deployment and Retrieval

For all soil vapor / air sampling described above, sample canisters will be deployed and retrieved as described below:

- Air sample canisters will be labeled with a unique sample designation number. The sample number and location will be recorded on the field log.
- The canister vacuum will be measured using an integrated vacuum gauge immediately prior to canister deployment and recorded on the field log. The critical orifice flow controller will be installed, as supplied by the laboratory, on the canister; the canister will

be opened fully at the beginning of sample collection period; and the start time will be recorded.

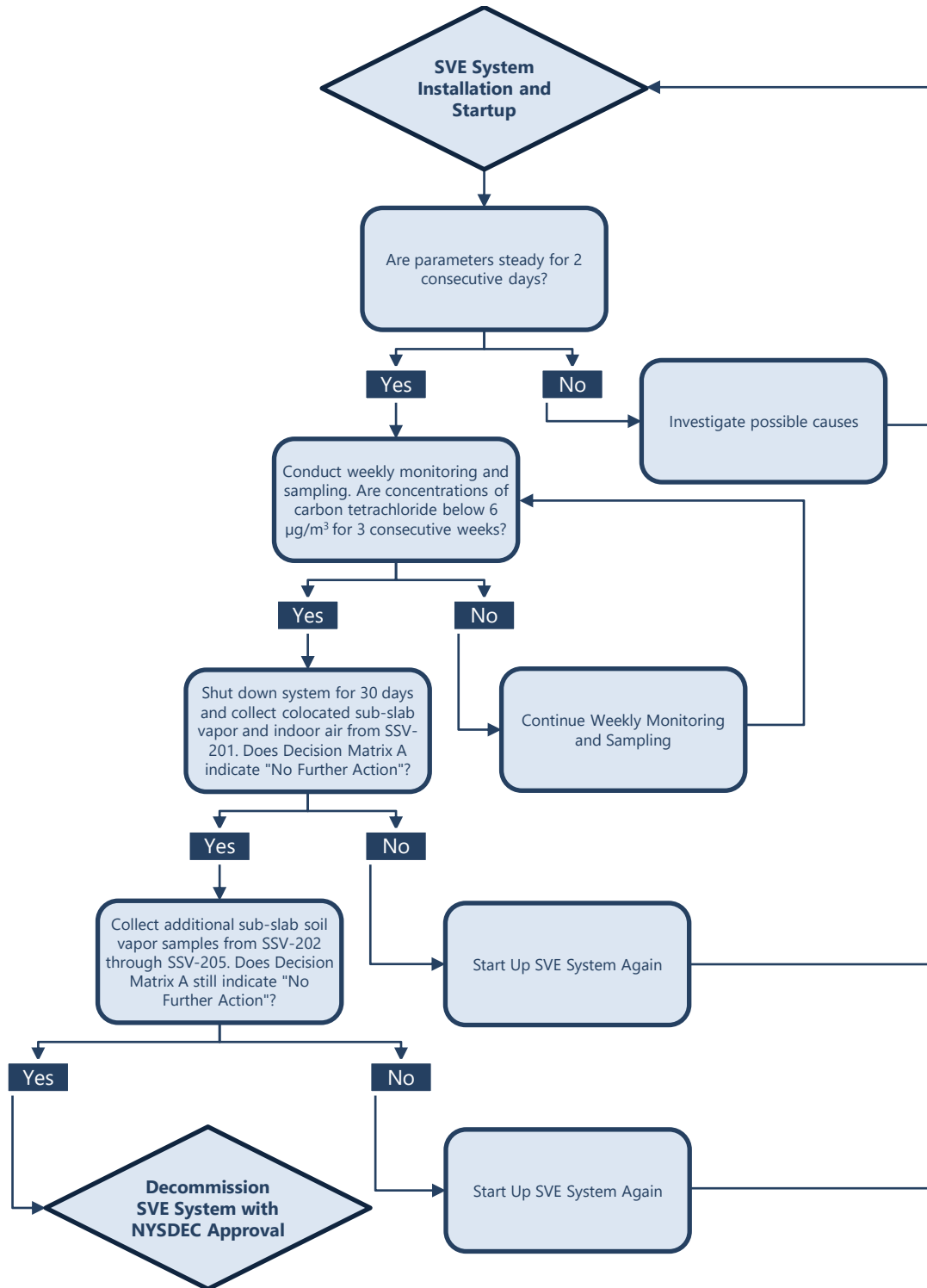
- The canister vacuum will be measured and recorded immediately prior to canister retrieval at the end of the sample period. Once the vacuum is measured, the canister valve will be closed fully at the end of the sample period by disconnecting the regulator from the canister (after 24-hours) and the end time will be recorded.
- The canisters will be returned to their sampling boxes for safe storage and shipping. Field data will be verified as correctly entered into field books prior to shipment and the canisters will be shipped to the laboratory under a chain-of-custody.
- Each sample will be analyzed for carbon tetrachloride via USEPA Method TO-15 SIM to achieve low level laboratory reporting limits of 0.20 µg/m³ or less.

3.6 SVE System Decommissioning

If end point sampling indicates that “No Further Action” is necessary based on NYSDOH Decision Matrix A, the SVE system will be decommissioned with NYSDEC approval. A SVE System Decommissioning Work Plan will be submitted to NYSDEC and NYSDOH for review and approval prior to SVE system removal. Decommissioning of the SVE system will include the following:

- SVE wells will be removed from the ground. The boreholes will be filled with quartz sand, sealed with cement grout, and finished with a concrete patch on the surface.
- SVE system piping will be cut into sections. PVC piping, fittings, vacuum gauges, and sampling ports will be recycled or disposed of in a landfill.
- Pipe supports will be segregated for recycling.
- The regenerative blower will be salvaged for reuse or recycled.

A flow chart outlining the steps required prior to decommissioning the SVE system is included below:



3.7 Management of Investigation Derived Waste

Investigation-derived wastes (IDW) associated with the work may include grossly contaminated soil cuttings (if encountered), used personal protective equipment (PPE), and disposable sampling equipment. All IDW will be collected and managed in accordance with Department of Environmental Remediation Technical Guidance for Site Investigation and Remediation (DER-10).

If encountered, grossly contaminated soil cuttings will be containerized or stockpiled and staged on-site, pending proper disposal at an off-site facility. Soil cuttings will be placed in steel 55-gallon drums or on polyethylene sheets. Decontamination fluids, if necessary, will be placed in steel 55-gallon drums with closed tops. Drums will be properly labeled, sealed, and characterized as necessary.

Discarded PPE (i.e., latex gloves, Tyvek, paper towels, etc.) and disposable sampling equipment (i.e., bailers or stainless-steel spoons) will be placed in sealed plastic garbage bags and disposed of as municipal solid waste.

3.8 Air Permitting

3.8.1 New York State Department of Environmental Conservation

Based on the data collected during the SVI Assessments, the maximum carbon tetrachloride concentration observed was $2,230 \mu\text{g}/\text{m}^3$ and the maximum combined concentration of other volatile organic compounds (VOCs) was $1,380.07 \mu\text{g}/\text{m}^3$. If the SVE system were to operate at the maximum flow rate of the blower (39 cfm), the maximum expected discharge is 4.6 pounds of total VOCs per year and 2.9 pounds of carbon tetrachloride per year. The NYSDEC threshold is 10 tons per year for a Major Facility Permit and 5 tons per year (or 100 pounds per year of carbon tetrachloride) to obtain a State Facility Permit per 6 NYCRR Part 201. Since the estimated discharges are much less than the NYSDEC requirements, no permitting will be necessary for this project.

NYSDEC typically requires an Air Facility Registration for the operation of SVE systems under 6 NYCRR Part 201. However, under 6 NYCRR Part 375-1.12(b), NYSDEC may exempt a remedial party from the requirement to obtain any department issued permits if:

- (1) the activity is conducted on the site or on premises that are under common control or are contiguous to or physically connected with the site and the activity manages exclusively contamination which the remedial party is handling as part of the site remedial program;*
- (2) all substantive technical requirements applicable to like activity conducted pursuant to a permit are complied with, as determined by the department; and*
- (3) the activity is a component of a program selected by a process complying with the citizen participation requirements of section 375-1.10 of this Subpart, to the extent applicable.*

Since the proposed IRM meets all the requirements listed above, the Volunteer is requesting an exemption from the requirement to obtain an Air Facility Registration to ensure the IRM is implemented in a timely manner.

3.8.2 United States Environmental Protection Agency

Resource Conservation and Recovery Act (RCRA) Organic Air Emission Standards Subpart AA establish air emission controls for process vents with organic concentrations of at least 10 parts per million by weight (ppmw). The highest concentration of carbon tetrachloride observed was 2,230 $\mu\text{g}/\text{m}^3$ which equates to 0.35 ppmw, substantially lower than the 10 ppmw threshold.

3.9 Green Remediation Evaluation

NYSDEC's Program Policy DER-31 / Green Remediation and DER-31 Green and Sustainable Remediation Initiative Memorandum require that green remediation concepts and techniques be considered during all stages of the remedial program including remediation, with the goal of improving the sustainability of the cleanup and documenting the net environmental benefit of any implemented green technology. Green Remediation is defined as "the practice of considering all environmental effects of remedy implementation and incorporating options to minimize the environmental footprint of cleanup actions." The use of these practices and technologies during remediation should be less disruptive to the environment, generate less waste, increase reuse and recycling, and emit fewer pollutants, including greenhouse gases (GHGs), to the atmosphere.

3.9.1 Green Remediation Components

This IRMWPs identifies the green remediation components that will be implemented for the construction, operation, optimization, maintenance, and monitoring of the SVE system. The purpose of this section is to identify concepts and develop a plan to best achieve a "Green Remediation" goal for the SVE system. The Green Remediation concepts considered during the development of the remedial alternatives include:

- Considering the environmental impacts of treatment technologies and remedy stewardship over the long term when choosing a site remedy;
- Reducing direct and indirect GHG and other emissions;
- Increasing energy efficiency and minimizing use of non-renewable energy;
- Conserving and efficiently managing resources and materials;
- Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste;
- Maximizing habitat value and creating habitat when possible;

- Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals;
- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development; and
- Designing buildings to meet the 2020 Energy Conservation Construction Code of New York.

Based on the type of remediation required for the Site, the principal green remediation goals for the Site are focused on the reduction of waste, the reuse of materials to extent feasible throughout the remediation process, and the selection of energy efficient equipment. The reduction in wastes and utilizing energy efficiently indirectly reduces the consumption of fossil fuels and generation of greenhouse gases.

3.9.2 Environmental Footprint Analysis

As a part of the Green Remediation, the use of an environmental footprint analysis was completed to further evaluate the impact of the planned remedy for the Site. For the purpose of analyzing the overall impact and sustainability of the planned remediation activities, C&S developed a Green Remediation Calculator that contains pertinent content of the DER-31 referenced calculators [(e.g. SEFA (Spreadsheets for Environmental Footprint Analysis, USEPA) and SiteWise™ (developed by the United States military)]. In addition to that content, C&S' Green Remediation calculator is based upon content previously created by engineers and scientists in C&S' air resources and aviation practices for use at industrial facilities to calculate emissions of GHGs, hazardous air pollutants (HAPs) and criteria pollutants for permitting, tracking, and reporting purposes; as well as for large airport construction projects to calculate potential and actual emissions from construction of terminals, taxiways, runways, etc.

Based on the anticipated elements of the implementation of the remedy, the Green Remediation Calculator was used to develop estimated values for:

- Water consumption
 - For the manufacturing of ready-mix concrete and cement for well construction and well decommissioning
 - For decontamination purposes
- GHGs
 - Emissions related to the transportation of personnel to and from the Site
 - Emissions related to the operation of equipment (i.e., GeoProbe)
 - Emissions related to the manufacturing and import of well construction and well decommissioning materials (i.e., PVC, Portland cement, sand, etc.)
 - Emissions related to export of solid waste
 - Emissions (VOCs) related to the operation of the SVE system

- Emissions related to the laboratory analysis of air samples
- Renewable and non-renewable energy usage
 - Charging of environmental monitoring equipment
 - Electricity use for regenerative blower, coring drills, and hammer drills
- Waste reduction and material usage
 - Reuse of materials on and off site

Narratives regarding the various elements of the remedy, their potential impact on the environment, and strategies employed to reduce their footprint are provided in the following subsections.

3.9.3 Green Remediation Techniques

To further reduce the environmental footprint of the remediation, Green Remediation Techniques (GRTs) were identified and will be implemented.

NYSDEC DER-31 identifies a list of specific techniques which were considered during the development of this IRMWP. This section further describes the techniques which were identified as being feasible to be implemented during the SVE system installation and operation to best achieve a green remediation goal for the Site.

3.9.4 Best Management Practices

The section describes the Best Management Practices (BMPs) which will be implemented throughout the implementation of the remedy to support green remediation goals. The following BMPs were identified for implementation:

3.9.4.1 Minimize Mobilizations

C&S will coordinate with the site contractor(s) to best schedule site activities in conjunction to minimize the number of trips to the Site for field staff, workers, and mobilizing equipment.

3.9.4.2 On-Site Equipment

Site contractor(s) will use equipment that is suitably sized to complete the anticipated sitework. The use of equipment which is undersized or oversized can decrease the efficiency of the equipment considerably. When possible, equipment will be used which can perform multiple types of tasks without mobilizing a single piece of equipment for each task. Contractors will be encouraged to utilize Clean Fuel Fleet vehicles and Tier 2 or higher Equipment and will burn ultra-low sulfur diesel fuel.

3.9.4.3 Idling of Motorized Equipment

Equipment and trucks will be shut down if left idling longer than 15-minutes.

3.9.4.4 On-Site Waste Recycling

Soil cuttings generated during SVE well installation will be stockpiled appropriately on-site (as described in **Section 3.7**) and will be re-used under the anticipated cover system, if waste characterization results allow.

3.9.4.5 Soil Stockpiles

Soil piles will be covered with tarps or plastic sheeting in a manner that allows for the reuse of the covers.

3.9.4.6 C&S Field Equipment

Battery-Powered Sampling Equipment – Community Air Monitoring Plan (CAMP) equipment (PIDs, Dustraks, Thiamis Antenna), PIDs, anemometers, micromanometers, and any other battery-operated equipment will be charged at the C&S facility. C&S estimated in 2024 that 28% of the electricity used at their facility is generated on-site through use of solar panels. This practice will reduce the load on the electrical grid and allow for the use of renewable energy source, and indirectly minimizing the use of fossil fuels and reducing the generation of greenhouse gas emissions.

Waste Storage Containers – C&S uses cleaned reclaimed 5-gallon buckets and 55-gallon drums for the collection, transport, and storage of sampling wastes. The re-use of containers decreases the generation of waste.

3.9.4.7 Sustainable Laboratory Practices

C&S will submit samples to a laboratory, which implements the following sustainable practices:

- Recycles paper products and shipping materials.
- Uses energy-efficient lighting and other equipment.
- Maintains a paperless reporting and invoicing program.
- Minimizes waste through use of USEPA-approved microscale methods.

All Site activities related to the BMPs described above will be recorded and tracked on a C&S Green Remediation BMP Tracker, which is equivalent to the NYSDEC Form A, Summary of Green Remediation Metrics. The total quantities will be recorded daily and summarized in the NYSDEC

Form A, upon the completion of IRM and provided in the IRM Report. A copy of the BMP Tracking Form and the NYSDEC Form A is provided in **Appendix D**.

3.9.5 Summary

The elements of the remedy with a significant environmental footprint will be tracked to document metrics and identify reductions of the environmental footprint throughout the remediation planning and implementation. The expectation of the environmental footprint from these significant elements are shown in Error! Reference source not found., Error! Reference source not found., and Error! Reference source not found.. The inputs and outputs from C&S' Green Remediation Calculator are provided in **Appendix E**. The actual environmental footprint results will be summarized in the Final Engineering Report (FER).

The following table provides a summary of the significant elements needed for the SVE system installation and operation.

Table 3-1: Interim Remedial Measure Metrics

Item / Activity	Volume / Unit	Note
Diesel Use	220.4 gallons	Operation of GeoProbe, transportation of materials / equipment / solid waste / workers
Gasoline Use	19 gallons	Transportation of workers
Grid Electricity Usage	0.1893 megawatt-hours	Operation of regenerative blower for 1 month and intermittent operation of coring and hammer drill
Public Water Use	15 gallons	Concrete / cement mixing and equipment decontamination
Recycled / reused solid waste	0.2 tons	Soil cuttings from SVE well installation to be put underneath cover system during construction
Solid waste to offsite non-hazardous waste landfill	0.1 tons	General refuse including PPE, disposable sampling equipment, PVC from decommissioning, etc.
Process Emissions	0.4 pounds	VOC emissions generated from the operation of the SVE system for one month
Off-site laboratory analyses	15 samples	Air sampling during SVE system operation and end-point sampling

The following table provides a summary of the environmental footprint.

Table 3-2: Environmental Footprint Summary

Activity	Total Energy (MMBtu)	lbs CO ₂	lbs NO _x	lbs SO _x	lbs PM	lbs HAPs
On-Site Investigation	6.8	978	6.9	0.0	0.6	0.4
Grid Electricity Generation	1.312	213	0.4	0.9	0.0	0.0
Transportation	26.9	4,344	30.6	1.0	0.7	0.1
Off-Site Components	6.0	907	2.9	5.8	1.0	0.6
Total	41.0	6,441	40.9	7.7	2.3	1.2

MMBtu – Metric Million British Thermal Unit

CO₂ – Carbon Dioxide

lbs – Pounds

NO_x – Nitrogen Oxides

SO_x – Sulfur Oxides

PM – Particulate Matter

HAP – Hazardous Air Pollutants

4.0 QUALITY ASSURANCE AND QUALITY CONTROL PROTOCOLS

To ensure that suitable and verifiable data results are obtained from the information collected at the Site, quality assurance / quality control (QA / QC) procedures are detailed in this section. The project Quality Assurance Project Plan (QAPP) is provided in **Appendix F**.

4.1 Sampling Methods

Sampling procedures will be conducted consistent with the NYSDEC *Sampling Guidelines and Protocols Manual*. Collection of representative samples will include the following procedures:

- Ensuring that the sample taken is representative of the material being sampled;
- Using proper sampling, handling and preservation techniques;
- Properly identifying the collected samples and documenting their collection in field records;
- Maintaining chain-of-custody; and
- Properly preserving samples after collection.

SVI sampling will be conducted consistent with the methods described in **Section 3.4** and **Section 3.5**. Samples will be collected in dedicated bags or canisters provided by the laboratory. The bags or canisters will be based on the requirements of the analytical methods. The samples will be analyzed for carbon tetrachloride via TO-15 SIM on a standard turnaround time.

4.2 Analytical Procedures

4.2.1 Laboratory Analysis

Laboratory analysis will be conducted by a third-party laboratory that is accredited by the NYSDOH Environmental Laboratory Accreditation Program (ELAP). Laboratory analytical methods will include the most current NYSDEC Analytical Services Protocol (ASP).

SVI samples sent to a certified laboratory will be analyzed in accordance with USEPA SW-846 methodology. Samples will be analyzed using USEPA Method TO-15 SIM.

Category B deliverables will be requested to be used in a third-party data validation.

4.2.2 Data Usability

A Data Usability Summary Report (DUSR) will be prepared by a third-party data consultant using the most recent methods and criteria from the USEPA. The DUSR will assess all sample analytical data, blanks, duplicates and laboratory control samples and evaluate the completeness of the data package.

4.3 Custody Procedures

As outlined in NYSDEC *Sampling Guidelines and Protocols*, a sample is in custody under the following conditions:

- It is in your actual possession;
- It is in your view after being in your physical possession;
- It was in your possession and then you locked or sealed it up to prevent tampering; or
- It is in a secure area.

The environmental professional will maintain all chain-of-custody documents that will be completed for all samples that will leave the Site to be tested in the laboratory.

5.0 COMMUNITY AIR MONITORING

Air monitoring will be conducted in the work zone for on-site health and safety. Air monitoring will be conducted during active invasive activities periods, such as SVE well installation. The monitoring will include dust and VOC screening. The specifics of the air monitoring procedures and criteria are detailed in the CAMP in **Appendix G** and Health and Safety Plan (HASP) in **Appendix H**.

The action threshold for VOCs established in the CAMP is 5 parts per million (ppm) above background. If this value is exceeded for the 15-minute average work will be halted and work may resume once instantaneous readings fall below 5 ppm work. The action level for dust is 100 $\mu\text{g}/\text{m}^3$ over background during a 15-minute average. If this limit is exceeded, dust suppression techniques will be employed, including using water to wet the area.

Odors generated from RI activities, which are discernable off-site are not expected. The proposed intrusive work is minor and limited to SVE well installation. The maximum exposed area is approximately 4.5 inches in diameter for the monitoring well borehole. After extraction, soil will be stored stockpiled as described in **Section 3.7**. As such, soil causing odors will be quickly addressed and mitigated as part of routine handling procedures. If needed, odor neutralizing sleeves such as Atmos RusScent Sleeves or equivalent will be placed at the Site perimeter.

Daily CAMP reports will be provided to NYSDEC and NYSDOH project managers. The reports will consist of figures showing work zones and monitoring stations and downloaded CAMP data. The daily reports will summarize any CAMP exceedances and the corrective actions taken. Any CAMP exceedances will be reported to NYSDEC and NYSDOH project managers within one business day.

6.0 HEALTH AND SAFETY

To verify the safety of the workers and the local community during the performance of the work, monitoring practices of the work environment will be in place during all phases of the IRM activities. A HASP was prepared that details procedures for maintaining safe working conditions and minimizing the potential for exposure to hazardous material. The HASP is provided in **Appendix H**.

Air monitoring during RI activities will be conducted using a PID and an aerosol particle meter. Air monitoring will be conducted in the work zone for on-site health and safety. Details on air monitoring are provided in the CAMP. The CAMP is provided in **Appendix G**.

7.0 REPORTING

Based on the results of the work described above, a report will be prepared to describe the methodologies and results of the IRM. The IRM Report will describe:

- System installation methods;
- System startup and monitoring observations;
- End-point sampling results;
- Comparison of SVI sample results to NYSDOH air guideline values;
- Results of the CAMP; and
- A qualitative human exposure assessment following the IRM completion.

If there are any deviations from the approved IRMWP, a detailed description of the deviation(s) will be included in the IRM Report.

The document will be submitted to the NYSDEC for review and approval.

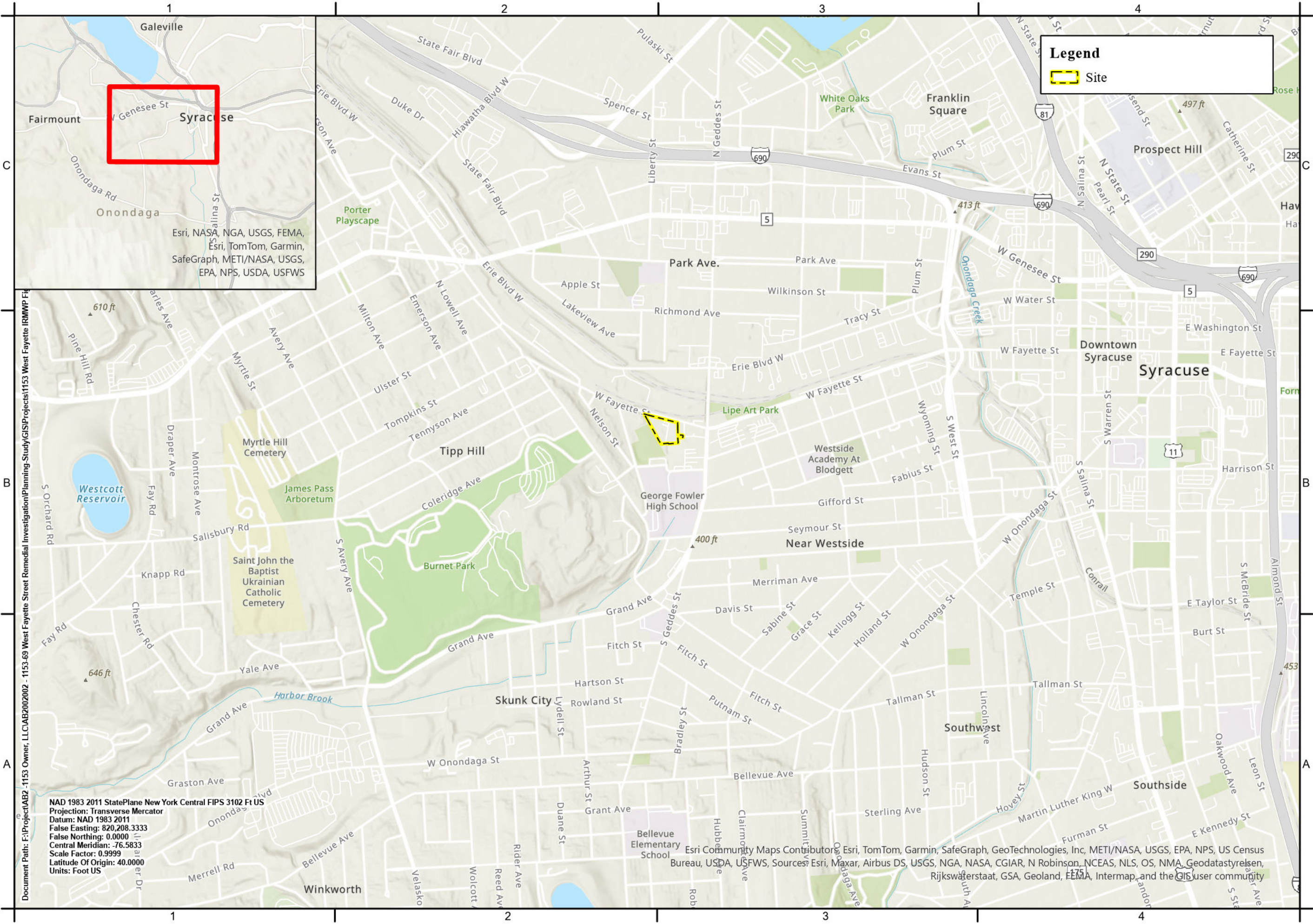
8.0 SCHEDULE

The following is the schedule to implement the IRM and achieve a Certificate of Completion (COC):

Table 8-1: Schedule

Date	Task
Monthly by 10 th day	Progress reports
April 2025	RI Report submitted to NYSDEC
May 2025	IRM Work Plan submitted to NYSDEC
May 2025	Alternatives Analysis Report (AAR) and Remedial Action Work Plan (RAWP) Report submitted to NYSDEC
Summer 2025	RI Report / IRM Work Plan Approved by NYSDEC
Summer 2025	AAR / RAWP Approved by NYSDEC
Summer 2025	DD Issued
Summer 2025	Draft Environmental Easement (EE) Package Submitted to NYSDEC
Summer 2025	Construction / Remediation and IRM Commencement
Fall 2025	Remedial system construction complete, including installation / construction of cover system and IRM Completion
Fall 2025	Draft Site Management Plan (SMP) submitted to NYSDEC
Fall 2025	Draft FER submitted to NYSDEC
November 1, 2025	EE recorded and notices provided
November 1, 2025	Final SMP submitted to NYSDEC
November 15, 2025	Final FER submitted in final form to NYSDEC

Figures



Legend

Site



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Fax: 315-455-9667
www.candc.com



0 1,200
Feet
1 inch equals 1,200 feet

Interim Remedial Measure Work Plan
1153-69 West Fayette Street (BCP Site No. 734164)
City of Syracuse, Onondaga County, New York

PROJECT NO:	AB2.002.002
DATE:	April 2025
SCALE:	AS SHOWN
DRAWN BY:	CND
DESIGNED BY:	CND
CHECKED BY:	HNB

SITE
LOCATION
MAP

FIGURE 1

NAD 1983 2011 StatePlane New York Central FIPS 3102 Ft US
Projection: Transverse Mercator
Datum: NAD 1983 2011
False Easting: 820,208.3333
False Northing: 0.0000
Central Meridian: -76.5833
Scale Factor: 0.9999
Latitude Of Origin: 40.0000
Units: Foot US

Esri Community Maps Contributors, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS, Sources: Esri, Maxar, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap, and the GIS user community



Legend

Site



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0 50
Feet
1 inch equals 50 feet

Interim Remedial Measure Work Plan
1153-69 West Fayette Street (BCP Site No. 734164)
City of Syracuse, Onondaga County, New York

PROJECT NO:	AB2.002.002
DATE:	April 2025
SCALE:	AS SHOWN
DRAWN BY:	CND
DESIGNED BY:	CND
CHECKED BY:	HNB

Modified: 4/30/25 @ 10:25 AM

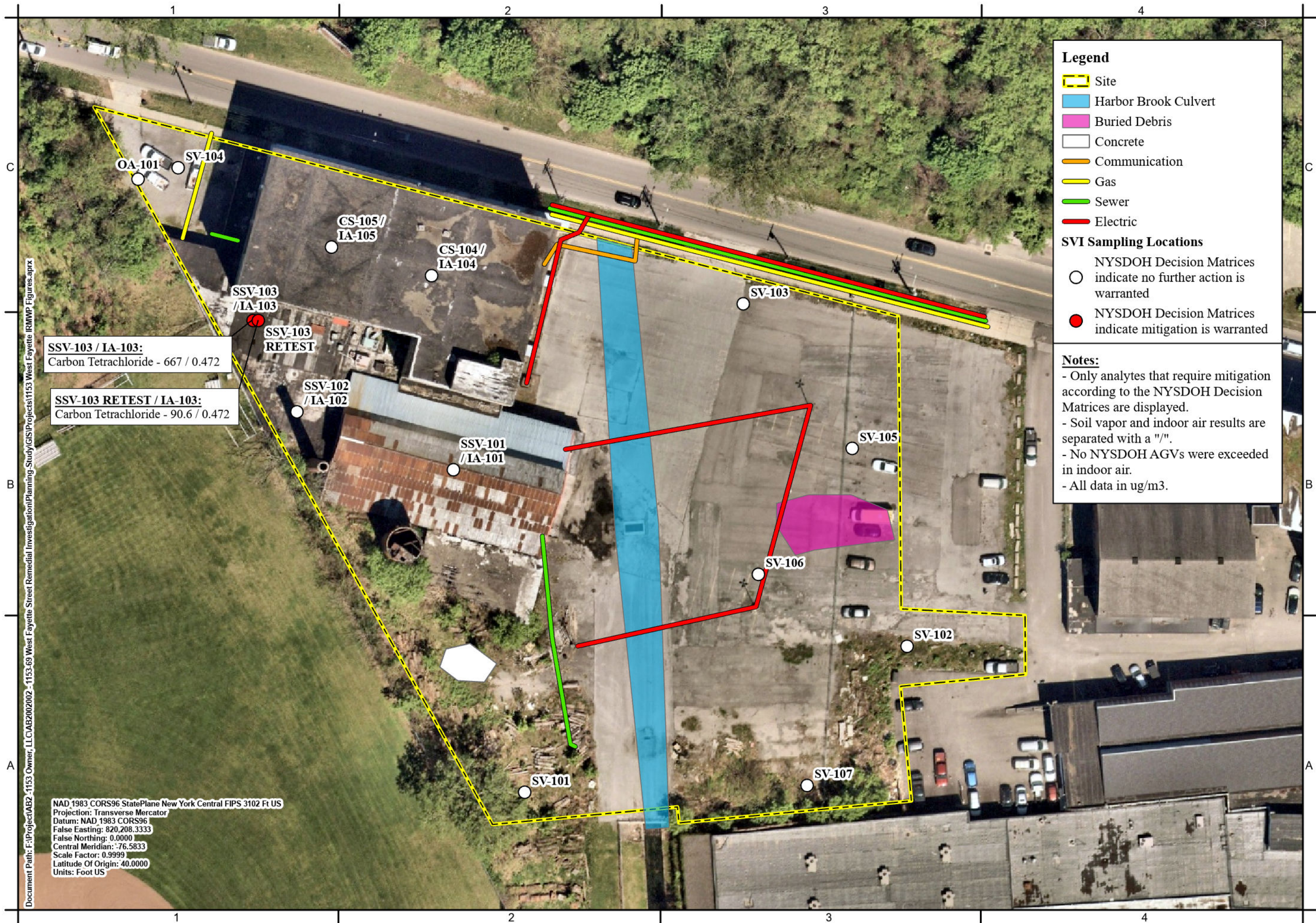
**SITE
MAP**

FIGURE 2

Document Path: F:\Project\AB2-1153-69 West Fayette Street Remedial Investigation\Planning-Study\GIS\Projects\1153 West Fayette IRMWP Figures.aprx

NAD 1983 CORS96 StatePlane New York Central FIPS 3102 Ft US
Projection: Transverse Mercator
Datum: NAD 1983 CORS96
False Easting: 820,208.3333
False Northing: 0.0000
Central Meridian: -76.5833
Scale Factor: 0.9999
Latitude Of Origin: 40.0000
Units: Foot US

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Document Path: F:\Project\AB2-1153\Owner, LLC\AB2002002-1153-69 West Fayette Street Remedial Investigation\Planning-Study\GIS\Project\1153 West Fayette IRMWP Figures.aprx

NAD 1983 CORS96 StatePlane New York Central FIPS 3102 Ft US
Projection: Transverse Mercator
Datum: NAD 1983 CORS96
False Easting: 820,208.3333
False Northing: 0.0000
Central Meridian: -76.5833
Scale Factor: 0.9999
Latitude Of Origin: 40.0000
Units: Foot US

Legend

- Site
- Harbor Brook Culvert
- Buried Debris
- Concrete
- Communication
- Gas
- Sewer
- Electric

SVI Sampling Locations

- NYSDOH Decision Matrices indicate no further action is warranted
- NYSDOH Decision Matrices indicate mitigation is warranted

Notes:

- Only analytes that require mitigation according to the NYSDOH Decision Matrices are displayed.
- Soil vapor and indoor air results are separated with a "/".
- No NYSDOH AGVs were exceeded in indoor air.
- All data in ug/m3.



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0 50 Feet
1 inch equals 50 feet

Interim Remedial Measure Work Plan
1153-69 West Fayette Street (BCP Site No. 734164)
City of Syracuse, Onondaga County, New York

PROJECT NO:	AB2.002.002
DATE:	April 2025
SCALE:	AS SHOWN
DRAWN BY:	CND
DESIGNED BY:	CND
CHECKED BY:	HNB

SVI
SAMPLING
LOCATIONS

FIGURE 3a



Legend

Site

Passive Soil Gas Sampling Locations

Concentration Contours

2230 ug/m3

<75 ug/m3

Notes:

- Only carbon tetrachloride detections are displayed.
- All data in ug/m3.



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0 10 Feet
1 inch equals 10 feet

Interim Remedial Measure Work Plan
1153-69 West Fayette Street (BCP Site No. 734164)
City of Syracuse, Onondaga County, New York

PROJECT NO:	AB2.002.002
DATE:	April 2025
SCALE:	AS SHOWN
DRAWN BY:	CND
DESIGNED BY:	CND
CHECKED BY:	HNB

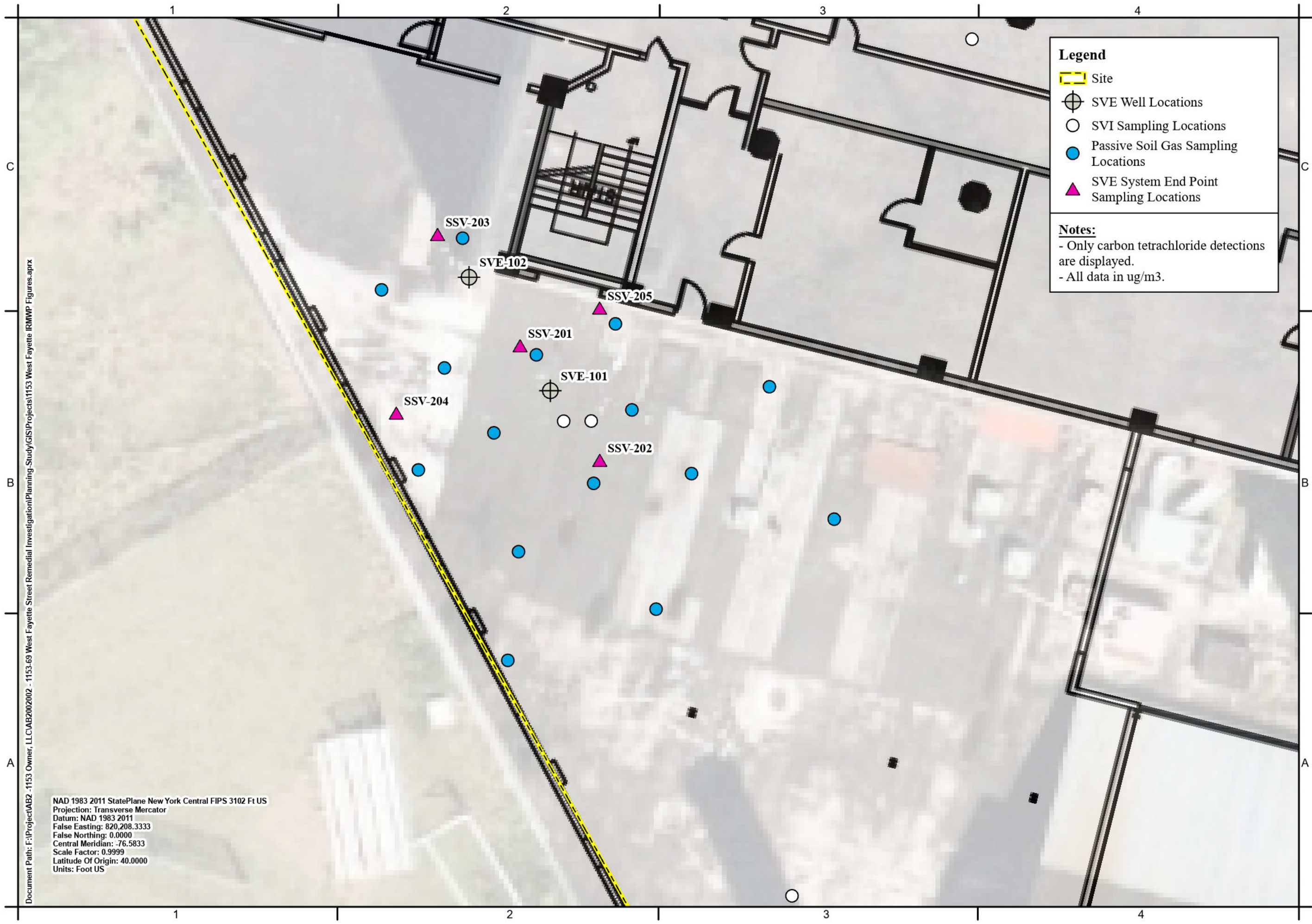
Revised: 4/8/2025 @ 12:32 PM

**PASSIVE
SOIL GAS
SAMPLING
LOCATIONS**

FIGURE 3b

Document Path: F:\Project\AB2 - 1153-69 West Fayette Street Remedial Investigation\Planning-Study\GIS\Projects\1153 West Fayette IRMWP Figures.aprx

NAD 1983 2011 StatePlane New York Central FIPS 3102 Ft US
Projection: Transverse Mercator
Datum: NAD 1983 2011
False Easting: 820,208.3333
False Northing: 0.0000
Central Meridian: -76.5833
Scale Factor: 0.9999
Latitude Of Origin: 40.0000
Units: Foot US



Document Path: F:\Project\AB2 - 1153-69 West Fayette Street Remedial Investigation\Planning-Study\GIS\Projects\1153 West Fayette IRMWP Figures.aprx

NAD 1983 2011 StatePlane New York Central FIPS 3102 Ft US
Projection: Transverse Mercator
Datum: NAD 1983 2011
False Easting: 820,208.3333
False Northing: 0.0000
Central Meridian: -76.5833
Scale Factor: 0.9999
Latitude Of Origin: 40.0000
Units: Foot US

Legend

- Site
- SVE Well Locations
- SVI Sampling Locations
- Passive Soil Gas Sampling Locations
- SVE System End Point Sampling Locations

Notes:

- Only carbon tetrachloride detections are displayed.
- All data in ug/m3.



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END POINT
SAMPLING
LOCATIONS

FIGURE 4

Tables

Table 2
Interim Remedial Measure Work Plan
Passive Soil Gas Sampler Data Summary

LOCATION				SSV-103		SSV-103 RETEST		PSG-101		PSG-102		PSG-103		PSG-104		PSG-105		PSG-106		PSG-107		PSG-108		PSG-109		PSG-110		PSG-111		PSG-112		PSG-113		PSG-114		PSG-115		TRIP BLANK		
SAMPLING DATE				12/4/2024		1/14/2025		2/20/2025		2/20/2025		2/20/2025		2/20/2025		2/20/2025		2/20/2025		2/20/2025		2/20/2025		2/20/2025		2/20/2025		2/20/2025		2/20/2025		2/20/2025		2/20/2025		2/20/2025		2/20/2025		
LAB SAMPLE ID				L2471075-05		L2502298-01		211313		211314		211315		211310		211312		211308		211309		211308		211304		211305		211306		211307		211289		211290		211291		211316		
SAMPLE TYPE				Sub-Slab Soil Vapor		Sub-Slab Soil Vapor		Sub-Slab Soil Vapor		Sub-Slab Soil Vapor		Sub-Slab Soil Vapor		Sub-Slab Soil Vapor		Sub-Slab Soil Vapor		Sub-Slab Soil Vapor		Sub-Slab Soil Vapor		Sub-Slab Soil Vapor		Sub-Slab Soil Vapor		Sub-Slab Soil Vapor		Sub-Slab Soil Vapor		Sub-Slab Soil Vapor		Sub-Slab Soil Vapor		Sub-Slab Soil Vapor		Sub-Slab Soil Vapor		Sub-Slab Soil Vapor		
Analyte		NYSDOH AGV	NYSDOH Matrix Indoor Air	NYSDOH Matrix Soil Vapor	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual	Results	Qual
Volatile Organics by TO-15 SIM																																								
Carbon tetrachloride			0.2	6	667		90.6		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organics by Modified USEPA Method 8260																																								
Carbon tetrachloride			0.2	6	-	-	-	-	75.8	U	75.8	U	197		2230		82.6		75.7	U	75.7	U	166		75.5	U	75.6	U	75.6	U	618		75.5	U	75.5	U	75.5	U	75.6	U

- Notes:**
- All values are reporting in micrograms per cubic meter (ug/m3)
 - Analytical results compared to NYSDOH Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York, October 2006 and NYSDOH Soil Vapor / Indoor Air Decision Matrices, May 2017. Only those analytes with accompanying NYSDOH guidance values are shown.
 - For analytes that exceed a Decision Matrix value, highlighted red cell indicates "Mitigate."
 - Highlighted grey cell indicates the detection limit exceeded the respective NYSDOH guidance value.
 - "U" indicates the analyte not detected at the reported detection limit for the sample.

Appendices

Appendix A

SVE System Design Documents

Apr 10, 2025 - 9:47am
F:\Project\AB2-1153\49 West Fayette Street Remedial Investigation\Design\CADD\Sheet Files\1153 West Fayette SVE Notes.rvt

GENERAL NOTES:

- THE CONTRACTOR SHALL SUPPLY ALL LABOR, EQUIPMENT AND MATERIALS TO COMPLETE THE SOIL VAPOR EXTRACTION WELL INSTALLATION, PIPING, MANIFOLDS, EQUIPMENT STAGING, REMEDIAL EQUIPMENT CONNECTIONS AND CONCRETE SLAB REPAIR AND RESTORATION ACCORDING TO THE PLANS AND SPECIFICATIONS HEREIN.
- ALL WORK WILL BE IN COMPLIANCE WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL STANDARDS AND REGULATIONS. IF THERE SHOULD ARISE ANY CONFLICT BETWEEN ANY NOTES AND / OR DETAILS ON THE APPROVED DRAWINGS OR SPECIFICATIONS FOR THE PROJECT, THIS NOTE WILL SUPERSEDE AND GOVERN UNLESS THERE IS A WRITTEN SIGNED DOCUMENT FROM THE ENGINEER STATING OTHERWISE.
- EACH CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR COMPLYING WITH ALL FEDERAL, STATE AND LOCAL SAFETY REQUIREMENTS INCLUDING THE OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970. EACH CONTRACTOR SHALL EXERCISE PRECAUTION ALWAYS FOR THE PROTECTION OF PERSONS (INCLUDING EMPLOYEES) AND PROPERTY. IT SHALL ALSO BE THE SOLE RESPONSIBILITY OF EACH CONTRACTOR TO INITIATE, MAINTAIN AND SUPERVISE ALL SAFETY REQUIREMENTS, PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK, INCLUDING THE REQUIREMENTS FOR CONFINED SPACES PER 29 CFR 1910.146.
- THESE DRAWINGS WERE PRODUCED FROM MAPS, DRAWINGS AND RECORDS COLLECTED FROM THE OWNER.
- EACH CONTRACTOR WILL BE RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, PROCEDURES OR TECHNIQUES.
- EACH CONTRACTOR SHALL BE RESPONSIBLE TO OBTAIN ALL NECESSARY PERMITS AND GOVERNMENT FEES, LICENSES AND INSPECTIONS ASSOCIATED WITH THE IMPROVEMENTS UNDER THEIR RESPONSIBILITY.
- ANY MODIFICATION TO THE SPECIFICATIONS OR CHANGES TO THE WORK AS SHOWN ON THE DRAWINGS MUST HAVE PRIOR WRITTEN APPROVAL BY THE OWNER AND ENGINEER.
- SHOULD WATER BE ENCOUNTERED DURING WELL INSTALLATION, THE CONTRACTOR SHALL CONSULT THE OWNER AND ENGINEER TO DETERMINE AN APPROPRIATE PATH FORWARD. SVE WELLS SHALL NOT BE SET IN THE GROUNDWATER TABLE. THE CONTRACTOR SHALL PROPERLY CONTAINERIZE, CHARACTERIZE AND DISPOSE OF ANY COLLECTED WATER IN ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL RULES AND REGULATIONS. THE CONTRACTOR SHALL CONSULT THE OWNER AND ENGINEER TO DETERMINE SUITABLE WATER AND SOIL CHARACTERIZATION AND DISPOSAL METHODS.
- THESE PLANS HAVE BEEN PREPARED USING THE MOST ACCURATE INFORMATION AND DATA AVAILABLE AT THE TIME OF PREPARATION. FIELD CONDITIONS MAY BE ENCOUNTERED WHICH VARY FROM THOSE DEPICTED HEREIN. AS SUCH, THESE PLANS SHOULD BE USED AS A CONSTRUCTION CONTROL REFERENCE, NOT A PRECISE CONSTRUCTION DOCUMENT. MODIFICATIONS TO THE DESIGN AS SHOWN MAY BE REQUIRED BASED ON FIELD CONDITIONS AT THE TIME OF CONSTRUCTION. IN ANY EVENT, THE ENGINEERING OBJECTIVES OF THE DESIGN SHALL BE MET.
- EACH CONTRACTOR SHALL CONFINE HIS ACTIVITIES TO THE PROJECT SITE AND SHALL NOT TRESPASS UPON OTHER PROPERTIES OR DISRUPT THE OPERATIONS OF ADJACENT PROPERTY OWNERS WITHOUT THE WRITTEN PERMISSION OF THOSE OWNERS.
- HORIZONTAL AND VERTICAL CONTROL WILL BE ESTABLISHED BY EACH CONTRACTOR FOR THE PROJECT. THE CONTRACTOR IS RESPONSIBLE FOR ALL REQUIRED SURVEYS TO COMPLETE THE PROJECT INCLUDING REESTABLISHMENT OF CONTROL POINTS AND PROJECT LAYOUT.
- FLOW IN EXISTING STORM AND SANITARY SEWERS SHALL BE MAINTAINED AT ALL TIMES DURING EXECUTION OF THE WORK FOR THIS PROJECT. EACH CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO EXISTING SEWERS RESULTING FROM THEIR OPERATIONS OR NEGLIGENCE.
- SUITABLE BACKFILL MATERIALS MAY BE STOCKPILED ON-SITE BUT MUST BE POSITIONED SO AS NOT TO COMINGLE WITH EXCAVATED SOILS.
- THE TRACKING OR SPILLAGE OF MUD, DIRT, CONCRETE, OR DEBRIS UPON STATE, COUNTY, TOWNSHIP, PRIVATE, OR CITY STREETS IS PROHIBITED AND ANY SUCH OCCURRENCE SHALL BE CLEANED UP IMMEDIATELY BY THE CONTRACTOR.
- DUST CONTROL SHALL BE MAINTAINED THROUGHOUT THE ENTIRE SITE. SAW-CUTTING SHALL BE PERFORMED USING A WET SAW TO MINIMIZE DUST.
- EACH CONTRACTOR SHALL MAINTAIN WORK AREA FREE OF WASTE MATERIALS, DEBRIS, AND RUBBISH. MAINTAIN SITE IN A CLEAN AND ORDERLY CONDITION. CONTRACTOR IS RESPONSIBLE FOR COLLECTING AND REMOVING WASTE MATERIALS, DEBRIS AND RUBBISH FROM THE SITE AND DISPOSING OF OFF-SITE.
- FACILITY INTERIOR WORK AREAS MUST BE LEFT FREE OF DEBRIS AND MATERIALS AT THE COMPLETION OF EACH WORK PERIOD. ANY FLOOR SPACE AND / OR EQUIPMENT WITHIN THE WORK AREA AND IMMEDIATE VICINITY MUST BE MOPPED AND WIPED CLEAN OF DIRT, MUD, DEBRIS AND DUST PRIOR TO COMPLETION OF WORK.
- MAINTAIN DRIVEWAYS AND PEDESTRIAN ACCESS IN A SAFE AND CLEAN CONDITION. COOPERATE WITH THE OWNER IN EVERY WAY PRACTICAL IN ORDER TO MINIMIZE DISRUPTION TO THEIR OPERATIONS.
- EACH CONTRACTOR SHALL REPAIR AND REPLACE ANY AND ALL EXISTING EQUIPMENT, SITE FEATURES OR WORK DAMAGED DURING OR DUE TO THE EXECUTION OF THIS PROJECT AT HIS OWN EXPENSE. ALL SAID WORK SHALL BE TO THE SATISFACTION OF THE OWNER.

HEALTH AND SAFETY:

- EACH CONTRACTOR SHALL COMPLY WITH 40 CFR 1910.120 (OSHA HAZWOPER).
- EACH CONTRACTOR SHALL COMPLY WITH BASIC PROVISIONS OF OSHA HEALTH AND SAFETY STANDARDS 29 CFR 1910 AND GENERAL CONSTRUCTION STANDARDS 29 CFR 1926, AS APPROPRIATE TO THIS CONSTRUCTION AND SITE ACTIVITY.
- EACH CONTRACTOR SHALL ENSURE THAT ALL PERSONNEL ON SITE AND ALL ACTIVITIES CONTAINED THEREIN COMPLY WITH APPLICABLE LAWS AND REGULATIONS OF THE PUBLIC BODY HAVING JURISDICTION FOR SAFETY OF PERSONS OR PROPERTY.
- EACH CONTRACTOR SHALL BE RESPONSIBLE FOR THE IMPLEMENTATION AND ENFORCEMENT OF THEIR HEALTH AND SAFETY PLAN, AND TAKE THE NECESSARY PRECAUTIONS AND PROVIDE PROTECTION FOR:
 - PERSONNEL WORKING ON OR VISITING THE PROJECT SITE (IRRESPECTIVE OF EMPLOYED BY THE CONTRACTOR);
 - WORK MATERIAL(S) TO BE INCORPORATED INTO THE WORK AREA ON OR OFF SITE;
 - OTHER PROPERTY AT OR ADJACENT TO THE PROJECT SITE; AND
 - MEMBERS OF THE PUBLIC POTENTIALLY EXPOSED TO JOB RELATED ACTIVITY.

UTILITIES:

- THE CONTRACTOR IS RESPONSIBLE FOR THE INVESTIGATION, LOCATION, SUPPORT, PROTECTION, AND RESTORATION OF ALL EXISTING UTILITIES AND APPURTENANCES WHETHER SHOWN ON THESE PLANS OR NOT. THE CONTRACTOR SHALL EXPOSE ALL UTILITIES OR STRUCTURES PRIOR TO CONSTRUCTION TO VERIFY THE VERTICAL AND HORIZONTAL EFFECTS ON THE PROPOSED CONSTRUCTION.
- THE CONTRACTOR SHALL NOTIFY THE U DIG NY AT LEAST 7 DAYS PRIOR TO THE START OF CONSTRUCTION.
- WHERE POTENTIAL CONFLICTS MIGHT OCCUR WITH EXISTING UTILITIES, THE CONTRACTOR SHALL CONSULT THE ENGINEER TO DETERMINE THE EXACT UTILITY LOCATION AND MAKE ANY NECESSARY ADJUSTMENTS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR EXERCISING REASONABLE CARE IN OPERATING EQUIPMENT IN THE VICINITY OF UTILITIES, WHETHER OVERHEAD, AT GROUND LEVEL, OR BURIED, AND SHALL SAVE AND HOLD HARMLESS C&S ENGINEERS, INC., THE OWNER AND ANY OF THEIR DESIGNATED AGENTS FROM AND AGAINST ANY AND ALL CLAIMS AND DAMAGES OF ANY KIND OF INJURY TO, OR DEATH TO, ANY PERSON OR PERSONS AND FROM DAMAGE TO OR LOSS OF PROPERTY, ARISING OUT OF, OR ATTRIBUTED TO THE NEGLIGENCE OF CONTRACTOR'S OPERATIONS.

SVE WELL INSTALLATION:

- SVE WELLS SHALL CONFORM TO THE FOLLOWING, EXCEPT WHERE OTHERWISE NOTED:
 - SVE WELL MATERIALS SHALL BE 2-INCH SCHEDULE 40 POLYVINYL CHLORIDE (PVC) PRESSURE PIPE MADE FROM CLASS 12454 MATERIALS IN ACCORDANCE WITH ASTM D1784, UNLESS NOTED OTHERWISE. PIPE DIMENSIONS SHALL CONFORM TO ASTM D1785.
 - SVE WELL SCREENS SHALL BE 2-INCH SCHEDULE 40 PVC, 0.020 INCH SLOT, WITH ASTM D2466 FLUSH THREAD FITTINGS.
- SVE WELL CONSTRUCTION SHALL CONFORM TO THE FOLLOWING, EXCEPT WHERE OTHERWISE NOTED:
 - SVE WELLS SHALL BE SET AT 8 FEET BELOW GRADE AND CONSTRUCTED WITH 5 FEET OF SCREEN CONNECTED TO AN APPROPRIATE LENGTH OF RISER TO COMPLETE THE WELL SO THE RISER IS FLUSH WITH THE EXISTING GRADE.
 - THE SVE WELL ANNULUS SHALL BE SAND PACKED WITH QUARTZ SAND TO APPROXIMATELY 1 FOOT ABOVE THE SCREENED SECTION.
 - A MINIMUM OF A 1 FOOT BENTONITE SLURRY / BENTONITE CHIP SEAL WILL BE PLACED ABOVE THE SAND PACK.
 - THE REMAINDER OF THE ANNULUS WILL BE FILLED WITH CONCRETE TO GRADE.
 - THE SLAB PENETRATION SHALL BE SEALED AROUND THE PERIMETER OF THE PVC RISER WITH AN ELASTOMERIC SEALANT (OR SIMILAR).

PIPING:

- SVE SYSTEM PIPING AND FITTINGS SHALL CONFORM TO THE FOLLOWING, EXCEPT WHERE OTHERWISE NOTED:
 - PIPING SHALL BE THE SIZE INDICATED ON THE PLANS AND BE SCHEDULE 40 PVC PRESSURE PIPE MADE FROM CLASS 12454 MATERIALS IN ACCORDANCE WITH ASTM D1784, UNLESS NOTED OTHERWISE. PIPE DIMENSIONS SHALL CONFORM TO ASTM D1785.
 - PVC FITTINGS SHALL BE SCHEDULE 40 PVC SOCKET STYLE IN ACCORDANCE WITH ASTM D1784.
 - THE REGENERATIVE BLOWER WILL BE INSTALLED WITH THREADED CONNECTIONS. ALL OTHER PVC PIPE SHALL BE SOLVENT WELDED USING LOW VOC PRIMER AND LOW VOC PVC CEMENT IN ACCORDANCE WITH MANUFACTURER RECOMMENDATIONS.
- EXACT LOCATION OF SVE WELLS SHALL BE COORDINATED IN FIELD. INTENDED LOCATIONS ARE SHOWN ON THE SVE SYSTEM FLOOR PLAN.
- COORDINATE ALL SVE SYSTEM PIPING ROUTES WITH ALL GENERAL, MECHANICAL, ELECTRICAL & PLUMBING WORK. NO ELBOWS SHALL BE ADDED WITHOUT THE APPROVAL OF THE OWNER AND ENGINEER.
- ANY PIPING AT GROUND LEVEL SHALL BE CORDONED OFF TO PREVENT SITE WORKERS FROM ENTERING THE AREA AND TO PREVENT A TRIPPING HAZARD.
- VERTICAL PIPES SHALL BE SUPPORTED AND SECURED AT LEAST EVERY 10 FEET. HORIZONTAL PIPES SHALL BE SUPPORTED AND SECURED AT LEAST EVERY 4 FEET.
- HORIZONTAL PIPES SHALL BE SLOPED TO PROMOTE DRAINAGE OF CONDENSATION / WATER DOWNWARD TO EXTRACTION PIT.
- ALL FASTENERS USED IN OUTDOOR APPLICATIONS SHALL BE MADE OF HOT-DIPPED GALVANIZED STEEL OR AN EQUIVALENT WEATHER-RATED MATERIAL.
- ALL ABOVE-GROUND DUCT PIPING SHALL HAVE A CONTINUOUS DOWNWARD SLOPE TOWARD THE SUCTION POINT OF NOT LESS THAN 1/8 INCH PER FOOT TO ALLOW CONDENSATION OR RAINWATER WITHIN THE PIPES TO DRAIN DOWNWARD INTO THE GROUND BELOW THE SLAB.
- ALL OPEN BOREHOLES SHALL BE SECURELY PLATED DURING NON-WORKING HOURS.
- THE HORIZONTAL MANIFOLD CONNECTING THE SVE WELLS SHALL BE EQUIPPED WITH A 2-INCH PVC UNION BALL VALVE FOR EACH SVE WELL TO ALLOW FOR SYSTEM SHUTDOWN IF NEEDED. EACH CONNECTION SHALL BE AIRTIGHT.
- THE EXHAUST PIPE SHALL EXTEND VERTICALLY A MINIMUM OF 18 INCHES ABOVE THE ROOF EDGE. THE EXHAUST POINT SHALL BE AT LEAST 4 FEET ABOVE AND 10 FEET HORIZONTALLY AWAY FROM ANY OPERABLE WINDOW, DOOR, AIR INTAKES, OR OTHER OPENING INTO CONDITIONED / OCCUPIED BUILDING SPACE.
- THE EXHAUST POINT SHALL BE DIRECTED VERTICALLY UPWARD ABOVE THE ROOF.

REGENERATIVE BLOWER:

- THE REGENERATIVE BLOWER SHALL BE FPZ 0.33 HP SCL 06B-33-115/230 NP (OR EQUIVALENT); 0.33 HP, 60 HZ, SINGLE-PHASE, 3500 RPM; 39 CFM AT 36 INCHES OF WATER COLUMN WITH 1-INCH NATIONAL PIPE THREAD INLET AND OUTLET CONNECTIONS.
- THE REGENERATIVE BLOWER SHALL BE INSTALLED WITH THREADED CONNECTIONS. ALL PVC PIPE SHALL BE CONNECTED WITH A SEALANT LIKE TEFLON TAPE IN ACCORDANCE WITH MANUFACTURER RECOMMENDATIONS.
- IF THE REGENERATIVE BLOWER IS SUBJECT TO EXTREME CLIMATE CONDITIONS, IT SHALL BE PROTECTED WITH THERMAL INSULATION, AS NEEDED.

CONCRETE & SEALING:

- CONCRETE SHALL BE 4,000 PSI (28-DAY) MINIMUM COMPRESSIVE STRENGTH.
- ALL INTERIOR CONCRETE WORK SHALL BE COMPLETED IN ACCORDANCE WITH ACI 301, ACI 315, AND ACI 318.
- ALL CRACKS, PERFORATION, HOLES, AND OTHER PENETRATIONS THROUGH CONCRETE FOUNDATION SHALL BE THOROUGHLY SEALED WITH ELASTOMERIC / URETHANE SEALANT.

SITE RESTORATION:

- REPAIR AND / OR REPLACE ANY FLOORING, STAIRWAYS, DRIVEWAYS, CONCRETE SIDEWALKS, CONCRETE APRONS, LANDSCAPING, ETC. DAMAGED OR REMOVED DURING CONSTRUCTION ACTIVITIES.

SYSTEM MONITORS:

- THE HORIZONTAL MANIFOLD SHALL BE EQUIPPED WITH A SAMPLING PORT FOR EACH SVE WELL IN A CONSPICUOUS LOCATION TO ALLOW FOR SYSTEM MONITORING AND SAMPLING. THE BLOWER DISCHARGE SHALL ALSO BE EQUIPPED WITH A SAMPLING PORT. THE CONNECTIONS TO THE MANIFOLD AND BLOWER DISCHARGE SHALL BE AIRTIGHT.
 - SAMPLING PORTS SHALL BE PRM FILTRATION PART NO. MGPVC025SAMPLEPORT OR AN ENGINEER APPROVED EQUIVALENT.
 - EACH SAMPLING PORT SHALL BE EQUIPPED WITH A 1/4-INCH HOSE BARB AND BALL VALVE.
- THE HORIZONTAL MANIFOLD SHALL BE EQUIPPED WITH A VACUUM GAUGE FOR EACH SVE WELL IN A CONSPICUOUS LOCATION TO ALLOW VISUAL CONFIRMATION OF SYSTEM OPERATION AND ADEQUATE NEGATIVE PRESSURE. THE CONNECTIONS TO THE MANIFOLD SHALL BE AIRTIGHT.
 - VACUUM GAUGES SHALL BE PRM FILTRATION PART NO. PGCN8BY630452/60 OR AN ENGINEER APPROVED EQUIVALENT.
 - EACH VACUUM GAUGE SHALL BE CAPABLE OF MEASURING TO -60 INCHES OF WATER COLUMN.
 - EACH VACUUM GAUGE SHALL BE CLEARLY MARKED OR LABELED TO INDICATE THE MEASURED PRESSURE THAT EXISTED AT THE TIME THE SVE SYSTEM WAS ACTIVATED.
- ALL SYSTEM MONITORS SHALL BE READILY ACCESSIBLE TO INDIVIDUALS RESPONSIBLE FOR SYSTEM MAINTENANCE WITHOUT DISASSEMBLY OF BUILDING COMPONENTS.
- ALL SYSTEM MONITORS SHALL BE PROTECTED FROM THE ELEMENTS AND DURABLE FOR THE AMBIENT ENVIRONMENTAL CONDITIONS.

ELECTRICAL:

- ALL ELECTRICAL WORK SHALL BE COMPLETED IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL ELECTRICAL CODES, REGULATIONS AND REQUIREMENTS.
- FOR THE REGENERATIVE BLOWER, A MEANS OF ELECTRICAL DISCONNECT SHALL BE PROVIDED IN THE LINE OF SIGHT AND WITHIN 6 FEET OF THE BLOWER.
- ALL OUTDOOR WIRING FOR FANS SHALL BE PROTECTED IN CONDUIT.

LABELING:

- ALL LABELS SHALL BE MADE OF DURABLE MATERIALS AND LABEL LETTERING SHALL BE OF A COLOR IN CONTRAST TO THE COLOR OF THE BACKGROUND ON WHICH THE LETTERING IS APPLIED. LABEL TITLES SHALL BE WITH LETTERING NOT LESS THAN 1/4-INCH IN HEIGHT AND ADDITIONAL INFORMATION TEST SHALL BE WITH LETTERING NOT LESS THAN 1/8 INCH IN HEIGHT.
- THE HORIZONTAL MANIFOLD WILL BE LABELLED WITH A SIGN THAT READS: SOIL VAPOR EXTRACTION SYSTEM - DO NOT TURN OFF OR ALTER.
- THE BLOWER WILL BE LABELLED WITH A SIGN THAT READS: SOIL VAPOR EXTRACTION SYSTEM - DO NOT TURN OFF OR ALTER.

CONTAMINATED SOIL AND GROUNDWATER ENCOUNTERED DURING CONSTRUCTION:

- THE SITE CONTAINS IMPACTED SOIL AND GROUNDWATER. IF ENCOUNTERED, CONTAMINATED SOILS AND GROUNDWATER MUST BE MANAGED IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL RULES AND REGULATIONS.
- ALL ACTIVITIES RELATED TO THE DISTURBANCE OF SOILS AND / OR GROUNDWATER AT THE SITE SHALL BE CONDUCTED IN ACCORDANCE WITH AN ADEQUATE HEALTH AND SAFETY PLAN IN ACCORDANCE WITH OSHA REQUIREMENTS. EACH CONTRACTOR MUST HAVE ITS OWN HEALTH AND SAFETY PLAN.
- SOILS SHALL NOT BE TRANSPORTED OFF SITE UNTIL THEY ARE CHARACTERIZED TO DETERMINE PROPER DISPOSAL REQUIREMENTS AND APPLICABLE PERMITS OR REGULATORY APPROVAL IS OBTAINED.
- SHOULD WATER BE ENCOUNTERED DURING WELL INSTALLATION, THE CONTRACTOR SHALL CONSULT THE OWNER AND ENGINEER TO DETERMINE AN APPROPRIATE PATH FORWARD. SVE WELLS SHALL NOT BE SET IN THE GROUNDWATER TABLE. THE CONTRACTOR SHALL PROPERLY CONTAINERIZE, CHARACTERIZE AND DISPOSE OF ANY COLLECTED WATER IN ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL RULES AND REGULATIONS. THE CONTRACTOR SHALL CONSULT THE OWNER AND ENGINEER TO DETERMINE SUITABLE WATER AND SOIL CHARACTERIZATION AND DISPOSAL METHODS.
- SURFACE WATER OR GROUNDWATER SHALL NOT BE DISCHARGED TO A STORM OR SANITARY SEWER.
- INFORMATION REGARDING THE CONTAMINANTS IDENTIFIED AT THIS SITE CAN BE OBTAINED FROM THE ENGINEER, IF NECESSARY.



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CERTIFICATE OF AUTHORIZATION # 002 365

PRELIMINARY
NOT FOR
CONSTRUCTION

Interim Remedial Measure Work Plan
Soil Vapor Extraction System Design
1153-69 West Fayette Street (BCP Site No. C734164)
City of Syracuse, Onondaga County, New York

MARK	DATE	DESCRIPTION
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REVISIONS	
PROJECT NO:	AB2,002,002
DATE:	APRIL 2025
DRAWN BY:	N. COULOMBE
DESIGNED BY:	C. DEL FATTI
CHECKED BY:	N. BRADFORD P.E.

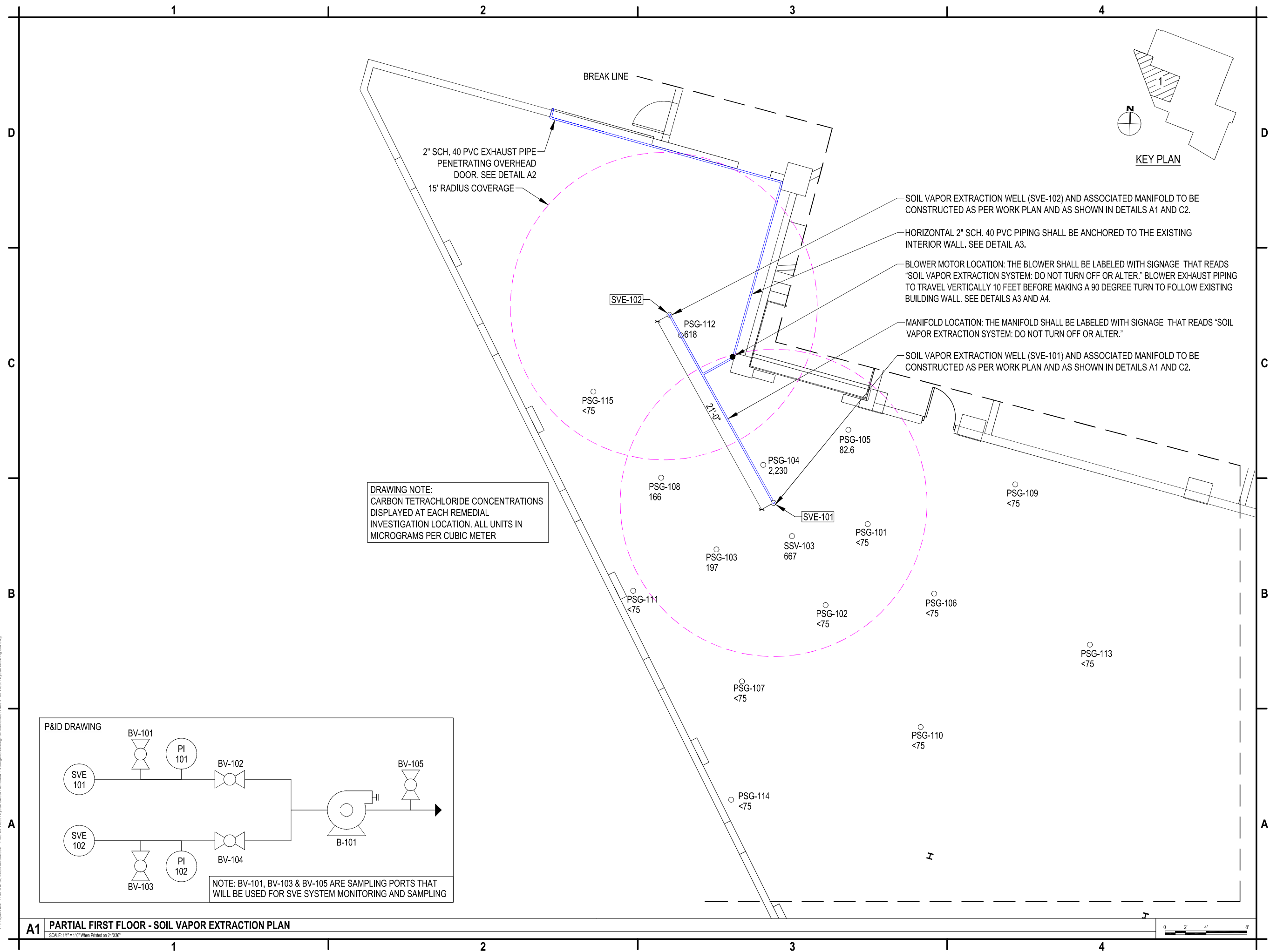
NO ALTERATION PERMITTED HEREON
EXCEPT AS PROVIDED UNDER SECTION
7209 SUBDIVISION 2 OF THE NEW YORK
EDUCATION LAW

Soil Vapor
Extraction System

Note Sheet

SVE-100

May 05, 2025 - 1:49pm
F:\Project\AB2-1153\Owner, LLC\AB2002002 - 1153-69 West Fayette Street Remedial Investigation\Design\CADD\Sheet Files\1153 West Fayette Drawing Set.dwg



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**Interim Remedial Measure Work Plan
Soil Vapor Extraction System Design
1153-69 West Fayette Street (BCP Site No. C734164)
City of Syracuse, Onondaga County, New York**

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PROJECT NO: AB2.002.002		
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NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 7209 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW		

Soil Vapor
Extraction System

Partial First
Floor Plan

SVE-101

CERTIFICATE OF AUTHORIZATION #: 002 365

CERTIFICATE OF AUTHORIZATION # 002 355

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**Interim Remedial Measure Work Plan
Soil Vapor Extraction System Design
1153-69 West Fayette Street (BCP Site No. C734164)
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DRAWN BY: N. COULOMBE		
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NO ALTERATION PERMITTED HEREON EXCEPT AS PROVIDED UNDER SECTION 206 SUBDIVISION 2 OF THE NEW YORK EDUCATION LAW		

Soil Vapor Extraction System

Detail Sheet

SVE-102



Appendix B

Pressure Loss Calculations

1153-69 West Fayette BCP Site
SVE System Pressure Drop Calculation

		1	2	3
1. Flow medium				
Flow medium		Air 20 °C	Air 20 °C	Air 20 °C
Condition		gaseous	gaseous	gaseous
Volume flow	ft3/min	6.6	6.6	13.2
Mass flow	lb/min	0.496318282	0.496318282	0.992636565
Volume flow branch.pipe	ft3/min	---	---	---
Density	lb/ft3	0.0752	0.0752	0.0752
Dyn.Viscos.	10-6 kg/ms	18.09607546	18.09607546	18.09607546
Kin.Viscos.	10-6 m2/s	15.02261882	15.02261882	15.02261882
2. Additional data for gases				
Pressure (inlet, abs.)	in.wtr.	33	33	33
Temperature (inlet)	°C	20	20	20
Temperature (outlet)	°C	20	20	20
Norm volume flow	Nm3/h	0.847623683	0.847623683	1.695247366
3. Element of pipe				
Pipe identification		Perforated Pipe Pre-Manifold	Solid Pipe Pre-Manifold	Solid Pipe Post-Manifold
Element of pipe		circular	circular	circular
Number		2	1	1
Dimensions of element	US	Diameter of pipe D: 2.05 in. Length of pipe L: 5.00 ft.	Diameter of pipe D: 2.05 in. Length of pipe L: 27.60 ft.	Diameter of pipe D: 2.05 in. Length of pipe L: 76.00 ft.
4. Result of calculation				
Veloc.of flow	ft/s	4.799075405	4.799075405	9.59815081
Reynolds number		5070.075965	5070.075965	10140.15193
Flow		turbulent	turbulent	turbulent
Absolute roughness	in.	0.002	0.0001	0.0001
Pipe friction number		0.038321111	0.0372982	0.030845003
Resistance coefficient		1.121593482	6.025933572	13.72226463
Pressure drop	in.wtr.	0.01160757	0.031190985	0.285210856
Sum Pressure drop	in.wtr.	0.01160757	0.042798555	0.328009411

Appendix C

SVE System Equipment Specifications

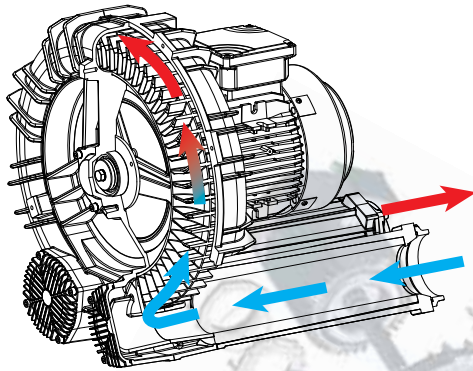


designs

DESIGNS

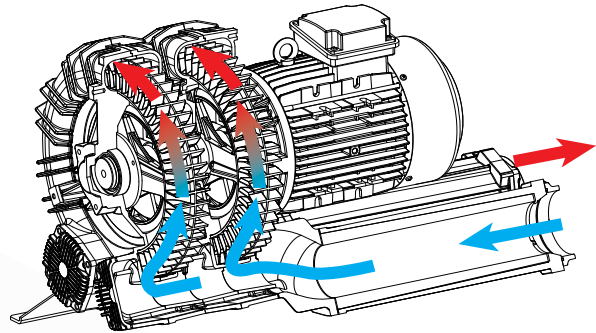
MS

Single impeller single stage



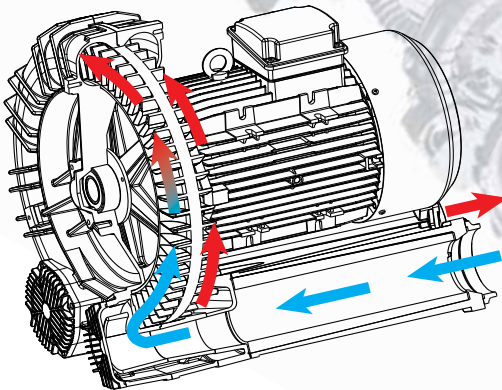
TS

Twin impeller single stage



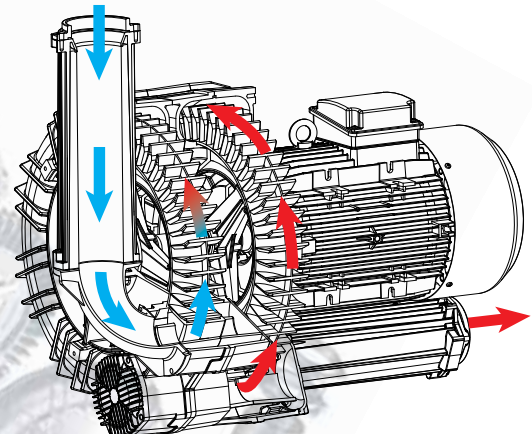
MD

Single impeller double stage



TD

Twin impeller double stage

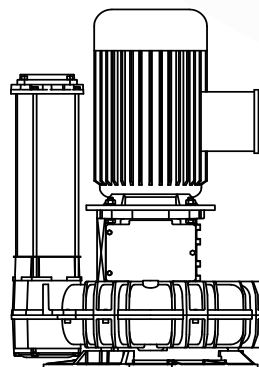


Standard Design

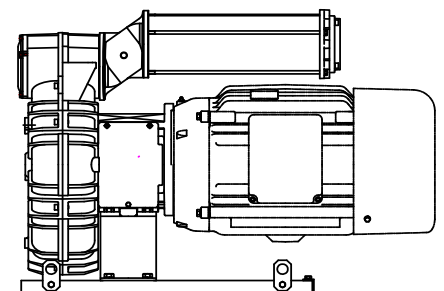
The standard FPZ design is a direct drive configuration, with a dynamically balanced impeller fitted directly on the motor shaft. Fitted motors are 2-pole, 1 or 3 phase, rated for continuous service. Standard motors utilize class F insulation, are suitable for use with a variable speed drive (3 phase only), and are tropicalized for corrosion resistance. Single or two stage options are pictured above.

GOR / GVR Design

“GOR / GVR” designs utilize a standard nema (or metric) electric motor that is directly coupled to the blower shaft. This direct coupled design allows the use of specialty motors that may be required to meet a variety of electrical requirements. For some models the vacuum / pressure capabilities can be increased with this GOR / GVR design (pictured right).



“GVR” Design



“GOR” Design



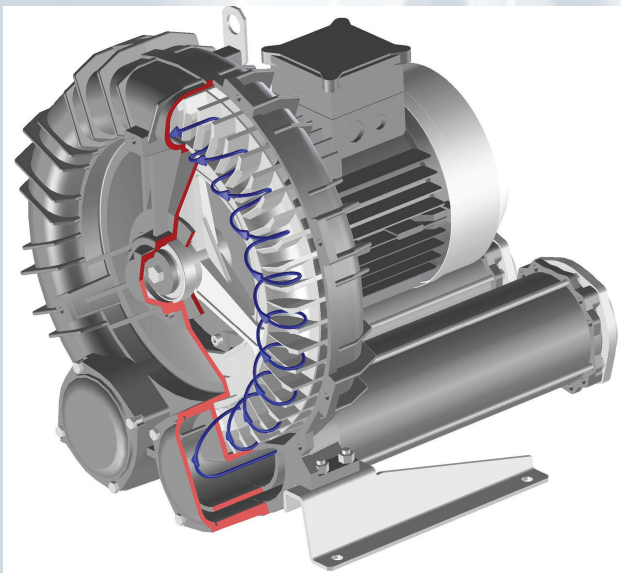
applications

APPLICATIONS

Thousands of FPZ blowers are working in a variety of applications: from commercial to industrial installations, in food processing to pharmaceuticals, from textiles to aerospace, in medical applications to environmental. Wherever efficiency and reliability are needed, FPZ responds with the appropriate product "solution"

Advantages of side channel blowers

- Compact execution
- Simple concept
- Reduced maintenance costs
- Modular design
- Pulsation and oil free air



How Blowers Work

Blowers have an impeller blade mounted inside a housing. As air passes the inlet port, impeller blades draw air in and accelerate the air outward and forward. As each impeller blade strikes it, the air moves faster and faster. At the base of the housing an air stripper diverts the air out of the housing reducing the speed and then increasing the pressure.



Table of Contents

SS2109

					Page(s)	
General Pressure and Vacuum Performance Curves					4	5
K Series "MOR" Blowers - Direct Drive		Max CFM	Max Pressure (In H ₂ O)	Max Vacuum (In Hg.)	Pressure	Vacuum
SCL K03-K06 M5	Single Stage Blowers	216	122	8.9	6-7	38-39
SCL K07-K12 M5	Single Stage Blowers	726	201	10.3	8-9	40-41
SCL K05-K06 T5	Single Stage Blowers	400	85	6.3	10-11	42-43
SCL K07-K12 T5	Single Stage Blowers	1410	100	8.1	12-13	44-45
SCL K07R-12 MD	Two Stage Blowers	336	290	14.0	14-15	46-47
SCL K05-K06 TD	Two Stage Blowers	222	180	11.8	16-17	48-49
SCL K07-K12 TD	Two Stage Blowers	716	220	14.0	18-19	50-51

06 / R Series Performance Data

SCL 06	Single Stage Blowers	39	52	3.5	20-21	52-53
SCL 10DL-15DH	Two Stage Blowers	35	120.5	8.1	22-23	54-55
SCL R20-R40 MD	Two Stage Blowers	81	201	11.1	24-25	56-57

K Series Direct Coupled - "GOR/GVR" configuration

SCL K03-K06 M5-GOR/GVR	Single Stage Blowers	216	140	9.6	26-27	58-59
SCL K07-K12 M5-GOR/GVR	Single Stage Blowers	726	200	10.3	28-29	60-61
SCL K05-K06 T5-GOR/GVR	Single Stage Blowers	400	130	7.8	30-31	62-63
SCL K07-K12 T5-GOR/GVR	Single Stage Blowers	1410	150	10.3	32-33	64-45
SCL K07R- K12 MD GOR/GVR	Two Stage Blowers	336	280	14.7	34-35	66-67
SCL K07-K12 TD GOR/GVR	Two Stage Blowers	716	225	13.2	36-37	68-69

Values in above table based on 60 hz performance

Accessories

Installation Guide	General guide on how to install accessories.	70
VG / PG / CV / SS / IH	Gauges, Check Valves, Silencers, and Sound Enclosures	71
VRL6-9	Safety valve selection guide	72
VRL6-9	Safety Valves	73
CSL / CT	Filters for vacuum applications.	74
FS	Filters & dirty filter indicator for pressure applications	75
VK / PK	Flange Connectors for safety valves and flexible hoses	76
VS 6 / VS 8	Flow Converting Devices for diverting air stream	77
CA / CK	Filter Manifolds and 90 Degree Manifold for K series blowers	78
MF / TF / MP	Flexible Sleeves, Flanges, Sleeves	79

Technical

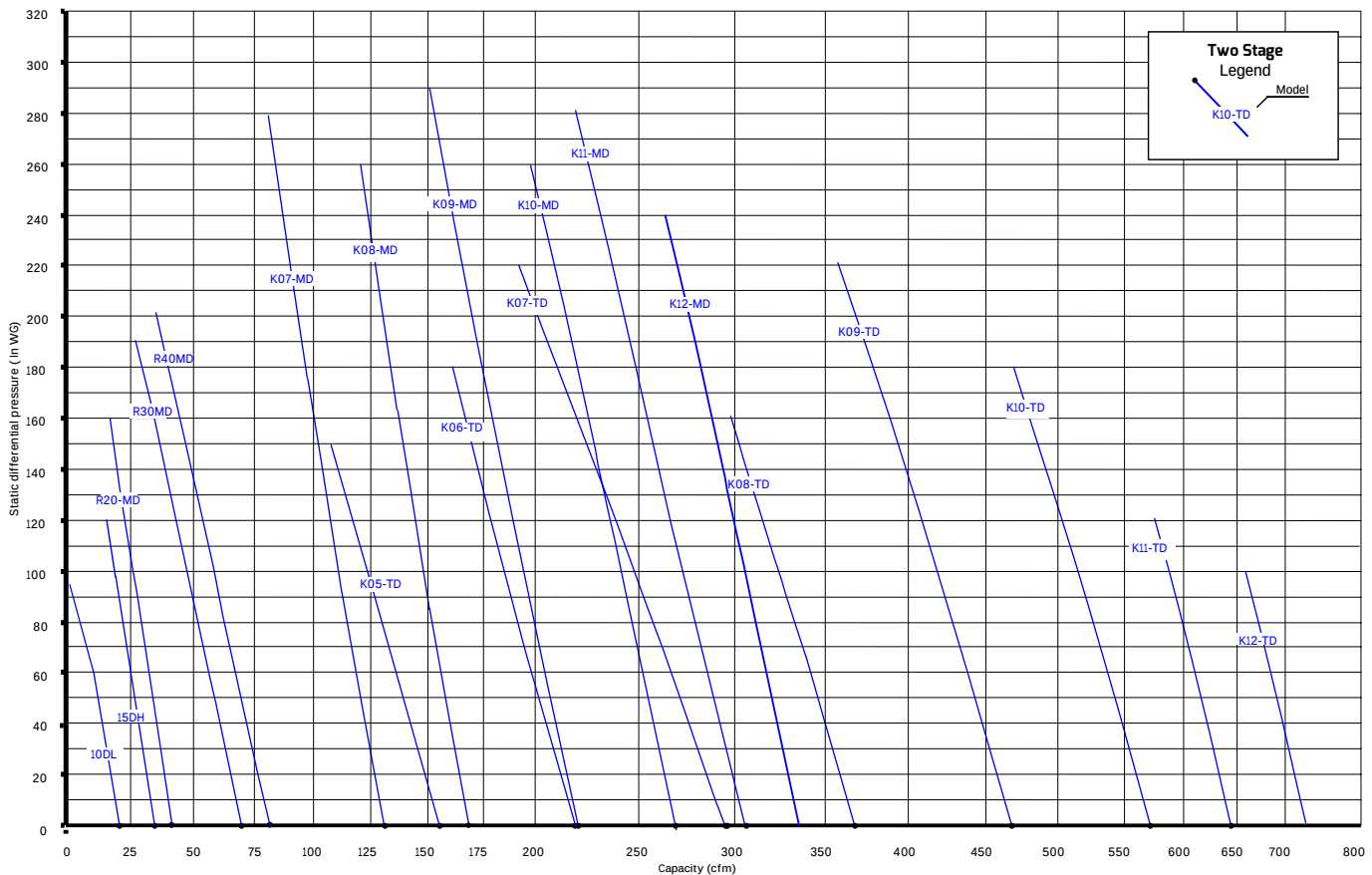
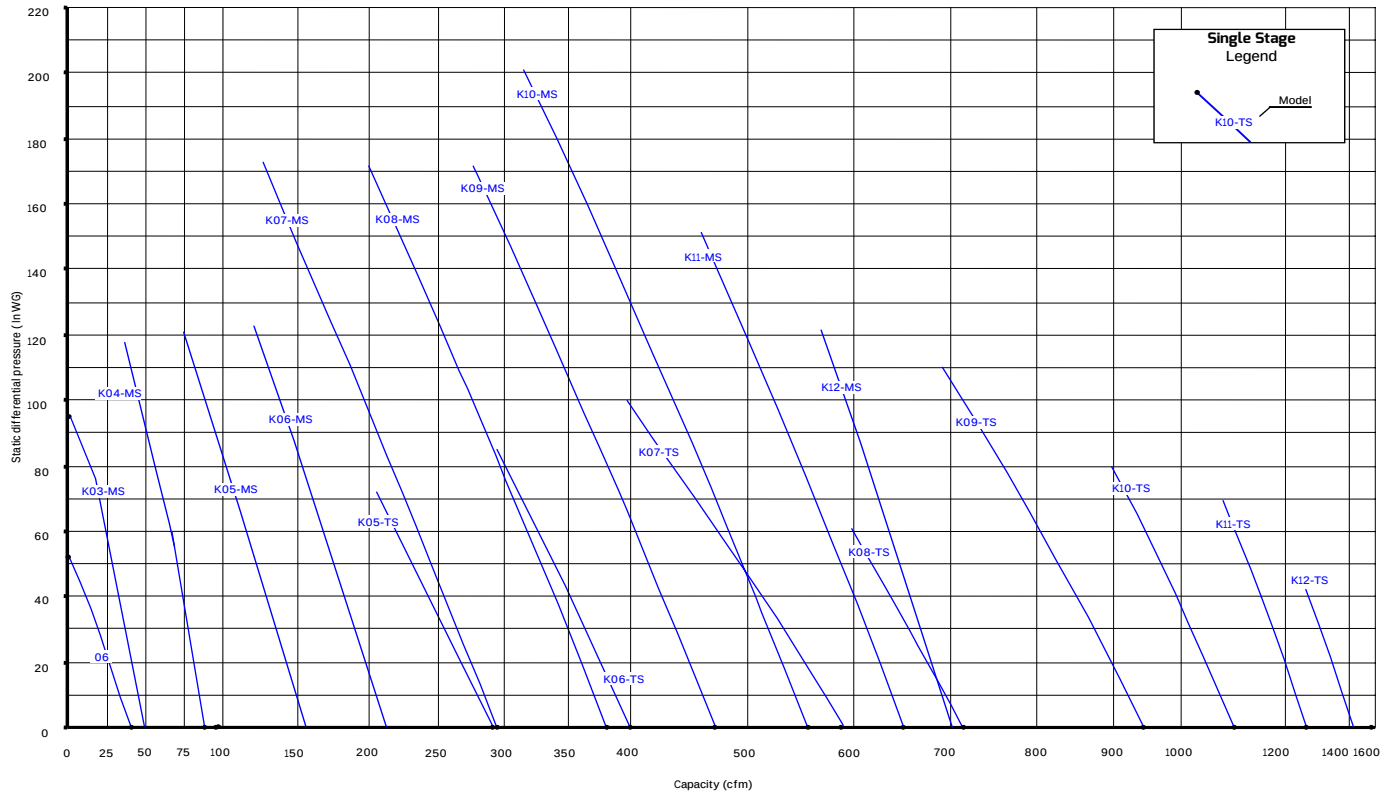
Altitude chart and conversion factors	80
Single Phase Motor information	81
Three Phase Motor Information	82
575 V Premium Efficiency Three Phase Motor Information	83
Airflow Through an Orifice	84
FPZ Pneumatic Range	85

Disclaimer

The information contained in this catalog is based on information that we believe to be correct. It is the users responsibility to determine the suitability of the product for the application they are used in and the user assumes all risk and liability whatsoever in connection therewith.



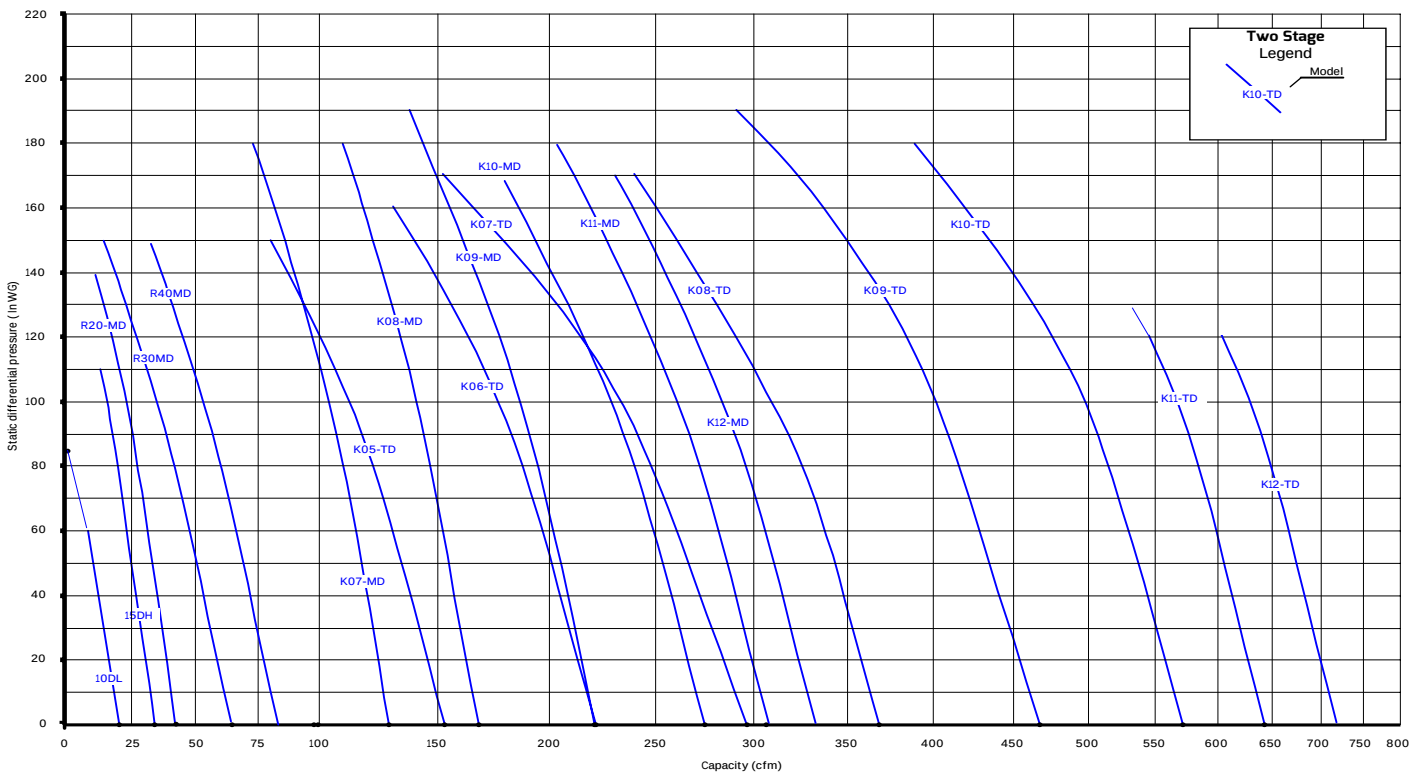
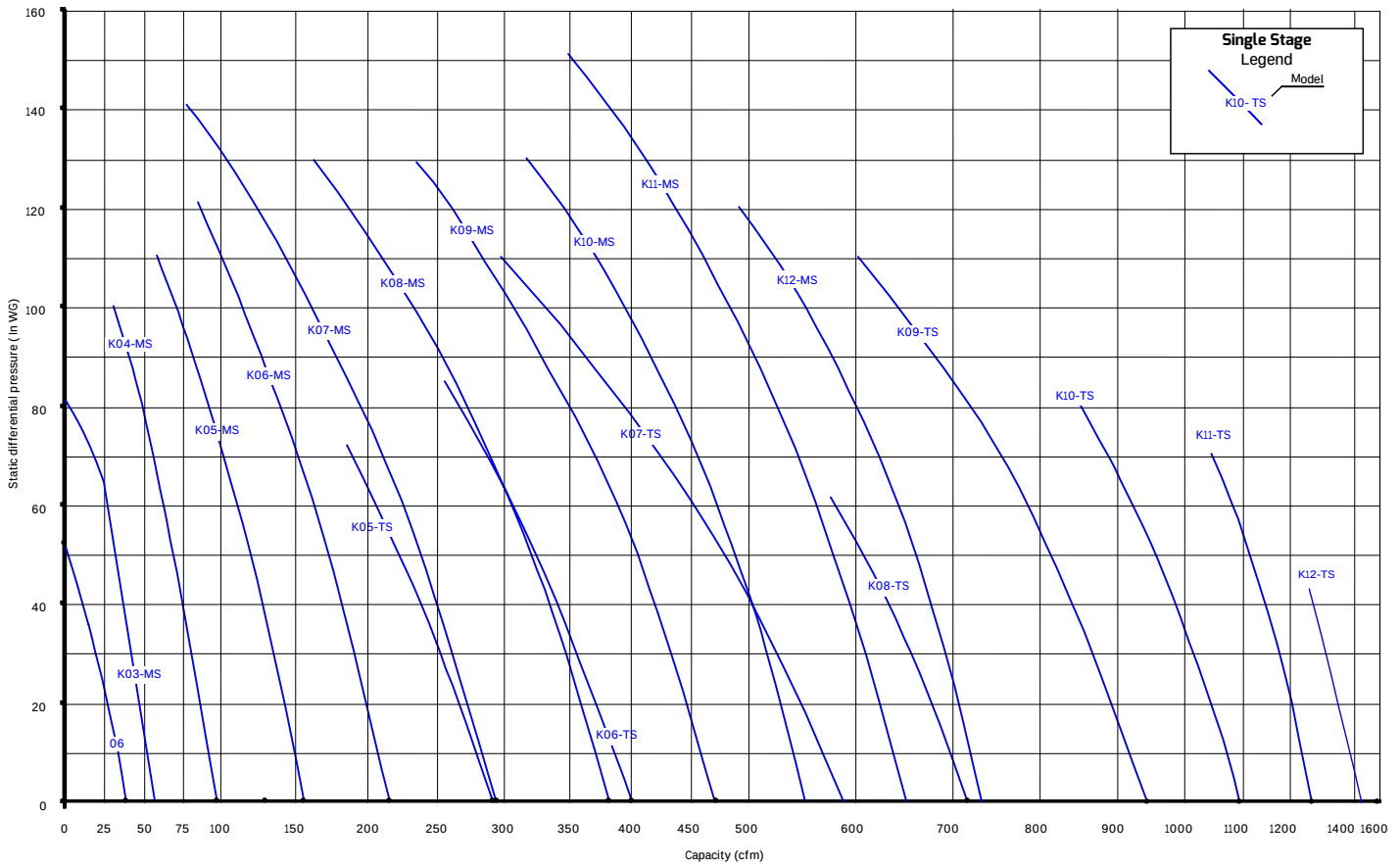
Pressure Performance Curves



Curves refer to air at 68°F temperature and 29.92 in Hg atmospheric pressure (abs) measured at inlet port.
Tolerance on given values $\pm 10\%$ - data can change without prior notice.



Vacuum Performance Curves



Curves refer to air at 68°F temperature, measured at inlet port and 29.92 in Hg atmospheric backpressure (abs).
Tolerance on given values $\pm 10\%$ - data can change without prior notice.



SCL 06

06 SERIES

SN 2674-2B 1/2

STANDARD FEATURES

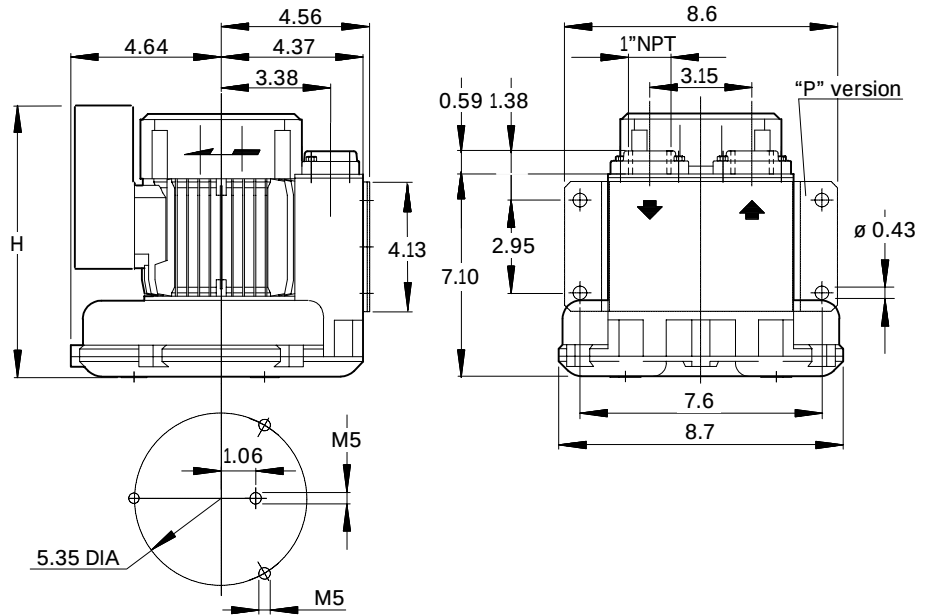
- Low weight cast aluminum construction.
- Quiet operation with integral inlet and outlet muffling.
- Recognized TEFC - cURus motor.
- High efficiency / low noise impeller design.
- No lubrication / maintenance required.
- Allowed ambient: +5 °F to +104 °F.
- Mountable in any plane.

OPTIONS

- Special voltages.
- Surface treatment or plating.
- Gas tight sealing.
- Special designs available.

ACCESSORIES

- Inlet and/or inline filters.
- Additional inlet/outlet silencers.
- Safety valves.
- Flow converting devices.
- Optional connectors

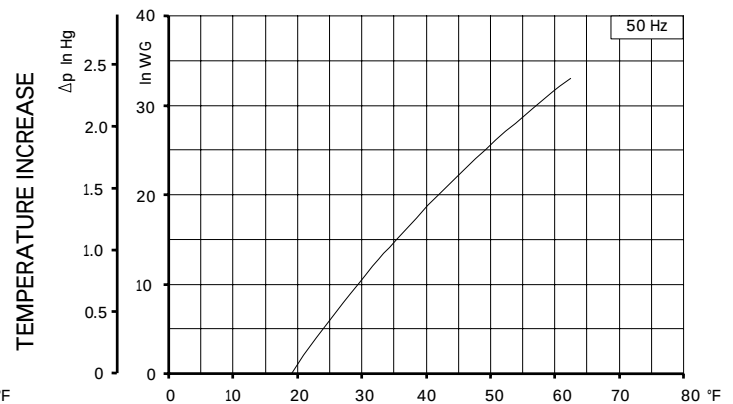
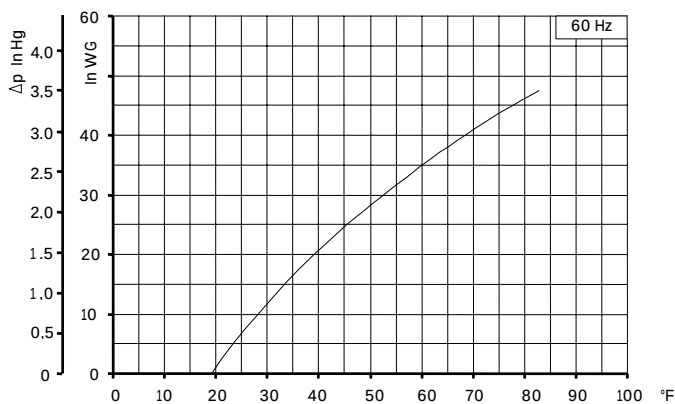
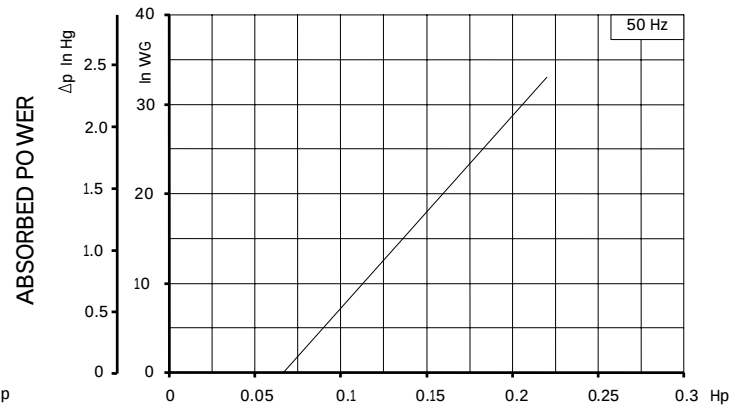
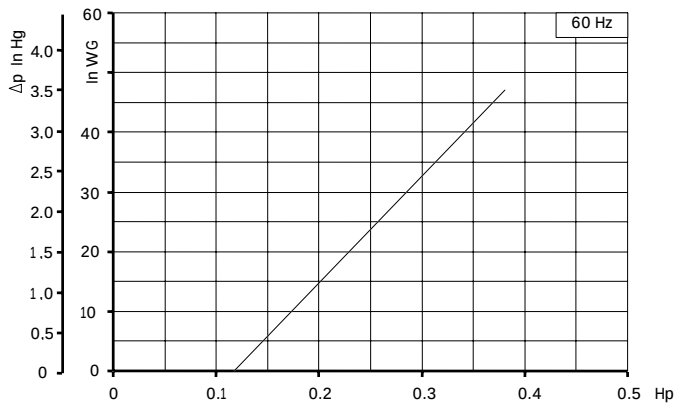
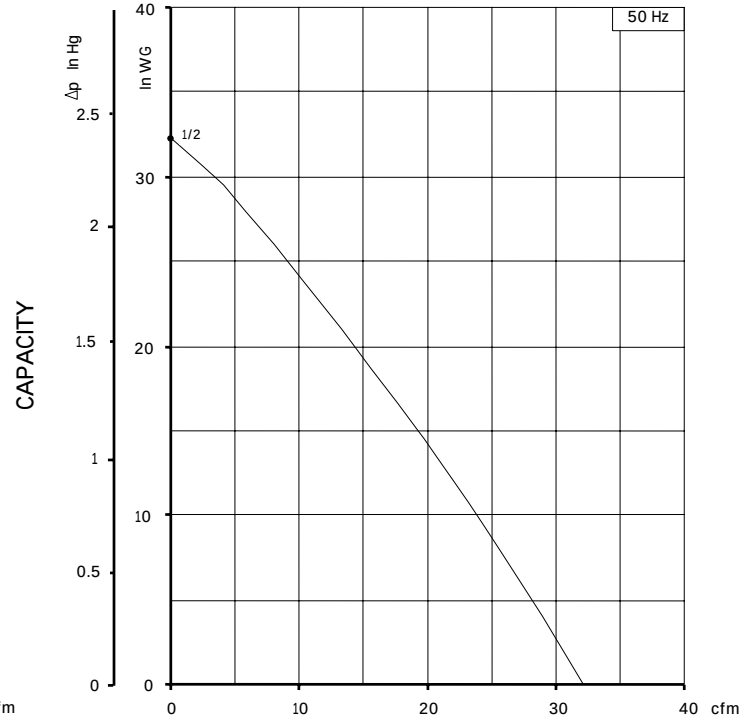
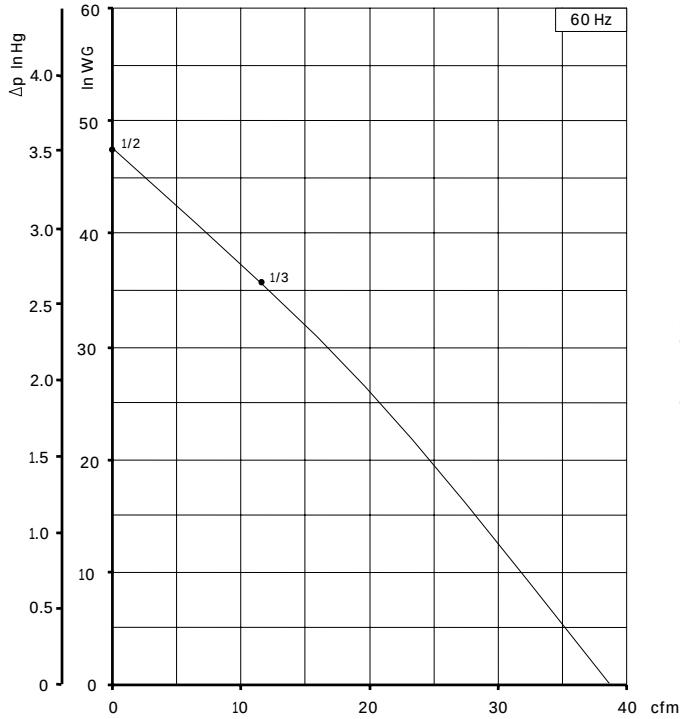


Dimensions in inches.
Dimension for reference only.

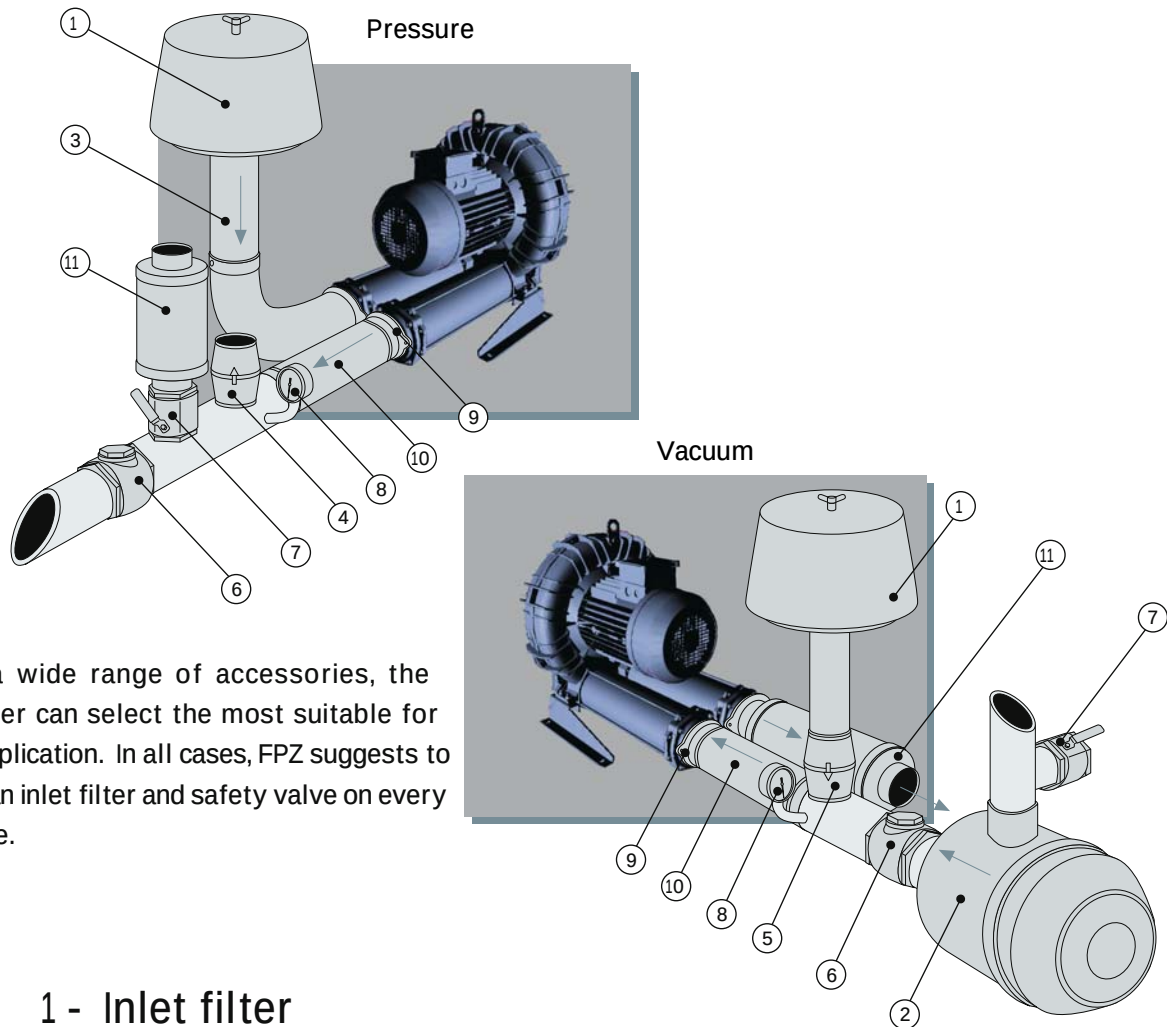
Model	Maximum flow cfm		Installed power Hp		Maximum differential pressure Δp (in Hg)		Noise level Lp dB (A) (1)		Overall dimensions H Inches	Weight Lbs
	60 Hz 3500 rpm	50 Hz 2900 rpm	60 Hz 3500 rpm	50 Hz 2900 rpm	60 Hz 3500 rpm	50 Hz 2900 rpm	60 Hz 3500 rpm	50 Hz 2900 rpm		
06	39	32	1/3	-	2.7	-	58.7	-	10.60	18.30
			1/2	1/2	3.5	2.4	59.0	58.0	10.60	18.50

(1) Noise measured at 1 m distance with inlet and outlet ports piped, in accordance to ISO 3744.

- For proper use, the blower should be equipped with inlet filter and safety valve; other accessories available on request.
- Ambient temperature from +5° to +104°F.
- Specifications subject to change without notice.



Curves refer to air at 68° F temperature, measured at inlet port and 29.92 In Hg atmospheric backpressure (abs).
Values for flow, power consumption and temperature rise: +/-10% tolerance.
Data subject to change without notice.



From a wide range of accessories, the customer can select the most suitable for their application. In all cases, FPZ suggests to install an inlet filter and safety valve on every machine.

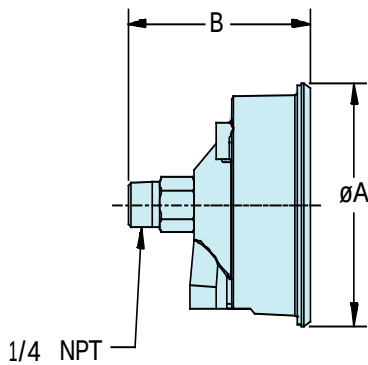
- 1 - Inlet filter
- 2 - Inline filter
- 3 - Filter manifold
- 4 - Safety valve (pressure)
- 5 - Safety valve (vacuum)
- 6 - Check valve
- 7 - Ball valve (used to control flow by bleeding air)
- 8 - Pressure / Vacuum gauge
- 9 - Sleeve (for hose connection)
- 10 - Flexible hose
- 11 - Additional silencer



Gauges, Check Valves, Silencers, Enclosures

SS1708

Gauges



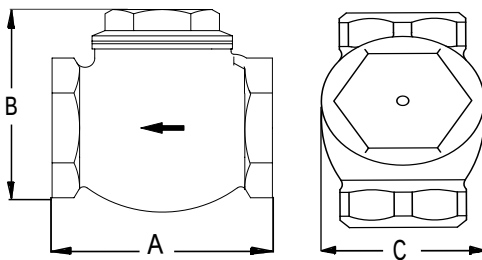
Gauges are important for monitoring the operating pressure or vacuum of the blower. Gauges should be positioned as close to the blower as possible.

Part number	Duty	Scale	A	B
VG25-60	Vacuum	0-60" H ₂ O	2.88	2.59
VG25-200	Vacuum	0-200" H ₂ O		
VG25-300	Vacuum	0-300" H ₂ O		
PG25-60	Pressure	0-60" H ₂ O		
PG25-200	Pressure	0-200" H ₂ O		
PG25-300	Pressure	0-300" H ₂ O	2.7	2.25
PG25-15*	Pressure	0-15 psi		

Dimensions in inches. Tolerance on given values $\pm 1.0\%$ - unbinding and can be changed without prior notice.

*PG25-15 is suitable for outdoor use

Check Valves

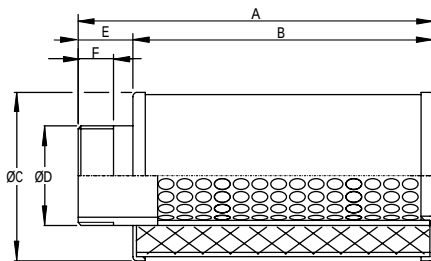


Swing check valves allow air to flow in one direction. These valves prevent backflow into the blower and are supplied in bronze or brass.

Part Number	NPT	A	B	C
CV075	0.75"	2.4		
CV10	1"	2.8	2.7	1.9
CV125	1.25"	3.2	3.2	2.2
CV15	1.5"	3.6	3.5	2.5
CV20	2"	4.3	4.2	3.1
CV30	3"	5.8	6.1	4.2
CV40	4"	6.9	7.1	5.5

Dimensions in inches. Tolerance on given values $\pm 1.0\%$ - unbinding and can be changed without prior notice.

Silencers



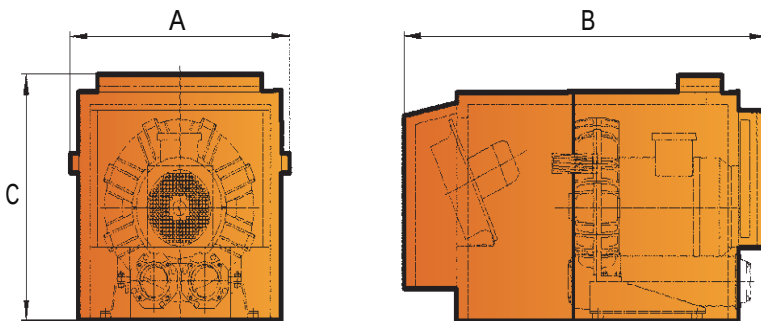
Silencers provide additional sound attenuation.

TYPE	D	A	B	C	E	F	lbs
SS 4	1" 1/4	7.5	5.5	2.8	2	0.6	0.8
SS 5	1" 1/2	7.9	6.7	3.1	1.2	0.8	1.1
SS 6	2"	9.1	7.9	3.5	1.2	0.8	1.3
SS 8	3"	19.1	15.7	6.0	3.3	0.8	4.8
SS 9	4"	18.3	16.9	6.7	1.1	0.8	9.9

Steel manufactured (apart from SI 9 / SS 9 - entirely in aluminium) with sound absorbing polyurethane element.

Dimensions in inches. Tolerance on given values $\pm 1.0\%$ - unbinding and can be changed without prior notice.

Sound Enclosures



Part #	Used on models	A	B	C
IH1	SCL K03-MS	13.4	18.2	15.8
IH3	SCL K04-MS	14.3	19.7	16.5
IH5	SCL K05-6 MS + 30-40DH	16.9	26.8	21.3
IH7	SCL K07-8 MS / MD	31.7	64.4	26
IH8	SCL K07-8 TD	31.7	64.4	26
IH9	SCL K07-8 TS	31.7	64.4	26
IH10	SCL K09-12 MS/MD	31.7	67.2	30
IH11	SCL K09-10 TD	31.7	67.2	30
IH12	SCL K11-TD	31.7	67.2	30
IH13	SCL K09-11 TS	31.7	67.2	31.5

Dimensions in inches - unbinding and can be changed without prior notice.



The following table is a guide to select the appropriate safety valve. The selections in the table are based on blowers operating at **60 Hz** - for 50 hz applications refer to the safety valve data sheets. To select the appropriate safety valve, determine the blower model, horsepower, and whether it is to be used for vacuum or pressure service. If it is desirable to have the valve activate at lower pressures than the maximum rated pressure or vacuum of the blower, a different safety valve might be required (refer to safety valve data sheets). In some cases, two valves are required. **FPZ valves are supplied uncalibrated.** All safety valves include detailed instructions on how to calibrate and install the valve.

Single Stage Blowers			
Model	HP	Safety Valve Vacuum	Safety Valve Pressure
K03-MS	3/4	VRL6	VRL6
K04-MS	ALL	VRL6	VRL6
K05-MS	ALL	VRL6	VRL6
K06-MS	3	VRL6	VRL8
K06-MS	4	VRL6	VRL6
K06-MS	5 1/2	VRL6	VRL6
K06-MS	6 1/5	VRL6	VRL6
K07-MS	4	VRL8	VRL8
K07-MS	5 1/2	VRL6	VRL8
K07-MS	7 1/2	VRL6	VRL6
K07-MS	10	VRL6	VRL6
K08-MS	5.5	VRL8	VRL9
K08-MS	7 1/2	VRL8	VRL8
K08-MS	10	VRL6	VRL8
K08-MS	15	VRL6	VRL6
K09-MS	7 1/2	VRL9	VRL9
K09-MS	10	VRL8	VRL8
K09-MS	15	VRL6	VRL8
K09-MS	20	VRL6	VRL6
K10-MS	7 1/2	VRL9	VRL9
K10-MS	10	VRL9	VRL9
K10-MS	15	VRL8	VRL8
K10-MS	20	VRL8	VRL8
K10-MS	25	-	VRL6
K11-MS	15	VRL9	VRL9
K11-MS	20	VRL8	VRL8
K11-MS	25	-	VRL8
K12-MS	15	VRL9	VRL9
K12-MS	20	VRL9	VRL9
K12-MS	25	VRL8	VRL8
K05-TS	5.5	VRL8	VRL8
K06-TS	5 1/2	VRL9	VRL9
K06-TS	7 1/2	VRL8	VRL8
K06-TS	10	VRL6	VRL8
K07-TS	7 1/2	VRL9	VRL9
K07-TS	10	VRL9	VRL9
K07-TS	15	VRL8	VRL8
K08-TS	15	VRL9	VRL9

Single Stage Blowers			
Model	HP	Safety Valve Vacuum	Safety Valve Pressure
K09-TS	20	VRL9	VRL9
K09-TS	25	VRL8	VRL9
K10-TS	20	(2) VRL9	(2) VRL9
K10-TS	25	VRL9	VRL9
K11-TS	25	(2) VRL9	(2) VRL9
K11-TS	30	(2) VRL9	(2) VRL9
K12-TS	30	(3) VRL9	(3) VRL9
Two Stage Blowers			
Model	HP	Safety Valve Vacuum	Safety Valve Pressure
15DH	ALL	VRL6	VRL6
R20-MD	ALL	VRL6	VRL6
R30-MD	ALL	VRL6	VRL6
R40-MD	ALL	VRL6	VRL6
K07R-MD	5 1/2	VRL6	VRL6
K07R-MD	7 1/2	VRL6	VRL6
K07R-MD	10	VRL6-HP	VRL6-HP
K08R-MD	5 1/2	VRL6	VRL6
K08R-MD	7 1/2	VRL6	VRL6
K08R-MD	10	VRL6	VRL6
K08R-MD	15	-	VRL6-HP
K09-MD	10	VRL6	VRL6
K09-MD	15	-	VRL6-HP
K10-MD	10	VRL6	VRL6
K10-MD	15	VRL6	VRL6
K10-MD	20	-	VRL6-HP
K11-MD	15	VRL6	VRL8
K11-MD	20	VRL6	VRL6-HP
K12-MD	15	VRL8	VRL8
K12-MD	20	VRL6	VRL8
K12-MD	25	-	VRL6
K05-TD	5 1/2	VRL6	VRL6
K06-TD	10	VRL6	VRL6
K07-TD	15	VRL6	VRL6
K08-TD	15	VRL6	VRL6
K09-TD	25	VRL6	VRL6
K10-TD	25	VRL6	VRL8
K11-TD	25	VRL8	VRL8
K12-TD	30	VRL8	VRL8

Valve selections are based on 60 Hz operation and refer to air having a density equal to 0.075 lbs / cu. Ft and inlet temperature of 68 deg F. Data is subject to change without notice



Safety Valves

SN 1733 -7 1/1

The VRL valves are designed to protect blowers and / or motors from over pressurization or excess vacuum. When there is over pressurization, the valve opens and discharges to the outside. When there is excess in vacuum, the valve opens and takes flow from outside.

The valves have been designed for low pressure / low vacuum, with minimal difference between the initial value at which the valve begins to open and its fully opened position. The valves are supplied with 2 different springs to maximize their efficiency. These compact valves, made of aluminum alloy, are both easy to install and calibrate, and operate in a wide range of capacities. The VRL can be plumbed to divert excess primary flow through a secondary external outlet when working in pressure conditions, or to pipe in a secondary flow when working in vacuum.

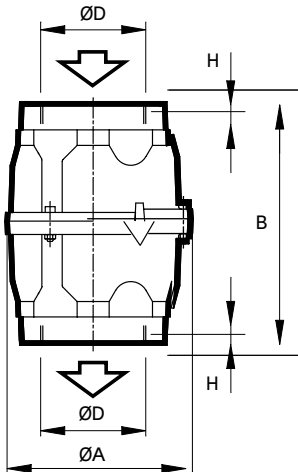
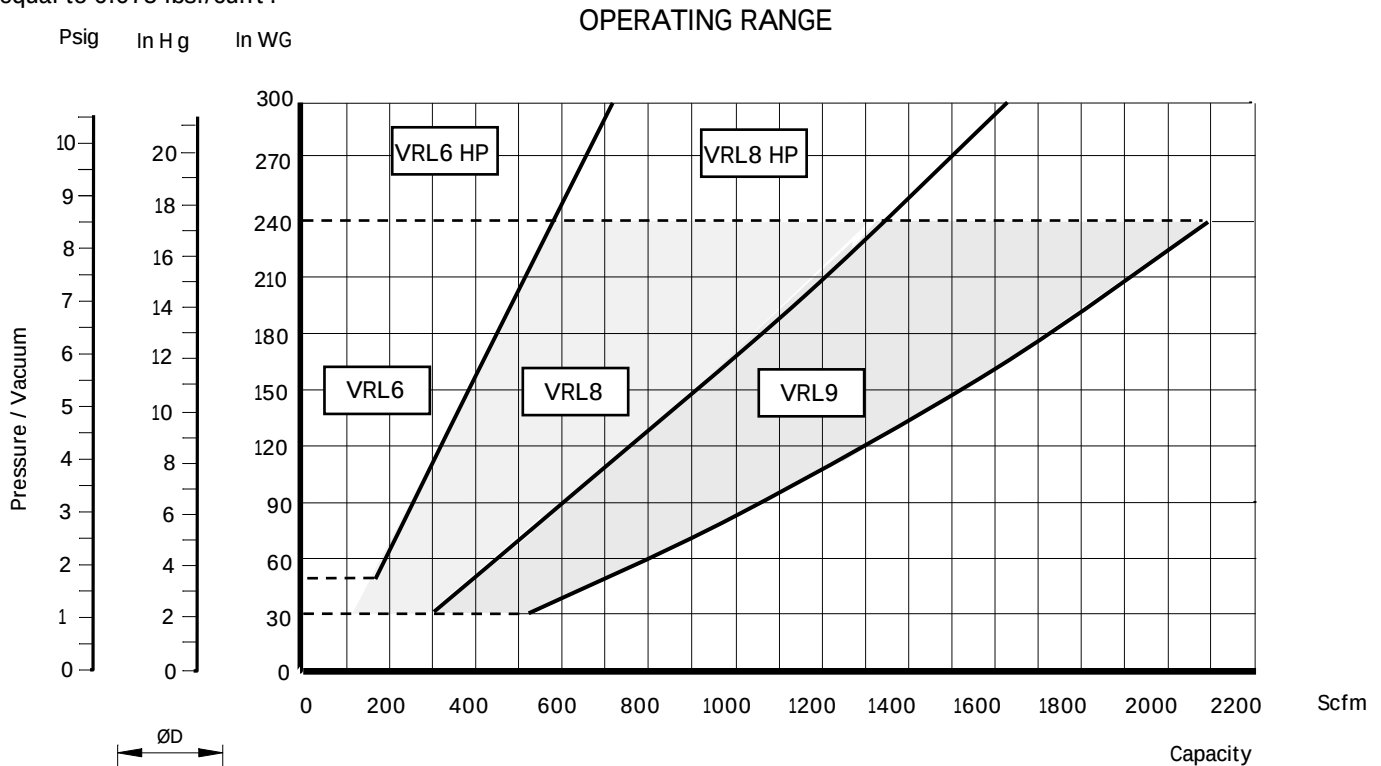
"HP" valves are used for pressures >240" H₂O.

Maximum efficiency is achieved by keeping operating values (flow versus pressure or vacuum) within the operating range (shaded area on graph). Capacity refers to air having a density equal to 0.075 lbs./cu.ft.


VRL6
VRL6 HP

VRL8
VRL8 HP

VRL9



OVERALL DIMENSIONS

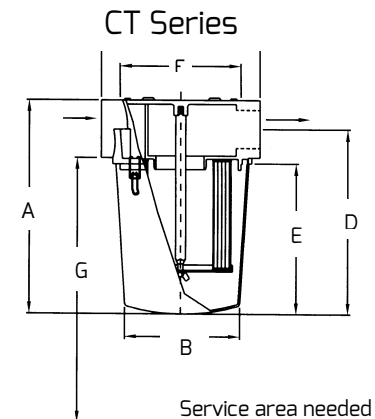
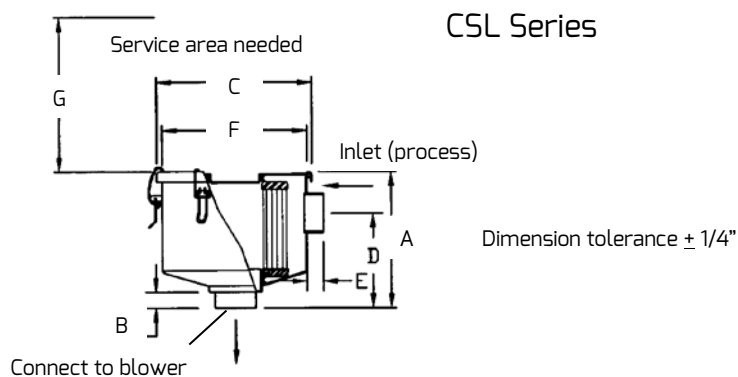
TYPE	ND	D	A	B	H	WEIGHT (Lbs)
VR6 & VRL6 HP	2"	2" NPT	4.02	6.90	0.47	1.9
VRL8 & VRL8HP	3"	3" NPT	5.31	7.48	0.59	4.2
VRL9	4"	4" NPT	6.30	8.11	0.71	5.7

- Dimensions in inches.
- Specifications subject to change without prior notice.

VRL valves are supplied uncalibrated - contact FPZ for calibration options.



FPZ inline filters are typically used in vacuum applications to prevent debris from entering the blower. Inline filters consist of a metal housing with a metal cover retained by quick - change clamps for easy servicing of the element. Polyester elements are recommended for humid applications.



- ♦ Polyester: 99%+ removal efficiency standard to 5 micron
- ♦ Stainless steel torsion clips for durability
- ♦ Rugged construction with powder coated finish
- ♦ Low pressure drop
- ♦ Positive sealing O-ring seal system
- ♦ Large dirt holding capacity and easy field cleaning, (especially when mounted horizontally or inverted)
- ♦ Fully-drawn one piece canister
- ♦ Filter change out differential: 10"-15" H₂O Over Initial Delta P

- ♦ Various media available
- ♦ Epoxy coated housings
- ♦ Special connections
- ♦ Available in Stainless Steel
- ♦ Activated carbon prefilter to reduce odor
- ♦ Alternate Top-to-canister fastening system for low pressure or pulsating systems

Polyester Element	NPT	DIMENSIONS (Inches)							Used on Models	Approx Wt. Lbs
		A	B	C	D	E	F	G		
CSL-843-050HC	½"	4 ⅜	9/16	5 7/8	2 ½	9/16	5	3 ¼	10DL	3
CSL-843-075HC	¾"	4 ⅜	9/16	5 7/8	2 ½	9/16	5	3 ¼	15DH	3
CSL-843-100HC	1"	4 ⅜	¾	5 7/8	2 ½	¾	5	3 ¼	06	3
CSL-843-125HC	1 ¼"	4 ⅜	¾	5 7/8	2 ½	¾	5	3 ¼	K03-MS, R20-MD	3
CSL-849-125HC	1 ¼"	6 ¾	¾	7 5/16	4 ½	¾	6 13/16	5 ¼	R30-MD, R40-MD	5
CSL-849-150HC	1 ½"	6 ¾	¾	7 5/16	4 ½	¾	6 13/16	5 ¼	K04-MS	5
CSL-851-200HC	2"	10 ¼	¾	8 ¾	5	¾	7 5/8	9 ¼	K05-MS, K06-MS, K05-TD, K06-TD, K07R-MD, K08R-MD	15
CT-235P-300C	3"	18 13/16	9 7/8	13 ½	16 4/5	13 1/8	10	14	K05-TS, K06-TS, K07-MS, K08-MS, K07-TD, K08-TD	30
CT-235P-400C	4"	18 13/16	9 7/8	13 ½	16 4/5	13 1/8	10	14	K09-MS, K10-MS, K09-MD, K10-MD, K11-MD, K12-MD, K09-TD, K10-TD	29
CSL-2541-400I*	4"	16 3/8	3 5/8	13 ¼	9 ½	3 ½	12 1/16	8	K07-TS, K08-TS, K11-MS, K12-MS, K11-TD, K12-TD	38
CT-275P-500C	5"	18 ¼	16	19	14 3/8	9 7/8	14 ¾	20	K09-TS, K10-TS	50
CTD-375P-500C	5"	25 3/8	16	19	21 ½	17	14 ¾	35	K11-TS, K12-TS	60

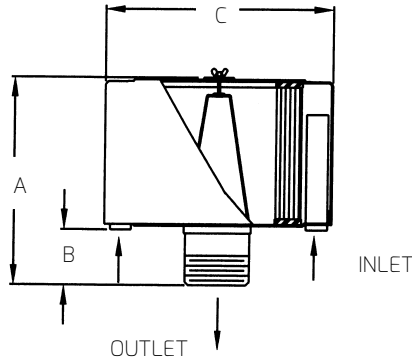
* Male x male npt connections
Dimensions for reference only



Inlet Filters

SS1905

FPZ inlet filters are used for pressure applications. The inlet filters combine filtration and sound attenuation into a compact package. Inlet filters consist of a filter cartridge enclosed by a carbon steel weather hood. Elements are easily serviceable by simply removing the weather hood.



Dimension tolerance $\pm 1/8"$



VG-020-013



FEATURES & SPECIFICATIONS

- Polyester: 99%+ removal efficiency standard to 5 micron. (Other media available upon request.)
- Fully drawn weather hood - no welds to rust or vibrate apart
- Tubular silencing design - tube is positioned to maximize sound attenuation and air flow while minimizing pressure drop
- Durable carbon steel construction with baked enamel finish
- Filter change out differential: 10"-15" H₂O Over Initial Delta P.

OPTIONAL DIRTY FILTER INDICATOR

The **VG-020-013** dirty filter indicator is used to maximize filter life for pressure applications only. The yellow indicator in the site window drops as dirt accumulates on the filter element. The element is ready for change out or servicing when the yellow indicator reaches the red zone. The filter condition can be determined without removing the weather hood even after the blower has been shut down.

The indicator can be mounted in the inlet piping between the blower and filter or directly to the filter housing by having a 1/8" npt tap installed in the hood. If a tap is required, FPZ part number **M020*** should be ordered.

Polyester Element	NPT	Dimensions (Inches)			Used on Models	Approx Wt. Lbs
		A	B	C		
FS-15-050	1/2"	4	1 1/2	6	10DL	2
FS-15-075	3/4"	4	1 1/2	6	15DH	2
FS-15-100	1"	4	1 1/2	6	O6	2
FS-19P-125	1 1/4"	6 5/8"	1 5/8"	6	K03-MS, R20-MD, R30-MD, R40-MD	3
FS-19P-150	1 1/2"	6 5/8"	1 5/8"	6	K04-MS	4
FS-31P-200	2"	7 1/4"	2 1/4"	10	K05-MS, K05-TD	8
FS-231P-200	2"	12 1/4"	2 1/4"	10	K06-MS, K06-TD, K07R-MD, K08R-MD	14
FS-231P-300	3"	13"	3"	10"	K07-MS, K05-TS, K07-TD	15
FS-235P-300	3"	13"	3"	16"	K08-MS, K06-TS, K08-TD	29
FS-235P-400	4"	14"	4"	16"	K09-MS, K10-MS, K09-MD, K10-MD, K11-MD, K12-MD, K09-TD, K10-TD	30
FS-245P-400	4"	14"	4"	16"	K07-TS, K08-TS, K11-MS, K12-MS, K11-TD, K12TD	31
FL10**	NA	14 3/8"	1 3/8"	16 3/16"	K09-TS, K10-TS, K11-TS, K12-TS,	18

*M020 1/8" npt filter tap will be added to filter part number suffix if ordered.

**FL10 utilizes 15 micron paper element and does not include tubular silencers. FL10 filters are normally ordered with CA10



VK - FLANGE CONNECTOR FOR VRL VALVES

This VK flange accessory allows direct connection of the VRL relief valves to the cover of the SCL "K" model blowers; either in pressure or vacuum.

Note: VK flanges usable on K-MS and K-TS blowers in vacuum or pressure K-MD useable in vacuum only.

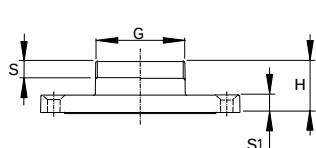


Fig. 1

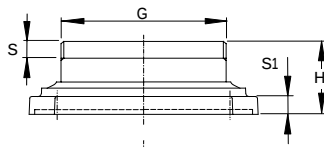
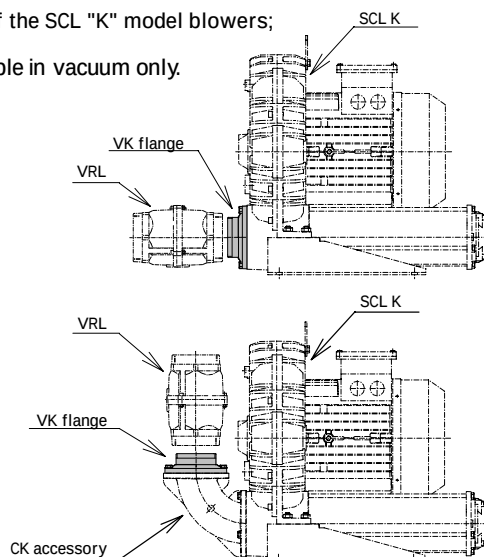


Fig. 2



Dimensions in Inches

Model	DN	G	H	I	R	S	S1	Fig.	Parts List
VK 5	1" 1/2	1" 1/2 NPT	1.18	3.62	0.26	0.59	0.39	1	SP 1552
VK 6	2"	2" NPT	1.97	4.33	0.33	0.75	0.39		SP 1553
VK 6A	2"	2" NPT	2.34	5.12	0.35	0.75	0.43	2	SP 1611
VK 8	3"	3" NPT	1.69	5.12	0.35	0.83	0.43		SP 1554
VK 9	4"	4" NPT	1.81	5.90	0.35	0.90	0.43		SP 1555

PK - FLANGED TUBE CONNECTOR FOR SCL K

The PK accessory allows connection of the "K" Series blowers directly to the process line without use of the intake or outlet manifolds.

CHARACTERISTICS

Flange in aluminium alloy with tube stub connection.

Supplied as a kit for mounting (with gasket and screws with wrench), please see the respective Parts List in table.

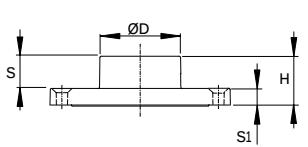


Fig. 1

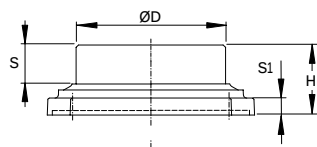
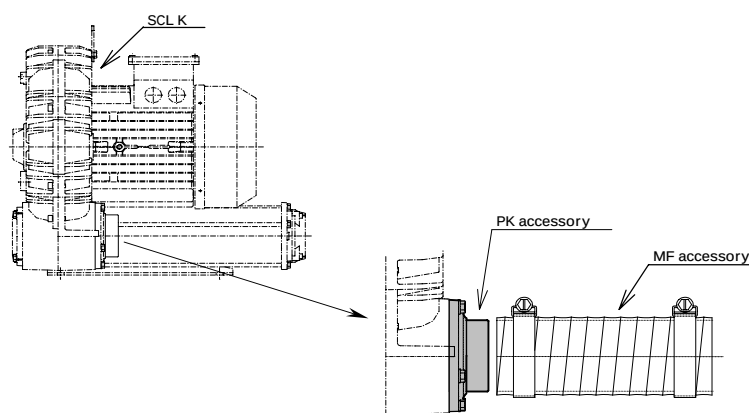


Fig. 2



Dimensions in Inches

Model	DN	D	H	I	R	S	S1	Fig.	Parts List
PK 5	1" 1/2	1.89	1.18	3.62	0.26	0.79	0.39	1	SP 1543
PK 6	2"	2.36	1.97	4.33	0.33	1.38	0.39		SP 1544
PK 6A	2"	2.36	2.34	5.12	0.35	1.38	0.43	2	SP 1609
PK 8	3"	3.46	1.69	5.12	0.35	0.94	0.43		SP 1545
PK 9	4"	4.48	1.81	5.90	0.35	1.06	0.43		SP 1546

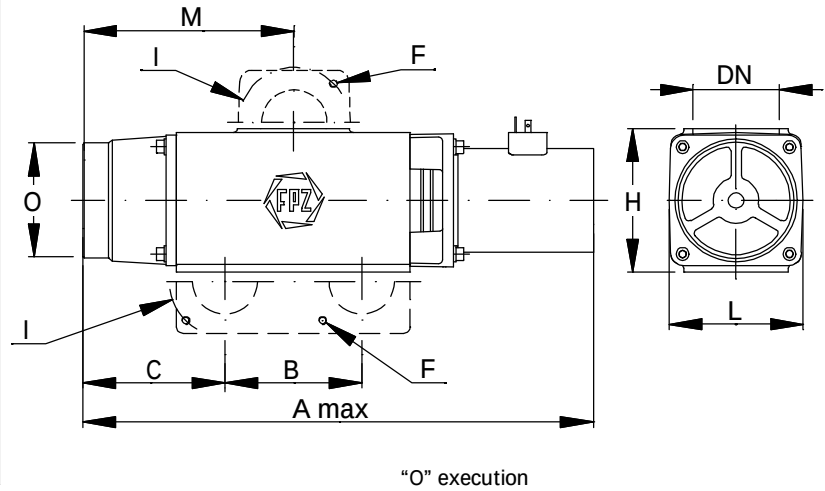
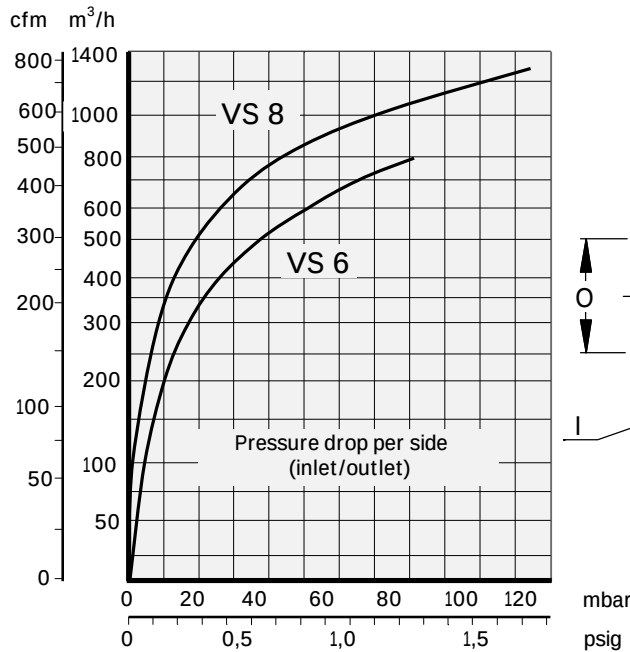
Note: PK flanges usable on K-MS, K-TS, K-TD blowers in vacuum or pressure K-MD useable in vacuum only.



Flow Converting Devices

V6 / VS8
SN 2616-4 1/1

This all aluminum device is simple in both design and operation. Change of flow direction is attained by an electronically or pneumatically activated diverter.



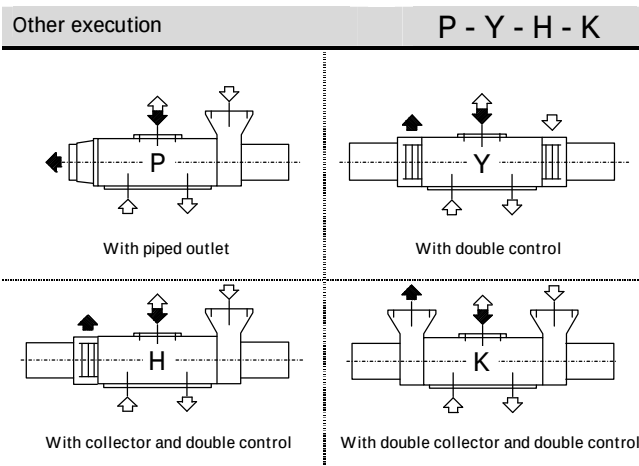
TYPE	DN	A		B	C	F	H	I	L	M	O
VS 6	2"	15.43 ⁽¹⁾	16.42 ⁽²⁾	4.13	4.29	M6	4.33	2 x int.3.35	3.94	6.38	3.46
VS 8	3"	19.09 ⁽¹⁾	20.08 ⁽²⁾	4.02	5.28	M6	6.3	4 x int.4.72	5.91	8.27	4.33

Overall dimensions refer to "O" execution without flanges

For the dimensions of the other executions pls see:

SI 1787 Executions O/P
SI 1788 Executions Y/H/K with pneumatic control
SI 2021 Executions Y/H/K with electrical control

(2) Electronically activated
(3) Pneumatically activated



Available connection

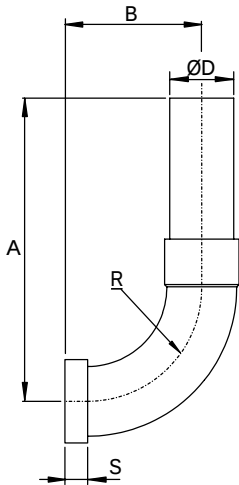
- TF threaded flange GAS (G 1 1/2", G 2", G 3");
- TF threaded flange NPT (NPT 1 1/2", NPT 2", NPT 3");
- See SU 0012.

Dimensions in inches. Tolerance on given values $\pm 10\%$ - unbinding and can be changed without prior notice.

		EXECUTION	
		O / P	Y / H / K
Electrical control			
Thrust solenoid			
Working ratio		60% of cycle time	
Max. cycle duration		5 min.	
Max. activated time		5 min.	
Power rating		56 W	120 W (3)
Standard supply voltages		V: 24 DC-110 AC-220 AC	
(3) Only for VS6 (dp max. +350-350 mbar)			
Pneumatic control			
Thrust air cylindrer		Double effect	
Max pressure		10 Bar	
Air consumption		0.02 litres/cycle	
Operating temperature		-5°C ~ +70 °C	

CA MANIFOLD FOR FA/FL/FS FILTERS

90° wide radius PVC manifold with flanged connection and unthreaded or female threaded tube end. Working temperature -20° to +40°C (-5°/+105 °F).



Type	DN	A	B	D	S	I	M	R	Fig.
CA4-K	1.25"	10.24	6.30	1.65	0.59	2.52	0.28	3.15	1
CA4K-NPT	1.25" npt	11.61	6.30	1.65	0.59	2.52	0.28	3.15	1
CA5-K	1.5"	11.81	7.09	1.89	0.59	2.95	0.28	3.94	1
CA5K-NPT	1.5" npt	12.80	7.09	1.89	0.59	2.95	0.28	3.94	1
CA6V	2"	12.60	5.31	2.36	0.59	3.35	0.28	4.96	1
CA6V-NPT	2" npt	13.60	5.31	2.36	0.59	3.35	0.28	4.96	1
CA8	3"	14.96	7.28	3.48	0.59	4.72	0.28	7.09	1
CA8-NPT	3" npt	16.65	7.28	3.48	0.59	4.72	0.28	7.09	2
CA9	4"	15.75	9.25	4.48	0.79	5.91	0.35	8.66	
CA9-NPT	4" npt	17.44	9.25	4.48	0.79	5.91	0.35	8.66	
CA10	5"	4.92	11.81	5.51	0.79	8.27	0.71	11.02	

Dimensions in inches - unbinding and can be changed without prior notice.

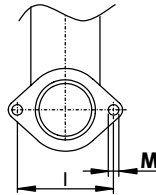


Fig. 1

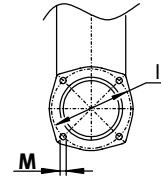


Fig. 2

CK MANIFOLD

90° aluminium manifold for "K" models supplied in a kit containing the gasket and bolts.

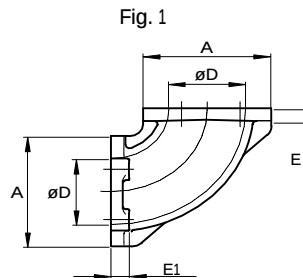
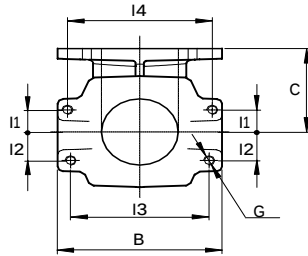


Fig. 1

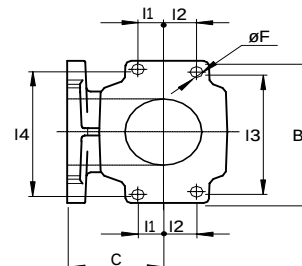
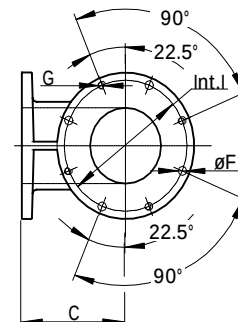
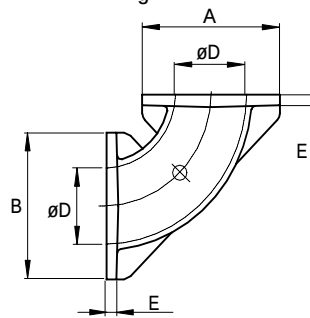
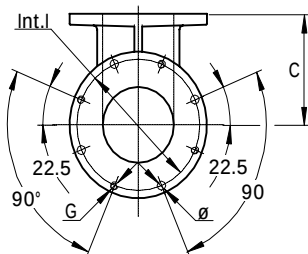


Fig. 2

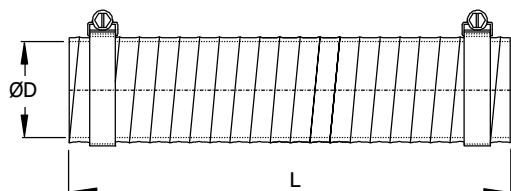


Type	DN	A	B	C	D	E	E1	F	G	I	I1	I2	I3	I4	Fig.
CK5	1.5"	3.15	3.94	2.20	1.69	0.27	0.45	0.27	M6	-	0.69	0.69	3.35	3.35	1
CK6	2"	3.62	4.65	2.72	2.16	0.31	0.51	0.35	M8	-	0.73	0.95	3.92	4.10	
CK8	3"	5.71	5.71	4.31	2.95	0.39	-	0.35	M8	5.12	-	-	-	-	2
CK9	4"	6.50	6.50	5.22	3.54	0.39	-	0.35	M8	5.90	-	-	-	-	
CK10	5"	8.66	8.66	7.56	5.04	0.39	-	0.35	M8	7.48	-	-	-	-	

Dimensions in inches - unbinding and can be changed without prior notice.

FLEXIBLE CONNECTION

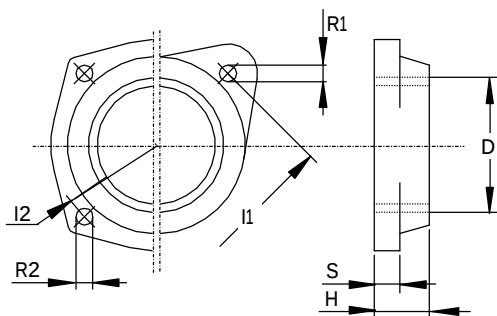
Steel reinforced rubber - coated fibreglass flex tubing, including 2 adjustable hose clamps. Working temperature: $-55 \div +176$ °C ($-67 \div +350$ °F). Maximum working pressure: 3 bar (44 psi).



TYPE	DN	D	L
MF 1	1/2"	20	200
MF 2	3/4"	26	200
MF 3	1"	32	200
MF 4	1" 1/4	45	200
MF 5	1" 1/2	50	250
MF 6	2"	64	250
MF 8	3"	89	330
MF 9	4"	114	330
MF 10	5"	140	330

THREADED FLANGE

Threaded flange in aluminum alloy.



TYPE	D	H	I1	I2	R1	R2	S
TF 4N	1" 1/4 npt	18	75	-	6.5	-	10
TF 4VN	1" 1/4 npt	18	64	-	6.5	-	10
TF 5N	1" 1/2 npt	18	85	-	6.5	-	10
TF 5VN	1" 1/2 npt	18	75	-	6.5	-	10
TF 6N	2" npt	18	85	-	6.5	-	10
TF 8N	3" npt	25	-	120	-	6.5	13
TF 9N	4" npt	25	-	150	-	9	13
TF 10N	5" npt	35	-	210	-	17	13

SLEEVE

Aluminum alloy or steel flanged sleeve coupling.

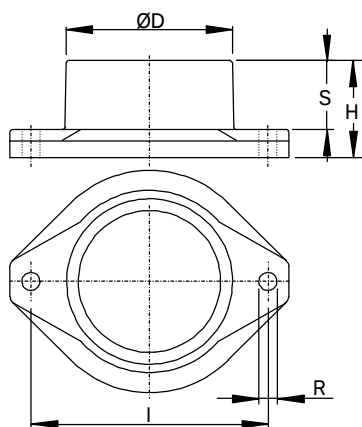


Fig. 1
Mat.: Al

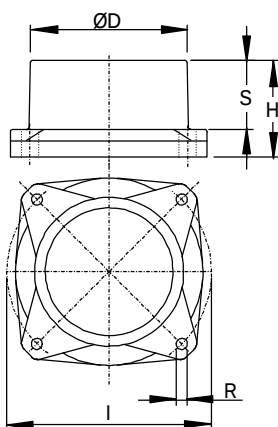


Fig. 2
Mat.: Al

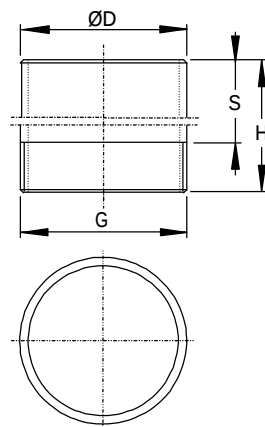


Fig. 3
Mat.: Fe

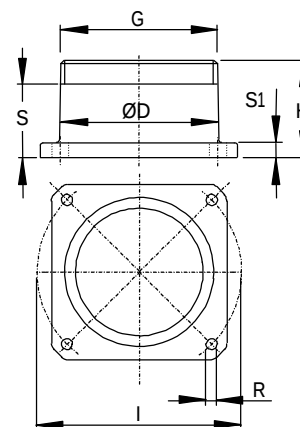


Fig. 4
Mat.: Fe

TYPE	DN	D	G	H	I	R	S	Fig.
MP 3	1"	33	-	35	55	6.5	25	1
MP 4	1" 1/4	42	-	35	75	6.5	25	
MP 4V	1" 1/4	42	-	35	64	6.5	25	

TYPE	DN	D	G	H	I	R	S	S1	Fig.
MP 5V	1" 1/2	48	-	35	75	6.5	25	-	1
MP 6	2"	60	-	35	85	6.5	25	-	
MP 8	3"	88	-	45	120	6.5	32	-	2
MP 9	4"	114	4" npt	100	-	-	80	-	3
MP 10	5"	140	5" npt	60	210	18	40	8	4

Dimensions in mm. Tolerance on given values $\pm 10\%$ - unbinding and can be changed without prior notice.



Engineering Information

PSI	In. H ₂ O	In. Hg	mBar	mmH ₂ O
1	27.68	2.04	68.95	703.0
1.5	41.5	3.05	103.43	1054.5
2	55.4	4.07	137.90	1406.0
2.5	69.2	5.09	172.38	1757.5
3	83.0	6.11	206.85	2109.0
3.5	96.9	7.13	241.33	2460.5
4	110.7	8.14	275.80	2812.0
4.5	124.6	9.16	310.28	3163.5
5	138.4	10.18	344.75	3515.0
5.5	152.2	11.20	379.23	3866.5
6	166.1	12.22	413.70	4218.0
6.5	179.9	13.23	448.18	4569.5
7	193.8	14.25	482.65	4921.0
7.5	207.6	15.27	517.13	5272.5
8	221.4	16.29	551.60	5624.0
8.5	235.3	17.31	586.08	5975.5
9	249.1	18.32	620.55	6327.0
9.5	263.0	19.34	655.03	6678.5
10	276.8	20.36	689.50	7030.0

Pressure				
In. H ₂ O	x	0.03613	=	psi
In. H ₂ O	x	0.07355	=	In. Hg
mbar	x	0.4019	=	In. H ₂ O
psi	x	2.036	=	In. Hg

Flow				
m ³ /h	x	0.588	=	cfm
lpm	x	0.03528	=	cfm
cfm	x	1.699	=	m ³ /h
cfm	x	28.32	=	lpm

Length				
Feet	x	12	=	Inches
Inches	x	2.54	=	cm
Feet	x	0.3048	=	meters

Barometric pressure varies in direct proportion to altitude

Example #1 – If a blower is required to deliver 2 psig at 5000 feet, what pressure at standard air is required?

$$\text{Pressure} = 14.7 / 12.23 \times 2 = 2.4 \text{ psig}$$

Example #2 – If a blower is required to deliver 2 psig at standard air, what pressure will it deliver at 5000 feet?

$$\text{Pressure} = 12.23 / 14.7 \times 2 = 1.66 \text{ psig}$$

Altitude Versus Barometric Pressure

Altitude Feet	Pressure		Altitude Feet	Pressure		Altitude Feet	Pressure	
	In Hg.	Psia		In. Hg.	Psia		In. Hg.	Psia
0	29.92	14.70	1500	28.33	13.90	7000	23.09	11.34
500	29.38	14.43	2000	27.82	13.67	7500	22.65	11.12
600	29.28	14.38	2500	27.31	13.41	8000	22.22	10.90
700	29.18	14.33	3000	26.81	13.19	8500	21.80	10.70
800	29.07	14.28	3500	26.32	12.92	9000	21.38	10.50
900	28.97	14.23	4000	25.84	12.70	9500	20.98	10.90
1000	28.86	14.18	4500	25.36	12.45	10000	20.58	10.10
1100	28.75	14.09	5000	24.89	12.23	10500	20.18	9.91
1200	28.65	14.04	5500	24.43	12.00	11000	19.79	9.72
1300	28.54	13.99	6000	23.98	11.77	11500	19.41	9.53
1400	28.44	13.94	6500	23.53	11.56	12000	19.03	9.35



Single Phase Electric Motors

ss2109

SINGLE PHASE DUAL VOLTAGE

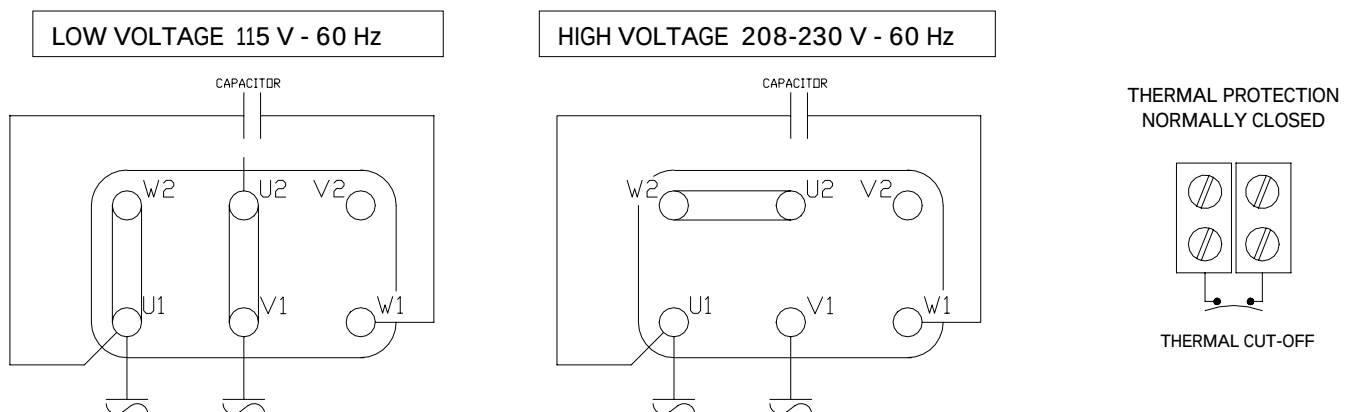
GENERAL SPECIFICATIONS:

1. Type: AC Motor IEC 60034
2. Marks: cURus, CE
3. Poles: 2
4. Insulation class: F
5. Frequency: 60 hz
6. Enclosure: TEFC
7. Protection IP55, Tropicalized
8. Thermal protector: Klixon 140° C or 150° C (R series)
9. Max. Ambient 40° C
10. Duty: Continuous
11. Construction: aluminum frame

POWER		SIZE	VOLTAGE (60 hz)	Full Load Amperage	Starting Current A	Power Factor	SF	Capacitor μ F	Cable Entry
HP	KW								
0.33	0.25	63	115 / 208-230	3.5 / 1.7	12.3 / 6.0	0.97	1.0	16 - 400 V	M16
0.5	0.37	63	115 / 208-230	4.8 / 2.6	16.8 / 9.1	0.96	1.0	16 - 400 V	M16
0.75	0.55	71	115 / 208-230	9.8 / 4.9	46.1 / 23.0	0.95	1.0	20 - 400 V	M16
0.75	0.55	71	115 / 208-230	8.3 / 4.1-4.2	34.9 / 17.2	0.83	1.15	30 - 450 V	M20
1	0.75	80	115 / 208-230	13.0 / 7.2	49.4 / 24.7	0.77	1.0	31.5 - 400 V	M20
1	0.75	80	115 / 208-230	9.4 / 5.5-5.0	35.8 / 17.3	0.99	1.15	40 - 450 V	M20
1.5	1.1	80	115 / 208-230	13.6 / 7.3	54.4 / 29.2	0.97	1.0	50 - 400 V	M20
1.5	1.1	80	115 / 208-230	14.6 / 7.6-7.3	49.3 / 23.2	0.97	1.15	45 - 450 V	M20
1.5*	1.1	80	115 / 208-230	14.3 / 7.18	71.1 / 35	0.96	1.0	55 - 450 V	M20
2	1.5	90	115 / 208-230	24.0 / 12.0	79.2 / 39.6	0.90	1.0	70 - 400 V	M20
2	1.5	90	115 / 208-230	19.7 / 10.6-9.9	103 / 52.4	0.95	1.15	50 - 450 V	M20
2*	1.5	80	115 / 208-230	19.4 / 9.8	96 / 48.2	0.89	1.0	55 - 450 V	M20
3	2.2	90	115 / 208-230	31.5 / 16.0	154.4 / 78.4	0.85	1.0	60 - 400 V	M20
3	2.2	90	115 / 208-230	29.4 / 16.6-14.8	119.8 / 61.8	0.91	1.15	45 - 450 V	M20
3*	2.2	90	115 / 208-230	26.2 / 13.1	152 / 76	0.95	1.0	70 - 450 V	M20

* Applicable to R series ONLY.

Shaded models to be discontinued.



Specifications subject to change without notice. Alternate motor suppliers may be used.



Three Phase Electric Motor

SS2002

THREE PHASE MOTOR

GENERAL SPECIFICATIONS:

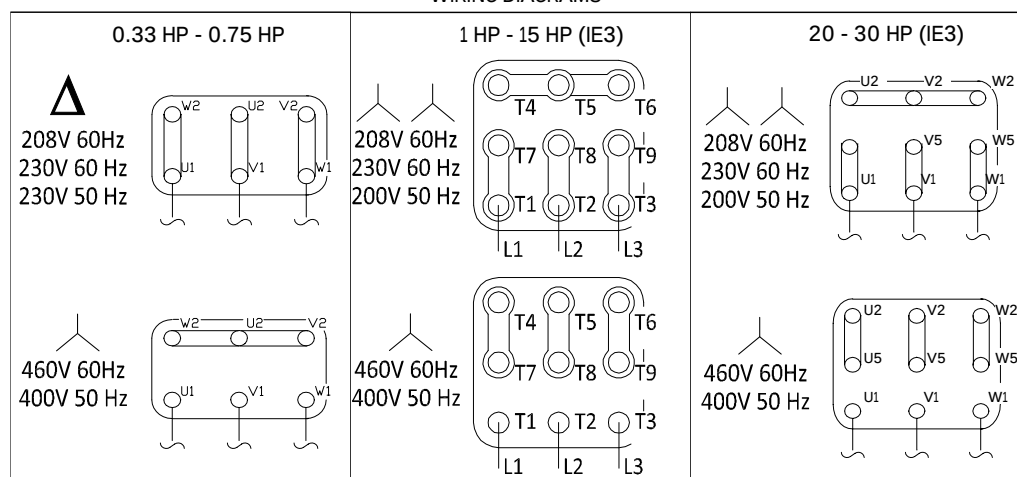
1. Type: 3-phase AC Motor IEC 60034
2. Marks: cURus, CE
3. Nema Premium Efficiency (IE3) - 1 HP AND LARGER (3 ph)
4. Poles: 2
5. Insulation class: F; F (B) for Premium efficient
6. Enclosure: TEFC
7. Protection IP55, Tropicalized
8. Thermal protector: Klaxon 1400 C/150° C
9. Service factor: 1.15 (60 hz)
10. Max. Ambient 40° C
11. Duty: Continuous
12. Construction: aluminum frame

POWER		SIZE	60 HZ			50 HZ			60 hz Starting Current Ratio*	CABLE ENTRY 1 (cable gland incl.)	CABLE ENTRY 2
HP	KW		VOLTAGE	FLA 208-230 / 460 V	Efficiency	VOLTAGE	FLA 200/400 V	Efficiency			
0.33	0.25	63	208-230/460	1.5 / 0.7	59%	230/400	1.4 / 0.8	60.0%	3.9	M16	M20
0.5	0.37	63	208-230/460	2.3 / 1.0	59.2%	230/400	2.1 / 1.2	61.4%	3.6	M16	M20
0.75	0.55	71	208-230/460	2.7 / 1.2	68.8%	230/400	2.6 / 1.5	69.0%	3.8	M16	M20
0.75	0.55	71	208-230/460	2.3-2.2 / 1.3	74.5%	230/400	2.6 / 1.5	74.5%	6.8	M20	-
1	0.75	80	208-230/460	2.99-2.94 / 1.47	77.0%	200/400	3.28 / 1.64	80.7%	8.0	M25	M25
1.5	1.1	80	208-230/460	4.35-4.34 / 2.17	84.0%	200/400	4.92 / 2.46	82.8%	9.3	M25	M25
2	1.5	80**	208-230/460	5.91-5.96 / 2.98	85.5%	200/400	6.82 / 3.41	84.2%	8.7	M25	M25
		90	208-230/460	5.77-5.74 / 2.87	85.5%	200/400	6.58 / 3.29	84.2%	9.4	M25	M25
3	2.2	90	208-230/460	8.27-8.31 / 4.15	86.5%	200/400	9.6 / 4.8	85.9%	10.7	M25	M25
4	3	100	208-230/460	10.9-11.1 / 5.53	88.5%	200/400	12.86 / 6.38	87.1%	11.0	M25	M25
5.5	4	100	208-230/460	14.6-15.1 / 7.55	88.5%	200/400	17.7 / 8.86	88.1%	11.1	M25	M25
6.2	4.6	100	208-230/460	16.5-16.4 / 8.2	89.5%	200/400	19 / 9.5	88.6%	12.5	M25	M25
7.5	5.5	132	208-230/460	19.8-19.5 / 9.75	89.5%	200/400	22.2 / 11.1	89.2%	13.7	M25	M25
10	7.5	132	208-230/460	26.1-25 / 12.5	90.2%	200/400	28.6 / 14.3	90.1%	13.0	M25	M25
15	11	132	208-230/460	38.2-37.3 / 18.7	91.0%	200/400	43.4 / 21.7	91.0%	12.5	M25	M25
20	15	132	208-230/460	47.0 / 23.5	91.7%	200/400	52.4 / 26.2	91.9%	9.7	M32	M32
20***	15	160	208-230/460	48.8 / 24.4	91.0%	200/400	54.4 / 27.2	91.9%	10.7	M32	M32
25	18.5	160	208-230/460	62 / 31	91.7%	200/400	69 / 34.5	92.4%	12.5	M40	M40
30	22	160	208-230/460	71.6/35.8	91.7%	200/400	77.8 / 38.9	92.7%	10.6	M40	M40

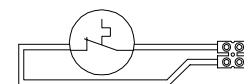
* FLA x starting current ratio = starting current ** 2 hp size 80 motors used on SCL R30-MD ONLY. *** T5 / TD models ONLY.

Shaded models to be discontinued

WIRING DIAGRAMS



Thermal protection



$V_N = 250V$, $\cos\phi 0,6$, $I_N = 1,6 A$
 $V_N = 250V$, $\cos\phi 1$, $I_N = 2,5 A$

Specifications subject to change without notice. Alternate motor suppliers may be used.

FPZ, Inc. 150 N. Progress Drive Saukville, WI 53080 USA Tel. (262) 268-0180 usa@fpz.com www.fpzusa.com



575 Volt Three Phase Electric Motors

TECHNICAL

SS2101

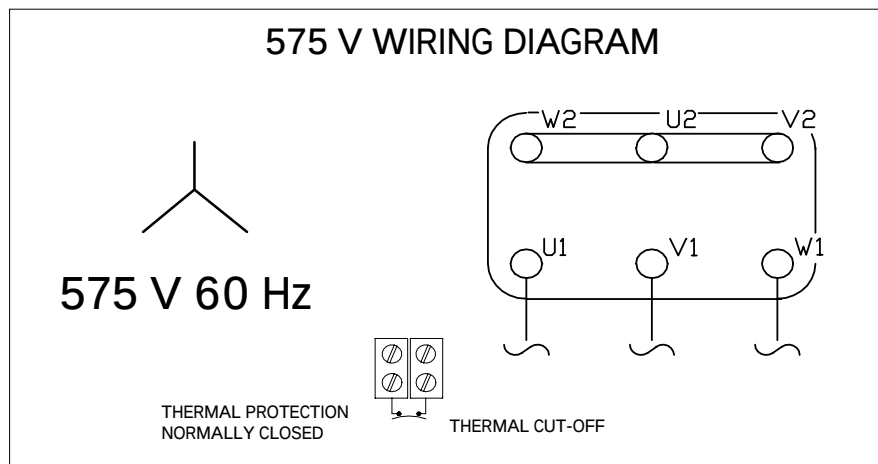
575 V THREE PHASE MOTOR

GENERAL SPECIFICATIONS:

1. Type: 3-phase AC Motor IEC 60034
2. Marks: cURus, CE, Nema Premium Efficiency (IE3)
3. Poles: 2
4. Insulation class: F (B)
5. Frequency: 60 hz / 50 hz
6. Enclosure: TEFC
7. Protection IP55, Tropicalized
8. Thermal protector: Klixon 150⁰ C
9. Service factor: 1.15 (60 hz)
10. Max. Ambient 40⁰ C
11. Duty: Continuous
12. Construction: aluminum frame

POWER		SIZE	60 HZ			Starting Current A	Cable Entry
HP	KW		VOLTAGE	FLA 575 V	Efficiency		
1	0.75	80	575	1.18	77.0%	9.5	M25
1.5	1.1	80	575	1.74	84.0%	16.2	M25
2	1.5	80*	575	2.14	85.5%	17.0	M25
		90	575	2.3	85.5%	21.7	M25
3	2.2	90	575	3.0	86.5%	29.1	M25
4	3	100	575	3.94	88.5%	39.8	M25
5.5	4	100	575	5.31	88.5%	57.9	M25
6.2	4.6	100	575	6.0	89.5%	-	M25
7.5	5.5	132	575	7.21	89.5%	97.4	M25
10	7.5	132	575	10	90.2%	129.0	M25
15	11	132	575	13.9	91.0%	152.9	M25
20	15	132	575	18.8	91.0%	184.3	M25
25	18.5	160	575	24.8	91.7%	310.0	M40
30	22.0	160	575	28.6	91.7%	303.2	M40

* 2 hp size 80 motors used on SCL R30-MD ONLY.



Specifications subject to change without notice. Alternate motor suppliers may be used.



Airflow Through an Orifice

Pressure

Orifice Diameters - Inches

Pressure " H ₂ O	1/32	1/16	1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4	1	1-1/4	1-1/2	1-3/4	2.0	2-1/4	2-1/2	2-3/4	3
1	0.0	0.1	0.2	0.5	0.9	1.4	2.0	2.7	3.5	6	7.8	14	22	31	43	56	70	87	105	125
2	0.0	0.1	0.3	0.7	1.2	1.9	2.8	3.8	4.9	8	11	20	31	44	60	79	100	123	149	177
3	0.0	0.1	0.4	0.8	1.5	2.4	3.4	4.6	6.0	10	14	24	38	54	74	96	122	150	182	217
4	0.0	0.1	0.4	1.0	1.7	2.7	3.9	5.3	7.0	11	16	28	43	63	85	111	141	174	210	250
5	0.0	0.1	0.5	1.1	1.9	3.0	4.4	6.0	7.8	12	18	31	49	70	95	124	157	194	235	280
10	0.0	0.2	0.7	1.5	2.8	4.3	6.2	8.4	11.0	18	25	44	69	99	135	176	222	275	332	395
15	0.1	0.2	0.8	1.9	3.4	5.3	7.6	10.3	13.4	21	30	54	84	121	165	215	272	336	407	484
20	0.1	0.2	1.0	2.2	3.9	6.1	8.7	11.9	15.5	25	35	62	97	140	190	248	314	388	469	559
25	0.1	0.3	1.1	2.4	4.3	6.8	9.8	13.3	17.3	28	39	69	108	156	212	277	351	434	525	624
30	0.1	0.3	1.2	2.6	4.8	7.4	10.7	14.5	19.0	30	43	76	119	171	233	304	385	475	574	684
35	0.1	0.3	1.3	2.9	5.1	8.0	11.5	15.7	20.5	33	46	82	128	185	251	328	415	513	620	738
40	0.1	0.3	1.4	3.1	5.5	8.6	12.3	16.8	21.9	35	49	88	137	197	268	351	444	548	663	789
45	0.1	0.4	1.5	3.3	5.8	9.1	13.1	17.8	23.2	37	52	93	145	209	285	372	470	581	703	836
50	0.1	0.4	1.5	3.4	6.1	9.6	13.8	18.7	24.5	39	55	98	153	220	300	392	496	612	740	881
55	0.1	0.4	1.6	3.6	6.4	10.0	14.4	19.6	25.7	41	58	103	160	231	314	411	520	641	776	924
60	0.1	0.4	1.7	3.8	6.7	10.5	15.1	20.5	26.8	43	60	107	167	241	328	429	542	670	810	964
65	0.1	0.4	1.7	3.9	7.0	10.9	15.7	21.3	27.9	45	63	111	174	251	341	446	564	697	843	1003
70	0.1	0.5	1.8	4.1	7.2	11.3	16.3	22.1	28.9	46	65	116	181	260	354	463	585	723	874	1041
75	0.1	0.5	1.9	4.2	7.5	11.7	16.8	22.9	29.9	48	67	120	187	269	366	479	606	748	905	1077
80	0.1	0.5	1.9	4.3	7.7	12.1	17.4	23.6	30.9	50	70	124	193	278	378	494	625	772	934	1112
85	0.1	0.5	2.0	4.5	8.0	12.4	17.9	24.4	31.6	51	72	127	199	285	390	509	644	795	962	1145
90	0.1	0.5	2.0	4.6	8.2	12.8	18.4	25.1	32.7	53	74	131	204	294	401	524	663	818	990	1178
95	0.1	0.5	2.1	4.7	8.4	13.1	18.9	25.7	33.6	54	76	134	210	302	412	538	680	840	1016	1210
100	0.1	0.5	2.2	4.9	8.6	13.5	19.4	26.4	34.5	55	78	138	215	310	422	551	698	861	1042	1241
105	0.1	0.6	2.2	5.0	8.8	13.8	19.9	27.0	35.3	57	79	141	221	318	432	565	715	882	1068	1271
110	0.1	0.6	2.3	5.1	9.0	14.1	20.3	27.6	36.1	58	81	144	226	325	442	578	731	903	1092	1300

1 psi = 27.68" H₂O

discharge coefficient = 0.65

Air Temperature = 70 deg F

Airflow in CFM

Vacuum

Orifice Diameters - Inches

Vacuum " Hg	1/32	1/16	1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4	1	1-1/4	1-1/2	1-3/4	2.0	2-1/4	2-1/2	2-3/4	3
0.5	0.0	0.1	0.6	1.3	2.2	3.5	5.1	6.9	9	14	20	36	56	81	110	144	182	225	272	324
1	0.0	0.2	0.8	1.8	3.1	4.9	7.1	9.6	13	20	28	50	79	113	154	202	255	315	381	453
2	0.1	0.3	1.1	2.5	4.4	6.8	9.8	13.0	17	27	39	70	109	157	214	280	354	437	529	629
3	0.1	0.3	1.3	3.0	5.2	8.2	11.8	16.0	21	33	47	84	131	189	257	336	425	525	635	756
4	0.1	0.4	1.5	3.3	5.9	9.3	13.4	18.0	24	37	53	95	148	214	291	380	481	594	718	855
5	0.1	0.4	1.6	3.7	6.5	10.0	14.6	20.0	26	41	58	104	162	234	318	416	526	650	786	936
6	0.1	0.4	1.7	3.9	7.0	11.0	15.7	21.0	28	44	63	111	174	251	341	446	564	696	842	1002
7	0.1	0.5	1.8	4.1	7.3	11.0	16.5	22.0	29	46	66	118	184	264	360	470	595	735	889	1058
8	0.1	0.5	1.9	4.3	7.7	12.0	17.3	23.0	31	48	69	123	192	276	376	491	621	766	927	1104
9	0.1	0.5	2.0	4.5	7.9	12.0	17.8	24.0	32	50	71	127	198	285	388	507	642	792	959	1141
10	0.1	0.5	2.0	4.6	8.1	13.0	18.3	25.0	33	51	73	130	203	293	398	520	659	813	984	1171
11	0.1	0.5	2.1	4.7	8.3	13.0	18.7	25.0	33	52	76	133	207	298	406	530	671	829	1003	1193
12	0.1	0.5	2.1	4.7	8.4	13.0	18.9	26.0	34	52	76	134	210	302	412	538	680	840	1016	1210
13	0.1	0.5	2.1	4.8	8.5	13.0	19.1	26.0	34	53	76	135	212	305	415	542	686	847	1025	1219
14	0.1	0.5	2.1	4.8	8.5	13.0	19.1	26.0	34	53	76	136	212	306	416	544	688	849	1028	1223
15	0.1	0.5	2.1	4.8	8.5	13.0	19.1	26.0	34	53	76	136	212	306	416	544	688	849	1028	1223

1" HG = 13.6" H₂O

discharge coefficient = 0.65

Air Temperature = 70 deg F

Airflow in CFM

PRM VACUUM GAUGES



Vacuum gauges measure negative pressure. They are commonly used with vacuum pumps and in suction lines to measure and display vacuum.

Features:

Brass or 304 SS Connections:

Brass connections are used with noncorrosive liquids and gas. For corrosive environments that could damage brass, choose a gauge with a stainless steel connection. PRM Gauges either have bottom connections or back connections.

Dry or Liquid Filled:

Gauges with a dry dial work well for most applications. For environments prone to vibration, gauges with a liquid-filled dial suppress needle flutter for more accurate readings and extend the life of the gauge. Liquid filled gauges have an elastomeric vent/fill plug tip which can be easily cut (after installation) to permit case venting. This is recommended for all liquid filled gauges, especially those with maximum pressure ratings of 100 psi and under. This will compensate for atmospheric changes that could effect the calibration of the filled gauge.

Vacuum Range:

Choose a gauge with a range that is approximately double your normal operating pressure. The maximum operating vacuum pressure of your application should not exceed 75% of the maximum range of the gauge.

Full-Scale Accuracy:

Full-scale accuracy applies to readings for the entire vacuum. Gauges are typically assigned an accuracy grade from 4A to D. PRM Gauges are Grade B ($\pm 1.6\%$ Accuracy)
Ambient Temperature Range: -20°F to 140°F

Dual Scale Readings:

PRM gauges feature Dual Scale readings.



PRM DRY VACUUM GAUGES



PGCNBTY63035330HG

-30 to 0 inHg, -1 to 0 bar
2 Inch Dial
Steel Case
Back Mount
1/4" Brass Connector



PGCNBTY630451160WCV

-160 to 0 "WC, -6 to 0 psi
2.5 Inch Dial
Chrome Case
Bottom Mount
1/4" Brass Connector



PGCNBTY630454160WCV

-160 to 0 "WC, -12 to 0 inHg
2.5 Inch Dial
Chrome Case
Back Mount
1/4" Brass Connector



PGCNBTY6307511V150WCV

-150 to 0 "WC, -11 to 0 inHg
2.5 Inch Dial
Stainless Steel Case
Bottom Mount
1/4" SS Connector



PGCNBTY630453100WCV

-100 to 0 "WC, -7 to 0 inHg
2.5 Inch Dial
Chrome Case
Back Mount
1/4" Brass Connector



PGCNBTY630453J100WCV

-100 to 0 "WC, -7 to 0 inHg
2.5 Inch Dial
Chrome Case
Bottom Mount
1/4" Brass Connector



PGCNBTY630452J60WCV

-60 to 0 "WC, -4 to 0 inHg
2.5 Inch Dial
Chrome Case
Bottom Mount
1/4" Brass Connector



PGCNBTY630452H60WCV

-60 to 0 "WC, -4 to 0 inHg
2.5 Inch Dial
Chrome Case
Back Mount
1/4" Brass Connector

PRM LIQUID FILLED VACUUM GAUGES



PGCNBTY63065630WCV

-30 to 0 "WC, -2 to 0 inHg

2.5 Inch Dial

Stainless Steel Case

Back Mount

1/4" Brass Connector



PGCNBTY63065210HG

-140 to 0 "WC, -10 to 0 inHg

2.5 Inch Dial

Stainless Steel Case

Back Mount

1/4" Brass Connector



PGCNBTY630652J10HG

-140 to 0 "WC, -10 to 0 inHg

2.5 Inch Dial

Stainless Steel Case

Bottom Mount

1/4" Brass Connector



PGCNBTY630252130HG

-30 to 0 inHg, -1 to 0 bar

2.5 Inch Dial

Stainless Steel Case

Bottom Mount

1/4" Brass Connector



PGCNBTY630252230HG

-30 to 0 inHg, -1 to 0 bar

2.5 Inch Dial

Stainless Steel Case

Back Mount

1/4" Brass Connector



PGCNBTY630651200WCV

-200 to 0 "WC, -15 to 0 inHg

2.5 Inch Dial

Stainless Steel Case

Back Mount

1/4" Brass Connector



Roll over image to zoom in Click on image to zoom

Actual product appearance may vary



SCH 80 PVC Sample Port Ball Valve - 1/4 Inch MNPT X Barb

SKU: MGPVC025SAMPLEPORT

Price: \$ 12.99

Quantity:

Add to cart

[← View All Ball Valves](#)

Description

Warranty

Shipping & Delivery

Exchanges

SCH 80 PVC 1/4" SAMPLE PORT VALVE WITH HOSE BARB AND CHEMICAL RESISTANT VITON O-RING.

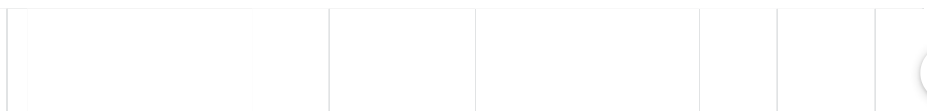
SAMPLE PORT VALVE -

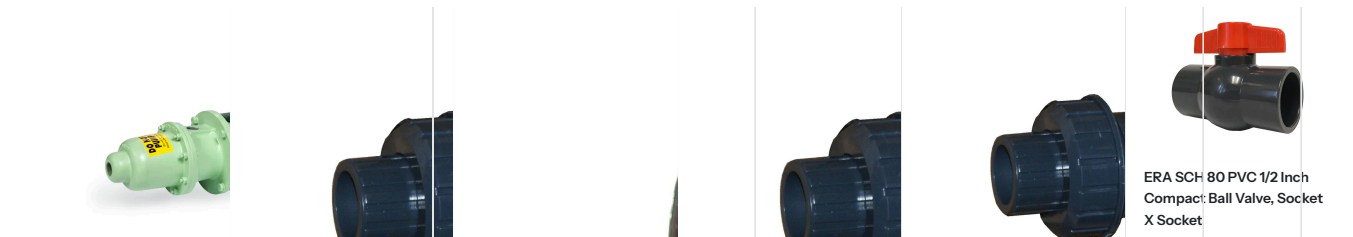
HOSE BARB FOR 1/4" ID HOSE X 1/4" BSPP CONNECTION, COMES WITH 1/4" PVC ADAPTER TO CONVERT BSPP CONNECTION TO NPT. CHEMICAL RESISTANT BUNA-N SEALING WASHER INCLUDED.

This Sch 80 PVC Sample Port Valve is a ball valve is made of PVC (polyvinyl chloride) for less weight than metals, and has a lever handle for on/off manual control. This inline valve has 1/4" male BSPP threads and comes with a National Pipe Taper (NPT) adapter to connect to a female threaded pipe and a 1/4" ID hose connection to connect to a hose going in the same direction. This valve has a Viton Rubber seal for increased chemical resistance. This inline ball valve is suitable for chemical processing and water and wastewater applications.

Ball valves use a spherical disc to control the flow between pipes, tubes, or hoses. Flow is allowed when the hole that pierces the ball-shaped disc is in line with the inlet and outlet of the valve and is blocked when the ball is horizontally swiveled 90 degrees, so that the hole of the ball is perpendicular to the opening of the valve. Ball valves can be referred to as full port or reduced port (also known as regular or standard port) depending on the inner diameter of the valve. A ball valve is full port if the hole of the ball is the same size as the inner diameter of the connecting pipeline (resulting in lower friction) and termed reduced port if the hole of the valve is one pipe size smaller than the pipe, resulting in less flow through the valve than through the shaft of the pipe. Ball valves may have a handle or lever that aligns with the ball's position (open or closed) for manual operation. They are primarily used in air, gas, liquid, and steam applications.

You may also like





ERA SCH 80 PVC 1/2 Inch
Compact Ball Valve, Socket
X Socket

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PRM Filtration is one of the nation's top suppliers for equipment, parts, and maintenance supplies in the environmental remediation and landfill gas recovery industries.

CONTACT US

200 20th Street | Butner | North Carolina 27509 USA

[1-855-643-5598](tel:1-855-643-5598)

sales@prmfiltration.com

8AM -5:00PM, Mon-Fri, EST

CANCELLATION POLICY

There is a 5% non refundable fee on cancellations of orders. This fee is to cover transaction and platform fees, which are non-refundable to us from our vendors. For more information, please refer to our [return policy](#).

REMEDATION EQUIPMENT RENTALS

PRM Filtration has one of the largest rental fleets of remediation equipment and systems in the nation.

We can provide you with the lease equipment you need for short or long term projects. We offer customized leases and terms which can allow you to meet specific project budgets or timelines. In addition, our smaller rental equipment is available for daily, weekly or monthly Pilot Testing. [Click here for details.](#)

Contact us and ask for Bruce for additional information on remediation equipment and rental systems.

Request a Quote

We'll send you an email. All you have to do is reply.

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We Accept



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Liquid error (layout/theme line 148): Could not find asset snippets/quantity-breaks-now.liquid

Appendix D

BMP Tracking Form and NYSDEC Form A



GREEN REMEDIATION METRICS TRACKING LOG

(to be used for Daily / Weekly / or Phase Tracking)

Project Number / Name:

Client:

Address:

Project Start Date:

Project End Date:

___ of ___

Equipment Emissions

Equipment Type	Fuel Type	Hours of Operation	Time of Idling or not in Use
On-site diesel equipment			
Other:			
Other:			
Other:			
Other:			
Other:			

VOC Emissions

Type of Equipment	Hours of Operation	Volume of VOCs Emitted	lbs VOCs Emitted
Soil remediation equipment			
Groundwater remediation equipment			
Other:			
Other:			

Materials & Waste Totals

(See truck logs for more detail)

Imported Materials

Type of Material	Total Quantity	Origin	# of Trips	Miles from Site
Topsoil				
Fill				
Silt Fence				
Silt Logs				
Aggregate Base Course				
Geotextile				
Solidification Additives				
Activated Carbon				
Other:				
Other:				

Total Waste Generated On-Site

Type of Material	Total Quantity	Origin	Exported?	Miles from Site
Remedy Generated Waste				
Contractor Generated Waste				
Other:				
Other:				

Solid Waste Disposal and Diversion

Type of Material	Total Quantity	Disposal Location	# of Trips	Miles from Site
TSCA Contaminated Sediment				
Non-TSCA Contaminated Sediment				
Cleared Vegetation				
Spent Granular Activated Carbon				
Monitoring Well Removal Debris				
Other:				
Other:				



GREEN REMEDIATION METRICS TRACKING LOG

(to be used for Daily / Weekly / or Phase Tracking)

Project Number / Name:

Client:

Address:

Project Start Date:

Project End Date:

___ of ___

Recycled / Bio-Based Products

Type of Material	Total \$ Value	% Recycled Content	% Bio-based Content

Energy Usage

Energy Type	KWh	Total Used	Type of Generation
Total Electricity Usage			
Total Renewable			
Other:			
Other:			

Water Usage

Type of Water	Gallons	Reason for Usage	Provider
Total Water Usage			
Public potable water supply			
Surface water			
On-site treated groundwater			
Reclaimed treated groundwater			
Collected or diverted storm water			
Re-Injected groundwater			
Other:			
Other:			

Land / Ecosystem Tracking

Land Disturbance Type	Total Area	Land Finished / Restored Type	COC Type
Total land area disturbed			
total land area restored			
Increase in area for storm water infiltration (vs pre-disturbed)			
Increase in area of native species plantings (vs pre-disturbed)			
Total area of land impacted by contamination			
Total area of land remediated to unrestricted use			
Total area of land remediated to other future use			



GREEN REMEDIATION METRICS TRACKING LOG

(to be used for Daily / Weekly / or Phase Tracking)

Project Number / Name:

Client:

Address:

Project Start Date:

Project End Date:

__ of __

Additional Comments:

See Daily CAMP Log or Daily Truck Log for more details on work completed, materials imported/exported, and materials/resources used.



Form A Summary of Green Remediation Metrics

Site Name: _____ Site Code: _____ Operable Unit: _____
Address: _____ City: _____
State: _____ Zip: _____ County: _____

Reporting Period

Contract Period From: _____ To: _____
Reporting Period From: _____ To: _____ Is this a Final Report? Yes ☐ No ☐

Contact Information

Preparer's Name: _____ Phone No.: _____
Preparer's Affiliation: _____ Company Code: _____
Contract No. _____

Materials & Waste Generation: Quantify the materials used or consumed and the management of waste generated on-site.

	Current Reporting Period (Include Units)	Total to Date (Include Units)
Materials Brought to the Site		
• Topsoil		
• Fill		
• Silt Fence		
• Silt Logs		
• Aggregate Base Course		
• Geotextile		
• Solidification Additives		
• Activated carbon		
• Other:		
• Other:		
• Other:		
• Other:		
• Other:		
• Other:		
• Other:		
Total Wastes Generated On-Site		
• Remedy Generated Waste		
• Contractor Generated Waste		
• Other:		
• Other:		
• Other:		
• Other:		
• Other:		
• Other:		
• Other:		

Provide a description of any implemented waste reduction programs appropriate for this project in the space provided on the certification page.

Recycled and Bio-Based Content in Imported Products and Materials: Quantify all materials and products imported to the site, including cost of materials/dollar values. Provide total percentages of recycled and bio-based of products and materials.

List Products and Materials Below	Total \$ Value Provided	Total Percent of Recycled Content	Total Percent of Bio-based Content

Provide additional descriptions, as necessary, in the space provided on certification page.

Solid Waste Disposal and Diversion: Quantify all solid wastes generated, and indicate whether material was disposed or diverted for recycling or reuse.

Solid Waste Material	Date	Disposed or Diverted	Volume (Ton or CY)	Disposal/Recycling Facility Name	Comments (if not diverted, state why)
TSCA Contaminated Sediment					
Non-TSCA Contaminated Sediment					
Cleared Vegetation					
Spent Granular Activated Carbon					
Monitoring Well Removal Debris					
Other:					
Other:					
Other:					
Other:					
Other:					
Other:					

Provide descriptions in the space provided on the certification page of all wastes that were redirected for recycling or reuse. Indicate full names and addresses of facilities.

Energy Usage: Quantify the amount of energy used on-site and portion of that voluntarily derived from renewable energy sources.

	Current Reporting Period (KWh)	Total to Date (KWh)
Total electricity usage		
Of that total amount, provide quantity:		
• Derived from renewable source (i.e., solar, wind)		
• Other:		

Provide descriptions in the space provided on the certification page of all reported energy use reduction programs appropriate to this project, including use of electricity derived from renewable sources.

Water Usage: Quantify the volume of water used on-site from difference sources.

	Current Reporting Period (Gallons)	Total to Date (Gallons)
Total quantity of water used on-site		
Of that total amount, provide the quantity obtained from:		
• Public potable water supply		
• Surface water		
• On-site treated groundwater		
• Reclaimed treated water		
• Collected or diverted storm water		
• Re-Injected groundwater		
• Other:		
• Other:		

Provide descriptions in the space provided on the certification page of any reported water use reduction programs applied. Please note if reused/injected groundwater is pre-treated.

Emissions: Quantify the distance traveled for delivery of supplies and removal of waste.

	Current Reporting Period (Miles)	Total to Date (Miles)
Off-site mobile fuel combustion		
Other:		

Provide descriptions in the space provided on the certification page of practices such as use of local vendors within 150 miles of the site and on-site stationary fuel use reduction programs.

Quantify the number of hours that diesel and other equipment with the potential to emit hazardous air pollutants (HAPs) or greenhouse gas (GHG) emissions was operated on-site.

	Current Reporting Period (Hours)	Total to Date (Hours)
On-site diesel excavation/construction equipment usage		
Other on-site processes generating emissions		
Other:		

Quantify the VOC emissions from active remediation systems on-site.

	Current Reporting Period (lbs VOCs emitted)	Total to Date (lbs VOCs emitted)
Operating soil remediation equipment		
Operating groundwater remediation equipment		
Other:		

Provide descriptions in the space provided on the certification page of the type of equipment used, rating, emission control devices used and other means to reduce emissions.

Land and Ecosystem: Quantify the amount of land and/or ecosystems disturbed by construction and the area of land and/or ecosystems restored to a natural condition.

	Current Reporting Period (Acres)	Total to Date (Acres)
Total land area disturbed		
Total land area restored		
Increase in area for storm water infiltration (vs pre-disturbed conditions)		
Increase in area of native species plantings (vs pre-disturbed conditions)		
Other:		

Quantify the amount of land and/or ecosystems remediated.

	Current Reporting Period (Acres)	Total to Date (Acres)
Total area of land impacted by contamination		
Total area of land remediated to unrestricted use		
Total area of land remediated to other future site use		

Additional Comments on Green Remediation Programs Implemented: *Provide descriptions in the space provided of other green remediation practices performed during the project.*

Descriptions of green remediation programs reported above (Attach additional sheet if needed)
Materials and Products Imported:
Waste Generation:

Descriptions of green remediation programs reported above (Attach additional sheet if needed)**Recycled and Bio-Based Content in Imported Products and Materials:****Solid Waste Disposal and Diversion:****Energy Use:****Water Use:****Emissions:****Land and Ecosystem:****Other:****CERTIFICATION BY CONTRACTOR**

I, _____ (**Name**) do hereby certify that I am _____ (**Title**) of the Company/Corporation herein referenced and contractor for the work described in the foregoing application for payment. According to my knowledge and belief, all items and amounts shown on the face of this application for payment are correct, all work has been performed and/or materials supplied, the foregoing is a true and correct statement of the contract account up to and including the last day of the period covered by this application.

Date_____
Contractor

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Appendix E

Green Remediation Evaluation

Remedy Component Number →		Input Summary																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
		1	2	3	4	5	6																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													

		Input Summary																				
Remedy Component Number →		1	2	3	4	5	6									Remedy Component Subtotals						Total
		Column headings in Row 6 must match the name of "Input" tabs in this workbook for Columns C - P in this table to be populated ("0" in Row 4 means "Input" tab is turned Off and will not be grouped to a Remedy Component (Columns Q - V) or used in subsequent calculations)																				
Item		Input Template	Input Template (2)	Input Template (3)	Input Template (4)	Input Template (5)	Input Template (6)	Input Template (7)	Input Template (8)	Input Template (9)	Input Template (10)	Input Template (11)	Input Template (12)	Input Template (13)	Input Template (14)	1	2	3	4	5	6	
Transportation																						
Transportation Fuel Use Breakdown																						
Biodiesel use - Personnel Transport	gal	0														0	0	0	0	0	0	
Biodiesel use - Personnel Transport - User Defined	gal	0														0	0	0	0	0	0	
Biodiesel use - Equipment Transport	gal	0														0	0	0	0	0	0	
Biodiesel use - Equipment Transport - User Defined	gal	0														0	0	0	0	0	0	
Biodiesel use - Material Transport	gal	0														0	0	0	0	0	0	
Biodiesel use - Material Transport - User Defined	gal	0														0	0	0	0	0	0	
Biodiesel use - Waste Transport	gal	0														0	0	0	0	0	0	
Biodiesel use - Waste Transport - User Defined	gal	0														0	0	0	0	0	0	
Diesel use - Personnel Transport - other vehicles	gal	132.4														132.4	0	0	0	0	0	
Diesel use - Personnel Transport - car	gal	0														0	0	0	0	0	0	
Diesel use - Personnel Transport - passenger truck	gal	0														0	0	0	0	0	0	
Diesel use - Personnel Transport - User Defined	gal	0														0	0	0	0	0	0	
Diesel use - Equipment Transport	gal	41.7														41.7	0	0	0	0	0	
Diesel use - Equipment Transport - User Defined	gal	0														0	0	0	0	0	0	
Diesel use - Material Transport	gal	2.142														2.142	0	0	0	0	0	
Diesel use - Material Transport - User Defined	gal	0														0	0	0	0	0	0	
Diesel use - Waste Transport	gal	0.1														0.1	0	0	0	0	0	
Diesel use - Waste Transport - User Defined	gal	0														0	0	0	0	0	0	
Gasoline use - Personnel Transport - other vehicles	gal	0														0	0	0	0	0	0	
Gasoline use - Personnel Transport - car	gal	0														0	0	0	0	0	0	
Gasoline use - Personnel Transport - passenger truck	gal	19														19	0	0	0	0	0	
Gasoline use - Personnel Transport - User Defined	gal	0														0	0	0	0	0	0	
Gasoline use - Equipment Transport	gal	0														0	0	0	0	0	0	
Gasoline use - Equipment Transport - User Defined	gal	0														0	0	0	0	0	0	
Natural Gas use - Personnel Transport	ccf	0														0	0	0	0	0	0	
Natural Gas use - Personnel Transport - User Defined	ccf	0														0	0	0	0	0	0	
Natural Gas use - Equipment Transport	ccf	0														0	0	0	0	0	0	
Conventional Energy																						
Transportation diesel use	gal	176.342														176.342	0	0	0	0	0	
Transportation gasoline use	gal	19														19	0	0	0	0	0	
Transportation natural gas use	ccf	0														0	0	0	0	0	0	
User-defined conventional energy transportation #1	TBD	0														0	0	0	0	0	0	
User-defined conventional energy transportation #2	TBD	0														0	0	0	0	0	0	
Renewable Energy																						
Transportation biodiesel use	gal	0														0	0	0	0	0	0	
User-defined renewable energy transportation #1	TBD	0														0	0	0	0	0	0	
User-defined renewable energy transportation #2	TBD	0														0	0	0	0	0	0	
Off-Site																						
Construction Materials																						
Aluminum, Rolled Sheet	lb	0														0	0	0	0	0	0	
Asphalt, mastic	lb	0														0	0	0	0	0	0	
Asphalt, paving-grade	lb	0														0	0	0	0	0	0	
Ethanol, Corn, 95%	lb	0														0	0	0	0	0	0	
Ethanol, Corn, 99.7%	lb	0														0	0	0	0	0	0	
Ethanol, Petroleum, 99.7%	lb	0														0	0	0	0	0	0	
Gravel/Sand Mix, 65% Gravel	lb	0														0	0	0	0	0	0	
Gravel/sand/clay	lb	0														0	0	0	0	0	0	
HDPE	lb	0														0	0	0	0	0	0	
Photovoltaic system (installed)	W	0														0	0	0	0	0	0	
PVC	lb	0														0	0	0	0	0	0	
Portland cement, US average	lb	0																				
Ready-mixed concrete, 20 MPa	ft3	0														0	0	0	0	0	0	
Round Gravel	lb	0														0	0	0	0	0	0	
Sand	lb	0														0	0	0	0	0	0	
Stainless Steel	lb	0														0	0	0	0	0	0	
Steel	lb	0														0	0	0	0	0	0	
Other refined construction materials	lb	0														0	0	0	0	0	0	
Other unrefined construction materials	lb	0														0	0	0	0	0	0	

Remedy Component Number →		Input Summary																										Total
		1	2	3	4	5	6																					
		Column headings in Row 6 must match the name of "Input" tabs in this workbook for Columns C - P in this table to be populated ("0" in Row 4 means "Input" tab is turned Off and will not be grouped to a Remedy Component (Columns Q - V) or used in subsequent calculations)														Remedy Component Subtotals												
		Input Template	Input Template (2)	Input Template (3)	Input Template (4)	Input Template (5)	Input Template (6)	Input Template (7)	Input Template (8)	Input Template (9)	Input Template (10)	Input Template (11)	Input Template (12)	Input Template (13)	Input Template (14)	1	2	3	4	5	6							
Item																												
<u>Treatment Materials & Chemicals</u>																												
Cheese Whey	lbs	0														0	0	0	0	0	0							
Emulsified vegetable oil	lbs	0														0	0	0	0	0	0							
Granular activated carbon, primary	lbs	0														0	0	0	0	0	0							
Granular activated carbon, regenerated	lbs	0														0	0	0	0	0	0							
Hydrogen Peroxide, 50% in H2O	lbs	0														0	0	0	0	0	0							
Iron (II) Sulfate	lbs	0														0	0	0	0	0	0							
Lime, Hydrated, Packed	lbs	0														0	0	0	0	0	0							
Molasses	lbs	0														0	0	0	0	0	0							
Phosphoric Acid, 70% in H2O	lbs	0														0	0	0	0	0	0							
Potassium Permanganate	lbs	0														0	0	0	0	0	0							
Sodium Hydroxide, 50% in H2O	lbs	0														0	0	0	0	0	0							
Other Treatment Chemicals & Materials	lbs	0														0	0	0	0	0	0							
<u>Material Type</u>																												
Total Virgin Refined Materials	tons	0.2655														0.2655	0	0	0	0	0							
Total Recycled Refined Materials	tons	0														0	0	0	0	0	0							
Total Reused Refined Materials	tons	0														0	0	0	0	0	0							
Total Refined Material	tons	0.2655														0.2655	0	0	0	0	0							
Total Virgin Unrefined Materials	tons	0														0	0	0	0	0	0							
Total Recycled Unrefined Materials	tons	0														0	0	0	0	0	0							
Total Reused Unrefined Materials	tons	0														0	0	0	0	0	0							
Total Unrefined Material	tons	0														0	0	0	0	0	0							
<u>Fuel Processing</u>																												
Biodiesel produced	gal	0														0	0	0	0	0	0							
Diesel produced	gal	220.3786972														220.3787	0	0	0	0	0							
Gasoline produced	gal	19														19	0	0	0	0	0							
Compressed natural gas produced	ccf	0														0	0	0	0	0	0							
Liquified petroleum gas produced	gal	0														0	0	0	0	0	0							
Natural gas produced	ccf	0														0	0	0	0	0	0							
<u>Water Use</u>																												
Public Water Supply	gal x 1000	0.015														0.015	0	0	0	0	0							
Extracted Groundwater	gal x 1000	0														0	0	0	0	0	0							
Surface Water	gal x 1000	0														0	0	0	0	0	0							
Reclaimed Water	gal x 1000	0														0	0	0	0	0	0							
Collected/Diverted Storm Water	gal x 1000	0														0	0	0	0	0	0							
User-defined water resource #1	gal x 1000	0														0	0	0	0	0	0							
User-defined water resource #2	gal x 1000	0														0	0	0	0	0	0							
<u>Waste/Recycle Handling</u>																												
Hazardous waste incineration	lbs	0														0	0	0	0	0	0							
Off-site waste water treatment (POTW)	gal x 1000	0														0	0	0	0	0	0							
Off-site non-hazardous waste landfill	tons	0.1														0.1	0	0	0	0	0.1							
Off-site hazardous waste landfill	tons	0														0	0	0	0	0	0							
Recycled/Reused On-Site	tons	0.2														0.2	0	0	0	0	0.2							
Recycled/Reused Off-Site	tons	0														0	0	0	0	0	0							
<u>Solid Waste Totals</u>																												
Total Non-Hazardous Waste	tons	0.1														0.1	0	0	0	0	0.1							
Total Hazardous Waste	tons	0														0	0	0	0	0	0							
Total Recycled/Reused	tons	0.2														0.2	0	0	0	0	0.2							
Total Waste (all types)	tons	0.3														0.3	0	0	0	0	0.3							

Remedy Component Number →		Input Summary														Remedy Component Subtotals						Total
		1	2	3	4	5	6															
		Column headings in Row 6 must match the name of "Input" tabs in this workbook for Columns C - P in this table to be populated ("0" in Row 4 means "Input" tab is turned Off and will not be grouped to a Remedy Component (Columns Q - V) or used in subsequent calculations)																				
		Input Template	Input Template (2)	Input Template (3)	Input Template (4)	Input Template (5)	Input Template (6)	Input Template (7)	Input Template (8)	Input Template (9)	Input Template (10)	Input Template (11)	Input Template (12)	Input Template (13)	Input Template (14)	1	2	3	4	5	6	
Item																						
<u>Lab Services</u>																						
Off-site Laboratory Analysis - Other	sample	0														0	0	0	0	0	0	
Off-site Laboratory Analysis - Metals	sample	0														0	0	0	0	0	0	
Off-site Laboratory Analysis - Mercury	sample	0														0	0	0	0	0	0	
Off-site Laboratory Analysis - Inorganic Anions	sample	0														0	0	0	0	0	0	
Off-site Laboratory Analysis - Alkalinity	sample	0														0	0	0	0	0	0	
Off-site Laboratory Analysis - Perchlorate	sample	0														0	0	0	0	0	0	
Off-site Laboratory Analysis - Nitrogen/Nitrate	sample	0														0	0	0	0	0	0	
Off-site Laboratory Analysis - Sulfate	sample	0														0	0	0	0	0	0	
Off-site Laboratory Analysis - PCBs	sample	0														0	0	0	0	0	0	
Off-site Laboratory Analysis - VOCs	sample	15														15	0	0	0	0	15	
Off-site Laboratory Analysis - SVOCs	sample	0														0	0	0	0	0	0	
<u>Resource Extraction for Electricity</u>																						
Coal extraction and processing	MWh	0.0577365														0.0577365	0	0	0	0	0.0577365	
Natural gas extraction and processing	MWh	0.0641727														0.0641727	0	0	0	0	0.0641727	
Nuclear fuel extraction and processing	MWh	0.0374814														0.0374814	0	0	0	0	0.0374814	
Oil extraction and processing	MWh	0.0013251														0.0013251	0	0	0	0	0.0013251	
Other fuel extraction and processing	MWh	0.0001893														0.0001893	0	0	0	0	0.0001893	
<u>Electricity Transmission</u>																						
Transmission and distribution losses	MWh	0.1893														0.1893	0	0	0	0	0.1893	
<u>Other</u>																						
User-defined material #1	TBD	0														0	0	0	0	0	0	
User-defined material #2	TBD	0														0	0	0	0	0	0	
User-defined material #3	TBD	0														0	0	0	0	0	0	
User-defined material #4	TBD	0														0	0	0	0	0	0	
User-defined material #5	TBD	0														0	0	0	0	0	0	
User-defined material #6	TBD	0														0	0	0	0	0	0	
User-defined material #7	TBD	0														0	0	0	0	0	0	
User-defined material #8	TBD	0														0	0	0	0	0	0	
User-defined material #9	TBD	0														0	0	0	0	0	0	
User-defined material #10	TBD	0														0	0	0	0	0	0	
User-defined material #11	TBD	0														0	0	0	0	0	0	
User-defined material #12	TBD	0														0	0	0	0	0	0	
User-defined material #13	TBD	0														0	0	0	0	0	0	
User-defined material #14	TBD	0														0	0	0	0	0	0	
User-defined material #15	TBD	0														0	0	0	0	0	0	
User-defined material #16	TBD	0														0	0	0	0	0	0	
User-defined material #17	TBD	0														0	0	0	0	0	0	
User-defined material #18	TBD	0														0	0	0	0	0	0	
User-defined material #19	TBD	0														0	0	0	0	0	0	
User-defined material #20	TBD	0														0	0	0	0	0	0	
<u>User-defined Waste Destinations</u>																						
User-defined recycled/reused on-site #1	TBD	0														0	0	0	0	0	0	
User-defined recycled/reused on-site #2	TBD	0														0	0	0	0	0	0	
User-defined recycled/reused on-site #3	TBD	0														0	0	0	0	0	0	
User-defined recycled/reused off-site #1	TBD	0														0	0	0	0	0	0	
User-defined recycled/reused off-site #2	TBD	0														0	0	0	0	0	0	
User-defined recycled/reused off-site #3	TBD	0														0	0	0	0	0	0	
User-defined non-hazardous waste destination #1	TBD	0														0	0	0	0	0	0	
User-defined non-hazardous waste destination #2	TBD	0														0	0	0	0	0	0	
User-defined non-hazardous waste destination #3	TBD	0														0	0	0	0	0	0	
User-defined hazardous waste destination #1	TBD	0														0	0	0	0	0	0	
User-defined hazardous waste destination #2	TBD	0														0	0	0	0	0	0	
User-defined hazardous waste destination #3	TBD	0														0	0	0	0	0	0	

Input Worksheet for Input Template

Please specify which Remedy Component this Input worksheet is part of: (Select "Off" to exclude this Input worksheet from calculations and results)	Component 1	SVE System Installation
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General Scope	Example Items Eliminated through Screening Process
SVE System Instllation, SVE System Operation, SVE System Monitoring and Sampling, End-Point Sampling, SVE System Decommissioning	

Other Notes and References

Personnel Transportation

Participant	Number of Roundtrips to Site	Roundtrip Distance to Site (miles)	Mode of Transportation*	Transport Fuel Type*	Total Distance Transported (miles)	Default Fuel Usage Rate**	Fuel Usage Rate Override**	Fuel Used for Personnel Transport**	Activity or Notes
Drilling Subcontractor Personnel 1	2	250	Heavy-Duty Truck	Diesel	500	7.55		66.2	Drilling subcontractor trip to site and back each day
Drilling Subcontractor Personnel 2	2	250	Heavy-Duty Truck	Diesel	500	7.55		66.2	Drilling subcontractor trip to site and back each day
C&S Staff	12	30	Light-Duty/Passenger Truck	Gasoline	360	18.9		19	C&S trip to site, lab, and back each day

* See the "Detailed Notes and Explanations" tab for explanation of transport and fuel options. ** for biodiesel, B20, diesel, and gasoline, units are gallons for Fuel Used and miles/gallon for Fuel Usage Rate; for natural gas, units are hundreds of cubic feet (ccf) for Fuel Used and ccf/miles for Fuel Usage Rate; for electricity, units are miles/kWh for Fuel Usage Rate and the kWh (Fuel Used) are added to total grid electricity used (cell G69).

On-Site Equipment Use and Transportation

Equipment Type*	HP*	Load Factor (%)*	Equipment Fuel Type**	Equipment Fuel Usage Rate	Equipment Hours Operated	Fuel Used for On-site Equipment	Equipment weight (tons)	Number of Equipment Roundtrips to Site	Roundtrip Distance to Site (miles)	Total Distance Transported (miles)	Mode of Transportation	Transport Fuel Type***	Default Transport Fuel Usage Rate (gptm or mpg)	Transport Fuel Usage Rate Override (gptm or mpg)	Fuel Used for Equipment Transport (gallons)	Activity or Notes
Drilling - direct push (60 HP)	60	75%	Diesel less than 75 hp	2.752293578	16	44.03669725	5	1	250	250	Truck (mpg)	Diesel	6		41.7	GeoProbe

* HP and Load Factor must be entered by user in Columns C and D. Please see the "Detailed Notes and Explanations" tab for further explanation.

** For biodiesel, B20, diesel, gasoline, and liquified petroleum gas, units are gallons for Fuel Used for On-site Equipment and gallons/hr for Equipment Fuel Usage Rate; for compressed natural gas units are ccf (hundreds of cubic feet) for Fuel Used for On-site Equipment and ccf/hr for Equipment Fuel Usage Rate.

*** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation and other aspects of data entry in Columns M, N, and P. Units are gallons for Fuel Used for Equipment Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.

Input Worksheet for Input Template

Remedy Component that this Input worksheet is part of:	Component 1	SVE System Installation
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On-Site Electricity Use

Equipment Type	HP	Load Factor (%)	Efficiency (%)	Electrical Rating (kW)	Hours Used	Energy Used (kWh)	Notes
<Equip. with HP, Efficiency, and Hours>							
<Equip. with HP, Efficiency, and Hours>							
<Equip. with HP, Efficiency, and Hours>							
<Equip. with HP, Efficiency, and Hours>							
Concrete Core Drill				2.4	2	4.8	Drill for coring floor for borings
0.3 HP Regenerative Blower				0.25	730	182.5	Continuous operation of blower - 1 mo
Dewalt Hammer Drill				1	2	2	Drill for sub-slab vapor points
<Equip. with known kW rating>							
<Equip. with known total Energy Used>							
<Equip. with known total Energy Used>							
<Equip. with known total Energy Used>							
<Equip. with known total Energy Used>							
Estimated Total Electricity Usage Based on Above						189.3	
Renewable Electricity Generated On-Site*							
Total Electricity Usage Based on Personnel Transportation						0	
Total Grid Electricity Used						189.3	

* Electricity generated on-site from renewable resources, for which the facility retains the rights to the renewable energy (i.e., does not sell renewable energy certificates associated with the renewable energy generation).

On-Site Natural Gas Use

Equipment Type	Power Rating (Btu/hr)	Efficiency (%)	Hours Used	Energy Required (Btu)	Natural Gas Used (ccf)	Notes
					0	
				0		
Totals			0	0	0	

Landfill Gas Combusted On-Site for Energy Use

Equipment Type	Landfill Gas (ccf)	% Methane by volume	Used for electricity?	Landfill Gas Methane Used (ccf)	Notes
				0	
				0	
				0	
Total				0	

Please see the “Detailed Notes and Explanations” tab for instructions on using the two tables above (“On-site Natural Gas Use” and “Landfill Gas Combusted On-Site for Energy Use”). In the two tables above, ccf = hundreds of cubic feet.

Materials Use and Transportation

Material Type*	Unit	Quantity	Tons	Is the Material Refined or Unrefined?**	Material Source: Virgin, Recycled, or Reused?**	Calculate Item Footprint?***	Default One-way Distance to Site (miles)	One-way Distance to Site Override (miles)	Number of One-way Trips to Site	Include Return Trip in Calculations?	Total Distance Transported (miles)	Mode of Transportation* **	Transport Fuel Type	Default Transport Fuel Usage Rate (gptm or mpg)	Transport Fuel Usage Rate Override (gptm or mpg)	Fuel Used for Materials Transport (gallons)	Notes and Description of Materials
PVC	lb	81	0.0405	Refined	Virgin	No	500	250		No	250	(gptm)	Diesel	0.032258065		0.327	PVC for well construction, risers, and fittings
Portland cement, US average	lb	110	0.055	Refined	Virgin	No	25	250		No	250	Truck single unit (gptm)	Diesel	0.032258065		0.444	Cement for well construction and decommissioning
Sand	lb	190	0.095	Refined	Virgin	No	25	250		No	250	Truck single unit (gptm)	Diesel	0.032258065		0.766	Sand for well construction
Ready-mixed concrete, 20 MPa	ft3	2	0.075	Refined	Virgin	No	25	250		No	250	Truck single unit (gptm)	Diesel	0.032258065		0.605	Concrete for floor patching
			0														
			0														
			0														
			0														
			0														
			0														
			0														
			0														
			0														
			0														
			0														
			0														
			0														
			0														

* Please see the “Detailed Notes and Explanations” tab for instructions on specifying “User-Defined Materials” in the dropdown menu.

** Selections must be made in Columns F - H in order for the footprint calculations to be performed. Please see the “Detailed Notes and Explanations” tab for further information.

*** Please see the “Detailed Notes and Explanations” tab for instructions on selecting mode of transportation, accounting for empty return trips, and other aspects of data entry in Columns L, N, O, and Q. Units are gallons for Fuel Used for Materials Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.

Input Worksheet for Input Template

Spreadsheets for Environmental Footprint Analysis (SEFA) Version 3.0, November 2019
1153-69 West Fayette BCP Site (No. C734164) - Interim Remedial Measure Work Plan

Remedy Component that this Input worksheet is part of:	Component 1	SVE System Installation
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Waste Disposal and Transportation

Waste Destination*	Unit	Quantity	Tons	Default One-way Distance to Site (miles)	One-way Distance to Site Override (miles)	Number of One-way Trips to Site	Include Return Trip in Calculations?	Total Distance Transported (miles)	Mode of Transportation **	Transport Fuel Type	Default Transport Fuel Usage Rate (gptm or mpg)	Transport Fuel Usage Rate Override (gptm or mpg)	Fuel Used for Waste Transport (gallons)	Notes and Description of Waste
Recycled/reused on-site	tons	0.2	0.2	0			No	0	Truck single unit (gptm)	Diesel	0.032258065		0.0	Place soil cuttings underneath cover system during construction
Off-site non-hazardous waste landfill	tons	0.1	0.1	25			No	25	Truck single unit (gptm)	Diesel	0.032258065		0.1	Disposal of general refuse (PPE, acetate liners, piping upon decommissioning, etc.)
			0											
			0											
			0											
			0											
			0											
			0											
			0											
			0											
			0											
			0											

* No footprint is calculated for the Recycled/Reused On-Site and Off-Site selections. Please see the “Detailed Notes and Explanations” tab for instructions on specifying “User-Defined” selections in the dropdown menu.

** Please see the "Detailed Notes and Explanations" tab for instructions on selecting mode of transportation, accounting for empty return trips, and other aspects of data entry in Columns I, K, L, and N. Units are gallons for Fuel Used for Waste Transport and miles/gallon (mpg) or gallons per ton-mile (gptm) for Transport Fuel Usage Rate.

Source of Water Used*	Unit	Quantity	Tons	Source Location/Aquifer (optional)	Quality of Water Used (optional)	Water Uses (optional)	Fate of Used Water (optional)
Public Water	gal x 1000	0.015	0.06255				Cement mixing and decontamination water
			0				
			0				
			0				
			0				
			0				
			0				
			0				
			0				
			0				
			0				
			0				

* Only the "Public Water" selection has an associated footprint. No footprint is calculated for the other water source selections.

Note: Information entered in Columns F - V (Source/Quality/Use/Fate) is not compiled or reported by SEFA.

Input Worksheet for Input Template

Spreadsheets for Environmental Footprint Analysis (SEFA) Version 3.0, November 2019
1153-69 West Fayette BCP Site (No. C734164) - Interim Remedial Measure Work Plan

Remedy Component that this Input worksheet is part of:	Component 1	SVE System Installation
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Other Energy Use and Air Emissions

Item		Units	Quantity	Notes
<u>On-Site</u>				
User-defined on-site conventional energy use #1	*User-Defined	TBD		
User-defined on-site conventional energy use #2	*User-Defined	TBD		
On-site HAP process emissions**		lbs	0.4	VOC emissions from SVE system operation for 1 month
On-site GHG emissions**		lbs CO2e		
On-site carbon storage**		lbs CO2e		
Landfill gas flared on-site		ccf CH4		
Other on-site NOx emissions or reductions**		lbs		
Other on-site SOx emissions or reductions**		lbs		
Other on-site PM emissions or reductions**		lbs		
<u>Transportation</u>		Units	Quantity	Notes
User-defined conventional energy transportation #1	*User-Defined	TBD		
User-defined conventional energy transportation #2	*User-Defined	TBD		

* Enter units and conversion factors on "User Defined Factors" tab
** Enter a positive number for emissions and a negative number for reductions, avoidances, or storage
See the "Detailed Notes and Explanations" tab for use of this table.

Other Voluntary Renewable Energy Use

Item		Units	Quantity	Notes
User-defined on-site renewable energy use #1	*User-Defined	TBD		
User-defined on-site renewable energy use #2	*User-Defined	TBD		
User-defined renewable energy transportation #1	*User-Defined	TBD		
User-defined renewable energy transportation #2	*User-Defined	TBD		
Voluntary purchase of renewable electricity**		MWh		
Voluntary purchase of RECs**		MWh		

* Enter units and conversion factors on "User Defined Factors" tab
** Complete information on provider in the table to the right. No footprint reductions are associated with the voluntary purchases.
See the "Detailed Notes and Explanations" tab for use of this table

Off-Site Laboratory Analysis

Parameter and Notes	Number of Samples	Comments
Off-site Laboratory Analysis - VOCs	15	
Off-site Laboratory Analysis - SVOCs		
Off-site Laboratory Analysis - Other		
Off-site Laboratory Analysis - Other		
Off-site Laboratory Analysis - PCBs		
Off-site Laboratory Analysis - Metals		
Off-site Laboratory Analysis - Mercury		
Off-site Laboratory Analysis - Other		
Off-site Laboratory Analysis - Other		
Off-site Laboratory Analysis - Other		
Off-site Laboratory Analysis - Other		
Totals	15	

Description of purchased renewable electricity (green pricing product or green marketing product)	Provider:	
	Type of product:	
	Type of renewable energy source:	
	Date of renewable system installation:	
Description of purchased RECs	Provider:	
	Type of renewable energy source:	
	Date of renewable system installation:	
	Location of renewable system installation:	

SVE System Installation - On-Site Footprint (Scope 1)

Contributors to Footprints	Units	Usage	Energy		GHG		NOx		SOx		PM		HAPs	
			Conv. Factor	MMBtus	Conv. Factor	lbs CO2e	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs
On-Site														
<u>On-site Renewable Energy</u>														
Renewable electricity generated on-site	MWh	0	3.413	0										
Landfill gas combusted on-site for energy use	ccf CH4	0	0.103	0	13.1	0	0.01	0	0.000063	0	0.00076	0	0.0000084	0
On-site biodiesel use	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
On-site biodiesel use - User Defined	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
User-defined on-site renewable energy use #1	gal	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined on-site renewable energy use #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
On-site Renewable Energy Subtotals				0		0		0		0		0		0
Notes:														
<u>On-site Conventional Energy</u>														
On-site grid electricity	MWh	0.1893	3.413	0.6460809										
On-site diesel use - Other	Gal	0	0.139	0	22.5	0	0.17	0	0.0054	0	0.0034	0	0.0000052	0
On-site diesel use <75 hp	Gal	44.036697	0.139	6.1211009	22.21	978.05505	0.1565	6.8917431	0.000145	0.0063853	0.0145	0.6385321	0.00004	0.0017615
On-site diesel use 75<hp<750	Gal	0	0.139	0	22.24	0	0.101	0	0.00013	0	0.009	0	0.00004	0
On-site diesel use >750 hp	Gal	0	0.139	0	22.24	0	0.149	0	0.00013	0	0.006	0	0.00004	0
On-site gasoline use - Other	Gal	0	0.124	0	19.6	0	0.11	0	0.0045	0	0.00054	0	0.000039	0
On-site gasoline use <25 hp	Gal	0	0.124	0	17.48	0	0.037	0	0.00025	0	0.165	0	0.00008	0
On-site gasoline use >25 hp	Gal	0	0.124	0	19.93	0	0.032	0	0.00029	0	0.002	0	0.00009	0
On-site natural gas use	ccf	0	0.103	0	13.1	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
On-site compressed natural gas use - Other	ccf	0	NP		1957.835	0	16.0325	0	0.023045	0	0.2775	0	0	0
On-site compressed natural gas use	ccf	0	NP		1957.835	0	16.0325	0	0.023045	0	0.2775	0	0	0
On-site liquified petroleum gas use - Other	gal	0	NP		12.69	0	0.021	0	0.00013	0	0.001	0	0	0
On-site liquified petroleum gas use	gal	0	NP		12.69	0	0.021	0	0.00013	0	0.001	0	0	0
Other forms of on-site conventional energy use #1	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
Other forms of on-site conventional energy use #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
On-site Conventional Energy Subtotals				7		978		7		0		1		0
Notes:														
<u>Other On-site Emissions</u>														
On-site HAP process emissions	lbs	0.4											1	0.4
On-site GHG emissions	lbs CO2e	0			1	0								
On-site carbon storage	lbs CO2e	0			1	0								
GHG avoided by flaring on-site landfill methane	Lbs	0			-262	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
Other on-site NOx emissions or reductions	lbs	0					1	0						
Other on-site SOx emissions or reductions	lbs	0							1	0				
Other on-site PM emissions or reductions	lbs	0									1	0		
User-defined recycled/reused on-site #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined recycled/reused on-site #3	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined recycled/reused off-site #1	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
Notes:														
On-site Totals				6.77		978		7		0		1		0

SVE System Installation - Electricity Generation Footprint (Scope 2)

Contributors to Footprints	Units	Usage	Energy		GHG		NOx		SOx		PM		HAPs	
			Conv. Factor	MMBtus	Conv. Factor	lbs CO2e	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs
<u>Electricity Generation</u>														
Grid electricity	MWh	0.1893	6.929	1.3116597	1124.3	212.82999	2.2421	0.4244295	4.6078874	0.8722731	0.057518	0.0108882	0.2102371	0.0397979
Voluntary purchase of renewable electricity	MWh	0												
Voluntary purchase of RECs	MWh	0												
Notes:														

SVE System Installation - Transportation Footprint (Scope 3a)

Category	Units	Usage	Energy		Greenhouse Gas		NOx		SOx		PM		HAPs	
			Conv. Factor	MMBtus	Conv. Factor	lbs CO2e	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs
<i>Conventional Energy</i>														
Transportation diesel use	gal	176.342	0.139	24.511538	22.5	3967.695	0.17	29.97814	0.0054	0.9522468	0.0034	0.5995628	0.0000052	0.000917
Transportation diesel use - car	gal	0	0.139	0	22.57	0	0.015	0	0.0002	0	0.003	0	0.00252	0
Transportation diesel use - passenger truck	gal	0	0.139	0	22.545	0	0.0585	0	0.0002	0	0.007	0	0.002605	0
Transportation diesel use - User Defined	gal	0	0.139	0	22.5	0	0.17	0	0.0054	0	0.0034	0	0.0000052	0
Transportation gasoline use	gal	0	0.124	0	19.6	0	0.11	0	0.0045	0	0.00054	0	0.000039	0
Transportation gasoline use - car	gal	0	0.124	0	19.77	0	0.027	0	0.00036	0	0.003	0	0.0067	0
Transportation gasoline use - passenger truck	gal	19	0.124	2.356	19.79	376.01	0.035	0.665	0.00036	0.00684	0.003	0.057	0.00661	0.12559
Transportation gasoline use - User Defined	gal	0	0.124	0	19.6	0	0.11	0	0.0045	0	0.00054	0	0.000039	0
Transportation natural gas use	ccf	0	0.103	0	13.1	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
Transportation natural gas use - User Defined	ccf	0	0.103	0	13.1	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
User-defined conventional energy transportation #1	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined conventional energy transportation #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
Conventional Energy Subtotals				27		4,344		31		1		1		0
Notes:														
<i>Renewable Energy</i>														
Transportation biodiesel use	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
Transportation biodiesel use - User Defined	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
User-defined renewable energy transportation #1	TBD	0	Biodiesel		0	0	0	0	0	0	0	0	Ref.	
User-defined renewable energy transportation #2	TBD	0	npg or pnp		0	0	0	0	0	0	0	0	0	0
Renewable Energy Subtotals				0		0		0		0		0		0
Notes:														
Transportation Totals				27		4344		31		1		1		0

SVE System Installation - Off-Site Footprint (Scope 3b)

Category	Units	Usage	Energy		Greenhouse Gas		NOx		SOx		PM		HAPs	
			Conv. Factor	MMBtus	Conv. Factor	lbs CO2e	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs
<u>Construction Materials</u>														
Aluminum, Rolled Sheet	lb	0	0.0633	0	9.15	0	0.0148	0	0.0283	0	0.0088	0	0.00102	0
Asphalt, mastic	lb	0	0.0412	0	0.85	0	0.00271	0	0.00798	0	0.000766	0	0.00107	0
Asphalt, paving-grade	lb	0	0.5	0	8.58	0	0.0299	0	0.0969	0	0.0091	0	0.0133	0
Ethanol, Corn, 95%	lb	0	0.0318	0	-0.0199	0	0.00425	0	0.00303	0	0.000469	0	0.0000846	0
Ethanol, Corn, 99.7%	lb	0	0.0324	0	0.0591	0	0.00431	0	0.0031	0	0.000472	0	0.000087	0
Ethanol, Petroleum, 99.7%	lb	0	0.0205	0	1.25	0	0.00199	0	0.00214	0	0.000277	0	0.0000589	0
Gravel/Sand Mix, 65% Gravel	lb	0	0.0000248	0	0.0024	0	0.000018	0	4.52E-06	0	2.61E-06	0	3.08E-07	0
Gravel/sand/clay	lb	0	0.000028	0	0.00335	0	0.0000165	0	0.000015	0	0.000002	0	2.05E-10	0
HDPE	lb	0	0.0332	0	1.94	0	0.00325	0	0.00409	0	0.000439	0	0.0000641	0
Photovoltaic system (installed)	W	0	0.0336	0	4.47	0	0.015	0	0.032	0	0.00063	0	0.0000029	0
PVC	lb	0	0.0262	0	2.02	0	0.004	0	0.00274	0	0.000372	0	0.000375	0
Portland cement, US average	lb	0	0.0139	0	1.34	0	0.00654	0	0.0104	0	0.00378	0	0.00097	0
Ready-mixed concrete, 20 MPa	ft3	0	0.217	0	19.5	0	0.0975	0	0.154	0	0.057	0	0.0141	0
Round Gravel	lb	0	0.0000248	0	0.0024	0	0.000018	0	4.52E-06	0	2.61E-06	0	3.08E-07	0
Sand	lb	0	0.0000248	0	0.0024	0	0.000018	0	4.52E-06	0	2.61E-06	0	3.08E-07	0
Stainless Steel	lb	0	0.0116	0	3.4	0	0.0075	0	0.012	0	0.0044	0	0.000144	0
Steel	lb	0	0.0044	0	1.1	0	0.0014	0	0.0017	0	0.00056	0	0.000067	0
Other refined construction materials	lb	0	0.01885	0	2.115	0	0.0040375	0	0.0051325	0	0.0014428	0	0.0001625	0
Other unrefined construction materials	lb	0	0.000028	0	0.00335	0	0.0000165	0	0.000015	0	0.000002	0	2.05E-10	0
Notes:														

SVE System Installation - Off-Site Footprint (Scope 3b)

Category	Units	Usage	Energy		Greenhouse Gas		NOx		SOx		PM		HAPs	
			Conv. Factor	MMBtus	Conv. Factor	lbs CO2e	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs
<u>Treatment Materials & Chemicals</u>														
Cheese Whey	lbs	0	0.0025	0	0.031	0	0.000062	0	0.000033	0	0.000002	0	NP	
Emulsified vegetable oil	lbs	0	0.0077	0	3.44	0	0.0066	0	0.0019	0	0.000033	0	NP	
Granular activated carbon, primary	lbs	0	0.0356	0	4.82	0	0.0793	0	0.128	0	0.000987	0	0.000657	0
Granular activated carbon, regenerated	lbs	0	0.00873	0	1.7	0	0.00733	0	0.0129	0	0.000886	0	0.000671	0
Hydrogen Peroxide, 50% in H2O	lbs	0	0.00979	0	1.19	0	0.00142	0	0.0024	0	0.000308	0	0.0000629	0
Iron (II) Sulfate	lbs	0	0.00147	0	0.167	0	0.000316	0	0.000589	0	0.000103	0	0.000023	0
Lime, Hydrated, Packed	lbs	0	0.00206	0	0.762	0	0.000513	0	0.000358	0	0.00013	0	6.57E-06	0
Molasses	lbs	0	0.0044	0	0.48	0	0.0011	0	0.00024	0	0.0000041	0	NP	
Phosphoric Acid, 70% in H2O	lbs	0	0.0067	0	0.882	0	0.00282	0	0.0294	0	0.00171	0	0.000163	0
Potassium Permanganate	lbs	0	0.00981	0	1.16	0	0.00234	0	0.0032	0	0.000422	0	0.000122	0
Sodium Hydroxide, 50% in H2O	lbs	0	0.00977	0	1.09	0	0.00194	0	0.00352	0	0.000403	0	0.000129	0
Other Treatment Chemicals & Materials	lbs	0	0.015	0	1.67	0	0.003	0	0.0065	0	0.00061	0	0.000016	0
Notes:														
<u>Fuel Processing</u>														
Biodiesel produced	gal	0	0.029	0	-16.8	0	0.018	0	0.033	0	0.00082	0	NP	
Diesel produced	gal	220.3787	0.017	3.7464379	3.02	665.54367	0.0051	1.1239314	0.0062	1.3663479	0.0017	0.3746438	0.0011	0.2424166
Gasoline produced	gal	19	0.033	0.627	2.8	53.2	0.0046	0.0874	0.005	0.095	0.0015	0.0285	0.001	0.019
Liquefied Petroleum Gas Produced	gal	0	0.088	0	1.47	0	0.0016	0	0.0024	0	0.0007	0	0.0003	0
Natural Gas - Compressed Produced	ccf	0	19.983	0	343.92	0	0.4732	0	2.1651	0	0.1846	0	0.2895	0
Natural Gas Produced	ccf	0	0.0052	0	2.2	0	0.0037	0	0.0046	0	0.000072	0	0.0000061	0
Fuel Processing Subtotals				4.3734379		718.74367		1.2113314		1.4613479		0.4031438		0.2614166
Notes:														
<u>Public water</u>	gal x 1000	0.015	0.0092	0.000138	5	0.075	0.0097	0.0001455	0.0059	0.0000885	0.016	0.00024	0.000015	2.25E-07
<u>User-defined water resource #1</u>	gal x 1000	0	0	0	0	0	0	0	0	0	0	0	0	0
<u>User-defined water resource #2</u>	gal x 1000	0	0	0	0	0	0	0	0	0	0	0	0	0
Notes:														

SVE System Installation - Off-Site Footprint (Scope 3b)

Category	Units	Usage	Energy		Greenhouse Gas		NOx		SOx		PM		HAPs	
			Conv.	MMBtus	Conv.	lbs CO2e	Conv.	lbs	Conv.	lbs	Conv.	lbs	Conv.	lbs
			Factor		Factor		Factor		Factor		Factor		Factor	
Off-Site Services														
Hazardous waste incineration	lb	0	0.00609	0	2.43	0	0.0016	0	0.00167	0	0.000209	0	0.000087	0
Off-site waste water treatment (POTW)	gal x 1000	0	0.015	0	4.4	0	0.016	0	0.015	0	NP		NP	
Off-site non-hazardous waste landfill	ton	0.1	0.16	0.016	25	2.5	0.14	0.014	0.075	0.0075	0.4	0.04	0.0014	0.00014
Off-site hazardous waste landfill	ton	0	0.18	0	27.5	0	0.154	0	0.0825	0	0.44	0	0.00154	0
Off-site Laboratory Analysis - Other	sample	0	0.058071	0	6.8534384	0	0.131402	0	0.3038758	0	0.0455698	0	0.0330165	0
Off-site Laboratory Analysis - Metals	sample	0	0.212	0	27.4693	0	0.6423	0	1.5072	0	0.2264	0	0.1643	0
Off-site Laboratory Analysis - Mercury	sample	0	0.0731715	0	9.325458	0	0.2127439	0	0.4982396	0	0.0747359	0	0.0542332	0
Off-site Laboratory Analysis - Inorganic Anions	sample	0	0.0074025	0	0.6459478	0	0.0067681	0	0.0147929	0	0.0022024	0	0.0015542	0
Off-site Laboratory Analysis - Alkalinity	sample	0	0.0174398	0	1.3381922	0	0.0070106	0	0.0132496	0	0.00194	0	0.0012831	0
Off-site Laboratory Analysis - Perchlorate	sample	0	0.023885	0	1.8717054	0	0.0079807	0	0.0141535	0	0.0020547	0	0.0012875	0
Off-site Laboratory Analysis - Nitrogen/Nitrate	sample	0	0.0336475	0	4.29897	0	0.0954592	0	0.2226646	0	0.0335099	0	0.0242506	0
Off-site Laboratory Analysis - Sulfate	sample	0	0.0141225	0	1.4726728	0	0.0079807	0	0.0136024	0	0.0019797	0	0.0012015	0
Off-site Laboratory Analysis - PCBs	sample	0	0.0512769	0	5.224902	0	0.0833339	0	0.1904774	0	0.0284393	0	0.0212083	0
Off-site Laboratory Analysis - VOCs	sample	15	0.0762045	1.1430673	9.016814	135.25221	0.104498	1.5674706	0.2270738	3.406107	0.0339508	0.5092626	0.0235892	0.3538383
Off-site Laboratory Analysis - SVOCs	sample	0	0.0715602	0	7.870422	0	0.1459445	0	0.3373038	0	0.0504853	0	0.0372577	0
Notes:														
Resource Extraction for Electricity														
Coal extraction and processing	MWh	0.0577365	3.1	0.1763157	180.0	10.39257	0.8	0.0444571	0.2	0.0086605	0.0	0.0010393	NP	
Natural gas extraction and processing	MWh	0.0641727	1.6	0.104717	270.0	17.326629	0.2	0.0115511	13.0	0.8342451	0.0	0.0004556	NP	
Nuclear fuel extraction and processing	MWh	0.0374814	0.2	0.0058273	25.0	0.937035	0.2	0.0056222	0.5	0.0187407	0.0	5.622E-05	NP	
Oil extraction and processing	MWh	0.0013251	2.3	0.0030416	270.0	0.357777	1.7	0.0022527	0.1	9.143E-05	0.0	5.565E-05	NP	
Other fuel extraction and processing	MWh	0.0001893	0	0	0	0	0	0	0	0	0	0	0	0
Resource Extraction Subtotals				0.2899017		29.014011		0.0638831		0.8617377		0.0016068		0
Notes:														
Electricity Transmission														
Transmission and distribution losses	MWh	0.1893	1.0342	0.1957741	112.43	21.282999	0.22421	0.042443	0.4607887	0.0872273	0.0057518	0.0010888	0.0210237	0.0039798
Notes:														

SVE System Installation - Off-Site Footprint (Scope 3b)

Category	Units	Usage	Energy		Greenhouse Gas		NOx		SOx		PM		HAPs	
			Conv.	MMBtus	Conv.	lbs CO2e	Conv.	lbs	Conv.	lbs	Conv.	lbs	Conv.	lbs
			Factor		Factor		Factor		Factor		Factor		Factor	
User-defined Materials														
User-defined material #1	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #3	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #4	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #5	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #6	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #7	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #8	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #9	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #10	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #11	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #12	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #13	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #14	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #15	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #16	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #17	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #18	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #19	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #20	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
Notes:														
User-defined Waste Destinations														
User-defined recycled/reused off-site #1	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined recycled/reused off-site #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined recycled/reused off-site #3	TBD	0	y(MMBtu/t)		(lbs CO2e/t)		Ox(lbs/unit)		Ox(lbs/unit)		M(lbs/unit)		APs(lbs/unit)	
User-defined non-hazardous waste destination #1	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined non-hazardous waste destination #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined non-hazardous waste destination #3	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined hazardous waste destination #1	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined hazardous waste destination #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined hazardous waste destination #3	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
Notes:														
Off-site Totals				6.0183189		906.86789		2.8992735		5.8240084		0.955342		0.6193749

SVE System Installation - Intermediate Totals

Category	Units	Usage	Energy		Greenhouse Gas		NOx		SOx		PM		HAPs	
			Conv. Factor	MMBtus	Conv. Factor	lbs CO2e	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs
Total Grid Electricity Footprint														
On-site grid electricity	MWh	0.1893	3.413	0.6460809										
Electricity Generation														
Grid electricity	MWh	0.1893	6.929	1.3116597	1124.3	212.82999	2.2421	0.4244295	4.6078874	0.8722731	0.057518	0.0108882	0.2102371	0.0397979
Resource Extraction for Electricity														
Coal extraction and processing	MWh	0.0577365	3.1	0.1763157	180.0	10.39257	0.8	0.0444571	0.2	0.0086605	0.0	0.0010393	NP	
Natural gas extraction and processing	MWh	0.0641727	1.6	0.104717	270.0	17.326629	0.2	0.0115511	13.0	0.8342451	0.0	0.0004556	NP	
Nuclear fuel extraction and processing	MWh	0.0374814	0.2	0.0058273	25.0	0.937035	0.2	0.0056222	0.5	0.0187407	0.0	5.622E-05	NP	
Oil extraction and processing	MWh	0.0013251	2.3	0.0030416	270.0	0.357777	1.7	0.0022527	0.1	9.143E-05	0.0	5.565E-05	NP	
Other fuel extraction and processing	MWh	0.0001893	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
Electricity Transmission														
Transmission and distribution losses	MWh	0.1893	1.0342	0.1957741	112.43	21.282999	0.22421	0.042443	0.4607887	0.0872273	0.0057518	0.0010888	0.0210237	0.0039798
Total Grid Electricity Footprint				2		263		1		2		0		0
Total Fuel Footprints														
Total Gasoline Footprint														
On-site gasoline use - Other	gal	0	0.124	0	19.6	0	0.11	0	0.0045	0	0.00054	0	0.000039	0
On-site gasoline use <25 hp	gal	0	0.124	0	17.48	0	0.037	0	0.00025	0	0.165	0	0.00008	0
On-site gasoline use >25 hp	gal	0	0.124	0	19.93	0	0.032	0	0.00029	0	0.002	0	0.00009	0
Transportation gasoline use	gal	0	0.124	0	19.6	0	0.11	0	0.0045	0	0.00054	0	0.000039	0
Transportation gasoline use - car	gal	0	0.124	0	19.77	0	0.027	0	0.00036	0	0.003	0	0.0067	0
Transportation gasoline use - passenger truck	gal	19	0.124	2.356	19.79	376.01	0.035	0.665	0.00036	0.00684	0.003	0.057	0.00661	0.12559
Transportation gasoline use - User Defined	gal	0	0.124	0	19.6	0	0.11	0	0.0045	0	0.00054	0	0.000039	0
Gasoline produced	gal	19	0.033	0.627	2.8	53.2	0.0046	0.0874	0.005	0.095	0.0015	0.0285	0.001	0.019
Total Gasoline Footprint		19		2.983		429.21		0.7524		0.10184		0.0855		0.14459
Total Diesel Footprint														
On-site diesel use - Other	gal	0	0.139	0	22.5	0	0.17	0	0.0054	0	0.0034	0	0.000052	0
On-site diesel use <75 hp	gal	44.036697	0.139	6.1211009	22.21	978.05505	0.1565	6.8917431	0.000145	0.0063853	0.0145	0.6385321	0.00004	0.0017615
On-site diesel use 75<hp<750	gal	0	0.139	0	22.24	0	0.101	0	0.00013	0	0.009	0	0.00004	0
On-site diesel use >750 hp	gal	0	0.139	0	22.24	0	0.149	0	0.00013	0	0.006	0	0.00004	0
Transportation diesel use	gal	176.342	0.139	24.511538	22.5	3967.695	0.17	29.97814	0.0054	0.9522468	0.0034	0.5995628	0.000052	0.000917
Transportation diesel use - car	gal	0	0.139	0	22.57	0	0.015	0	0.0002	0	0.003	0	0.00252	0
Transportation diesel use - passenger truck	gal	0	0.139	0	22.545	0	0.0585	0	0.0002	0	0.007	0	0.002605	0
Transportation diesel use - User Defined	gal	0	0.139	0	22.5	0	0.17	0	0.0054	0	0.0034	0	0.000052	0
Diesel produced	gal	220.3787	0.017	3.7464379	3.02	665.54367	0.0051	1.1239314	0.0062	1.3663479	0.0017	0.3746438	0.0011	0.2424166
Total Diesel Footprint		220.3787		34.379077		5611.2937		37.993814		2.32498		1.6127387		0.245095
Total Biodiesel Footprint														
On-site biodiesel use	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
On-site biodiesel use - User Defined	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
Transportation biodiesel use	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
Transportation biodiesel use - User Defined	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
Biodiesel produced	gal	0	0.029	0	-16.8	0	0.018	0	0.033	0	0.00082	0	NP	
Total Biodiesel Footprint		0		0		0		0		0		0		0
Total Natural Gas Footprint														
On-site natural gas use	ccf	0	0.103	0	13.1	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
Transportation natural gas use	ccf	0	0.103	0	13.1	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
Transportation natural gas use - User Defined	ccf	0	0.103	0	13.1	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
Natural gas produced	ccf	0	0.0052	0	2.2	0	0.0037	0	0.0046	0	0.000072	0	0.0000061	0
Total Natural Gas Footprint		0		0		0		0		0		0		0
Total Liquefied Petroleum Gas Footprint														
On-site liquefied petroleum gas use - Other	ccf	0	NP		12.69	0	0.021	0	0.00013	0	0.001	0	0	0
On-site liquefied petroleum gas use	ccf	0	NP		12.69	0	0.021	0	0.00013	0	0.001	0	0	0
Liquefied petroleum gas produced	ccf	0	0.088	0	1.47	0	0.0016	0	0.0024	0	0.0007	0	0.0003	0
Total Natural Gas Footprint		0		0		0		0		0		0		0
Total Compressed Gas Footprint														
On-site compressed gas use - Other	ccf	0	NP		1957.835	0	16.0325	0	0.023045	0	0.2775	0	0	0
On-site compressed gas use	ccf	0	NP		1957.835	0	16.0325	0	0.023045	0	0.2775	0	0	0
Compressed gas produced	ccf	0	19.983	0	343.92	0	0.4732	0	2.1651	0	0.1846	0	0.2895	0
Total Natural Gas Footprint		0		0		0		0		0		0		0

Notes:

Note: Please refer to the "Default Conversions" tab for references for the default conversion factors used on this calculation sheet.

Space below available for notes and calculations:

Environmental Footprint Summary

Core Element	Metric		Unit of Measure	Footprint					
				SVE System Installation	NA	NA	NA	NA	Total
Materials & Waste	M&W-1	Refined materials used on-site	Tons	0.3	0.0	0.0	0.0	0.0	0.3
	M&W-2	% of refined materials from recycled or reused material	%	0.0%					0.0%
	M&W-3	Unrefined materials used on-site	Tons	0.000	0.000	0.000	0.000	0.000	0.0
	M&W-4	% of unrefined materials from recycled or reused material	%						
	M&W-5	On-site hazardous waste disposed of off-site	Tons	0.0	0.0	0.0	0.0	0.0	0.0
	M&W-6	On-site non-hazardous waste disposed of off-site	Tons	0.1	0.0	0.0	0.0	0.0	0.1
	M&W-7	Recycled or reused waste	Tons	0.2	0.0	0.0	0.0	0.0	0.2
	M&W-8	% of total potential waste recycled or reused	%	66.7%					66.7%
Water (used on-site)	W-1	Public water use	MG	0.0	0.0	0.0	0.0	0.0	0.0
	W-2	Groundwater use	MG	0.0	0.0	0.0	0.0	0.0	0.0
	W-3	Surface water use	MG	0.0	0.0	0.0	0.0	0.0	0.0
	W-4	Reclaimed water use	MG	0.0	0.0	0.0	0.0	0.0	0.0
	W-5	Storm water use	MG	0.0	0.0	0.0	0.0	0.0	0.0
	W-6	User-defined water resource #1	MG	0.0	0.0	0.0	0.0	0.0	0.0
	W-7	User-defined water resource #2	MG	0.0	0.0	0.0	0.0	0.0	0.0
	W-8	Wastewater generated	MG	0.0	0.0	0.0	0.0	0.0	0.0
Energy	E-1	Total energy used (on-site and off-site)	MMBtu	41.0	0.0	0.0	0.0	0.0	41.0
	E-2	Energy voluntarily derived from renewable resources							
	E-2A	On-site renewable energy generation or use + on-site biodiesel use + biodiesel and other renewable resource use for transportation	MMBtu	0.0	0.0	0.0	0.0	0.0	0.0
	E-2B	Voluntary purchase of renewable electricity	MWh	0.0	0.0	0.0	0.0	0.0	0.0
	E-3	Voluntary purchase of RECs	MWh	0.0	0.0	0.0	0.0	0.0	0.0
	E-4	On-site grid electricity use	MWh	0.189	0.000	0.000	0.000	0.000	0.2
Air	A-1	On-site NOx, SOx, and PM emissions	Pounds	7.5	0.0	0.0	0.0	0.0	7.5
	A-2	On-site HAP emissions	Pounds	0.4	0.0	0.0	0.0	0.0	0.4
	A-3	Total NOx, SOx, and PM emissions	Pounds	50.8	0.0	0.0	0.0	0.0	50.8
	A-3A	Total NOx emissions	Pounds	40.9	0.0	0.0	0.0	0.0	40.9
	A-3B	Total SOx emissions	Pounds	7.7	0.0	0.0	0.0	0.0	7.7
	A-3C	Total PM emissions	Pounds	2.3	0.0	0.0	0.0	0.0	2.3
	A-4	Total HAP emissions	Pounds	1.2	0.0	0.0	0.0	0.0	1.2
	A-5	Total greenhouse gas emissions	Tons CO2e*	3.2	0.0	0.0	0.0	0.0	3.2
Land & Ecosystems		Qualitative Description							

* Total greenhouse gases emissions (in CO2e) include consideration of CO2, CH4, and N2O (Nitrous oxide) emissions.

"MMBtu" = millions of Btus

"MG" = millions of gallons

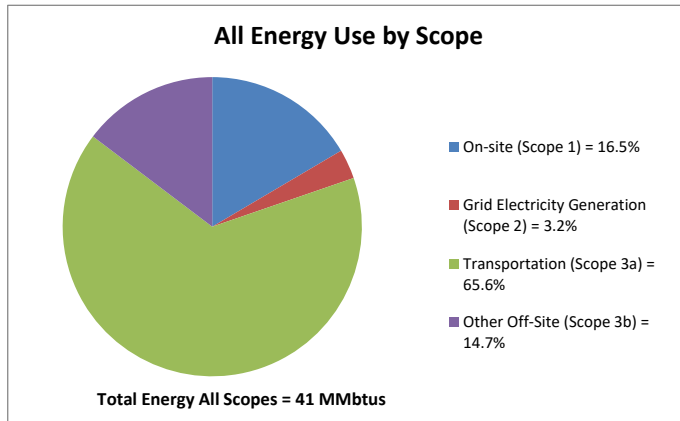
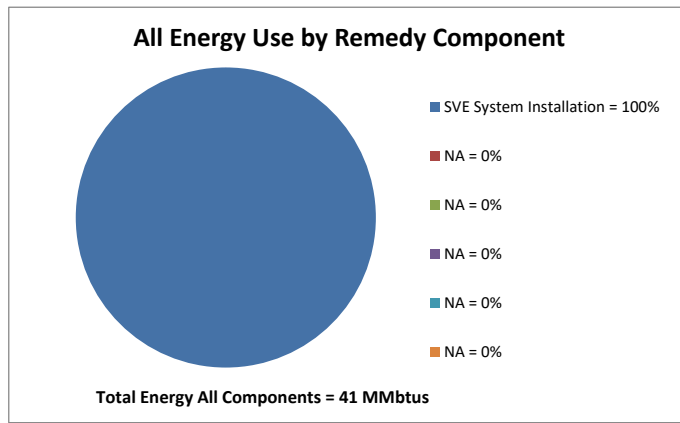
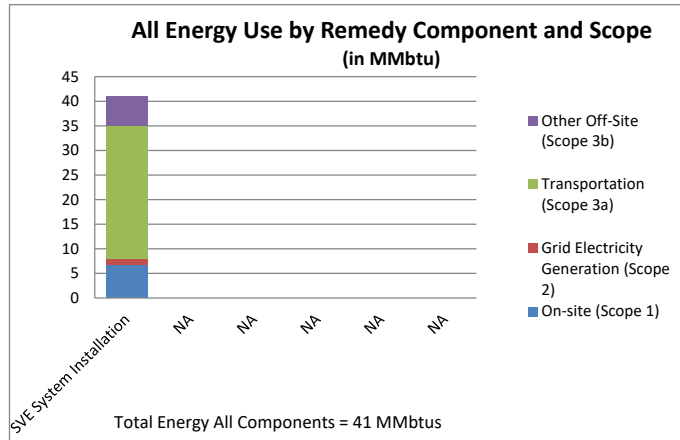
"CO2e" = carbon dioxide equivalents of global warming potential

"MWh" = megawatt hours (i.e., thousands of kilowatt-hours or millions of Watt-hours)

"Tons" = short tons (2,000 pounds)

The above metrics are consistent with EPA's Methodology for Understanding and Reducing a Project's Environmental Footprint (EPA 542-R-12-002), February 2012

Notes:



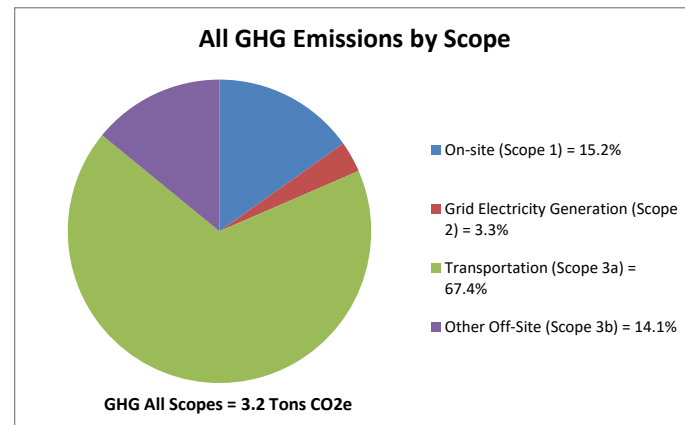
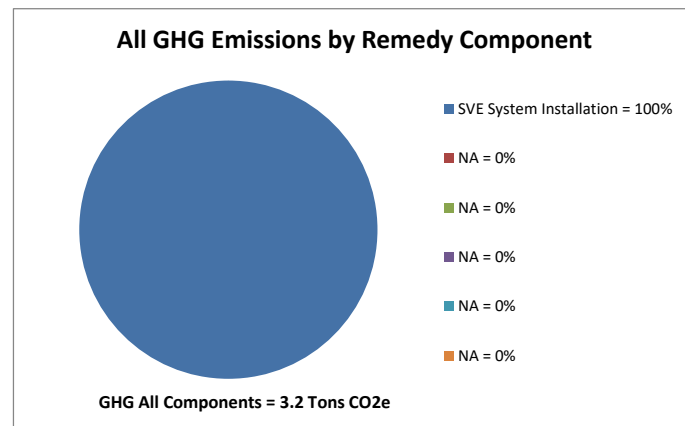
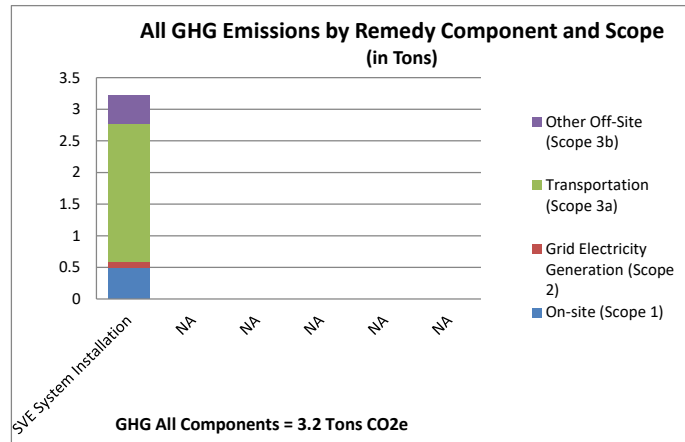
Total Energy
MMbtus

	SVE System	NA	NA	NA	NA	NA	Total	
On-site (Scope 1)	6.8	0.0	0.0	0.0	0.0	0.0	6.8	
Grid Electricity Generation (Scope 2)	1.3	0.0	0.0	0.0	0.0	0.0	1.3	Grid Electricity
Transportation (Scope 3a)	26.9	0.0	0.0	0.0	0.0	0.0	26.9	Transportation
Other Off-Site (Scope 3b)	6.0	0.0	0.0	0.0	0.0	0.0	6.0	Other Off-Site
Total	41.0	0.0	0.0	0.0	0.0	0.0	41.0	

SVE System Installation = 100%
NA = 0%
NA = 0%
NA = 0%
NA = 0%
NA = 0%

On-site (Scope 1) = 16.5%
Grid Electricity Generation (Scope 2) = 3.2%
Transportation (Scope 3a) = 65.6%
Other Off-Site (Scope 3b) = 14.7%

Total Energy All Components = 41 MMbtus
Total Energy All Scopes = 41 MMbtus

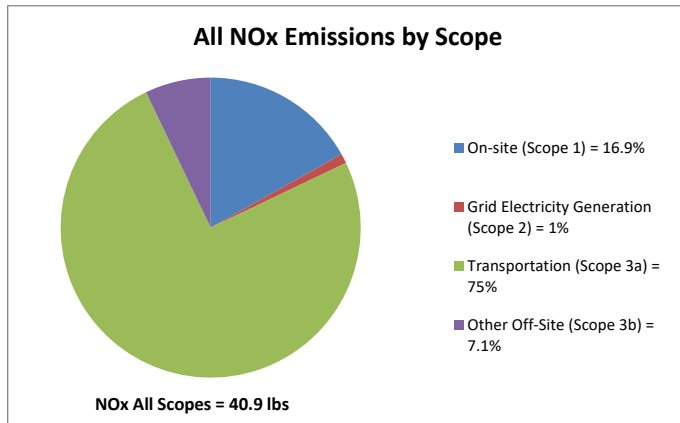
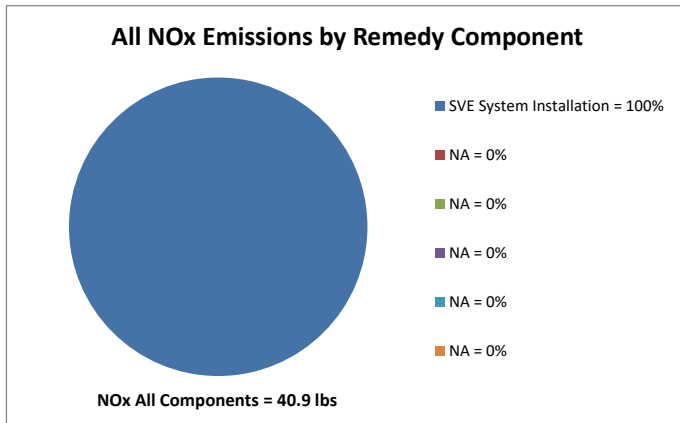
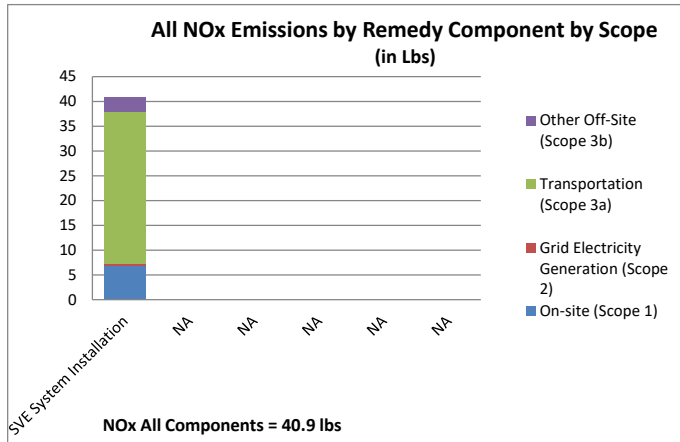


GHG Tons CO ₂ e	SVE System	NA	NA	NA	NA	NA	Total	
On-site (Scope 1)	0.5	0.0	0.0	0.0	0.0	0.0	0.5	
Generation (Scope 2)	0.1	0.0	0.0	0.0	0.0	0.0	0.1	Grid Electricity
Transportation (Scope 3a)	2.2	0.0	0.0	0.0	0.0	0.0	2.2	Transportation
Other Off-Site (Scope 3b)	0.5	0.0	0.0	0.0	0.0	0.0	0.5	Other Off-Site
Total	3.2	0.0	0.0	0.0	0.0	0.0	3.2	

SVE System Installation = 100%
NA = 0%
NA = 0%
NA = 0%
NA = 0%
NA = 0%

On-site (Scope 1) = 15.2%
Grid Electricity Generation (Scope 2) = 3.3%
Transportation (Scope 3a) = 67.4%
Other Off-Site (Scope 3b) = 14.1%

GHG All Components = 3.2 Tons CO₂e
GHG All Scopes = 3.2 Tons CO₂e

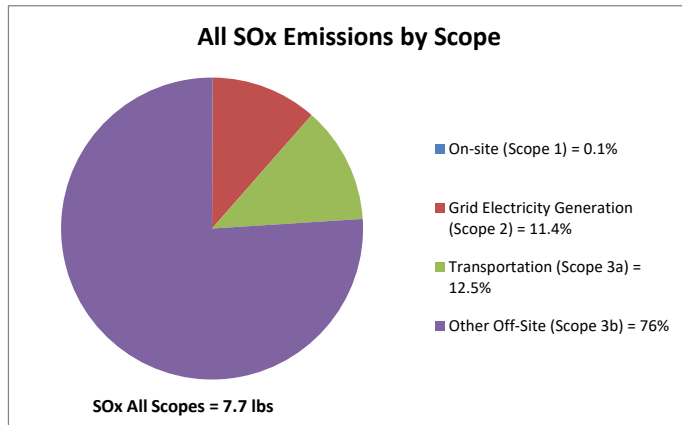
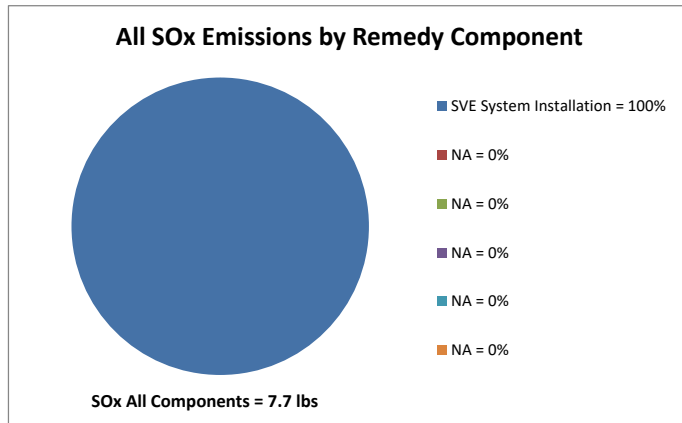
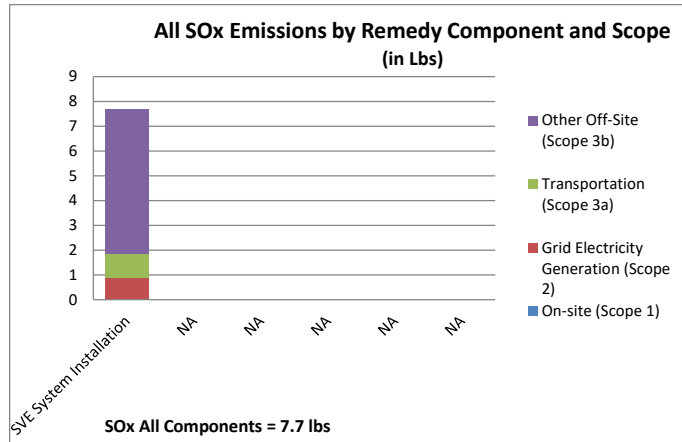


NOx lbs							
	SVE System	NA	NA	NA	NA	Total	
On-site (Scope 1)	6.9	0.0	0.0	0.0	0.0	6.9	
Generation (Scope 2)	0.4	0.0	0.0	0.0	0.0	0.4	Grid Electricity
Transportation (Scope 3a)	30.6	0.0	0.0	0.0	0.0	30.6	Transportation
Other Off-Site (Scope 3b)	2.9	0.0	0.0	0.0	0.0	2.9	Other
Total	40.9	0.0	0.0	0.0	0.0	40.9	

SVE System Installation = 100%
NA = 0%
NA = 0%
NA = 0%
NA = 0%
NA = 0%

On-site (Scope 1) = 16.9%
Grid Electricity Generation (Scope 2) = 1%
Transportation (Scope 3a) = 75%
Other Off-Site (Scope 3b) = 7.1%

NOx All Components = 40.9 lbs
NOx All Scopes = 40.9 lbs

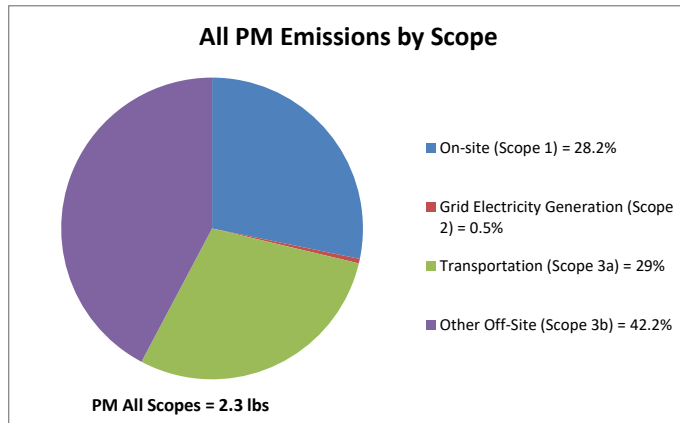
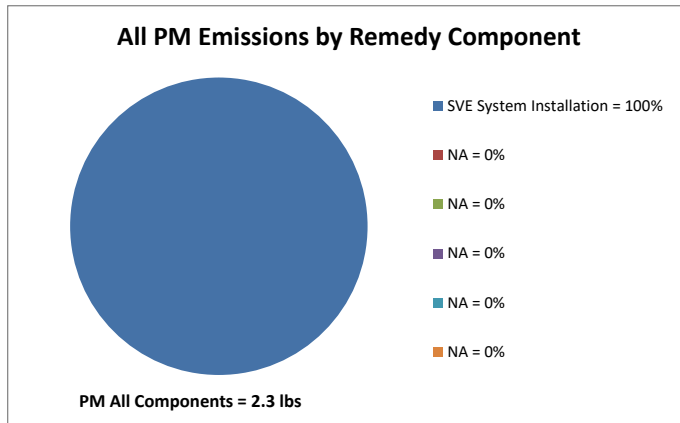
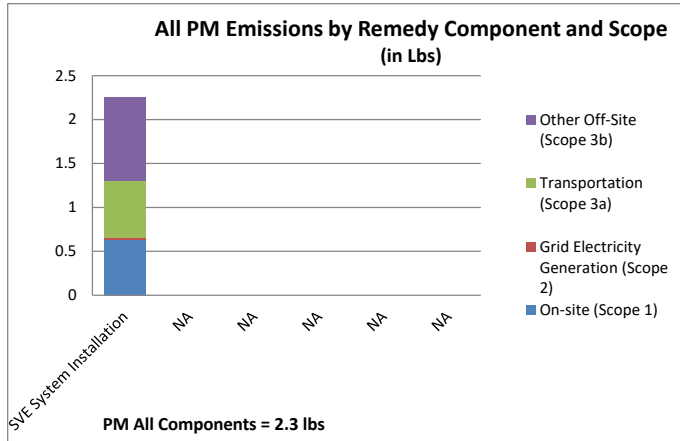


SOx lbs	SVE System	NA	NA	NA	NA	NA	Total	
On-site (Scope 1)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Generation (Scope 2)	0.9	0.0	0.0	0.0	0.0	0.0	0.9	Grid Electricity
Transportation (Scope 3a)	1.0	0.0	0.0	0.0	0.0	0.0	1.0	Tran
ier Off-Site (Scope 3b)	5.8	0.0	0.0	0.0	0.0	0.0	5.8	Oth
Total	7.7	0.0	0.0	0.0	0.0	0.0	7.7	

SVE System Installation = 100%
NA = 0%
NA = 0%
NA = 0%
NA = 0%
NA = 0%

On-site (Scope 1) = 0.1%
Grid Electricity Generation (Scope 2) = 11.4%
Transportation (Scope 3a) = 12.5%
Other Off-Site (Scope 3b) = 76%

SOx All Components = 7.7 lbs
SOx All Scopes = 7.7 lbs

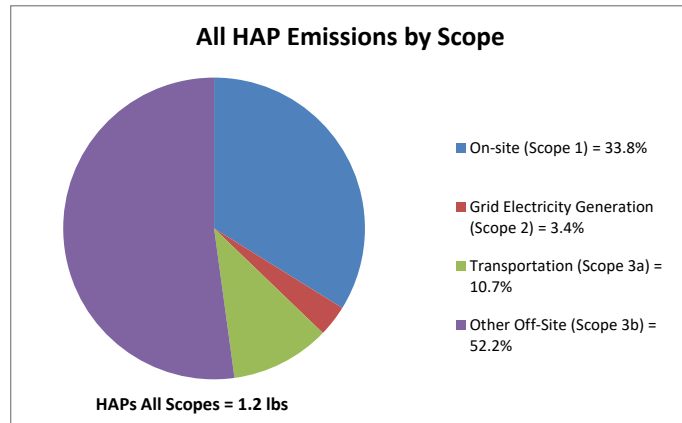
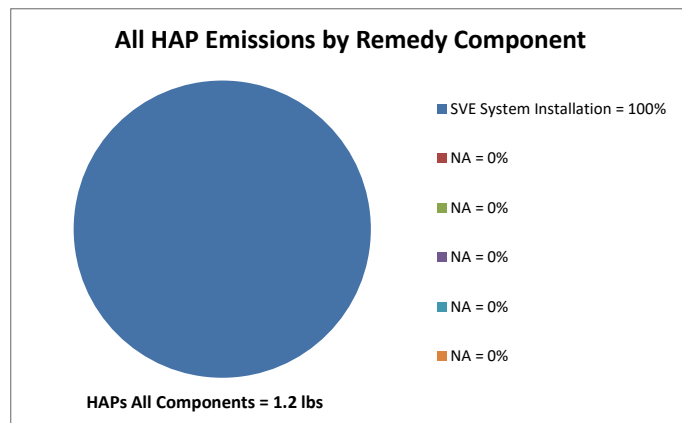
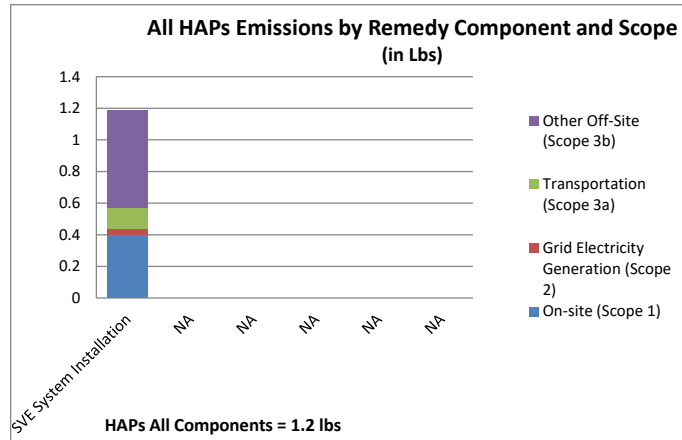


PM lbs							
	SVE System	NA	NA	NA	NA	NA	Total
On-site (Scope 1)	0.6	0.0	0.0	0.0	0.0	0.0	0.6
Generation (Scope 2)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Transportation (Scope 3a)	0.7	0.0	0.0	0.0	0.0	0.0	0.7
Other Off-Site (Scope 3b)	1.0	0.0	0.0	0.0	0.0	0.0	1.0
Total	2.3	0.0	0.0	0.0	0.0	0.0	2.3

SVE System Installation = 100%
NA = 0%
NA = 0%
NA = 0%
NA = 0%
NA = 0%

On-site (Scope 1) = 28.2%
Grid Electricity Generation (Scope 2) = 0.5%
Transportation (Scope 3a) = 29%
Other Off-Site (Scope 3b) = 42.2%

PM All Components = 2.3 lbs
PM All Scopes = 2.3 lbs



HAPs lbs	SVE System	NA	NA	NA	NA	NA	Total
On-site (Scope 1)	0.4	0.0	0.0	0.0	0.0	0.0	0.4
Generation (Scope 2)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Transportation (Scope 3a)	0.1	0.0	0.0	0.0	0.0	0.0	0.1
Other Off-Site (Scope 3b)	0.6	0.0	0.0	0.0	0.0	0.0	0.6
Total	1.2	0.0	0.0	0.0	0.0	0.0	1.2

SVE System Installation = 100%
NA = 0%
NA = 0%
NA = 0%
NA = 0%
NA = 0%

On-site (Scope 1) = 33.8%
Grid Electricity Generation (Scope 2) = 3.4%
Transportation (Scope 3a) = 10.7%
Other Off-Site (Scope 3b) = 52.2%

HAPs All Components = 1.2 lbs
HAPs All Scopes = 1.2 lbs

SVE System Installation - Energy & Air Compiled Results

Category	Total Energy	GHG	NOx	SOx	PM	NOx + SOx + PM	HAPs
	MMbtus	lbs CO2e	lbs	lbs	lbs	lbs	lbs
On-site (Scope 1)	6.8	978	6.9	0.0	0.6	7.5	0.4
Grid Electricity Generation (Scope 2)	1.312	213	0.4	0.9	0.0	1.3	0.0
Transportation (Scope 3a)	26.9	4,344	30.6	1.0	0.7	32.3	0.1
Other Off-Site (Scope 3b)	6.0	907	2.9	5.8	1.0	9.7	0.6
Remedy Totals	41.0	6,441	40.9	7.7	2.3	50.8	1.2

Values that are forwarded to the "Summary" tab are indicated in orange.

Voluntary Renewable Energy Use	Unit	Quantity
On-site renewable energy generation or use	MMBtu	0
On-site biodiesel use	MMBtu	0
Biodiesel and other renewable resource use for transportation	MMBtu	0
On-site renewable energy generation or use + on-site biodiesel use + biodiesel and other renewable resource use for transportation	MMBtu	0
Voluntary purchase of renewable electricity	MWh	0
Voluntary purchase of RECs	MWh	0

(This value is the sum of the three rows above)

This worksheet is not intended for user input. Values on this worksheet are obtained from the following file:
 SEFA_calculations_(121718).xlsx

Appendix F

Quality Assurance Project Plan

Quality Assurance Project Plan for 1153-69 West Fayette Street

**1153-69 West Fayette Street
City of Syracuse, Onondaga County, New York**

BCP Site No. C734164

Prepared by:



C&S Engineers, Inc.
499 Col Eileen Collins Blvd.
Syracuse, New York 13212

July 2024

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ATTACHMENTS

Attachment A – Supporting Documentation for PFAS Analysis

SECTION 1 – INTRODUCTION

C&S' Quality Control (QC) Program is a vital part of its approach to remedial investigations. Through our thorough QC program, our firm is able to provide accurate and dependable data. QC also provides safe working conditions for field staff.

The QC program contains procedures, which provide for collected data to be properly evaluated, and which document that quality control procedures have been followed in the collection of samples. The QC program represents the methodology and measurement procedures used in collecting quality field data. This methodology includes the proper use of equipment, documentation of sample collection, and sample handling practices.

Procedures used in the firm's QC program are consistent with federal, state, and local regulations, as well as, appropriate professional and technical standards.

This QC program has been organized into the following areas:

- QC Objectives
- Field Sampling Techniques
 - Procedures
 - Preparation
 - Measurement
 - Decontamination
- Sample Management

SECTION 2 – QUALITY CONTROL OBJECTIVES

2.1 Data Quality Objectives

Data Quality Objectives (DQOs) are statements which describe the desired quality of data necessary to meet the objectives of the sampling program. The DQOs for the site sampling program were formulated during the scoping effort and developed as part of this Plan. The general steps followed in preparation of the DQOs were as follows:

- Identification of the media to be sampled – Identifies the media being investigated (e.g., ground water, surface soil).
- Identification of the data uses – Identifies the intended use of the data according to the following:
 - Site Characterization – Data are used to determine the composition, nature, and extent of contamination.
 - Risk Assessment – Data are used to evaluate the actual or potential risks posed by contaminants determined to be present on-site. Particular attention is given to sampling at locations where human exposure is possible.
 - Health and Safety Plan (HASP) – Data are used to establish the level of protection needed for on-site workers during site characterization activities.
 - Monitoring – Data are used during the monitoring of the remedial action to assess the effectiveness of such action.
 - PRP Enforcement – Data are used to help establish potentially responsible parties (PRP's).
 - Evaluation of Alternatives – Data are used to evaluate various proposed remedial technologies and assist in proper design of alternatives.
- Identification of the data types – Identifies what types of analyses are to be performed.
- Sample Collected – Describes the sample types to be collected.
 - Environmental – Refers to a specific media sampled such as water, soil, air, or biological.
 - Source – Refers to sampling an actual contamination source.
 - Grab – A discrete sample representative of a specific location.
 - Composite – A sample that represents a mixture of a number of grab samples that represents the average properties over the extent of areas sampled.
 - Biased – Sampling that focuses on a specific area of expected contamination or uncontaminated area (background).
- Identification of the data quality needs – Identifies the analytical options available to support data collection activities and are identified as follows:
 - Level I: Field Screening – Portable type instruments which provide real-time data.

- Level II: Field Analysis – Portable analytical instruments in an on-site lab or transported to the site.
 - Level III: Standard Analytical Protocols – Standard analytical protocols or without the NYSDEC Analytical Services Protocol (ASP) (2000) deliverables / reportables documentation.
 - Level IV: NYSDEC ASP Reportables / Deliverables – Rigorous QA / QC protocols and reportables / deliverables documentation; NYSDEC ASP (2000) Category B deliverables.
 - Level V: Non-Standard – Methods which have been modified to meet specific site study or remediation needs or by use of some other specialized analytical methods that cannot be obtained through standard or typical avenues of analytical support.
-
- Identification of Data Quality Factors – Describes factors which influence the quality or quantity of data to be collected. Primary contaminants and associated levels of concern are identified concerning ARARs or potential risks. The required detection limit are also given or referenced.
 - Identification of QA / QC Samples – Specifies additional samples to be collected to support Quality Assurance / Quality Control (QA / QC) procedures. Additional samples to be collected could include:
 - Matrix Spike / Matrix Spike Duplicates – Matrix spike and matrix spike duplicate samples are collected as a duplicate sample to which the analytical laboratory will add known amounts of target analytes. These QA / QC samples are intended to assess the extraction procedure used by the laboratory.
 - Blind Duplicates – Blind duplicates are a duplicate of another sample submitted for analysis. The location of the sample is recorded in the field book and not disclosed on the chain of custody. These QA / QC samples are intended to assess the repeatability of analysis by the laboratory.
 - Equipment Blanks – Equipment blanks are samples which are obtained by running analyte-free water through the sample collection equipment in a way that is identical to the sample collection procedures. Equipment blanks may be used during QA / QC procedures to evaluate if sampling equipment has contributed contaminants to the samples.
 - Trip Blanks – Trip blanks are samples which are prepared prior to the sampling event in the same type of sample container and are kept with the collected samples throughout the sampling event unit analysis. Trip blank vials are not opened in the field and are analyzed for volatile organics only.

2.2 Sampling Procedures

All sampling objectives, locations, and procedures have been included as the Remedial Investigation Work Plan (RIWP) and are further described in Section 3. Items including Field Measurement Techniques, General Field Decontamination, and Sample Management have also

been included in Sections 3 and 4.

2.3 Laboratory Certification and Coordination

The Environmental Laboratory Approval Program (ELAP) certification is an accreditation issued by the New York State Department of Health (NYSDOH). Such laboratories have demonstrated that they consistently ensure the accuracy and reliability of samples analyzed. All chemical analyses for samples from the site will be completed by an ELAP laboratory capable of performing project specific analyses as indicated in this QA / QC plan. The project QA / QC Officer will also be responsible for all project related laboratory coordination.

Supporting documentation related to per- and polyfluoroalkyl substances (PFAS) analysis, such as standard operating procedures (SOPs), analyte lists, and method detection limits (MDLs) are provided in **Attachment A**.

2.4 Analytical Methodologies

Sampling and analysis will be performed for the Target Compound List (TCL) parameters including volatiles and total petroleum hydrocarbons (TPH). The specific analyses will be conducted according to the following NYSDEC ASP 2000 methodologies:

Parameter Group	USEPA Analysis Method
TPH	8015
Volatiles	8260 or TO-15 for air
Semivolatiles	8270 and 8270-SIM
PCBs	8082
Pesticides	8081
Herbicides	8151
Metals / Inorganics	6010, 6020, 7470, 7471, 9010 / 9012, 7196
1,4-Dioxane	8270-SIM
PFAS	1633

Samples will be analyzed by Alpha Analytical, Inc. (Alpha) or SGS North America, Inc. (SGS), and the data will be presented in Category B reportables / deliverables format.

2.5 Analytical Quality Control

Analytical quality control for this Project will be consistent with the methodology and QA / QC requirements in the NYSDEC ASP 2000.

The tables on the following page detail sample volumes, containers, preservation, and holding time for typical analytes.

2.6 Data Usability Summary Report

A Data Usability Summary Report (DUSR) will be prepared by Environmental Data Validation, Inc. (EDV) or Vali-Data of WNY, LLC (Vali-Data), consistent with NYSDECs Guidance for the Development of Quality Assurance Plans and Data Usability Summary Reports as given in DER-10. The main objective of the DUSR is to determine whether the data presented meets the project specific needs for data quality and data use.

Table 2-1
Soil Sample Collection Requirements

Matrix	Analytical Group	Sample Volume	Containers	Preservation Requirements	Maximum Holding Time
Soil	TPH	4 oz.	4-ounce amber glass, Teflon-lined	Cool to 4°C	14 Days (Extraction)
	VOCs	5-15 grams	40 mL VOA vial	MeOH Cool to 4°C	14 Days
		(2) 5 grams	40 mL VOA vial	Water Cool to 4°C	48 Hours (Freeze) 14 Days (Analysis)
	SVOCs	4 oz.	4-ounce amber glass, Teflon-lined	Cool to 4°C	14 Days (Extraction)
	PCBs	4 oz.	4-ounce amber glass, Teflon-lined	Cool to 4°C	365 Days (Extraction)
	Pesticides	4 oz.	4-ounce amber glass, Teflon-lined	Cool to 4°C	14 Days (Extraction)
	Herbicides	4 oz.	4-ounce amber glass, Teflon-lined	Cool to 4°C	14 Days (Extraction)
	Metals, including Hg	4 oz.	4-ounce amber glass	Cool to 4°C	180 Days (28 Days for Hg)
	Hexavalent Chromium	4 oz.	4-ounce amber glass	Cool to 4°C	30 Days
	Cyanide	4 oz.	4-ounce amber glass	Cool to 4°C	14 Days
	1,4-Dioxane	4 oz.	4-ounce amber glass, Teflon-lined	Cool to 4°C	14 Days (Extraction)
	PFAS	8 oz.	8-ounce plastic	Cool to 4°C	90 Days (Extraction)

Table 2-2
Water Sample Collection Requirements

Matrix	Analytical Group	Sample Volume	Containers	Preservation Requirements	Maximum Holding Time
Groundwater	VOCs	(3) 40 mL	40 mL VOA vial	HCl, pH < 2 Cool to 4°C	14 Days
	SVOCs	(2) 250 mL	250 mL amber glass, Teflon-lined	Cool to 4°C	7 Days (Extraction)
	PCBs	(2) 125 mL	125 mL amber glass, Teflon-lined	Cool to 4°C	365 Days (Extraction)
	Pesticides	(2) 125 mL	125 mL amber glass, Teflon-lined	Cool to 4°C	7 Days (Extraction)
	Herbicides	(2) 1000 mL	1000 mL amber glass, Teflon-lined	Cool to 4°C	7 Days (Extraction)
	Total / Dissolved Metals, including Hg	(2) 250 mL	250 mL plastic	HNO ₃ , pH<2 Cool to 4°C	180 Days (28 Days for Hg)
	Hexavalent Chromium	500 mL	500 mL plastic	Cool to 4°C	24 Hours
	Cyanide	250 mL	250 mL plastic	NaOH, pH>12 Cool to 4°C	14 Days
	1,4-Dioxane	(2) 250 mL	250 mL amber glass, Teflon-lined	Cool to 4°C	7 Days (Extraction)
	PFAS	(2) 250 mL	250 mL plastic	Cool to 4°C	28 Days (Extraction)

SECTION 3 – FIELD SAMPLING PLAN

3.1 Sampling Procedures

The following sections provide procedures for collecting a variety of samples, not all of which will be needed at this site.

3.1.1 Preparation for Sampling

The sample collection technique is of prime importance to assure the integrity of the collected sample. The following techniques include provisions so that:

- A representative sample is obtained;
- Contamination of the sample is minimized;
- The sample is properly preserved; and
- An acceptable Chain-of-Custody record is maintained.

The QA / QC Sampling Component of the Plan includes:

- Incorporation of accepted sampling techniques referenced in the sampling plan;
- Procedures for documenting any field actions contrary to the QA / QC Plan;
- Documentation of all preliminary activities such as equipment check-out, calibrations, and container storage and preparation;
- Documentation of field measurement quality control data (quality control procedures for such measurements shall be equivalent to corresponding QC procedures);
- Documentation of field activities;
- Documentation of post-field activities including sample shipment and receipt, field team debriefing, and equipment check-in;
- Generation of quality control samples including duplicate samples, equipment blanks, and trip blanks;
- The use of these samples in the context of data evaluation with details of the methods employed (including statistical methods) and of the criteria upon which the information generated will be judged; and
- The number of QA / QC samples generally required are shown in the following table. When there is a disagreement with QA / QC sample numbers and types, between this document and a Work Plan, the Work Plan shall prevail.

Table 3-1
QA / QC Samples

Sample Type	Analysis	Number	Note
MS / MSD	Full Suite	Every sample batch, or minimum of 5% (1 per 20)	Two additional samples at a given location
Blind Duplicate	Full Suite	Every sample batch, or minimum of 5% (1 per 20)	An additional sample at a given location
Trip Blank (Groundwater Only)	VOC	One per day or 5% (1 per 20), whichever is more frequent	Vials of clean water provided by laboratory. Packed with collected samples.
Equipment Blank (Groundwater Only)	PFAS	One per day or 5% (1 per 20), or whichever is more frequent	Clean water passed through / over decontaminated sample collection equipment / tubing.

The personnel responsible for collection of groundwater, soil, air, miscellaneous media, and petroleum spill remediation / verification samples will be familiar with standard sampling procedures and follow the appropriate protocol. Field records will be maintained in bound notebooks with numbered pages to document daily instrument calibration, locations sampled, field observations, and weather conditions. Each page will be dated and signed by the sampler. Each notebook will be numbered and a log of notebooks will be maintained by the project manager.

Prior to sampling, all equipment must be procured and accommodations for sample container delivery, and sample shipment must be made. The following is a list of general equipment that would be on hand for sampling events. Special equipment for each sampling event is presented in the section describing that specific sampling event.

3.1.2 General Field Sampling Equipment

- Field Data Sheets
- Chain-of-Custody forms
- Engineers tape and folding ruler with 0.01-foot intervals
- Field Record Sheets
- Latex gloves
- Face-safety shield
- Tyvek coveralls
- Respirators
- Photoionization detector
- Bio-degradable phosphate free detergent
- Coolers and ice (no blue ice)
- Drums
- Sample bottles
- Aluminum foil
- Duct and filament tape
- Tap water
- Distilled water
- Laboratory grade methanol and hexane
- Wash buckets
- Decontamination towels / cloths
- Large disposal containers
- Large plastic sheets

3.2 Sample Collection Techniques

3.2.1 Surface Soil Sampling

Surface soil samples will be collected at the locations and depths indicated in the Work Plan. When sampling is conducted in areas where a vegetative turf has been established, a pre-cleaned trowel or shovel will be used to remove the turf so that it may be replaced at the conclusion of sampling. Samples will then be collected using a pre-cleaned, stainless-steel spoon. When the sample is obtained, it will be deposited into a pre-cleaned stainless-steel bowl or plastic pail for mixing prior to filling the sample containers. The soil will be mixed thoroughly until the material is homogenized. At that point, the soil will be placed into the laboratory provided containers.

Once removed from the ground the soil will immediately be observed for soil characteristics, including general soil type (sand, silt, clay), moisture, and evidence of impairment (e.g. petroleum or chemical odors, staining, volatile organic vapors as measured by a photoionization detector (PID)). The PID will be calibrated daily (and more often as required by the manufacturer's data) prior to use in the field, using calibration test gases.

When PFAS sampling / testing is required, no sampling equipment components or sample containers should come into contact with aluminum foil, LDPE, glass, or Teflon tape. Acceptable equipment includes stainless steel spoons and bowl, HDPE containers, and steel shovels or augers that are not coated.

3.2.2 Subsurface Soil Sampling – Direct Push Drilling

Generally, soil borings will be advanced with a Geoprobe direct push sampling system. The use of direct push technology allows for rapid sampling, observation, and characterization of relatively shallow overburden soils. The Geoprobe utilizes a four to five-foot MacroCore® sampler, with disposable polyethylene sleeves. Soil cores will be retrieved in four or five-foot sections and can be easily cut from the polyethylene sleeves for observation and sampling. The MacroCore® sampler will be decontaminated between boring locations using an Alconox and water solution.

Prior to initiating drilling activities, the MacroCore®, drive rods, and pertinent equipment, will be steam cleaned or washed with an Alconox and water solution. This cleaning procedure will also be used between each boring. Throughout and after the cleaning processes, direct contact between the equipment and the ground surface will be avoided. Plastic sheeting and/or clean support structures (e.g., pallets, sawhorses) will be used.

Test borings will be advanced with 2-inch (or larger) inside diameter (ID) direct push MacroCore® through overburden soils. Drilling fluids, other than potable water will not be allowed without special consideration and agreement from NYSDEC. The use of lubricants is also not allowed unless approved by the NYSDEC representative.

3.2.3 Subsurface Soil Sampling – Hollow Stem Auger

The drilling and installation of monitoring wells will be performed using a rotary drill rig which will have sufficient capacity to perform 4 1/4-inch ID hollow-stem auger drilling in the overburden, retrieve MacroCore® or split-spoon samples. Equipment sizes and diameters may vary based on project-specific criteria. Any investigative derived waste generated during the advancement of soil borings and monitoring well installations will be containerized and characterized for proper disposal.

Prior to initiating drilling activities, the augers, rods, MacroCore®, split spoons, and other pertinent equipment will be steam cleaned or washed with an Alconox and water solution. This cleaning procedure will also be used between each boring. Steam cleaning activities will be performed in a designated on-site decontamination area. During and after the cleaning processes, direct contact between the equipment and the ground surface will be avoided. Plastic sheeting and/or clean support structures (e.g., pallets, sawhorses) will be used.

Test borings will be advanced with 4 1/4-inch ID hollow stem augers through overburden, driven by truck-, track-, or trailer-mounted drilling equipment. Alternative methods of drilling or equipment may be allowed or requested for project specific criteria but must be approved by the NYSDEC. Drilling fluids, other than water from a NYSDEC-approved source, will not be allowed without special consideration and agreement from NYSDEC. The use of lubricants is also not allowed unless approved by the NYSDEC representative.

Hollow stem auger advanced groundwater-monitoring wells typically utilize minimum 2-inch threaded flush joint PVC pipe with 0.010-in. slotted screen or pre-packed well screens. PVC piping used for risers and screens will conform to the requirements of ASTM-D 1785 Schedule 40 pipe. All materials used to construct the wells will be NSF / ASTM approved. Solvent PVC glue shall not be used at any time in the construction of the wells. The bottom of the screen shall be sealed with a treated wood cap or plastic plug. No lead shot or lead wool is to be employed in sealing the bottom of the well or for sealant at any point in the well.

3.2.4 Subsurface Soil Sample Screening and Collection

When polyethylene sleeves or split spoons are removed from borings, the soil will immediately be observed for soil characteristics, including general soil type (sand, silt, clay), moisture, confining layers, and evidence of impairment (e.g. petroleum or chemical odors, staining, volatile organic vapors as measured by a PID – ex-situ and headspace). Generally, sample selection is based on evidence of impairment, depth, spatial distribution, or for delineation purposes. Normally, sample locations will not be known until the end of each day in the field. Therefore, samples for potential analysis will be placed in new Ziploc bags and placed on ice until they are placed into laboratory provided glassware.

When PFAS sampling / testing is required, no sampling equipment components or sample containers should come into contact with aluminum foil, LDPE, glass, or Teflon tape. Acceptable

equipment includes stainless steel spoons and bowl, HDPE containers, and steel tools that are not coated.

3.2.5 Groundwater Monitoring Well Construction / Completion

Artificial Sand Pack

When utilized, granular backfill will be chemically and texturally clean, inert, siliceous, and of appropriate grain size for the screen slot size and the host environment. The sand pack will be installed using a tremie pipe, when possible (i.e., a tremie pipe may not fit into smaller, 2-inch diameter boreholes). When utilized, the well screen and casing will be installed, and the sand pack placed around the screen and casing to a depth extending at least 2 feet above the top of the screen. A pre-packed well screen may be used if pre-approved by the NYSDEC.

Bentonite Seal

A minimum 2-foot-thick seal will be placed directly on top of the sand pack, and care will be taken to avoid bridging. In the event that Site geology does not allow for a 2-foot seal (e.g., only 1-foot of space remains between the top of the sand pack and ground surface), the remaining space in the annulus will be filled with bentonite.

Grout Mixture

Upon completion of the bentonite seal, the well may be grouted with a 30% solids pure bentonite grout, a non-shrinking cement grout, a cement / bentonite grout mix, or a bentonite / soil mix as indicated in the Work Plan. The grout will be placed from the top of the bentonite seal to the ground surface.

Surface Protection

At all times during the progress of the work, precautions shall be used to prevent tampering with or the entrance of foreign material into the well. Upon completion of the well, a suitable cap shall be installed to prevent material from entering the well. Where permanent wells are to be installed, the well riser shall be protected by a flush mounted road box set into a concrete pad or locking well cap for stick-up wells. A concrete pad, sloped away from the well, shall be constructed around the flush mount road box or stick-up casing at ground level.

Any well that is to be temporarily removed from service or left incomplete due to delay in construction shall be capped with a watertight cap.

Surveying

Coordinates and elevations will be established for each monitoring well and sampling location. Elevations to the closest 0.01 foot shall be used for the survey. These elevations shall be referenced to a regional, local, or project-specific datum. The location, identification, coordinates, and elevations of the wells will be plotted on maps with a scale large enough to show their location with reference to other structures at each site.

Well Development

After completion of the well, but not sooner than 48 hours after grouting is completed, development will be accomplished using pumping, bailing, and / or surge blocking. No dispersing agents, acids, disinfectants, or other additives will be used during development or introduced into the well at any other time. During development, water will be removed throughout the entire water column by periodically lowering and raising the pump intake (or bailer stopping point).

Water elevations will be taken on all wells prior to development, purging, and sampling. All measurements will be taken within a 24-hour period to obtain consistent elevations and recorded on well data sheets. The procedure for measuring water levels in the monitoring wells is:

- Unlock and remove well cap;
- Test the atmosphere of the well with the calibrated PID. If the gases from the well have caused the air in the breathing zone to read greater than 5 ppm, stop work and refer to the HASP
- Measure water level to nearest 0.01 foot with a water level indicator (electronic).
- Water level indicators will be decontaminated before moving to next well. The tape and cable are decontaminated by washing in a bucket of distilled water-biodegradable phosphate free-detergent solution, followed by a rinse with distilled water.

Development water will either be properly contained and treated as waste until the results of chemical analysis of samples are obtained or discharged on Site as determined by the Site-specific work plans and / or consultation with the NYSDEC representatives on Site.

The development process will continue until removal of a minimum of three well volumes, and when water quality monitoring demonstrates stabilization of the effluent. The water quality meter will be calibrated prior to each sampling event (and more often as required by the manufacturer's data), using calibration fluids. Stabilization criteria is shown in the table below. In the event that limited recharge does not allow for the removal of three well volumes, the well will be allowed to stabilize to conditions deemed representative of groundwater conditions. Stabilization periods will vary by project but will be confirmed with the NYSDEC prior to sampling.

Table 3-2
Well Development Stabilization Criteria

Parameter	Units	Stabilization Criteria
pH	Standard Units (s.u.)	±0.1
Specific Electric Conductance	mS/cm	3%
Temperature	°C / °F	3%
Turbidity	NTU	10% or <10 NTU
Oxidation Reduction Potential (ORP)	mV	±10
Dissolved Oxygen (DO)	mg/L	10% or <0.5 mg/L

3.2.6 Groundwater Sample Collection

Groundwater samples will be collected using a dedicated low flow pump. When PFAS sampling / testing is required, only the following equipment will be permitted:

- Stainless steel inertia pump with HDPE tubing
- Peristaltic pump with HDPE and silicone tubing
- Stainless steel bailer with stainless steel ball
- Bladder pump (identified as PFAS-free) with HDPE tubing

All sampling equipment will be properly decontaminated in the field (see Section 3.4). The following equipment will be available for sampling of monitoring wells in addition to the general sampling equipment list:

- Well Data Sheets
- Pump
- Electronic water level indicator
- Water Quality Meter
- Acid resistant gloves

The following activities will be completed before going into the field every day before the start of sampling:

1. Fill out appropriate section on Well Data Sheet for the wells to be sampled;
2. Obtain the sampling schedule for each well to be sampled;
3. Calibrate the PID with the calibration gas;
4. Determine the amount of sampling to be done for the day and prepare the necessary number of coolers;
5. Each well to be sampled will have designated coolers containing the pre-labeled, certified clean, sample bottles. The groundwater samples will be placed in the cooler labeled for the well from which they were taken. The bottle shall be labeled with large distinguishable letters, so that the groundwater samples will be placed in the proper cooler; and
6. Select the appropriate sample bottles for the day's sampling. The bottles shall be pre-marked with a sample parameter and preservatives. Reusable glass bottles will have been cleaned and prepared at the laboratory. The bottles for the various parameters to be analyzed from each well location will then be placed in a cooler.

The following steps describe the sample collection of groundwater:

1. Unlock and remove the well cap.
2. When VOCs are a contaminant of concern, test the air at the wellhead with the calibrated PID. If the gases from the well have caused the air in the breathing zone to read greater than 5 ppm, stop work and refer to the HASP. Record the reading on the Well Data Sheet.
3. In order to obtain a representative sample of the formation water, the well must be purged of the static water within the well. Prior to purging, the static water level within

the well must be measured and the measurement recorded on the Well Data Sheet.

4. Lower the pump or tubing slowly into the well until it is below the water surface.
5. Connect the pump output to an in-line water quality device (i.e., flow-through cell). Purge the well at a low-flow rate (0.1 – 0.5 L/min). In accordance with the Work Plan, purge waters will either be disposed within the vicinity of the respective well or containerized.
6. Water level measurement should be recorded periodically to monitor drawdown in the well and guide flow rate adjustment. The goal is to minimize drawdown in the well to less than 0.33 feet. The flow rate should be stabilized as soon as possible.
7. Periodically record the pumping rate, drawdown, and the volume of water purged.
8. Water quality indicator parameters (pH, specific conductance, temperature, turbidity, ORP, and DO) should be recorded every three to five minutes or after one flow-through cell volume has been purged, whichever is greater.
9. The well is ready to be sampled once the water quality indicator parameters have stabilized in accordance with Table 3-2. If the well goes dry during pumping, allow for full recovery (measure the water level), and then sample. If recovery takes more than twenty minutes, proceed to next well but return to sample within 24 hours.
10. Fill the appropriate sample bottles according to the sampling schedule for each well. While filling the sample bottles, record the well number, type, volume of container, and the preservatives used on the Ground Water Sampling Analyses form.
11. The preservatives for the various sampling parameters were previously added to the clean sample bottles by the laboratory. Some parameters may require additional special handling.
12. Volatile organics analyses sample vials must be free of air bubbles. When a bubble-free sample has been obtained, it must be immediately chilled.
13. Collect the MS / MSD, duplicates, equipment blanks, and trip blanks, as applicable. Take samples according to sampling schedule presented in the Work Plan.
14. Record all pertinent information in field logbook and on the Well Data Sheet (include color, odor, sediment content of sample, etc.). Any situations at the site that have the potential to interfere with the analytical results should also be recorded here.
15. Lock well, inspect well site, and note any maintenance required.
16. Dispose of potentially contaminated materials in designated container.

3.2.7 Air Sample Collection

Indoor Air Sampling

Indoor air samples will be collected using a Summa™ canister (6-Liter capacity) equipped with a critical orifice flow regulation device sized to allow an air sample to be collected over a 24-hour sampling period. Care is taken to deploy the canisters away from the direct influence of any forced air emanating from air conditioning units, central air conditioning vents, furnaces or heaters. The indoor air sampling procedure is as follows:

- Building spaces are examined to determine a location for deploying the sample. The canister is deployed in areas not subject to disturbances and which will not interfere with the occupant's normal activities.

- Building occupants are requested to keep out of the sampling area during the sampling event.
- Air sample canisters are labeled with a unique sample designation number. The sample number and location is recorded in the field log book.
- The canister vacuum is measured using an integrated vacuum gauge immediately prior to canister deployment, and recorded in the field log book. The critical orifice flow controller is installed, as supplied by the laboratory, on the canister, the canister is opened fully at the beginning of sample collection period, and the start time is recorded.
- The canister valve is closed fully at the end of the sample period by disconnecting the regulator from the canister (after 24-hours) and the end time recorded. Any evidence of canister disturbance during the sample collection will be recorded.
- The canister vacuum is measured and recorded immediately after canister retrieval at the end of the sample period. Once the vacuum is measured, the canisters are returned to their sampling boxes for safe storage and shipping. Field data is verified as correctly entered into field books prior to shipment; and canisters are shipped to the laboratory under a chain-of-custody.

Sub-Slab Soil Gas Sampling

Sub-slab sampling points will be installed to collect soil gas immediately below the slab. The sub-slab samples will be co-located with a corresponding indoor air sample to evaluate the potential from exposure. Sub-slab gas samples will be collected using a 6-Liter Summa™ canister fitted with a flow orifice pre-calibrated to collect a 6-Liter sample over a 24-hour period. Once the 24-hour sampling period has been completed, the canister will be boxed and shipped to the laboratory for analysis. A brief summary of the sampling protocol is provided below. The sub-slab vapor points will be installed by first advancing a small diameter hole (approximately 3/8-inches in diameter) through the floor slab to determine thickness. The holes will be drilled via a hammer drill. The hole will extend through the slab and terminate at the interface with underlying material (i.e. gravel base or soil). A sample point consisting of a length of tubing will be placed into the boring. The cored slab annulus will be filled with clay placed around the sub-slab vapor point. The bottom of the sub-slab vapor point will extend to the bottom of slab. Prior to sub-slab soil gas sample collection, the monitoring point and above grade tubing will be purged at a rate not exceeding 200 ml/min. The total volume purged prior to sample collection will equal three volumes of air in the open space of tubing and the sample point. At the end of the sampling event, a pressure gauge reading will be recorded. The 6-Liter canister with a calibrated 24-hour orifice will be connected to the tubing. The following summarizes the above:

- The sub-slab sampling point construction will be temporary, with the sampling points securely mounted through the concrete slab and grouted in place using pottery clay.
- Prior to sub-slab soil gas sample collection, the monitoring point and above grade tubing will be purged at a rate not exceeding 200 ml/min.
- Samples will be collected over a 24-hour period at a flow rate not greater than 200 mL/min.

- Helium will be used as a field tracer during sampling. The Helium will be introduced into a dome next to the above grade sampling train and Summa™ canister. The helium concentration will be read using a helium meter that is capable to read down to 1-2%.
- Field documentation will be maintained in a field notebook and on field data forms.

Crawl Space Air Sampling

Crawl space sampling points will be installed to collect air in the crawl space, immediately below the ground floor. The crawl space air samples will be co-located with a corresponding indoor air sample to evaluate the potential from exposure. Crawl space air samples will be collected using a 6-Liter Summa™ canister fitted with a flow orifice pre-calibrated to collect a 6-Liter sample over a 24-hour period. Once the 24-hour sampling period has been completed, the canister will be boxed and shipped to the laboratory for analysis. A brief summary of the sampling protocol is provided below. The crawl space sampling points will be installed by first advancing a small diameter hole (approximately 3/8-inches in diameter) through the ground floor slab to determine thickness. The holes will be drilled via a hammer drill. The hole will extend through the slab and terminate in the crawl space. A sample point consisting of a length of tubing will be placed into the hole. The cored slab annulus will be filled with clay placed around the crawl space sampling point. The bottom of the crawl space point will extend one to two feet into the crawl space. Prior to crawl space air sample collection, the monitoring point and above grade tubing will be purged at a rate not exceeding 200 ml/min. The total volume purged prior to sample collection will equal three volumes of air in the open space of tubing and the sample point. At the end of the sampling event, a pressure gauge reading will be recorded. The 6-Liter canister with a calibrated 24-hour orifice will be connected to the tubing. The following summarizes the above:

- The crawl space sampling point construction will be temporary, with the sampling points securely mounted through the concrete slab and grouted in place using pottery clay.
- Prior to crawl space air sample collection, the monitoring point and above grade tubing will be purged at a rate not exceeding 200 ml/min.
- Samples will be collected over a 24-hour period at a flow rate not greater than 200 mL/min.
- Helium will be used as a field tracer during sampling. The Helium will be introduced into a dome next to the above grade sampling train and Summa™ canister. The helium concentration will be read using a helium meter that is capable to read down to 1-2%.
- Access doors to the crawl space will remain closed throughout the sample collection duration.
- Field documentation will be maintained in a field notebook and on field data forms.

Ambient Air Sampling

Ambient air samples are collected in the same manner as the indoor air samples. The sampling device will be located upwind of the structure and will be placed approximately three to five feet off the ground for sample collection purposes. The outdoor air samples will be collected using a Summa canister equipped with a laboratory calibrated regulator over a 24-hour period.

3.3 General Decontamination

The following procedures will be performed for the decontamination of exploration equipment, sampling equipment, and personnel after each drilling / sampling event:

Drill rig, backhoe, and excavator – The drill rig, direct-push rig, backhoe, and / or excavator will be cleaned prior to their entrance and exit of the site. Greases and oils will not be used on any down hole equipment during drilling or exploration activities.

Exploration equipment – To avoid cross contamination, use of a PID meter and cleaning between each sampling site will be employed on backhoe arms, buckets, hollow stem augers, casing drill rods, down-hole tools, and appurtenant equipment.

Split spoon sampler – The split spoon sampler will be scrubbed, cleaned, and put through a series of rinses between each sampling event. A number of split spoon samplers will be used so that one can be utilized for sampling while the others are being cleaned.

Reusable equipment – The following steps will be employed to decontaminate reusable equipment:

- Rinse equipment of soil or foreign material with potable water;
- Immerse and scrub equipment with bio-degradable phosphate-free detergent and potable water;
- Immerse and scrub in a potable water rinse without detergent;
- Immerse and scrub in deionized/distilled water;
- Saturate by spraying or immersion in laboratory-grade hexane;
- Air dry and wrap cleaned equipment in foil to carry to next monitoring site to prevent contamination of equipment during transfer; and
- The decontamination wash and rinse water will not be considered hazardous unless visual inspection or monitoring by the PID and other equipment indicate that contaminants may be present. The rinse waters can be discharged on-site if they are not contaminated. If contaminants are expected to be present, the rinsate waters should be placed in 55-gallon drums and stored on-site.

Disposable equipment – The following steps will be employed to decontaminate disposable equipment:

- Rinse with potable water;
- Remove all standing liquid from the piece of equipment;
- Dispose of the equipment in a dedicated container for contaminated solids; and
- Dispose of rinse water in 55-gallon drums if contaminants are found to be present.

Sample containers – Upon filling and capping sample bottles, the outside of the bottle will be wiped off with a clean paper towel. These towels will be disposed of in a dedicated container

for contaminated solids.

Personnel decontamination – The following procedures will be used to decontaminate sampling personnel.

- After each sampling event chemical resistant gloves will be disposed of in a dedicated container for contaminated solids;
- At the end of each sampling day, Tyvek™ coveralls will be disposed of in a dedicated container for contaminated solids;
- Boots will be rinsed off with water to remove mud, clay, or any other contaminants; and
- Personnel will be required to follow procedures outlined in the HASP.

Special Considerations When Sampling for PFAS

- Clothing that contains PTFE material, including Gore-Tex or that have been water-proofed with PFAS materials should be avoided. All clothing worn by sampling personnel should first be laundered multiple times. Acceptable rain gear includes PVC, polyurethane, or rubber. If such materials are required because site conditions warrant additional protection for samplers, their use will be documented in the field notes.
- Decontamination water shall be verified in advance to be PFAS-free through laboratory analysis or certification. Previous results of non-detect for PFAS are acceptable.

SECTION 4 – SAMPLE MANAGEMENT PLAN

4.1 Sample Management

This Sample Management Plan provides procedures to document and track samples and results obtained during this work effort. A series of pre-printed forms with the appropriate information serves as a vehicle for documentation and tracking.

In order to accomplish this task, the documentation materials will include sample labels, sample characterization and Chain-of-Custody sheets, daily field reports, and a sample log.

Sample Label – A sample label will be completed for each sample obtained and will be affixed to the sample container. The label is configured in a way to address various types of mediums. Information on the label includes, at a minimum, client name, location, sample description, sample number, date, time, grab sample, composite sample, notes, and sampler's name.

Sample Characterization & Chain-of-Custody Sheet – All pertinent field information will be entered onto the sample characterization and chain-of-custody sheets including client name, sample ID, sample description, location of sample, sampling method, number of containers, container type, analysis required, and preservation. The monitoring well form has space allotted for entering information regarding the well including depth to water, well volume, sample pH, temperature, color, etc. The Chain-of-Custody section of the form will document the sample's pathway of sample shipment which will include names of persons delivering/receiving, dates, and times. The reverse side of this form will be used by the laboratory to document analysis performed on the sample. Copies of the completed forms will be retained by the Engineer and the analytical laboratory. The original sample characterization and Chain-of-Custody sheets will be submitted in the Remedial Investigation report along with the laboratory results.

Daily Field Reports – Daily activities will be recorded on the Inspection Report form. The purpose of this form will be to summarize the work performed on the site each day. The completed forms will be submitted to the Project Manager on a daily basis for short term site activity and on a weekly basis for site activities of a longer duration.

Sample Log – The sample log will be utilized to track each individual sample obtained at the site. The upper portion, "Field Identification" will be completed the day the sample is taken. The form will accompany the sample characterization and Chain-of-Custody form to the laboratory. Personnel at the laboratory will complete the middle section of this form and return it to the Engineer, who will use the document to track incoming results. The bottom of the sheet has space allocated to enter "Recommended Actions" based on laboratory results.

4.2 Sample Handling

Each collected sample will be dispensed into the appropriate sample containers for the type of analysis to be performed. Sampling staff will wear nitrile gloves at all times when handling

samples. Appropriate sample preservatives will be added to the sample containers by the contracted analytical laboratory prior to the delivery into the field, except in cases where the sample preservative must be added after sample collection. All samples that require cool storage will be immediately placed in coolers with appropriate packaging materials so as to protect the breakage of sample containers during shipment. The sample coolers will be filled with cubed ice (no "Blue Ice") prior to leaving the sample collection location. In the instance that a local analytical laboratory is contracted, the samples will be hand delivered to the laboratory each sampling day. The chain-of-custody forms will be signed by the laboratory personnel picking up the samples and placed within the coolers. In the instance that an analytical laboratory is contracted which is not based locally and a common carrier is used for sample shipment, the chain-of-custody forms will be signed by the sampler and the carrier personnel and placed inside of the coolers. Careful packaging techniques will be used to prevent sample containers from breakage during shipment. Materials such as cardboard, foam wrap, or Styrofoam may be used as packaging materials. All samples will be delivered to the contracted analytical laboratory on the day they were collected and will be received by the laboratory within 24 hours of sample collection. The samples will be collected with sufficient time allowed at the end of the day for the analytical laboratory to properly process the sample chain-of-custody form.

Attachment A

SUPPORTING DOCUMENTATION FOR PFAS ANALYSIS



Department of
Environmental
Conservation

SAMPLING, ANALYSIS, AND ASSESSMENT OF PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS)

Under NYSDEC's Part 375 Remedial Programs

April 2023



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ERRATA SHEET for

**SAMPLING, ANALYSIS, AND ASSESSMENT OF PER- AND POLYFLUOROALKYL SUBSTANCES
(PFAS) Under NYSDEC's Part 375 Remedial Programs Issued January 17, 2020**

Citation and Page Number	Current Text	Corrected Text	Date
Title of Appendix I, page 32	Appendix H	Appendix I	2/25/2020
Document Cover, page 1	Guidelines for Sampling and Analysis of PFAS	Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Programs	9/15/2020
Data Assessment and Application to Site Cleanup Page 3	Until such time as Ambient Water Quality Standards (AWQS) and Soil Cleanup Objectives (SCOs) for PFOA and PFOS are published	Until such time as Soil Cleanup Objectives (SCOs) for PFOA and PFOS are published	3/28/2023
Water Sample Results Page 3	PFOA and PFOS should be further assessed and considered as potential contaminants of concern in groundwater or surface water if PFOA or PFOS is detected in any water sample at or above 10 ng/L (ppt) and is determined to be attributable to the site, either by a comparison of upgradient and downgradient levels, or the presence of soil source areas, as defined below.	NYSDEC has adopted ambient water quality guidance values for PFOA and PFOS. Groundwater samples should be compared to the human health criteria of 6.7 ng/l (ppt) for PFOA and 2.7 ng/l (ppt) for PFOS. These guidance values also include criteria for surface water for PFOS applicable for aquatic life, which may be applicable at some sites. Drinking water sample results should be compared to the NYS maximum contaminant level (MCL) of 10 ng/l (ppt). Analysis to determine if PFOA and PFOS concentrations are attributable to the site should include a comparison between upgradient and downgradient levels, and the presence of soil source areas, as defined below.	3/28/2023
Soil Sample Results Page 3	Soil cleanup objectives for PFOA and PFOS have been proposed in an upcoming revision to 6 NYCRR Part 375-6. Until SCOs are in effect, the following are to be used as guidance values:	NYSDEC will delay adding soil cleanup objectives for PFOA and PFOS to 6 NYCRR Part 375-6 until the PFAS rural soil background study has been completed. Until SCOs are in effect, the following are to be used as guidance values:	3/28/2023
Protection of Groundwater Page 3	PFOA (ppb) 1.1 PFOS (ppb) 3.7	PFOA (ppb) 0.8 PFOS (ppb) 1.0	3/28/2023

Citation and Page Number	Current Text	Corrected Text	Date
Footnote 2 Page 3	The movement of PFAS in the environment is being aggressively researched at this time; that research will eventually result in more accurate models for the behaviors of these chemicals. In the meantime, DEC has calculated the guidance value for the protection of groundwater using the same procedure used for all other chemicals, as described in Section 7.7 of the Technical Support Document (http://www.dec.ny.gov/docs/remediation_hudson_pdf/techsuppdoc.pdf).	The Protection of Groundwater values are based on the above referenced ambient groundwater guidance values. Details on that calculation are available in the following document, prepared for the February 2022 proposed changes to Part 375 (https://www.dec.ny.gov/docs/remediation_hudson_pdf/part375techsupport.pdf). The movement of PFAS in the environment is being aggressively researched at this time; that research will eventually result in more accurate models for the behaviors of these chemicals. In the meantime, DEC has calculated the guidance value for the protection of groundwater using the same procedure used for all other chemicals, as described in Section 7.7 of the Technical Support Document (http://www.dec.ny.gov/docs/remediation_hudson_pdf/techsuppdoc.pdf).	3/28/2023
Testing for Imported Soil Page 4	If the concentrations of PFOA and PFOS in leachate are at or above 10 ppt (the Maximum Contaminant Levels established for drinking water by the New York State Department of Health), then the soil is not acceptable.	If the concentrations of PFOA and PFOS in leachate are at or above the ambient water quality guidance values for groundwater, then the soil is not acceptable.	3/28/2023
Routine Analysis, page 9	“However, laboratories analyzing environmental samples...PFOA and PFOS in drinking water by EPA Method 537, 537.1 or ISO 25101.”	“However, laboratories analyzing environmental samples...PFOA and PFOS in drinking water by EPA Method 537, 537.1, ISO 25101, or Method 533.”	9/15/2020
Additional Analysis, page 9, new paragraph regarding soil parameters	None	“In cases where site-specific cleanup objectives for PFOA and PFOS are to be assessed, soil parameters, such as Total Organic Carbon (EPA Method 9060), soil pH (EPA Method 9045), clay content (percent), and cation exchange capacity (EPA Method 9081), should be included in the analysis to help evaluate factors affecting the leachability of PFAS in site soils.”	9/15/2020

Citation and Page Number	Current Text	Corrected Text	Date
Data Assessment and Application to Site Cleanup Page 10	Until such time as Ambient Water Quality Standards (AWQS) and Soil Cleanup Objectives (SCOs) for PFAS are published, the extent of contaminated media potentially subject to remediation should be determined on a case-by-case basis using the procedures discussed below and the criteria in DER-10. Target levels for cleanup of PFAS in other media, including biota and sediment, have not yet been established by the DEC.	Until such time as Ambient Water Quality Standards (AWQS) and Soil Cleanup Objectives (SCOs) for PFOA and PFOS are published, the extent of contaminated media potentially subject to remediation should be determined on a case-by-case basis using the procedures discussed below and the criteria in DER-10. Preliminary target levels for cleanup of PFOA and PFOS in other media, including biota and sediment, have not yet been established by the DEC.	9/15/2020
Water Sample Results Page 10	PFAS should be further assessed and considered as a potential contaminant of concern in groundwater or surface water (...) If PFAS are identified as a contaminant of concern for a site, they should be assessed as part of the remedy selection process in accordance with Part 375 and DER-10.	PFOA and PFOS should be further assessed and considered as potential contaminants of concern in groundwater or surface water (...) If PFOA and/or PFOS are identified as contaminants of concern for a site, they should be assessed as part of the remedy selection process in accordance with Part 375 and DER-10.	9/15/2020

Citation and Page Number	Current Text	Corrected Text	Date
Soil Sample Results, page 10	“The extent of soil contamination for purposes of delineation and remedy selection should be determined by having certain soil samples tested by Synthetic Precipitation Leaching Procedure (SPLP) and the leachate analyzed for PFAS. Soil exhibiting SPLP results above 70 ppt for either PFOA or PFOS (individually or combined) are to be evaluated during the cleanup phase.”	“Soil cleanup objectives for PFOA and PFOS will be proposed in an upcoming revision to 6 NYCRR Part 375-6. Until SCOs are in effect, the following are to be used as guidance values. “ [Interim SCO Table] “PFOA and PFOS results for soil are to be compared against the guidance values listed above. These guidance values are to be used in determining whether PFOA and PFOS are contaminants of concern for the site and for determining remedial action objectives and cleanup requirements. Site-specific remedial objectives for protection of groundwater can also be presented for evaluation by DEC. Development of site-specific remedial objectives for protection of groundwater will require analysis of additional soil parameters relating to leachability. These additional analyses can include any or all the parameters listed above (soil pH, cation exchange capacity, etc.) and/or use of SPLP. As the understanding of PFAS transport improves, DEC welcomes proposals for site-specific remedial objectives for protection of groundwater. DEC will expect that those may be dependent on additional factors including soil pH, aqueous pH, % organic carbon, % Sand/Silt/Clay, soil cations: K, Ca, Mg, Na, Fe, Al, cation exchange capacity, and anion exchange capacity. Site-specific remedial objectives should also consider the dilution attenuation factor (DAF). The NJDEP publication on DAF can be used as a reference: https://www.nj.gov/dep/srp/guidance/rs/daf.pdf. ”	9/15/2020

Citation and Page Number	Current Text	Corrected Text	Date
Testing for Imported Soil Page 11	Soil imported to a site for use in a soil cap, soil cover, or as backfill is to be tested for PFAS in general conformance with DER-10, Section 5.4(e) for the PFAS Analyte List (Appendix F) using the analytical procedures discussed below and the criteria in DER-10 associated with SVOCs. If PFOA or PFOS is detected in any sample at or above 1 µg/kg, then soil should be tested by SPLP and the leachate analyzed for PFAS. If the SPLP results exceed 10 ppt for either PFOA or PFOS (individually) then the source of backfill should be rejected, unless a site-specific exemption is provided by DER. SPLP leachate criteria is based on the Maximum Contaminant Levels proposed for drinking water by New York State's Department of Health, this value may be updated based on future Federal or State promulgated regulatory standards. Remedial parties have the option of analyzing samples concurrently for both PFAS in soil and in the SPLP leachate to minimize project delays. Category B deliverables should be submitted for backfill samples, though a DUSR is not required.	Testing for PFAS should be included any time a full TAL/TCL analyte list is required. Results for PFOA and PFOS should be compared to the applicable guidance values. If PFOA or PFOS is detected in any sample at or above the guidance values then the source of backfill should be rejected, unless a site-specific exemption is provided by DER based on SPLP testing, for example. If the concentrations of PFOA and PFOS in leachate are at or above 10 ppt (the Maximum Contaminant Levels established for drinking water by the New York State Department of Health), then the soil is not acceptable. PFOA, PFOS and 1,4-dioxane are all considered semi-volatile compounds, so composite samples are appropriate for these compounds when sampling in accordance with DER-10, Table 5.4(e)10. Category B deliverables should be submitted for backfill samples, though a DUSR is not required.	9/15/2020

Citation and Page Number	Current Text	Corrected Text	Date
Footnotes	None	¹ TOP Assay analysis of highly contaminated samples, such as those from an AFFF (aqueous film-forming foam) site, can result in incomplete oxidation of the samples and an underestimation of the total perfluoroalkyl substances. ² The movement of PFAS in the environment is being aggressively researched at this time; that research will eventually result in more accurate models for the behaviors of these chemicals. In the meantime, DEC has calculated the soil cleanup objective for the protection of groundwater using the same procedure used for all other chemicals, as described in Section 7.7 of the Technical Support Document (http://www.dec.ny.gov/docs/remediation_hudson_pdf/techsuppdoc.pdf).	9/15/2020
Additional Analysis, page 9	In cases... soil parameters, such as Total Organic Carbon (EPA Method 9060), soil...	In cases... soil parameters, such as Total Organic Carbon (Lloyd Kahn), soil...	1/8/2021
Appendix A, General Guidelines, fourth bullet	List the ELAP-approved lab(s) to be used for analysis of samples	List the ELAP- certified lab(s) to be used for analysis of samples	1/8/2021
Appendix E, Laboratory Analysis and Containers	Drinking water samples collected using this protocol are intended to be analyzed for PFAS by ISO Method 25101.	Drinking water samples collected using this protocol are intended to be analyzed for PFAS by EPA Method 537, 537.1, 533, or ISO Method 25101	1/8/2021
Water Sample Results Page 9	“In addition, further assessment of water may be warranted if either of the following screening levels are met: a. any other individual PFAS (not PFOA or PFOS) is detected in water at or above 100 ng/L; or b. total concentration of PFAS (including PFOA and PFOS) is detected in water at or above 500 ng/L”	Deleted	6/15/2021

Citation and Page Number	Current Text	Corrected Text	Date
Routine Analysis, Page XX	Currently, New York State Department of Health's Environmental Laboratory Approval Program (ELAP)... criteria set forth in the DER's laboratory guidelines for PFAS in non-potable water and solids (Appendix H - Laboratory Guidelines for Analysis of PFAS in Non-Potable Water and Solids).	Deleted	5/31/2022
Analysis and Reporting, Page XX	As of October 2020, the United States Environmental Protection Agency (EPA) does not have a validated method for analysis of PFAS for media commonly analyzed under DER remedial programs (non-potable waters, solids). DER has developed the following guidelines to ensure consistency in analysis and reporting of PFAS.	Deleted	5/31/2022
Routine Analysis, Page XX	LC-MS/MS analysis for PFAS using methodologies based on EPA Method 537.1 is the procedure to use for environmental samples. Isotope dilution techniques should be utilized for the analysis of PFAS in all media.	EPA Method 1633 is the procedure to use for environmental samples.	
Soil Sample Results, Page XX	Soil cleanup objectives for PFOA and PFOS will be proposed in an upcoming revision to 6 NYCRR Part 375-6	Soil cleanup objectives for PFOA and PFOS have been proposed in an upcoming revision to 6 NYCRR Part 375-6	
Appendix A	"Include in the text... LC-MS/MS for PFAS using methodologies based on EPA Method 537.1"	"Include in the textEPA Method 1633"	
Appendix A	"Laboratory should have ELAP certification for PFOA and PFOS in drinking water by EPA Method 537, 537.1, EPA Method 533, or ISO 25101"	Deleted	
Appendix B	"Samples collected using this protocol are intended to be analyzed for PFAS using methodologies based on EPA Method 537.1"	"Samples collected using this protocol are intended to be analyzed for PFAS using EPA Method 1633"	

Citation and Page Number	Current Text	Corrected Text	Date
Appendix C	“Samples collected using this protocol are intended to be analyzed for PFAS using methodologies based on EPA Method 537.1”	“Samples collected using this protocol are intended to be analyzed for PFAS using EPA Method 1633”	
Appendix D	“Samples collected using this protocol are intended to be analyzed for PFAS using methodologies based on EPA Method 537.1”	“Samples collected using this protocol are intended to be analyzed for PFAS using EPA Method 1633”	
Appendix G		Updated to include all forty PFAS analytes in EPA Method 533	
Appendix H		Deleted	
Appendix I	Appendix I	Appendix H	
Appendix H	“These guidelines are intended to be used for the validation of PFAS analytical results for projects within the Division of Environmental Remediation (DER) as well as aid in the preparation of a data usability summary report.”	“These guidelines are intended to be used for the validation of PFAS using EPA Method 1633 for projects within the Division of Environmental Remediation (DER).”	
Appendix H	“The holding time is 14 days...”	“The holding time is 28 days...”	
Appendix H, Initial Calibration	“The initial calibration should contain a minimum of five standards for linear fit...”	“The initial calibration should contain a minimum of six standards for linear fit...”	
Appendix H, Initial Calibration	Linear fit calibration curves should have an R ² value greater than 0.990.	Deleted	
Appendix H, Initial Calibration Verification	Initial Calibration Verification Section	Deleted	
Appendix H	secondary Ion Monitoring Section	Deleted	
Appendix H	Branched and Linear Isomers Section	Deleted	

Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Programs

Objective

New York State Department of Environmental Conservation's Division of Environmental Remediation (DER) performs or oversees sampling of environmental media and subsequent analysis of PFAS as part of remedial programs implemented under 6 NYCRR Part 375. To ensure consistency in sampling, analysis, reporting, and assessment of PFAS, DER has developed this document which summarizes currently accepted procedures and updates previous DER technical guidance pertaining to PFAS.

Applicability

All work plans submitted to DEC pursuant to one of the remedial programs under Part 375 shall include PFAS sampling and analysis procedures that conform to the guidelines provided herein.

As part of a site investigation or remedial action compliance program, whenever samples of potentially affected media are collected and analyzed for the standard Target Analyte List/Target Compound List (TAL/TCL), PFAS analysis should also be performed. Potentially affected media can include soil, groundwater, surface water, and sediment. Based upon the potential for biota to be affected, biota sampling and analysis for PFAS may also be warranted as determined pursuant to a Fish and Wildlife Impact Analysis. Soil vapor sampling for PFAS is not required.

Field Sampling Procedures

DER-10 specifies technical guidance applicable to DER's remedial programs. Given the prevalence and use of PFAS, DER has developed "best management practices" specific to sampling for PFAS. As specified in DER-10 Chapter 2, quality assurance procedures are to be submitted with investigation work plans. Typically, these procedures are incorporated into a work plan, or submitted as a stand-alone document (e.g., a Quality Assurance Project Plan). Quality assurance guidelines for PFAS are listed in Appendix A - Quality Assurance Project Plan (QAPP) Guidelines for PFAS.

Field sampling for PFAS performed under DER remedial programs should follow the appropriate procedures outlined for soils, sediments, or other solids (Appendix B), non-potable groundwater (Appendix C), surface water (Appendix D), public or private water supply wells (Appendix E), and fish tissue (Appendix F).

QA/QC samples (e.g. duplicates, MS/MSD) should be collected as specified in DER-10, Section 2.3(c). For sampling equipment coming in contact with aqueous samples only, rinsate or equipment blanks should be collected. Equipment blanks should be collected at a minimum frequency of one per day per site or one per twenty samples, whichever is more frequent.

Analysis and Reporting

The investigation work plan should describe analysis and reporting procedures, including laboratory analytical procedures for the methods discussed below. As specified in DER-10 Section 2.2, laboratories should provide a full Category B deliverable. In addition, a Data Usability Summary Report (DUSR) should be prepared by an independent, third-party data validator. Electronic data submissions should meet the requirements provided at: <https://www.dec.ny.gov/chemical/62440.html>.

DER has developed a *PFAS Analyte List* (Appendix G) for remedial programs to understand the nature of contamination at sites. It is expected that reported results for PFAS will include, at a minimum, all the compounds listed. If lab and/or matrix specific issues are encountered for any analytes, the DER project manager, in consultation with the DER chemist, will make case-by-case decisions as to whether certain analytes may be temporarily or permanently discontinued from analysis at each site. As with other contaminants that are analyzed for at a site, the *PFAS Analyte List* may be refined for future sampling events based on investigative findings.

Routine Analysis

EPA Method 1633 is the procedure to use for environmental samples. Reporting limits for PFOA and PFOS in aqueous samples should not exceed 2 ng/L. Reporting limits for PFOA and PFOS in solid samples should not exceed 0.5 µg/kg. Reporting limits for all other PFAS in aqueous and solid media should be as close to these limits as possible. If laboratories indicate that they are not able to achieve these reporting limits for the entire *PFAS Analyte List*, site-specific decisions regarding acceptance of elevated reporting limits for specific PFAS can be made by the DER project manager in consultation with the DER chemist. Data review guidelines were developed by DER to ensure data comparability and usability (Appendix H - Data Review Guidelines for Analysis of PFAS in Non-Potable Water and Solids).

Additional Analysis

Additional laboratory methods for analysis of PFAS may be warranted at a site, such as the Synthetic Precipitation Leaching Procedure (SPLP) and Total Oxidizable Precursor Assay (TOP Assay).

In cases where site-specific cleanup objectives for PFOA and PFOS are to be assessed, soil parameters, such as Total Organic Carbon (Lloyd Kahn), soil pH (EPA Method 9045), clay content (percent), and cation exchange capacity (EPA Method 9081), should be included in the analysis to help evaluate factors affecting the leachability of PFAS in site soils.

SPLP is a technique used to determine the mobility of chemicals in liquids, soils and wastes, and may be useful in determining the need for addressing PFAS-containing material as part of the remedy. SPLP by EPA Method 1312 should be used unless otherwise specified by the DER project manager in consultation with the DER chemist.

Impacted materials can be made up of PFAS that are not analyzable by routine analytical methodology. A TOP Assay can be utilized to conceptualize the amount and type of oxidizable PFAS which could be liberated in the environment, which approximates the maximum concentration of perfluoroalkyl substances that could be generated if all polyfluoroalkyl substances were oxidized. For example, some polyfluoroalkyl substances may degrade or transform to form perfluoroalkyl substances (such as PFOA or PFOS), resulting in an increase in perfluoroalkyl substance concentrations as contaminated groundwater moves away from a source. The TOP Assay converts, through oxidation, polyfluoroalkyl substances (precursors) into perfluoroalkyl substances that can be detected by routine analytical methodology.¹

¹ TOP Assay analysis of highly contaminated samples, such as those from an AFFF (aqueous film-forming foam) site, can result in incomplete oxidation of the samples and an underestimation of the total perfluoroalkyl substances.

Commercial laboratories have adopted methods which allow for the quantification of targeted PFAS in air and biota. The EPA's Office of Research and Development (ORD) is currently developing methods which allow for air emissions characterization of PFAS, including both targeted and non-targeted analysis of PFAS. Consult with the DER project manager and the DER chemist for assistance on analyzing biota/tissue and air samples.

Data Assessment and Application to Site Cleanup

Until such time as Soil Cleanup Objectives (SCOs) for PFOA and PFOS are published, the extent of contaminated media potentially subject to remediation should be determined on a case-by-case basis using the procedures discussed below and the criteria in DER-10. Preliminary target levels for cleanup of PFOA and PFOS in other media, including biota and sediment, have not yet been established by the DEC.

Water Sample Results

NYSDEC has adopted ambient water quality guidance values for PFOA and PFOS. Groundwater samples should be compared to the human health criteria of 6.7 ng/l (ppt) for PFOA and 2.7 ng/l (ppt) for PFOS. These human health criteria should also be applied to surface water that is used as a water supply. This guidance also includes criteria for surface water for PFOS applicable for aquatic life, which may be applicable at some sites. Drinking water sample results should be compared to the NYS maximum contaminant level (MCL) of 10 ng/l (ppt). Analysis to determine if PFOA and PFOS concentrations are attributable to the site should include a comparison between upgradient and downgradient levels, and the presence of soil source areas, as defined below.

If PFOA and/or PFOS are identified as contaminants of concern for a site, they should be assessed as part of the remedy selection process in accordance with Part 375 and DER-10.

Soil Sample Results

NYSDEC will delay adding soil cleanup objectives for PFOA and PFOS to 6 NYCRR Part 375-6 until the PFAS rural soil background study has been completed. Until SCOs are in effect, the following are to be used as guidance values:

Guidance Values for Anticipated Site Use	PFOA (ppb)	PFOS (ppb)
Unrestricted	0.66	0.88
Residential	6.6	8.8
Restricted Residential	33	44
Commercial	500	440
Industrial	600	440
Protection of Groundwater ²	0.8	1.0

PFOA and PFOS results for soil are to be compared against the guidance values listed above. These guidance values are to be used in determining whether PFOA and PFOS are contaminants of concern for the site and for determining remedial action objectives and cleanup requirements. Site-specific remedial objectives for protection of groundwater can also be presented for evaluation by DEC. Development of site-specific remedial objectives for protection of groundwater will require analysis of additional soil parameters relating to leachability. These

² The Protection of Groundwater values are based on the above referenced ambient groundwater guidance values. Details on that calculation are available in the following document, prepared for the February 2022 proposed changes to Part 375 (https://www.dec.ny.gov/docs/remediation_hudson_pdf/part375techsupport.pdf). The movement of PFAS in the environment is being aggressively researched at this time; that research will eventually result in more accurate models for the behaviors of these chemicals. In the meantime, DEC has calculated the guidance value for the protection of groundwater using the same procedure used for all other chemicals, as described in Section 7.7 of the Technical Support Document (http://www.dec.ny.gov/docs/remediation_hudson_pdf/techsuppdoc.pdf).

additional analyses can include any or all the parameters listed above (soil pH, cation exchange capacity, etc.) and/or use of SPLP.

As the understanding of PFAS transport improves, DEC welcomes proposals for site-specific remedial objectives for protection of groundwater. DEC will expect that those may be dependent on additional factors including soil pH, aqueous pH, % organic carbon, % Sand/Silt/Clay, soil cations: K, Ca, Mg, Na, Fe, Al, cation exchange capacity, and anion exchange capacity. Site-specific remedial objectives should also consider the dilution attenuation factor (DAF). The NJDEP publication on DAF can be used as a reference:

<https://www.nj.gov/dep/srp/guidance/rs/daf.pdf>.

Testing for Imported Soil

Testing for PFAS should be included any time a full TAL/TCL analyte list is required. Results for PFOA and PFOS should be compared to the applicable guidance values. If PFOA or PFOS is detected in any sample at or above the guidance values then the source of backfill should be rejected, unless a site-specific exemption is provided by DER based on SPLP testing, for example. If the concentrations of PFOA and PFOS in leachate are at or above the ambient water quality guidance values for groundwater, then the soil is not acceptable.

PFOA, PFOS and 1,4-dioxane are all considered semi-volatile compounds, so composite samples are appropriate for these compounds when sampling in accordance with DER-10, Table 5.4(e)10. Category B deliverables should be submitted for backfill samples, though a DUSR is not required.

Appendix A - Quality Assurance Project Plan (QAPP) Guidelines for PFAS

The following guidelines (general and PFAS-specific) can be used to assist with the development of a QAPP for projects within DER involving sampling and analysis of PFAS.

General Guidelines in Accordance with DER-10

- Document/work plan section title – Quality Assurance Project Plan
- Summarize project scope, goals, and objectives
- Provide project organization including names and resumes of the project manager, Quality Assurance Officer (QAO), field staff, and Data Validator
 - The QAO should not have another position on the project, such as project or task manager, that involves project productivity or profitability as a job performance criterion
- List the ELAP certified lab(s) to be used for analysis of samples
- Include a site map showing sample locations
- Provide detailed sampling procedures for each matrix
- Include Data Quality Usability Objectives
- List equipment decontamination procedures
- Include an “Analytical Methods/Quality Assurance Summary Table” specifying:
 - Matrix type
 - Number or frequency of samples to be collected per matrix
 - Number of field and trip blanks per matrix
 - Analytical parameters to be measured per matrix
 - Analytical methods to be used per matrix with minimum reporting limits
 - Number and type of matrix spike and matrix spike duplicate samples to be collected
 - Number and type of duplicate samples to be collected
 - Sample preservation to be used per analytical method and sample matrix
 - Sample container volume and type to be used per analytical method and sample matrix
 - Sample holding time to be used per analytical method and sample matrix
- Specify Category B laboratory data deliverables and preparation of a DUSR

Specific Guidelines for PFAS

- Include in the text that sampling for PFAS will take place
- Include in the text that PFAS will be analyzed by EPA Method 1633
- Include the list of PFAS compounds to be analyzed (*PFAS Analyte List*)
- Include the laboratory SOP for PFAS analysis
- List the minimum method-achievable Reporting Limits for PFAS
 - Reporting Limits should be less than or equal to:
 - Aqueous – 2 ng/L (ppt)
 - Solids – 0.5 µg/kg (ppb)
- Include the laboratory Method Detection Limits for the PFAS compounds to be analyzed
-
- Include detailed sampling procedures
 - Precautions to be taken
 - Pump and equipment types
 - Decontamination procedures
 - Approved materials only to be used
- Specify that regular ice only will be used for sample shipment
- Specify that equipment blanks should be collected at a minimum frequency of 1 per day per site for each matrix

Appendix B - Sampling Protocols for PFAS in Soils, Sediments and Solids

General

The objective of this protocol is to give general guidelines for the collection of soil, sediment and other solid samples for PFAS analysis. The sampling procedure used should be consistent with Sampling Guidelines and Protocols – Technological Background and Quality Control/Quality Assurance for NYS DEC Spill Response Program – March 1991 (http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf), with the following limitations.

Laboratory Analysis and Containers

Samples collected using this protocol are intended to be analyzed for PFAS using EPA Method 1633.

The preferred material for containers is high density polyethylene (HDPE). Pre-cleaned sample containers, coolers, sample labels, and a chain of custody form will be provided by the laboratory.

Equipment

Acceptable materials for sampling include stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. Additional materials may be acceptable if pre-approved by New York State Department of Environmental Conservation's Division of Environmental Remediation.

No sampling equipment components or sample containers should come in to contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials including sample bottle cap liners with a PTFE layer.

A list of acceptable equipment is provided below, but other equipment may be considered appropriate based on sampling conditions.

- stainless steel spoon
- stainless steel bowl
- steel hand auger or shovel without any coatings

Equipment Decontamination

Standard two step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for sampling equipment. All sources of water used for equipment decontamination should be verified in advance to be PFAS-free through laboratory analysis or certification.

Sampling Techniques

Sampling is often conducted in areas where a vegetative turf has been established. In these cases, a pre-cleaned trowel or shovel should be used to carefully remove the turf so that it may be replaced at the conclusion of sampling. Surface soil samples (e.g. 0 to 6 inches below surface) should then be collected using a pre-cleaned, stainless steel spoon. Shallow subsurface soil samples (e.g. 6 to ~36 inches below surface) may be collected by digging a hole using a pre-cleaned hand auger or shovel. When the desired subsurface depth is reached, a pre-cleaned hand auger or spoon shall be used to obtain the sample.

When the sample is obtained, it should be deposited into a stainless steel bowl for mixing prior to filling the sample containers. The soil should be placed directly into the bowl and mixed thoroughly by rolling the material into the middle until the material is homogenized. At this point the material within the bowl can be placed into the laboratory provided container.

Sample Identification and Logging

A label shall be attached to each sample container with a unique identification. Each sample shall be included on the chain of custody (COC).

Quality Assurance/Quality Control

- Immediately place samples in a cooler maintained at $4 \pm 2^\circ$ Celsius using ice
- Collect one field duplicate for every sample batch, minimum 1 duplicate per 20 samples. The duplicate shall consist of an additional sample at a given location
- Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, minimum 1 MS/MSD per 20 samples. The MS/MSD shall consist of an additional two samples at a given location and identified on the COC
- Request appropriate data deliverable (Category B) and an electronic data deliverable

Documentation

A soil log or sample log shall document the location of the sample/borehole, depth of the sample, sampling equipment, duplicate sample, visual description of the material, and any other observations or notes determined to be appropriate. Additionally, care should be performed to limit contact with PFAS containing materials (e.g. waterproof field books, food packaging) during the sampling process.

Personal Protection Equipment (PPE)

For most sampling Level D PPE is anticipated to be appropriate. The sampler should wear nitrile gloves while conducting field work and handling sample containers.

Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials should be avoided. All clothing worn by sampling personnel should have been laundered multiple times.

Appropriate rain gear (PVC, polyurethane, or rubber rain gear are acceptable), bug spray, and sunscreen should be used that does not contain PFAS. Well washed cotton coveralls may be used as an alternative to bug spray and/or sunscreen.

PPE that contains PFAS is acceptable when site conditions warrant additional protection for the samplers and no other materials can be used to be protective. Documentation of such use should be provided in the field notes.

Appendix C - Sampling Protocols for PFAS in Monitoring Wells

General

The objective of this protocol is to give general guidelines for the collection of groundwater samples for PFAS analysis. The sampling procedure used should be consistent with Sampling Guidelines and Protocols – Technological Background and Quality Control/Quality Assurance for NYS DEC Spill Response Program – March 1991 (http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf), with the following limitations.

Laboratory Analysis and Container

Samples collected using this protocol are intended to be analyzed for PFAS using EPA Method 1633.

The preferred material for containers is high density polyethylene (HDPE). Pre-cleaned sample containers, coolers, sample labels, and a chain of custody form will be provided by the laboratory.

Equipment

Acceptable materials for sampling include: stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. Additional materials may be acceptable if pre-approved by New York State Department of Environmental Conservation's Division of Environmental Remediation.

No sampling equipment components or sample containers should come in contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials including plumbers tape and sample bottle cap liners with a PTFE layer.

A list of acceptable equipment is provided below, but other equipment may be considered appropriate based on sampling conditions.

- stainless steel inertia pump with HDPE tubing
- peristaltic pump equipped with HDPE tubing and silicone tubing
- stainless steel bailer with stainless steel ball
- bladder pump (identified as PFAS-free) with HDPE tubing

Equipment Decontamination

Standard two step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for sampling equipment. All sources of water used for equipment decontamination should be verified in advance to be PFAS-free through laboratory analysis or certification.

Sampling Techniques

Monitoring wells should be purged in accordance with the sampling procedure (standard/volume purge or low flow purge) identified in the site work plan, which will determine the appropriate time to collect the sample. If sampling using standard purge techniques, additional purging may be needed to reduce turbidity levels, so samples contain a limited amount of sediment within the sample containers. Sample containers that contain sediment may cause issues at the laboratory, which may result in elevated reporting limits and other issues during the sample preparation that can compromise data usability. Sampling personnel should don new nitrile gloves prior to sample collection due to the potential to contact PFAS containing items (not related to the sampling equipment) during the purging activities.

Sample Identification and Logging

A label shall be attached to each sample container with a unique identification. Each sample shall be included on the chain of custody (COC).

Quality Assurance/Quality Control

- Immediately place samples in a cooler maintained at $4 \pm 2^\circ$ Celsius using ice
- Collect one field duplicate for every sample batch, minimum 1 duplicate per 20 samples. The duplicate shall consist of an additional sample at a given location
- Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, minimum 1 MS/MSD per 20 samples. The MS/MSD shall consist of an additional two samples at a given location and identified on the COC
- Collect one equipment blank per day per site and minimum 1 equipment blank per 20 samples. The equipment blank shall test the new and decontaminated sampling equipment utilized to obtain a sample for residual PFAS contamination. This sample is obtained by using laboratory provided PFAS-free water and passing the water over or through the sampling device and into laboratory provided sample containers
- Additional equipment blank samples may be collected to assess other equipment that is utilized at the monitoring well
- Request appropriate data deliverable (Category B) and an electronic data deliverable

Documentation

A purge log shall document the location of the sample, sampling equipment, groundwater parameters, duplicate sample, visual description of the material, and any other observations or notes determined to be appropriate. Additionally, care should be performed to limit contact with PFAS containing materials (e.g. waterproof field books, food packaging) during the sampling process.

Personal Protection Equipment (PPE)

For most sampling Level D PPE is anticipated to be appropriate. The sampler should wear nitrile gloves while conducting field work and handling sample containers.

Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials should be avoided. All clothing worn by sampling personnel should have been laundered multiple times.

Appropriate rain gear (PVC, polyurethane, or rubber rain gear are acceptable), bug spray, and sunscreen should be used that does not contain PFAS. Well washed cotton coveralls may be used as an alternative to bug spray and/or sunscreen.

PPE that contains PFAS is acceptable when site conditions warrant additional protection for the samplers and no other materials can be used to be protective. Documentation of such use should be provided in the field notes.

Appendix D - Sampling Protocols for PFAS in Surface Water

General

The objective of this protocol is to give general guidelines for the collection of surface water samples for PFAS analysis. The sampling procedure used should be consistent with Sampling Guidelines and Protocols – Technological Background and Quality Control/Quality Assurance for NYS DEC Spill Response Program – March 1991 (http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf), with the following limitations.

Laboratory Analysis and Container

Samples collected using this protocol are intended to be analyzed for PFAS using EPA Method 1633.

The preferred material for containers is high density polyethylene (HDPE). Pre-cleaned sample containers, coolers, sample labels, and a chain of custody form will be provided by the laboratory.

Equipment

Acceptable materials for sampling include: stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. Additional materials may be acceptable if pre-approved by New York State Department of Environmental Conservation's Division of Environmental Remediation.

No sampling equipment components or sample containers should come in contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials including sample bottle cap liners with a PTFE layer.

A list of acceptable equipment is provided below, but other equipment may be considered appropriate based on sampling conditions.

- stainless steel cup

Equipment Decontamination

Standard two step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for sampling equipment. All sources of water used for equipment decontamination should be verified in advance to be PFAS-free through laboratory analysis or certification.

Sampling Techniques

Where conditions permit, (e.g. creek or pond) sampling devices (e.g. stainless steel cup) should be rinsed with site medium to be sampled prior to collection of the sample. At this point the sample can be collected and poured into the sample container.

If site conditions permit, samples can be collected directly into the laboratory container.

Sample Identification and Logging

A label shall be attached to each sample container with a unique identification. Each sample shall be included on the chain of custody (COC).

Quality Assurance/Quality Control

- Immediately place samples in a cooler maintained at $4 \pm 2^\circ$ Celsius using ice
- Collect one field duplicate for every sample batch, minimum 1 duplicate per 20 samples. The duplicate shall consist of an additional sample at a given location
- Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, minimum 1 MS/MSD per 20 samples. The MS/MSD shall consist of an additional two samples at a given location and identified on the COC
- Collect one equipment blank per day per site and minimum 1 equipment blank per 20 samples. The equipment blank shall test the new and decontaminated sampling equipment utilized to obtain a sample for residual PFAS contamination. This sample is obtained by using laboratory provided PFAS-free water and passing the water over or through the sampling device and into laboratory provided sample containers
- Request appropriate data deliverable (Category B) and an electronic data deliverable

Documentation

A sample log shall document the location of the sample, sampling equipment, duplicate sample, visual description of the material, and any other observations or notes determined to be appropriate. Additionally, care should be performed to limit contact with PFAS containing materials (e.g. waterproof field books, food packaging) during the sampling process.

Personal Protection Equipment (PPE)

For most sampling Level D PPE is anticipated to be appropriate. The sampler should wear nitrile gloves while conducting field work and handling sample containers.

Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials should be avoided. All clothing worn by sampling personnel should have been laundered multiple times.

Appropriate rain gear (PVC, polyurethane, or rubber rain gear are acceptable), bug spray, and sunscreen should be used that does not contain PFAS. Well washed cotton coveralls may be used as an alternative to bug spray and/or sunscreen.

PPE that contains PFAS is acceptable when site conditions warrant additional protection for the samplers and no other materials can be used to be protective. Documentation of such use should be provided in the field notes.

Appendix E - Sampling Protocols for PFAS in Private Water Supply Wells

General

The objective of this protocol is to give general guidelines for the collection of water samples from private water supply wells (with a functioning pump) for PFAS analysis. The sampling procedure used should be consistent with Sampling Guidelines and Protocols – Technological Background and Quality Control/Quality Assurance for NYS DEC Spill Response Program – March 1991 (http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf), with the following limitations.

Laboratory Analysis and Container

Drinking water samples collected using this protocol are intended to be analyzed for PFAS by EPA Method 537, 537.1, 533, or ISO Method 25101. The preferred material for containers is high density polyethylene (HDPE). Pre-cleaned sample containers, coolers, sample labels, and a chain of custody form will be provided by the laboratory.

Equipment

Acceptable materials for sampling include stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. Additional materials may be acceptable if pre-approved by New York State Department of Environmental Conservation's Division of Environmental Remediation.

No sampling equipment components or sample containers should come in contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials (e.g. plumbers tape), including sample bottle cap liners with a PTFE layer.

Equipment Decontamination

Standard two step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for sampling equipment. All sources of water used for equipment decontamination should be verified in advance to be PFAS-free through laboratory analysis or certification.

Sampling Techniques

Locate and assess the pressure tank and determine if any filter units are present within the building. Establish the sample location as close to the well pump as possible, which is typically the spigot at the pressure tank. Ensure sampling equipment is kept clean during sampling as access to the pressure tank spigot, which is likely located close to the ground, may be obstructed and may hinder sample collection.

Prior to sampling, a faucet downstream of the pressure tank (e.g., washroom sink) should be run until the well pump comes on and a decrease in water temperature is noted which indicates that the water is coming from the well. If the homeowner is amenable, staff should run the water longer to purge the well (15+ minutes) to provide a sample representative of the water in the formation rather than standing water in the well and piping system including the pressure tank. At this point a new pair of nitrile gloves should be donned and the sample can be collected from the sample point at the pressure tank.

Sample Identification and Logging

A label shall be attached to each sample container with a unique identification. Each sample shall be included on the chain of custody (COC).

Quality Assurance/Quality Control

- Immediately place samples in a cooler maintained at $4 \pm 2^\circ$ Celsius using ice
- Collect one field duplicate for every sample batch, minimum 1 duplicate per 20 samples. The duplicate shall consist of an additional sample at a given location
- Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, minimum 1 MS/MSD per 20 samples. The MS/MSD shall consist of an additional two samples at a given location and identified on the COC
- If equipment was used, collect one equipment blank per day per site and a minimum 1 equipment blank per 20 samples. The equipment blank shall test the new and decontaminated sampling equipment utilized to obtain a sample for residual PFAS contamination. This sample is obtained by using laboratory provided PFAS-free water and passing the water over or through the sampling device and into laboratory provided sample containers.
- A field reagent blank (FRB) should be collected at a rate of one per 20 samples. The lab will provide a FRB bottle containing PFAS free water and one empty FRB bottle. In the field, pour the water from the one bottle into the empty FRB bottle and label appropriately.
- Request appropriate data deliverable (Category B) and an electronic data deliverable
- For sampling events where multiple private wells (homes or sites) are to be sampled per day, it is acceptable to collect QC samples at a rate of one per 20 across multiple sites or days.

Documentation

A sample log shall document the location of the private well, sample point location, owner contact information, sampling equipment, purge duration, duplicate sample, visual description of the material, and any other observations or notes determined to be appropriate and available (e.g. well construction, pump type and location, yield, installation date). Additionally, care should be performed to limit contact with PFAS containing materials (e.g. waterproof field books, food packaging) during the sampling process.

Personal Protection Equipment (PPE)

For most sampling Level D PPE is anticipated to be appropriate. The sampler should wear nitrile gloves while conducting field work and handling sample containers.

Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials should be avoided. All clothing worn by sampling personnel should have been laundered multiple times.

Appendix F - Sampling Protocols for PFAS in Fish

This appendix contains a copy of the current SOP developed by the Division of Fish and Wildlife (DFW) entitled “General Fish Handling Procedures for Contaminant Analysis” (Ver. 8). This SOP should be followed when collecting fish for contaminant analysis. Note, however, that the Bureau of Ecosystem Health will not be supplying bags or tags. All supplies are the responsibility of the collector

Procedure Name: General Fish Handling Procedures for Contaminant Analysis

Number: FW-005

Purpose: This procedure describes data collection, fish processing and delivery of fish collected for contaminant monitoring. It contains the chain of custody and collection record forms that should be used for the collections.

Organization: Environmental Monitoring Section
Bureau of Ecosystem Health
Division of Fish and Wildlife (DFW)
New York State Department of Environmental Conservation (NYSDEC)
625 Broadway
Albany, New York 12233-4756

Version: 8

Previous Version Date: 21 March 2018

Summary of Changes to this Version: Updated bureau name to Bureau of Ecosystem Health. Added direction to list the names of all field crew on the collection record. Minor formatting changes on chain of custody and collection records.

Originator or Revised by: Wayne Richter, Jesse Becker

Date: 26 April 2019

Quality Assurance Officer and Approval Date: Jesse Becker, 26 April 2019

**NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION**

GENERAL FISH HANDLING PROCEDURES FOR CONTAMINANT ANALYSES

- A. Original copies of all continuity of evidence (i.e., Chain of Custody) and collection record forms must accompany delivery of fish to the lab. A copy shall be directed to the Project Leader or as appropriate, Wayne Richter. All necessary forms will be supplied by the Bureau of Ecosystem Health. Because some samples may be used in legal cases, it is critical that each section is filled out completely. Each Chain of Custody form has three main sections:
1. The top box is to be filled out **and signed** by the person responsible for the fish collection (e.g., crew leader, field biologist, researcher). This person is responsible for delivery of the samples to DEC facilities or personnel (e.g., regional office or biologist).
 2. The second section is to be filled out **and signed** by the person responsible for the collections while being stored at DEC, before delivery to the analytical lab. This may be the same person as in (1), but it is still required that they complete the section. Also important is the **range of identification numbers** (i.e., tag numbers) included in the sample batch.
 3. Finally, the bottom box is to record any transfers between DEC personnel and facilities. Each subsequent transfer should be **identified, signed, and dated**, until laboratory personnel take possession of the fish.
- B. The following data are required on each **Fish Collection Record** form:
1. Project and Site Name.
 2. DEC Region.
 3. All personnel (and affiliation) involved in the collection.
 4. Method of collection (gill net, hook and line, etc.)
 5. Preservation Method.
- C. The following data are to be taken on each fish collected and recorded on the **Fish Collection Record** form:
1. Tag number - Each specimen is to be individually jaw tagged at time of collection with a unique number. Make sure the tag is turned out so that the number can be read without opening the bag. Use tags in sequential order. For small fish or composite samples place the tag inside the bag with the samples. The Bureau of Ecosystem Health can supply the tags.
 2. Species identification (please be explicit enough to enable assigning genus and species). Group fish by species when processing.
 3. Date collected.
 4. Sample location (waterway and nearest prominent identifiable landmark).
 5. Total length (nearest mm or smallest sub-unit on measuring instrument) and weight (nearest g or

smallest sub-unit of weight on weighing instrument). Take all measures as soon as possible with calibrated, protected instruments (e.g. from wind and upsets) and prior to freezing.

6. Sex - fish may be cut enough to allow sexing or other internal investigation, but do not eviscerate. Make any incision on the right side of the belly flap or exactly down the midline so that a left-side fillet can be removed.

D. General data collection recommendations:

1. It is helpful to use an ID or tag number that will be unique. It is best to use metal striped bass or other uniquely numbered metal tags. If uniquely numbered tags are unavailable, values based on the region, water body and year are likely to be unique: for example, R7CAY11001 for Region 7, Cayuga Lake, 2011, fish 1. If the fish are just numbered 1 through 20, we have to give them new numbers for our database, making it more difficult to trace your fish to their analytical results and creating an additional possibility for errors.
 2. Process and record fish of the same species sequentially. Recording mistakes are less likely when all fish from a species are processed together. Starting with the bigger fish species helps avoid missing an individual.
 3. If using Bureau of Ecosystem Health supplied tags or other numbered tags, use tags in sequence so that fish are recorded with sequential Tag Numbers. This makes data entry and login at the lab and use of the data in the future easier and reduces keypunch errors.
 4. Record length and weight as soon as possible after collection and before freezing. Other data are recorded in the field upon collection. An age determination of each fish is optional, but if done, it is recorded in the appropriate "Age" column.
 5. For composite samples of small fish, record the number of fish in the composite in the Remarks column. Record the length and weight of each individual in a composite. All fish in a composite sample should be of the same species and members of a composite should be visually matched for size.
 6. Please submit photocopies of topographic maps or good quality navigation charts indicating sampling locations. GPS coordinates can be entered in the Location column of the collection record form in addition to or instead for providing a map. These records are of immense help to us (and hopefully you) in providing documented location records which are not dependent on memory and/or the same collection crew. In addition, they may be helpful for contaminant source trackdown and remediation/control efforts of the Department.
 7. When recording data on fish measurements, it will help to ensure correct data recording for the data recorder to call back the numbers to the person making the measurements.
- E. Each fish is to be placed in its own individual plastic bag. For small fish to be analyzed as a composite, put all of the fish for one composite in the same bag but use a separate bag for each composite. It is important to individually bag the fish to avoid difficulties or cross contamination when processing the fish for chemical analysis. Be sure to include the fish's tag number inside the bag, preferably attached to the fish with the tag number turned out so it can be read. Tie or otherwise secure the bag closed. **The Bureau of Ecosystem Health will supply the bags.** If necessary, food grade bags may be procured from a suitable vendor (e.g., grocery store). It is preferable to redundantly label each bag with a manila tag tied between the knot and the body of the bag. This tag should be labeled with the project name, collection location, tag number, collection date, and fish species. If scales are collected, the scale envelope should be labeled with

the same information.

- F. Groups of fish, by species, are to be placed in one large plastic bag per sampling location. **The Bureau of Ecosystem Health will supply the larger bags.** Tie or otherwise secure the bag closed. Label the site bag with a manila tag tied between the knot and the body of the bag. The tag should contain: project, collection location, collection date, species and **tag number ranges**. Having this information on the manila tag enables lab staff to know what is in the bag without opening it.
- G. Do not eviscerate, fillet or otherwise dissect the fish unless specifically asked to. If evisceration or dissection is specified, the fish must be cut along the exact midline or on the right side so that the left side fillet can be removed intact at the laboratory. If filleting is specified, the procedure for taking a standard fillet (SOP PREPLAB 4) must be followed, including removing scales.
- H. Special procedures for PFAS: Unlike legacy contaminants such as PCBs, which are rarely found in day to day life, PFAS are widely used and frequently encountered. Practices that avoid sample contamination are therefore necessary. While no standard practices have been established for fish, procedures for water quality sampling can provide guidance. The following practices should be used for collections when fish are to be analyzed for PFAS:
 - No materials containing Teflon.
 - No Post-it notes.
 - No ice packs; only water ice or dry ice.
 - Any gloves worn must be powder free nitrile.
 - No Gore-Tex or similar materials (Gore-Tex is a PFC with PFOA used in its manufacture).
 - No stain repellent or waterproof treated clothing; these are likely to contain PFCs.
 - Avoid plastic materials, other than HDPE, including clipboards and waterproof notebooks.
 - Wash hands after handling any food containers or packages as these may contain PFCs.
 - Keep pre-wrapped food containers and wrappers isolated from fish handling.
 - Wear clothing washed at least six times since purchase.
 - Wear clothing washed without fabric softener.
 - Staff should avoid cosmetics, moisturizers, hand creams and similar products on the day of sampling as many of these products contain PFCs (Fujii et al. 2013). Sunscreen or insect repellent should not contain ingredients with “fluor” in their name. Apply any sunscreen or insect repellent well downwind from all materials. Hands must be washed after touching any of these products.
- I. All fish must be kept at a temperature <45° F (<8° C) immediately following data processing. As soon as possible, freeze at -20° C ± 5° C. Due to occasional freezer failures, daily freezer temperature logs are required. The freezer should be locked or otherwise secured to maintain chain of custody.
- J. In most cases, samples should be delivered to the Analytical Services Unit at the Hale Creek field station. Coordinate delivery with field station staff and send copies of the collection records, continuity of evidence forms and freezer temperature logs to the field station. For samples to be analyzed elsewhere, non-routine collections or other questions, contact Wayne Richter, Bureau of Ecosystem Health, NYSDEC, 625 Broadway, Albany, New York 12233-4756, 518-402-8974, or the project leader about sample transfer. Samples will then be directed to the analytical facility and personnel noted on specific project descriptions.
- K. A recommended equipment list is at the end of this document.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF FISH AND WILDLIFE
FISH COLLECTION RECORD

page _____ of _____

Project and Site Name _____ DEC Region _____

Collections made by (include all crew) _____

Sampling Method: ☐Electrofishing ☐Gill netting ☐Trap netting ☐Trawling ☐Seining ☐Angling ☐Other _____

Preservation Method: ☐Freezing ☐Other _____ Notes (SWFDB survey number): _____

FOR LAB USE ONLY- LAB ENTRY NO.	COLLECTION OR TAG NO.	SPECIES	DATE TAKEN	LOCATION	AGE	SEX &/OR REPROD. CONDIT	LENGTH ()	WEIGHT ()	REMARKS

richter: revised 2011, 5/7/15, 10/4/16, 3/20/17; becker: 3/23/17, 4/26/19

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION CHAIN OF CUSTODY

I, _____, of _____ collected the
(Print Name) (Print Business Address)

following on _____, 20____ from _____
(Date) (Water Body)

in the vicinity of _____
(Landmark, Village, Road, etc.)

Town of _____, in _____ County.

Item(s) _____

Said sample(s) were in my possession and handled according to standard procedures provided to me prior to collection. The sample(s) were placed in the custody of a representative of the New York State Department of Environmental Conservation on _____, 20____.

Signature Date

I, _____, received the above mentioned sample(s) on the date specified and assigned identification number(s) _____ to the sample(s). I have recorded pertinent data for the sample(s) on the attached collection records. The sample(s) remained in my custody until subsequently transferred, prepared or shipped at times and on dates as attested to below.

Signature Date

SECOND RECIPIENT (Print Name)	TIME & DATE	PURPOSE OF TRANSFER
SIGNATURE	UNIT	
THIRD RECIPIENT (Print Name)	TIME & DATE	PURPOSE OF TRANSFER
SIGNATURE	UNIT	
FOURTH RECIPIENT (Print Name)	TIME & DATE	PURPOSE OF TRANSFER
SIGNATURE	UNIT	
RECEIVED IN LABORATORY BY (Print Name)	TIME & DATE	REMARKS
SIGNATURE	UNIT	
LOGGED IN BY (Print Name)	TIME & DATE	ACCESSION NUMBERS
SIGNATURE	UNIT	

NOTICE OF WARRANTY

By signature to the chain of custody (reverse), the signatory warrants that the information provided is truthful and accurate to the best of his/her ability. The signatory affirms that he/she is willing to testify to those facts provided and the circumstances surrounding the same. Nothing in this warranty or chain of custody negates responsibility nor liability of the signatories for the truthfulness and accuracy of the statements provided.

HANDLING INSTRUCTIONS

On day of collection, collector(s) name(s), address(es), date, geographic location of capture (attach a copy of topographic map or navigation chart), species, number kept of each species, and description of capture vicinity (proper noun, if possible) along with name of Town and County must be indicated on reverse.

Retain organisms in manila tagged plastic bags to avoid mixing capture locations. Note appropriate information on each bag tag.

Keep samples as cool as possible. Put on ice if fish cannot be frozen within 12 hours. If fish are held more than 24 hours without freezing, they will not be retained or analyzed.

Initial recipient (either DEC or designated agent) of samples from collector(s) is responsible for obtaining and recording information on the collection record forms which will accompany the chain of custody. This person will seal the container using packing tape and writing his signature, the time and the date across the tape onto the container with indelible marker. Any time a seal is broken, for whatever purpose, the incident must be recorded on the Chain of Custody (reason, time, and date) in the purpose of transfer block. Container then is resealed using new tape and rewriting signature, with time and date.

EQUIPMENT LIST

Scale or balance of appropriate capacity for the fish to be collected.

Fish measuring board.

Plastic bags of an appropriate size for the fish to be collected and for site bags.

Individually numbered metal tags for fish.

Manila tags to label bags.

Small envelopes, approximately 2" x 3.5", if fish scales are to be collected.

Knife for removing scales.

Chain of custody and fish collection forms.

Clipboard.

Pens or markers.

Paper towels.

Dish soap and brush.

Bucket.

Cooler.

Ice.

Duct tape.

Appendix G – PFAS Analyte List

Group	Chemical Name	Abbreviation	CAS Number
Perfluoroalkyl sulfonic acids	Perfluorobutanesulfonic acid	PFBS	375-73-5
	Perfluoropentanesulfonic acid	PFPeS	2706-91-4
	Perfluorohexanesulfonic acid	PFHxS	355-46-4
	Perfluoroheptanesulfonic acid	PFHpS	375-92-8
	Perfluorooctanesulfonic acid	PFOS	1763-23-1
	Perfluorononanesulfonic acid	PFNS	68259-12-1
	Perfluorodecanesulfonic acid	PFDS	335-77-3
	Perfluorododecanesulfonic acid	PFDoS	79780-39-5
Perfluoroalkyl carboxylic acids	Perfluorobutanoic acid	PFBA	375-22-4
	Perfluoropentanoic acid	PFPeA	2706-90-3
	Perfluorohexanoic acid	PFHxA	307-24-4
	Perfluoroheptanoic acid	PFHpA	375-85-9
	Perfluorooctanoic acid	PFOA	335-67-1
	Perfluorononanoic acid	PFNA	375-95-1
	Perfluorodecanoic acid	PFDA	335-76-2
	Perfluoroundecanoic acid	PFUnA	2058-94-8
	Perfluorododecanoic acid	PFDoA	307-55-1
	Perfluorotridecanoic acid	PFTTrDA	72629-94-8
	Perfluorotetradecanoic acid	PFTeDA	376-06-7
Per- and Polyfluoroether carboxylic acids	Hexafluoropropylene oxide dimer acid	HFPO-DA	13252-13-6
	4,8-Dioxa-3H-perfluorononanoic acid	ADONA	919005-14-4
	Perfluoro-3-methoxypropanoic acid	PFMPA	377-73-1
	Perfluoro-4-methoxybutanoic acid	PFMBA	863090-89-5
	Nonafluoro-3,6-dioxaheptanoic acid	NFDHA	151772-58-6
Fluorotelomer sulfonic acids	4:2 Fluorotelomer sulfonic acid	4:2-FTS	757124-72-4
	6:2 Fluorotelomer sulfonic acid	6:2-FTS	27619-97-2
	8:2 Fluorotelomer sulfonic acid	8:2-FTS	39108-34-4
Fluorotelomer carboxylic acids	3:3 Fluorotelomer carboxylic acid	3:3 FTCA	356-02-5
	5:3 Fluorotelomer carboxylic acid	5:3 FTCA	914637-49-3
	7:3 Fluorotelomer carboxylic acid	7:3 FTCA	812-70-4
Perfluorooctane sulfonamides	Perfluorooctane sulfonamide	PFOSA	754-91-6
	N-methylperfluorooctane sulfonamide	NMeFOSA	31506-32-8
	N-ethylperfluorooctane sulfonamide	NEtFOSA	4151-50-2
Perfluorooctane sulfonamidoacetic acids	N-methylperfluorooctane sulfonamidoacetic acid	N-MeFOSAA	2355-31-9
	N-ethylperfluorooctane sulfonamidoacetic acid	N-EtFOSAA	2991-50-6
Perfluorooctane sulfonamide ethanols	N-methylperfluorooctane sulfonamidoethanol	MeFOSE	24448-09-7
	N-ethylperfluorooctane sulfonamidoethanol	EtFOSE	1691-99-2

Group	Chemical Name	Abbreviation	CAS Number
Ether sulfonic acids	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (F-53B Major)	9Cl-PF3ONS	756426-58-1
	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (F-53B Minor)	11Cl-PF3OUdS	763051-92-9
	Perfluoro(2-ethoxyethane) sulfonic acid	PFEESA	113507-82-7

Appendix H - Data Review Guidelines for Analysis of PFAS in Non-Potable Water and Solids

General

These guidelines are intended to be used for the validation of PFAS using EPA Method 1633 for projects within the Division of Environmental Remediation (DER). Data reviewers should understand the methodology and techniques utilized in the analysis. Consultation with the end user of the data may be necessary to assist in determining data usability based on the data quality objectives in the Quality Assurance Project Plan. A familiarity with the laboratory's Standard Operating Procedure may also be needed to fully evaluate the data. If you have any questions, please contact DER's Quality Assurance Officer, Dana Barbarossa, at dana.barbarossa@dec.ny.gov.

Preservation and Holding Time

Samples should be preserved with ice to a temperature of less than 6°C upon arrival at the lab. The holding time is 28 days to extraction for aqueous and solid samples. The time from extraction to analysis for aqueous samples is 28 days and 40 days for solids.

Temperature greatly exceeds 6°C upon arrival at the lab*	Use professional judgement to qualify detects and non-detects as estimated or rejected
Holding time exceeding 28 days to extraction	Use professional judgement to qualify detects and non-detects as estimated or rejected if holding time is grossly exceeded

*Samples that are delivered to the lab immediately after sampling may not meet the thermal preservation guidelines. Samples are considered acceptable if they arrive on ice or an attempt to chill the samples is observed.

Initial Calibration

The initial calibration should contain a minimum of six standards for linear fit and six standards for a quadratic fit. The relative standard deviation (RSD) for a quadratic fit calibration should be less than 20%.

The low-level calibration standard should be within 50% - 150% of the true value, and the mid-level calibration standard within 70% - 130% of the true value.

%RSD >20%	J flag detects and UJ non detects
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Continuing Calibration Verification

Continuing calibration verification (CCV) checks should be analyzed at a frequency of one per ten field samples. If CCV recovery is very low, where detection of the analyte could be in question, ensure a low level CCV was analyzed and use to determine data quality.

CCV recovery <70 or >130%	J flag results
---------------------------	----------------

Blanks

There should be no detections in the method blanks above the reporting limits. Equipment blanks, field blanks, rinse blanks etc. should be evaluated in the same manner as method blanks. Use the most contaminated blank to evaluate the sample results.

Blank Result	Sample Result	Qualification
Any detection	<Reporting limit	Qualify as ND at reporting limit
Any detection	>Reporting Limit and >10x the blank result	No qualification
>Reporting limit	>Reporting limit and <10x blank result	J+ biased high

Field Duplicates

A blind field duplicate should be collected at rate of one per twenty samples. The relative percent difference (RPD) should be less than 30% for analyte concentrations greater than two times the reporting limit. Use the higher result for final reporting.

RPD >30%	Apply J qualifier to parent sample
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Lab Control Spike

Lab control spikes should be analyzed with each extraction batch or one for every twenty samples. In the absence of lab derived criteria, use 70% - 130% recovery criteria to evaluate the data.

Recovery <70% or >130% (lab derived criteria can also be used)	Apply J qualifier to detects and UJ qualifier to non detects
---	---

Matrix Spike/Matrix Spike Duplicate

One matrix spike and matrix spike duplicate should be collected at a rate of one per twenty samples. Use professional judgement to reject results based on out of control MS/MSD recoveries.

Recovery <70% or >130% (lab derived criteria can also be used)	Apply J qualifier to detects and UJ qualifier to non detects of parent sample only
RPD >30%	Apply J qualifier to detects and UJ qualifier to non detects of parent sample only

Extracted Internal Standards (Isotope Dilution Analytes)

Problematic analytes (e.g. PFBA, PFPeA, fluorotelomer sulfonates) can have wider recoveries without qualification. Qualify corresponding native compounds with a J flag if outside of the range.

Recovery <50% or >150%	Apply J qualifier
Recovery <25% or >150% for poor responding analytes	Apply J qualifier
Isotope Dilution Analyte (IDA) Recovery <10%	Reject results

Signal to Noise Ratio

The signal to noise ratio for the quantifier ion should be at least 3:1. If the ratio is less than 3:1, the peak is discernable from the baseline noise and symmetrical, the result can be reported. If the peak appears to be baseline noise and/or the shape is irregular, qualify the result as tentatively identified.

Reporting Limits

If project-specific reporting limits were not met, please indicate that in the report along with the reason (e.g. over dilution, dilution for non-target analytes, high sediment in aqueous samples).

Peak Integrations

Target analyte peaks should be integrated properly and consistently when compared to standards. Ensure branched isomer peaks are included for PFAS where standards are available. Inconsistencies should be brought to the attention of the laboratory or identified in the data review summary report.

Appendix G

Community Air Monitoring Plan

Community Air Monitoring Plan for 1153-69 West Fayette Street

**1153-69 West Fayette Street
City of Syracuse, Onondaga County, New York**

BCP Site No. C734164

Prepared by:



C&S Engineers, Inc.
499 Col Eileen Collins Blvd.
Syracuse, New York 13212

July 2024
Revised November 2024

Overview

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and / or particulate levels at the perimeter of the exclusion zone or work area will be necessary.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil / waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. "Periodic" monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling / purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

Daily CAMP reports will be provided to New York State Department of Environmental Conservation (NYSDEC) and New York State Department of Health (NYSDOH) project managers. The reports will consist of figures showing work zones and monitoring stations and downloaded CAMP data. The daily reports will summarize any CAMP exceedances and the corrective actions taken. Any CAMP exceedances will be reported to NYSDEC and NYSDOH project managers within one business day.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically

thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate, such as isobutylene. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below:

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.
2. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less – but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.
3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.
4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10

particulate levels do not exceed $150 \mu\text{g}/\text{m}^3$ above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than $150 \mu\text{g}/\text{m}^3$ above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within $150 \mu\text{g}/\text{m}^3$ of the upwind level and in preventing visible dust migration.
3. All readings must be recorded and be available for State (DEC and NYSDOH) personnel to review.

Fugitive Dust and Particulate Monitoring

A program for suppressing fugitive dust and particulate matter monitoring at hazardous waste sites is a responsibility on the remedial party performing the work. These procedures must be incorporated into appropriate intrusive work plans. The following fugitive dust suppression and particulate monitoring program should be employed at sites during construction and other intrusive activities which warrant its use:

1. Reasonable fugitive dust suppression techniques must be employed during all site activities which may generate fugitive dust.
2. Particulate monitoring must be employed during the handling of waste or contaminated soil or when activities on site may generate fugitive dust from exposed waste or contaminated soil. Remedial activities may also include the excavation, grading, or placement of clean fill. These control measures should not be considered necessary for these activities.
3. Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM10) with the following minimum performance standards:
 - a. Objects to be measured: Dust, mists or aerosols;
 - b. Measurement Ranges: 0.001 to $400 \text{ mg}/\text{m}^3$ (1 to $400,000 \mu\text{g}/\text{m}^3$);
 - c. Precision (2-sigma) at constant temperature: $\pm 10 \text{ g}/\text{m}^3$ for one second averaging; and $\pm 1.5 \text{ g}/\text{m}^3$ for sixty second averaging;
 - d. Accuracy: $\pm 5\%$ of reading $\pm$ precision (Referred to gravimetric calibration with SAE fine test dust (mmd= 2 to 3 μm , $\rho = 2.5$, as aerosolized);
 - e. Resolution: 0.1% of reading or $1 \text{ g}/\text{m}^3$, whichever is larger;
 - f. Particle Size Range of Maximum Response: 0.1 - 10 ;
 - g. Total Number of Data Points in Memory: $10,000$;

- h. Logged Data: Each data point with average concentration, time / date and data point number;
 - i. Run Summary: overall average, maximum concentrations, time / date of maximum, total number of logged points, start time / date, total elapsed time (run duration), STEL concentration and time / date occurrence, averaging (logging) period, calibration factor, and tag number;
 - j. Alarm Averaging Time (user selectable): real-time (1-60 seconds) or STEL (15 minutes), alarms required;
 - k. Operating Time: 48 hours (fully charged NiCd battery); continuously with charger;
 - l. Operating Temperature: -10 to 50°C (14 to 122°F); and
 - m. Particulate levels will be monitored upwind and immediately downwind at the working site and integrated over a period not to exceed 15 minutes.
4. In order to ensure the validity of the fugitive dust measurements performed, there must be appropriate Quality Assurance / Quality Control (QA / QC). It is the responsibility of the remedial party to adequately supplement QA / QC Plans to include the following critical features: periodic instrument calibration, operator training, daily instrument performance (span) checks, and a record-keeping plan.
5. The action level will be established at 150 $\mu\text{g}/\text{m}^3$ (15 minutes average). While conservative, this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 $\mu\text{g}/\text{m}^3$, the upwind background level must be confirmed immediately. If the working site particulate measurement is greater than 100 $\mu\text{g}/\text{m}^3$ above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see paragraph 7). Should the action level of 150 $\mu\text{g}/\text{m}^3$ continue to be exceeded work must stop and DER must be notified as provided in the site design or remedial work plan. The notification shall include a description of the control measures implemented to prevent further exceedances.
6. It must be recognized that the generation of dust from waste or contaminated soil that migrates off-site, has the potential for transporting contaminants off-site. There may be situations when dust is being generated and leaving the site and the monitoring equipment does not measure PM-10 at or above the action level. Since this situation has the potential to allow for the migration of contaminants off-site, it is unacceptable. While it is not practical to quantify total suspended particulates on a real-time basis, it is appropriate to rely on visual observation. If dust is observed leaving the working site, additional dust suppression techniques must be employed.
7. The following techniques have been shown to be effective for the controlling of the generation and migration of dust during construction activities:

- a. Applying water on haul roads;
- b. Wetting equipment and excavation faces;
- c. Spraying water on buckets during excavation and dumping;
- d. Hauling materials in properly tarped or watertight containers;
- e. Restricting vehicle speeds to 10 miles per hour (mph);
- f. Covering excavated areas and material after excavation activity ceases; and
- g. Reducing the excavation size and/or number of excavations.

Experience has shown that the chance of exceeding the 150 $\mu\text{g}/\text{m}^3$ action level is remote when the above-mentioned techniques are used. When techniques involving water application are used, care must be taken not to use excess water, which can result in unacceptably wet conditions. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

8. The evaluation of weather conditions is necessary for proper fugitive dust control. When extreme wind conditions make dust control ineffective, as a last resort remedial actions may need to be suspended. There may be situations that require fugitive dust suppression and particulate monitoring requirements with action levels more stringent than those provided above. Under some circumstances, the contaminant concentration and / or toxicity may require additional monitoring to protect site personnel and the public. Additional integrated sampling and chemical analysis of the dust may also be in order. This must be evaluated when a health and safety plan is developed and when appropriate suppression and monitoring requirements are established for protection of health and the environment.
9. CAMP action level exceedances and corrective actions will be reported to the Department within one business day.

Special Requirements:

In addition, or in combination with the above, the following special requirements apply for work within 20 feet of potentially exposed individuals or structures:

When work areas are within 20 feet of potentially exposed populations or occupied structures, the continuous monitoring locations for VOCs and particulates will reflect the nearest potentially exposed individuals and the location of ventilation system intakes for nearby structures. The use of engineering controls such as vapor / dust barriers, temporary negative-pressure enclosures, or special ventilation devices will be considered to prevent exposures related to the work activities and to control dust and odors. Consideration will be given to implementing the planned activities when potentially exposed populations are at a minimum, such as during weekends or evening hours in non-residential settings.

- If total VOC concentrations opposite the walls of occupied structures or next to intake vents exceed 1 ppm, monitoring will occur within the occupied structure(s). Depending upon the nature of contamination, chemical-specific colorimetric tubes of sufficient

sensitivity may be necessary for comparing the exposure point concentrations with appropriate pre-determined response levels (response actions should also be pre-determined). Background readings in the occupied spaces must be taken prior to commencement of the planned work. Any unusual background readings should be discussed with NYSDOH prior to commencement of the work.

- If total particulate concentrations opposite the walls of occupied structures or next to intake vents exceed $150 \mu\text{g}/\text{m}^3$, work activities will be suspended until controls are implemented and are successful in reducing the total particulate concentration to $150 \mu\text{g}/\text{m}^3$ or less at the monitoring point.
- Depending upon the nature of contamination and remedial activities, other parameters (e.g., explosivity, oxygen, hydrogen sulfide, carbon monoxide) may also need to be monitored. Response levels and actions should be pre-determined, as necessary, for each site.

Unless a self-contained, negative-pressure enclosure with proper emission controls will encompass the work area, all individuals not directly involved with the planned work must be absent from the room in which the work will occur. Monitoring requirements are as stated above under "Special Requirements for Work within 20 Feet of Potentially Exposed Individuals or Structures" except that in this instance "nearby / occupied structures" would be adjacent occupied rooms. Additionally, the location of all exhaust vents in the room and their discharge points, as well as potential vapor pathways (openings, conduits, etc.) relative to adjoining rooms, shall be understood and the monitoring locations established accordingly. In these situations, exhaust fans or other engineering controls will be used to create negative air pressure within the work area during remedial activities. Additionally, the planned work will be implemented during hours (e.g. weekends or evenings) when building occupancy is at a minimum.

Appendix H

Health and Safety Plan

Health and Safety Plan for 1153-69 West Fayette Street

**1153-69 West Fayette Street
City of Syracuse, Onondaga County, New York**

BCP Site No. C734164

Prepared by:



C&S Engineers, Inc.
499 Col Eileen Collins Blvd.
Syracuse, New York 13212

July 2024



EMERGENCY PHONE NUMBERS

Emergency Service.....	911
<u>Police</u> : Syracuse Police Department.....	(315) 442-5200
<u>Fire</u> : Syracuse Fire Department.....	(315) 453-5525
<u>Hospital</u> : Upstate: Emergency Room.....	(315) 464-5611
<u>Hospital</u> : Crouse: Emergency Room	(315) 470-7111
Department of Public Works	(315) 448-2489
National Response Center.....	(800) 424-8802
Poison Control Center	(800) 222-1222
Center for Disease Control.....	(800) 311-3435
NYSDEC Region 7 (Syracuse, New York).....	(315) 426-7551
C&S Engineers	(315) 455-2000
Site Superintendent	***
Project Field Office Trailer	***

*** A site superintendent and field office trailer will not be onsite until remedial actions commence.

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ATTACHMENTS

Attachment A – Map and Directions to Hospital

Attachment B – Guidance on Incident Investigation and Reporting



SECTION 1 – GENERAL INFORMATION

This Health and Safety Plan (HASP) addresses health and safety considerations for the activities that personnel employed by C&S Engineers, Inc., may be engaged in during site investigation and remedial activities at 1153-69 West Fayette Street in the City of Syracuse, Onondaga County, New York; hereby, referred to as (Site). This HASP will be implemented by the Health and Safety Officer (HSO) during site work. All personnel engaged in the Phase II Environmental Site Investigation are required to maintain current HAZWOPER training, including initial 40-hour training, on-the-job training, and consistent annual 8-hour refresher training, as per the requirements of 29 CFR 1910.120.

Compliance with this HASP is required of C&S personnel who enter this Site. The content of the HASP may change or undergo revision based upon additional information made available to the health, safety, and training (H&S) committee, monitoring results or changes in the technical scope of work. Any changes proposed must be reviewed by the H&S committee.

1.1 Responsibilities

Project Manager.....	Claire Del Fatti Phone: (315) 703-4233 Cell: (315) 949-1805
C&S Health and Safety Director.....	Mike Sherlock Phone: (315) 703-4210 Cell: (315) 420-3455
Site Health and Safety Officer.....	Nick Coulombe Phone: (315) 703-4284 Cell: (315) 720-8682
Emergency Coordinator.....	Nick Coulombe Phone: (315) 703-4284 Cell: (315) 720-8682

1.2 Applicable Standards and Regulations References

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only. Where a conflict or overlap among regulations and/or these specifications exist, the most stringent requirements shall apply. C&S's Project Manager will determine which requirements are most stringent.

1. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

- a. ANSI Z89.1, Personnel Protective Equipment-Protective Headwear for Industrial Workers-Requirements (Latest Revision)
- b. ANSI Z87.1, Occupational and Educational Personal Eye and Face Protection Devices
- c. ANSI Z9.2, Fundamentals Governing the Design and Operation of Local Exhaust Systems
- d. ANSI Z88.2-80, Practices for Respiratory Protection

2. CODE OF FEDERAL REGULATIONS (CFR)

- a. 29 CFR Subpart D Walking-Working Surfaces
- b. 29 CFR 1910 Occupational Safety and Health Standards-All Sections
- c. 29 CFR 1926 Safety and Health Regulations for Construction-All Sections
- d. 40 CFR 50.6 National Primary and Secondary Ambient Air Quality Standards for Particulate Matter
- e. 40 CFR 61 National Emissions Standards for Hazardous Air Pollutants (NESHAPS)-Subpart A-General Provisions
- f. 49 CFR 172 Hazardous Material Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements

3. NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH)

- a. Publication Number 87-108 Respiratory Decision Logic
- b. NIOSH/OSHA Booklet 3142 Lead in Construction
- c. Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (NIOSH Publication 85-115)

4. U.S. DEPARTMENT OF LABOR, OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA)

- a. PUB 3126 Working with Lead in the Construction Industry
- b. 29 CFR 1910, Subpart I, Appendix B-Non-Mandatory Compliance Guidelines for Hazard Assessment and Personal Protective Equipment Selection

SECTION 2 – HEALTH AND SAFETY PERSONNEL

The following information briefly describes the health and safety designations and general responsibilities for this Site.

2.1 Project Manager (PM)

The PM is responsible for the overall project including the implementation of the HASP. Specifically, this includes allocating adequate manpower, equipment, and time resources to conduct Site activities safely.

2.2 Health and Safety Manager

- Has the overall responsibility for coordinating and reporting health and safety activities and the health and safety of Site Workers.
- Must have completed, at a minimum, the OSHA 30-Hour Construction Safety Training, and either the 24-Hour training course for the Occasional Hazardous Waste Site Worker or the 40-Hour training course for the Hazardous Waste Operations Worker that meets OSHA 29 CFR 1910.
- Must have completed the 8-Hour site supervisor / manager's course for supervisors and managers having responsibilities for hazardous waste site operations and management.
- Directs and coordinates health and safety monitoring activities.
- Ensures that field teams utilize proper personal protective equipment (PPE).
- Conducts initial on-site specific training prior to Site Workers commencing work.
- Conducts and documents daily and periodic safety briefings.
- Ensures that field team members comply with this HASP.
- Immediately notifies the Project Manager of all accident / incidents.
- Determines upgrading or downgrading of PPE based on Site conditions and/or real time monitoring results.
- Ensures that monitoring instruments are calibrated daily or as the manufacturer's instructions determine.
- Provides daily summaries of field operations and progress to the Project Manager.
- Submits and maintains all documentation required in this HASP and any other pertinent health and safety documentation.

2.3 Health and Safety Officer (HSO)

- Must be designated by the Health and Safety Manager and at a minimum, have the OSHA 10-Hour Construction Safety Training.
- Must schedule and attend a Pre-Construction Safety Meeting with the Health and Safety Manager to discuss the Subcontractor Safety Requirements and must attend the Weekly Subcontractor Coordination Meeting.

- Responsible for ensuring subcontractors and their lower tier contractors comply with project safety requirements.
- Must make frequent and regular inspections of their work areas and activities and ensure hazards that are under their control are corrected immediately and all other hazards are reported to the Project Manager and Health and Safety Manager.
- Must report all work-related injuries, regardless of severity, to the Project Manager and the Health and Safety Manager within 24 hours after they occur.

2.4 Emergency Coordinator

- The Emergency Coordinator or his on-site designee will, in coordination with the Authority / Agency having Jurisdiction, implement the emergency response procedures outlined in Section 11 whenever conditions at the Site warrant such action.
- The Emergency Coordinator or his on-site designee will be responsible for assuring the evacuation, emergency treatment, emergency transport of C&S personnel as necessary, and notification of emergency response units (refer to phone listing in the beginning of this HASP) and the appropriate management staff.

2.5 Site Workers

- Report any unsafe or potentially hazardous conditions to the HSO and the Health and Safety Manager.
- Maintain knowledge of the information, instructions, and emergency response actions contained in the HASP.
- Comply with rules, regulations, and procedures as set forth in this HASP, including any revisions that are instituted.
- Prevent unauthorized personnel from entering work Site.

SECTION 3 – SITE HAZARDS EVALUATION

3.1 Chemical Hazards

3.1.1 Nature of Chemical Hazards

Based on the June 2023 Phase II Environmental Site Assessment (ESA) and the September 2023 Surface Soil Investigation, the known contaminants of concern include volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, polychlorinated biphenyls (PCBs), pesticides, and herbicides. Various combinations of these contaminants are present in the surface soil, subsurface soil, and groundwater at the Site. The extent of the contamination in each media is unknown and will be further investigated during the Remedial Investigation (RI).

3.1.2 Common Routes of Exposure

The contaminants at the Site may enter the human body in a variety of ways. Based on the nature of site contaminants, the chemical routes of exposure anticipated from the remedial activities at this site include:

Route	Mechanism	Control
Absorption	Dermal (skin) contact with impacted soil on-site resulting in absorption of chemicals of concern through the skin and into the blood stream.	Proper use of PPE will minimize risks of exposure at the site.
Ingestion	Chemicals / materials of concern can come in direct contact with the mouth from soil or other contaminated areas (PPE, skin, tools, etc.) and enter the bloodstream through the stomach lining.	Proper care in handling PPE and tools, refraining from eating and drinking at the Site, and frequent hand washing with soap and water will minimize risks of exposure.
Inhalation	Volatile vapors and/or contaminants attached to dust and particulates can be entrained by wind and become airborne across the site and be subsequently inhaled through the nose and / or mouth. This exposure route is the most likely way for worker exposure to occur.	Conduct monitoring of air quality for VOCs in worker breathing zones. Employ methods that minimize the creation of dust and utilize dust suppression techniques to minimize dust and particulates. Respirators with appropriate filtration and organic adsorption cartridges should be available to on-site workers in case volatile compounds become a nuisance or health hazard.

3.2 Physical Hazards

Based upon the anticipated field activities, the following potential physical hazardous conditions may exist:

Category	Mechanism	Control
Mechanical Equipment	The use of typical mechanical equipment such as drill rigs and sampling vehicles can create a potential for crushing and pinching hazards due to movement and positioning of the equipment, movement of lever arms and hydraulics, and entanglement of clothing and appendages in exposed drives and tracks. Mechanical equipment can also create a potential for impact of steel tools, masts, and cables should equipment rigging fail, or other structural failures occur during hydraulic equipment operation.	Heavy equipment work must be conducted only by trained, experienced personnel. If possible, personnel must remain outside the turning radius of large, moving equipment. At a minimum, personnel must maintain visual contact with the equipment operator. When not operational, equipment must be set and locked so that it cannot be activated, released, dropped, etc. The mechanical equipment stated above represents typical equipment that is ordinarily used during this scope of work but is not meant to be an all-inclusive list. Similar precautions should be used around other mechanical equipment deployed to the Site that is not listed above.
Excavations and Trenches	The use of excavation/trenching such as removal of overburden soils, installation of utilities, and site grading operations can cause potential for suffocation, crushing, or other injury from falling material. Advancement of excavation and trenches can also create possible damage/failure of any installed underground utility services and create hazards. Other hazards created can include tripping, slipping, or falling. Entering an excavation or trench could have the possibility of an explosive, flammable, toxic, or oxygen-deficient atmosphere within the excavation or trench.	Ensure compliance with OSHA's construction standard for excavations (29 CFR 1926 Subpart P). Designate a Competent Person responsible for selecting and implementing the appropriate protective system(s), assuring appropriate means of access and egress for excavations greater than four (4) feet in depth, and for ensuring that potential atmospheric and physical hazards associated with any excavation / trenching activities are completed in accordance with Subpart P and other applicable OSHA Standards.
Noise	Work around large equipment often creates excessive noise. Noise can cause workers to be startled, annoyed, and/or distracted; as well as causing pain, physical damage to the ear, and temporary and/or permanent hearing loss; and can interfere with communication.	If workers are subjected to noise exceeding an 8-hour time-weighted average sound level of 85 dBA, hearing protection will be required with an appropriate noise reduction rating to comply with 29 CFR 1910.95 and to reduce noise levels below levels of concern.

Category	Mechanism	Control
Slips / Trips / Falls	Personnel may encounter slip, trip, and fall hazards associated with excavations, manways, and construction debris and materials. Precautionary measures should be taken by identifying and removing slip, trip, and fall hazards prior to commencing work.	In the event slip, trip, and fall hazards cannot be removed or minimized, site workers will be shown the location of the physical hazard and be asked to avoid it during work activities.
Fire / Explosion	The potential for fire and/or explosion emergencies is always present on the Site.	Field vehicles will be equipped with a fire extinguisher. Employees, contractors and workers must be trained in the proper use of fire suppression equipment. However, large fires that cannot be controlled with a fire extinguisher shall be handled by professionals. The proper authorities shall be notified in these instances, as well as the HSO and Health and Safety Manager.
Cold Exposure	Persons working in the outdoors in temperatures at or below freezing may be subject to frostbite. Extreme cold for a short time may cause injury to exposed body surfaces or result in a profound generalized cooling which can cause death. Areas of the body such as fingers, toes, and ears, are the most susceptible to cold stress. Ambient air temperature and wind velocity are two factors which influence the development of a cold weather injury. Local injury resulting from exposure to cold temperatures is known as "frostbite." There are several degrees of damage in which frostbite of the extremities can be categorized, as follows: ○ Frost nip or incipient frostbite is characterized by sudden bleaching or whitening of the skin. ○ Superficial frostbite occurs when the skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient. ○ Deep frostbite is characterized by tissues that are cold, pale, and solid; this is an extremely serious injury.	Wear several layers of dry clothes so that you can vary the amount of clothing to match the conditions. If there is wind, wear a windbreaker, since wind increases the effects of cold air and in turn lowers your body's core temperature even faster. Don't get overheated. Sweat can dampen clothing and in turn lead to over-cooling. Keep hands, feet, ears, and face warm. These are the areas of the body where frostbite tends to strike first. Heart disease and the use of sedatives or excessive alcohol will make you more susceptible to cold stress. If you feel chilly or sleepy, or have pain in your extremities, go to a warm shelter to recover.

Category	Mechanism	Control
Heat Exposure / Stress	Heat stress can result from a number of contributing factors, including environmental conditions, clothing, and workload as well as the physical condition of the individual. Since heat stress is one of the most common injuries / symptoms associated with outdoor work conducted with direct solar load, and, in particular, because wearing PPE can increase the risk of developing heat stress, workers must be capable of recognizing the signs and symptoms of heat-related illnesses. Signs and symptoms of heat-related illnesses which all on-site personnel should be aware, include the following: - Heat rash may result from continuous exposure to heat or humid air. - Heat cramps are caused by heavy sweating and may include muscle spasms and pain in the hands, feet, and abdomen. - Heat exhaustion is indicated by pale, cool, and moist skin; heavy sweating; dizziness; nausea; and fainting. - Heat stroke is indicated by red, hot, and unusually dry skin; lack of or reduced perspiration; nausea; dizziness and confusion; rapid pulse; and coma. Immediate action must be taken to cool the body before serious injury or death occurs.	The following will steps will be taken to limit heat exposure: adjust schedules, take breaks, limit heavy work in protective clothing or in a hot environment may require more time resting than working. Schedule heavy work in the coolest part of the day. Have shaded rest shelters with chairs or benches. Drink Fluids. Sweating cools the body, but it also robs the body of fluid. Drink enough fluids to replace what you lose. You may not feel thirsty until you've become dehydrated. Drink regularly throughout the day. Don't wait until you're thirsty. Monitor for signs of potential heat exposure and stress through use of the "buddy system", with frequent communication between site personnel. Take scheduled breaks and hydrate frequently throughout the day. Maintain an adequate supply of cold water and electrolyte containing drinks in support zone of site. In the event that personnel are observed to exhibit dizziness, disorientation, heat rash, slurred speech, dry mouth, heat cramps, or other symptoms of heat stress, discontinue work immediately and move affected person(s) to a location that is free from direct sunlight and provide fluids (preferably "Gatorade" or similar product that will replenish electrolytes). Monitor condition during to evaluate whether there is notable improvement in their condition.
Utilities	Overhead and underground utilities may exist within the Work Area, which may expose workers to electrocution hazards, explosive hazards, and volatile vapors.	Dig Safely New York shall be contacted a minimum of three business days prior to initiating the field activities, to arrange for the identification and markout of buried utilities at the site. The contact number for Dig Safely New York is 1-800-962-7962. In the event of inadvertent damage to buried utilities, all work shall cease, and the situation shall be evaluated by the HSO.

3.3 Environmental Hazards

Based upon the anticipated field activities, the following potential environmental hazardous conditions may exist:

Category	Hazard	Control
Biological	Ticks, bees/wasps, mosquitos, spiders, snakes, rabid animals	There are no known species of poisonous spiders or snakes common to the area. Minimize potential exposure to by wearing wear long pants and safety shoes. Change clothing and carefully examine for evidence of insects and ticks upon undressing, immediately following return from the site. Avoid contact with any animals, either wild or domestic, that may be encountered while conducting the field activities, and notify the local office of the New York State Department of Health (NYSDOH) in the event that animals are observed to elicit strange behavior. In the event of contact with an animal that is behaving in a strange manner, the NYSDOH should be contacted immediately.
Biological	Poison Ivy, Poison Oak	Familiarize yourself with the characteristics and appearance of poison ivy and poison oak. Be cognizant of vegetation while conducting work activities. Minimize potential exposure to by wearing wear long pants and safety shoes. Change clothing immediately following return from the site.
Weather	Wet surfaces, lighting, high winds (falling objects, contaminated dust), hail, excessive heat, extreme cold, snow and ice.	Remain cognizant of weather conditions, forecasts, and changing weather conditions. Exercise extra caution during wet and inclement site conditions to minimize risk of slips and falls. Avoid work during periods of high winds to reduce risk of injury from falling objects and airborne contaminant migration. Cease work and monitor conditions in the event that lightning is observed or suspected in the area, or in the event that other weather conditions pose a health or safety hazard.

SECTION 4 – TRAINING**4.1 Site-Specific Training**

Training will be provided that specifically addresses the activities, procedures, monitoring, and equipment for the Site operations prior to going on Site. Training will include familiarization with Site and facility layout, known and potential hazards, and emergency services at the Site, and details all provisions contained within this HASP. This training will also allow Site Workers to clarify anything they do not understand and to reinforce their responsibilities regarding safety and operations for their particular activity.

4.2 Task-Specific Training

For projects involving asbestos sampling, personnel will be trained to collect bulk asbestos samples using the requirements set forth in 40 CFR Part 763.92(a) (1) and (2) and 40 CFR Part. 763, Subpart. E, App. C. The training incorporates many sections of 40 CFR Part 763 but should focus on the sampling method listed in 40 CFR Part 763.86. The training includes inspection planning, bulk sampling, personal protection, and reporting. Personnel must demonstrate proficiency by identifying areas where asbestos may be found and properly collecting a bulk sample using proper methodology.

4.3 Safety Briefings

C&S project personnel will be given briefings by the HSO on a daily or as needed basis to further assist Site workers in conducting their activities safely. Pertinent information will be provided when new operations are to be conducted. Changes in work practices must be implemented due to new information made available, or if Site or environmental conditions change. Briefings will also be given to facilitate conformance with prescribed safety practices. When conformance with these practices is not occurring or if deficiencies are identified during safety audits, the project manager will be notified.

4.4 Daily Tailgate Safety Meeting

The HSO or the HSO designee will be responsible for conducting a daily tailgate safety meeting prior to start of any work activities. The contractor and workers will be responsible for attending daily tailgate safety meetings, as well as providing any additional insight into any possible hazards which might be anticipated or encountered throughout the day on the Site. The meeting will discuss any measures which will be implemented throughout the day to mitigate any hazards. The meetings are designed to create awareness of any hazards and their associated mitigation measures at the Site. If conditions at the Site change and new hazards are determined to be present, work will be stopped and an additional safety meeting will be conducted. The daily tailgate meetings discussions will be logged, as well as all who attended.

SECTION 5 – COMMUNICATIONS

5.1 Communications

A phone will be located on Site to be utilized by personnel conducting investigation. Cell phones will be the primary means of communicating with emergency support services/facilities.

SECTION 6 – PERSONAL PROTECTIVE EQUIPMENT

6.1 Personal Protective Equipment – General

The level of protection to be worn by field personnel will be defined and controlled by the HSO. Depending upon the type and levels of material present or anticipated at the site, varying degrees of protective equipment will be needed. If the possible hazards are unknown, a reasonable level of protection will be taken until sampling and monitoring results can ascertain potential risks. The levels of protection listed below are based on USEPA Guidelines. A list of the appropriate clothing for each level is also provided.

Level A protection must be worn when a reasonable determination has been made that the highest available level of respiratory, skin, eye, and mucous membrane protection is needed. It should be noted that while Level A provides maximum available protection, it does not protect against all possible hazards. Consideration of the heat stress that can arise from wearing Level A protection should also enter into the decision-making process. Level A protection includes:

- Open circuit, pressure-demand self-contained breathing apparatus (SCBA)
- Totally encapsulated chemical resistant suit
- Gloves, inner (surgical type)
- Gloves, outer, chemical protective
- Boots, chemical protective

Level B protection must be used when the highest level of respiratory protection is needed, but hazardous material exposure to the few unprotected areas of the body (e.g., the back of the neck) is unlikely. Level B protection includes:

- Open circuit, pressure-demand SCBA or pressure airline with escape air bottle
- Chemical protective clothing: Overalls and long sleeved jacket; disposal chemical resistant coveralls; coveralls; one or two piece chemical splash suit with hood
- Gloves, inner (surgical type)
- Gloves, outer, chemical protective
- Boots, chemical protective

Level C must be used when the required level of respiratory protection is known, or reasonably assumed to be, not greater than the level of protection afforded by air purifying respirators; and hazardous materials exposure to the few unprotected areas of the body (e.g. the back of the neck) is unlikely. Level C protection includes:

- Full or half face air-purifying respirator
- Chemical protective clothing: Overalls and long-sleeve jacket; disposable chemical resistant coveralls; coveralls; one- or two-piece chemical splash suit
- Gloves, inner (surgical type)

- Gloves, outer, chemical protective
- Boots, chemical protective

Level D is the basic work uniform. It cannot be worn on any site where respiratory or skin hazards exist. Level D protection includes:

- Safety boots/shoes
- Safety glasses
- Hard hat with optional face shield

Note that the use of SCBA and airline equipment is contingent upon the user receiving special training in the proper use and maintenance of such equipment.

6.2 Personal Protective Equipment – Site Specific

Level D with some modification will be required when working on this Site. In addition to the basic work uniform specified by Level D protection, Nitrile gloves will be required when contact with soil and/or groundwater is likely. Hearing protection will be worn when power equipment is used to perform subsurface work. An upgrade to a higher level (Level C) of protection may occur if determined necessary by the HSO.

SECTION 7 – MONITORING PROCEDURES

7.1 Monitoring During Site Operations

All Site environmental monitoring should be accompanied by periodic meteorological monitoring of appropriate climatic conditions.

7.1.1 Surface Soil Operation

Monitoring will be performed by the HSO or field personnel during the conduct of work. A photoionization detector (PID) equipped with a 10.6 eV lamp will be utilized to monitor for the presence of volatile organic vapors within the breathing zone, the surface soil holes, and subsurface samples upon their retrieval. The PID will be field checked for calibration accuracy three times per day (morning, lunch, and end of day).

7.1.2 Drilling / Test Pit Operations (Monitoring Well Installation and Subsurface Borings)

Monitoring will be performed by the HSO or drilling observer during the conduct of work. A PID equipped with a 10.6 eV lamp will be utilized to monitor for the presence of volatile organic vapors within the breathing zone, the borehole, and subsurface samples upon their retrieval. Drill cuttings and excavation spoils will also be monitored by use of the PID. The PID will be field checked for calibration accuracy three times per day (morning, lunch, and end of day. If subsurface conditions warrant, a combustible gas indicator (CGI) with oxygen alarm may also be used to monitor the borehole for the presence of combustible gases. Similar monitoring of fluids produced during well development will also be conducted.

7.2 Action Levels

If readings on the PID exceed 10 ppm for more than fifteen minutes consecutively, then personal protective equipment should be upgraded to Level C. The air purifying respirator used with Level C protective equipment must be equipped with organic vapor cartridges. If readings on the explosive gas meter are within a range of 10%-25% of the lower exposure limit (LEL) then continuous monitoring will be implemented. Readings above 25% of the LEL indicate the potential for an explosive condition. Sources of ignition should be removed and the Site should be evacuated.

7.3 Personal Monitoring Procedures

Personal monitoring shall be performed as a contingency measure in the event that VOC concentrations are consistently above the 10-ppm action level as detected by the PID. If the concentration of VOCs is above this action level, then amendments to the HASP must be made before work can continue at the Site.

SECTION 8 – SAFETY CONSIDERATIONS FOR SITE OPERATIONS**8.1 General**

Standard safe work practices that will be followed include:

- Do not climb over/under drums, or other obstacles.
- Do not work on the Site alone.
- Practice contamination avoidance, on and off-site.
- Plan activities ahead of time, and use caution when conducting concurrently running activities.
- No eating, drinking, chewing or smoking is permitted on the Site.
- Due to the unknown nature of waste placement at the Site, extreme caution should be practiced during excavation activities.
- Apply immediate first aid to any and all cuts, scratches, abrasions, etc.
- Be alert to your own physical condition. Watch your buddy for signs of fatigue, exposure, etc.
- A work/rest regimen will be initiated when ambient temperatures and protective clothing create a potential heat or cold stress situation.
- No work will be conducted without adequate natural light or without appropriate supervision.
- Task safety briefings will be held prior to onset of task work.
- Ignition of flammable liquids within or through improvised heating devices (barrels, etc.) or space heaters is forbidden.
- Entry into areas of spaces where toxic or explosive concentrations of gases or dust may exist without proper equipment is prohibited.
- Any injury or unusual health effect must be reported to the Site HSO.
- Prevent splashing or spilling of potentially contaminated materials.
- Use of contact lenses is prohibited while on site.
- Beards and other facial hair that would impair the effectiveness of respiratory protection are prohibited if respiratory protection is necessary.
- Field crew members should be familiar with the physical characteristics of investigations, including but not limited to:
 - Wind direction in relation to potential sources
 - Accessibility to co-workers, equipment, and vehicles
 - Communication
 - Hot zones (areas of known or suspected contamination)
 - Site access
 - Nearest water sources
- The number of personnel and equipment in potentially contaminated areas should be minimized consistent with site operations.

8.2 Field Operations

The HSO or designee will be present on-site during all intrusive work, e.g., drilling operations, excavations, trenching, and will provide monitoring to oversee that appropriate levels of protection and safety procedures are utilized by C&S Engineers, Inc., personnel. The use of salamanders or other equipment with an open flame is prohibited and the use of protective clothing, especially hard hats and boots, will be required during drilling or other heavy equipment operations.

8.3 General Asbestos Safety

Asbestos exposure is primarily an inhalation hazard. OSHA compliant respiratory protection should be worn if there is risk of asbestos becoming airborne. Personal Protective Equipment including protective clothing (suits/gloves, etc.) may be necessary to avoid contaminating the worker and/or the site.

Procedural Precautions - The sampler should be aware that disruption of asbestos-containing materials can create the potential for cross contamination when conducting bulk asbestos sampling.

The Sampler should take the following precautions to avoid cross contamination as well as disruption of material while sampling:

- The sampling tool must be cleaned with amended water after every sample is collected, or a different clean tool must be used.
- The sampler must avoid touching the material being sampled (utilize gloves).
- The area being sampled must be sufficiently wet before collecting the sample.
- The space left after sampling must be sealed with repair/patch material to reduce the chance of airborne exposure.

The object or material sampled should be minimally disturbed during the sampling process.

SECTION 9 – DECONTAMINATION PROCEDURES

9.1 General Decontamination

Decontamination involves physically removing contaminants and / or converting them chemically into innocuous substances. Only general guidance can be given on methods and techniques for decontamination. Decontamination procedures are designed to:

- Remove contaminant(s).
- Avoid spreading the contamination off Site.
- Avoid exposing unprotected personnel off Site to contaminants.

9.2 Contamination Avoidance

Contamination avoidance is the first and best method for preventing spread of contamination from a hazardous site. Each person involved in site operations must practice the basic methods of contamination avoidance listed below. Additional precautions may be required in the HASP.

- Know the limitations of all protective equipment being used.
- Use the proper tools necessary to safely conduct the work.

9.3 Reducing Contamination

Specific methods that may reduce the chance of contamination are:

- Use of remote sampling techniques.
- Opening containers by non-manual means.
- Bagging monitoring instruments.
- Use of drum grapplers.
- Watering down dusty areas.

9.4 Equipment Decontamination

Equipment which will need to be decontaminated includes tools, monitoring equipment, and personal protective equipment. Items to be decontaminated will be brushed off, rinsed, and dropped into a plastic container supplied for that purpose. They will then be washed with a detergent solution and rinsed with clean water. Instrumentation that is contaminated during field operations will be carefully wiped down. Heavy equipment, if utilized for operations where it may be contaminated, will have prescribed decontamination procedures to prevent contaminant materials from potentially leaving the Site. On-site contractors, such as drillers or backhoe operators, will be responsible for decontaminating all construction equipment prior to demobilization.

SECTION 10 – DISPOSAL PROCEDURES

All discarded materials, waste materials, or other objects shall be handled in such a way as to reduce or eliminate the potential for spreading contamination, creating a sanitary hazard, or causing litter to be left on-site. All potentially contaminated materials, e.g., clothing, gloves, etc., will be bagged or drummed as necessary and segregated for proper disposal. All contaminated waste materials shall be disposed of as required by the provisions included in the contract and consistent with regulatory provisions. All non-contaminated materials shall be collected and bagged for appropriate disposal.

Investigation derived waste (IDW) that is free from physical indications of contamination such as odors, staining, and sheens will be placed back into the borehole of origin or in the case of well water allowed to infiltrate the Site surface. In cases where physical indications of contamination are evident, the affected media will be containerized per NYSDOT requirements pending proper disposal. Samples may be analyzed for toxicity characteristic leaching procedure (TCLP) VOCs, SVOCs, pesticides, herbicides, and metals; PCBs; pH (corrosivity), flash point (ignitability); reactivity; and paint filter (free liquids).

SECTION 11 – EMERGENCY RESPONSE PROCEDURES

As a result of the hazards at the Site, and the conditions under which operations are conducted, there is the possibility of emergency situations. This section establishes procedures for the implementation of an emergency plan.

11.1 Emergency Coordinator

Emergency Coordinator:..... Nick Coulombe..... Work Phone: (315) 703-4284

The Emergency Coordinator or his on-site designee will, in coordination with the Authority / Agency having Jurisdiction, implement the emergency response procedures whenever conditions at the site warrant such action. The Emergency Coordinator or his on-site designee will be responsible for assuring the evacuation, emergency treatment, emergency transport of C&S personnel or workers as necessary, and notification of emergency response units (**refer to phone listing** in the beginning of this HASP) and the appropriate management staff.

11.2 Evacuation

In the event of an emergency situation, such as fire, explosion, significant release of toxic gases, etc., all personnel will evacuate and assemble in a designated assembly area. The Emergency Coordinator or his on-site designee will have authority to contact outside services as required. Under no circumstances will incoming personnel or visitors be allowed to proceed into the area once the emergency signal has been given. The Emergency Coordinator or his on-site designee must see that access for emergency equipment is provided and that all ignition sources have been shut down once the emergency situation is established. Once the safety of all personnel is established, the Fire Department and other emergency response groups will be notified by telephone of the emergency.

11.3 Potential / Actual Fire or Explosion

Immediately evacuate the Site and notify local fire and police departments, and other appropriate emergency response groups, if LEL values are above 25% in the work zone or if an actual fire or explosion has taken place.

11.4 Environmental Incident (Spread or Release of Contamination)

Control or stop the spread of contamination if possible. Notify the Emergency Coordinator and the Project Manager. Other appropriate response groups will be notified as appropriate.

11.5 Personnel Injury

Emergency first aid shall be applied on-site as necessary. Then, decontaminate (en route if necessary) and transport the individual to nearest medical facility if needed. The ambulance/rescue squad shall be contacted for transport as necessary in an emergency. A map of directions to the nearest hospital is shown in **Attachment A**.

11.6 Personnel Exposure

- *Skin Contact:* Use copious amounts of soap and water. Wash/rinse affected area thoroughly, and then provide appropriate medical attention. Eyes should be thoroughly rinsed with water for at least 15 minutes.
- *Inhalation:* Move to fresh air and/or, if necessary, decontaminate and transport to emergency medical facility.
- *Ingestion:* Decontaminate and transport to emergency medical facility.
- *Puncture Wound/Laceration:* Decontaminate, if possible, and transport to emergency medical facility.

11.7 Adverse Weather Conditions

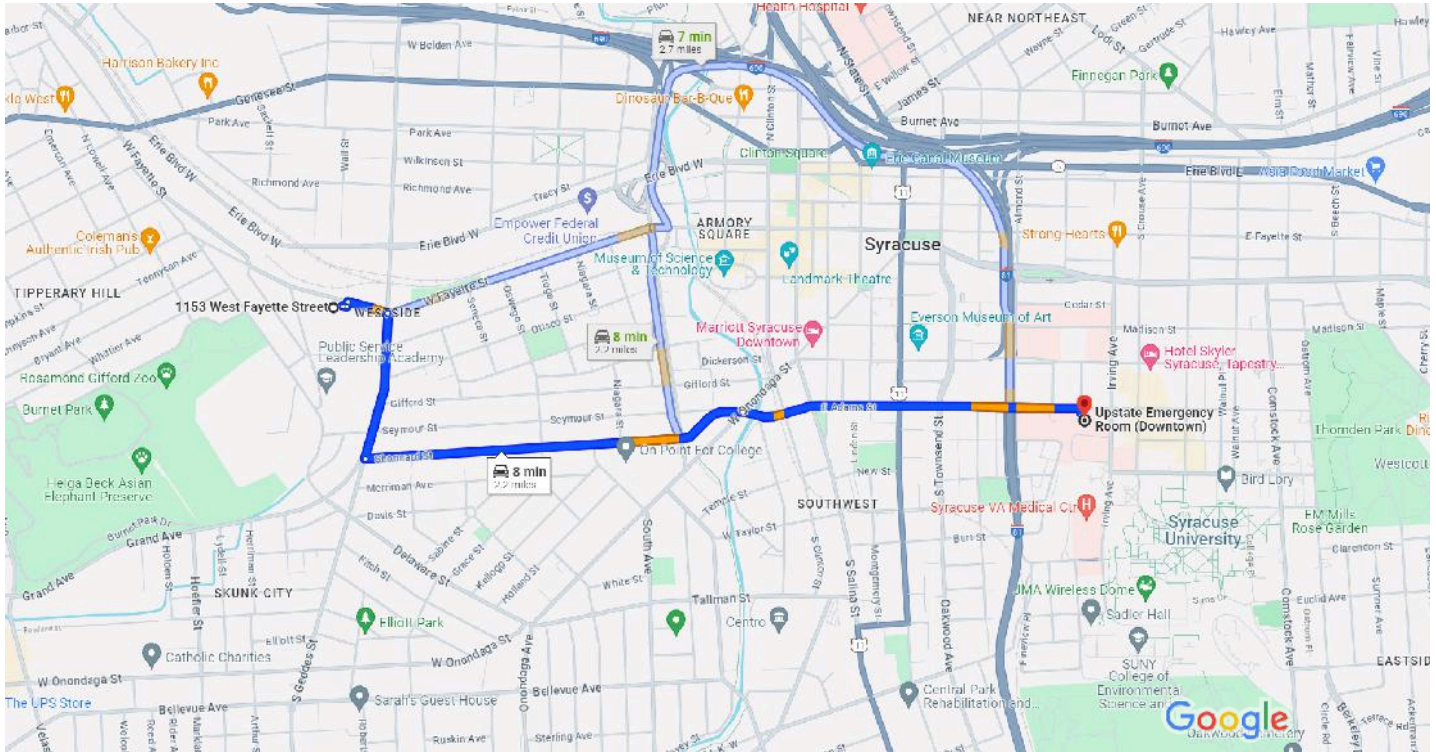
In the event of adverse weather conditions, the HSO will determine if work can continue without sacrificing the health and safety of field workers.

11.8 Incident Investigation and Reporting

In the event of an incident, procedures discussed in the Medical Emergency / Incident Response Protocol, presented in **Attachment B** of this HASP, shall be followed.

Attachment A

MAP AND DIRECTIONS TO HOSPITAL



Map data ©2024 Google 1000 ft

1153 W Fayette St
Syracuse, NY 13204

- ↑ 1. Head east toward W Fayette St
46 ft
- ↶ 2. Turn left toward W Fayette St
59 ft
- ↷ 3. Turn right onto W Fayette St
0.1 mi
- ↷ 4. Turn right onto S Geddes St
0.3 mi
- ↶ 5. Turn left onto Shonnard St
0.9 mi
- ↑ 6. Continue onto W Adams St
0.8 mi
- ↷ 7. Turn right
75 ft

i Destination will be on the right

Attachment B

GUIDANCE ON INCIDENT INVESTIGATION AND REPORTING

Medical Emergency / Incident Response Protocol

Prepared by:



C&S Engineers, Inc.
499 Col Eileen Collins Blvd.
Syracuse, New York 13212

SECTION 1 – PURPOSE

From time to time employees of C&S Engineers, Inc. will sustain an injury while working on the job. While every effort is being made to prevent this, in the event of an injury or illness on the job, the following procedures will be implemented. This format may also be utilized in the event of a property damage incident.

SECTION 2 – SCOPE

This guideline applies to all C&S Engineers, Inc. job sites and employees.

SECTION 3 – GUIDELINES

3.1 First Response Procedures

Upon notification or awareness of an incident/accident with injuries or illness the Emergency Coordinator or his On-Site Designee will:

1. Ensure that the injured employee is receiving immediate first aid and medical care.
2. Notify Emergency Services (911) if injuries are severe.
3. Stabilize the work area; ensure that no one else can be injured.
4. Notify the Project Manager at the earliest possible convenience.
5. Notify the Owner/Client at the earliest possible convenience.

To assist the Health and Safety Manager in the root cause analysis, the Emergency Coordinator or his On-Site Designee will also make an attempt to:

1. Obtain the names and phone numbers of witnesses.
2. Preserve the accident scene if possible for analysis.

3.2 Injury Management

1. If the patient is stable with non-life threatening injuries, the foreman will ensure the employee is transported to the emergency medical facility listed in Section 1 of the HASP. Directions to the nearest emergency medical facility are located in Attachment A of the HASP.

At no time will an injured employee drive themselves to medical care.

2. If the patient has serious or life threatening injuries, the emergency coordinator or his on-site designee will notify the emergency services for the area for treatment and transport to a hospital or emergency room. Serious injuries can be considered but not limited to head injuries, loss of consciousness, severe laceration or amputation, fractured bones, burns and eye injuries.

3. Following the treatment and care of the injured employee, the emergency coordinator or his on-site designee and the project manager will initiate the completion of the first injury report. The Health & Safety Manager will assist.

3.3 Project Manager

1. Upon notification of a personal injury or illness on the job site, will notify C&S Engineers, Inc, President and Corporate Legal and C&S Companies Health and Safety Manager.
2. Will report to the worksite to initiate the first injury report.
3. Will report to the treatment facility to check on the well being of the injured employee.
4. The project manager will ensure that the treatment facility is aware that this is a workers compensation case.
5. Will assist the Health and Safety Manager in the analysis of the incident.

3.4 Health & Safety Manager

1. Upon notification of the personal injury will determined if it is necessary to report to the treatment facility or the accident site, depending on the nature of the injuries and the circumstances of the accident.
2. Will report to the worksite to begin a root cause analysis investigation of the accident.
3. The investigation may include interview of witnesses, field crew , and project manager, the photographing of the scene, reconstruction of the accident scene, using test instruments and taking measurements. The Health and Safety Manager may draw diagrams from the information learned.
4. The Health and Safety Manager will work with the owner/client as necessary to investigate the accident.
5. The Health & Safety manager will ensure that the site is safe to resume work.
6. The Health & Safety Manager shall initiate the New York State Compensation form requirements (C-2) and forward a copy of the C-2 to the C & S Engineers, Inc. controller for transmittal to the Compensation Carrier within 8 hrs of notification of the incident or by the end of the next business day.
7. The Health and Safety manager, upon completion of the investigation, will provide the
8. Project Manager with a written investigative report (copy to the President)
9. The accident will be reviewed at the next Project Managers meeting with the intent to prevent further or similar events on other projects.
10. The Health & Safety Manager will assess the incident to determine OSHA record ability and make record if necessary on the OSHA 300 form, within five working days.

SECTION 4 - INCIDENT RESPONSE

4.1 Purpose

To prevent the occurrence of accidents on C&S Engineers, Inc., work sites and to establish a procedure for investigation and reporting of incidents occurring in, or related to C&S work activities.

4.2 Scope

Applies to all incidents related to C&S Engineers, Inc. work activities.

4.3 Definitions

Accident - An undesired event resulting in personal injury and/or property damage, and/or equipment failure.

Fatality - An injury or illness resulting in death of the individual.

Incident - Any occurrence which results in, or could potentially result in, the need for medical care or property damage. Such incidents shall include lost time accidents or illness, medical treatment cases, unplanned exposure to toxic materials or any other significant occurrence resulting in property damage or in "near misses."

Incidence Rate - the number of injuries, illnesses, or lost workdays related to a common exposure base of 100 full-time workers. The rate is calculated as:

$$N/EH \times 200,000$$

N = number of injuries and illnesses or lost workday cases; EH = total hours worked by all associates during calendar year. 200,000 = base for 100 full-time equivalent workers (working 40 hours per week, 50 weeks per year).

Injury - An injury such as a cut, fracture, sprain, amputation, etc. which results from a work accident or from a single instantaneous event in the work environment.

Lost Workday Case - A lost workday case occurs when an injured or ill employee experiences days away from work beginning with the next scheduled work day. Lost workday cases do not occur unless the employee is affected beyond the day of injury or onset of illness.

Recordable Illness - An illness that results from the course of employment and must be entered on the OSHA 300 Log and Summary of Occupational Injuries and Illnesses. These illnesses require medical treatment and evaluation of work related injury. For example, dermatitis, bronchitis, irritation of eyes, nose, and throat can result from work and non-work related incidents.



Recordable Injury - An injury that results from the course of employment and must be entered on the OSHA 300 Log and Summary of Occupational Injuries and Illnesses. These injuries require medical treatment; may involve loss of consciousness; may result in restriction of work or motion or transfer to another job; or result in a fatality.

Near Miss - An incident which, if occurring at a different time or in a different personnel or equipment configuration, would have resulted in an incident.

4.4 Responsibilities

Employees - It shall be the responsibility of all C&S Engineers, Inc. employees to report all incidents as soon as possible to the HSC, regardless of the severity.

Human Resources - has overall responsibility for maintaining accident/ incident reporting and investigations according to current regulations and recording injuries/ illness on the OSHA 300 log, and posting the OSHA 300 log.

Emergency Coordinator - It is the responsibility of the Emergency Coordinator to investigate and prepare an appropriate report of all accidents, illnesses, and incidents occurring on or related to C&S Engineers, Inc. work. The Emergency Coordinator shall complete Attachment A within 24 hours of the incident occurrence.

Health and Safety Manager (HSM) - It is the responsibility of the HSM to investigate and prepare an appropriate report of all lost time injuries and illnesses and significant incidents occurring on or related to C&S Companies. The HSM shall maintain the OSHA 300 form.

Project Managers (PM) - It shall be the PM's responsibility to promptly correct any deficiencies in personnel, training, actions, or any site or equipment deficiencies that were determined to cause or contribute to the incident investigated.

SECTION 5 – GUIDELINES

5.1 Incident Investigation

The Project Manager will immediately investigate the circumstances surrounding the incident and will make recommendations to prevent recurrence. The HSM shall be immediately notified by telephone if a serious accident/ incident occurs. The incident shall be evaluated to determine whether it is OSHA recordable. If the incident is determined to be OSHA 300 recordable, it shall be entered on the OSHA 300 form.

The Project Manager with assistance from the HSM must submit to the office an incident report form pertaining to any incident resulting in injury or property damage.



5.2 Incident Report

The completed incident report must be completed by the Project Manager within 12 hours of the incident and distributed to the HSM, and Human Resources. This form shall be maintained by Human Resources for at least five years for all OSHA recordable cases. This form serves as an equivalent to the OSHA 101 form.

5.3 Incident Follow-up Report

The Incident Follow-Up Report (Attachment B) shall be distributed with the Incident Report within one week of the incident. Delay in filing this report shall be explained in a brief memorandum.

5.4 Reporting of Fatalities or Multiple Hospitalization Accidents

Fatalities or accidents resulting in the hospitalization of three or more employees must be reported to OSHA verbally or in writing within 8 hours. The report must contain 1) circumstances surrounding the accident(s), 2) the number of fatalities, and 3) the extent of any injuries.

5.5 OSHA 300A Summary Form

Recordable cases must be entered on the log within six workdays of receipt of the information that a recordable case has occurred. The OSHA log must be kept updated to within 45 calendar days.

OSHA 300 forms must be updated during the 5 year retention period, if there is a change in the extent or outcome of an injury or illness which affects an entry on a log. If a change is necessary, the original entry should be lined out and a corrected entry made on that log. New entries should be made for previously unrecorded cases that are discovered or for cases that initially weren't recorded but were found to be recordable after the end of the year. Log totals should also be modified to reflect these changes.

5.6 Posting

The log must be summarized at the end of the calendar year and the summary must be posted from February 1 through May 31.

5.7 OSHA 300A

Facilities selected by the Bureau of Labor Statistics (BLS) to participate in surveys of occupational injuries and illnesses will receive the OSHA 300A. The data from the annual summary on the OSHA 300 log should be transferred to the OSHA 300A, other requested information provided and the form returned as instructed by the BLS.



5.8 Access to OSHA Records

All OSHA records (accident reporting forms and OSHA 300 logs) should be available for inspection and copying by authorized Federal and State government officials.

Employees, former employees, and their representatives must be given access for inspection and copying to only the log, OSHA No. 300, for the establishment in which the employee currently works or formerly worked.

SECTION 6 – REFERENCES

29 CFR Part 1904

SECTION 7 – ATTACHMENTS

Attachment A - Incident Investigation Form

Attachment B - Incident Follow-Up Report

Attachment C - Establishing Recordability



ATTACHMENT A

INCIDENT INVESTIGATION FORM

Accident investigation should include:

Location:

Time of Day:

Accident Type:

Victim:

Nature of Injury:

Released Injury:

Hazardous Material:

Unsafe Acts:

Unsafe Conditions:

Policies, Decisions:

Personal Factors:

Environmental Factors:



ATTACHMENT B

INCIDENT FOLLOW-UP REPORT

Date _____

Foreman: _____

Date of Incident: _____

Site: _____

Brief description of incident: _____

Outcome of incident: _____

Physician's recommendations: _____

Date the injured returned to work: _____

Project Manager Signature: _____

Date: _____

ATTACH ANY ADDITIONAL INFORMATION TO THIS FORM

ATTACHMENT C

ATTACHMENT ESTABLISHING RECORDABILITY

1. Deciding whether to record a case and how to classify the case.

Determine whether a fatality, injury or illness is recordable.

A fatality is recordable if:

- Results from employment

An injury is recordable if:

- Results from employment and
- It requires medical treatment beyond first aid or
- Results in restricted work activity or job transfer, or
- Results in lost work day or
- Results in loss of consciousness

An illness is recordable if:

- It results from employment

2. Definition of "Resulting from Employment"

Resulting from employment is when the injury or illness results from an event or exposure in the work environment. The work environment is primarily composed of: 1) The employer's premises, and 2) other locations where associates are engaged in work-related activities or are present as a condition of their employment.

The employer's premises include company rest rooms, hallways, cafeterias, sidewalks and parking lots. Injuries occurring in these places are generally considered work related.

The employer's premises EXCLUDES employer controlled ball fields, tennis courts, golf courses, parks, swimming pools, gyms, and other similar recreational facilities, used by associates on a voluntary basis for their own benefit, primarily during off work hours.

Ordinary and customary commute, is not generally considered work related.

Employees injured or taken ill while engaged in consuming food, as part of a normal break or activity is not considered work related. Employees injured or taken ill as the result of smoking, consuming illegal drugs, alcohol or applying make-up are generally not considered work related. Employee injured by unauthorized horseplay is generally not considered work related, however, an employee injured as a result of a fight or other

workplace violence act, may be considered work related. Associates who travel on company business are considered to be engaged in work related activities all the time they spend in the interest of the company. This includes travel to and from customer contacts, and entertaining or being entertained for purpose of promoting or discussing business. Incidents occurring during normal living activities (eating, sleeping, recreation) or if the associate deviates from a reasonably direct route of travel are not considered OSHA recordable.

3. Distinction between Medical Treatment and First Aid.

First aid:

Any one-time treatment, and any follow up visit for the purpose of observation, of minor scratches, cuts, burns, splinters, etc., which do not ordinarily require medical care. Such one-time treatment, and follow up visit for the purpose of observation, is considered first aid even though provided by a physician or registered professional personnel.

Medical Treatment (recordable):

- a) Must be treated only by a physician or licensed medical personnel.
- b) Impairs bodily function (i.e. normal use of senses, limbs, etc.).
- c) Results in damage to physical structure of a non-superficial nature (fractures).
- d) Involves complications requiring follow up medical treatment.