1199 Sutter Avenue

Kings COUNTY

Brooklyn, NEW YORK

SITE MANAGEMENT PLAN

NYSDEC Site Number: C224141

Prepared for:

AAA Sutter Realty LLC

153-157 Seventh Street

Garden City, New York 11530

Prepared by:

EnviroTrac Engineering PE PC

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(631) 924-3001

Revisions to Final Approved Site Management Plan:

Revision No.	Date Submitted	Summary of Revision	NYSDEC Approval Date

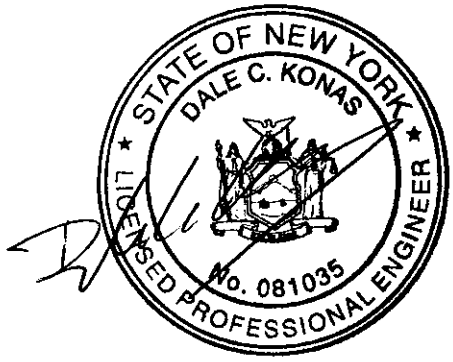
JANUARY 2019

CERTIFICATION STATEMENT

I _DALE KONAS certify that I am currently a NYS registered professional engineer and that this Site Management Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

_____ P.E.

1/8/19 _____DATE



EnviroTrac

SITE MANAGEMENT PLAN

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List of Acronyms

AS	Air Sparging
ASP	Analytical Services Protocol
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CAMP	Community Air Monitoring Plan
C/D	Construction and Demolition
CFR	Code of Federal Regulation
CLP	Contract Laboratory Program
COC	Certificate of Completion
CO2	Carbon Dioxide
CP	Commissioner Policy
DER	Division of Environmental Remediation
EC	Engineering Control
ECL	Environmental Conservation Law
ELAP	Environmental Laboratory Approval Program
ERP	Environmental Restoration Program
EWP	Excavation Work Plan
GHG	Green House Gas
GWE&T	Groundwater Extraction and Treatment
HASP	Health and Safety Plan
IC	Institutional Control
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYCRR	New York Codes, Rules and Regulations
O&M	Operation and Maintenance
OM&M	Operation, Maintenance and Monitoring
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
PID	Photoionization Detector
PRP	Potentially Responsible Party
PRR	Periodic Review Report
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RAO	Remedial Action Objective
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision

List of Acronyms *(continued)*

RP	Remedial Party
RSO	Remedial System Optimization
SAC	State Assistance Contract
SCG	Standards, Criteria and Guidelines
SCO	Soil Cleanup Objective
SMP	Site Management Plan
SOP	Standard Operating Procedures
SOW	Statement of Work
SPDES	State Pollutant Discharge Elimination System
SSD	Sub-slab Depressurization
SVE	Soil Vapor Extraction
SVI	Soil Vapor Intrusion
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leachate Procedure
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VCA	Voluntary Cleanup Agreement
VCP	Voluntary Cleanup Program

ES EXECUTIVE SUMMARY

The following provides a brief summary of the controls implemented for the Site, as well as the inspections, monitoring, maintenance and reporting activities required by this Site Management Plan (SMP):

Site Identification: C224141 – 1199 Sutter Avenue Site, 1199-1221 Sutter Avenue, Brooklyn, New York

Institutional Controls:	• require the remedial party or Site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8 (h)(3); • allow the use and development of the controlled property for restricted residential and/or commercial as defined by Part 375-1.8(g), although land use is subject to local zoning laws; • restrict the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or NYCDOH; and • require compliance with the Department approved Site Management Plan.	
Engineering Controls:	1. Cover system	
	2. SVE system 3. AS system 3. SSD system	
Inspections:		Frequency
1. Cover inspection		Annually
Monitoring:		
1. SVE Wells 1-4		Monthly
2. AS Wells 1-3		Monthly
3. SSDS Extraction Points		Annually
4. Groundwater Monitoring Wells MW-1S, MW-2S, MW-5S, MW-8S, MW-10S, and MW-11S		Quarterly

Maintenance:	
1. Blower maintenance	Monthly
2. Compressor maintenance	Monthly
Reporting:	
1. Treatment System Data	Annually
2. Periodic Review Report	Annually

Further descriptions of the above requirements are provided in detail in the latter sections of this Site Management Plan.

1.0 INTRODUCTION

1.1 General

This Site Management Plan (SMP) is a required element of the remedial program for the 1199 Sutter Avenue Site located in Brooklyn, New York [hereinafter referred to as the "Site" (See Figure 1)]. The Site is currently in the New York State Brownfield Cleanup Program (BCP), Site No. C224141 which is administered by New York State Department of Environmental Conservation (NYSDEC).

AAA Sutter Realty LLC entered into a Brownfield Cleanup Agreement (BCA) on August 2, 2012 with the NYSDEC to remediate the Site. A figure showing the Site location and boundaries of this Site is provided in Figure 2. The boundaries of the Site are more fully described in the metes and bounds Site description that is part of the Environmental Easement provided in Appendix A.

After completion of the remedial work, some contamination was left at this Site, which is hereafter referred to as "remaining contamination". Institutional and Engineering Controls (ICs and ECs) have been incorporated into the Site remedy to control exposure to remaining contamination to ensure protection of public health and the environment. An Environmental Easement granted to the NYSDEC, and recorded with the Kings County Clerk, requires compliance with this SMP and all ECs and ICs placed on the Site.

This SMP was prepared to manage remaining contamination at the Site until the Environmental Easement is extinguished in accordance with ECL Article 71, Title 36. This plan has been approved by the NYSDEC, and compliance with this plan is required by the grantor of the Environmental Easement and the grantor's successors and assigns. This SMP may only be revised with the approval of the NYSDEC.

It is important to note that:

- This SMP details the Site-specific implementation procedures that are required by the Environmental Easement. Failure to properly implement the SMP is a violation of the Environmental Easement, which is grounds for revocation of the Certificate of Completion (COC); and
- Failure to comply with this SMP is also a violation of Environmental Conservation Law, 6NYCRR Part 375 and the BCA Site #C224141 for the Site, and thereby subject to applicable penalties.

All reports associated with the Site can be viewed by contacting the NYSDEC or its successor agency managing environmental issues in New York State. A list of contacts for persons involved with the Site is provided in Appendix B of this SMP.

This SMP was prepared by EnviroTrac Engineering PE PC, on behalf of AAA Sutter Realty LLC, in accordance with the requirements of the NYSDEC's DER-10 ("Technical Guidance for Site Investigation and Remediation"), dated May 3, 2010 and the guidelines provided by the NYSDEC. This SMP addresses the means for implementing the ICs and/or ECs that are required by the Environmental Easement for the Site.

1.2 Revisions

Revisions to this plan will be proposed in writing to the NYSDEC's project manager. Revisions will be necessary upon, but not limited to, the following occurring:

- a change in media monitoring requirements;
- upgrades to or shut-down of a remedial system;
- post-remedial removal of contaminated soil; or
- other significant change to the Site conditions.

In accordance with the Environmental Easement for the Site, the NYSDEC will provide a notice of any approved changes to the SMP, and append these notices to the SMP that is retained in its files.

1.3 Notifications

Notifications will be submitted by the property owner to the NYSDEC, as needed, in accordance with NYSDEC's DER – 10 for the following reasons:

- Sixty (60) day advance notice of any proposed changes in Site use that are required under the terms of the BCA, 6NYCRR Part 375, and/or Environmental Conservation Law;
- Seven (7) day advance notice of any field activity associated with the remedial program;
- Fifteen (15) day advance notice of any proposed ground-intrusive activity pursuant to the Excavation Work Plan;
- Notice within 48 hours of any damage or defect to the foundation, structures or EC that reduces or has the potential to reduce the effectiveness of an EC, and likewise, any action to be taken to mitigate the damage or defect;
- Verbal notice by noon of the following day of any emergency, such as a fire; flood; or earthquake that reduces or has the potential to reduce the effectiveness of ECs in place at the Site, with written confirmation within seven (7) days that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public; and
- Follow-up status reports on actions taken to respond to any emergency event requiring on-going responsive action submitted to the NYSDEC within 45

days describing and documenting actions taken to restore the effectiveness of the ECs.

Any change in the ownership of the Site or the responsibility for implementing this SMP will include the following notifications:

- At least 60 days prior to the change, the NYSDEC will be notified in writing of the proposed change. This will include a certification that the prospective purchaser/Remedial Party has been provided with a copy of the BCA, and all approved work plans and reports, including this SMP; and
- Within 30 days after the transfer of all or part of the Site, the new owner's name, contact representative, and contact information will be confirmed in writing to the NYSDEC.

Table 1 on the following page includes contact information for the above notification. The information on this table will be updated as necessary to provide accurate contact information. A full listing of Site-related contact information is provided in Appendix B.

Table 1: Notifications*

Name	Contact Information
Michael MacCabe, P.E.	518-402-9687, michael.maccabe@dec.ny.gov
Wendy Kuehner	518-402-7860, wendy.kuehner@health.ny.gov

* Note: Notifications are subject to change and will be updated as necessary.

2.0 SUMMARY OF PREVIOUS INVESTIGATIONS AND REMEDIAL ACTIONS

2.1 Site Location and Description

The Site is located in the County of Kings, New York and is identified as Block 4248 and Lot 1 on the Brooklyn Tax Map. A United States Geological Survey (USGS) topographical quadrangle map (Figure 1) shows the Site location. The Site is situated on an approximately 0.532-acre area bounded by the Site's northern parking lot, then residential housing, then Belmont Avenue to the north, Sutter Avenue and then New York City Housing Authority (NYCHA) Cypress Hills apartment complex to the south, Chestnut Street and then a US post office building to the east, and Crystal Street and then Cypress Hills Branch public library building to the west (see Figure 2). The boundaries of the Site are more fully described in Appendix A –Environmental Easement. The owner of the Site parcel at the time of issuance of this SMP is AAA Sutter Realty, LLC.

2.2 Physical Setting

2.2.1 Land Use

The Site consists of the retail/office building located at 1199-1221 Sutter Avenue in Brooklyn, New York. The Site is bounded by Sutter Avenue to the south, Chestnut Street to the east, the Site's northern parking lot, then residential properties to the north, and Crystal Street to the west. The Site contains a single-story commercial building along the southern portion and an asphalt parking lot covering the northern portion. Catch basins within the parking lot direct runoff into the municipal stormwater drainage system. The building at the Site is divided into five (5) separate retail/office units.

Sanitary waste and waste water from the laundromat are discharged to the municipal sewerage system piping located beneath Sutter Avenue. The building is underlain with a basement segmented for each retail/office unit with utilities, storage, and service rooms. The Site is zoned for commercial purposes. The building at the Site from west to east is currently occupied by a delicatessen, a nail salon, a dentist office, a supermarket, and a self-service laundromat. A dry cleaner establishment formerly occupied the easternmost unit, which is currently occupied by the self-service laundromat.

The properties adjoining to the Site and in the neighborhood surrounding the Site primarily include commercial/municipal and residential properties. The properties immediately south of the Site include residential properties managed by the NYCHA, and known as the Cypress Hills Houses; the properties immediately north of the Site include residential dwellings along Chestnut Street and Crystal Street; the property immediately east of the Site includes a commercial/municipal property occupied by the US Post Office; and the property immediately west of the Site includes a commercial/municipal property occupied by the Cypress Hills Branch Public Library.

2.2.2 Geology

The Site is underlain by approximately 13 feet of unsaturated soil. Soil in the area of the Site is classified as Urban Land soil and consists of a mix of sand, silt, clay, gravel, and fill material. The saturated zone begins at approximately 13 feet below grade and is part of the Upper Glacial Aquifer, which is composed of outwash-plain deposits of stratified sand and gravel. The Upper Glacial Aquifer is the only formation considered in this investigation. Soil borings were installed within the Upper Glacial Aquifer to a maximum depth of 40 feet below grade. Figure 3 shows the hydrogeologic cross-section of Long Island aquifers. Site-specific monitoring well construction logs, which describe the soil characteristics beneath the Site, are provided in Appendix C.

2.2.3 Hydrogeology

Groundwater beneath the Site is characterized as Class GA indicating it has the potential to be used as a source of potable water. Based on USGS Long Island Groundwater Conditions, 2013, regional groundwater in the area of the Site flows generally to the south. Groundwater at the Site is not utilized as a source of potable water. Temporary wells and permanent monitoring wells were installed within the Upper Glacial Aquifer to a maximum depth of 40 feet below grade. Figure 3 shows the hydrogeologic cross-section of Long Island aquifers. A groundwater contour map is included in Figure 4. The flow direction shown on the contour map agrees with the regional groundwater flow direction. Groundwater elevation data is provided in Table 2. Groundwater monitoring well, air sparge well, soil vapor extraction, injection well, and sub-slab depressurization well construction logs are provided in Appendix D.

2.3 Investigation and Remedial History

The following narrative provides a remedial history timeline and a brief summary of the available project records to document key investigative and remedial milestones for the Site. Full titles for each of the reports referenced below are provided in Section 8.0 - References.

Subsurface investigations and remedial activities were conducted at the Site from January, 2009 through August, 2018, which included soil, soil vapor, ambient air, and groundwater sampling events. Figure 5 shows the sample and injection locations from 2009 to 2018. Below lists the previously performed remedial investigations for the Site.

- **Summary Letter of Phase II Subsurface Investigation, 1199-1221 Sutter Avenue, Brooklyn, New York. Atlantic Environmental Solutions, Inc., January 12, 2009;**
- **Phase II Subsurface Investigation, 1199-1221 Sutter Avenue, Brooklyn, New York. Associated Environmental Services, Ltd., May 19, 2009;**
- **Remedial Action Report, 1199-1221 Sutter Avenue, Brooklyn, New York. Associated Environmental Services, Ltd., January 29, 2010;**
- **Remedial Action Report Addendum, 1199-1221 Sutter Avenue, Brooklyn, New York. Associated Environmental Services, Ltd., March 24, 2010;**
- **Remedial Investigation Report (RIR), 1199-1221 Sutter Avenue, Brooklyn, New York. Associated Environmental Services, Ltd., July 23, 2015;**
- **Supplemental RIR, 1199-1221 Sutter Avenue, Brooklyn, New York. Associated Environmental Services, Ltd., July 6, 2016;**
- **On-Site and Off-Site Soil Vapor Intrusion Investigation Work Plan, 1199 Suter Avenue, 548 & 552 Chestnut Street & NYCHA Apartment, 475 Fountain Avenue, Brooklyn, New York. EnviroTrac Ltd., December 16, 2016;**
- **On-Site Soil Vapor Intrusion Report, 1199 Sutter Avenue, Brooklyn, New York. EnviroTrac Ltd., May 1, 2017;**
- **Interim Remedial Measures Work Plan, 1199 Sutter Avenue, Brooklyn, New York. EnviroTrac Ltd., February 17, 2017, Revised March 28, 2017;**
- **Interim Remedial Measures Report, 1199 Sutter Avenue, Brooklyn, New York. EnviroTrac Ltd., March, 2018; and**
- **Remedial Action Work Plan, 1199 Sutter Avenue, Brooklyn, New York, EnviroTrac Engineering PE PC, July, 2018**

Soil

Soil samples were collected from the Site during the Phase II ESA, Supplemental Phase II ESA, Site Characterization, and Supplemental RIR. The soil sampling results showed that tetrachloroethene (PCE) was detected at concentrations in 2009 that exceeded its 6 NYCRR Part 375 Subpart 375-6.8(a) Unrestricted Use Soil Cleanup Objectives (UUSCOs) in boring B-7 [5,100 micrograms per kilogram (ug/kg)] located beneath the basement slab of the former dry cleaner, detected at concentrations in 2016 that exceeded its 6 NYCRR Part 375 Subpart 375-6.8(b) Restricted Use Soil Cleanup Objectives for Residential Use (RUSCO) in boring S4 (15,000 ug/kg) located in the parking lot to the rear of the former dry cleaner, and detected at concentrations in 2009 that exceed its 6 NYCRR Part 375 Subpart 375-6.8 (b) Restricted Use Soil Cleanup Objectives for Restricted Residential Use (RRUSCO) in boring S3 (37,500 ug/kg) also located in the parking lot to the rear of the former dry cleaner. Acetone was detected at concentrations in 2011 that exceeded its 6 NYCRR Part 375 Subpart 375-6.8(a) UUSCOs in borings B-10 and B-12 (170 ug/kg and 210 ug/kg, respectively) located in the parking lot to the rear of the former dry cleaner. Acetone is a known laboratory contaminant and may not have been present in the soil samples. Table 3 summarizes the remaining soil sample exceedances. Figure 6 shows the soil data detected above NYSDEC SCOs.

Groundwater

Groundwater samples were collected from the Site during the Phase II ESA, Supplemental Phase II ESA, Interim Remedial Measure (IRM) in 2009, Site Characterization, RIR, Supplemental RIR, IRM in 2017, and other groundwater sampling events. Groundwater samples were also collected from the adjoining properties to the south and east during the Site Characterization, RIR, Supplemental RIR, and other groundwater sampling events. The groundwater sampling results showed that PCE, trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2-DCE), acetone, and chloroform were detected at concentrations that exceeded the NYSDEC Class GA Ambient Water Quality Standards and Guidance Values (NYSDEC Groundwater Standards) in locations

beneath the former dry cleaner, in the rear parking lot to the north of the former dry cleaner unit, to the south beneath the sidewalk along the northern and southern portions of Sutter Avenue, and on the adjoining property to the south, across Sutter Avenue. The results of the investigations show that groundwater contamination exists beneath the Site and has migrated to the south, across Sutter Avenue. The groundwater concentrations detected in the wells across the street on the south side of Sutter Avenue were significantly lower than the concentrations detected in the wells and borings at the Site. The most recent groundwater sampling event, which occurred on August 27, 2018, showed a significant overall decrease in the concentrations of cis-1,2-DCE, TCE, and PCE. Acetone and chloroform have not been detected above their NYSDEC Groundwater Standards since 2011. Table 4 summarizes the historical and current groundwater sample exceedances. Figure 7 shows the historical and recent groundwater sample exceedances from 2009 to April, 2016. Figure 8 shows the groundwater sample exceedances from 2011 to August, 2018.

Soil Vapor Intrusion

Sub-slab soil vapor samples, soil gas samples, indoor air samples, and outdoor air samples were collected from the Site and in the vicinity of adjoining properties to the north, south, and east during the Site Characterization, Remedial Investigations, and On-Site Soil Vapor Intrusion Investigation. The results showed that vapors emanating from soil and groundwater contaminated with solvents located beneath the Site were infiltrating into the former dry cleaner unit and had the potential to infiltrate into the adjacent supermarket unit. The results showed that no soil vapor intrusion (SVI) impacts were present in the other units within the Site building or in the vicinity of the adjoining properties to the north, south, and east. The most recent sampling event that occurred in March, 2017 did not show an impact to the indoor air within the basement of the former dry cleaner unit (current laundromat). The March, 2017 results for the former dry cleaner unit showed a significant decrease in the concentration of PCE and TCE when compared to the results collected during the 2011 soil vapor intrusion sampling event. Table 5

summarizes the soil vapor sample results from July, 2011 to March, 2017. Table 6 summarizes the ambient air sample results from July, 2011 to March, 2017. Figure 9 shows the soil vapor and ambient air results from July, 2011 to March, 2017.

2.4 Remedial Action Objectives

The Remedial Action Objectives (RAOs) for the Site as listed in the Decision Document dated November 16, 2018 are as follows:

Groundwater

RAOs for Public Health Protection

- Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards;
- Prevent contact with, or inhalation of volatiles, from contaminated groundwater.

RAOs for Environmental Protection

- Restore ground water aquifer to pre-disposal/pre-release conditions, to the extent practicable.
- Remove the source of ground or surface water contamination.

Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation exposure from contaminants volatilizing from soil.

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater or surface water contamination.

Soil Vapor

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.

2.5 Remaining Contamination

2.5.1 Soil

This section summarizes the soil analytical results obtained during the previous subsurface and remedial investigations from January, 2009 to April, 2016. Soil was determined to be contaminated with PCE and its breakdown products beneath the southern portion of the former dry cleaner unit and in the parking lot located to the north of the former dry cleaner.

Soil samples collected during the previous subsurface and remedial investigations were analyzed for VOCs by US Environmental Protection Agency (EPA) Method 8260. Detected VOCs included PCE, cis-1,2-DCE, methylene chloride, TCE, toluene, ethylbenzene, trans-1,2-DCE, m&p-xylenes, o-xylenes, acetone, 2-butanone, and chloroform. The detected VOCs were then compared to the 6 NYCRR Part 375(a)(b) UUSCOs, RUSCO, and RRUSCO. Acetone exceeded its UUSCO of 50 ug/kg in B-10 (170 ug/kg) and in B-12 (210 ug/kg) in 2011. PCE exceeded its UUSCO of 1,300 ug/kg in B-7 (5,100 ug/kg), its RUSCO in S4 (15,000 ug/kg), and its RRUSCO in S3 (37,500 ug/kg) in 2009. None of the concentrations detected exceeded their Restricted Commercial Use Soil Cleanup Objectives (RCUSCO).

The soil sample collected in 2016 was also analyzed for target analyte list (TAL) metals, polychlorinated biphenyls (PCBs), pesticides, and herbicides. No PCBs,

pesticides, or herbicides were detected in sample S-4 collected in 2016. TAL metals detected in S-4 (2016) included aluminum, arsenic, barium, beryllium, calcium, trivalent chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, sodium, vanadium, and zinc. Elevated levels of aluminum and iron were detected at concentrations above their UUSCOs.

Soil samples collected in 2009 and 2016 were also analyzed for semi-volatile organic compounds (SVOCs). Detected SVOCs included acenaphthylene, acenaphthene, dibenzofuran, fluorene, phenanthrene, anthracene, fluoroanthene, pyrene, benzo(a)anthracene, chrysene, bis-1,2(ethylhexyl)phthalate, benzo(b)anthracene, benzo(k)anthracene, benzo(a)pyrene, indeno1,2,3-cd)pyrene, dibenzo(a,h) anthracene, and benzo(g,h,i)perylene. Four (4) SVOCs were detected at concentrations above their UUSCOs in boring S-1 collected in 2009. Benzo(a)pyrene was detected at a concentration slightly above its NYSDEC Restricted Use Soil Cleanup Objective for Industrial Use (RIUSCO) in boring S-1 sampled in 2009.

The data showed that PCE and acetone were detected at concentrations above their NYSDEC UUSCOs in S-3, S-4 (2016), B-7, and B-11 (2009), but all concentrations were below the NYSDEC RCUSCOs. Benzo(a)anthracene, chrysene, benzo(a)fluoranthene, and benzo(k)fluoranthene were detected in sample S-1 slightly above the NYSDEC UUSCOs. Benzo(a)pyrene was detected in sample S-1 above its NYSDEC RIUSCO. Aluminum and iron exceeded their NYSDEC UUSCOs. These metals are naturally occurring and can also be found in elevated levels of urban fill. SVOCs can also be found in elevated levels of urban fill. The presence of these metals and SVOCs does not appear to be associated with a source of contamination at the Site.

Based on the sample collection depths, contaminated soil that was allowed to remain in-place at the Site is present from approximately four (4) feet to 13 feet below

grade. Based on the results of the previous subsurface investigations, a suspect source area is present beneath the former dry cleaner basement and in the rear parking lot to the north of the former dry cleaner. Assuming that the soil beneath the rear parking lot to the north of the former dry cleaner (80 feet by 45 feet) and the soil beneath the basement floor of the former dry cleaner (60 feet by 45 feet) is contaminated with PCE, the impacted volume of soil allowed to remain in-place is estimated to be conservatively a total of 3,034 cubic yards.

Table 3 shows exceedances from Track 1 UUSCOs for all soil/fill at the Site. Figure 6 is a spider map that shows the location and summarizes exceedances from Track 1 UUSCOs for all soil/fill.

A Track 4 cleanup was chosen to be implemented at the Site, which included the installation of a soil vapor extraction (SVE) system to remediate soil contamination and an air sparge (AS) system to remediate groundwater contamination. Removing soil from the rear parking lot to the north of the former dry cleaner and beneath the basement of the former dry cleaner is not cost feasible, could damage the integrity of the existing structure at the Site, increase truck traffic at and in the vicinity of the Site, and would also create a dust issue during the process of soil removal that could have the potential to impact the surrounding community.

2.5.2 Groundwater

This section describes the groundwater analytical data obtained during the previous subsurface and remedial investigations.

Non-aqueous phase liquid (NAPL) was not detected in any of the monitoring wells during the investigations. Based on the most recent groundwater sampling event (August 27, 2018), the depth to water at the Site ranges between 12.15 feet below grade

to 12.78 feet below grade. Groundwater sampling events occurred in 2009, 2010, 2011, 2016, 2017, and 2018, and samples were collected from 16 temporary and permanent groundwater monitoring wells. Detected VOCs in groundwater included 2-butanone, acetone, chloroform, cis-1,2-DCE, PCE, bromodichloromethane, VC, trans-1,2-DCE, and TCE.

Concentrations of VOCs above their NYSDEC Groundwater Standards were historically detected in samples collected from temporary and permanent monitoring wells B-6, MW-1S, MW-1D, B-5, MW-2S, MW-2D, S-2, MW-3S, MW-3D, B-7, MW-4S, MW-4D, MW-5S, and MW-8S.

A non-emergency Interim Remedial Measure (IRM) was performed at the Site by Associated Environmental Services, Inc. in August, 2009 and included injections of a four (4) percent solution of potassium permanganate at 12 locations within a grid pattern at and adjacent to the former dry cleaner unit. Injections occurred at 10, 15, 20, 25, 35, and 40 feet below grade utilizing Geoprobe direct-push technology. Groundwater samples collected following the injections showed an overall decreasing trend in groundwater contaminant concentrations. Contaminants were showed to slightly rebound in the following sampling events, however, the concentrations remained lower than the initial groundwater sampling results. Figure 3 shows the previous injection locations.

A second non-emergency IRM was performed at the Site in August, 2017 and included injections of a six (6) percent solution of sodium permanganate into four (4) newly installed injection wells within the basement of the former dry cleaner located around monitoring well MW-4S, which had the highest groundwater concentration of PCE at 390 ug/L in April, 2016. The solution was placed into the formation via pumps and hoses connected to the wells. Also, two (2) new groundwater monitoring wells were installed in the basement (MW-10S) located downgradient of MW-4S, and in the sidewalk to the south of the former dry cleaner (MW-11S), and also downgradient of

MW-4S. MW-10S was installed to replace MW-4S, due to its small diameter construction, which inhibited representative groundwater sampling of the surrounding formation. MW-11S was installed to monitor the downgradient groundwater located directly south of the proposed source area, beneath and north of the former dry cleaner.

Based on the most recent groundwater sampling event, August 27, 2018, PCE was detected at concentrations that exceeded its NYSDEC Groundwater Standard in monitoring wells MW-1S (8.2 ug/L), MW-5S (151 ug/L), MW-8S (5.7 ug/L), MW-10S (234 ug/L), and MW-11S (52.5 ug/L). TCE was detected in monitoring wells MW-5S (8.4 ug/L), MW-10S (7.0 ug/L), and MW-11S (2.4 ug/L). However, the detected concentrations only slightly exceeded its NYSDEC Groundwater Standard in monitoring wells MW-5S and MW-10S. cis-1,2-DCE was detected in monitoring wells MW-5S (5.90 ug/L), MW-10S (2.90 ug/L), and MW-11S (3.5 ug/L). However, the detected concentrations only slightly exceeded its NYSDEC Groundwater Standard in monitoring well MW-5S. Chloroform was also detected in monitoring well MW-11S (1.90 ug/L), however, its detected concentration was below its NYSDEC Groundwater Standard.

Based on the sample collection depths, contaminated groundwater is located at and downgradient of the Site from approximately 12 feet to 40 feet below grade. Based on the results of the previous subsurface investigations, a suspect source area is present in the soil beneath the former dry cleaner basement and in the northern parking lot. The impacted volume of groundwater allowed to remain in place is estimated to be conservatively a total of 2,222 cubic yards or 448,786 gallons.

Spider maps that indicates the location of and summarizes the historical and most recent exceedances of the NYSDEC Groundwater Standards are is shown in Figures 7 and 8. Figure 8 also shows the shallow PCE contaminant plume beneath the Site for the most recent groundwater sampling event for August 27, 2018. Table 4 summarizes the exceedances of the NYSDEC Groundwater Standards from 2009 to 2018.

A Track 4 cleanup was chosen to be implemented at the Site, which included the installation of a SVE system and an AS system to actively remediate impacted groundwater beneath the Site. A Monitoring Natural Attenuation (MNA) plan will also be implemented for on and off-Site groundwater and will be conducted on a quarterly basis. The MNA plan will track the SVE/AS system progress and degradation of VOCs in the off-Site groundwater. Groundwater samples will be laboratory analyzed for VOCs by USEPA Method 8260.

2.5.3 Soil Vapor and Indoor Air

Several soil vapor intrusion investigations and sampling of the on-Site and off-Site soil gas occurred from 2011 to 2017. Six (6) sub-slab soil vapor samples designated as SS-1, SSV-2, SSV-3, SSV-4, SSV-5, and VP-1, and four (4) soil gas samples designated SSV-6, SSV-7, SSV-8, SSV-9, SSV-10, and SSV-11 were collected at the Site, near Site perimeter, or off-Site in 2011 2014, 2016, and 2017. In addition, six (6) indoor and outdoor ambient air samples designated as IA-1 (2011), IA-1 (2017), OA-1 (2011), OA-1 (2014), OA-1 (2017), ASV-2, ASV-3, ASV-4, ASV-5, and OA-2 were collected at the Site or near the Site perimeter in 2011, 2014, 2016, and 2017. Several VOCs were detected in the sub-slab soil vapor, soil gas, indoor air, and outdoor air samples, and included PCE, TCE, cis-1,2-DCE, and vinyl chloride (VC).

Detected PCE concentrations in the soil gas ranged from non-detectable levels in soil gas sample SSV-7 (collected off-Site along the southern portion of Sutter Avenue) to 428,000 micrograms per cubic meter of air (ug/m^3) in sub-slab soil vapor sample SS-1 (collected beneath the basement floor of the former dry cleaner). Detected PCE concentrations in the indoor/outdoor air ranged from non-detectable levels in samples OA-1 (2011), OA-1 (2017), and OA-2 (2016) (collected from the outdoor parking areas surrounding the Site) to 68.5 ug/m^3 in sample IA-1 (2011) (collected from the former dry cleaner basement). Detected TCE concentrations in the soil gas ranged from non-

detectable levels in SSV-3, SSV-7, SSV-8, SSV-9, SSV-10, and SSV-11 (collected from beneath the delicatessen, off-Site along the southern portion of Sutter Avenue, off-Site along the eastern portion of Chestnut Street, and along the northern perimeter of the Site) to 9,730 ug/m^3 in sample SS-1 (2011) (collected from beneath the basement floor of the former dry cleaner). Detected TCE concentrations in the indoor/outdoor air ranged from non-detectable levels in samples IA-1 (2011), IA-1 (2017), OA-1 (2011), OA-1 (2014), OA-1 (2017), ASV-2, ASV-4, ASV-5, and OA-2 (collected from the basements of the former dry cleaner, the outdoor parking areas surrounding the Site, and the basements of the supermarket, the nail salon, and the delicatessen) to 1.27 ug/m^3 in sample IA-1 (2011) (collected from the basement of the former dry cleaner). Detected cis-1,2-DCE concentrations in the soil gas ranged from non-detectable levels in SSV-2, SSV-3, SSV-4, SSV-6, SSV-7, SSV-8, SSV-9, SSV-10, and SSV-11 (collected from beneath the basements of the supermarket, the dentist office, the nail salon, northern Site perimeter, off-site along the southern portion of Sutter Avenue, and off-Site along the eastern portion of Chestnut Street). Detected cis-1,2-DCE concentrations in the indoor/outdoor air were at non-detectable levels in all samples (collected from the basements of the former dry cleaner, the supermarket, the dentist office, the nail salon, the delicatessen, the northern Site perimeter, off-Site along the southern portion of Sutter Avenue, and off-Site along the eastern portion of Chestnut Street). Detected VC concentrations in soil gas ranged from non-detectable levels in SSV-2, SSV-3, SSV-4, SSV-5, SSV-6, SSV-7, SSV-8, SSV-9, and SSV-10 (collected from beneath the basements of the supermarket, the dentist office, the nail salon, and the delicatessen, along the northern perimeter of the Site, off-Site along the southern portion of Sutter Avenue, and off-Site along the eastern portion of Chestnut Street) to 795 ug/m^3 in SS-1 (2011) (collected beneath the basement of the former dry cleaner). Detected VC concentrations in the indoor/outdoor air were at non-detectable levels in all samples (collected from the basements of the former dry cleaner, the supermarket, the dentist office, the nail salon, the delicatessen, the northern Site perimeter, off-Site along the southern portion of Sutter Avenue, and off-Site along the eastern portion of Chestnut Street).

The indoor air results were compared to the NYSDOH Indoor Air Guidance Values. PCE detected in IA-1 (2011) (68.5 ug/m^3), collected from the basement of the former dry cleaner, exceeded its NYSDOH Indoor Air Guidance Value (30 ug/m^3). However, the recent soil vapor intrusion investigation that occurred within the basement of the former dry cleaner in March, 2017, showed that the indoor air result for PCE detected in IA-1 (2017) (3.60 ug/m^3), collected from the same area, did not exceed its NYSDOH Indoor Air Guidance Value. The sub-slab soil vapor and indoor air sample results were also compared to the NYSDOH Matrices 1 and 2 in 2011, and to the updated NYSDOH Matrices 1, 2, and 3 in 2017. Based on the Matrices and results in 2011, mitigation was required for the former dry cleaner unit (SS-1 and IA-1) and the adjoining supermarket unit (SSV-2 and ASV-2) to the west, due to the concentrations of PCE and TCE in the sub-slab soil vapor and/or indoor air. However, based on the Matrices and results in 2017, mitigation was only required for the former dry cleaner unit [VP-1 and IA-1 (2017)] due to the concentrations of TCE detected in sample VP-1 (399 ug/m^3).

Sub-slab soil vapor and soil gas sample results are shown in Table 5. Indoor air and outdoor air results are shown in Table 6. A spider map that indicates the locations of and summarizes sub-slab soil vapor, soil gas, and indoor air results are shown in Figure 9. The area of concern for soil vapor intrusion is shown in Figure 10.

A sub-slab depressurization system (SSDS) was installed beneath the basement slabs of the adjoining supermarket unit and former dry cleaner in May, 2017 to mitigate any potential vapors from entering the basements of these units. The SSDS originally consisted of eight (8) SSDS extraction points (SSD-1 through SSD-8). In October-November, 2018, the extraction points SSD-7 and SSD-8 located in the former dry cleaner basement were disconnected from the SSDS and connected to the SVE system to provide increased vacuum beneath the former dry cleaner basement and to capture the

vapors produced by the air sparge well installed in the basement of the former dry cleaner unit.

A SVE system was installed at the Site as part of the Track 4 cleanup and will address the suspect source area located beneath the former dry cleaner. The SVE system mitigates soil vapors present beneath the former dry cleaner unit and the SSDS mitigates soil vapors present beneath the supermarket unit. An additional two (2) SVE wells were also installed in the rear, northern parking lot and in the front sidewalk, and paired with the air sparge wells also installed in those areas. Once the SVE system reaches asymptotic levels, the extraction points in the basement of the former dry cleaner will have the potential to be reconnected back to the SSDS to mitigate any remaining vapors beneath the slabs of the former dry cleaner and supermarket units.

3.0 INSTITUTIONAL AND ENGINEERING CONTROL PLAN

3.1 General

Since remaining contamination exists at the Site, Institutional Controls (ICs) and Engineering Controls (ECs) are required to protect human health and the environment. This IC/EC Plan describes the procedures for the implementation and management of all IC/ECs at the Site. The IC/EC Plan is one (1) component of the SMP and is subject to revision by the NYSDEC.

This plan provides:

- A description of all IC/ECs on the Site;
- The basic implementation and intended role of each IC/EC;
- A description of the key components of the ICs set forth in the Environmental Easement;
- A description of the controls to be evaluated during each required inspection and periodic review;
- A description of plans and procedures to be followed for implementation of IC/ECs, such as the implementation of the Excavation Work Plan (EWP) (as provided in Appendix E) for the proper handling of remaining contamination that may be disturbed during maintenance or redevelopment work on the Site; and
- Any other provisions necessary to identify or establish methods for implementing the IC/ECs required by the Site remedy, as determined by the NYSDEC.

3.2 Institutional Controls

A series of ICs is required by the Decision Document to: (1) implement, maintain, and monitor EC systems; (2) prevent future exposure to remaining contamination; and, (3) limit the use and development of the Site to restricted residential, commercial, or industrial uses only. Adherence to these ICs on the Site is required by the Environmental Easement and will be implemented under this SMP. ICs identified in the Environmental Easement may not be discontinued without an amendment to or extinguishment of the Environmental Easement. The IC boundaries are shown on Figure 11. These ICs:

- require the remedial party or Site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8 (h)(3);
- allow the use and development of the controlled property for restricted residential, commercial, or industrial as defined by Part 375-1.8(g), although land use is subject to local zoning laws;
- restrict the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH; and
- require compliance with the Department approved Site Management Plan.

3.3 Engineering Controls

3.3.1 Cover

Exposure to remaining contamination at the Site is prevented by a cover system placed over the Site. This cover system is comprised of a minimum of six (6) inches of asphalt pavement, concrete-covered sidewalks, and concrete building slabs. Figure 12 presents the engineering controls, which includes the location of the cover system located

at the Site. The EWP provided in Appendix E outlines the procedures required to be implemented in the event the cover system is breached, penetrated, or temporarily removed, and any underlying remaining contamination is disturbed. Procedures for the inspection of this cover are provided in the Monitoring and Sampling Plan included in Section 4.0 of this SMP. Any work conducted pursuant to the EWP must also be conducted in accordance with the procedures defined in a Health and Safety Plan (HASP) and associated Community Air Monitoring Plan (CAMP) prepared for the Site and provided in Appendices F and G.

3.3.2 Soil Vapor Extraction (SVE) System

Two (2) SSD/SVE wells were installed in the basement of the former dry cleaner unit, one (1) SVE well was installed in the rear parking lot to the north of the former dry cleaner, and one (1) SVE well was installed in the front sidewalk to the south. The SVE wells are connected to a system shed located to the north of the former dry cleaner and the system effluent discharges above the roof line of the building. The SVE system mitigates potential long-term exposure to VOCs found in the sub-slab vapor beneath the former dry cleaner unit and beneath the rear parking lot and front sidewalk, and is considered an EC. Operation, maintenance, and monitoring (OMM) inspections will be performed on a monthly basis. The visits will consist of an overall system inspection, reading of system gauges, and effluent vapor screening with a calibrated photoionization detector (PID). The SVE system construction and installation are summarized in the Remedial Design Work Plan (RDWP) which was provide in the Remedial Action Work Plan (RAWP), and is summarized in the Final Engineering Report (FER), and will continue to be operated and maintained through this SMP. Figure 12 shows the SVE well locations. The system was installed in October-December, 2018, and January, 2019 and commenced operation in January, 2019.

Procedures for operating and maintaining the SVE system are documented in the Operation and Maintenance Plan (Section 5.0 of this SMP). As built drawings, signed

and sealed by a professional engineer, are included in Appendix H – Operations and Maintenance Manual for the Soil Vapor Extraction System. Figure 12 shows the location of the SVE ECs for the Site.

3.3.3 Air Sparge System

One (1) AS well was installed in the basement of the former dry cleaner unit, one (1) AS well was installed in the rear parking lot to the north of the former dry cleaner, and one (1) AS well was installed in the front sidewalk to the south. The AS wells are connected to a system shed located to the north of the former dry cleaner. The AS system remediates groundwater beneath the former dry cleaner unit and beneath the rear parking lot and front sidewalk, and is considered an EC. OMM inspections will be performed on a monthly basis. The visits will consist of an overall system inspection, and reading of system gauges. The proposed AS system construction and installation are summarized in the RDWP which was provide in the RAWP, and is summarized in the FER, and will continue to be operated and maintained through this SMP. Figure 12 shows the AS well locations. The system was installed in October-December, 2018, January, 2019 and commenced operation in January, 2019

Procedures for operating and maintaining the AS system are documented in the Operation and Maintenance Plan (Section 5.0 of this SMP). As built drawings, signed and sealed by a professional engineer, are included in Appendix H – Operations and Maintenance Manual for the Air Sparge System. Figure 12 shows the location of the AS ECs for the Site.

3.3.4 Sub-slab Depressurization System

A total of eight (8) SSDS extraction points were installed in the basements of the former dry cleaner and adjoining supermarket unit. The two (2) SSDS extraction wells in the former dry cleaner unit were disconnected from the SSDS and connected to the SVE

system in October-November, 2018. The SSDS mitigates soil vapors beneath the basement slab of the adjoining supermarket unit, and is considered an EC. OMM inspections will be performed on an annual basis. The visits will consist of an overall system inspection, reading of extraction point gauges, and vacuum measurements at vacuum monitoring points located within the basement. The proposed SSDS construction and installation are summarized in the RDWP which was provide in the IRM Work Plan, and is summarized in the FER, and will continue to be operated and maintained through this SMP. Figure 12 shows the SSDS extraction point locations. The system was installed and commenced operation in May, 2017. The SSDS was temporarily shut down to disconnect extraction points SSD-7 and SSD-8. The system was started back up in late November, 2018.

Procedures for operating and maintaining the SSDS are documented in the Operation and Maintenance Plan (Section 5.0 of this SMP). As built drawings, signed and sealed by a professional engineer, are included in Appendix J – Operations and Maintenance Manual for the SSDS. Figure 12 shows the location of the SSDS ECs for the Site.

Once the SVE system has reached asymptotic levels, a proposal to the Department will be submitted to reconnect the two (2) SVE wells in the basement of the former dry cleaner to SSDS to continue mitigating soil vapors present beneath the former dry cleaner unit and adjoining supermarket unit. The SVE wells and piping will remain in-place, however, the remediation system shed will be disconnected and removed. Effluent air will be directed to continue to discharge approximately two (2) feet above the building roofline.

3.3.5 Criteria for Completion of Remediation/Termination of Remedial/Mitigation Systems

Generally, remedial processes are considered completed when monitoring indicates that the remedy has achieved the remedial action objectives identified by the Decision Document. The framework for determining when remedial processes are complete is provided in Section 6.4 of NYSDEC DER-10.

3.3.5.1 - Cover

The composite cover system is a permanent control and the quality and integrity of this system will be inspected at defined, regular intervals in accordance with this SMP in perpetuity.

3.3.5.2 - Soil Vapor Extraction System (SVE) System

The SVE system will not be discontinued unless prior written approval is granted by the NYSDEC. In the event that monitoring data indicates that the SVE system may no longer be required, a proposal to discontinue the system will be submitted by the remedial party. Conditions that may warrant discontinuing the SVE system include contaminant concentrations in groundwater and/or soil that: (1) reach levels that are consistently below ambient water quality standards or the Site SCGs, as appropriate; (2) have become asymptotic to a low level over an extended period of time, as accepted by the NYSDEC; or (3) the NYSDEC has determined that the SVE system has reached the limit of its effectiveness. This assessment will be based in part on post-remediation contaminant levels in groundwater collected from monitoring wells located throughout the Site. Systems will remain in place and operational until permission to discontinue their use is granted in writing by the NYSDEC.

3.3.5.3 – Air Sparge (AS) System

The AS system will not be discontinued unless prior written approval is granted by the NYSDEC. In the event that monitoring data indicates that the AS system may no longer be required, a proposal to discontinue the system will be submitted by the remedial party. Conditions that may warrant discontinuing the AS system include contaminant concentrations in groundwater that: (1) reach levels that are consistently below ambient water quality standards; (2) have become asymptotic to a low level over an extended period of time, as accepted by the NYSDEC; or (3) the NYSDEC has determined that the AS system has reached the limit of its effectiveness. This assessment will be based in part on post-remediation contaminant levels in groundwater collected from monitoring wells located throughout the Site. Systems will remain in place and operational until permission to discontinue their use is granted in writing by the NYSDEC.

3.3.5.4 - Sub-Slab Depressurization System (SSDS)

Once the SVE system has reached asymptotic levels, the remedial party will request to reconnect the two (2) extraction points in the basement of the former dry cleaner to the active SSDS to continue mitigation of soil vapors beneath the former dry cleaner and adjoining supermarket units. Once the NYSDEC approves the shutdown of the SVE system, the reconnection of the piping will take place.

The active SSDS will not be discontinued unless prior written approval is granted by the NYSDEC and the NYSDOH. In the event that monitoring data indicates that the SSDS may no longer be required, a proposal to discontinue the SSDS will be submitted by the remedial party to the NYSDEC and NYSDOH.

3.3.5.5 Monitoring Wells associated with Monitored Natural Attenuation

Groundwater monitoring activities to assess natural attenuation will continue, as determined by the NYSDEC with consultation with the NYSDOH, until residual

groundwater concentrations are found to be consistently below ambient water quality standards, the Site SCGs, or have become asymptotic at an acceptable level over an extended period. In the event that monitoring data indicates that monitoring for natural attenuation may no longer be required, a proposal to discontinue the monitoring will be submitted by the remedial party. Monitoring will continue until permission to discontinue is granted in writing by the NYSDEC. If groundwater contaminant levels become asymptotic at a level that is not acceptable to the NYSDEC, additional source removal, treatment and/or control measures will be evaluated.

4.0 MONITORING AND SAMPLING PLAN

4.1 General

This Monitoring and Sampling Plan describes the measures for evaluating the overall performance and effectiveness of the remedy. This Monitoring and Sampling Plan may only be revised with the approval of the NYSDEC. Details regarding the sampling procedures, data quality usability objectives, analytical methods, etc. for all samples collected as part of Site management for the Site are included in the Quality Assurance Project Plan (QAPP) provided in Appendix I.

This Monitoring and Sampling Plan describes the methods to be used for:

- Sampling and analysis of all appropriate media (groundwater and effluent SVE air samples);
- Assessing compliance with applicable NYSDEC standards, criteria and guidance (SCGs), particularly groundwater standards and Part 375 SCOs for soil; and
- Evaluating Site information periodically to confirm that the remedy continues to be effective in protecting public health and the environment.

To adequately address these issues, this Monitoring and Sampling Plan provides information on:

- Sampling locations, protocol, and frequency;
- Information on all designed monitoring systems;
- Analytical sampling program requirements;
- Inspection and maintenance requirements for monitoring wells;
- Monitoring well decommissioning procedures; and

- Annual inspection and periodic certification.

Reporting requirements are provided in Section 7.0 of this SMP.

Table 7 – Inspection, Monitoring, and Sampling Schedule

Remedial System Component	Inspection/Monitoring/Sampling Schedule
SVE System Operations and Maintenance	Weekly for the first Month of Operation; followed by monthly for the rest of the operating period.
AS System Operations and Maintenance	Weekly for the first Month of Operation; followed by monthly for the rest of the operating period.
SSDS Certification	Annually
Groundwater Monitoring Events	Quarterly
Cover System	Annually

4.2 Site – wide Inspection

Site-wide inspections will be performed on a monthly basis or at a minimum of once per year. Modification to the frequency or duration of the inspections will require approval from the NYSDEC. Site-wide inspections will also be performed after all severe weather conditions that may affect ECs or monitoring devices. During these inspections, an inspection form will be completed as provided in Appendix H – Site Management Forms. The form will compile sufficient information to assess the following:

- Compliance with all ICs, including Site usage;
- An evaluation of the condition and continued effectiveness of ECs;

- General Site conditions at the time of the inspection;
- The Site management activities being conducted including, where appropriate, confirmation sampling and a health and safety inspection; and
- Confirm that Site records are up to date.

Inspections of all remedial components installed at the Site will be conducted. A comprehensive site-wide inspection will be conducted and documented according to the SMP schedule, regardless of the frequency of the Periodic Review Report. The inspections will determine and document the following:

- Whether ECs continue to perform as designed;
- If these controls continue to be protective of human health and the environment;
- Compliance with requirements of this SMP and the Environmental Easement;
- Achievement of remedial performance criteria; and
- If Site records are complete and up to date; and

Reporting requirements are outlined in Section 7.0 of this plan.

Inspections will also be performed in the event of an emergency. If an emergency, such as a natural disaster or an unforeseen failure of any of the ECs occurs that reduces or has the potential to reduce the effectiveness of ECs in place at the Site, verbal notice to the NYSDEC must be given by noon of the following day. In addition, an inspection of the Site will be conducted within 5 days of the event to verify the effectiveness of the IC/ECs implemented at the Site by a qualified environmental professional, as determined by the NYSDEC. Written confirmation must be provided to

the NYSDEC within seven (7) days of the event that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public.

4.3 Treatment System Monitoring and Sampling

4.3.1 Remedial System Monitoring

Monitoring of the SVE/AS system will be performed on a routine basis, as identified in Table 8 Remedial System Monitoring Requirements and Schedule (see below). Modification to the frequency or sampling requirements will require approval from the NYSDEC. A visual inspection of the complete system will be conducted during each monitoring event. Unscheduled inspections and/or sampling may take place when a suspected failure of the SVE/AS system has been reported or an emergency occurs that is deemed likely to affect the operation of the system. SVE/AS system components to be monitored include, but are not limited to, the components included in Table 8 below.

Table 8 – Remedial System Monitoring Requirements and Schedule

Remedial System Component	Monitoring Parameter	Monitoring Schedule
SVE	Blower Flow Rate	Monthly
	Blower Vacuum	Monthly
	Individual Lateral Vacuum (per extraction point)	Monthly
	Effluent Discharge Total VOCs	Weekly Measurements with a photoionization detector (PID) for the first month, then monthly thereafter. Annual laboratory air sampling.
AS	Compressor Pressure	Monthly
	Compressor Flow Rate	Monthly
	Individual Lateral Pressure	Monthly
	Individual Lateral Flow Rate	Monthly
SSDS	Individual Extraction Point Vacuum	Annually
	SSDS Flow Alarms	Annually
	Vacuum Monitoring Points	Annually

A complete list of components to be inspected is provided in the Inspection Checklist, provided in Appendix J - Site Management Forms. If any equipment readings are not within their specified operation range, any equipment is observed to be malfunctioning or the system is not performing within specifications; maintenance and repair, as per the Operation and Maintenance Plan, is required immediately.

4.3.2 Remedial System Sampling

Samples shall be collected from the SVE system on an annual basis. Sampling locations, required analytical parameters, and schedule are provided in Table 9 – Remedial System Sampling Requirements and Schedule below. Modification to the frequency or sampling requirements will require approval from the NYSDEC.

Table 9 – Remedial System Sampling Requirements and Schedule

Sampling Location	Analytical Parameters	Schedule
	VOC (EPA Method TO-15)	Annual
SVE System Effluent Vapor	X	

Detailed sample collection and analytical procedures and protocols are provided in Appendix K – Field Activities Plan and Appendix G – Quality Assurance Project Plan.

Labeled 6 Liter Summa Canisters will be connected to the influent and effluent sampling ports of the SVE system, opened up, and allowed to collect vapors extracted by the SVE system by opening a valve on the influent and effluent pipes. Once filled, the Summa Canisters will be closed, the valves on the influent and effluent pipes will be closed, and delivered to an ELAP-accredited laboratory for analysis of VOCs by USEPA Method TO-15. The samples will also be analyzed for NYSDEC Category B Deliverables. The samples will be collected on an annual basis and reported in the corresponding quarterly report.

4.4 Post-Remediation Media Monitoring and Sampling

Groundwater samples shall be collected on a quarterly basis from on-Site and downgradient, off-Site wells MW-1S, MW-2S, MW-5S, MW-8S, MW-10S, and MW-11S. Sampling locations, required analytical parameters, and schedule are provided in Table 10 – Post Remediation Sampling Requirements and Schedule below. Modification to the frequency or sampling requirements will require approval from the NYSDEC.

Table 10 – Post Remediation Sampling Requirements and Schedule

Sampling Location	Analytical Parameters	Schedule
	TCL VOCs (EPA Method 8260)	
MW-1S, MW-2S, MW-5S, MW-8S, MW-10S, and MW-11S	X	Quarterly

Detailed sample collection and analytical procedures and protocols are provided in Appendix K – Field Activities Plan and Appendix I – Quality Assurance Project Plan.

4.4.1 Groundwater Sampling

Groundwater monitoring will be performed quarterly to assess the performance of the remedy. Modification to the frequency or sampling requirements will require approval from the NYSDEC.

The network of monitoring wells has been installed to monitor on-Site and downgradient groundwater conditions. The network of on-Site and off-Site wells has been designed based on the following criteria:

The selected groundwater monitoring wells to be sampled have been selected due to their location within or near the source area (former dry cleaner) and downgradient of

the source area (off-Site, across Sutter Avenue to the south). A plume of PCE has been identified and bound by the locations of this network of monitoring wells.

Groundwater monitoring wells will be opened using a socket wrench. Tubing will be placed into the wells and connected to a pump to purge the wells of three casing volumes and will following the protocols in USEPA Low Stress (Low-Flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells, January 19, 2010. Samples will be collected from the tubing into 40 mL vials preserved with hydrochloric acid. The vials will be labeled, placed into an ice filled cooler, and delivered to an ELAP-accredited laboratory for analysis of Target Compound List (TCL) VOCs by USEPA Method 8260. The samples will also be analyzed for NYSDEC Category B Deliverables.

Table 11 summarizes the wells identification number, as well as the purpose, location, depths, diameter, and screened intervals of the wells. As part of the groundwater monitoring, four (2) on-Site wells and two (2) downgradient, off-Site wells are sampled to evaluate the effectiveness of the remedial system.

Table 11 – Monitoring Well Construction Details

Monitoring Well ID	Well Location	Coordinates (longitude/ latitude)	Well Diameter (inches)	Elevation *(feet above mean sea level)*			
				Casing	Surface	Screen Top	Screen Bottom
MW-1S	On-Site	40.672695 N -73.873089 W	2	17.51	17.90	7.51	-7.49
MW-2S	On-Site	40.672718 N -73.872942 W	2	18.05	18.29	8.05	-6.95
MW-5S	Off-Site	40.672537 N -73.873011 W	2	17.84	18.18	7.84	-7.16
MW-8S	Off-Site	40.672343 N -73.873053 W	2	18.08	18.79	8.08	-6.92
MW-10S	On-Site	Not Available	1.5	9.93	10.14	6.93	-3.07
MW-11S	On-Site	40.672690 N -73.873021 W	2	17.71	18.03	7.71	-7.29

The monitoring well locations are shown in Figure 5. The shallow monitoring wells, MW-1S, MW-2S, MW-5S, MW-8S, and MW-11S, excluding MW-10S located in the basement of the former dry cleaner, are screened from 10 feet to 25 feet below grade (15 feet of 20 slot schedule 40 PVC screen). MW-10S is screened from three (3) feet to 13 feet below the basement floor (10 feet of 20 slot schedule 40 PVC screen). Monitoring well construction logs are included in Appendix D of this document. Depth to water measurements measured on October 29, 2018 ranged from 4.45 (MW-10S in basement of former dry cleaner) to 12.82 feet below grade (MW-8S, off-Site, across Sutter Avenue to the south). The Site-specific groundwater flow direction is generally to the south, which coincides with the regional groundwater flow direction. Figure 4 shows the groundwater contours for October 29, 2018.

The laboratory analysis for the groundwater samples collected will include halogenated solvents list only by USEPA Method 8260. The halogenated solvents list, method detection limits, and method reporting limits are provided in Table 12.

Table 12 – Laboratory Analyte List, Method Detection Limits, Method Reporting Limits, and NYSDEC Groundwater Quality Standards/Guidance Values for Groundwater Samples

8260C (Aqueous)

Analyte	Reporting Limit (ug/L)	MDL (ug/L)	NYSDEC Class GA Ambient Water Quality Standard/Guidance Value
1,1,1-Trichloroethane	1	0.52	5*
1,1,2,2-Tetrachloroethane	1	0.213	5*
1,1,2-Trichloroethane	1	0.194	1
1,1-Dichloroethane	1	0.144	5*
1,1-Dichloroethene	1	0.253	5*
1,2-Dibromo-3-chloropropane	1	0.564	0.04
1,2-Dibromoethane	1	0.118	--
1,2-Dichloroethane	1	0.174	0.6
1,2-Dichloropropane	1	0.202	1
Benzene	1	0.113	5*
Bromodichloromethane	1	0.104	50**
Bromoform	1	0.12	50**
Bromomethane	1	0.691	5*
Carbon tetrachloride	1	0.18	5
Chloroethane	1	0.218	5*
Chloroform	1	0.209	7
Chloromethane	1	0.217	--
cis-1,2-Dichloroethene	1	0.124	5*
cis-1,3-Dichloropropene	1	0.101	0.4***
Dibromochloromethane	1	0.157	50**
Methylene chloride	1	0.161	5*
Tetrachloroethene	1	0.166	5*
trans-1,2-Dichloroethene	1	0.179	5*

trans-1,3-Dichloropropene	1	0.203	0.4***
Trichloroethene	1	0.146	5*
Trichlorofluoromethane	1	0.176	5*
Vinyl chloride	1	0.358	2
1,1,2-Trichlorotrifluoroetha	1	0.151	--

Notes:

** - The Principal Organic Contaminant applies*

*** - The NYSDEC Class GA Ambient Water Quality Guidance Value applies*

**** - The NYSDEC Class GA Ambient Water Quality Standard is for the sum of cis-1,3-Dichloropropene and trans-1,3-Dichloropropene*

If biofouling or silt accumulation occurs in the on-Site and/or off-Site monitoring wells, the wells will be physically agitated/surged and redeveloped. Additionally, monitoring wells will be properly decommissioned and replaced, if an event renders the wells unusable.

Repairs and/or replacement of wells in the monitoring well network will be performed based on assessments of structural integrity and overall performance.

The NYSDEC will be notified prior to any repair or decommissioning of any monitoring well for the purpose of replacement, and the repair or decommissioning and replacement process will be documented in the subsequent Periodic Review Report. Well decommissioning without replacement will be done only with the prior approval of the NYSDEC. Well abandonment will be performed in accordance with NYSDEC's guidance entitled "CP-43: Groundwater Monitoring Well Decommissioning Procedures." Monitoring wells that are decommissioned because they have been rendered unusable will be replaced in kind in the nearest available location, unless otherwise approved by the NYSDEC.

The sampling frequency may only be modified with the approval of the NYSDEC. This SMP will be modified to reflect changes in sampling plans approved by the NYSDEC.

Deliverables for the groundwater monitoring program are specified in Section 7.0 – Reporting Requirements.

4.4.2 SVE System Sampling

For the first month following SVE system start up, PID readings will be collected using Tedlar bags on a weekly basis. Following the initial month of system operation, these readings will be continued on a monthly basis as long as the system is in operation. The monthly site visits will include SVE system gauge readings and site cover inspection.

In order to gauge VOC recovery rates associated with the SVE system, samples will be collected from the sampling ports located on the influent and effluent discharge piping of the system on an annual basis. Samples will be collected utilizing 6 Liter Summa Canisters and will be submitted to an ELAP-accredited laboratory analysis of VOCs via EPA Method TO-15.

The TO-15 list, method detection limits, and method reporting limits are provided in Table 13.

The sampling frequency may only be modified with the approval of the NYSDEC/NYSDOH. This SMP will be modified to reflect changes in sampling plans approved by the NYSDEC/NYSDOH.

Deliverables for the SVE monitoring program are specified in Section 7.0 – Reporting Requirements.

4.4.3 Monitoring and Sampling Protocol

All sampling activities will be recorded in a field book and associated sampling log as provided in Appendix J - Site Management Forms. Other observations (e.g., groundwater monitoring well integrity, etc.) will be noted on the sampling log. The sampling log will serve as the inspection form for the monitoring network. Additional detail regarding monitoring and sampling protocols are provided in the site-specific Field Activities Plan provided as Appendix K of this document.

4.5 Off-Site Soil Vapor Intrusion Sampling

The NYSDEC and the NYSDOH requested that attempts be made to access the adjoining property to the south of the Site [The New York City Housing Authority (NYCHA) Cypress Hills apartment complex] for the purposes of conducting a soil vapor intrusion (SVI) investigation. The results of the SVI investigation would be used to determine if vapor intrusion is a potential issue in the basement of the closet apartment building. Multiple attempts were made to gain access to the apartment complex, however, no response regarding approved access was provided to conduct the SVI investigation. If, in the future, the NYCHA permits access, the Participant will proceed with sampling in accordance with the On-Site and Off-Site SVI Investigation Work Plan, prepared by EnviroTrac Ltd., dated December 16, 2006.

5.0 OPERATION AND MAINTENANCE PLAN

5.1 General

This Operation and Maintenance Plan provides a brief description of the measures necessary to operate, monitor, and maintain the mechanical components of the remedy selected for the Site. This Operation and Maintenance Plan:

- Includes the procedures necessary to allow individuals unfamiliar with the Site to operate and maintain the SVE/AS/SSD systems; and
- Will be updated periodically to reflect changes in Site conditions or the manner in which the SVE/AS/SSD systems are operated and maintained.

Further detail regarding the Operation and Maintenance of the SVE/AS/SSD systems is provided in Appendix H - Operation and Maintenance Manual. A copy of this Operation and Maintenance Manual, along with the complete SMP, is to be maintained at the Site. This Operation and Maintenance Plan is not to be used as a stand-alone document, but as a component document of this SMP.

5.2 Engineering Controls Performance Criteria

Table 14 – Engineering Controls Performance Criteria

Remedial System Component	Monitoring Parameter	Operating Range	Monitoring Schedule
SVE	Blower Flow Rate	~200 cfm	Monthly
	Blower Vacuum	~40 "H2O	Monthly
	Individual Lateral Vacuum (per extraction point)	~20 "H2O	Monthly
	Effluent Discharge Total VOCs	<0.5 pounds per hour	Weekly Measurements with a photoionization detector (PID) for the first month, then monthly thereafter. Annual laboratory air sampling.
AS	Compressor Pressure	~9.0 psi	Monthly
	Compressor Flow Rate	~15 cfm	Monthly
	Individual Lateral Pressure (laterals to open one at a time via actuated valves)	~7.5 psi	Monthly
	Individual Lateral Flow Rate	~15 cfm	Monthly
SSDS	Individual Extraction Point Vacuum	~9.0 "H2O	Annually
	SSDS Vacuum Alarms	≥0.25 "H2O	Annually
	Vacuum Monitoring Points	≥0.02 "H2O	Annually

5.3 Operation and Maintenance of Soil Vapor Extraction System

The following sections provide a description of the operations and maintenance of the SVE system. Cut-sheets and as-built drawings for SVE system are provided in Appendix H - Operations and Maintenance Manual.

5.3.1 System Start-Up and Testing

The following is a list of SVE system start-up procedures:

- OPEN the main collection pipe valve located on the piping rack;
- OPEN the ball valve in each lateral extraction well vault;
- Verify that all sample ports are in the CLOSED position;
- Verify that the circuit breaker, located inside the maintenance building, is in the ON position;
- Turn the Hand/Off/Auto (HOA) switch located on the main control panel door to the Auto position. The system should start after a 10 second delay. If the blower does not start, turn the reset switch on the control panel to reset any alarm conditions;
- Close main collection pipe valve until desired flow from extraction laterals is measured; and
- If needed, adjust ball valves in extraction well vaults to balance flow rate evenly.

The system testing described above will be conducted if, in the course of the SVE system lifetime, the system goes down or significant changes are made to the system and the system must be restarted.

5.3.2 System Shutdown

The following procedure will represent a normal shutdown of the process equipment in preparation for such items as maintenance procedures that may need to be performed:

- Turn the HOA switch on the control panel to the OFF position.

5.3.3 Emergency Shutdown

The following shutdown methods can be utilized if an emergency condition exists:

Option 1: Turn Main Breaker located, in maintenance building breaker panel, to the OFF position. This will cut electrical power to all system components; or

Option 2: Turn the Hand/Off/Auto (HOA) switch located on the main control panel door to the OFF position.

5.3.4 Routine System Operation and Maintenance

The tasks to be performed during O&M visits are as follows:

- Visually inspect system for defects or damage;
- Inspect electrical connections for damage or loose connections;
- Record all gauge readings in system log book;
- Adjust ball valves in well vaults and on equipment rack to maintain desired airflow;
- Measure and record volatile organic compound concentrations (VOCs) at each extraction well vault, the influent sample port downstream of the inline particulate filter, and at the discharge sample port;

Standard procedure – Fill ½-liter Tedlar air bag with air from sample port (vacuum air pump required for sample ports on influent side of blower), analyze air bag with photoionization detector (PID);

- Work valves to ensure they are operable;
- Inspect the two vacuum relief valves for proper operation. Manually push each relief valve to the open position to verify the valve can move freely and functioning properly;
- Inspect inline filter housing and filter elements; and
- Visually inspect all system piping for damage.

5.3.5 Non-Routine Operation and Maintenance

The following tasks would be performed for non-routine operation and maintenance:

- Connect and disconnect warning devices or alarms;
- Inspect system for damage; and
- Replace components as needed.

Table 15 provides a summary and schedule of routine maintenance.

Table 15 – SVE System Routine Maintenance Schedule

Equipment	Maintenance Description	Recommended Frequency
Regenerative Blower	Replace bearing	Every 15,000 to 20,000 operating hours.
Inline Air Filter (F-1)	Change filter element.	Inspect filter monthly, change element when differential pressure reaches 10-15" H2O over initial differential pressure.
Vacuum/Pressure Gages	Inspect for proper performance, calibrate and replace as needed.	Monthly
Rotameter Air Flow Meters	Inspect for proper performance, clean internals as needed.	Monthly
Level Switch for Moisture Separator	Inspect for proper performance and clean as needed.	Monthly
Moisture Separator Tank	Inspect for leaks and proper high water check valve operation	Monthly
Monitoring Well Level Switch	Inspect for proper performance and clean as needed.	Monthly

5.3.6 System Monitoring Devices and Alarms

The SVE system has warning devices to indicate that the system is not operating properly. In the event that a warning device is activated, applicable maintenance and repairs will be conducted, as specified in the Operation and Maintenance Plan, and the SVE system will be restarted. Operational problems will be noted in the Periodic Review Report to be prepared for that reporting period.

5.4 Operation and Maintenance of Air Sparge System

The following sections provide a description of the operations and maintenance of the AS system. Cut-sheets and as-built drawings for AS system are provided in Appendix H - Operations and Maintenance Manual.

5.4.1 System Start-Up and Testing

The following is a list of AS system start-up procedures:

- ;
- OPEN the ball valve in each lateral sparge well,
- Verify that each actuated valve on the piping manifold is closed,
- Verify that individual runtimes are programmed correctly on the Air Sparge Pulse Panel timer,
- Verify that the circuit breaker, located outside the building, is in the ON position;
- Turn the Compressor Hand/Off/Auto (HOA) switch located on the main control panel door to the Auto position. The system should start after a 5 second delay. If the compressor does not start, turn the reset switch on the control panel to reset any alarm conditions;
- Close each manifold pipe valve until desired flow from air sparge laterals is measured; and

The system testing described above will be conducted if, in the course of the AS system lifetime, the system goes down or significant changes are made to the system and the system must be restarted.

5.4.2 System Shutdown

The following procedure will represent a normal shutdown of the process equipment in preparation for such items as maintenance procedures that may need to be performed.

- Turn the HOA switch on the control panel to the OFF position.

5.4.3 Emergency Shutdown

The following shutdown methods can be utilized if an emergency condition exists:

Option 1: Turn Main Breaker located, in breaker panel located on the building exterior wall, adjacent to the AS/SVE system, to the OFF position. This will cut electrical power to all system components; or

Option 2: Turn the Compressor Hand/Off/Auto (HOA) switch located on the main control panel door to the OFF position.

5.4.4 Routine System Operation and Maintenance

The tasks to be performed during O&M visits are as follows:

- Visually inspect system for defects or damage;
- Inspect electrical connections for damage or loose connections;
- Record all gauge readings in system log book;
- Adjust ball valves on sparge piping manifold to maintain desired airflow;
- Work valves to ensure they are operable; and
- Visually all system piping for damage.

5.4.5 Non-Routine Operation and Maintenance

The following tasks would be performed for non-routine operation and maintenance:

- Connect and disconnect warning devices or alarms;
- Inspect system for damage;
- Replace components as needed.

Table 16 provides a summary and schedule of routine maintenance.

Table 16 – AS System Routine Maintenance Schedule

Equipment	Maintenance Description	Recommended Frequency
Oil-less Compressor	Replace bearing Replace vanes	Every 15,000 to 20,000 operating hours. Every 3,000 operating hours.
Inlet Air Filter (F-1)	Change filter element.	Inspect filter monthly, change element when significant dust and/or debris builds up.
Pressure Gages	Inspect for proper performance, calibrate and replace as needed.	Monthly
Rotameter Air Flow Meters	Inspect for proper performance, clean internals as needed.	Monthly

5.4.6 System Monitoring Devices and Alarms

The AS system has warning devices to indicate that the system is not operating properly. In the event that warning device is activated, applicable maintenance and repairs will be conducted, as specified in the Operation and Maintenance Plan, and the AS system will be restarted. Operational problems will be noted in the Periodic Review Report to be prepared for that reporting period.

5.5 Operation and Maintenance of Sub-slab Depressurization System

The following sections provide a description of the operations and maintenance of the SSDS. Cut-sheets and as-built drawings for SSDS are provided in Appendix H - Operations and Maintenance Manual.

5.5.1 Pre-System Start-Up and Testing

Prior to the safe and successful startup of the SSD system it is important to verify the following items:

- Verify that the electrical service connection is switched OFF at the system circuit breaker located in the electrical service distribution panel. Verify that the blower power cords are unplugged from the dedicated blower power outlet. The outlet is located on the exterior wall of the building, adjacent to the SSDS blower. Prior to any repairs or modifications to the system, the electrical service should be disconnected using the proper lock out/tag out procedures, and should only be conducted by qualified personnel;
- Verify that all components are installed correctly and are in good working order, including the blowers, piping, depressurization points, and all instrumentation. Any defects or damage should be repaired or replaced prior to the startup of the system;
- Verify that all electrical connections are properly and securely connected to the SSD system components. All electrical components should be clean and free of any damage or defects. Verify that the electrical connection is of the proper voltage and power requirement for the installed blowers; and
- Verify that the system discharge stack is free of any debris that might cause any excessive back pressure on the system.

5.5.2 System Start-Up and Testing

The following procedure should be followed during each startup of the SSD system and should be conducted only after the “Pre-startup” items have been completed:

- Verify that all of the steps outlined above in the "Pre-startup" section have been successfully completed;
- Verify that the electrical service connection is switched ON at the system circuit breaker located in the electrical service distribution panel;
- Plug the blower into the electrical outlet. Take note that the blower is operating correctly by noting if there is any excessive noise and that the inlet vacuum is within the normal operating range of the installed blower. Normal operating vacuum should range from 0 - 15.0 inches of water column, which can be read using the vacuum gauges located at each extraction point. Note, if the blower is not operating correctly, unplug the blowers and make the proper repairs; and
- Once the system is operating, take note of the operating vacuum at the extraction blowers using the vacuum gauge or hand held meter. This reading will be used as a baseline to determine if the system is operating correctly in the future.

The system testing described above will be conducted if, in the course of the SSDS lifetime, the system goes down or significant changes are made to the system and the system must be restarted.

5.5.3 System Shutdown

During the shutdown of the system the steps outlined below should be followed:

- Unplug the blowers, the electrical outlet is located on the left side of the blowers. Verify that the motors have stopped. This can be confirmed by both sound and by checking that the vacuum gauges registering no vacuum in the pipe headers;

- In the event that the system is being shut down for maintenance or repairs, the circuit breakers should be properly disconnected using the appropriate lock out / tag out procedures; and
- Verify that there is zero vacuum at the depressurization points using the installed vacuum gauges.

5.5.4 Emergency Shutdown

The following shutdown methods can be utilized if an emergency condition exists:

Option 1: Turn Main Breaker located, in building breaker panel, to the OFF position. This will cut electrical power to all system components; or

Option 2: Unplug each Blower from the corresponding electrical outlet located adjacent to each Blower.

5.5.5 Routine System Operation and Maintenance

The tasks to be performed during O&M visits are as follows:

- Visually inspect system for defects or damage;
- Inspect electrical connections for damage or loose connections;
- Record all gauge readings in system log book;
- Adjust ball valves for each extraction point to the desired airflow;
- Work valves to ensure they are operable;
- Measure and record vacuum at each vacuum monitoring point in the basement; and
- Visually inspect all system piping for damage.

5.5.6 Non-Routine Operation and Maintenance

The following tasks would be performed for non-routine operation and maintenance:

- Connect and disconnect warning devices or alarms;
- Inspect system for damage;
- Replace components as needed.

Table 17 provides a summary and schedule of routine maintenance.

Table 17 – SSDS Routine Maintenance Schedule

Equipment	Maintenance Description	Recommended Frequency
RadonAway Fan	Replace fan	The blowers are designed to operate continuously without any routine maintenance or lubrication.
Blower Discharge Piping	Verify that the discharge piping is free of debris. Verify that condensation is not building up in the piping. In the event that condensation has collected, it can be cleared by shutting down the system and letting the condensation drain. The system has been designed to allow the water to drain back to the extraction points. Verify that there is no damage to piping.	Inspect discharge, air flow gauges, and piping on an annual basis.
Vacuum/Pressure Monitoring Gauges	Inspect for proper performance, calibrate and replace as needed.	Annually

5.5.7 System Monitoring Devices and Alarms

The SSDS has warning devices to indicate that the system is not operating properly. In the event that a warning device is activated, applicable maintenance and repairs will be conducted, as specified in the Operation and Maintenance Plan, and the SSDS will be restarted. Operational problems will be noted in the Periodic Review Report to be prepared for that reporting period.

6.0 PERIODIC ASSESSMENTS/EVALUATIONS

6.1 Climate Change Vulnerability Assessment

Increases in both the severity and frequency of storms/weather events, an increase in sea level elevations along with accompanying flooding impacts, shifting precipitation patterns and wide temperature fluctuation, resulting from global climactic change and instability, have the potential to significantly impact the performance, effectiveness and protectiveness of a given Site and associated remedial systems. Vulnerability assessments provide information so that the Site and associated remedial systems are prepared for the impacts of the increasing frequency and intensity of severe storms/weather events and associated flooding.

This section provides a summary of vulnerability assessments that will be conducted for the Site during periodic assessments, and briefly summarizes the vulnerability of the Site and/or engineering controls to severe storms/weather events and associated flooding.

- Flood Plain: the Site is located at an elevation of approximately 10 ft/amsl and is not associated with a flood plain, low-lying or low-groundwater recharge area;
- Site Drainage and Storm Water Management: the majority of the Site is paved or covered with the Site building. Stormwater drainage structures are present at the Site and along the roadways to the south, east, and west;
- Erosion: a majority of the Site is paved or covered with the Site building. Therefore, erosion is not expected to be an issue;
- High Wind: Based on inspection of the property and immediate surrounding area there is some susceptibility to damage from the wind itself or falling objects, such as trees or utility structures during periods of high wind;

- Electricity: Since there are remedial systems on-Site, power loss and/or dips/surges in voltage during severe weather events, including lightning strikes, could be problematic; and
- Spill/Contaminant Release: The Site is currently used for commercial purposes. However, no liquids would be stored at the Site as part of the remedial remedy.

6.2 Green Remediation Evaluation

NYSDEC's DER-31 Green Remediation requires that green remediation concepts and techniques be considered during all stages of the remedial program including Site management, with the goal of improving the sustainability of the cleanup and summarizing the net environmental benefit of any implemented green technology. This section of the SMP provides a summary of any green remediation evaluations to be completed for the Site during Site management, and as reported in the Periodic Review Report (PRR).

This assessment should include, but not be limited to, a discussion of items listed below, in relation to the implementation and operation and maintenance of the selected remedy. Where appropriate, quantification of these items should be provided:

- Waste Generation: excavated soils during the installation of the SVE and AS wells and piping were generated and placed into 55-gallon metal drums. A total of six (6) drums of soil was generated during the installation of the wells and piping. Waste characterization samples were collected from the drums, which showed that no contaminants were present above their NYSDEC UUSCOs. Therefore, the drums of soil were able to be approved by the NYSDEC to be disposed of as non-hazardous waste. The six (6) drums were removed from the Site on October 18, 2018. A copy of the waste manifest and the NYSDEC Contain-in Letter are provided in Appendix L;

- Energy usage: an increase in energy usage at the Site will be associated with the operation of the SVE/AS/SSD systems;

- Emissions: emissions from the SVE/SSD systems are expected to be below the NYSDEC air discharge standard of 0.5 pounds per year. An increase in fuel usage will be associated with performing monthly Site visits;

- Water usage: no increase in water usage is expected to be used at the Site associated with the remedial action; and

- Land and/or ecosystems: the Site will continue to be utilized for its current purpose with no expected changes in use. No open land or ecosystems will be impacted as part of the remedial action.

6.2.1 Timing of Green Remediation Evaluations

For major remedial system components, green remediation evaluations and corresponding modifications will be undertaken as part of a formal Remedial System Optimization (RSO), or at any time that the Project Manager feels appropriate, e.g. during significant maintenance events or in conjunction with storm recovery activities.

Modifications resulting from green remediation evaluations will be routinely implemented and scheduled to occur during planned/routine operation and maintenance activities. Reporting of these modifications will be presented in the PRR.

6.2.2. Remedial Systems

Remedial systems will be operated properly considering the current Site conditions to conserve materials and resources to the greatest extent possible.

Consideration will be given to operating rates and use of reagents and consumables. Spent materials will be sent for recycling, as appropriate.

Remedial system types and associated parameters to be evaluated include, but are not limited to:

- Soil vapor extraction points (operating rates/locations);
- Air sparge wells (operating rates/locations); and
- SSDS extraction points (operating rates/locations).

6.2.3 Building Operations

Structures including buildings and sheds will be operated and maintained to provide for the most efficient operation of the remedy, while minimizing energy, waste generation and water consumption.

Components to be evaluated should include, but are not limited to:

- Heating/cooling systems and temperature set-points;
- Building skin, insulation and building use and occupancy;
- Ventilation;
- Lighting and plug loads; and
- Grounds and property management.

6.2.4 Frequency of System Checks, Sampling and Other Periodic Activities

Transportation to and from the Site and use of consumables in relation to visiting the Site in order to conduct system checks and or collect samples and shipping samples to a laboratory for analyses have direct and/or inherent energy costs. The schedule and/or means of these periodic activities have been prepared so that these tasks can be

accomplished in a manner that does not impact remedy protectiveness but reduces expenditure of energy or resources.

Consideration shall be given to:

- Reduced sampling frequencies;
- Reduced Site visits and system checks;
- Installation of remote sensing/operations and telemetry;
- Coordination/consolidation of activities to maximize foreman/labor time; and
- Use of mass transit for Site visits, where available.

For the purposes of this remedy, multiple tasks will be scheduled at the Site where applicable to reduce Site visits.

6.2.5 Metrics and Reporting

As discussed in Section 7.0 and as shown in Appendix J – Site Management Forms, information on energy usage, solid waste generation, transportation and shipping, water usage and land use and ecosystems will be recorded to facilitate and document consistent implementation of green remediation during Site management and to identify corresponding benefits; a set of metrics has been developed.

6.3 Remedial System Optimization

A Remedial Site Optimization (RSO) study will be conducted any time that the NYSDEC or the remedial party requests in writing that an in-depth evaluation of the remedy is needed. An RSO may be appropriate if any of the following occur:

- The remedial actions have not met or are not expected to meet RAOs in the time frame estimated in the Decision Document;
- The management and operation of the remedial system is exceeding the estimated costs;
- The remedial system is not performing as expected or as designed;
- Previously unidentified source material may be suspected;
- Plume shift has potentially occurred;
- Site conditions change due to development, change of use, change in groundwater use, etc.;
- There is an anticipated transfer of the Site management to another remedial party or agency; and
- A new and applicable remedial technology becomes available.

An RSO will provide a critique of a Site's conceptual model, give a summary of past performance, document current cleanup practices, summarize progress made toward the Site's cleanup goals, gather additional performance or media specific data and information and provide recommendations for improvements to enhance the ability of the present system to reach RAOs or to provide a basis for changing the remedial strategy.

The RSO study will focus on overall Site cleanup strategy, process optimization and management with the intent of identifying impediments to cleanup and improvements to Site operations to increase efficiency, cost effectiveness, and remedial time frames. Green remediation technology and principals are to be considered when performing the RSO.

The RSO is not a PRR but is complementary to the PRR. While the PRR focuses on the protectiveness of the remedy and compliance with the SMP, and reports on the remedial progress, the RSO focuses on optimization of and improvements to the remedy. An RSO is a thorough evaluation of and implementation of actions that will move the Site to closure in a shorter time frame and/or provide cost savings in the long term. Some recommendations developed in the RSO process may address concepts such as:

- Improvements that will make the systems more efficient and effectively target the contamination;
- Modification or optimization of a treatment system process;
- Application of a new technology or remedial approach;
- Improvements that will reduce energy cost or frequency of Site visits;
- Evaluation of vendors and disposal arrangements for cost savings
- Consideration of alternate Site management techniques; and
- Implementation of green remediation concepts.

The phases of an RSO include:

- Work plan development;
- Work plan implementation (usually includes data gathering and conceptual site model verification);
- RSO Report; and
- Implementation of recommended actions and final report.

7.0 REPORTING REQUIREMENTS

7.1 Site Management Reports

All Site management inspection, maintenance and monitoring events will be recorded on the appropriate Site management forms provided in Appendix J. These forms are subject to NYSDEC revision.

All applicable inspection forms and other records, including media sampling data and system maintenance reports, generated for the Site during the reporting period will be provided in electronic format to the NYSDEC in accordance with the requirements of Table 18 and summarized in the Periodic Review Report.

Table 18: Schedule of Interim Monitoring/Inspection Reports

Task/Report	Reporting Frequency*
Inspection Report	Monthly
Groundwater Monitoring Report	Quarterly
Periodic Review Report	Annually
SSDS Certification Report	Annually

** The frequency of events will be conducted as specified until otherwise approved by the NYSDEC.*

All interim monitoring/inspections reports will include, at a minimum:

- Date of event or reporting period;
- Name, company, and position of person(s) conducting monitoring/inspection activities;
- Description of the activities performed;

- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents noted (included either on the checklist/form or on an attached sheet);

- Type of samples collected (e.g., SVE effluent, groundwater, etc);

- Copies of all field forms completed (e.g., well sampling logs, chain-of-custody documentation, etc.);

- Sampling results in comparison to appropriate standards/criteria;

- A figure illustrating sample type and sampling locations;

- Copies of all laboratory data sheets and the required laboratory data deliverables required for all points sampled (to be submitted electronically in the NYSDEC-identified format);

- Any observations, conclusions, or recommendations; and

- A determination as to whether contaminant conditions have changed since the last reporting event.

Routine maintenance event reporting forms will include, at a minimum:

- Date of event;

- Name, company, and position of person(s) conducting maintenance activities;

- Description of maintenance activities performed;

- Any modifications to the systems;

- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents noted (included either on the checklist/form or on an attached sheet); and,

- Other documentation such as copies of invoices for maintenance work, receipts for replacement equipment, etc., (attached to the checklist/form).

Non-routine maintenance event reporting forms will include, at a minimum:

- Date of event;
- Name, company, and position of person(s) conducting non-routine maintenance/repair activities;
- Description of non-routine activities performed;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents (included either on the form or on an attached sheet); and
- Other documentation such as copies of invoices for repair work, receipts for replacement equipment, etc. (attached to the checklist/form).

Data will be reported in digital format as determined by the NYSDEC. Currently, data is to be supplied electronically and submitted to the NYSDEC EQuIS™ database in accordance with the requirements found at this link http://www.dec.ny.gov/chemical/62440.html.

7.2 Periodic Review Report

A Periodic Review Report (PRR) will be submitted to the Department beginning sixteen (16) months after the Certificate of Completion is issued. After submittal of the initial Periodic Review Report, the next PRR shall be submitted annually to the Department or at another frequency as may be required by the Department. In the event that the Site is subdivided into separate parcels with different ownership, a single Periodic Review Report will be prepared that addresses the Site described in Appendix C - Environmental Easement. The report will be prepared in accordance with NYSDEC's DER-10 and submitted within 30 days of the end of each certification period. Media sampling results will also be incorporated into the Periodic Review Report. The report will include:

- Identification, assessment and certification of all ECs/ICs required by the remedy for the Site;

- Results of the required annual Site inspections and severe condition inspections, if applicable;

- All applicable Site management forms and other records generated for the Site during the reporting period in the NYSDEC-approved electronic format, if not previously submitted;

- A summary of any discharge monitoring data and/or information generated during the reporting period, with comments and conclusions;

- Data summary tables and graphical representations of contaminants of concern by media (groundwater, SVE effluent discharge, etc.), which include a listing of all compounds analyzed, along with the applicable standards, with all exceedances highlighted. These will include a presentation of past data as part of an evaluation of contaminant concentration trends;

- Results of all analyses, copies of all laboratory data sheets, and the required laboratory data deliverables for all samples collected during the reporting period will be submitted in digital format as determined by the NYSDEC. Currently, data is supplied electronically and submitted to the NYSDEC EQuIS™ database in accordance with the requirements found at this link: http://www.dec.ny.gov/chemical/62440.html;

- A Site evaluation, which includes the following:

  – The compliance of the remedy with the requirements of the Site-specific RAWP, Decision Document;

- The operation and the effectiveness of all treatment units, etc., including identification of any needed repairs or modifications;
- Any new conclusions or observations regarding Site contamination based on inspections or data generated by the Monitoring and Sampling Plan for the media being monitored;
- Recommendations regarding any necessary changes to the remedy and/or Monitoring and Sampling Plan;
- Trends in contaminant levels in the affected media will be evaluated to determine if the remedy continues to be effective in achieving remedial goals as specified by the Decision Document; and
- The overall performance and effectiveness of the remedy.

- A performance summary for all treatment systems at the Site during the calendar year, including information such as:
  - The number of days the system operated for the reporting period;
  - The average, high, and low flows per day;
  - The contaminant mass removed;
  - A description of breakdowns and/or repairs along with an explanation for any significant downtime;
  - A description of the resolution of performance problems;
  - Alarm conditions;
  - Trends in equipment failure;
  - A summary of the performance, effluent and/or effectiveness monitoring; and
  - Comments, conclusions, and recommendations based on data evaluation.

7.2.1 Certification of Institutional and Engineering Controls

Following the last inspection of the reporting period, a Professional Engineer licensed to practice in New York State will prepare, and include in the Periodic Review Report, the following certification as per the requirements of NYSDEC DER-10:

"For each institutional or engineering control identified for the Site, I certify that all of the following statements are true:

- *The inspection of the Site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under my direction;*
- *The institutional control and/or engineering control employed at this Site is unchanged from the date the control was put in place, or last approved by the Department;*
- *Nothing has occurred that would impair the ability of the control to protect the public health and environment;*
- *Nothing has occurred that would constitute a violation or failure to comply with any Site management plan for this control;*
- *Access to the Site will continue to be provided to the Department to evaluate the remedy, including access to evaluate the continued maintenance of this control;*
- *If a financial assurance mechanism is required under the oversight document for the site, the mechanism remains valid and sufficient for the intended purpose under the document;*
- *Use of the Site is compliant with the environmental easement;*
- *The engineering control systems are performing as designed and are effective;*
- *To the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the Site remedial program and generally accepted engineering practices; and*
- *The information presented in this report is accurate and complete.*

I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law. I, Dale Konas, PE, of EnviroTrac PC PE, 5 Old Dock Road, Yaphank, New York 11980, am certifying as Owner's/Remedial Party's Designated Site Representative: *I have been authorized and designated by all Site owners/remedial parties to sign this certification for the Site."*

- *The assumptions made in the qualitative exposure assessment remain valid.*

The signed certification will be included in the Periodic Review Report.

The Periodic Review Report will be submitted, in electronic format, to the NYSDEC Central Office, Regional Office in which the Site is located and the NYSDOH Bureau of Environmental Exposure Investigation. The Periodic Review Report may need to be submitted in hard-copy format, as requested by the NYSDEC project manager.

7.3 Corrective Measures Work Plan

If any component of the remedy is found to have failed, or if the periodic certification cannot be provided due to the failure of an institutional or engineering control, a Corrective Measures Work Plan will be submitted to the NYSDEC for approval. This plan will explain the failure and provide the details and schedule for performing work necessary to correct the failure. Unless an emergency condition exists, no work will be performed pursuant to the Corrective Measures Work Plan until it has been approved by the NYSDEC.

7.4 Remedial Site Optimization Report

In the event that an RSO is to be performed (see Section 6.3, upon completion of an RSO), an RSO report must be submitted to the Department for approval. A general outline for the RSO report is provided in Appendix J. The RSO report will document the research/investigation and data gathering that was conducted, evaluate the results and facts obtained, present a revised conceptual Site model and present recommendations. RSO recommendations are to be implemented upon approval from the NYSDEC. Additional work plans, design documents, HASPs etc., may still be required to implement the recommendations, based upon the actions that need to be taken. A final engineering report and update to the SMP may also be required.

The RSO report will be submitted, in electronic format, to the NYSDEC Central Office, Regional Office in which the Site is located, Site Control and the NYSDOH Bureau of Environmental Exposure Investigation.

8.0 REFERENCES

6NYCRR Part 375, Environmental Remediation Programs. December 14, 2006.

NYSDEC DER-10 – "Technical Guidance for Site Investigation and Remediation".

NYSDEC, 1998. Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1. June 1998 (April 2000 addendum).

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

Summary Letter of Phase II Subsurface Investigation, 1199-1221 Sutter Avenue, Brooklyn, New York. Atlantic Environmental Solutions, Inc., January 12, 2009

Phase II Subsurface Investigation, 1199-1221 Sutter Avenue, Brooklyn, New York. Associated Environmental Services, Ltd., May 19, 2009

Remedial Action Report, 1199-1221 Sutter Avenue, Brooklyn, New York. Associated Environmental Services, Ltd., January 29, 2010

Remedial Action Report Addendum, 1199-1221 Sutter Avenue, Brooklyn, New York. Associated Environmental Services, Ltd., March 24, 2010

Remedial Investigation Report, 1199-1221 Sutter Avenue, Brooklyn, New York. Associated Environmental Services, Ltd., July 23, 2015

Supplemental RIR, 1199-1221 Sutter Avenue, Brooklyn, New York. Associated Environmental Services, Ltd., July 6, 2016

On-Site and Off-Site Soil Vapor Intrusion Investigation Work Plan, 1199 Suter Avenue, 548 & 552 Chestnut Street & NYCHA Apartment, 475 Fountain Avenue, Brooklyn, New York, EnviroTrac Ltd., December 16, 2016

On-Site Soil Vapor Intrusion Report, 1199 Sutter Avenue, Brooklyn, New York, EnviroTrac Ltd., May 1, 2017

Interim Remedial Measures Work Plan, 1199 Sutter Avenue, Brooklyn, New York, EnviroTrac Ltd., February 17, 2017, Revised March 28, 2017

Interim Remedial Measures Report, 1199 Sutter Avenue, Brooklyn, New York, EnviroTrac Ltd., March, 2018

Remedial Action Work Plan, 1199 Sutter Avenue, Brooklyn, New York, EnviroTrac Engineering PE PC, July, 2018

TABLES

Table 2
Groundwater Elevation Measurements
1199 Sutter Avenue, Brooklyn, New York
BCP # 224141

Well ID	Casing Elevation (in feet above mean sea level)	DTW (in feet below grade)	DTB (in feet below grade)	Water Table Elevation (in feet above mean sea level)
Date	10/29/2018			
MW-1S	17.51	12.08	25.00	5.43
MW-1D	17.92	12.18	40.00	5.74
MW-2S	18.05	12.61	24.65	5.44
MW-2D	18.13	12.71	39.33	5.42
MW-3S	18.08	12.47	24.82	5.61
MW-3D	18.48	12.93	40.09	5.55
MW-4S	9.88	4.75	10.03	5.13
MW-5S	17.84	12.46	24.34	5.38
MW-5D	17.80	12.41	39.29	5.39
MW-6S	17.36	11.99	24.81	5.37
MW-6D	16.90	12.51	40.35	4.39
MW-7S	18.04	12.68	25.36	5.36
MW-7D	18.29	12.71	39.85	5.58
MW-8S	18.08	12.82	19.89	5.26
MW-8D	18.40	13.11	40.28	5.29
MW-9S	18.66	-	-	-
MW-10S	9.93	4.45	10.75	5.48
MW-11S	17.71	12.28	25.09	5.43

Notes:

DTW = Depth to water

DTB = Depth to bottom

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Table 3
Remaining Soil Sample Exceedances
Historical Soil Sample Results Detected Above NYSDEC SCOs
2009 to April, 2016
1199 Sutter Avenue, Brooklyn, New York
BCA No. C224141

Sample Collection Depth	10'	11'-12'	8-13'	5'-6'	9'-10'	NYSDEC Soil Cleanup Objectives			
Sample Location	S3	S4	B-7	B-10	B-12	Unrestricted Use	Residential Use	Restricted Residential Use	Restricted Commercial Use
Sample Date	1/6/2009	4/5/2016	4/1/2009	7/27/2011	7/27/2011				
Volatile Organic Compounds									
Acetone	ND	ND	ND	**170**	**210**	50	100,000	100,000	500,000
Tetrachloroethene	**37,500**	**15,000**	**5,100**	640	560	1,300	5,500	19,000	150,000

Notes:
All results reported as parts per billion (ppb) / micrograms per kilogram (ug/kg).
Analysis performed in accordance with USEPA Method 8260.
ND - Not Detected above method detection limit
Bolded and shaded values indicate an exceedance of the New York State Department of Environmental Conservation (NYSDEC) Part 375 Soil Cleanup Objectives.

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Table 3
Historical Groundwater Sample Exceedances
VOC Groundwater Sample Results 2009 to August, 2018
1199 Sutter Avenue, Brooklyn, New York
BCA No. 224141

Parameters	Sample Designation:	Corresponding Phase II Data	Monitoring Well												Corresponding Phase II Data	Monitoring Well												
		B-6	MW-1S									MW-1D			B-5	MW-2S									MW-2D		
	Date:	4/1/09	8/27/09	11/2/09	2/25/10	7/20/11	5/17/17	6/27/17	7/27/17	8/29/17	8/27/18	8/27/09	11/2/09	7/20/11	4/1/09	8/27/09	11/2/09	2/25/10	7/20/11	5/17/17	6/27/17	7/27/17	8/29/17	8/27/18	8/27/09	11/2/09	7/20/11
	NYSDEC GWQS																										
Acetone	50	<2.00	<50.0	<50.0	<50.0	<10.0	<5.00	NR	<5.00	18.4	<5.00	<50.0	<50.0	<5.00	<2.00	<50.0	<50.0	<50.0	<5.00	8.90	NR	<5.00	13.4	<5.00	<50.0	<50.0	<5.00
Chloroform	7	<1.00	<5.00	<5.00	<5.00	**30**	<1.00	<1.00	<1.00	<1.00	<1.00	<5.00	<5.00	0.90	<1.00	<5.00	<5.00	<5.00	**13.0**	<1.00	<1.00	<1.00	<1.00	<1.00	<5.00	<5.00	1.10
cis-1,2-Dichloroethene	5*	4.60	<5.00	<5.00	**5.82**	0.71 J	<1.00	<1.00	<1.00	<1.00	<1.00	<5.00	<5.00	<5.00	**6.80**	<5.00	<5.00	<5.00	0.20 J	<1.00	<1.00	<1.00	<1.00	<1.00	<5.00	<5.00	<5.00
Tetrachloroethene	5*	**380**	**98.3**	**48.2**	**172**	**84.0**	**49.5**	**46.1**	**24.9**	**21.7**	**8.20**	5.00	<5.00	**6.80**	**93.0**	**18.9**	<5.00	<5.00	**10.0**	2.20	1.10	2.90	1.50	<1.00	<5.00	<5.00	**9.60**
Trichloroethene	5*	**14.0**	<5.00	<5.00	**8.37**	3.20	2.10	2.80	1.30	<1.00	<1.00	<5.00	<5.00	1.70	2.70	<5.00	<5.00	<5.00	0.36 J	<1.00	<1.00	<1.00	<1.00	<1.00	<5.00	<5.00	0.95

Notes:
Only detected analytes are reported.
All data is in parts per billion (ppb) / micrograms per liter (ug/L)
NYSDEC GWQSs -New York State Department of Environmental Conservation (NYSDEC) Technical and Operational Guidance Series 1.1.1 Ambient Water Quality Standards and Guidance Values
Bolded and shaded values indicate an exceedance of the NYSDEC GWQSs.
J = The concentration is estimated
NA = Not Available
NR = Not Reported
* = The Principal Organic Contaminant Standard applies
** = The blind duplicate sample was named MW-15S on June 27, 2017.

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Table 3
Historical Groundwater Sample Exceedances
VOC Groundwater Sample Results 2009 to August, 2018
1199 Sutter Avenue, Brooklyn, New York
BCA No. 224141

Parameters	Sample Designation:	Corresponding Phase II Data	Monitoring Well							Corresponding Phase II Data	Monitoring Well							Monitoring Well						
		S2	MW-3S				MW-3D			B-7	MW-4S					MW-4D		MW-5S						
	Date:	1/6/09	8/27/09	11/2/09	2/25/10	7/20/11	8/27/09	11/2/09	7/20/11	4/1/09	8/27/09	11/2/09	2/25/10	7/20/11	4/6/16	8/27/09	11/2/09	7/20/11	4/6/16	5/17/17	6/27/17	7/27/17	8/29/17	8/28/18
	NYSDEC GWQS																							
Acetone	50	10.3	<50.0	<50.0	<50.0	<5.00	<50.0	<50.0	<5.00	<2.00	**577**	<50.0	<50.0	<12.0	<50.0	<50.0	<50.0	<12.0	<5.00	<5.00	NR	<5.00	17.6	<5.00
Chloroform	7	<0.14	<5.00	<5.00	<5.00	**14.0**	<5.00	<5.00	1.80	<1.00	**97.7**	<5.00	<5.00	**15**	3.00 J	<5.00	<5.00	**29.0**	2.40 J	<1.00	<1.00	<1.00	<1.00	<1.00
cis-1,2-Dichloroethene	5*	NA	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	0.34 J	**81.0**	<5.00	**16.9**	<5.00	4.30	2.60	<5.00	<5.00	**9.80**	**5.10**	<1.00	**5.30**	4.80	4.70	**5.90**
Tetrachloroethene	5*	**187**	<5.00	**14.9**	<5.00	0.73	<5.00	<5.00	**20.0**	**610**	**51.0**	**359**	**348**	**470**	**390**	**23.1**	<5.00	**98.0**	**200**	**122**	**128**	**136**	**258**	**151**
Trichloroethene	5*	1.50	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	1.10	**42.0**	<5.00	**20.4**	**11.9**	**14.0**	**14.0**	<5.00	<5.00	**5.20**	**10.0**	**7.40**	**8.20**	**7.30**	**9.60**	**8.40**

Notes:
Only detected analytes are reported.
All data is in micrograms per liter (ug/L)
NYSDEC GWQSs -New York State Department of Environmental Conservation (NYSDEC) Technical and Operational Guidance Series 1.1.1 Ambient Water Quality Standards and Guidance Values
Bolded and shaded values indicate an exceedance of the NYSDEC GWQSs.
J = The concentration is estimated
NA = Not Available
NR = Not Reported
* = The Principal Organic Contaminant Standard applies
** = The blind duplicate sample was named MW-15S on June 27, 2017.

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Table 3
Historical Groundwater Sample Exceedances
VOC Groundwater Sample Results 2009 to August, 2018
1199 Sutter Avenue, Brooklyn, New York
BCA No. 224141

Parameters	Sample Designation:	Monitoring Well																					
		MW-8S						MW-9S	MW-10S					Blind Duplicate (MW-10S)				MW-11S					
	Date:	4/6/16	5/17/17	6/27/17	7/27/17	8/29/17	8/27/18	4/6/16	5/17/17	6/27/17	7/27/17	8/29/17	8/28/18	5/17/17	6/27/2017**	7/27/17	8/29/17	8/28/18	5/17/17	6/27/17	7/27/17	8/29/17	8/28/18
	NYSDEC GWQS																						
Acetone	50	<5.00	<5.00	NR	<5.00	<5.00	<5.00	<5.00	<5.00	NR	<5.00	12.4	<5.00	<5.00	NR	<5.00	12.4	<5.00	<5.00	NR	<5.00	9.00	<5.00
Chloroform	7	3.3 0J	<1.00	<1.00	<1.00	<1.00	<1.00	0.50 J	1.50	1.40	<1.00	<1.00	<1.00	1.70	1.10	1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	1.9
cis-1,2-Dichloroethene	5*	0.34 J	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	**6.10**	**5.10**	**5.30**	2.90	<1.00	**6.40**	4.20	**5.10**	2.90	<1.00	1.50	3.50	2.50	3.50
Tetrachloroethene	5*	**12.0**	**5.50**	4.30	4.40	**8.40**	**5.70**	0.90 J	**575**	**363**	**441**	**719**	**234**	**435**	**337**	**428**	**712**	**225**	**24.1**	**37.4**	**86.7**	**105**	**52.5**
Trichloroethene	5*	0.62 J	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	**21.0**	**16.2**	**13.4**	**16.2**	**7.00**	**19.8**	**18.1**	**13.3**	**15.9**	**6.90**	1.10	2.00	3.40	4.70	2.40

Notes:
Only detected analytes are reported.
All data is in micrograms per liter (ug/L)
NYSDEC GWQSs -New York State Department of Environmental Conservation (NYSDEC) Technical and Operational Guidance Series 1.1.1 Ambient Water Quality Standards and Guidance Values
Bolded and shaded values indicate an exceedance of the NYSDEC GWQSs.
J = The concentration is estimated
NA = Not Available
NR = Not Reported
* = The Principal Organic Contaminant Standard applies
** = The blind duplicate sample was named MW-15S on June 27, 2017.

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Table 4
Historical Groundwater Sample Exceedances
Historical Groundwater Sample Results Detected Above NYSDEC GWQS
2009 to April, 2016
1199 Sutter Avenue, Brooklyn, New York
BCA No. 224141

Parameters	Sample Designation:	Corresponding Phase II Data	Monitoring Well							Corresponding Phase II Data	Monitoring Well						
		B-6	MW-1S				MW-1D			B-5	MW-2S				MW-2D		
	Date:	4/1/09	8/27/09	11/2/09	2/25/10	7/20/11	8/27/09	11/2/09	7/20/11	4/1/09	8/27/09	11/2/09	2/25/10	7/20/11	8/27/09	11/2/09	7/20/11
	NYSDEC GWQS																
Acetone	50	<2.00	<50.0	<50.0	<50.0	<10.0	<50.0	<50.0	<5.00	<2.00	<50.0	<50.0	<50.0	<5.00	<50.0	<50.0	<5.00
Chloroform	7	<1.00	<5.00	<5.00	<5.00	**30**	<5.00	<5.00	0.90	<1.00	<5.00	<5.00	<5.00	**13.0**	<5.00	<5.00	1.10
cis-1,2-Dichloroethene	5*	4.60	<5.00	<5.00	**5.82**	0.71 J	<5.00	<5.00	<5.00	**6.80**	<5.00	<5.00	<5.00	0.20 J	<5.00	<5.00	<5.00
Tetrachloroethene	5*	**380**	**98.3**	**48.2**	**172**	**84.0**	5	<5.00	**6.80**	**93.0**	**18.9**	<5.00	<5.00	**10.0**	<5.00	<5.00	**9.60**
Trichloroethene	5*	**14.0**	<5.00	<5.00	**8.37**	3.20	<5.00	<5.00	1.70	2.70	<5.00	<5.00	<5.00	0.36 J	<5.00	<5.00	0.95

Notes:
All data is in parts per billion (ppb) / micrograms per liter (ug/L)
NYSDEC GWQSs -New York State Department of Environmental Conservation (NYSDEC) Technical and Operational Guidance Series 1.1.1 Ambient Water Quality Standards and Guid
Bolded and shaded values indicate an exceedance of the NYSDEC GWQSs.
J = The concentration is estimated
* = The Principal Organic Contaminant Standard applies

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Table 4
Historical Groundwater Sample Exceedances
Historical Groundwater Sample Results Detected Above NYSDEC GWQS
2009 to April, 2016
1199 Sutter Avenue, Brooklyn, New York
BCA No. 224141

Parameters	Sample Designation:	Corresponding Phase II Data	Monitoring Well							Corresponding Phase II Data	Monitoring Well										
		S2	MW-3S				MW-3D			B-7	MW-4S					MW-4D		MW-5S		MW-8S	MW-9S
	Date:	1/6/09	8/27/09	11/2/09	2/25/10	7/20/11	8/27/09	11/2/09	7/20/11	4/1/09	8/27/09	11/2/09	2/25/10	7/20/11	4/6/16	8/27/09	11/2/09	7/20/11	4/6/16	4/6/16	4/6/16
	NYSDEC GWQS																				
Acetone	50	10.3	<50.0	<50.0	<50.0	<5.00	<50.0	<50.0	<5.00	<2.00	**577**	<50.0	<50.0	<12.0	<50.0	<50.0	<50.0	<12.0	<5.00	<5.00	<5.00
Chloroform	7	<0.14	<5.00	<5.00	<5.00	**14.0**	<5.00	<5.00	1.80	<1.00	**97.7**	<5.00	<5.00	**15**	3.00 J	<5.00	<5.00	**29.0**	2.40 J	3.3 0J	0.50 J
cis-1,2-Dichloroethene	5*	NA	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	0.34 J	**81.0**	<5.00	**16.9**	<5.00	4.30	2.60	<5.00	<5.00	**9.80**	**5.10**	0.34 J	<1.00
Tetrachloroethene	5*	**187**	<5.00	**14.9**	<5.00	0.73	<5.00	<5.00	**20.0**	**610**	**51.0**	**359**	**348**	**470**	**390**	**23.1**	<5.00	**98.0**	**200**	**12.0**	0.90 J
Trichloroethene	5*	1.50	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	1.10	**42.0**	<5.00	**20.4**	**11.9**	**14.0**	**14.0**	<5.00	<5.00	**5.20**	**10.0**	0.62 J	<1.00

Notes:
All data is in micrograms per liter (ug/L)
NYSDEC GWQSs -New York State Department of Environmental Conservation (NYSDEC) Technical and Operational Guidance Series 1.1.1 Ambient Water Quality Standards and Guidance Values
Bolded and shaded values indicate an exceedance of the NYSDEC GWQSs.
J = The concentration is estimated
* = The Principal Organic Contaminant Standard applies

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Table 5
Historical Soil Vapor Sample Results
July, 2011 to August, 2017
1199 Sutter Avenue, Brooklyn, New York
BCA No. 224141

Sample ID:	SS-1	VP-1	SSV-2	SSV-3	SSV-4	SSV-5	SSV-6	SSV-7	SSV-8	SSV-9	SSV-10				SSV-11			
Sample Date:	7/20/11	3/21/17	4/21/14	4/21/14	4/21/14	4/21/14	4/21/14	4/21/14	4/6/16	4/6/16	5/17/17	6/27/17	7/27/17	8/29/17	5/17/17	6/27/17	7/27/17	8/29/17
Media:	Sub-Slab	Sub-Slab	Indoor Air	Sub-Slab	Sub-Slab	Sub-Slab	Soil Gas	Soil Gas	Soil Gas	Soil Gas	Soil Gas				Soil Gas			
Location:	Former Dry Cleaner	Former Dry Cleaner	Supermarket	Dentist Office	Nail Salon	Deli	Rear Parking Lot	Sidewalk Across Sutter Ave	Rear Parking Lot	Sidewalk Across Chestnut St	Rear Parking Lot, Near Northern Property Perimeter				Sidewalk Across Sutter Avenue, Near NYCHA Apartment Building			
Parameter:																		
Propylene	--	--	--	--	--	--	--	--	191	131	--	--	--	--	--	--	--	--
Dichlorodifluoromethane	--	5.82	--	9.2	9.05	4.32	--	3.16	4.99	--	1.94	2.90 S	2.56	3.91	--	--	--	--
Chloromethane	--	--	--	--	--	--	--	--	--	--	1.01	--	--	--	--	--	6.75 D	--
Vinyl Chloride	795	--	--	--	--	--	--	--	--	--	--	--	--	--	19.60	--	25.8 D	24.3 D
1,3-Butadiene	--	--	--	8.5	15	1.67	2.99	1.37	20.6	13.7	--	--	--	--	--	--	--	--
2-Hexanone	--	--	--	--	--	--	--	--	323	97.0	--	--	--	--	--	--	--	--
Chloroethane	--	1.75	--	0.161	0.063	0.087	--	--	--	--	--	--	--	--	--	--	--	--
Ethanol	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acetone	--	36.7	--	--	--	--	--	--	995	356	60.60	33.30	39.90	25.50	778 D	--	--	--
Trichlorofluoromethane	--	16.7	--	5.61	4.07	5.62	--	--	2.35	1.39	--	2.79	2.07	3.21	--	--	--	--
Isopropanol	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methylene Chloride	--	--	--	--	--	--	--	--	1.64	--	--	--	--	6.83	--	--	--	--
Methyl butyl ketone											--	1.41	1.05	0.94 S+	50.5 S	--	--	--
Methyl ethyl ketone											18.90	17.60	13.60	13.1 S	434 D	8.82 D	46.2 D	15.3 D
Methyl isobutyl ketone											--	1.82	--	1.27	0.82	--	--	--
Freon 113	3,720	--	--	0.537	0.69	0.606	--	--	--	--	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	390	22.8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	380	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	--	3.51	--	--	--	--	--	--	4,480	1,550	--	--	--	--	--	--	--	--
cis-1,2-Dichloroethene	3,830	30.5	--	--	--	0.163	--	--	--	--	--	--	--	--	--	--	--	--
Ethyl Acetate	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroform	444	61.5	222	2.57	6.79	18.6	--	--	4.71	--	--	--	--	--	--	--	--	--
Tetrahydrofuran	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane	538	--	--	0.271	--	0.409	--	--	--	--	--	--	--	--	--	--	--	--
n-Hexane	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	4,020	--	--	0.207	0.235	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzene	--	3.8	--	3.35	6.71	4.92	--	4.54	5.49	5.78	4.28	1.77	2.34	3.02	17.10	4.65 D	20.4 D	26.3 D
Carbon Disulfide											1.31	2.72	1.81	0.80	62.00	--	5.59 D	5.03 D
Carbon Tetrachloride	--	--	--	--	--	0.176	--	--	--	0.28	--	--	--	--	--	--	--	--
Cyclohexane	--	--	--	--	--	--	--	--	--	1.97	--	--	--	--	--	--	--	--
Bromodichloromethane	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Trichloroethene	9,730	399 E	677	--	0.167	2.09	7.69	--	--	--	--	--	--	--	--	--	--	--
2,2,4-Trimethylpentane	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Heptane	--	--	--	--	--	--	--	--	23.1	4.79	--	--	--	--	--	--	--	--
Toluene	757	7.29	40.7	43.3	45.6	55.4	59.2	50.5	29.3	10.4	9.47	13.00	13.80	25.40	18.90	9.90 D	16.6 D	27.5 D
Tetrachloroethene	428,000	831 E	20,100	0.678	16.4	2.9	214	--	1.96	13.3	2.43	9.99	17.70	14.40	--	--	16.60	--
Ethylbenzene	330	1.23	11	11.3	14.6	13.0	11.4	11.2	6.55	4.23	2.50	5.20	1.25	7.91	7.16	3.77 D	6.15 D	11.4 D
p+m Xylenes	--	4.44	41	46.9	59.9	52.6	41	42.3	18.3	13.0	9.99	21.10	5.19	34.10	29.50	14.2 D	24.5 D	44.6 D
Styrene	262	--	--	0.485	0.553	0.528	--	--	--	--	--	1.29	1.37	1.75	--	--	--	--
o Xylene	--	1.46		15.9	27.1	17.7	13.9	14.2	6.16	4.73	3.98	7.12	2.13	11.80	10.10	5.0 D	11.2 D	18.9 D
4-Ethyltoluene	--	--	--	5.9	6.49	6.24	--	4.23	--	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene											3.68	8.95	2.06	--	5.51	7.86 D	8.92 D	--
1,3,5-Trimethylbenzene	--	--	--	5.75	6.49	5.95	--	4.18	--	--	1.97	2.15	2.41	5.81	2.81	--	--	7.30 D
1,2,4-Trimethylbenzene	--	1.42	16	21.5	23.9	22.9	9.83	15.1	--	4.09	7.63	7.27	2.41	23.40	9.53	5.80	9.75 D	24.6 D
1,4-Dichlorobenzene	--	--	--	--	--	--	--	--	--	--	2.66	3.87	--	2.25	2.87	--	5.1 D	--

Notes:

All concentrations provided in micrograms per cubic meter (ug/m^3)
-- Detected Below the Laboratory Method Detection Limit
E - Value estimated
S - Recovery outside of the control limits for this analyte
D - Results for dilution

EnviroTrac
Environmental Services

Table 6
Historical Ambient Air Sample Results
July, 2011 to March, 2017
1199 Sutter Avenue, Brooklyn, New York
BCA No. 224141

Parameter:	Sample Designation:	IA-1	IA-1	OA-1	ASV-2	ASV-3	ASV-4	ASV-5	OA-1	OA-2	OA-1
	Sampling Date:	7/20/11	3/21/17	7/20/11	4/21/14	4/21/14	4/21/14	4/21/14	4/21/14	4/6/16	3/21/17
	Sample Media:	Indoor Air	Indoor Air	Outdoor Air	Indoor Air	Indoor Air	Indoor Air	Indoor Air	Outdoor Air	Outdoor Air	Outdoor Air
	Location:	Former Dry Cleaner	Former Dry Cleaner	Rear Parking Lot	Supermarket	Dentist Office	Nail Salon	Deli	Rear Parking Lot	Rear Parking Lot	Parking Area, Rear of Former Dry Cleaner
	NYSDOH Indoor Air Guidance Value										
Propylene	NA	1.91	--	--	--	--	--	--	--	1.46	--
Dichlorodifluoromethane	NA	3.81	2.22	2.38	6.03	2.18	3.45	4.29	2.78	1.66	2.15
Chloromethane	NA	3.45	1.00	1.2	1.94	1.73	1.68	1.52	1.18	--	0.94
Vinyl Chloride	NA	--	--	--	--	--	--	--	--	--	--
1,3-Butadiene	NA	--	--	--	0.173	0.407	0.341	0.192	0.201	--	--
2-Hexanone	NA	--	--	--	--	--	--	--	--	--	--
Chloroethane	NA	--	--	--	0.124	0.092	0.069	0.063	0.069	--	--
Ethanol	NA	920	--	14.9	--	--	--	--	--	7.87	--
Acetone	NA	--	7.79	6.44	--	--	--	--	--	4.04	9.56
Trichlorofluoromethane	NA	27.8	2.41	1.4	8.99	7.19	5.55	6.18	2.49	1.53	1.27
Isopropanol	NA	61.4	--	1.81	--	--	--	--	--	1.16	--
Methylene Chloride	60	--	1.15	--	--	--	7.5	4.79	12.9	--	0.88
Freon 113	NA	--	--	--	0.636	0.713	0.636	0.981	0.621	--	--
trans-1,2-Dichloroethene	NA	--	--	--	--	--	--	--	0.135	--	--
1,1-Dichloroethane	NA	--	--	--	--	--	--	--	--	--	--
2-Butanone	NA	16.5	1.06	2.13	--	--	--	--	--	--	1.60
cis-1,2-Dichloroethene	NA	--	--	--	--	--	--	--	--	--	--
Ethyl Acetate	NA	8.11	--	--	--	--	--	--	--	--	--
Chloroform	NA	38.4	3.21	--	8.74	8.06	4.88	4.88	0.156	--	--
Tetrahydrofuran	NA	17.5	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane	NA	--	--	--	--	--	--	--	1.64	--	--
n-Hexane	NA	7.79	--	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	NA	--	--	--	--	--	--	--	--	--	--
Benzene	NA	3.77	1.24	0.831	1.38	1.44	1.33	1.03	11.1	1.44	1.35
Carbon Tetrachloride	NA	--	--	--	0.566	0.516	0.484	0.497	0.384	0.55	--
Cyclohexane	NA	2.11	--	--	--	--	--	--	--	--	--
Bromodichloromethane	NA	1.67	--	--	0.174	0.194	--	0.141	--	--	--
Trichloroethene	2	1.27	--	--	--	0.113	--	--	--	--	--
2,2,4-Trimethylpentane	NA	1.63	--	--	--	--	--	--	--	--	--
Heptane	NA	5.04	--	--	--	--	--	--	--	--	--
Toluene	NA	11.4	3.55	1.96	10.9	14.7	39.2	5.88	73.1	--	3.07
Tetrachloroethene	30	**68.5**	3.60	--	1.89	0.983	0.976	0.685	0.156	--	--
Ethylbenzene	NA	1.7	--	--	1.34	1.35	2.01	0.786	9.73	--	--
p+m Xylenes	NA	6.34	1.84	--	5.21	4.86	6.04	2.81	37.2	--	1.85
Styrene	NA	--	--	--	0.856	0.732	0.728	0.366	0.298	--	--
o Xylene	NA	2.96	--	--	2.16	1.83	2.25	1.16	11.4	--	--
4-Ethyltoluene	NA	1.9	--	--	1.20	1.29	1.42	0.787	3.26	--	--
1,3,5-Trimethylbenzene	NA	2.9	--	--	1.23	1.34	1.47	0.846	3.62	--	--
1,2,4-trimethylbenzene	NA	8.65	--	--	4.36	4.49	4.51	2.85	12.3	--	--
1,4-Dichlorobenzene	NA	2.84	--	--	1.05	0.613	0.601	0.367	--	--	--

Notes:

All concentrations provided in micrograms per cubic meter (ug/m^3)
-- Detected Below the Laboratory Method Detection Limit
NA - Not Applicable/Not Available
IA - Indoor Air
OA - Outdoor Air
NYSDOH - New York State Department of Health
Bolded and shaded values indicate exceedance of the NYSDOH Indoor Air Guidance Values.

EnviroTrac Environmental Services

Table 13
Pace Analytical Services, LLC
Method Detection Limits and Reporting Limits
by EPA TO15

							LCS		DUP
Analyte	CAS #	MDL (ppbv)	PRL (ppbv)	MW	MDL (ug/m^3)	PRL (ug/m^3)	Lower	Upper	RPD
1,1,1-Trichloroethane	71-55-6	0.0616	0.2	133.4047	0.342	1.11	70	135	25
1,1,2,2-Tetrachloroethane	79-34-5	0.0415	0.1	167.8498	0.290	0.698	70	146	25
1,1,2-Trichloroethane	79-00-5	0.0406	0.1	133.4047	0.225	0.555	70	135	25
1,1,2-Trichlorotrifluoroethane	76-13-1	0.0474	0.2	187.3762	0.369	1.56	63	139	25
1,1-Dichloroethane	75-34-3	0.0516	0.2	98.9596	0.212	0.823	70	134	25
1,1-Dichloroethene	75-35-4	0.0587	0.2	96.9438	0.237	0.806	70	137	25
1,2,4-Trichlorobenzene	120-82-1	0.127	0.5	181.4487	0.958	3.77	60	133	25
1,2,4-Trimethylbenzene	95-63-6	0.0345	0.2	120.1938	0.172	0.999	70	137	25
1,2-Dibromoethane	106-93-4	0.0426	0.2	187.8616	0.333	1.56	70	140	25
1,2-Dichlorobenzene	95-50-1	0.0533	0.2	147.0036	0.326	1.22	70	137	25
1,2-Dichloroethane	107-06-2	0.0481	0.1	98.9596	0.198	0.411	70	136	25
1,2-Dichloropropane	78-87-5	0.0652	0.2	112.9864	0.306	0.939	70	136	25
1,3,5-Trimethylbenzene	108-67-8	0.0824	0.2	120.1938	0.412	0.999	70	133	25
1,3-Butadiene	106-99-0	0.0915	0.2	54.0914	0.206	0.450	64	141	25
1,3-Dichlorobenzene	541-73-1	0.0763	0.2	147.0036	0.466	1.22	70	137	25
1,4-Dichlorobenzene	106-46-7	0.0358	0.2	147.0036	0.219	1.22	70	134	25
2-Butanone (MEK)	78-93-3	0.0676	1	72.1057	0.203	3.00	65	143	25
2-Hexanone	591-78-6	0.147	1	100.1589	0.612	4.16	60	148	25
2-Propanol	67-63-0	0.500	1	60.1	1.25	2.50	65	135	25
4-Ethyltoluene	622-96-8	0.0429	0.2	120.1938	0.214	0.999	70	132	25
4-Methyl-2-pentanone (MIBK)	108-10-1	0.0854	1	100.1602	0.356	4.16	70	135	25
Acetone	67-64-1	0.623	1	58.0798	1.50	2.41	59	132	25
Benzene	71-43-2	0.0465	0.1	78.1134	0.151	0.325	70	134	25
Benzyl Chloride	100-44-7	0.0449	0.2	126.58	0.236	1.05	56	150	25
Bromodichloromethane	75-27-4	0.0522	0.2	163.8289	0.356	1.36	70	142	25
Bromoform	75-25-2	0.0658	0.2	252.7309	0.691	2.10	69	150	25
Bromomethane	74-83-9	0.0526	0.2	94.9387	0.208	0.789	61	141	25
Carbon Disulfide	75-15-0	0.0566	0.2	76.131	0.179	0.633	66	134	25
Carbon tetrachloride	56-23-5	0.0498	0.1	153.823	0.318	0.639	60	145	25
Chlorobenzene	108-90-7	0.0382	0.2	112.5585	0.179	0.936	70	130	25
Chloroethane	75-00-3	0.0762	0.2	64.5145	0.204	0.536	65	143	25

Chloroform	67-66-3	0.0465	0.1	119.3779	0.231	0.496	70	132	25
Chloromethane	74-87-3	0.0637	0.2	50.4877	0.134	0.420	58	140	25
cis-1,2-Dichloroethene	156-59-2	0.0845	0.2	96.9438	0.341	0.806	70	136	25
cis-1,3-Dichloropropene	10061-01-5	0.0531	0.2	110.9706	0.245	0.923	70	136	25
Cyclohexane	110-82-7	0.0648	0.2	84.1608	0.227	0.700	70	133	25
							LCS		DUP
Analyte	**CAS #**	**MDL (ppbv)**	**PRL (ppbv)**	**MW**	**MDL (ug/m^3)**	**PRL (ug/m^3)**	**Lower**	**Upper**	**RPD**
Dibromochloromethane	124-48-1	0.0511	0.2	208.2799	0.442	1.73	68	149	25
Dichlorodifluoromethane	75-71-8	0.0827	0.2	120.9138	0.416	1.01	69	130	25
Dichlorotetrafluoroethane	76-14-2	0.0622	0.2	170.9216	0.442	1.42	68	130	25
Ethanol	64-17-5	0.243	0.5	46.07	0.465	0.958	65	146	25
Ethyl Acetate	141-78-6	0.0534	0.2	88.106	0.196	0.733	68	136	25
Ethyl Benzene	100-41-4	0.0388	0.2	106.167	0.171	0.883	70	133	25
Hexachlorobutadiene	87-68-3	0.0802	0.2	260.762	0.869	2.17	59	140	25
m&p-Xylene	106-42-3	0.0791	0.4	106.167	0.349	1.77	70	133	25
Methyl Tert Butyl Ether	1634-04-4	0.182	1	88.1492	0.667	3.66	70	132	25
Methylene chloride	75-0902	0.431	1	84.9328	1.52	3.53	67	132	25
Naphthalene	91-20-3	0.112	0.5	128.1732	0.597	2.66	55	136	25
n-Heptane	142-82-5	0.0504	0.2	100.2034	0.210	0.833	64	136	25
n-Hexane	110-54-3	0.0929	0.2	86.1766	0.333	0.716	70	130	25
o-Xylene	95-47-6	0.0840	0.2	106.167	0.371	0.883	70	132	25
Propylene	115-07-1	0.0895	0.2	42.0804	0.157	0.350	37	150	25
Styrene	100-42-5	0.0386	0.2	104.1512	0.167	0.866	70	139	25
Tetrachloroethene	127-18-4	0.0416	0.1	165.834	0.287	0.689	70	133	25
Tetrahydrofuran	109-99-9	0.0913	0.2	72.1066	0.274	0.600	62	141	25
Toluene	108-88-3	0.0416	0.2	92.1402	0.159	0.766	70	130	25
trans-1,2-dichloroethene	156-60-5	0.0731	0.2	96.9438	0.295	0.806	70	132	25
trans-1,3-Dichloropropene	10061-02-6	0.0911	0.2	110.9706	0.420	0.923	70	135	25
Trichloroethene	79-01-6	0.0490	0.1	131.3889	0.268	0.546	70	135	25
Trichlorofluoromethane	75-69-4	0.0732	0.2	137.3684	0.418	1.14	59	140	25
Vinyl Acetate	108-05-4	0.0465	0.2	86.0902	0.166	0.716	57	150	25
Vinyl chloride	75-01-4	0.0486	0.1	62.4987	0.126	0.260	70	141	25

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Pace Analytical Services, LLC
Method Detection Limits and Reporting Limits
by EPA TO15

EXTRA ANALYTES (available upon request at an additional cost)

							LCS		DUP
Analyte	CAS #		PRL (ppbv)	MW	MDL (ug/m^3)	PRL (ug/m^3)	Lower	Upper	RPD
1,2,3-Trimethylbenzene	526-73-8	0.0440	0.2	120.19	0.220	0.999	69	150	25
1,4-Dioxane	123-91-1	0.0966	1	88.1051	0.354	3.66	70	145	25
2,2,4-Trimethylpentane	540-84-1	0.0909	0.5	114.22	0.432	2.37	70	140	25
Acrolein	107-02-8	0.110	0.5	56.06	0.256	1.17	65	150	25
Acrylonitrile	107-13-1	0.148	0.5	53.06	0.326	1.10	64	142	25
Allyl Chloride	107-05-1	0.114	0.5	76.525	0.363	1.59	60	147	25
Chlorodifluoromethane	75-45-6	0.0677	0.2	86.47	0.243	0.719	68	142	25
Di-isopropyl Ether	108-20-3	0.0410	1	102.1748	0.174	4.25	70	136	25
Ethyl Tert-Butyl Ether	637-92-3	0.211	1	102.1748	0.896	4.25	70	136	25
Isopentane	78-78-4	0.0704	0.2	72.15	0.211	0.600	44	150	25
Isopropylbenzene	98-82-8	0.0660	0.5	120.194	0.330	2.50	70	133	25
Methyl Methacrylate	80-62-6	0.0877	0.2	100.12	0.365	0.832	47	150	25
Methylcyclohexane	108-87-2	0.0849	0.2	98.186	0.347	0.816	70	137	25
N-Butylbenzene	104-51-8	0.101	0.5	134.2206	0.564	2.79	70	148	25
N-Propylbenzene	103-65-1	0.0402	0.5	120.1938	0.201	2.50	70	145	25
p-Isopropyltoluene	99-87-6	0.0333	0.2	134.22	0.186	1.12	70	143	25
Sec- Butylbenzene	135-98-8	0.0426	0.5	134.2206	0.238	2.79	70	142	25
Tert Amyl Methyl Ether	994-05-8	0.0385	1	102.1748	0.164	4.25	70	135	25
Tert Butyl Alcohol (TBA)	75-65-0	0.116	1	74.12	0.357	3.08	63	143	25
Tert-Butyl Benzene	98-06-6	0.0478	0.2	166.217	0.330	1.38	70	142	25
Vinyl Bromide	593-60-2	0.0517	1	106.95	0.230	4.45	70	140	25
THC as Gas (C4-C12)		11.95	23.9		51.9	104	59	150	25
Xylene (Total)	1330-20-7	0.0840	0.6	106.17	0.371	2.65	70	138	25

Surrogates								
1,4-Dichlorobenzene-d4 (S)	3855-82-1						30	150
Hexane-d14 (S)	21666-38-6						30	150
Toluene-d8 (S)	2037-26-5						30	150

Highlighted cells are calculated results

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FIGURES

TOPOGRAPHIC MAP

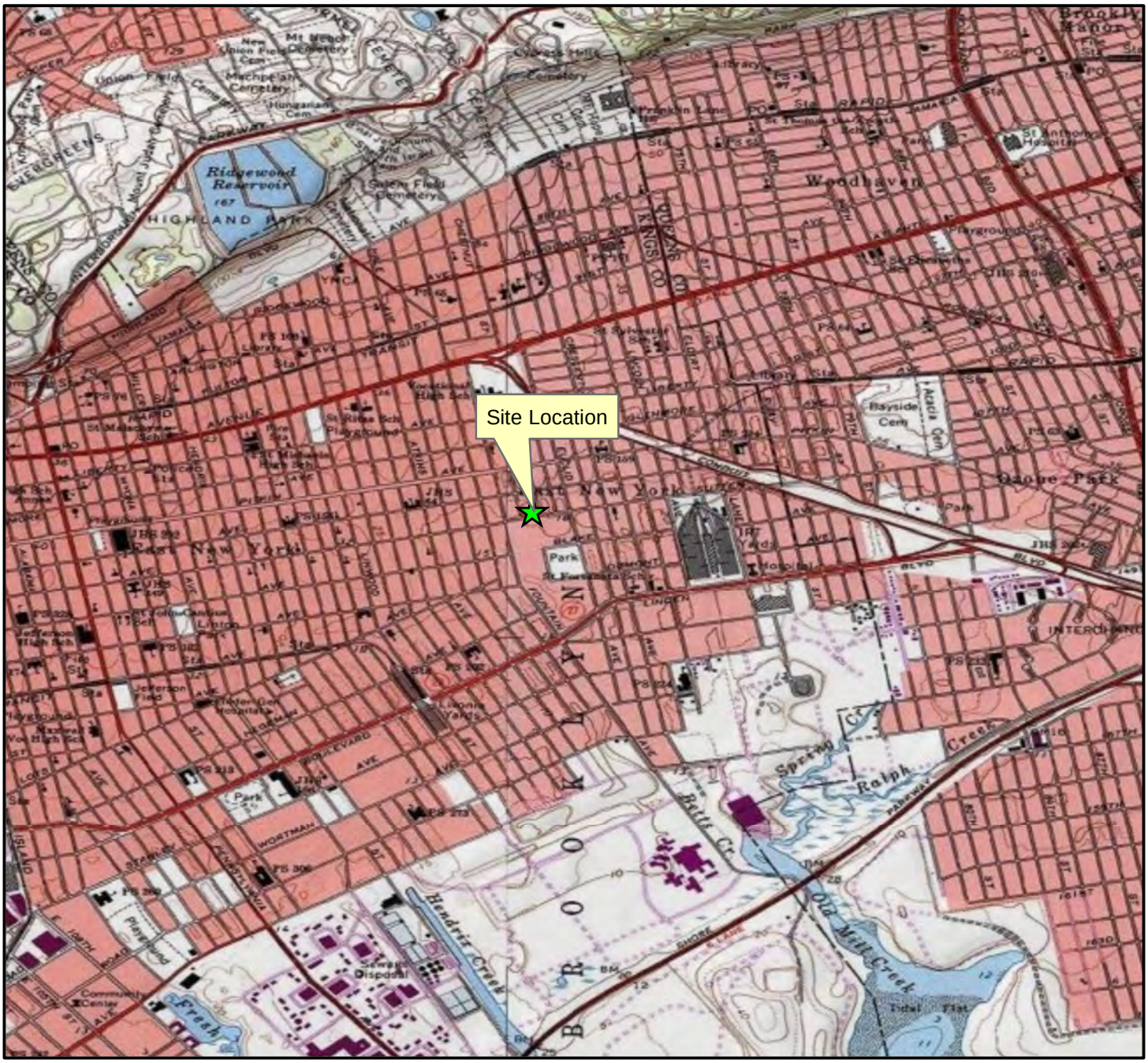

Figure 1
Topographic Map

1199 Sutter Avenue
Brooklyn, NY 11208

USGS Quadrangle:
Brooklyn

Approx. Elevation:
19 feet

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W E
S

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SURROUNDING LAND USE MAP

Figure 2
Surrounding Land Use Map

1199 Sutter Avenue
Brooklyn, NY 11208

N
W E
S

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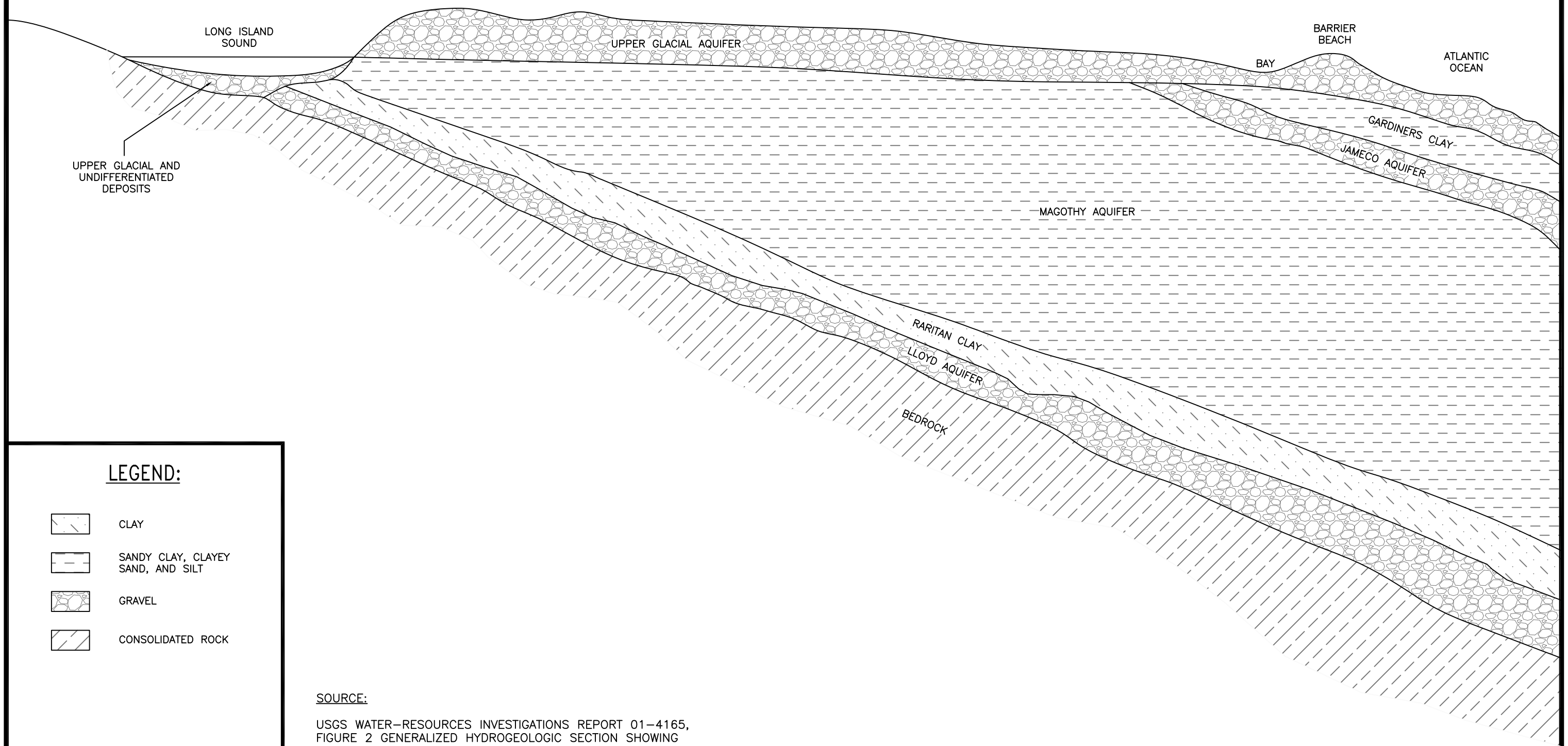
NORTH

SOUTH

CONN.
N.Y.

LONG ISLAND



LEGEND:

- CLAY
- SANDY CLAY, CLAYEY SAND, AND SILT
- GRAVEL
- CONSOLIDATED ROCK

SOURCE:

USGS WATER–RESOURCES INVESTIGATIONS REPORT 01–4165, FIGURE 2 GENERALIZED HYDROGEOLOGIC SECTION SHOWING MAJOR AQUIFERS AND CONFINING UNITS ON LONG ISLAND, N.Y.

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DRAWING IS NOT TO SCALE

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1199 SUTTER AVENUE
BROOKLYN, NEW YORK

GENERALIZED HYDROGEOLOGIC CROSS–SECTION SHOWING LONG ISLAND AQUIFERS

FIGURE # 3

CRYSTAL STREET

CHESTNUT STREET

SUPERMARKET

DELICATESSEN

NAIL SALON

DENTIST OFFICE

SIDEWALK

MW-3S 5.61

MW-3D

MW-9S

MW-4S

MW-10S 5.48

MW-1S 5.43

MW-1D

MW-11S 5.43

MW-2D 5.44

MW-2S

5.60

5.60

5.50

5.50

FORMER DRY CLEANERS
(CURRENT LAUNDROMAT)

5.40

5.40

SUTTER AVENUE

SIDEWALK

MW-6D

MW-6S 5.37

MW-5S 5.38

MW-5D

MW-7S 5.36

MW-7D

NYC HOUSING
AUTHORITY PROPERTY

5.30

5.30

APARTMENT
BUILDING

MW-8S 5.26

MW-8D

APARTMENT
BUILDING

LEGEND:

- BCP AGREEMENT SITE PROPERTY OUTLINE
- GROUNDWATER MONITORING WELL
- GROUNDWATER FLOW DIRECTION
- 5.43 GROUNDWATER ELEVATION (feet)
- GROUNDWATER MEASUREMENTS RECORDED ON 10/29/2018

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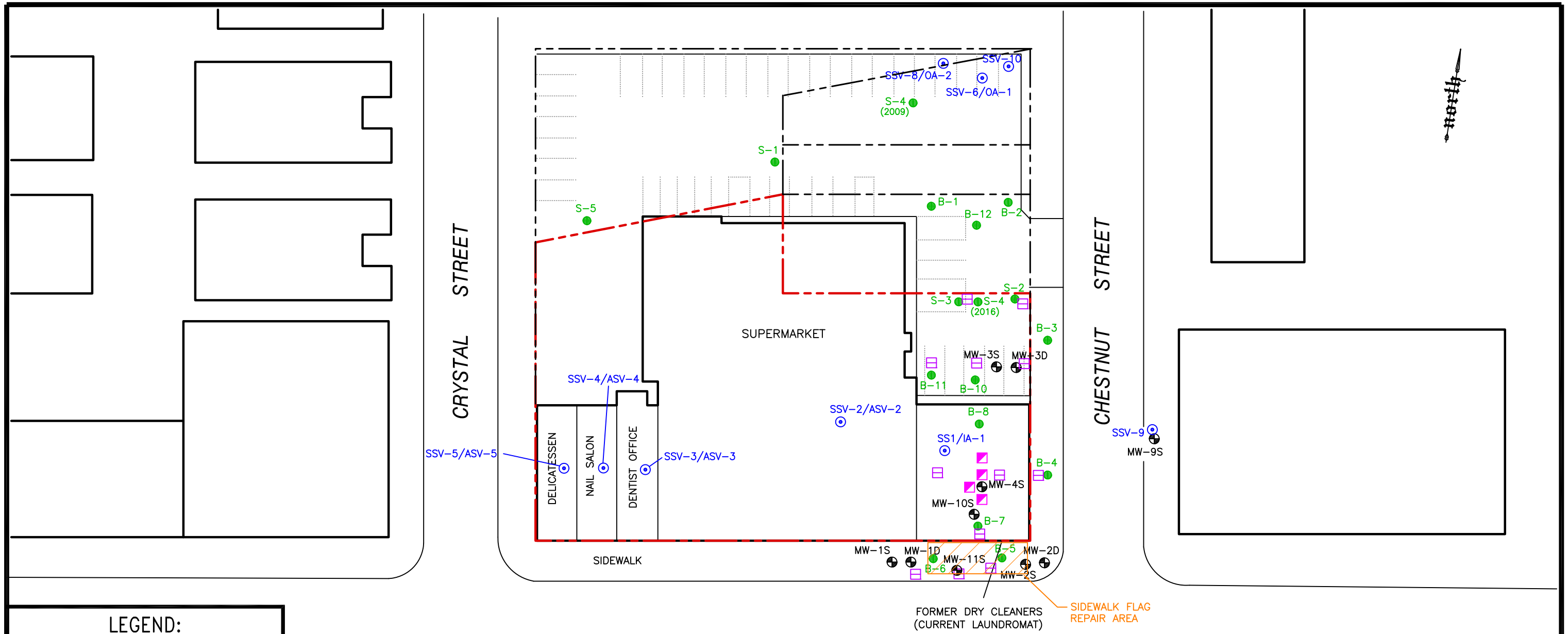
GROUNDWATER CONTOUR MAP

FIGURE # 4



LEGEND:

- BCP AGREEMENT SITE PROPERTY OUTLINE
- GROUNDWATER MONITORING WELL
- SOIL BORING
- SOIL & AMBIENT VAPOR SAMPLE
- SSV — SUB-SLAB SAMPLE
- IA/ASV — INDOOR AIR SAMPLE
- OA — OUTDOOR AIR SAMPLE
- INJECTION WELL (INSTALLED 2009)
- INJECTION WELL (INSTALLED 2017)

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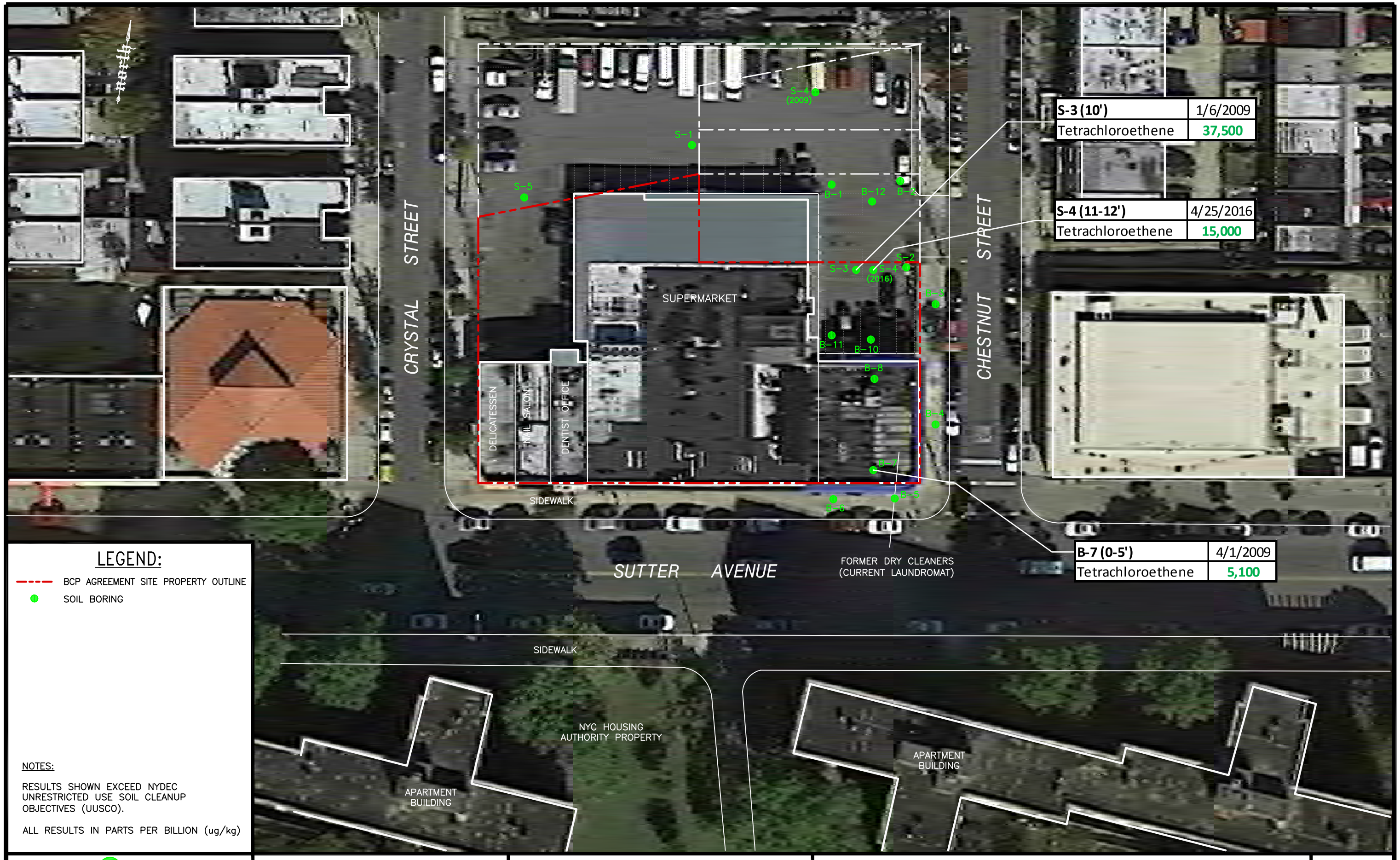
SAMPLE AND INJECTION LOCATIONS 2009 – 2017

FIGURE # 5



LEGEND:

- BCP AGREEMENT SITE PROPERTY OUTLINE
- SOIL BORING

NOTES:

RESULTS SHOWN EXCEED NYDEC UNRESTRICTED USE SOIL CLEANUP OBJECTIVES (UUSCO).

ALL RESULTS IN PARTS PER BILLION (ug/kg)

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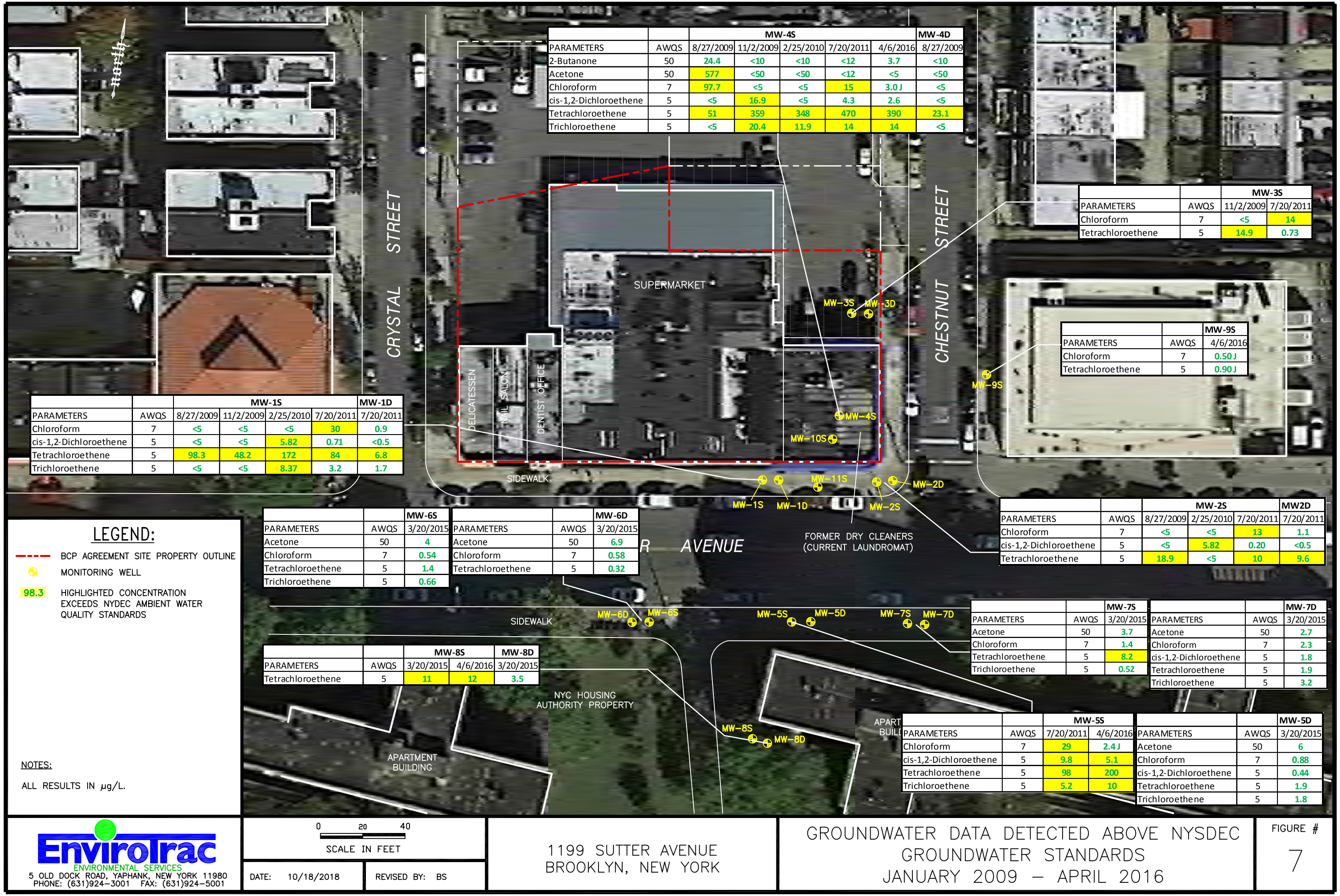
SOIL DATA DETECTED ABOVE NYSDEC SCOs

FIGURE #
6



		MW-4S					MW-4D
PARAMETERS	AWQS	8/27/2009	11/2/2009	2/25/2010	7/20/2011	4/6/2016	8/27/2009
2-Butanone	50	24.4	<10	<10	<12	3.7	<10
Acetone	50	577	<50	<50	<12	<5	<50
Chloroform	7	97.7	<5	<5	15	3.0 J	<5
cis-1,2-Dichloroethene	5	<5	16.9	<5	4.3	2.6	<5
Tetrachloroethene	5	51	359	348	470	390	23.1
Trichloroethene	5	<5	20.4	11.9	14	14	<5

		MW-3S	
PARAMETERS	AWQS	11/2/2009	7/20/2011
Chloroform	7	<5	14
Tetrachloroethene	5	14.9	0.73

		MW-9S
PARAMETERS	AWQS	4/6/2016
Chloroform	7	0.50 J
Tetrachloroethene	5	0.90 J

		MW-1S				MW-1D
PARAMETERS	AWQS	8/27/2009	11/2/2009	2/25/2010	7/20/2011	7/20/2011
Chloroform	7	<5	<5	<5	30	0.9
cis-1,2-Dichloroethene	5	<5	<5	5.82	0.71	<0.5
Tetrachloroethene	5	98.3	48.2	172	84	6.8
Trichloroethene	5	<5	<5	8.37	3.2	1.7

		MW-2S			MW2D
PARAMETERS	AWQS	8/27/2009	2/25/2010	7/20/2011	7/20/2011
Chloroform	7	<5	<5	13	1.1
cis-1,2-Dichloroethene	5	<5	5.82	0.20	<0.5
Tetrachloroethene	5	18.9	<5	10	9.6

		MW-6S
PARAMETERS	AWQS	3/20/2015
Acetone	50	4
Chloroform	7	0.54
Tetrachloroethene	5	1.4
Trichloroethene	5	0.66

		MW-6D
PARAMETERS	AWQS	3/20/2015
Acetone	50	6.9
Chloroform	7	0.58
Tetrachloroethene	5	0.32

		MW-7S
PARAMETERS	AWQS	3/20/2015
Acetone	50	3.7
Chloroform	7	1.4
Tetrachloroethene	5	8.2
Trichloroethene	5	0.52

		MW-7D
PARAMETERS	AWQS	3/20/2015
Acetone	50	2.7
Chloroform	7	2.3
cis-1,2-Dichloroethene	5	1.8
Tetrachloroethene	5	1.9
Trichloroethene	5	3.2

		MW-8S		MW-8D
PARAMETERS	AWQS	3/20/2015	4/6/2016	3/20/2015
Tetrachloroethene	5	11	12	3.5

		MW-5S	
PARAMETERS	AWQS	7/20/2011	4/6/2016
Chloroform	7	29	2.4 J
cis-1,2-Dichloroethene	5	9.8	5.1
Tetrachloroethene	5	98	200
Trichloroethene	5	5.2	10

		MW-5D
PARAMETERS	AWQS	3/20/2015
Acetone	50	6
Chloroform	7	0.88
cis-1,2-Dichloroethene	5	0.44
Tetrachloroethene	5	1.9
Trichloroethene	5	1.8

LEGEND:

- BCP AGREEMENT SITE PROPERTY OUTLINE
- MONITORING WELL
- 98.3 HIGHLIGHTED CONCENTRATION EXCEEDS NYDEC AMBIENT WATER QUALITY STANDARDS

NOTES:

ALL RESULTS IN µg/L.

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GROUNDWATER DATA DETECTED ABOVE NYSDEC GROUNDWATER STANDARDS JANUARY 2009 – APRIL 2016

FIGURE # 7

Sample ID	MW-10S					NYSDEC Groundwater Standards
Sample Date	5/17/2017	6/27/2017	7/27/2017	8/29/2017	8/27/2018	
Volatile Organic Compounds *(in micrograms per liter)*						
Acetone	ND	ND	ND	12.40	<5.00	50
Chloroform	1.50	1.40	ND	ND	<1.00	7
cis-1,2-Dichloroethylene	ND	**6.10**	**5.10**	**5.30**	2.90	5*
Tetrachloroethene	**575**	**363**	**441**	**719**	**234**	5*
Trichloroethene	**21.0**	**16.2**	**13.4**	**16.2**	**7.0**	5*

Sample ID	MW-11S					NYSDEC Groundwater Standards
Sample Date	5/17/2017	6/27/2017	7/27/2017	8/29/2017	8/27/2018	
Volatile Organic Compounds *(in micrograms per liter)*						
Acetone	ND	ND	ND	9.00	<5.00	50
Chloroform	ND	ND	ND	ND	1.90	7
cis-1,2-Dichloroethylene	ND	1.50	3.50	2.50	3.50	5*
Tetrachloroethene	**24.1**	**37.4**	**86.7**	**105.0**	**52.5**	5*
Trichloroethene	1.1	2.0	3.4	4.7	2.4	5*

Sample ID	MW-1S						NYSDEC Groundwater Standards
Sample Date	7/20/2011	5/17/2017	6/27/2017	7/27/2017	8/29/2017	8/27/2018	
Volatile Organic Compounds *(in micrograms per liter)*							
Acetone	ND	ND	ND	ND	18.40	<5.00	50
Chloroform	**30.0**	ND	ND	ND	ND	<1.00	7
cis-1,2-Dichloroethylene	0.71 J	ND	ND	ND	ND	<1.00	5*
Tetrachloroethene	**84.0**	**49.5**	**46.1**	**24.9**	**21.7**	**8.2**	5*
Trichloroethene	3.2	2.1	2.8	1.3	ND	<1.00	5*

Sample ID	MW-2S						NYSDEC Groundwater Standards
Sample Date	7/20/2011	5/17/2017	6/27/2017	7/27/2017	8/29/2017	8/27/2018	
Volatile Organic Compounds *(in micrograms per liter)*							
Acetone	ND	8.90	ND	ND	13.40	<5.00	50
Chloroform	**13.0**	ND	ND	ND	ND	<1.00	7
cis-1,2-Dichloroethylene	0.20 J	ND	ND	ND	ND	<1.00	5*
Tetrachloroethene	**10.0**	2.20	1.10	2.90	1.50	<1.00	5*
Trichloroethene	0.36 J	ND	ND	ND	ND	<1.00	5*

Sample ID	MW-5S						NYSDEC Groundwater Standards
Sample Date	4/6/2016	5/17/2017	6/27/2017	7/27/2017	8/29/2017	8/27/2018	
Volatile Organic Compounds *(in micrograms per liter)*							
Acetone	ND	ND	ND	ND	17.60	<5.00	50
Chloroform	2.4 J	ND	ND	ND	ND	<1.00	7
cis-1,2-Dichloroethylene	**5.10**	ND	**5.30**	4.80	4.70	**5.90**	5*
Tetrachloroethene	**200**	**122**	**128**	**136**	**258**	**151**	5*
Trichloroethene	**10.0**	**7.4**	**8.2**	**7.3**	**9.6**	**8.4**	5*

Sample ID	MW-8S						NYSDEC Groundwater Standards
Sample Date	4/6/2016	5/17/2017	6/27/2017	7/27/2017	8/29/2017	8/27/2018	
Volatile Organic Compounds *(in micrograms per liter)*							
Acetone	ND	ND	ND	ND	ND	<5.00	50
Chloroform	3.3 J	ND	ND	ND	ND	<1.00	7
cis-1,2-Dichloroethylene	0.34 J	ND	ND	ND	ND	<1.00	5*
Tetrachloroethene	**12.0**	**5.5**	4.3	4.4	**8.4**	**5.7**	5*
Trichloroethene	0.62 J	ND	ND	ND	ND	<1.00	5*

LEGEND:

- BCP AGREEMENT SITE PROPERTY OUTLINE
- MONITORING WELL
- PCE GROUNDWATER PLUME CONTOUR DATA COLLECTED: 8/27/2018
- ND — NOT DETECTED
- * — THE PRINCIPAL ORGANIC COMPOUND STANDARD APPLIES

NOTES:

ONLY DETECTED ANALYTES ARE REPORTED.

BOLD VALUES INDICATE AN EXCEEDANCE OF THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYSDEC) CLASS GA AMBIENT WATER QUALITY STANDARDS.

RESULTS GIVEN IN MICROGRAMS PER LITER (µg/L).

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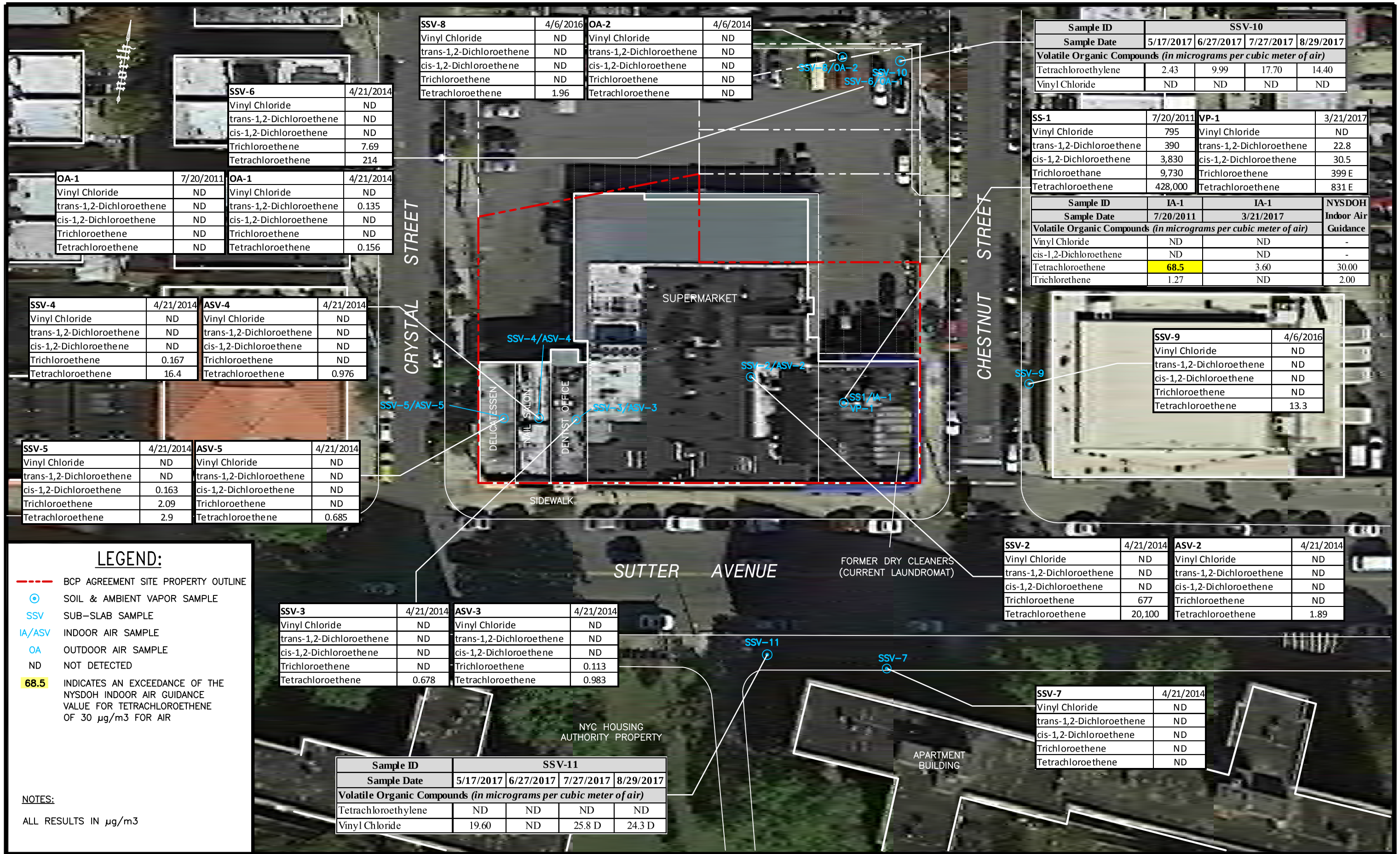
GROUNDWATER DATA DETECTED ABOVE NYSDEC GROUNDWATER STANDARDS JULY 2011 – AUGUST 2018

FIGURE # 8



SSV-8	4/6/2016
Vinyl Chloride	ND
trans-1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
Trichloroethene	ND
Tetrachloroethene	1.96

OA-2	4/6/2014
Vinyl Chloride	ND
trans-1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
Trichloroethene	ND
Tetrachloroethene	ND

SSV-6	4/21/2014
Vinyl Chloride	ND
trans-1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
Trichloroethene	7.69
Tetrachloroethene	214

OA-1	7/20/2011
Vinyl Chloride	ND
trans-1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
Trichloroethene	ND
Tetrachloroethene	ND

OA-1	4/21/2014
Vinyl Chloride	ND
trans-1,2-Dichloroethene	0.135
cis-1,2-Dichloroethene	ND
Trichloroethene	ND
Tetrachloroethene	0.156

SSV-4	4/21/2014
Vinyl Chloride	ND
trans-1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
Trichloroethene	0.167
Tetrachloroethene	16.4

ASV-4	4/21/2014
Vinyl Chloride	ND
trans-1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
Trichloroethene	ND
Tetrachloroethene	0.976

SSV-5	4/21/2014
Vinyl Chloride	ND
trans-1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	0.163
Trichloroethene	2.09
Tetrachloroethene	2.9

ASV-5	4/21/2014
Vinyl Chloride	ND
trans-1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
Trichloroethene	ND
Tetrachloroethene	0.685

Sample ID	SSV-10			
Sample Date	5/17/2017	6/27/2017	7/27/2017	8/29/2017
Volatile Organic Compounds *(in micrograms per cubic meter of air)*				
Tetrachloroethylene	2.43	9.99	17.70	14.40
Vinyl Chloride	ND	ND	ND	ND

SS-1	7/20/2011
Vinyl Chloride	795
trans-1,2-Dichloroethene	390
cis-1,2-Dichloroethene	3,830
Trichloroethane	9,730
Tetrachloroethene	428,000

VP-1	3/21/2017
Vinyl Chloride	ND
trans-1,2-Dichloroethene	22.8
cis-1,2-Dichloroethene	30.5
Trichloroethene	399 E
Tetrachloroethene	831 E

Sample ID	IA-1	IA-1	NYSDOH
Sample Date	7/20/2011	3/21/2017	Indoor Air
Volatile Organic Compounds *(in micrograms per cubic meter of air)*			Guidance
Vinyl Chloride	ND	ND	-
cis-1,2-Dichloroethene	ND	ND	-
Tetrachloroethene	**68.5**	3.60	30.00
Trichlorethene	1.27	ND	2.00

SSV-9	4/6/2016
Vinyl Chloride	ND
trans-1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
Trichloroethene	ND
Tetrachloroethene	13.3

SSV-2	4/21/2014
Vinyl Chloride	ND
trans-1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
Trichloroethene	677
Tetrachloroethene	20,100

ASV-2	4/21/2014
Vinyl Chloride	ND
trans-1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
Trichloroethene	ND
Tetrachloroethene	1.89

SSV-3	4/21/2014
Vinyl Chloride	ND
trans-1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
Trichloroethene	ND
Tetrachloroethene	0.678

ASV-3	4/21/2014
Vinyl Chloride	ND
trans-1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
Trichloroethene	0.113
Tetrachloroethene	0.983

SSV-7	4/21/2014
Vinyl Chloride	ND
trans-1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
Trichloroethene	ND
Tetrachloroethene	ND

Sample ID	SSV-11			
Sample Date	5/17/2017	6/27/2017	7/27/2017	8/29/2017
Volatile Organic Compounds *(in micrograms per cubic meter of air)*				
Tetrachloroethylene	ND	ND	ND	ND
Vinyl Chloride	19.60	ND	25.8 D	24.3 D

LEGEND:

- BCP AGREEMENT SITE PROPERTY OUTLINE
- SOIL & AMBIENT VAPOR SAMPLE
- SSV — SUB–SLAB SAMPLE
- IA/ASV — INDOOR AIR SAMPLE
- OA — OUTDOOR AIR SAMPLE
- ND — NOT DETECTED
- **68.5** — INDICATES AN EXCEEDANCE OF THE NYSDOH INDOOR AIR GUIDANCE VALUE FOR TETRACHLOROETHENE OF 30 µg/m3 FOR AIR

NOTES:

ALL RESULTS IN µg/m3

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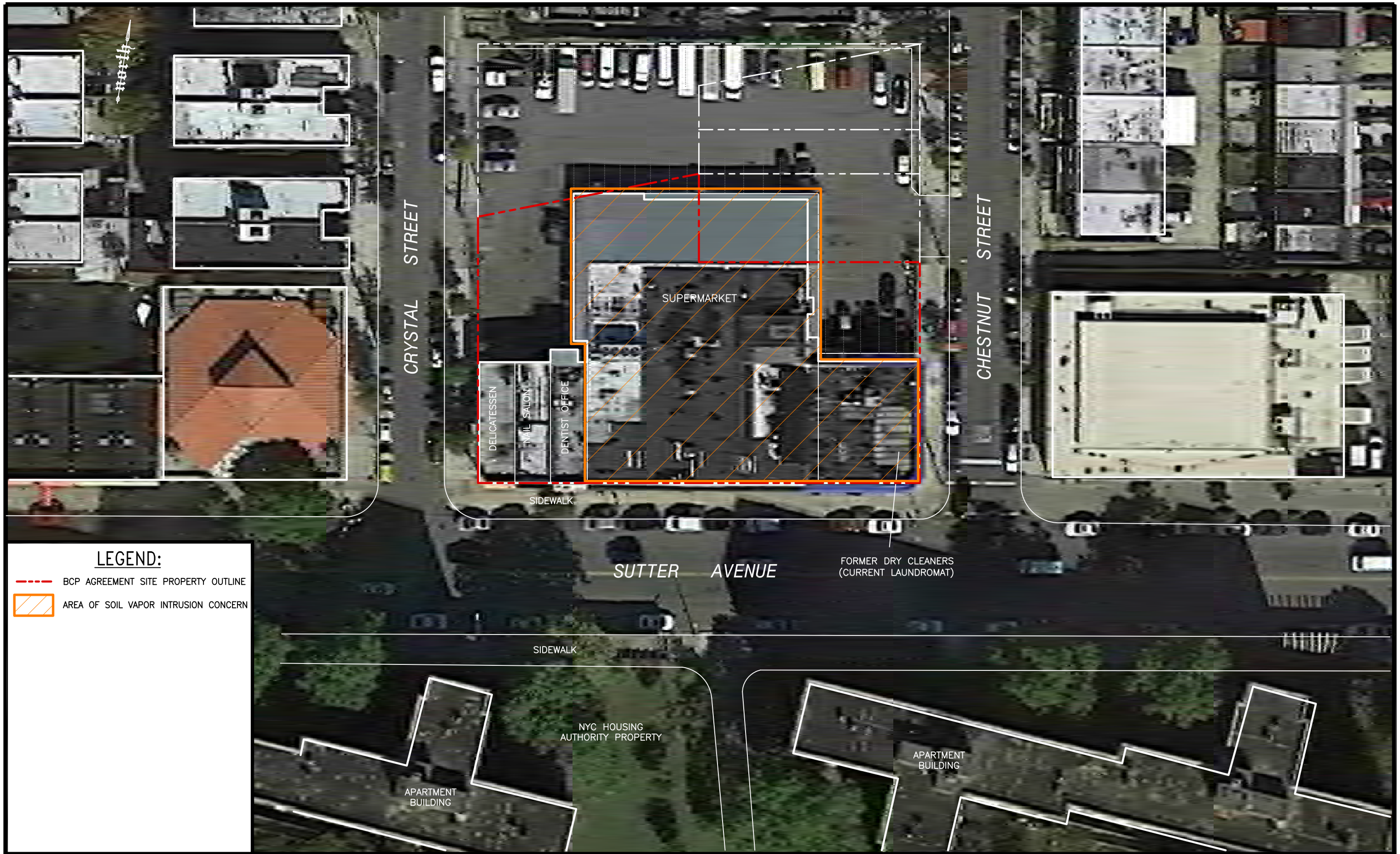
SOIL VAPOR/SOIL GAS/AMBIENT AIR DATA MAP
JULY 2011 – AUGUST 2017

FIGURE # 9



LEGEND:

- BCP AGREEMENT SITE PROPERTY OUTLINE
- AREA OF SOIL VAPOR INTRUSION CONCERN

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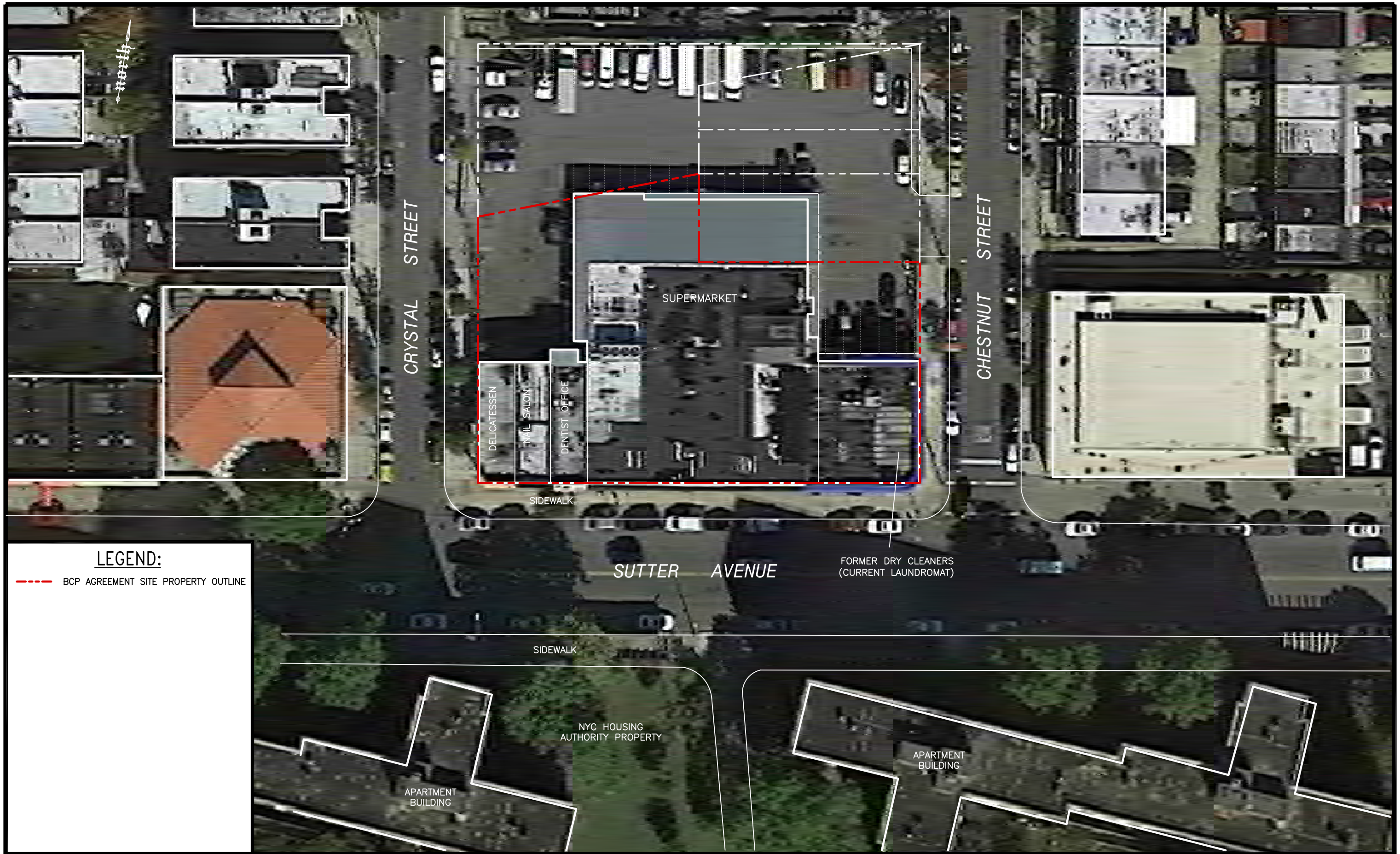
AREA OF SOIL VAPOR INTRUSION CONCERN

FIGURE #
10



LEGEND:

BCP AGREEMENT SITE PROPERTY OUTLINE

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0 20 40
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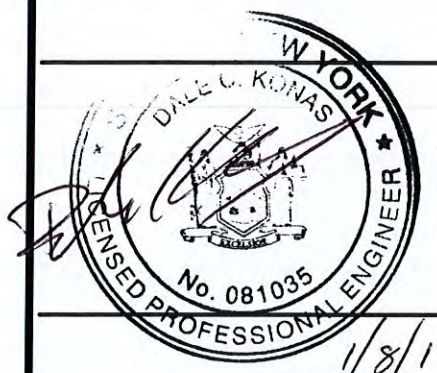
INSTITUTIONAL CONTROL BOUNDARIES

FIGURE #
11



1/8/19

CRYSTAL STREET

SIDEWALK OVERHANG

SIDEWALK OVERHANG

VMP-1 −0.150

SVE/SSD-1

SVE/SSD-2

VMP-2 −0.786

SUPERMARKET BASEMENT

BLOWERS

MW-3S

MW-3D

SVE/SSD-3

VMP-5 −0.840

SVE/SSD-4

VMP-6 −0.031

SVE/SSD-7

MW-4S

SVE/SSD-5

SVE/SSD-6

MW-10S

VMP-7 −0.075

SVE/SSD-8

VMP-3 −1.588

VMP-4 −1.199

DELICATESSEN

NAIL SALON

DENTIST OFFICE

SIDEWALK

MW-1S

MW-1D

MW-2D

MW-2S

MW-11S

FORMER DRY CLEANERS (CURRENT LAUNDROMAT)

SUTTER AVENUE

CHESTNUT STREET

REMEDIATION SHED LOCATION

MW-9S

LEGEND:

- BCP AGREEMENT SITE PROPERTY OUTLINE
- GROUNDWATER MONITORING WELL
- VAPOR MONITORING POINT
- EXISTING SVE/SSDS PIPING
- EXISTING SVE/SSDS WELL
- −0.150 VACUUM (IN INCHES OF WATER) SAMPLE DATE: 5/25/2017
- AIR SPARGE WELL
- SOIL VAPOR EXTRACTION WELL
- SVE PIPING
- AS PIPING
- 30 FT. SVE RADIUS OF INFLUENCE
- 20 FT. AS RADIUS OF INFLUENCE

NOTE:

COVER SYSTEM CONSISTS OF PAVED CONCRETE AND ASPHALT AND BUILDING FOUNDATION PRESENT WITHIN THE SITE BOUNDARY.

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ENVIRONMENTAL SERVICES
5 OLD DOCK ROAD, YAPHANK, NEW YORK 11980
PHONE: (631)924-3001 FAX: (631)924-5001

0 15 30
SCALE IN FEET

DATE: 10/30/2018

REVISED BY: BS

1199 SUTTER AVENUE
BROOKLYN, NEW YORK

AS-BUILT: ENGINEERING CONTROLS LOCATIONS SVE/AS REMEDIATION SYSTEM/SSDS MITIGATION SYSTEM AND COVER SYSTEM

FIGURE # 12

APPENDICES

APPENDIX A – ENVIRONMENTAL EASEMENT

NYC DEPARTMENT OF FINANCE
OFFICE OF THE CITY REGISTER

This page is part of the instrument. The City Register will rely on the information provided by you on this page for purposes of indexing this instrument.The information on this page will control for indexing purposes in the event of any conflict with the rest of the document.

2018112800862001002E64A7

RECORDING AND ENDORSEMENT COVER PAGE **PAGE 1 OF 10**

Document ID: 2018112800862001 Document Date: 11-07-2018 Preparation Date: 12-07-2018
Document Type: EASEMENT
Document Page Count: 9

PRESENTER:
TITLEVEST AGENCY
110 EAST 42ND STREET,R-KI-675070
10TH FLOOR
NEW YORK, NY 10017
212-757-5800
RECORDINGS@TITLEVEST.COM

RETURN TO:
TITLEVEST AGENCY
110 EAST 42ND STREET,R-KI-675070
10TH FLOOR
NEW YORK, NY 10017
212-757-5800
RECORDINGS@TITLEVEST.COM

PROPERTY DATA

Borough	Block	Lot	Unit	Address
BROOKLYN	4248	1	Entire Lot	1199 SUTTER AVENUE

Property Type: OTHER

CROSS REFERENCE DATA

CRFN_____ *or* DocumentID_____ *or* _____ Year____ Reel____ Page_____ *or* File Number_____

PARTIES

GRANTOR/SELLER:
AAA SUTTER REALTY LLC
153 SEVENTH STREET
GARDEN CITY, NY 11530

GRANTEE/BUYER:
NYS DEPT. OF ENVIRONMENTAL CONSERVATION
625 BROADWAY
ALBANY, NY 12207

FEES AND TAXES

Mortgage :

Mortgage Amount:	$	0.00
Taxable Mortgage Amount:	$	0.00
Exemption:		
TAXES: County (Basic):	$	0.00
City (Additional):	$	0.00
Spec (Additional):	$	0.00
TASF:	$	0.00
MTA:	$	0.00
NYCTA:	$	0.00
Additional MRT:	$	0.00
TOTAL:	$	0.00
Recording Fee:	$	82.00
Affidavit Fee:	$	0.00

Filing Fee: $ 100.00

NYC Real Property Transfer Tax: $ 0.00

NYS Real Estate Transfer Tax: $ 0.00

RECORDED OR FILED IN THE OFFICE OF THE CITY REGISTER OF THE CITY OF NEW YORK
Recorded/Filed 12-07-2018 16:31
City Register File No.(CRFN): **2018000405070**

City Register Official Signature

ENVIRONMENTAL EASEMENT GRANTED PURSUANT TO ARTICLE 71, TITLE 36 OF THE NEW YORK STATE ENVIRONMENTAL CONSERVATION LAW

THIS INDENTURE made this 7th day of November, 2018 between Owner(s) AAA Sutter Realty, LLC, having an office at 153-157 Seventh Street, Garden City, New York 11530, County of Nassau, State of New York (the "Grantor"), and The People of the State of New York (the "Grantee."), acting through their Commissioner of the Department of Environmental Conservation (the "Commissioner", or "NYSDEC" or "Department" as the context requires) with its headquarters located at 625 Broadway, Albany, New York 12233,

WHEREAS, the Legislature of the State of New York has declared that it is in the public interest to encourage the remediation of abandoned and likely contaminated properties ("sites") that threaten the health and vitality of the communities they burden while at the same time ensuring the protection of public health and the environment; and

WHEREAS, the Legislature of the State of New York has declared that it is in the public interest to establish within the Department a statutory environmental remediation program that includes the use of Environmental Easements as an enforceable means of ensuring the performance of operation, maintenance, and/or monitoring requirements and the restriction of future uses of the land, when an environmental remediation project leaves residual contamination at levels that have been determined to be safe for a specific use, but not all uses, or which includes engineered structures that must be maintained or protected against damage to perform properly and be effective, or which requires groundwater use or soil management restrictions; and

WHEREAS, the Legislature of the State of New York has declared that Environmental Easement shall mean an interest in real property, created under and subject to the provisions of Article 71, Title 36 of the New York State Environmental Conservation Law ("ECL") which contains a use restriction and/or a prohibition on the use of land in a manner inconsistent with engineering controls which are intended to ensure the long term effectiveness of a site remedial program or eliminate potential exposure pathways to hazardous waste or petroleum; and

WHEREAS, Grantor, is the owner of real property located at the address of 1199-1221 Sutter Avenue in the City of New York, County of Kings and State of New York, known and designated on the tax map of the New York City Department of Finance as tax map parcel number: Block 4248 Lot 1, being a portion of the property conveyed to Grantor by deed dated June 19, 2009 and recorded in the City Register of the City of New York as CRFN # 2009000199791. The property subject to this Environmental Easement (the "Controlled Property") comprises approximately 0.532 +/- acres, and is hereinafter more fully described in the Land Title Survey dated June 15, 2015 and last revised October 8, 2018 prepared by Jaroslava Vonder, P.L.S., which will be attached to the Site Management Plan. The Controlled Property description is set forth in and attached hereto as Schedule A; and

WHEREAS, the Department accepts this Environmental Easement in order to ensure the protection of public health and the environment and to achieve the requirements for remediation established for the Controlled Property until such time as this Environmental Easement is

extinguished pursuant to ECL Article 71, Title 36; and

NOW THEREFORE, in consideration of the mutual covenants contained herein and the terms and conditions of Brownfield Cleanup Agreement Index Number: C224141-04-13, Grantor conveys to Grantee a permanent Environmental Easement pursuant to ECL Article 71, Title 36 in, on, over, under, and upon the Controlled Property as more fully described herein ("Environmental Easement").

1. Purposes. Grantor and Grantee acknowledge that the Purposes of this Environmental Easement are: to convey to Grantee real property rights and interests that will run with the land in perpetuity in order to provide an effective and enforceable means of encouraging the reuse and redevelopment of this Controlled Property at a level that has been determined to be safe for a specific use while ensuring the performance of operation, maintenance, and/or monitoring requirements; and to ensure the restriction of future uses of the land that are inconsistent with the above-stated purpose.

2. Institutional and Engineering Controls. The controls and requirements listed in the Department approved Site Management Plan ("SMP") including any and all Department approved amendments to the SMP are incorporated into and made part of this Environmental Easement. These controls and requirements apply to the use of the Controlled Property, run with the land, are binding on the Grantor and the Grantor's successors and assigns, and are enforceable in law or equity against any owner of the Controlled Property, any lessees and any person using the Controlled Property.

A. (1) The Controlled Property may be used for:

Restricted Residential as described in 6 NYCRR Part 375-1.8(g)(2)(ii), Commercial as described in 6 NYCRR Part 375-1.8(g)(2)(iii) and Industrial as described in 6 NYCRR Part 375-1.8(g)(2)(iv)

(2) All Engineering Controls must be operated and maintained as specified in the Site Management Plan (SMP);

(3) All Engineering Controls must be inspected at a frequency and in a manner defined in the SMP;

(4) The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the New York City Department of Health and Mental Hygiene to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department;

(5) Groundwater and other environmental or public health monitoring must be performed as defined in the SMP;

(6) Data and information pertinent to Site Management of the Controlled Property must be reported at the frequency and in a manner defined in the SMP;

(7) All future activities on the property that will disturb remaining contaminated material must be conducted in accordance with the SMP;

(8) Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in the SMP;

(9) Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical components of the remedy shall be performed as defined in the SMP;

(10) Access to the site must be provided to agents, employees or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by this Environmental Easement.

B. The Controlled Property shall not be used for Residential purposes as defined in 6NYCRR 375-1.8(g)(2)(i), and the above-stated engineering controls may not be discontinued without an amendment or extinguishment of this Environmental Easement.

C. The SMP describes obligations that the Grantor assumes on behalf of Grantor, its successors and assigns. The Grantor's assumption of the obligations contained in the SMP which may include sampling, monitoring, and/or operating a treatment system, and providing certified reports to the NYSDEC, is and remains a fundamental element of the Department's determination that the Controlled Property is safe for a specific use, but not all uses. The SMP may be modified in accordance with the Department's statutory and regulatory authority. The Grantor and all successors and assigns, assume the burden of complying with the SMP and obtaining an up-to-date version of the SMP from:

Site Control Section
Division of Environmental Remediation
NYSDEC
625 Broadway
Albany, New York 12233
Phone: (518) 402-9553

D. Grantor must provide all persons who acquire any interest in the Controlled Property a true and complete copy of the SMP that the Department approves for the Controlled Property and all Department-approved amendments to that SMP.

E. Grantor covenants and agrees that until such time as the Environmental Easement is extinguished in accordance with the requirements of ECL Article 71, Title 36 of the ECL, the property deed and all subsequent instruments of conveyance relating to the Controlled Property shall state in at least fifteen-point bold-faced type:

This property is subject to an Environmental Easement held by the New York State Department of Environmental Conservation

pursuant to Title 36 of Article 71 of the Environmental Conservation Law.

F. Grantor covenants and agrees that this Environmental Easement shall be incorporated in full or by reference in any leases, licenses, or other instruments granting a right to use the Controlled Property.

G. Grantor covenants and agrees that it shall, at such time as NYSDEC may require, submit to NYSDEC a written statement by an expert the NYSDEC may find acceptable certifying under penalty of perjury, in such form and manner as the Department may require, that:

(1) the inspection of the site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under the direction of the individual set forth at 6 NYCRR Part 375-1.8(h)(3).

(2) the institutional controls and/or engineering controls employed at such site:

(i) are in-place;

(ii) are unchanged from the previous certification, or that any identified changes to the controls employed were approved by the NYSDEC and that all controls are in the Department-approved format; and

(iii) that nothing has occurred that would impair the ability of such control to protect the public health and environment;

(3) the owner will continue to allow access to such real property to evaluate the continued maintenance of such controls;

(4) nothing has occurred that would constitute a violation or failure to comply with any site management plan for such controls;

(5) the report and all attachments were prepared under the direction of, and reviewed by, the party making the certification;

(6) to the best of his/her knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program, and generally accepted engineering practices; and

(7) the information presented is accurate and complete.

3. Right to Enter and Inspect. Grantee, its agents, employees, or other representatives of the State may enter and inspect the Controlled Property in a reasonable manner and at reasonable times to assure compliance with the above-stated restrictions.

4. Reserved Grantor's Rights. Grantor reserves for itself, its assigns, representatives, and successors in interest with respect to the Property, all rights as fee owner of the Property, including:

A. Use of the Controlled Property for all purposes not inconsistent with, or limited by the terms of this Environmental Easement;

B. The right to give, sell, assign, or otherwise transfer part or all of the underlying fee interest to the Controlled Property, subject and subordinate to this Environmental Easement;

5. Enforcement

A. This Environmental Easement is enforceable in law or equity in perpetuity by Grantor, Grantee, or any affected local government, as defined in ECL Section 71-3603, against the owner of the Property, any lessees, and any person using the land. Enforcement shall not be defeated because of any subsequent adverse possession, laches, estoppel, or waiver. It is not a defense in any action to enforce this Environmental Easement that: it is not appurtenant to an interest in real property; it is not of a character that has been recognized traditionally at common law; it imposes a negative burden; it imposes affirmative obligations upon the owner of any interest in the burdened property; the benefit does not touch or concern real property; there is no privity of estate or of contract; or it imposes an unreasonable restraint on alienation.

B. If any person violates this Environmental Easement, the Grantee may revoke the Certificate of Completion with respect to the Controlled Property.

C. Grantee shall notify Grantor of a breach or suspected breach of any of the terms of this Environmental Easement. Such notice shall set forth how Grantor can cure such breach or suspected breach and give Grantor a reasonable amount of time from the date of receipt of notice in which to cure. At the expiration of such period of time to cure, or any extensions granted by Grantee, the Grantee shall notify Grantor of any failure to adequately cure the breach or suspected breach, and Grantee may take any other appropriate action reasonably necessary to remedy any breach of this Environmental Easement, including the commencement of any proceedings in accordance with applicable law.

D. The failure of Grantee to enforce any of the terms contained herein shall not be deemed a waiver of any such term nor bar any enforcement rights.

6. Notice. Whenever notice to the Grantee (other than the annual certification) or approval from the Grantee is required, the Party providing such notice or seeking such approval shall identify the Controlled Property by referencing the following information:

County, NYSDEC Site Number, NYSDEC Brownfield Cleanup Agreement, State Assistance Contract or Order Number, and the County tax map number or the Liber and Page or computerized system identification number.

Parties shall address correspondence to:

Site Number: C224141
Office of General Counsel
NYSDEC
625 Broadway
Albany New York 12233-5500

With a copy to:

Site Control Section
Division of Environmental Remediation
NYSDEC
625 Broadway
Albany, NY 12233

All notices and correspondence shall be delivered by hand, by registered mail or by Certified mail and return receipt requested. The Parties may provide for other means of receiving and

communicating notices and responses to requests for approval.

7. Recordation. Grantor shall record this instrument, within thirty (30) days of execution of this instrument by the Commissioner or her/his authorized representative in the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

8. Amendment. Any amendment to this Environmental Easement may only be executed by the Commissioner of the New York State Department of Environmental Conservation or the Commissioner's Designee, and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

9. Extinguishment. This Environmental Easement may be extinguished only by a release by the Commissioner of the New York State Department of Environmental Conservation, or the Commissioner's Designee, and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

10. Joint Obligation. If there are two or more parties identified as Grantor herein, the obligations imposed by this instrument upon them shall be joint and several.

11. Consistency with the SMP. To the extent there is any conflict or inconsistency between the terms of this Environmental Easement and the SMP, regarding matters specifically addressed by the SMP, the terms of the SMP will control.

Remainder of Page Intentionally Left Blank

IN WITNESS WHEREOF, Grantor has caused this instrument to be signed in its name.

AAA Sutter Realty, LLC:

By: _____

Print Name: ANTHONY BILEDDO

Title: PRESIDENT Date: 10/25/2018

Grantor's Acknowledgment

STATE OF NEW YORK)
) ss:
COUNTY OF Nassau)

On the 25th day of October, in the year 20 18, before me, the undersigned, personally appeared Anthony Bileddo, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted, executed the instrument.

_____
Notary Public - State of New York

ARISTIDIS S VOUZAKIS
Notary Public - State of New York
NO. 01V06232115
Qualified in Nassau County
My Commission Expires 12/6/18

THIS ENVIRONMENTAL EASEMENT IS HEREBY ACCEPTED BY THE PEOPLE OF THE STATE OF NEW YORK, Acting By and Through the Department of Environmental Conservation as Designee of the Commissioner,

By: _____
Michael J. Ryan, Director
Division of Environmental Remediation

Grantee's Acknowledgment

STATE OF NEW YORK)
) ss:
COUNTY OF ALBANY)

On the 7th day of November, in the year 2018 before me, the undersigned, personally appeared Michael J. Ryan, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/ executed the same in his/her/ capacity as Designee of the Commissioner of the State of New York Department of Environmental Conservation, and that by his/her/ signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

_____
Notary Public - State of New York

David J. Chiusano
Notary Public, State of New York
No. 01CH5032146
Qualified in Schenectady County
Commission Expires August 22, 2021

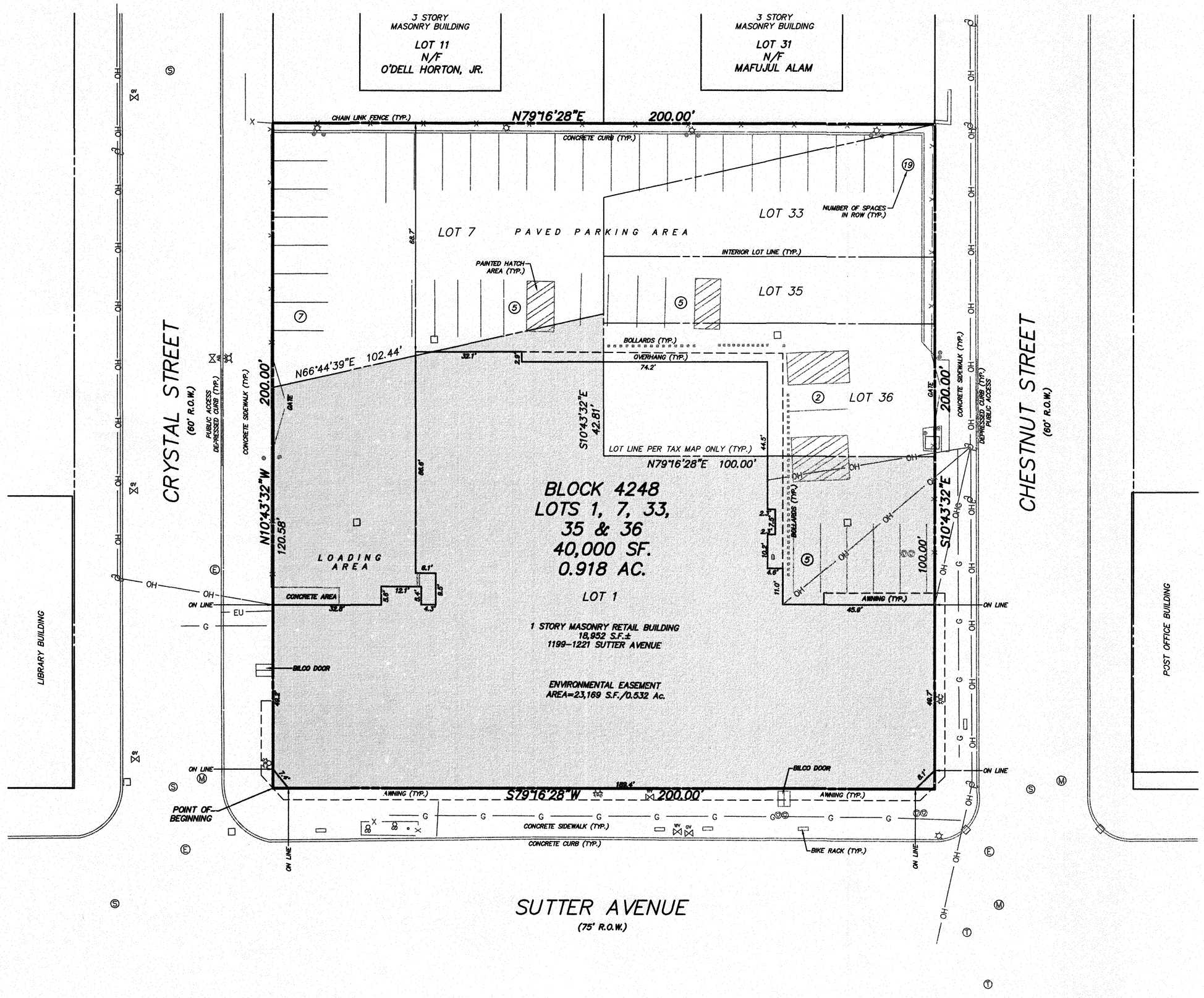
SCHEDULE "A" PROPERTY DESCRIPTION

Block 4248, Lot 1
Borough of Brooklyn
Kings County, New York

Beginning at a point, said point being the intersection of the northerly right-of-way line of Sutter Avenue (75 foot wide right-of-way) with the easterly right-of-way of Crystal Street (60 foot wide right-of-way), and running, thence:

1. Along said easterly right-of-way line, north 10°43'32" west a distance of 120.58 feet to a point, thence;
2. Leaving said right-of-way line, along the northerly line of Lot 1 north 66°44'39" east, a distance of 102.44 feet to a point, thence;
3. Along the westerly line of Lot 36, south 10°43'32" east, a distance of 42.81 feet to a point, thence;
4. Along the northerly line of Lot 1, north 79°16'28" east, a distance of 100.00 feet to a point on the westerly right-of-way line of Chestnut Street (60 foot wide right-of-way), thence;
5. Along said westerly right-of-way line of Chestnut Street, south 10°43'32" east, a distance of 100.00 feet to a point of intersection of the westerly right-of-way line of Chestnut Street with the northerly right-of-way line of Sutter Avenue (75 foot wide right-of-way), thence;
6. Along the northerly right-of-way line of Sutter Avenue, south 79°16'28" west, a distance of 200.00 feet to the point of beginning.

Containing an area of 23,169 square feet or 0.532 acres.



THIS SURVEY IS CERTIFIED TO

New York State Department of Environmental Conservation. This property is subject to an environmental easement held by the New York State Department of Environmental Conservation pursuant to Title 36 of Article 71 of the New York Environmental Conservation Law. The engineering and institutional controls for this Easement are set forth in the Site Management Plan (SMP). A copy of the SMP must be obtained by any party with an interest in the property. The SMP can be obtained from NYS Department of Environmental Conservation, Division of Environmental Remediation, Site Control Section, 625 Broadway, Albany, New York 12233 or at "derweb@dec.ny.gov".

ENVIRONMENTAL EASEMENT AREA DESCRIPTION
D.E.C. SITE NUMBER C224141

BLOCK 4248, PORTIONS OF LOT 1
BOROUGH OF BROOKLYN
KINGS COUNTY, NEW YORK

BEGINNING AT A POINT, SAID POINT BEING THE INTERSECTION OF THE NORTHERLY RIGHT-OF-WAY LINE OF SUTTER AVENUE (75 FOOT WIDE RIGHT-OF-WAY) WITH THE EASTERLY RIGHT-OF-WAY OF CRYSTAL STREET (60 FOOT WIDE RIGHT-OF-WAY), AND RUNNING, THENCE;

1. ALONG SAID EASTERLY RIGHT-OF-WAY LINE, NORTH 10°43'32" WEST A DISTANCE OF 120.58 FEET TO A POINT, THENCE;
2. LEAVING SAID RIGHT-OF-WAY LINE, ALONG THE NORTHERLY LINE OF LOT 1 NORTH 66°44'39" EAST, A DISTANCE OF 102.44 FEET TO A POINT, THENCE;
3. ALONG THE WESTERLY LINE OF LOT 36, SOUTH 10°43'32" EAST, A DISTANCE OF 42.81 FEET TO A POINT, THENCE;
4. ALONG THE NORTHERLY LINE OF LOT 1, NORTH 79°16'28" EAST, A DISTANCE OF 100.00 FEET TO A POINT ON THE WESTERLY RIGHT-OF-WAY LINE OF CHESTNUT STREET (60 FOOT WIDE RIGHT-OF-WAY), THENCE;
5. ALONG SAID WESTERLY RIGHT-OF-WAY LINE OF CHESTNUT STREET, SOUTH 10°43'32" EAST, A DISTANCE OF 100.00 FEET TO A POINT OF INTERSECTION OF THE WESTERLY RIGHT-OF-WAY LINE OF CHESTNUT STREET WITH THE NORTHERLY RIGHT-OF-WAY LINE OF SUTTER AVENUE (75 FOOT WIDE RIGHT-OF-WAY), THENCE;
6. ALONG THE NORTHERLY RIGHT-OF-WAY LINE OF SUTTER AVENUE, SOUTH 79°16'28" WEST, A DISTANCE OF 200.00 FEET TO THE POINT OF BEGINNING.

CONTAINING AN AREA OF 23,169 SQUARE FEET OR 0.532 ACRES.

LEGAL DESCRIPTION OF THE ENTIRE PARCEL

BLOCK 4248, LOTS 1, 7, 33, 35 & 36
BOROUGH OF BROOKLYN
KINGS COUNTY, NEW YORK

BEGINNING AT A POINT, SAID POINT BEING THE INTERSECTION OF THE NORTHERLY RIGHT-OF-WAY OF SUTTER AVENUE (75 FOOT WIDE RIGHT-OF-WAY) WITH THE EASTERLY RIGHT-OF-WAY OF CRYSTAL STREET (60 FOOT WIDE RIGHT-OF-WAY), AND RUNNING, THENCE;

1. ALONG SAID EASTERLY RIGHT OF WAY, NORTH 10°43'32 WEST A DISTANCE OF 200.00 FEET TO A POINT, THENCE;
2. ALONG LOTS 11 & 31, BLOCK 4248, NORTH 79°16'28" EAST A DISTANCE OF 200.00 FEET TO A POINT IN THE WESTERLY RIGHT-OF-WAY OF CHESTNUT STREET, THENCE;
3. ALONG SAID WESTERLY RIGHT-OF-WAY, SOUTH 10°43'32" EAST A DISTANCE OF 200.00 FEET TO THE INTERSECTION OF SAID WESTERLY RIGHT-OF-WAY WITH THE NORTHERLY RIGHT-OF-WAY OF SUTTER AVENUE, THENCE;
4. ALONG SAID NORTHERLY RIGHT-OF-WAY, SOUTH 79°16'28" WEST A DISTANCE OF 200.00 FEET TO THE POINT OF BEGINNING.

CONTAINING AN AREA OF 40,000 SQUARE FEET OR 0.918 ACRES.

SCHEDULE A LEGAL DESCRIPTION

ALL THAT CERTAIN PLOT, PIECE OR PARCEL OF LAND, WITH THE BUILDINGS AND IMPROVEMENTS THEREON ERECTED, SITUATE, LYING AND BEING IN THE BOROUGH OF BROOKLYN, COUNTY OF KINGS, CITY AND STATE OF NEW YORK, BEING KNOWN AS LOTS1, 7, 33, 35 AND 36 ON THE CURRENT TAX MAP OF THE CITY OF NEW YORK, AND WHEN TAKEN TOGETHER ARE BOUNDED AND DESCRIBED AS FOLLOWS:

BEGINNING AT THE CORNER FORMED BY THE INTERSECTION OF THE NORTHERLY SIDE OF SUTTER AVENUE WITH THE EASTERLY SIDE OF CRYSTAL STREET;

RUNNING THENCE NORTHERLY ALONG THE EASTERLY SIDE OF CRYSTAL STREET, 200 FEET TO A POINT ON THE WESTERLY SIDE OF CHESTNUT STREET;

THENCE SOUTHERLY AT RIGHT ANGLES TO THE EASTERLY SIDE OF CRYSTAL STREET, 200 FEET TO A POINT ON THE WESTERLY SIDE OF CHESTNUT STREET;

THENCE SOUTHERLY ALONG THE WESTERLY SIDE OF CHESTNUT STREET, 200 FEET TO THE CORNER FORMED BY THE INTERSECTION OF THE WESTERLY SIDE OF CHESTNUT STREET WITH THE NORTHERLY SIDE OF SUTTER AVENUE;

THENCE WESTERLY ALONG THE NORTHERLY SIDE OF SUTTER AVENUE, 200 FEET TO THE POINT OR PLACE OF BEGINNING.

SURVEY REFERENCES

1. CITY OF NEW YORK TAX MAP.
2. MAP PREPARED BY THEO E. SCHATT DATED AUGUST 31, 1974.
3. DEED RECORDED IN THE KINGS COUNTY CLERK'S OFFICE ON JULY 1, 2009 IN CRFN 20090000199791.
4. DOCUMENTS CONTAINED WITHIN TITLE INSURANCE POLICY ISSUED BY STEWART TITLE INSURANCE COMPANY, TITLE NUMBER: APS156646K, DATED MARCH 28, 2015..

GENERAL NOTES

1. BOUNDARY & PLANIMETRIC INFORMATION SHOWN HEREON WAS PREPARED BY PAULUS, SOKOLOWSKI & SARTOR, LLC DURING JUNE, 2015.
2. HORIZONTAL POSITIONS ARE BASED ON THE NEW YORK STATE PLANE COORDINATE SYSTEM (LONG ISLAND ZONE) NAD 83.
3. PROPERTY IS LOCATED IN ZONE "X" AS SHOWN ON FEMA FLOOD INSURANCE RATE MAP COMMUNITY/PANEL NUMBER 3604970236F DATED SEPTEMBER 5, 2007.
4. THIS SURVEY IS VALID ONLY WHEN SURVEYOR'S EMBOSSED SEAL IS AFFIXED.
5. THERE ARE 43 STRIPED PARKING SPACES OBSERVED ON THE PROPERTY
6. INTERNAL LOT LINES SHOWN HEREON ARE SHOWN PER TAX MAP. FOR INFORMATION PURPOSES ONLY (NO TITLE INFORMATION PROVIDED).

GRAPHIC SCALE

20 0 10 20 40 80
0 6.10 3.05 6.10 12.20 24.40
(IN FEET)
1 inch = 20 ft.
(IN METERS)
1 inch = 6.10 meters

REV. / ISSUE	DATE	DESCRIPTION
1	10/8/2018	REVISED ENVIRONMENTAL EASEMENT PER D.E.C.

LEGEND

- G — GAS LINE
- OH — OVERHEAD WIRES
- EU — UNDERGROUND ELECTRIC
- X — FENCE LINE
- STORM INLET
- UTILITY POLE
- HYDRANT
- HYDRANT
- LIGHT
- CLEANOUT
- BOLLARD
- WV — WATER VALVE
- GAS VALVE
- (S) — SANITARY MANHOLE
- (E) — ELECTRIC MANHOLE
- (T) — TELEPHONE MANHOLE
- (V) — MONITORING WELL
- (M) — MANHOLE

PAULUS, SOKOLOWSKI AND SARTOR, LLC
67B MOUNTAIN BLVD EXT.
P.O. BOX 4039
WARREN, NEW JERSEY 07059
PHONE: (732) 560-9700
CERTIFICATE OF AUTHORIZATION NO. 24GA28032700

JAROSLAVA V. SNYDER
N.J. LIC. NO. 050533
PROFESSIONAL ENGINEER & LAND SURVEYOR
SIGNATURE OF 050533 DATE
PROFESSIONAL ENGINEER AND SURVEYOR

PROJECT

1199-1221 SUTTER AVENUE
BLOCK 4248
LOTS 1, 7, 33, 35 & 36

BOROUGH OF BROOKLYN
KINGS COUNTY, NEW YORK

SHEET TITLE

SITE ENVIRONMENTAL EASEMENT

D.E.C. SITE NUMBER C224141

JOB NO.:	05465-0001
DATE:	06/15/2015
DRAWN:	B.J.F.
CHECK:	J.V.
SCALE:	1"=20'

BINDING ORDER:
SHEET 1 OF 1
SHEET NO.
S-1

FILE NAME: P:\05465\0001\DWGs\CAD\V-Survey\05465-0001-BOOK-WK.dwg LAST EDIT: 10/08/2018 - 05:21:30 PM LOGIN: mpatrone XREFS: IMAGE:

APPENDIX B – LIST OF SITE CONTACTS

Name	Phone/Email Address
Site Owner: AAA Sutter Realty LLC	516-742-2713, tony@pastachese.com
Remedial Party: AAA Sutter Realty, LLC	516-742-2713, tony@pastachese.com
Qualified Environmental Professional: Tracy Wall (EnviroTrac, Ltd.)	631-924-3001, tracyw@envirotrac.com
NYSDEC DER Project Manager: Michael MacCabe, P.E.	518-402-9687, Michael.maccabe@dec.ny.gov
NYSDEC Site Control: Kelly A. Lewandowski	518-402-9569, Kelly.lewandowski@dec.ny.gov
NYSDOH, Wendy Kuehner	wendy.kuehner@health.ny.gov 518-402-7860
On and off-Site access contacts such as tenants, adjacent property owners, etc.: US Post Office (adjoining to the east)	718-277-0217
Cypress Hills Branch Library (adjoining to the west)	718-277-6004
New York City Housing Authority (adjoining to south) – Michael Wyands, Property Manager	718-647-1820, Michael.wyands@nycha.nyc.gov
New York City Housing Authority (adjoining to south) – Michael Hamilton, Superintendent	718-647-1820, Michael.hamilton@nycha.nyc.gov
Remedial Party Attorney: James Rigano, Esq.	631-756-5900, jrigano@riganollc.com

APPENDIX C – BORING LOGS

Geologic Log

Soil Boring B-1

1199 Sutter Avenue
Brooklyn, New York

Client:		Depth to Water (ft. from grade)		Site Elevation Datum
AAA Sutter Realty LLC				
Site Name:	Address:	Date	DTW	NM
	1199 Sutter Avenue, Brooklyn, NY			
Drilling Company:	Method:			
Associated Environmental	Geoprobe with 5' Macro-core			Measuring Point Elevation
Date Started:	Date Completed:			
4/1/2009	4/1/2009			NM
Completion Depth:	Geologist:			
15'	Gregory Ernst			

GEOLOGY	DEPTH (ft below grade)	SAMPLES Reco-very (ft.)	Blow per 6 in.	PID (ppm)	SOIL DESCRIPTION
	0				
		2.5	NA	NM	0-5' Hand clear to 5' - Brown, medium **SAND**, some pebbles. Dry. No odor.
	4				
		3	NA	NM	5-10' Light brown, medium to fine **SAND**. Dry. No odor.
	8				
		4.0	NA	NM	10-15' Brown, medium **SAND**. Wet @ 13'. No odor.
	12				
	16				End of Boring
	20				
	24				
	28				
	32				
Coarse Sand					
Medium Sand	36				
Fine Sand					
W. Bedrock	40				

Associated Environmental Services, Ltd.

NTS - Not to Scale NA - Not Applicable ND - Not Detected NM - Not Measured DTW - Depth to Water

Geologic Log

Soil Boring B-2

1199 Sutter Avenue
Brooklyn, New York

Client:		Depth to Water (ft. from grade)		Site Elevation Datum
AAA Sutter Realty LLC				
Site Name:	Address:	Date	DTW	NM
	1199 Sutter Avenue, Brooklyn, NY			
Drilling Company:	Method:			
Associated Environmental	Geoprobe with 5' Macro-core			Measuring Point Elevation
Date Started:	Date Completed:			
4/1/2009	4/1/2009			NM
Completion Depth:	Geologist:			
15'	Gregory Ernst			

GEOLOGY	DEPTH (ft below grade)	SAMPLES Reco-very (ft.)	Blow per 6 in.	PID (ppm)	SOIL DESCRIPTION
	0				
		2.5	NA	NM	0-5' Hand clear to 5' - Brown, medium **SAND** and pebbles. Dry. No odor.
	4				
		2.5	NA	NM	5-10' Same as above.
	8				
		4.0	NA	NM	10-15' Same as above. Wet @ 13'.
	12				
	16				End of Boring
	20				
	24				
	28				
	32				
Coarse Sand					
Medium Sand	36				
Fine Sand					
W. Bedrock	40				

Associated Environmental Services, Ltd.

NTS - Not to Scale NA - Not Applicable ND - Not Detected NM - Not Measured DTW - Depth to Water

Geologic Log

Soil Boring B-3

1199 Sutter Avenue
Brooklyn, New York

Client:		Depth to Water (ft. from grade)		Site Elevation Datum
AAA Sutter Realty LLC				
Site Name:	Address:	Date	DTW	NM
	1199 Sutter Avenue, Brooklyn, NY			
Drilling Company:	Method:			
Associated Environmental	Geoprobe with 5' Macro-core			Measuring Point Elevation
Date Started:	Date Completed:			
4/1/2009	4/1/2009			NM
Completion Depth:	Geologist:			
15'	Gregory Ernst			

GEOLOGY	DEPTH (ft below grade)	SAMPLES Reco-very (ft.)	Blow per 6 in.	PID (ppm)	SOIL DESCRIPTION
	0	NM	NA	NM	0-5' Hand clear to 5' - Brown, medium **SAND** and debris.
	4	3	NA	NM	5-10' Brown, medium to fine **SAND**. Dry. No odor.
	8	3.5	NA	NM	10-15' Brown to dark brown, medium to fine **SAND**, trace silt. 3" layer of black soil @ 14'. Wet @ 14'. No odor.
	12				
	16				End of Boring
	20				
	24				
	28				
	32				
Coarse Sand	36				
Medium Sand					
Fine Sand					
W. Bedrock	40				

Associated Environmental Services, Ltd.

NTS - Not to Scale NA - Not Applicable ND - Not Detected NM - Not Measured DTW - Depth to Water

Geologic Log

Soil Boring B-4

1199 Sutter Avenue
Brooklyn, New York

Client:		Depth to Water (ft. from grade)		Site Elevation Datum
AAA Sutter Realty LLC				
Site Name:	Address:	Date	DTW	NM
	1199 Sutter Avenue, Brooklyn, NY			
Drilling Company:	Method:			
Associated Environmental	Geoprobe with 5' Macro-core			Measuring Point Elevation
Date Started:	Date Completed:			
4/1/2009	4/1/2009			NM
Completion Depth:	Geologist:			
15'	Gregory Ernst			

GEOLOGY	DEPTH (ft below grade)	SAMPLES Reco-very (ft.)	Blow per 6 in.	PID (ppm)	SOIL DESCRIPTION
	0				
		NM	NA	NM	0-5' Hand clear to 5' - Brown, medium to fine **SAND** and pebbles. Dry. No odor.
	4				
		2.5	NA	NM	5-10' Brown, medium to fine **SAND**. Dry. No odor.
	8				
		NM	NA	NM	10-15' Brown to black, medium to fine **SAND**. Black layer right above water table. Wet @ 14'. No odor.
	12				
	16				End of Boring
	20				
	24				
	28				
	32				
Coarse Sand					
Medium Sand	36				
Fine Sand					
W. Bedrock	40				

Associated Environmental Services, Ltd.

NTS - Not to Scale NA - Not Applicable ND - Not Detected NM - Not Measured DTW - Depth to Water

Geologic Log

Soil Boring B-5

1199 Sutter Avenue
Brooklyn, New York

Client:		Depth to Water (ft. from grade)		Site Elevation Datum
AAA Sutter Realty LLC				
Site Name:	Address:	Date	DTW	NM
	1199 Sutter Avenue, Brooklyn, NY			
Drilling Company:	Method:			
Associated Environmental	Geoprobe with 5' Macro-core			Measuring Point Elevation
Date Started:	Date Completed:			
4/1/2009	4/1/2009			NM
Completion Depth:	Geologist:			
15'	Gregory Ernst			

GEOLOGY	DEPTH (ft below grade)	SAMPLES Reco-very (ft.)	Blow per 6 in.	PID (ppm)	SOIL DESCRIPTION
	0	NM	NA	NM	0-5' Hand clear to 5' - Brown, medium to fine **SAND** and debris. Dry. No odor.
	4	2	NA	NM	5-10' Brown, medium to fine **SAND** and debris. Dry. No odor.
	8	0.0	NA	NM	10-15' No recovery. Casing is wet. Wet @ 14'.
	12				
	16				End of Boring
	20				
	24				
	28				
	32				
Coarse Sand					
Medium Sand	36				
Fine Sand					
W. Bedrock	40				

Associated Environmental Services, Ltd.

NTS - Not to Scale NA - Not Applicable ND - Not Detected NM - Not Measured DTW - Depth to Water

Geologic Log

Soil Boring B-6

1199 Sutter Avenue
Brooklyn, New York

Client:		Depth to Water (ft. from grade)		Site Elevation Datum
AAA Sutter Realty LLC				
Site Name:	Address:	Date	DTW	NM
	1199 Sutter Avenue, Brooklyn, NY			
Drilling Company:	Method:			
Associated Environmental	Geoprobe with 5' Macro-core			Measuring Point Elevation
Date Started:	Date Completed:			
4/1/2009	4/1/2009			NM
Completion Depth:	Geologist:			
15'	Gregory Ernst			

GEOLOGY	DEPTH (ft below grade)	SAMPLES Reco-very (ft.)	Blow per 6 in.	PID (ppm)	SOIL DESCRIPTION
	0	NM	NA	NM	0-5' Hand clear to 5' - Brown, medium to fine **SAND** and debris. Dry. No odor.
	4	1.5	NA	NM	5-10' Brown, medium to fine **SAND**, some pebbles. Dry. No odor.
	8	3.0	NA	NM	10-15' Same as above. Wet @ 13'. No odor.
	12				
	16				End of Boring
	20				
	24				
	28				
	32				
Coarse Sand	36				
Medium Sand					
Fine Sand					
W. Bedrock	40				

Associated Environmental Services, Ltd.

NTS - Not to Scale NA - Not Applicable ND - Not Detected NM - Not Measured DTW - Depth to Water

Geologic Log

Soil Boring B-7

1199 Sutter Avenue
Brooklyn, New York

Client:		Depth to Water (ft. from grade)		Site Elevation Datum
AAA Sutter Realty LLC				
Site Name:	Address:	Date	DTW	NM
	1199 Sutter Avenue, Brooklyn, NY			
Drilling Company:	Method:			
Associated Environmental	Geoprobe with 5' Macro-core			Measuring Point Elevation
Date Started:	Date Completed:			
4/1/2009	4/1/2009			NM
Completion Depth:	Geologist:			
5'	Gregory Ernst			

GEOLOGY	DEPTH (ft below grade)	SAMPLES Reco-very (ft.)	Blow per 6 in.	PID (ppm)	SOIL DESCRIPTION
	0	NM	NA	NM	0-5' Hand clear to 5' - Dark brown to black, medium to fine **SAND**, trace silt. Wet @ 5' below basement floor..
	4	NA	NA	NA	5-10'
	8	NA	NA	NA	10-15'
	12				
	16				End of Boring
	20				
	24				
	28				
	32				
Coarse Sand	36				
Medium Sand					
Fine Sand					
W. Bedrock	40				

Associated Environmental Services, Ltd.

NTS - Not to Scale NA - Not Applicable ND - Not Detected NM - Not Measured DTW - Depth to Water

Geologic Log

Soil Boring B-8

1199 Sutter Avenue
Brooklyn, New York

Client:		Depth to Water (ft. from grade)		Site Elevation Datum
AAA Sutter Realty LLC				
Site Name:	Address:	Date	DTW	NM
	1199 Sutter Avenue, Brooklyn, NY			
Drilling Company:	Method:			
Associated Environmental	Geoprobe with 5' Macro-core			Measuring Point Elevation
Date Started:	Date Completed:			
4/1/2009	4/1/2009			NM
Completion Depth:	Geologist:			
5'	Gregory Ernst			

GEOLOGY	DEPTH (ft below grade)	SAMPLES Reco-very (ft.)	Blow per 6 in.	PID (ppm)	SOIL DESCRIPTION
	0	NM	NA	NM	0-5' Hand clear to 5' - Dark brown to black, medium to fine **SAND**, trace silt. Wet @ 5' below basement floor..
	4	NA	NA	NA	5-10'
	8	NA	NA	NA	10-15'
	12				
	16				End of Boring
	20				
	24				
	28				
	32				
Coarse Sand	36				
Medium Sand					
Fine Sand					
W. Bedrock	40				

Associated Environmental Services, Ltd.

NTS - Not to Scale NA - Not Applicable ND - Not Detected NM - Not Measured DTW - Depth to Water

Geologic Log

Soil Boring B-10

1199 Sutter Avenue
Brooklyn, New York

Client:		Depth to Water (ft. from grade)		Site Elevation Datum
AAA Sutter Realty LLC				
Site Name:	Address:	Date	DTW	NM
	1199 Sutter Avenue, Brooklyn, NY			
Drilling Company:	Method:			
Associated Environmental	Geoprobe with 5' Macro-core			Measuring Point Elevation
Date Started:	Date Completed:			
7/19/11	7/19/11			NM
Completion Depth:	Geologist:			
15'	Gregory Ernst			

GEOLOGY	DEPTH (ft below grade)	SAMPLES Reco-very (ft.)	SAMPLES Blow per 6 in.	PID (ppm)	SOIL DESCRIPTION
	0				
		NA	NA		0-5'
				5.2	Hand clear to 5' - fill material - dark brown silty fine sand with trace rubble, dry, no odor.
	4				
		1.5	NA	9.1	5-10'
	8			7.9	
				6.2	
		3.5	NA	3.1	10-15'
	12				Dark brown, fine **SAND.**
					Wet at ~13'. No odor.
				2.3	
	16				End of Boring
	20				
	24				
	28				
	32				
Coarse Sand					
Medium Sand	36				
Fine Sand					
W. Bedrock	40				

Associated Environmental Services, Ltd.

NTS - Not to Scale NA - Not Applicable ND - Not Detected NM - Not Measured DTW - Depth to Water

Geologic Log

Soil Boring B-11

1199 Sutter Avenue
Brooklyn, New York

Client:		Depth to Water (ft. from grade)		Site Elevation Datum
AAA Sutter Realty LLC				
Site Name:	Address:	Date	DTW	NM
	1199 Sutter Avenue, Brooklyn, NY			
Drilling Company:	Method:			
Associated Environmental	Geoprobe with 5' Macro-core			Measuring Point Elevation
Date Started:	Date Completed:			
7/19/11	7/19/11			NM
Completion Depth:	Geologist:			
15'	Gregory Ernst			

GEOLOGY	DEPTH (ft below grade)	SAMPLES Recovery (ft.)	SAMPLES Blow per 6 in.	SAMPLES PID (ppm)	SOIL DESCRIPTION
	0				
		NA	NA		0-5'
				1.5	Hand clear to 5' - fill material - dark brown silty fine sand with trace rubble, dry, no odor.
	4				
		3.5	NA	9.6	5-10'
	8			7.2	
				6.0	
		4.5	NA		10-15'
	12			6.2	Dark brown, fine **SAND.**
					Wet at ~13'. No odor.
				5.2	
	16				End of Boring
	20				
	24				
	28				
	32				
Coarse Sand					
Medium Sand	36				
Fine Sand					
W. Bedrock	40				

Associated Environmental Services, Ltd.

NTS - Not to Scale NA - Not Applicable ND - Not Detected NM - Not Measured DTW - Depth to Water

Geologic Log

Soil Boring B-12

1199 Sutter Avenue
Brooklyn, New York

Client:		Depth to Water (ft. from grade)		Site Elevation Datum
AAA Sutter Realty LLC				
Site Name:	Address:	Date	DTW	NM
	1199 Sutter Avenue, Brooklyn, NY			
Drilling Company:	Method:			
Associated Environmental	Geoprobe with 5' Macro-core			Measuring Point Elevation
Date Started:	Date Completed:			
7/19/11	7/19/11			NM
Completion Depth:	Geologist:			
15'	Gregory Ernst			

GEOLOGY	DEPTH (ft below grade)	SAMPLES Recovery (ft.)	SAMPLES Blow per 6 in.	SAMPLES PID (ppm)	SOIL DESCRIPTION
	0				
		NA	NA		0-5'
				0.2	Hand clear to 5' - fill material - dark brown silty fine sand with trace rubble, dry, no odor.
	4				
		1.5	NA	0.2	5-10'
	8			0.1	
				0.9	
		3.5	NA		10-15'
	12			0.2	Dark brown, fine **SAND.**
					Wet at ~13'. No odor.
				0.1	
	16				
					End of Boring
	20				
	24				
	28				
	32				
Coarse Sand					
Medium Sand	36				
Fine Sand					
W. Bedrock	40				

Associated Environmental Services, Ltd.

NTS - Not to Scale NA - Not Applicable ND - Not Detected NM - Not Measured DTW - Depth to Water

APPENDIX D – MONITORING WELL CONSTRUCTION LOGS

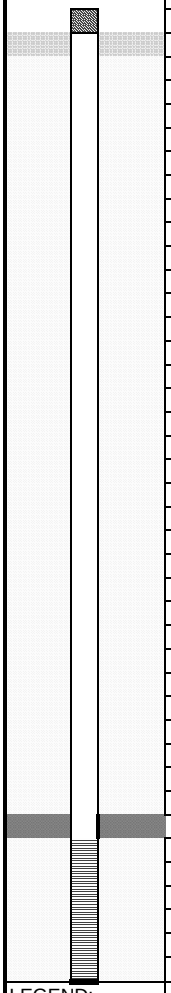
Monitoring Well Construction

Associated Environmental Services, Ltd.

Hauppauge, New York

MW-1D

		Depth to Water (ft. from grade.)		Site Elevation Datum
Site Name:	Address:	Date	DTW	Ground Elevation
Commercial Building	1199-1221 Sutter Avenue, Brooklyn	10/29/2018	12.18	NA
Drilling Company:	Method:			Measuring Point Elevation
Associated Env	Geoprobe 6610			17.92
Date Started:	Date Completed:			10/10/2018
7/27/2009	7/27/2009			
Completion Depth:	*AES* Geologist:			
40'	John V.			

(NTS)	DEPTH (ft below grade)	SAMPLES Reco-very	SAMPLES Blow per 6 in.	SAMPLES PID ppm	SOIL DESCRIPTION
	0 5 10 15 20 25 30 35 40				*Monitoring Well Construction:* 35' x 2" PVC Riser 5' x 2" 20 slot PVC Screen

LEGEND:

- Natural Backfill
- Bentonite
- Cement
- Silica
- Screen
- End Cap

Associated Environmental Services, Ltd.

NTS - Not to Scale

DTW - Depth to Water

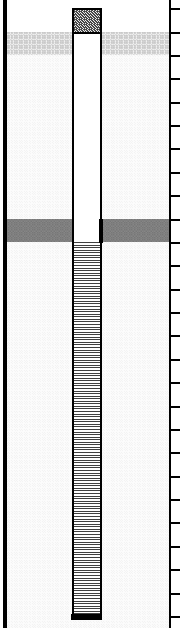
Monitoring Well Construction

Associated Environmental Services, Ltd.

Hauppauge, New York

MW-2S

		Depth to Water (ft. from grade.)		Site Elevation Datum
Site Name:	Address:	Date	DTW	Ground Elevation
Commercial Building	1199-1221 Sutter Avenue, Brooklyn	10/29/2018	12.61	18.29
Drilling Company:	Method:			
Associated Env	Geoprobe 6610			Measuring Point Elevation
Date Started:	Date Completed:			18.05
7/28/2009	7/28/2009			10/10/2018
Completion Depth:	*AES* Geologist:			
25'	John V.			

(NTS)	DEPTH (ft below grade)	SAMPLES Recovery	SAMPLES Blow per 6 in.	SAMPLES PID ppm	SOIL DESCRIPTION
	0 5 10 15 20 25				*Monitoring Well Construction:* 10' x 2" PVC Riser 15' x 2" 20 Slot PVC Screen

LEGEND:

- Natural Backfill
- Bentonite
- Cement
- Silica
- Screen
- End Cap

Associated Environmental Services, Ltd.

NTS - Not to Scale

DTW - Depth to Water

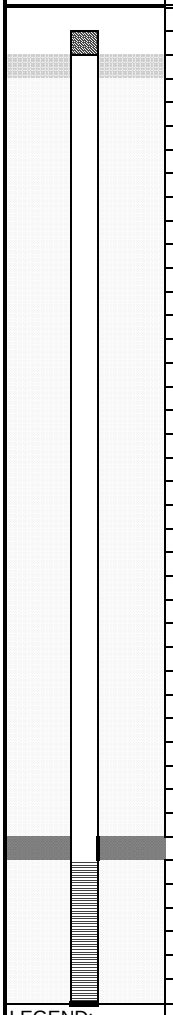
Monitoring Well Construction

Associated Environmental Services, Ltd.

Hauppauge, New York

MW-2D

		Depth to Water (ft. from grade.)		Site Elevation Datum
Site Name:	Address:	Date	DTW	Ground Elevation
Commercial Building	1199-1221 Sutter Avenue, Brooklyn	10/29/2018	12.71	18.29
Drilling Company:	Method:			Measuring Point Elevation
Associated Env	Geoprobe 6610			18.13
Date Started: 7/27/2009	Date Completed: 7/27/2009			10/10/2018
Completion Depth: 40'	*AES* Geologist: John V.			

(NTS)	DEPTH (ft below grade)	SAMPLES Reco-very	SAMPLES Blow per 6 in.	SAMPLES PID ppm	SOIL DESCRIPTION
	0 5 10 15 20 25 30 35 40				*Monitoring Well Construction:* 35' x 2" PVC Riser 5' x 2" 20 Slot PVC Screen

LEGEND:

- Natural Backfill
- Bentonite
- Cement
- Silica
- Screen
- End Cap

Associated Environmental Services, Ltd.

NTS - Not to Scale

DTW - Depth to Water

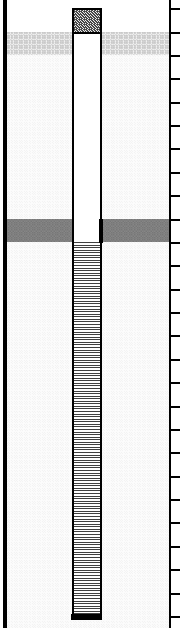
Monitoring Well Construction

Associated Environmental Services, Ltd.

Hauppauge, New York

MW-3S

		Depth to Water (ft. from grade.)		Site Elevation Datum
Site Name:	Address:	Date	DTW	Ground Elevation
Commercial Building	1199-1221 Sutter Avenue, Brooklyn	10/29/2018	12.47	18.53
Drilling Company:	Method:			
Associated Env	Geoprobe 6610			Measuring Point Elevation
Date Started:	Date Completed:			18.08
7/28/2009	7/28/2009			10/10/2018
Completion Depth:	*AES* Geologist:			
25'	John V.			

(NTS)	DEPTH (ft below grade)	SAMPLES Recovery	SAMPLES Blow per 6 in.	SAMPLES PID ppm	SOIL DESCRIPTION
	0 5 10 15 20 25				*Monitoring Well Construction:* 10' x 2" PVC Riser 15' x 2" 20 Slot PVC Screen

LEGEND:

- Natural Backfill
- Bentonite
- Cement
- Silica
- Screen
- End Cap

Associated Environmental Services, Ltd.

NTS - Not to Scale

DTW - Depth to Water

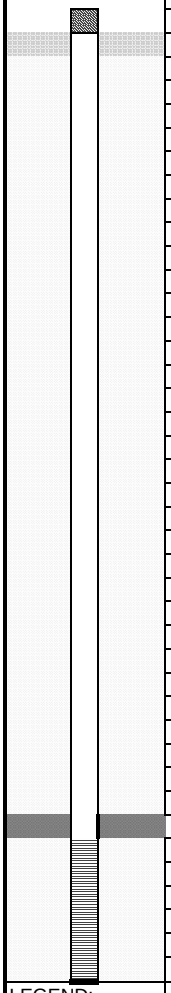
Monitoring Well Construction

Associated Environmental Services, Ltd.

Hauppauge, New York

MW-3D

		Depth to Water (ft. from grade.)		Site Elevation Datum
Site Name:	Address:	Date	DTW	Ground Elevation
Commercial Building	1199-1221 Sutter Avenue, Brooklyn	10/29/2018	12.93	18.66
Drilling Company:	Method:			Measuring Point Elevation
Associated Env	Geoprobe 6610			18.48
Date Started: 7/28/2009	Date Completed: 7/28/2009			10/10/2018
Completion Depth: 40'	*AES* Geologist: John V.			

(NTS)	DEPTH (ft below grade)	SAMPLES Reco-very	SAMPLES Blow per 6 in.	SAMPLES PID ppm	SOIL DESCRIPTION
	0 5 10 15 20 25 30 35 40				*Monitoring Well Construction:* 35' x 2" PVC Riser 5' x 2" 20 Slot PVC Screen

LEGEND:

- Natural Backfill
- Bentonite
- Cement
- Silica
- Screen
- End Cap

Associated Environmental Services, Ltd.

NTS - Not to Scale

DTW - Depth to Water

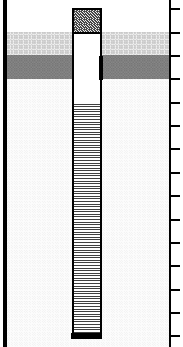
Monitoring Well Construction

Associated Environmental Services, Ltd.

Hauppauge, New York

MW-4S

Site Name:	Address:	Depth to Water (ft. from grade.) Date	DTW	Site Elevation Datum
Commercial Building	1199-1221 Sutter Avenue, Brooklyn	10/29/2018	4.75	Ground Elevation 10.13
Drilling Company:	Method:			
Associated Env	Geoprobe 6610			Measuring Point Elevation
Date Started:	Date Completed:			9.88
7/28/2009	7/28/2009			10/10/2018
Completion Depth:	*AES* Geologist:			
13'	John V.			

(NTS)	DEPTH (ft below grade)	SAMPLES Recovery	SAMPLES Blow per 6 in.	SAMPLES PID ppm	SOIL DESCRIPTION
	0 5 10 15 20 25				*Monitoring Well Construction:* 3' x 1" PVC Riser 10' x 1" 20 Slot PVC Screen

LEGEND:

- Natural Backfill
- Bentonite
- Cement
- Silica
- Screen
- End Cap

Associated Environmental Services, Ltd.

NTS - Not to Scale

DTW - Depth to Water

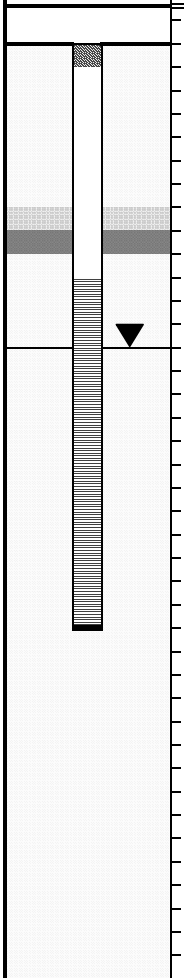
Monitoring Well Construction

Associated Environmental Services, Ltd.

Hauppauge, New York

MW-5S

		Depth to Water (ft. from grade.)		Site Elevation Datum Arbitrary
Site Name:	Address:	Date	DTW	Ground Elevation
Commercial Building	1199-1221 Sutter Avenue, Brooklyn			18.18
Drilling Company:	Method:	7/19/2011	~13'	
Associated Env	Geoprobe 6610	10/29/2018	12.46	Measuring Point Elevation
Date Started:	Date Completed:			17.84
7/19/2011	7/19/2011			10/10/2018
Completion Depth:	*AES* Geologist:			
25'	Greg E.			

(NTS)	DEPTH (ft below grade)	SAMPLES Recovery	SAMPLES Blow per 6 in.	SAMPLES PID ppm	SOIL DESCRIPTION
	0 5 10 15 20 25				*Monitoring Well Construction:* 10' x 2" PVC Riser 15' x 2" 20 Slot PVC Screen

LEGEND:

- Natural Backfill
- Bentonite
- Cement
- Silica
- Screen
- End Cap

Associated Environmental Services, Ltd.

NTS - Not to Scale

DTW - Depth to Water

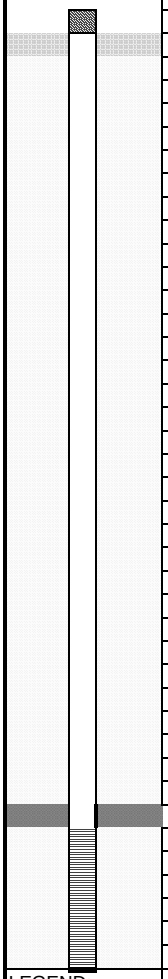
Monitoring Well Construction

Associated Environmental Services, Ltd.

Hauppauge, New York

MW-5D

		Depth to Water (ft. from grade.)		Site Elevation Datum
Site Name:	Address:	Date	DTW	Ground Elevation
Commercial Building	1199-1221 Sutter Avenue, Brooklyn	10/29/2018	12.41	18.21
Drilling Company:	Method:			
Associated Env	Geoprobe 6610			Measuring Point Elevation
Date Started:	Date Completed:			17.80
7/28/2009	7/28/2009			10/10/2018
Completion Depth:	*AES* Geologist:			
40'	John V.			

(NTS)	DEPTH (ft below grade)	SAMPLES Recovery	SAMPLES Blow per 6 in.	SAMPLES PID ppm	SOIL DESCRIPTION
	0 5 10 15 20 25 30 35 40				*Monitoring Well Construction:* 35' x 2" PVC Riser 5' x 2" 20 Slot PVC Screen

Associated Environmental Services, Ltd.

NTS - Not to Scale

DTW - Depth to Water

Monitoring Well Construction

Associated Environmental Services, Ltd.

Hauppauge, New York

MW-6S

		Depth to Water (ft. from grade.)		Site Elevation Datum Arbitrary
Site Name:	Address:	Date	DTW	Ground Elevation
Commercial Building	1199-1221 Sutter Avenue, Brooklyn			17.77
Drilling Company:	Method:	7/19/2011	~13'	
Associated Env	Geoprobe 6610	10/29/2018	11.99	Measuring Point Elevation
Date Started:	Date Completed:			17.36
7/19/2011	7/19/2011			10/10/2018
Completion Depth:	*AES* Geologist:			
25'	Greg E.			

(NTS)	DEPTH (ft below grade)	SAMPLES Reco-very	Blow per 6 in.	PID ppm	SOIL DESCRIPTION
	0				
	5				
	10				
	15				*Monitoring Well Construction:*
	20				10' x 2" PVC Riser 15' x 2" 20 Slot PVC Screen
	25				

LEGEND:

- Natural Backfill
- Bentonite
- Cement
- Silica
- Screen
- End Cap

Associated Environmental Services, Ltd.

NTS - Not to Scale

DTW - Depth to Water

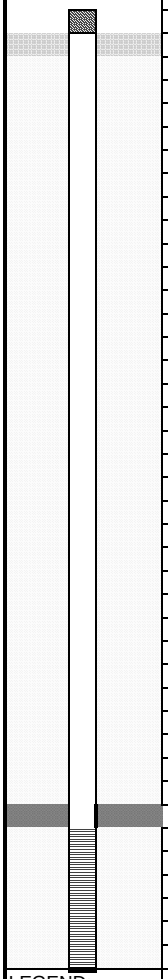
Monitoring Well Construction

Associated Environmental Services, Ltd.

Hauppauge, New York

MW-6D

		Depth to Water (ft. from grade.)		Site Elevation Datum
Site Name:	Address:	Date	DTW	Ground Elevation
Commercial Building	1199-1221 Sutter Avenue, Brooklyn	10/29/2018	12.51	17.8
Drilling Company:	Method:			
Associated Env	Geoprobe 6610			Measuring Point Elevation
Date Started:	Date Completed:			16.90
7/28/2009	7/28/2009			10/10/2018
Completion Depth:	*AES* Geologist:			
40'	John V.			

(NTS)	DEPTH (ft below grade)	SAMPLES Reco-very	SAMPLES Blow per 6 in.	SAMPLES PID ppm	SOIL DESCRIPTION
	0 5 10 15 20 25 30 35 40				*Monitoring Well Construction:* 35' x 2" PVC Riser 5' x 2" 20 Slot PVC Screen

Associated Environmental Services, Ltd.

NTS - Not to Scale

DTW - Depth to Water

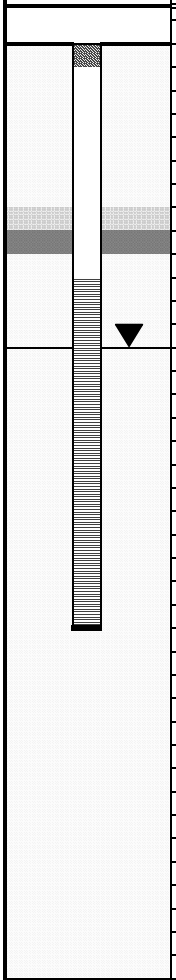
Monitoring Well Construction

Associated Environmental Services, Ltd.

Hauppauge, New York

MW-7S

		Depth to Water (ft. from grade.)		Site Elevation Datum Arbitrary
Site Name:	Address:	Date	DTW	Ground Elevation
Commercial Building	1199-1221 Sutter Avenue, Brooklyn			18.38
Drilling Company:	Method:	7/19/2011	~13'	
Associated Env	Geoprobe 6610	10/29/2018	12.68	Measuring Point Elevation
Date Started:	Date Completed:			18.04
7/19/2011	7/19/2011			10/10/2018
Completion Depth:	*AES* Geologist:			
25'	Greg E.			

(NTS)	DEPTH (ft below grade)	SAMPLES Recovery	SAMPLES Blow per 6 in.	SAMPLES PID ppm	SOIL DESCRIPTION
	0 5 10 15 20 25				*Monitoring Well Construction:* 10' x 2" PVC Riser 15' x 2" 20 Slot PVC Screen

Associated Environmental Services, Ltd.

NTS - Not to Scale

DTW - Depth to Water

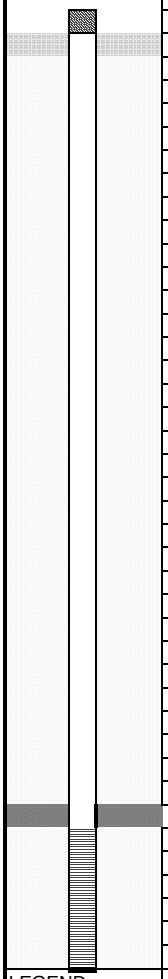
Monitoring Well Construction

Associated Environmental Services, Ltd.

Hauppauge, New York

MW-7D

		Depth to Water (ft. from grade.)		Site Elevation Datum
Site Name:	Address:	Date	DTW	Ground Elevation
Commercial Building	1199-1221 Sutter Avenue, Brooklyn	10/29/2018	12.71	18.38
Drilling Company:	Method:			
Associated Env	Geoprobe 6610			Measuring Point Elevation
Date Started:	Date Completed:			18.29
7/28/2009	7/28/2009			10/10/2018
Completion Depth:	*AES* Geologist:			
40'	John V.			

(NTS)	DEPTH (ft below grade)	SAMPLES Recovery	SAMPLES Blow per 6 in.	SAMPLES PID ppm	SOIL DESCRIPTION
	0 5 10 15 20 25 30 35 40				*Monitoring Well Construction:* 35' x 2" PVC Riser 5' x 2" 20 Slot PVC Screen

Associated Environmental Services, Ltd.

NTS - Not to Scale

DTW - Depth to Water

Monitoring Well Construction

Associated Environmental Services, Ltd.

Hauppauge, New York

MW-8S

		Depth to Water (ft. from grade.)		Site Elevation Datum Arbitrary
Site Name:	Address:	Date	DTW	Ground Elevation
Commercial Building	1199-1221 Sutter Avenue, Brooklyn	7/19/2011	~13'	18.79
Drilling Company:	Method:	10/29/2018	12.82	Measuring Point Elevation
Associated Env	Geoprobe 6610			18.08
Date Started: 7/19/2011	Date Completed: 7/19/2011			10/10/2018
Completion Depth: 25'	*AES* Geologist: Greg E.			

(NTS)	DEPTH (ft below grade)	SAMPLES Reco-very	Blow per 6 in.	PID ppm	SOIL DESCRIPTION
	0				
	5				
	10				
	15				*Monitoring Well Construction:*
	20				10' x 2" PVC Riser 15' x 2" 20 Slot PVC Screen
	25				

LEGEND:

- Natural Backfill
- Bentonite
- Cement
- Silica
- Screen
- End Cap

Associated Environmental Services, Ltd.

NTS - Not to Scale

DTW - Depth to Water

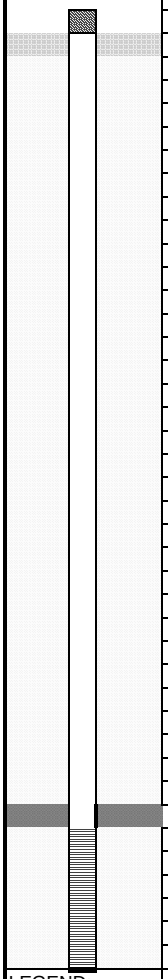
Monitoring Well Construction

Associated Environmental Services, Ltd.

Hauppauge, New York

MW-8D

		Depth to Water (ft. from grade.)		Site Elevation Datum
Site Name:	Address:	Date	DTW	Ground Elevation
Commercial Building	1199-1221 Sutter Avenue, Brooklyn	10/29/2018	13.11	18.8
Drilling Company:	Method:			
Associated Env	Geoprobe 6610			Measuring Point Elevation
Date Started:	Date Completed:			18.40
7/28/2009	7/28/2009			10/10/2018
Completion Depth:	*AES* Geologist:			
40'	John V.			

(NTS)	DEPTH (ft below grade)	SAMPLES Reco-very	SAMPLES Blow per 6 in.	SAMPLES PID ppm	SOIL DESCRIPTION
	0 5 10 15 20 25 30 35 40				*Monitoring Well Construction:* 35' x 2" PVC Riser 5' x 2" 20 Slot PVC Screen

LEGEND:

- Natural Backfill
- Bentonite
- Cement
- Silica
- Screen
- End Cap

Associated Environmental Services, Ltd.

NTS - Not to Scale

DTW - Depth to Water

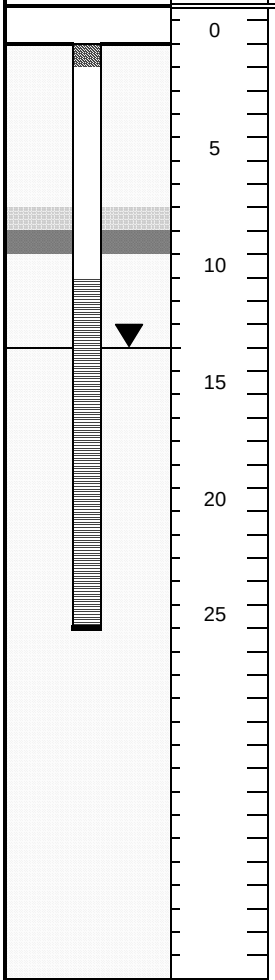
Monitoring Well Construction

Associated Environmental Services, Ltd.

Hauppauge, New York

MW-9S

		Depth to Water (ft. from grade.)		Site Elevation Datum Arbitrary
Site Name:	Address:	Date	DTW	Ground Elevation
Commercial Building	1199-1221 Sutter Avenue, Brooklyn	7/19/2011	~13'	19.20
Drilling Company:	Method:			Measuring Point Elevation
Associated Env	Geoprobe 6610			18.66
Date Started: 7/19/2011	Date Completed: 7/19/2011			10/10/2018
Completion Depth: 25'	*AES* Geologist: Greg E.			

(NTS)	DEPTH (ft below grade)	SAMPLES Recovery	SAMPLES Blow per 6 in.	SAMPLES PID ppm	SOIL DESCRIPTION
	0 5 10 15 20 25				*Monitoring Well Construction:* 10' x 2" PVC Riser 15' x 2" 20 Slot PVC Screen

Associated Environmental Services, Ltd.

NTS - Not to Scale

DTW - Depth to Water

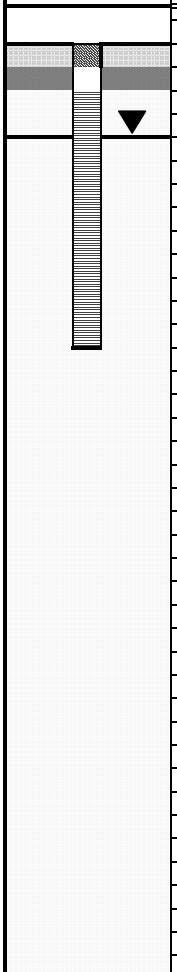
Monitoring Well Construction

EnviroTrac Ltd.

Yaphank, New York

MW-10S

		Depth to Water (ft. from grade.)		Site Elevation Datum Arbitrary
Site Name:	Address:	Date	DTW	Ground Elevation
Commercial Building	1199-1221 Sutter Avenue, Brooklyn	10/29/2018	4.45	10.14
Drilling Company:	Method:			Measuring Point Elevation
Associated Env	Geoprobe 6610			9.93
Date Started:	Date Completed:			10/10/2018
Completion Depth:	*ET Geologist*			
13'	Josh Levy			

(NTS)	DEPTH (ft below the slab)	SAMPLES Reco-very	Blow per 6 in.	PID ppm	SOIL DESCRIPTION
	0 5 10 15				*Monitoring Well Construction:* 3' x 1.5" PVC Riser 10' x 1.5" 20 Slot PVC Screen

LEGEND:

- Natural Backfill
- Bentonite
- Cement
- Silica
- Screen
- End Cap

NTS - Not to Scale

DTW - Depth to Water

Monitoring Well Construction

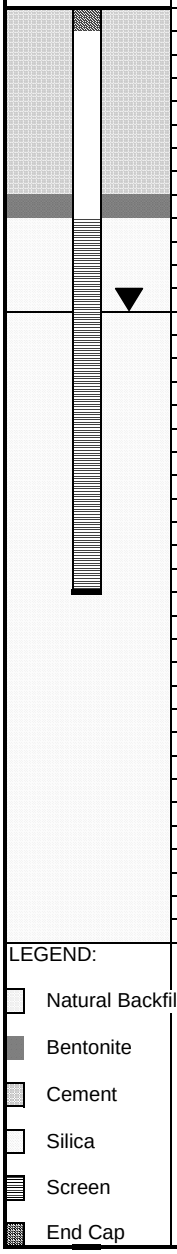
EnviroTrac Ltd.

Yaphank, New York

MW-11S

		Depth to Water (ft. from grade.)		Site Elevation Datum Arbitrary
Site Name:	Address:	Date	DTW	Ground Elevation
Commercial Building	1199-1221 Sutter Avenue, Brooklyn	10/29/2018	12.28	18.03
Drilling Company:	Method:			Measuring Point Elevation
Associated Env	Geoprobe 6610			17.71
Date Started:	Date Completed:			10/10/2018
Completion Depth:	*ET Geologist*			
25'	Josh Levey			

(NTS)	DEPTH (ft below grade)	SAMPLES Recovery	SAMPLES Blow per 6 in.	SAMPLES PID ppm	SOIL DESCRIPTION
	0				
	5				
	10				
	15				*Monitoring Well Construction:*
	20				10' x 2" PVC Riser 15' x 2" 20 Slot PVC Screen
	25				



LEGEND:

- Natural Backfill
- Bentonite
- Cement
- Silica
- Screen
- End Cap

NTS - Not to Scale

DTW - Depth to Water

Sub-Slab Depressurization System Point Construction

EnviroTrac Ltd.

Yaphank, NY

SSD-1

		Depth to Water (ft. from grade.)		Site Elevation Datum
Site Name:	Address:	Date	DTW	Ground Elevation
Commercial Building	1199-1221 Sutter Avenue, Brooklyn			
Drilling Company:	Method:			
EnviroTrac Ltd.	Concrete Core and Manual Soil Removal			Measuring Point Elevation
Date Started:	Date Completed:			
May, 2018	May, 2018			
Completion Depth:	*ET Engineer*			
3'	David Weber			

(NTS)	DEPTH (ft below grade)	SAMPLES Reco-very	Blow per 6 in.	PID ppm	SOIL DESCRIPTION
	0				
	5				
	10				
	15				*SSDS Extraction Point Construction:*
	20				1' x 4" PVC Riser 2' x 4" 20 Slot PVC Screen
	25				

LEGEND:

- Natural Backfill
- Bentonite
- Cement
- Silica
- Screen
- End Cap

NTS - Not to Scale

DTW - Depth to Water

Sub-slab Depressurization System Point Construction

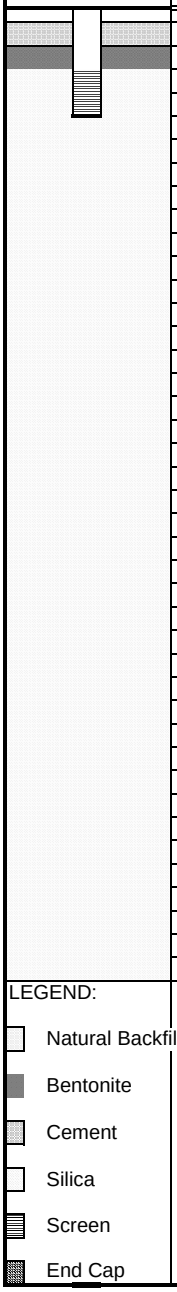
EnviroTrac Ltd.

Yaphank, NY

SSD-2

		Depth to Water (ft. from grade.)		Site Elevation Datum
Site Name:	Address:	Date	DTW	Ground Elevation
Commercial Building	1199-1221 Sutter Avenue, Brooklyn			
Drilling Company:	Method:			
EnviroTrac Ltd.	Concrete Core and Manual Soil Removal			Measuring Point Elevation
Date Started:	Date Completed:			
May, 2018	May, 2018			
Completion Depth:	*ET Engineer*			
3'	David Weber			

(NTS)	DEPTH (ft below grade)	SAMPLES Recovery	SAMPLES Blow per 6 in.	SAMPLES PID ppm	SOIL DESCRIPTION
	0				*SSDS Extraction Point Construction:*
	5				1' x 4" PVC Riser
	10				2' x 4" 20 Slot PVC Screen
	15				
	20				
	25				



LEGEND:

- Natural Backfill
- Bentonite
- Cement
- Silica
- Screen
- End Cap

NTS - Not to Scale

DTW - Depth to Water

Sub-slab Depressurization System Point Construction

EnviroTrac Ltd.

Yaphank, NY

SSD-3

		Depth to Water (ft. from grade.)		Site Elevation Datum
Site Name:	Address:	Date	DTW	Ground Elevation
Commercial Building	1199-1221 Sutter Avenue, Brooklyn			
Drilling Company:	Method:			
EnviroTrac Ltd.	Concrete Core and Manual Soil Removal			Measuring Point Elevation
Date Started:	Date Completed:			
May, 2018	May, 2018			
Completion Depth:	*ET Engineer*			
3'	David Weber			

(NTS)	DEPTH (ft below grade)	SAMPLES Reco-very	Blow per 6 in.	PID ppm	SOIL DESCRIPTION
	0				
	5				
	10				
	15				*SSDS Extraction Point Construction:*
	20				1' x 4" PVC Riser 2' x 4" 20 Slot PVC Screen
	25				

LEGEND:

- Natural Backfill
- Bentonite
- Cement
- Silica
- Screen
- End Cap

NTS - Not to Scale

DTW - Depth to Water

Sub-slab Depressurization System Point Construction

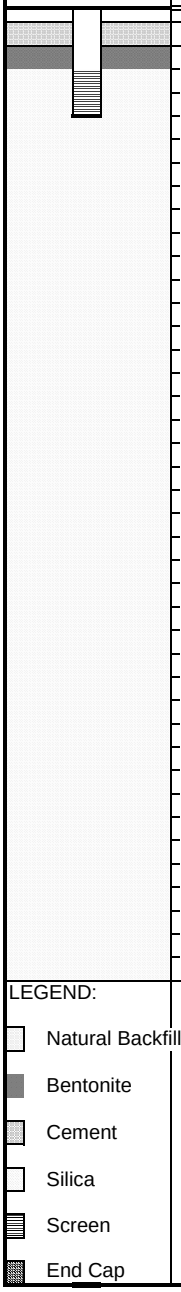
EnviroTrac Ltd.

Yaphank, NY

SSD-4

		Depth to Water (ft. from grade.)		Site Elevation Datum
Site Name:	Address:	Date	DTW	Ground Elevation
Commercial Building	1199-1221 Sutter Avenue, Brooklyn			
Drilling Company:	Method:			
EnviroTrac Ltd.	Concrete Core and Manual Soil Removal			Measuring Point Elevation
Date Started:	Date Completed:			
May, 2018	May, 2018			
Completion Depth:	*ET Engineer*			
3'	David Weber			

(NTS)	DEPTH (ft below grade)	SAMPLES Recovery	SAMPLES Blow per 6 in.	SAMPLES PID ppm	SOIL DESCRIPTION
	0				*SSDS Extraction Point Construction:*
	5				1' x 4" PVC Riser
	10				2' x 4" 20 Slot PVC Screen
	15				
	20				
	25				



LEGEND:

- Natural Backfill
- Bentonite
- Cement
- Silica
- Screen
- End Cap

NTS - Not to Scale

DTW - Depth to Water

Sub-slab Depressurization System Point Construction

EnviroTrac Ltd.

Yaphank, NY

SSD-5

		Depth to Water (ft. from grade.)		Site Elevation Datum
Site Name:	Address:	Date	DTW	Ground Elevation
Commercial Building	1199-1221 Sutter Avenue, Brooklyn			
Drilling Company:	Method:			Measuring Point Elevation
EnviroTrac Ltd.	Concrete Core and Manual Soil Removal			
Date Started:	Date Completed:			
May, 2018	May, 2018			
Completion Depth:	*ET Engineer*			
3'	David Weber			

(NTS)	DEPTH (ft below grade)	SAMPLES Reco-very	Blow per 6 in.	PID ppm	SOIL DESCRIPTION
	0				*SSDS Extraction Point Construction:*
	5				1' x 4" PVC Riser
	10				2' x 4" 20 Slot PVC Screen
	15				
	20				
	25				

LEGEND:

- Natural Backfill
- Bentonite
- Cement
- Silica
- Screen
- End Cap

NTS - Not to Scale

DTW - Depth to Water

Sub-slab Depressurization System Point Construction

EnviroTrac Ltd.

Yaphank, NY

SSD-6

		Depth to Water (ft. from grade.)		Site Elevation Datum
Site Name:	Address:	Date	DTW	Ground Elevation
Commercial Building	1199-1221 Sutter Avenue, Brooklyn			
Drilling Company:	Method:			
EnviroTrac Ltd.	Concrete Core and Manual Soil Removal			Measuring Point Elevation
Date Started:	Date Completed:			
May, 2018	May, 2018			
Completion Depth:	*ET Engineer*			
3'	David Weber			

(NTS)	DEPTH (ft below grade)	SAMPLES Reco-very	Blow per 6 in.	PID ppm	SOIL DESCRIPTION
	0				
	5				
	10				
	15				*SSDS Extraction Point Construction:*
	20				1' x 4" PVC Riser 2' x 4" 20 Slot PVC Screen
	25				

LEGEND:

- Natural Backfill
- Bentonite
- Cement
- Silica
- Screen
- End Cap

NTS - Not to Scale

DTW - Depth to Water

Soil Vapor Extraction Well Construction

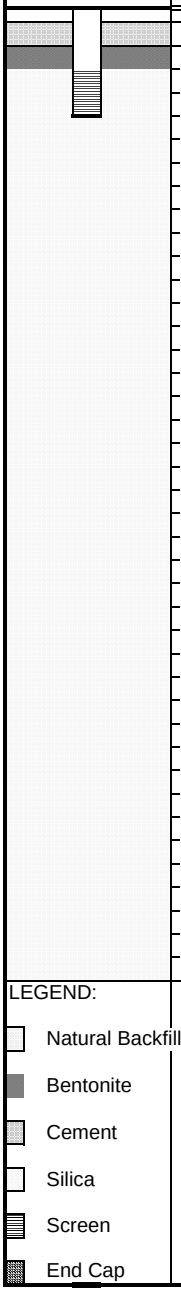
EnviroTrac Ltd.

Yaphank, NY

SVE-7

		Depth to Water (ft. from grade.)		Site Elevation Datum
Site Name:	Address:	Date	DTW	Ground Elevation
Commercial Building	1199-1221 Sutter Avenue, Brooklyn			
Drilling Company:	Method:			
EnviroTrac Ltd.	Concrete Core and Manual Soil Removal			Measuring Point Elevation
Date Started:	Date Completed:			
May, 2018	May, 2018			
Completion Depth:	*ET Engineer*			
3'	David Weber			

(NTS)	DEPTH (ft below grade)	SAMPLES Recovery	SAMPLES Blow per 6 in.	SAMPLES PID ppm	SOIL DESCRIPTION
	0				
	5				
	10				
	15				*SVE Well Construction:*
	20				1' x 4" PVC Riser 2' x 4" 20 Slot PVC Screen
	25				



NTS - Not to Scale

DTW - Depth to Water

Soil Vapor Extraction Well Construction

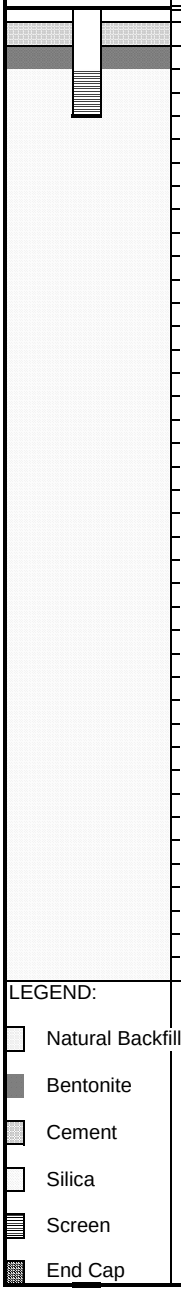
EnviroTrac Ltd.

Yaphank, NY

SVE-8

		Depth to Water (ft. from grade.)		Site Elevation Datum
Site Name:	Address:	Date	DTW	Ground Elevation
Commercial Building	1199-1221 Sutter Avenue, Brooklyn			
Drilling Company:	Method:			
EnviroTrac Ltd.	Concrete Core and Manual Soil Removal			Measuring Point Elevation
Date Started:	Date Completed:			
May, 2018	May, 2018			
Completion Depth:	*ET Engineer*			
3'	David Weber			

(NTS)	DEPTH (ft below grade)	SAMPLES Reco-very	Blow per 6 in.	PID ppm	SOIL DESCRIPTION
	0				
	5				
	10				
	15				*SVE Well Construction:*
	20				1' x 4" PVC Riser 2' x 4" 20 Slot PVC Screen
	25				



NTS - Not to Scale

DTW - Depth to Water

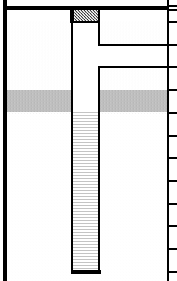
Soil Vapor Extraction Well Construction

EnviroTrac Ltd.

Yaphank, NY

SVE-9

		Depth to Water (ft. from grade.)		Site Elevation Datum
Site Name:	Address:	Date	DTW	Ground Elevation
Commercial Building	1199-1221 Sutter Avenue, Brooklyn			
Drilling Company:	Method:			Measuring Point Elevation
Associated Env.	Geoprobe Auger			
Date Started:	Date Completed:			
9/18/2018	9/18/2018			
Completion Depth:	*ET Geologist*			
10'	Victor Cardoza			

(NTS)	DEPTH (ft below grade)	SAMPLES Reco-very	Blow per 6 in.	PID ppm	SOIL DESCRIPTION
	0 5 10 15 20 25				- *SVE Well Construction:* 4' x 2" PVC Riser 6' x 2" 20 Slot PVC Screen

LEGEND:

- Natural Backfill
- Bentonite
- Cement
- Silica
- Screen
- End Cap
- Compactedn Fill

NTS - Not to Scale

DTW - Depth to Water

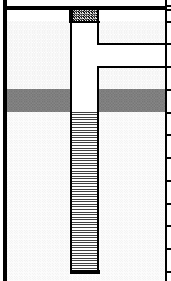
Soil Vapor Extraction Well Construction

EnviroTrac Ltd.

Yaphank, NY

SVE-10

		Depth to Water (ft. from grade.)		Site Elevation Datum
Site Name:	Address:	Date	DTW	Ground Elevation
Commercial Building	1199-1221 Sutter Avenue, Brooklyn			
Drilling Company:	Method:			Measuring Point Elevation
Associated Env.	Geoprobe Auger			
Date Started:	Date Completed:			
9/19/2018	9/19/2018			
Completion Depth:	*ET Geologist*			
10'	Nicholas Byrnes			

(NTS)	DEPTH (ft below grade)	SAMPLES Reco-very	Blow per 6 in.	PID ppm	SOIL DESCRIPTION
	0 5 10 15 20 25				*SVE Well Construction:* 4' x 2" PVC Riser 6' x 2" 20 Slot PVC Screen

LEGEND:

- Natural Backfill
- Bentonite
- Cement
- Silica
- Screen
- End Cap
- Compactedn Fill

NTS - Not to Scale

DTW - Depth to Water

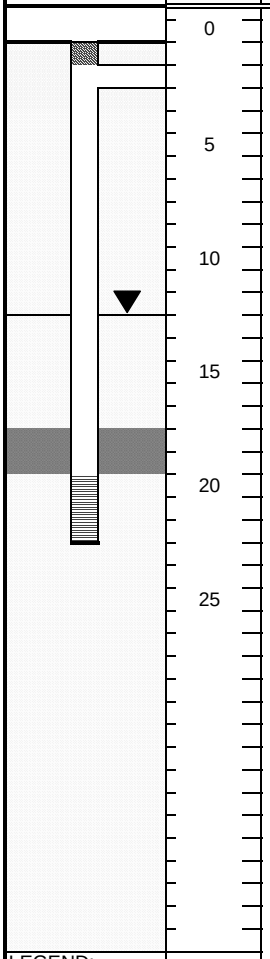
Air Sparge Well Construction

EnviroTrac Ltd.

Yaphank, New York

AS-1

		Depth to Water (ft. from grade.)		Site Elevation Datum Arbitrary
Site Name:	Address:	Date	DTW	Ground Elevation
Commercial Building	1199-1221 Sutter Avenue, Brooklyn			
Drilling Company:	Method:			
Associated Env	Geoprobe Auger			Measuring Point Elevation
Date Started:	Date Completed:			
9/18/2018	9/18/2018			
Completion Depth:	*EnviroTrac Geologist*			
22'	Victor Cardoza			

(NTS)	DEPTH (ft below grade)	SAMPLES Reco-very	Blow per 6 in.	PID ppm	SOIL DESCRIPTION
	0 5 10 15 20 25				*Air Sparge Well Construction:* 20' x 2" PVC Riser 2' x 2" 20 Slot PVC Screen

LEGEND:

- Natural Backfill
- Bentonite
- Cement
- Silica
- Screen
- End Cap
- Compacted Fill

NTS - Not to Scale

DTW - Depth to Water

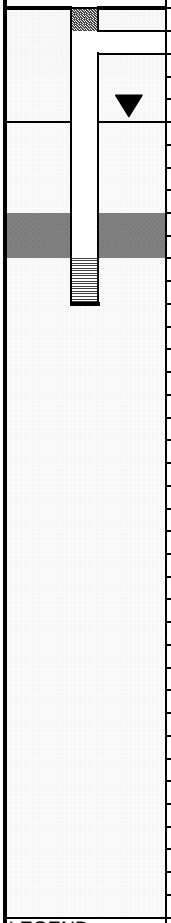
Air Sparge Well Construction

EnviroTrac Ltd.

Yaphank, New York

AS-2

		Depth to Water (ft. from grade.)		Site Elevation Datum Arbitrary
Site Name:	Address:	Date	DTW	Ground Elevation
Commercial Building	1199-1221 Sutter Avenue, Brooklyn			
Drilling Company:	Method:			
Associated Env	Geoprobe Auger			Measuring Point Elevation
Date Started:	Date Completed:			
9/24/2018	9/24/2018			
Completion Depth:	*EnviroTrac Geologist*			
13'	Nicholas Byrnes			

(NTS)	DEPTH (ft below basement slab)	SAMPLES Reco-very	Blow per 6 in.	PID ppm	SOIL DESCRIPTION
	0 5 10 15 20 25				*Air Sparge Well Construction:* 11' x 2" PVC Riser 2' x 2" 20 Slot PVC Screen

LEGEND:

- Natural Backfill
- Bentonite
- Cement
- Silica
- Screen
- End Cap
- Compacted Fill

NTS - Not to Scale

DTW - Depth to Water

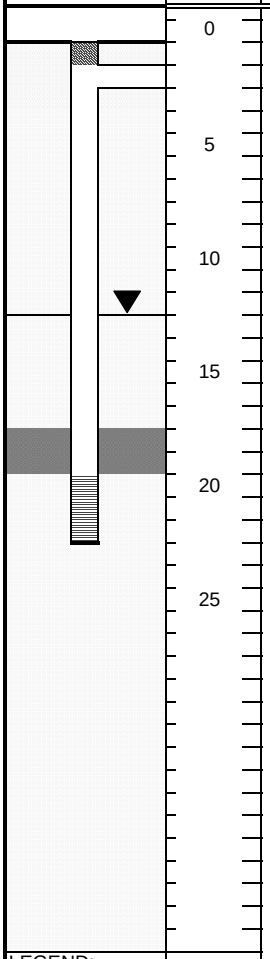
Air Sparge Well Construction

EnviroTrac Ltd.

Yaphank, New York

AS-3

		Depth to Water (ft. from grade.)		Site Elevation Datum Arbitrary
Site Name:	Address:	Date	DTW	Ground Elevation
Commercial Building	1199-1221 Sutter Avenue, Brooklyn			
Drilling Company:	Method:			Measuring Point Elevation
Associated Env	Geoprobe Auger			
Date Started: 9/19/2018	Date Completed: 9/19/2018			
Completion Depth: 22'	*EnviroTrac Geologist* Nicholas Byrnes			

(NTS)	DEPTH (ft below grade)	SAMPLES Reco-very	Blow per 6 in.	PID ppm	SOIL DESCRIPTION
	0 5 10 15 20 25				*Air Sparge Well Construction:* 20' x 2" PVC Riser 2' x 2" 20 Slot PVC Screen

LEGEND:

- Natural Backfill
- Bentonite
- Cement
- Silica
- Screen
- End Cap
- Compacted Fill

NTS - Not to Scale

DTW - Depth to Water

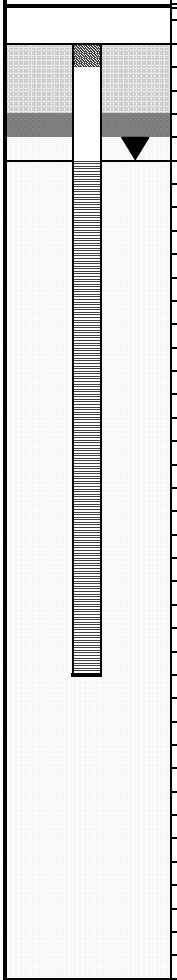
Injection Well Construction

EnviroTrac Ltd.

Yaphank, New York

Inj-1

		Depth to Water (ft. from grade.)		Site Elevation Datum Arbitrary
Site Name:	Address:	Date	DTW	Ground Elevation
Commercial Building	1199-1221 Sutter Avenue, Brooklyn			
Drilling Company:	Method:			
Associated Env	Geoprobe 6610			Measuring Point Elevation
Date Started:	Date Completed:			
May, 2018	May, 2018			
Completion Depth:	*EnviroTrac Geologist*			
25'	Joshua Levy			

(NTS)	DEPTH (ft below grade)	SAMPLES Reco-very	Blow per 6 in.	PID ppm	SOIL DESCRIPTION
	0 5 10 15 20 25				*Injection Well Construction:* 5' x 1.5" PVC Riser 22' x 1.5" 20 Slot PVC Screen

NTS - Not to Scale

DTW - Depth to Water

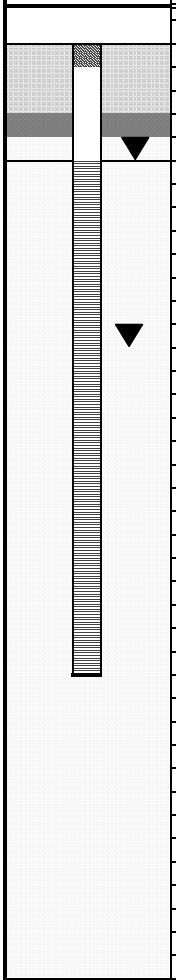
Injection Well Construction

EnviroTrac Ltd.

Yaphank, New York

Inj-2

		Depth to Water (ft. from grade.)		Site Elevation Datum Arbitrary
Site Name:	Address:	Date	DTW	Ground Elevation
Commercial Building	1199-1221 Sutter Avenue, Brooklyn			
Drilling Company:	Method:			
Associated Env	Geoprobe 6610			Measuring Point Elevation
Date Started:	Date Completed:			
May, 2018	May, 2018			
Completion Depth:	*EnviroTrac Geologist*			
25'	Joshua Levy			

(NTS)	DEPTH (ft below grade)	SAMPLES Reco-very	Blow per 6 in.	PID ppm	SOIL DESCRIPTION
	0 5 10 15 20 25				*Injection Well Construction:* 5' x 1.5" PVC Riser 22' x 1.5" 20 Slot PVC Screen

NTS - Not to Scale

DTW - Depth to Water

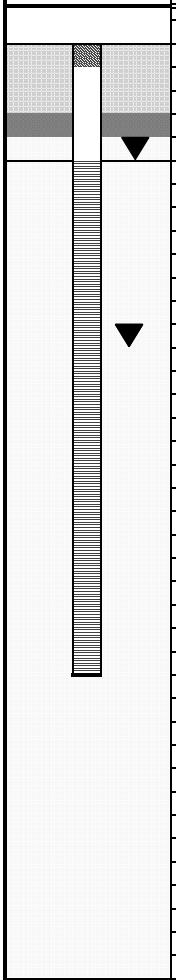
Injection Well Construction

EnviroTrac Ltd.

Yaphank, New York

Inj-3

		Depth to Water (ft. from grade.)		Site Elevation Datum Arbitrary
Site Name:	Address:	Date	DTW	Ground Elevation
Commercial Building	1199-1221 Sutter Avenue, Brooklyn			
Drilling Company:	Method:			
Associated Env	Geoprobe 6610			Measuring Point Elevation
Date Started:	Date Completed:			
May, 2018	May, 2018			
Completion Depth:	*EnviroTrac Geologist*			
25'	Joshua Levy			

(NTS)	DEPTH (ft below grade)	SAMPLES Reco-very	Blow per 6 in.	PID ppm	SOIL DESCRIPTION
	0 5 10 15 20 25				*Injection Well Construction:* 5' x 1.5" PVC Riser 22' x 1.5" 20 Slot PVC Screen

LEGEND:

- Natural Backfill
- Bentonite
- Cement
- Silica
- Screen
- End Cap

NTS - Not to Scale

DTW - Depth to Water

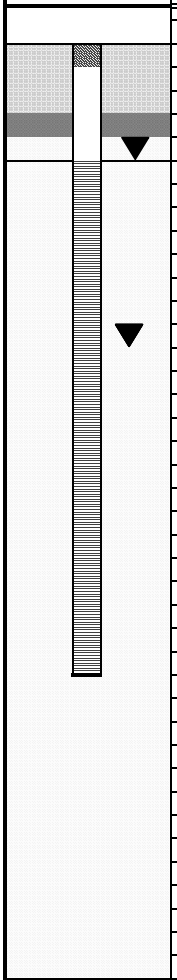
Injection Well Construction

EnviroTrac Ltd.

Yaphank, New York

Inj-4

		Depth to Water (ft. from grade.)		Site Elevation Datum Arbitrary
Site Name:	Address:	Date	DTW	Ground Elevation
Commercial Building	1199-1221 Sutter Avenue, Brooklyn			
Drilling Company:	Method:			
Associated Env	Geoprobe 6610			Measuring Point Elevation
Date Started:	Date Completed:			
May, 2018	May, 2018			
Completion Depth:	*EnviroTrac Geologist*			
25'	Joshua Levy			

(NTS)	DEPTH (ft below grade)	SAMPLES Reco-very	Blow per 6 in.	PID ppm	SOIL DESCRIPTION
	0 5 10 15 20 25				*Injection Well Construction:* 5' x 1.5" PVC Riser 22' x 1.5" 20 Slot PVC Screen

NTS - Not to Scale

DTW - Depth to Water

APPENDIX E – EXCAVATION WORK PLAN (EWP)

Under the existing and anticipated site use scenarios, additional excavation activities are not anticipated. However, should additional excavations become necessary, the excavation work plan below should be implemented.

E-1 NOTIFICATION

At least 15 days prior to the start of any activity that is anticipated to encounter remaining contamination, the Site owner or their representative will notify the NYSDEC. Table B-1 includes contact information for the above notification. The information on this table will be updated as necessary to provide accurate contact information. A full listing of site-related contact information is provided in Appendix A.

Table B-1: Notifications*

Michael MacCabe, P.E.	518-402-9687, Michael.maccabe@dec.ny.gov
Kelly A. Lewandowski	518-402-9569, Kelly.lewandowski@dec.ny.gov

* Note: Notifications are subject to change and will be updated as necessary.

This notification will include:

- A detailed description of the work to be performed, including the location and areal extent of excavation, plans/drawings for Site re-grading, intrusive elements or utilities to be installed below the soil cover, estimated volumes of contaminated soil to be excavated and any work that may impact an engineering control;
- A summary of environmental conditions anticipated to be encountered in the work areas, including the nature and concentration levels of contaminants of concern, potential presence of grossly contaminated media, and plans for any pre-construction sampling;
- A schedule for the work, detailing the start and completion of all intrusive work;
- A summary of the applicable components of this EWP;

- A statement that the work will be performed in compliance with this EWP and 29 CFR 1910.120;
- A copy of the contractor's health and safety plan (HASP), in electronic format, if it differs from the HASP provided in Appendix G of this SMP;
- Identification of disposal facilities for potential waste streams; and
- Identification of sources of any anticipated backfill, along with all required chemical testing results.

E-2 SOIL SCREENING METHODS

Visual, olfactory and instrument-based (e.g. photoionization detector) soil screening will be performed by a qualified environmental professional during all excavations into known or potentially contaminated material (remaining contamination). Soil screening will be performed when invasive work is done and will include all excavation and invasive work performed during development, such as excavations for foundations and utility work, after issuance of the COC.

Soils will be segregated based on previous environmental data and screening results into material that requires off-Site disposal and material that requires testing to determine if the material can be reused on-Site as soil beneath a cover or if the material can be used as cover soil. Further discussion of off-Site disposal of materials and on-Site reuse is provided in Section B-6 and B-7, respectively, of this Appendix.

E-3 SOIL STAGING METHODS

Large scale excavations are not anticipated, however, should they become necessary soil stockpiles will be continuously encircled with a berm and/or silt fence. Hay bales will be used as needed near catch basins, surface waters and other discharge points.

Stockpiles will be kept covered at all times with appropriately anchored tarps. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced.

Stockpiles will be inspected at a minimum once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by the NYSDEC.

E-4 MATERIALS EXCAVATION AND LOAD-OUT

A qualified environmental professional or person under their supervision will oversee all invasive work and the excavation and load-out of all excavated material.

The owner of the property and remedial party (if applicable) and its contractors are responsible for safe execution of all invasive and other work performed under this Plan.

The presence of utilities and easements on the Site will be investigated by the qualified environmental professional. It will be determined whether a risk or impediment to the planned work under this SMP is posed by utilities or easements on the site.

Loaded vehicles leaving the Site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State, local, and NYSDOT requirements (and all other applicable transportation requirements).

A truck wash will be operated on-site, as appropriate. The qualified environmental professional will be responsible for ensuring that all outbound trucks will be washed at the truck wash before leaving the Site until the activities performed under this section are complete Truck wash waters will be collected and disposed of off-Site in an appropriate manner.

Locations where vehicles enter or exit the Site shall be inspected daily for evidence of off-Site soil tracking.

The qualified environmental professional will be responsible for ensuring that all egress points for truck and equipment transport from the Site are clean of dirt and other materials derived from the Site during intrusive excavation activities. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to site-derived materials.

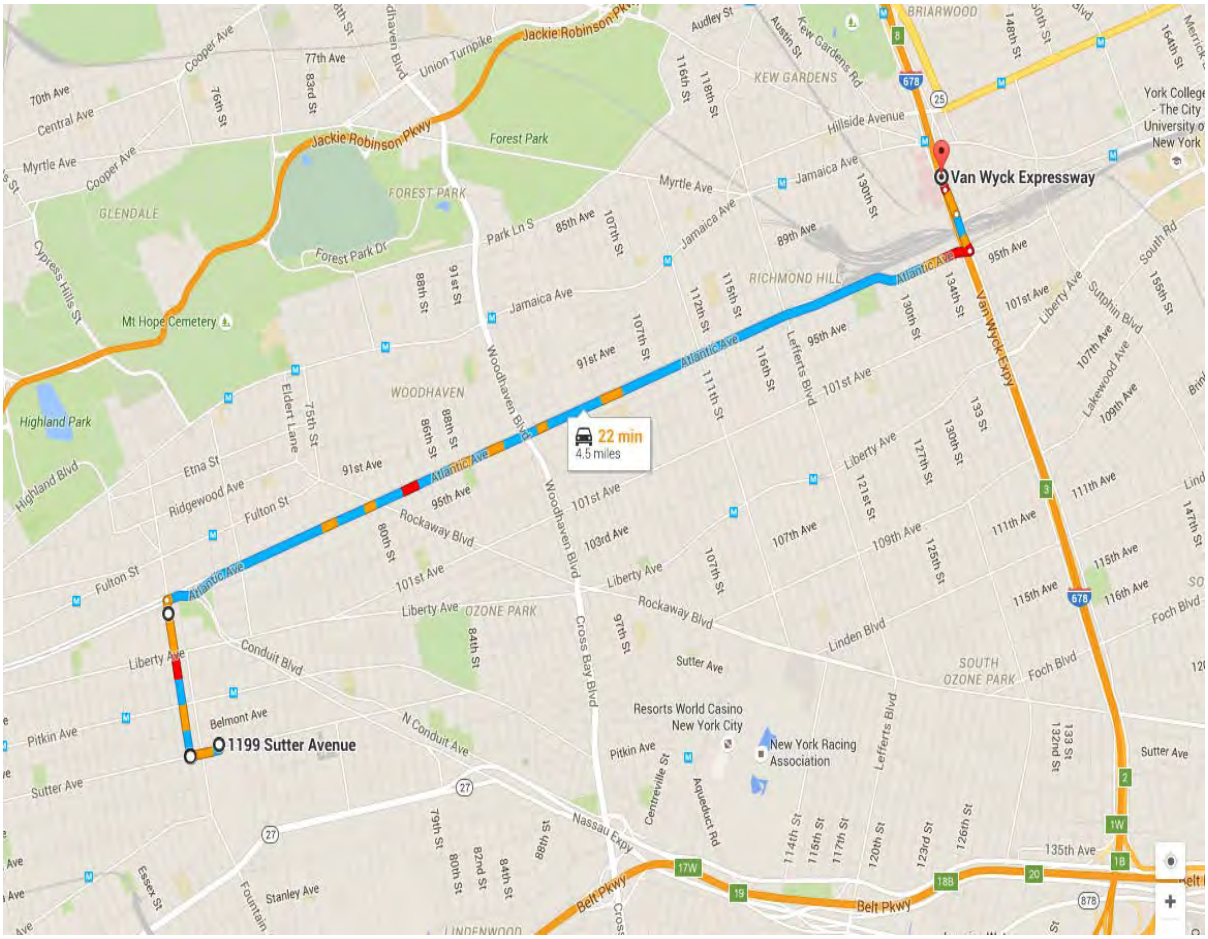
E-5 MATERIALS TRANSPORT OFF-SITE

All transport of materials will be performed by licensed haulers in accordance with appropriate local, State, and Federal regulations, including 6 NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded.

Based on the current and anticipated future use of the Site, any future materials generated requiring off-Site disposal will be minimal and will be disposed of utilizing labeled 55-gallon DOT drums. The drums would be removed and transported for proper disposal via a licensed waste hauler. Large scale excavations requiring bulk transport and disposal are not anticipated (i.e. demolition of the building).

Material transported by trucks exiting the Site will be secured with tight-fitting covers. Loose-fitting canvas-type truck covers will be prohibited. If loads contain wet material capable of producing free liquid, truck liners will be used.

Truck transport routes are as follows: via Sutter Avenue 0.1 mile toward Logan Street, then northbound 0.5 mile on Logan Street toward Atlantic Avenue, and then eastbound 3.6 miles toward the Van Wyck Expressway. A map is provided below.



All trucks loaded with Site materials will exit the vicinity of the Site using only these approved truck routes. This is the most appropriate route and takes into account: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting off-Site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; (f) overall safety in transport; and (g) community input [where necessary].

Trucks will be prohibited from stopping and idling in the neighborhood outside the project site.

Egress points for truck and equipment transport from the Site will be kept clean of dirt and other materials during Site remediation and development.

Queuing of trucks will be performed on-Site in order to minimize off-Site disturbance. Off-Site queuing will be prohibited.

E-6 MATERIALS DISPOSAL OFF-SITE

Under the existing and anticipated Site use scenarios, additional excavation activities could occur. Below provides for this scenario should it arise. Any groundwater generated at the Site will be disposed of off-Site.

All material excavated and removed from the Site will be treated as contaminated and regulated material and will be transported and disposed in accordance with all local, State (including 6NYCRR Part 360) and Federal regulations. If disposal of material from this Site is proposed for unregulated off-Site disposal (i.e. clean soil removed for development purposes), a formal request with an associated plan will be made to the NYSDEC. Unregulated off-Site management of materials from this Site will not occur without formal NYSDEC approval.

Off-Site disposal locations for excavated soils will be identified in the pre-excavation notification. This will include estimated quantities and a breakdown by class of disposal facility if appropriate, i.e. hazardous waste disposal facility, solid waste landfill, petroleum treatment facility, C/D recycling facility, etc. Actual disposal quantities and associated documentation will be reported to the NYSDEC in the Periodic Review Report. This documentation will include: waste profiles, test results, facility acceptance letters, manifests, bills of lading and facility receipts.

Non-hazardous historic fill and contaminated soils taken off-Site will be handled, at minimum, as a Municipal Solid Waste per 6NYCRR Part 360-1.2. Material that does not meet Unrestricted SCOs is prohibited from being taken to a New York State recycling facility (6NYCRR Part 360-16 Registration Facility).

E-7 MATERIALS REUSE ON-SITE

Under the existing and anticipated site use scenarios, additional excavation activities are not anticipated. Any groundwater generated on-Site will be disposed of off-Site and the reuse of material on-Site is not anticipated.

The qualified environmental professional will ensure that procedures defined for materials reuse in this SMP are followed and that unacceptable material does not remain on-Site. Contaminated on-Site material, including historic fill and contaminated soil, that is acceptable for reuse on-Site will be placed below the demarcation layer or impervious surface, and will not be reused within a cover soil layer, within landscaping berms, or as backfill for subsurface utility lines.

Any demolition material proposed for reuse on-Site will be sampled for asbestos and the results will be reported to the NYSDEC for acceptance. Concrete crushing or processing on-Site will not be performed without prior NYSDEC approval. Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of the Site will not be reused on-site.

E-8 FLUIDS MANAGEMENT

All liquids to be removed from the Site, including but not limited to, excavation dewatering, decontamination waters and groundwater monitoring well purge and development waters, will be handled, transported and disposed in accordance with applicable local, State, and Federal regulations. Dewatering, purge and development fluids will not be recharged back to the land surface or subsurface of the Site, and will be managed off-Site, unless prior approval is obtained from NYSDEC.

Discharge of water generated during large-scale construction activities to surface waters (i.e. a local pond, stream or river) will be performed under a SPDES permit.

E-9 COVER SYSTEM RESTORATION

After the completion of soil removal and any other invasive activities the cover system will be restored in a manner that complies with the Decision Document. The existing cover system is comprised of a minimum of 6 inches of clean soil, asphalt pavement, concrete covered sidewalks and concrete building. If the type of cover system changes from that which exists prior to the excavation (i.e., a soil cover is replaced by asphalt), this will constitute a modification of the cover element of the remedy and the upper surface of the remaining contamination. A figure showing the modified surface will be included in the subsequent Periodic Review Report and in an updated SMP.

E-10 BACKFILL FROM OFF-SITE SOURCES

All materials proposed for import onto the Site will be approved by the qualified environmental professional and will be in compliance with provisions in this SMP prior to receipt at the Site. A Request to Import/Reuse Fill or Soil form, which can be found at http://www.dec.ny.gov/regulations/67386.html, will be prepared and submitted to the NYSDEC project manager allowing a minimum of 5 business days for review.

Material from industrial sites, spill sites, or other environmental remediation sites or potentially contaminated sites will not be imported to the Site.

All imported soils will meet the backfill and cover soil quality standards established in 6 NYCRR 375-6.7(d). Based on an evaluation of the land use, protection of groundwater and protection of ecological resources criteria, the resulting soil quality standards are listed in Appendix 5 Allowable Constituent Levels for Imported Fill or Soil Subdivision 5.4(e) and area included as Attachment 1. Soils that meet 'exempt' fill requirements under 6 NYCRR Part 360, but do not meet backfill or cover soil objectives for this Site, will not be imported onto the Site without prior approval by NYSDEC. Solid waste will not be imported onto the Site.

Trucks entering the Site with imported soils will be securely covered with tight fitting covers. Imported soils will be stockpiled separately from excavated materials and covered to prevent dust releases.

E-11 STORMWATER POLLUTION PREVENTION

Under the future anticipated Site use (potential mixed commercial and residential use), large scale excavations or situations that would require a stormwater pollution prevention plan may occur. In the circumstance that the facility is demolished or major excavation is required, an appropriate stormwater pollution prevention plan which conforms to the requirement of the NYSDEC Division of Water guidelines and NYS regulations will be provided in advance to the NYSDEC.

The plan will include:

Barriers and hay bale checks will be installed and inspected once a week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by the NYSDEC. All necessary repairs shall be made immediately.

Accumulated sediments will be removed as required to keep the barrier and hay bale check functional.

All undercutting or erosion of the silt fence toe anchor shall be repaired immediately with appropriate backfill materials.

Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

Erosion and sediment control measures identified in the SMP shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters.

Silt fencing or hay bales will be installed around the entire perimeter of the construction area.

E-12 EXCAVATION CONTINGENCY PLAN

If underground tanks or other previously unidentified contaminant sources are found during post-remedial subsurface excavations or development related construction, excavation activities will be suspended until sufficient equipment is mobilized to address the condition.

Sampling will be performed on product, sediment and surrounding soils, etc. as necessary to determine the nature of the material and proper disposal method. Chemical analysis will be performed for a full list of analytes (TAL metals; TCL volatiles and semi-volatiles, TCL pesticides and PCBs), unless the Site history and previous sampling results provide a sufficient justification to limit the list of analytes. In this case, a reduced list of analytes will be proposed to the NYSDEC for approval prior to sampling.

Identification of unknown or unexpected contaminated media identified by screening during invasive Site work will be promptly communicated by phone to NYSDEC's Project Manager. Reportable quantities of petroleum product will also be reported to the NYSDEC spills hotline. These findings will be also included in the Periodic Review Report.

E-13 COMMUNITY AIR MONITORING PLAN

Should the need for excavations arise, a community air monitoring plan will be implemented. The location of air sampling stations will be based on the area of the excavation and prevailing wind conditions. These locations will be adjusted on a daily or more frequent basis based on actual wind directions to provide an upwind and at least two downwind monitoring stations. Given the presence of a residential community to the north and south of the Site, fixed monitoring stations will be located at the northern and southern perimeters of the Site, regardless of the prevailing wind conditions.

Real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) will be conducted during implementation of the excavation activities to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and

businesses) from potential airborne contaminant releases as a direct result of the remedial work activities. Based on the available Site characterization testing results and the Site setting, the likelihood of any adverse exposure to the community is very low.

VOC Monitoring, Response Levels, and Actions

VOCs will be monitored at the downwind perimeter of the work area on a continuous basis during intrusive activities (i.e., soil excavation and stockpiling). Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions. The equipment will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below:

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities will 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.
- 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 will 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.
- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations will be monitored continuously at the upwind and downwind perimeters of the work area at temporary particulate monitoring stations during work activities; i.e., soil excavation and stockpiling.

The particulate monitoring will 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 will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration will be visually assessed during all work activities:

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/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 will be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.
- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work will 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 mcg/m^3 of the upwind level and in preventing visible dust migration.

Exceedances of action levels listed in the CAMP will be reported to NYSDEC and NYSDOH Project Managers.

E-14 ODOR CONTROL PLAN

This odor control plan is capable of controlling emissions of nuisance odors off-Site and on-Site. Specific odor control methods to be used on a routine basis will include the implementation of the CAMP (Section B-13, above). If nuisance odors are identified at the Site

boundary, or if odor complaints are received, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. NYSDEC and NYSDOH will be notified of all odor events and of any other complaints about the project. Implementation of all odor controls, including the halt of work, is the responsibility of the remedial party's Remediation Engineer, and any measures that are implemented will be discussed in the Periodic Review Report.

All necessary means will be employed to prevent on- and off-Site nuisances. At a minimum, these measures will include: (a) limiting the area of open excavations and size of soil stockpiles; (b) shrouding open excavations with tarps and other covers; and (c) using foams to cover exposed odorous soils. If odors develop and cannot be otherwise controlled, additional means to eliminate odor nuisances will include: (d) direct load-out of soils to trucks for off-Site disposal; (e) use of chemical odorants in spray or misting systems; and, (f) use of staff to monitor odors in surrounding neighborhoods.

If nuisance odors develop during intrusive work that cannot be corrected, or where the control of nuisance odors cannot otherwise be achieved due to on-Site conditions or close proximity to sensitive receptors, odor control will be achieved by sheltering the excavation and handling areas in a temporary containment structure equipped with appropriate air venting/filtering systems.

E-15 DUST CONTROL PLAN

Large or extensive excavations generating dust are not anticipated at the Site. However, prior to the commencement of any such activities a task specific dust control plan will be developed and implemented in conjunction with the CAMP (see Section B-13, above).

Any task specific dust suppression plan developed that addresses dust management during invasive on-Site work will include, at a minimum, the items listed below:

- Dust suppression will be achieved through the use of a dedicated on-Site water truck for road wetting. The truck will be equipped with a water cannon capable of spraying water directly onto off-road areas including excavations and stockpiles.
- Clearing and grubbing of larger sites will be done in stages to limit the area of exposed, un-vegetated soils vulnerable to dust production.
- Gravel will be used on roadways to provide a clean and dust-free road surface.
- On-Site roads will be limited in total area to minimize the area required for water truck sprinkling.

E-16 OTHER NUISANCES

Procedures to address other nuisances that may require control will be developed on an as needed based on the work scope and other pertinent Site condition present at the time of the proposed excavation activities.

ATTACHMENT 1

Appendix 5
Allowable Constituent Levels for Imported Fill or Soil
Subdivision 5.4(e)

Source: This table is derived from soil cleanup objective (SCO) tables in 6 NYCRR 375. Table 375-6.8(a) is the source for unrestricted use and Table 375-6.8(b) is the source for restricted use.

Note: For constituents not included in this table, refer to the contaminant for supplemental soil cleanup objectives (SSCOs) in the Commissioner Policy on *Soil Cleanup Guidance*. If an SSCO is not provided for a constituent, contact the DER PM to determine a site-specific level.

Constituent	Unrestricted Use	Residential Use	Restricted Residential Use	Commercial or Industrial Use	If Ecological Resources are Present
Metals					
Arsenic	13	16	16	16	13
Barium	350	350	400	400	433
Beryllium	7.2	14	47	47	10
Cadmium	2.5	2.5	4.3	7.5	4
Chromium, Hexavalent[1]	1 [3]	19	19	19	1 [3]
Chromium, Trivalent[1]	30	36	180	1500	41
Copper	50	270	270	270	50
Cyanide	27	27	27	27	NS
Lead	63	400	400	450	63
Manganese	1600	2000	2000	2000	1600
Mercury (total)	0.18	0.73	0.73	0.73	0.18
Nickel	30	130	130	130	30
Selenium	3.9	4	4	4	3.9
Silver	2	8.3	8.3	8.3	2
Zinc	109	2200	2480	2480	109
PCBs/Pesticides					
2,4,5-TP Acid (Silvex)	3.8	3.8	3.8	3.8	NS
4,4'-DDE	0.0033 [3]	1.8	8.9	17	0.0033 [3]
4,4'-DDT	0.0033 [3]	1.7	7.9	47	0.0033 [3]
4,4'-DDD	0.0033 [3]	2.6	13	14	0.0033 [3]
Aldrin	0.005	0.019	0.097	0.19	0.14
Alpha-BHC	0.02	0.02	0.02	0.02	0.04 [4]
Beta-BHC	0.036	0.072	0.09	0.09	0.6
Chlordane (alpha)	0.094	0.91	2.9	2.9	1.3
Delta-BHC	0.04	0.25	0.25	0.25	0.04 [4]
Dibenzofuran	7	14	59	210	NS
Dieldrin	0.005	0.039	0.1	0.1	0.006
Endosulfan I	2.4[2]	4.8	24	102	NS
Endosulfan II	2.4[2]	4.8	24	102	NS
Endosulfan sulfate	2.4[2]	4.8	24	200	NS
Endrin	0.014	0.06	0.06	0.06	0.014
Heptachlor	0.042	0.38	0.38	0.38	0.14
Lindane	0.1	0.1	0.1	0.1	6
Polychlorinated biphenyls	0.1	1	1	1	1

Constituent	Unrestricted Use	Residential Use	Restricted Residential Use	Commercial or Industrial Use	If Ecological Resources are Present
Semi-volatile Organic Compounds					
Acenaphthene	20	98	98	98	20
Acenaphthylene	100	100	100	107	NS
Anthracene	100	100	100	500	NS
Benzo(a)anthracene	1	1	1	1	NS
Benzo(a)pyrene	1	1	1	1	2.6
Benzo(b)fluoranthene	1	1	1	1.7	NS
Benzo(g,h,i)perylene	100	100	100	500	NS
Benzo(k)fluoranthene	0.8	1	1.7	1.7	NS
Chrysene	1	1	1	1	NS
Dibenz(a,h)anthracene	0.33 [3]	0.33 [3]	0.33 [3]	0.56	NS
Fluoranthene	100	100	100	500	NS
Fluorene	30	100	100	386	30
Indeno(1,2,3-cd)pyrene	0.5	0.5	0.5	5.6	NS
m-Cresol(s)	0.33 [3]	0.33 [3]	0.33 [3]	0.33 [3]	NS
Naphthalene	12	12	12	12	NS
o-Cresol(s)	0.33 [3]	0.33 [3]	0.33 [3]	0.33 [3]	NS
p-Cresol(s)	0.33	0.33	0.33	0.33	NS
Pentachlorophenol	0.8 [3]	0.8 [3]	0.8 [3]	0.8 [3]	0.8 [3]
Phenanthrene	100	100	100	500	NS
Phenol	0.33 [3]	0.33 [3]	0.33 [3]	0.33 [3]	30
Pyrene	100	100	100	500	NS
Volatile Organic Compounds					
1,1,1-Trichloroethane	0.68	0.68	0.68	0.68	NS
1,1-Dichloroethane	0.27	0.27	0.27	0.27	NS
1,1-Dichloroethene	0.33	0.33	0.33	0.33	NS
1,2-Dichlorobenzene	1.1	1.1	1.1	1.1	NS
1,2-Dichloroethane	0.02	0.02	0.02	0.02	10
1,2-Dichloroethene(cis)	0.25	0.25	0.25	0.25	NS
1,2-Dichloroethene(trans)	0.19	0.19	0.19	0.19	NS
1,3-Dichlorobenzene	2.4	2.4	2.4	2.4	NS
1,4-Dichlorobenzene	1.8	1.8	1.8	1.8	20
1,4-Dioxane	0.1 [3]	0.1 [3]	0.1 [3]	0.1 [3]	0.1
Acetone	0.05	0.05	0.05	0.05	2.2
Benzene	0.06	0.06	0.06	0.06	70
Butylbenzene	12	12	12	12	NS
Carbon tetrachloride	0.76	0.76	0.76	0.76	NS
Chlorobenzene	1.1	1.1	1.1	1.1	40
Chloroform	0.37	0.37	0.37	0.37	12
Ethylbenzene	1	1	1	1	NS
Hexachlorobenzene	0.33 [3]	0.33 [3]	1.2	3.2	NS
Methyl ethyl ketone	0.12	0.12	0.12	0.12	100
Methyl tert-butyl ether	0.93	0.93	0.93	0.93	NS
Methylene chloride	0.05	0.05	0.05	0.05	12

Volatile Organic Compounds (continued)					
Propylbenzene-n	3.9	3.9	3.9	3.9	NS
Sec-Butylbenzene	11	11	11	11	NS
Tert-Butylbenzene	5.9	5.9	5.9	5.9	NS
Tetrachloroethene	1.3	1.3	1.3	1.3	2
Toluene	0.7	0.7	0.7	0.7	36
Trichloroethene	0.47	0.47	0.47	0.47	2
Trimethylbenzene-1,2,4	3.6	3.6	3.6	3.6	NS
Trimethylbenzene-1,3,5	8.4	8.4	8.4	8.4	NS
Vinyl chloride	0.02	0.02	0.02	0.02	NS
Xylene (mixed)	0.26	1.6	1.6	1.6	0.26

All concentrations are in parts per million (ppm)
NS = Not Specified

Footnotes:
[1] The SCO for Hexavalent or Trivalent Chromium is considered to be met if the analysis for the total species of this contaminant is below the specific SCO for Hexavalent Chromium.
[2] The SCO is the sum of endosulfan I, endosulfan II and endosulfan sulfate.
[3] For constituents where the calculated SCO was lower than the contract required quantitation limit (CRQL), the CRQL is used as the Track 1 SCO value.
[4] This SCO is derived from data on mixed isomers of BHC.

APPENDIX F – HEALTH AND SAFETY PLAN

1199 SUTTER AVENUE
BROOKLYN, NEW YORK

Health And Safety Plan

NYSDEC BCP Number: C224141

Prepared for:
AAA Sutter Realty, LLC
153-157 Seventh Street
Garden City, New York 11530

Prepared by:
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5 Old Dock Road
Yaphank, New York 11980
631-924-3001

JUNE 2018

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I. INTRODUCTION

This Health and Safety Plan (HASP) has been prepared to identify and address potential health and safety concerns that may be encountered as a result of the construction activities that will be conducted as part of the installation of a soil vapor extraction (SVE) and air sparge (AS) system at the Sutter Realty Site located at 1199 Sutter Avenue, Brooklyn, New York (Site). Specifically this plan applies to the activities detailed in:

1199 Sutter Avenue, Brooklyn, New York BCP Site Number C224141 Remedial Action Work Plan (RAWP).

The procedures were developed in accordance with Occupational Safety and Health Administration (OSHA) Hazardous Waste Operations and Emergency Response (HAZWOPER) Standard 29 CFR 1910.120.

II. OBJECTIVES

The objective of this HASP is to protect on-Site worker health and safety during field activities at the Site. General guidelines in the HASP are provided to assure that safe working conditions exist at the Site. The health and safety procedures set forth in this plan have been established based on analysis of potential hazards and protection measures have been selected in response to these potential risks. The HASP will be modified if unforeseen changes occur while work is in progress. This plan includes health and safety procedures required for field activities performed at the Site. It has been designed to meet the following objectives:

- Evaluate the risk associated with each operation;
- Provide for identification, recognition, evaluation, and control of health, safety, and environmental hazards (if any);
- Provide the requirements for an optimum, safe, and healthful work environment, in which personnel are not exposed to avoidable risks, accidents, or injuries in the performance of their duties;
- Identify the roles and responsibilities of on-Site personnel; and
- Establish personnel protection standards and mandatory safety practices and procedures for all on-Site personnel.

This document will be periodically reviewed to ensure that it is current and appropriate.

1.0 HEALTH AND SAFETY ORGANIZATION

A. Health and Safety Coordinator: Mr. Michael Clark, CHMM, will serve as the Health and Safety Coordinator. Mr. Clark is Director of Safety and Health for EnviroTrac and has twenty seven years of experience in the environmental, health, and safety field including managing hazardous waste site remediation. He has a working knowledge of federal and state occupational health and safety regulations and is familiar with air monitoring techniques and the development of health and safety programs for personnel working in potentially toxic atmosphere. In addition to developing this Site specific Health and Safety Plan (HASP) Mr. Clark's responsibilities will include the following:

- **a.** Implementation of the HASP.
- **b.** Modification of the HASP as necessary to address new tasks and changing Site conditions.
- **c.** Initial training of on-Site workers with respect to the contents of the HASP.
- **d.** Be available during normal business hours for consultation by the Safety Officer.
- **e.** Be available to assist the Safety Officer (SO) in follow-up training if either new tasks are to be performed or changes in Site conditions occur.

B. Safety Officer: The designated SO will have experience in the remediation of hazardous waste sites or related field experience. The designated SO will have formal training in health and safety and will be conversant with federal and state regulations governing occupational health and safety. The designated SO will be certified in CPR and first aid and will have experience and training in the implementation of personal protection and air monitoring programs. The designated SO will have "hands-on" experience with the operation and maintenance of real-time air monitoring equipment and is thoroughly knowledgeable of the operation and maintenance of air-purifying respirators (APR) and supplied-air respirators (SAR) including SCBA and airline respirators.

In addition to meeting the above qualifications, the designated SO will be responsible for the following minimum requirements:

a. Implementation, enforcement, and monitoring of the HASP.
b. Pre-construction indoctrination and periodic training of all on-Site personnel with regard to this safety plan and other safety requirements to be observed during construction, including:
   i. Potential hazards.
   ii. Personal hygiene principles.
   iii. PPE.
   iv. Respiratory protection equipment usage and fit testing.
   v. Emergency procedures dealing with fire and medical situations.
   vi. Conduct daily update meetings in regard to health and safety.
c. Alerting the project manager prior to starting any particular hazardous work.
d. Informing project personnel of the New York State Labor Law Section 876 (Right-to-Know Law)
e. The maintenance of separation of Exclusion Zone (Dirty) from the Support Zone (Clean) areas as described hereafter.

C. Health and Safety Technicians: The designated Health and Safety Technician(s) will have hazardous waste site or related experience and will be knowledgeable of applicable occupational health and safety regulations. The designated Health and Safety Technician(s)

will be certified in CPR and first aid, and will be under direct supervision of the SO during on-Site work. The designated Health and Safety Technician(s) will be familiar with the operations, maintenance, and calibration of monitoring equipment that will be used in this remediation.

D. Medical Consultant: A Medical Consultant (MC) Dr. Sarah Mendehlson an occupational medical physician, certified in occupational medicine will be retained for the project. The physician will have experience in the occupational health area and will be familiar with potential site hazards of remedial action projects. The MC will also be available to provide annual physicals and to provide additional medical evaluations of personnel when necessary.

Qualifications of the HSC are presented in Appendix A.

2.0 SITE DESCRIPTION AND HAZARD ASSESSMENT

1199-1221 Sutter Avenue, Brooklyn, NY (herein referred to as the Site) is located in a mixed residential / commercial area of Brooklyn. The Site is bounded by Sutter Ave. to the south, Chestnut St. to the east, residences to the north, and Crystal St. to the west.

Site Features: The Site occupies about half of a city block on the north side of Sutter Avenue. An asphalt parking lot covers the northern portion of the Site and a single-story building is located along the southern portion of the Site. The building is underlain with a basement segmented for each retail/office unit with utilities, storage and service rooms.

Current Zoning and Land Use: The Site is within an R5 (residential) zoned area. The Site is zoned C1-2 (commercial) as are the properties along the north side of a seven-block stretch of Sutter Avenue.

Past use of the Site: The structures on the Site were constructed in 1957 and were the original development on the property. Spanish American Dry Cleaners occupied the eastern-most unit from September 1988 to May 1995. The former location of the dry cleaner is presently occupied by a self-service laundromat.

Site Geology and Hydrogeology: The property is located within the Pavement and Buildings-Flatbush-Riverhead Series Soil Map Unit, which is described as anthropogenic urban fill overlying glacial outwash deposits and characterized as a sandy loam. The groundwater table is approximately 13 feet below grade and generally flows south. Groundwater is not utilized as a source of potable water at the Site or surrounding area.

The scope of work is outlined in the RAWP and consists of the installation of a SVE system and the excavation of soil for eight (8) wells in the basement of the former cleaner unit, the adjacent Supermarket unit to the west, and in the rear parking lot to the north of the former dry cleaner.

CONTAMINANTS OF CONCERN:

GROUNDWATER	Contaminants of Concern	Concentration Range Detected (ug/l)	(ug/l)
Volatile Organic Compounds (VOCs)	Tetrachloroethylene (PCE)	ND - 610	5
	Cis-1,2-DCE	ND- 81	5
	Acetone	ND-577	50
	Chloroform	ND-97.7	7
	Trichlorethene	ND - 42	5

Soil	Contaminants of Concern	Concentration Range Detected (ug/kg)	SCG (mg/kg)
Volatile Organic Compounds (VOCs)	Tetrachloroethene (PCE)	443 – 37,500	1,300

ug/l = micrograms per liter
ug/kg = micrograms per kilogram
SCG = standards, criteria, and guidance
ND = not detected
NA = none available

Note: Based on these results, the highest observed contaminate concentrations are below applicable OSHA, ACGIH, and NIOSH Exposure limits.
Tetrachloroethene - OSHA TWA 100 ppm, C200 ppm (5 minutes in any 3-hour period), with a maximum of 300 ppm);
Trichloroethene - OSHA Permissible Exposure Limit (PEL):100 ppm (TWA), 200 ppm (Ceiling), 300 ppm/5min/2hr (Max) -ACGIH Threshold Limit Value (TLV): 50 ppm (TWA) 100 ppm (STEL);

Potential routes by which Site workers could be exposed generally include: inhalation, ingestion, dermal contact, and injection. However, direct contact with contaminants that may be present in the soil is unlikely because the Site is covered with building foundations and concrete pavement. Site workers will be exposed to soil during SVE well installation: Implement HASP, PPE, air monitoring.

Contaminated groundwater at the Site is not used for drinking or other purposes and the Site is served by a public water supply that obtains water from a source not affected by this contamination.

Volatile organic compounds in the groundwater may move into the soil vapor (air spaces within the soil), which in turn may move into overlying buildings and affect the indoor air quality. This process, which is similar to the movement of radon gas from the subsurface into the indoor air of buildings, is referred to as soil vapor intrusion (SVI). SVI sampling has indicated that mitigation is warranted for the on-Site former dry cleaner and adjacent supermarket to the west. The following control measures will be used alleviate exposure by routes of entry:

Control of Potential Exposure by Route of Entry	
Route of Entry	**Control of Potential Exposure**
INHALATION	Tasks associated with this phase of the project have reasonable risk of exposure to inhalation hazards at or near published exposure limits. To control exposure, the following precautions will be followed by all site workers and visitors: • Area air monitoring for the presence of VOCs will be conducted using a direct reading instrument (e.g., MiniRae), if ambient air levels exceed: - 5.0 ppm sustained for 15 minutes, workers will be required to don respiratory protection, the source is to be identified and controlled, if possible, to allow workers to doff respiratory protection. - 25.0 ppm sustained for 15 minutes, work will be stopped and the source is to be identified and controlled prior to commencing work. • Excessive dust generated by drilling operations is to be avoided by distance from the activity, standing upwind, or wetting the material. If exposure cannot be avoided, a filtering facepiece (i.e., dust mask) rated as N95 is to be donned. • For odors detected outside the exclusion zone, as determined noticeable by the project manager, work will be stopped and the source is to be identified and controlled prior to commencing work. If there is a change in the scope of work, the Safety Officer (SO) will stop work and the new conditions will be evaluated for potential inhalation hazards. Work will not proceed until the new conditions are assessed and workers health is addressed.
INGESTION	Tasks associated with this project have a risk of exposure to chemicals or hazardous substances that pose mild to moderate toxicity if ingested. To control exposure, the following precautions will be followed by all site workers and visitors: • Follow good hygiene practices - wash hands, face, and exposed skin with soap and water after work and prior to eating, drinking, smoking, or applying cosmetics or lip balm or immediately after contact with chemicals or hazardous substances. Do not touch mouth, nose, or eyes with unwashed hands or with used gloves. • Chemical-resistant gloves (e.g. nitrile, neoprene, or butyl rubber gloves) are to be worn during hands-on inspections, removing liquid or cleaning, handling chemicals or hazardous substances, or during other tasks that involve direct contact with chemicals or hazardous substances.

DERMAL CONTACT	Tasks associated with this project have a risk of exposure to chemicals or hazardous substances that pose mild to moderate toxicity through dermal contact, including contact with eyes. To control exposure, the following precautions will be followed by all site workers and visitors: • Follow good hygiene practices - wash hands, face, and exposed skin with soap and water after work and prior to eating, drinking, smoking, or applying cosmetics or lip balm or immediately after contact with chemicals or hazardous substances. Do not touch mouth, nose, or eyes with unwashed hands or with used gloves. • Safety glasses with side shields that comply with ANSI Z87.1 requirements are to be worn at all times in the work zone. When working with liquid permanganate, a faceshield attached to the hardhat, in addition to the safety glasses is required. • Chemical-resistant gloves (e.g. nitrile, neoprene, or butyl rubber gloves) are to be worn during hands-on inspections, removing liquid or cleaning, handling chemicals or hazardous substances, or during other tasks that involve direct contact with chemicals or hazardous substances. • Safety shoes/boots that comply with ANSI Z41, ASTM F-2412, or ASTM F-2413 are to be worn while performing tasks in the work zone. Long pants and sleeved shirts are required to be worn at all times in the work zone. When working with liquid permanganate, a splash-resistant chemical suit (i.e., Saranex suit) will be worn by workers.
INJECTION	Tasks associated with this project have a risk of exposure to chemicals, hazardous substances, and biological hazards that pose mild to moderate toxicity through injection. Injection is the puncturing or abrasion of the skin allowing toxins to enter the body. To control exposure, the following precautions will be followed by all site workers and visitors: • Abrasive-resistant or cut-resistant gloves (i.e., leather, Mechanix®, Kevlar-type, etc.) are to be worn while working with tools or manipulating objects that can cause cuts or abrasions to the hands. • Chemical-resistant gloves (e.g. nitrile/neoprene/butyl rubber gloves) are to be worn during hands-on inspections, removing liquid or cleaning, handling chemicals or hazardous substances, or during other tasks that could result in direct contact with chemicals or hazardous substances. • Safety glasses with side shields that comply with ANSI Z87.1 requirements are to be worn at all times in the work zone. • Long pants and sleeved shirts are required to be worn at all times in the work zone. • Safety shoes/boots that comply with ANSI Z41, ASTM F-2412, or ASTM F-2413 are to be worn when there is a danger of foot injuries due to falling or rolling objects, or objects piercing the sole. Otherwise, sturdy, enclosed work shoes are to be worn while performing tasks in the work zone. • Be aware of biting/stinging/poisonous insects, poisonous or thorny plants, and any animal in the work zone and take precautions to avoid contact or exposure with these hazards. • Injection of hydraulic fluid can occur from contact with pressurized hydraulic lines on hydraulic powered equipment. Do not come in close proximity to pressurized lines. Depressurize lines prior to inspection, repair, or maintenance of equipment.

General Hazard Evaluation

Ground disturbance projects, such as remediation system installation and well installation will follow the procedures outlined in the EnviroTrac Ground Disturbance Practice are presented in Appendix B.

Risk Characterization

Precautions will be taken to prevent injuries and exposures to the following potential hazards and implement control measure to reduce any potential risks identified on the next table.

Potential Site Hazards and Risk Characterization		
Hazards	**Risk Characterizations**	**Control Measures**
SLIP/TRIP/FALL	Potential wet, or slippery conditions due to weather, on-site spills, on-site water, and drainage/runoff.	**Inspect/be aware of ground conditions and wet or slippery conditions.** **Use PPE to alleviate hazards, good boots, laced and tied; take small steps in slippery conditions, install handrails or use walking devices, like hiking poles.** **Use salt, calcium chloride, sand, or other material to alleviate slippery conditions and/or to melt snow/ice.**
	Potential slips, trips, and falls may result due to the proposed equipment and activities at the site like: drilling / excavation, well installation, system installation, loading/unloading, traffic control, etc.	**Clear trip hazards, when possible.** **Use good housekeeping practices and maintain the work zone free of debris and have equipment, supplies, and tools organized and out of main travel paths.** **Focus on path of travel and keep solid footing. Install handrails, steps, ramps, etc. to alleviate trip or fall hazards.**
INJURY TO BACK	Moving / lifting / carrying supplies, equipment, and materials around the work zone. Performing manual equipment operations such as shoveling, sweeping, raking, pushing (such as a wheel barrow), hand auguring, etc. Removal of well covers, manway covers, or manholes. Lifting and maneuvering cones and barriers to establish Work Zone Protection.	**Use proper lifting techniques: lift with legs, not back; keep load close to the body; do not twist torso, turn by moving your feet.** **Use proper bending techniques: bend at the knees, straighten back, lift and pull using legs, and do not use back or shoulders to lift up or pull.** **Use proper manual equipment techniques for shoveling, raking, sweeping: turn by moving your feet, do not twist torso, use legs not back** **take breaks as needed to alleviate muscle and joint strain.** **Get help or use mechanical lifting equipment when loads exceed 50 lbs or as needed.**

INJURY TO FOOT/FEET	Injury from moving or dropping of equipment, supplies, drums, tanks, and buckets onto foot/feet. Feet being run over by vehicles or being crushed from lowering equipment like a tailgate lift or equipment footing.	**Wear ANSI/ASTM compliant safety boots with steel, composite, or aluminum toes while performing any tasks on site.** **Properly secure equipment and objects. Anticipate and recognize any potential conditions which may cause the dropping of equipment (i.e., ground conditions and wet, icy, or slippery conditions).** **Ensure proper clearance when lowering outriggers on equipment.**
INJURY TO HANDS	Sharps including glass, pieces of metal, wood, plastic, etc. during clean up and debris removal process. Potential pinch points/sharp edges during equipment handling, dropping of equipment on hands. Exposure to hazardous substances from the material stored in the tanks or possible contamination in soil/ground water.	**Debris should not be handled, use shovels, dust pans, etc., to pick up debris. If debris is required to be handled, use cut-resistant gloves (e.g., Kevlar).** **Abrasive-resistant or cut-resistant gloves (e.g., leather, Kevlar, etc.) are to be worn while working with tools, equipment, or manipulating objects that can cause cuts or abrasions to the hands.** **Wear chemical-resistant gloves (e.g. nitrile, neoprene, or butyl rubber gloves) during hands-on inspections, removing liquid or cleaning, handling chemicals or hazardous substances, or during other tasks that involve direct contact with chemicals or hazardous substances.**
INJURY TO HEAD AND EYES	Potential of being struck by overhead equipment such as drill rigs, or other equipment, material, and supplies around work site. Potential projectiles from equipment or surrounding environmental and remediation chemical spills during the proposed monitoring/sampling/injection activities. Potential of being sprayed or splashed in eyes or face while using liquid chemicals under pressure, such as subsurface injection of sodium permanganate. Potential of projectiles impacting face and eyes during preclearing of boreholes.	**Wear a hard hat in compliance with EnviroTrac's Hard Hat Policy while in the Work Zone (certified ANSI Z89.1)** **Safety glasses with side shields that comply with ANSI Z87.1 requirements are to be worn at all times in the work zone.** **Full faceshield attached to the hard hat <u>in addition</u> to safety glasses with side shields that comply with ANSI Z87.1 requirements are to be worn while using airknife for preclearing, working with liquid chemicals, or similar activities that require the protection offered by a full faceshield.**

INJURY TO HEARING	Potential noise due to operating equipment during the proposed activities will not exceed the following levels at the designated durations: Duration Decibel Levels. (dB) (hrs) 8 90 6 92 4 95 3 97 2 100 1.5 102 1 105 0.5 110 <0.25 115	**Wear appropriate ear protection, such as:** **Ear Plugs:** **3M™ E-A-R™ Push-Ins™ corded foam earplugs (NRR 28 dB)** **Ear Muffs:** **MSA Cap Mounted Ear Muff Model: 10087422 (NRR 28)**
WORK IN HOT WEATHER CONDITIONS	Potential heat stress due to the warmer weather conditions (generally) late Spring through the Summer and into late Fall. Indoor and enclosed environments can produce heat stress related to activity, temperature, and lack of ventilation. Working in protective suites including Tyvek, Saranex, FRC, and Level A and Level B PPE. Chemical protective suites will attribute to heat stress in any weather and temperature conditions.	**Review weather forecast prior to going to site and plan accordingly.** **Use appropriate hot weather work apparel.** **Have fluids available on-site and ensure employees are hydrated, take frequent breaks in shade or air conditioned space, accordingly.** **Review OSHA Quick Card for: protecting Workers from Heat Stress.** **Follow requirements or EnviroTrac's Heat/Cold Stress Program.**
WORK IN COLD WEATHER CONDITIONS	Potential cold stress due to the cooler weather conditions (generally) late Fall through the Winter and into Spring. NOTE: Contact with water, being wet, and wet conditions (including rain) will exacerbate cold.	**Review weather forecast prior to going to site and plan accordingly.** **Cold conditions effect reaction time and decision making.** **Use appropriate protection from cold weather conditions including insulated gloves, neck and head coverings, insulated socks, and layering of clothing. Take breaks in warm areas as necessary.** **Protect from water and other wet conditions that can exacerbate cold conditions. Employees are not work in wet clothing.** **Review OSHA Quick Card for: protecting workers from Cold Stress.** **Follow requirements or EnviroTrac's Heat/Cold Stress Program.**

PRIVATE UTILITY MARK OUTS	Potential injury from electrocution while marking out underground utilities. Potential injury from being struck by vehicle while marking out utilities.	**Verify with a tester that there is no stray voltage on facilities connections.** **Provide for Work Zone Protection (cones and barriers) to control traffic, if necessary. Otherwise, observe traffic patterns and conduct work away from traffic.** **All personnel are to wear Class 2 Safety Vests with retro- reflective materials during utility markouts.**
PRE-CLEARING BOREHOLE	Potential to be struck-by debris from air stream Body part can be injured if contacts vacuum from vacuum extractor. Slips, trips from hoses and equipment, fall into bore hole.	**Use face shield attached to hardhat along with safety glasses when preclearing.** **Place a debris catcher, such as a traffic cone, over borehole while pre-clearing to alleviate amount of debris from hole** **Use good housekeeping and keep hoses, equipment, and materials in order, mark location of bore hole and cover when not actively clearing.** **Do not let intake hose of vacuum extractor come in contact with body part. Shut off equipment when not actively clearing hole.**
DRILLING	Potential of injury from rotating augers or being struck-by, or crushed by drill rig; potential of entanglement or struck by drill rig cables; being struck by materials and supplies falling off, or a fall from drill rig.	**Operators of equipment are to be trained and qualified, drillers are required to be licensed with a copy of the license available on site.** **Equipment is to be inspected prior to operation, and must be in satisfactory working order or removed from site.** **A safety zone is to be established around the ground disturbance operation. Equipment is to be shut off and locked out prior to approaching augers to remove cuttings, inspection, maintenance, repair, or for any reason** **Secure equipment and supplies that have the potential of falling or rolling, follow good housekeeping to prevent trip and slip hazards.** **Do not climb on equipment with feet over 6 feet above the ground without implementing fall protection.** **Follow EnviroTrac's Ground Disturbance Practice.**

PORTABLE AIR COMPRESSOR	Potential exposure to Carbon Dioxide gas	**Exhaust contains Carbon Monoxide, do not point exhaust toward: work area, vehicle, and occupied areas (i.e., attendant's kiosk, convenience store, manways where working, etc.)**
	Potential exposure to hot surfaces (muffler) that can cause burns and/or be a potential hot works issue.	**Exhaust muffler will get hot, treat as a potential Hot Works issue when working in areas where flammable vapors may accumulate, and maintain at least 3 feet from combustible or flammable materials.**
	Potential fire and/or explosion hazard from fuel.	**Shut off when re-fueling, use a funnel to alleviate potential for spills, clean up any spilled fuel immediately.**
	Strike hazard from pressurized air lines disconnecting.	**Inspect all lines and connections, take defective parts out of service, use whip checks and/or cotter pins at all connections, every time.**
	Injury from being struck by compressed air.	**Compressed air is not used to on people. Do not point air steam at anyone, including self. Everyone on site is to wear eye protection whenever compressed air is being used.**
	Injury from slips, trips, and falls from equipment associated with air compressor.	**Use good housekeeping and keep hoses, equipment, and materials in order.**
TRAFFIC	Potential vehicle traffic around work area	**Identify traffic patterns and develop a traffic control program using sufficient traffic control devises to control the traffic. Refer to EnviroTrac's Work Zone Protection Practice.** **Establish Work Zone Protection per site Maintenance and Protection of Traffic Plan** **Wear proper PPE for work zones including high visibility apparel (i.e., safety vest), safety boot, safety glasses, hard hat, and long pants.** **Be aware of on-site traffic patterns and any other activities/work being conducted at the site, including the movement of heavy equipment.** **Use buddy system, if more than one person on-site.** **A spotter is required whenever moving heavy equipment around the site or when backing any vehicle.**

EXPOSURE TO HAZARDOUS SUBSTANCES (PCE, TCE, 1,1 Dichloroethene)	Potential exposure to hazardous substances in the soil during the installation of the SVE and AS wells	**Read the SDS sheets in Appendix C for hazardous substances which may be encountered during the proposed activities.** **Wear proper PPE for handling the chemical including faceshield / safety glasses, neoprene/butyl rubber gloves with gauntlets, sleeved shirts, full-length pants, and safety shoes with chemical resistant soles (neoprene).** **Properly decontaminate equipment, materials, and supplies in accordance with EnviroTrac's Decontamination practice.** **Properly dispose of all waste and contaminated materials.**

The Safety Data Sheet for TCE, PCE, cis-1,2-DCE, Acetone, and Chloroform is presented in Appendix C.

3.0 TRAINING

A. OSHA Training

1. All project personnel that will be performing tasks in exclusion zone(s) and/or potentially exposed to hazardous materials will be trained in accordance with OSHA 29CFR1910.120 regulations (HAZWOPER).

2. As part of the initial training and in conformance with OSHA 29CFR 1910.1200 (Hazard Communication Standard), all project employees that will be working at the site and authorized visitors will be informed of the potential hazards of the toxic chemicals that may be encountered and of the risks associated with working at the project site.

3. Personnel that have not successfully completed the required training will not be permitted to enter the project site to perform work.

B. Safety Meetings

1. The SO will conduct daily safety meetings for each working shift that will be mandatory for all project personnel. The meetings will provide refresher courses for existing equipment and protocols, and will examine new site conditions as they are encountered.

2. Additional safety meetings will be held on an as-required basis.

C. Safety Program Triggers, Protocol and Review

If either unforeseen or potentially detrimental site-specific safety-related factor, hazard, or condition become evident during the performance of the work at this site, it will be immediately brought to the attention of the SO who will take appropriate action to stabilize and address the situation. The HSC as well as the project manager's representative will be notified verbally and then in writing as quickly as possible for resolution. In the interim, EnviroTrac and/or its subcontractor(s) will take prudent action to establish and maintain safe working conditions and to safeguard employees, the public, and the environment. Following resolution, the safety protocols will be reviewed for effectiveness and updated/revised as appropriate.

4.0 MEDICAL SURVEILLANCE

As previously stated, maximum contaminate concentrations at the site were observed to be below applicable OSHA, ACGIH, and NIOSH published exposure limits. Consequently, medical surveillance will not be initially required. As a safe guard, air monitoring will occur and if action levels are exceeded, work will be halted, engineering controls will be instituted, and medical surveillance requirements will be re-evaluated. If it is determined that medical evaluation is required, the following will apply:

A. EnviroTrac and its Subcontractor(s) project personnel that either may be exposed to hazardous materials at concentrations above applicable action levels or be required to wear respiratory protection while conducting work related to this project and have not received a baseline medical evaluation one year prior to the start of this project will be

provided with medical surveillance prior to the onset of work. Immediately at the conclusion of this project, and at any time there is suspected excessive exposure to substances that would be medically detectable, all project personnel will be medically monitored.

B. EnviroTrac has contracted the services of Dr. Sarah Mendehlson, an Occupational Physician to provide the minimum medical examinations and surveillance specified herein. The evidence of examination of EnviroTrac and Subcontractor on-site personnel will be kept by the SO.

C. Physical examinations will be required for:

1. Any and all personnel either performing work in either the hazardous or transition zones or performing work that requires respiratory protection.

2. All personnel on site who are dedicated for either emergency response or extraction purposes in the Exclusion Zone.

3. Project supervisors entering hazardous or transition zones for more than 16 hours during the length of the contract.

D. Physical examinations will not be required for people making periodic deliveries provided they do not enter hazardous or transition zones.

E. In accordance with good medical practice, the examining Physician or other appropriate representative of the Physician will discuss the results of such medical examination with the individual examined. Such discussion will include an explanation of any medical condition that the Physician believes required further evaluation or treatment and any medical condition which the Physician believes would be adversely affected by such individual's employment at the project site. A written report of such examination will be transmitted to the individual's private physician upon written request by the individual.

F. The examining Physician or Physician group will notify the SO in writing the individual has received a medical examination and will advise the SO as to any specific limitations upon such individual's ability to work at the project site that were identified as a result of the examination. Appropriate action will be taken in light of the advice given pursuant to this subparagraph.

G. The physical examination will also include but not be limited to the following minimum requirements:

1. Complete blood profile;

2. Blood chemistry to include: chloride, CO_2, potassium, sodium, BUN, glucose, globulin, total protein, albumin, calcium, cholesterol, alkaline phosphatase, triglycerides, uric acid, creatinine, total bilirubin, phosphorous, lactic dehydrogenase, SGPT, SGOT;

3. Urine analysis;

4. “Hand on” physical examination to include a complete evaluation of all organ systems including any follow-up appointments deemed necessary in the clinical judgement of the examining physician to monitor any chronic conditions or abnormalities;

5. Electrocardiogram;

6. Chest X-ray(if recommended by examining physician in accordance with good medical practice);

7. Pulmonary function;

8. Audiometry - To be performed by a certified technician, audiologist, or physician. The range of 500 to 8,000 hertz will be assessed;

9. Vision screening - Use a battery (TITMUS) instrument to screen the individual's ability to see test targets well at 13 to 16 inches and at 20 feet. Tests will include an assessment of muscle balance, eye coordination, depth perception, peripheral vision, color discrimination, and tonometry;

10. Tetanus booster shot (if no inoculation has been received within the last five years); and

11. Complete medical history.

5.0 WORK AREAS

A. EnviroTrac will clearly lay-out and identify work areas in the field and will limit equipment, operations and personnel in the areas as defined below:

1. Exclusion Zone (EZ) - The initial exclusion zone will be the SVE system well locations. The level of PPE required in this area will be determined by the HSC and the SO after air monitoring, review of the tasks to be performed and on-Site inspection have been conducted. The area will be clearly delineated from the Transition and Support areas. As work within the Exclusion zone proceeds, the delineating boundary will be relocated as necessary to prevent the accidental exposure of nearby people and equipment to either chemical or physical risk. Additional exclusion ones may include injection well locations. The Exclusion Zones will be delineated by barricading (e.g., chain link, snow fencing, orange plastic fencing, cones caution tape etc.).

2. Contamination Reduction Zone (CRZ) - These zones will include the support and equipment area for installation of the wells, including the stockpile area for cuttings and the decontamination area. These areas occur at the interface of exclusion and support areas and will provide for the transfer of equipment and materials from the Support Zone to the Exclusion Zone, the decontamination of personnel and equipment prior to entering the Support area, and for the physical segregation of the Support and Exclusion areas. These areas will contain all required emergency equipment, and will provide areas for construction equipment storage and

decontamination. These areas will be clearly delineated by fencing (e.g., chain link, snow fencing, orange plastic fencing, cones caution tape etc.). These areas also delineate areas that although not contaminated at a particular time may become so at a later date.

3. Support Zone (SZ) - This area is the remainder of the work Site and project Site. The Support Zone will be clearly delineated and procedures implemented to prevent active or passive contamination from the work Site. The function of the Support Zone includes:

    a. An entry area for personnel, material and equipment to the Exclusion Zone of site operations through the Contamination Reduction Zone;

    b. An exit for decontamination personnel, materials and equipment from the "Decontamination" area of site operations;

    c. The housing of Site special services; and

    d. A storage area for clean, safety, and work equipment.

6.0 SITE SECURITY

Access to the Site will be controlled during operating hours by the on-Site Supervisor. No unauthorized personnel will be allowed on-Site. Only trained and qualified personnel will be authorized to access the Exclusion or Contamination Reduction zones.

7.0 STANDARD OPERATING SAFETY PROCEDURES (SOSP), ENGINEERING CONTROLS

A. General SOP

1. EnviroTrac will ensure that all safety equipment and protective clothing is kept clean and well maintained.

2. All prescription eyeglasses in use on this project will be safety glasses and will be compatible with respirators. No contact lenses will be allowed on Site.

3. All disposable or reusable gloves worn on the Site will be approved by the SO.

4. During periods of prolonged respirator usage in contaminated areas, respirator filters will be changed upon suspected breakthrough. Respirator filters will always be changed either daily or after each work shift whichever occurs first.

5. Footwear used on Site will be covered by rubber boots or booties when entering or working in the Exclusion Zone area or Contamination Reduction Zone. Boots or booties will be washed with water and detergents to remove dirt and contaminated sediment before leaving the Exclusion Zone or Contamination Reduction Zone.

6. All PPE used on Site will be decontaminated or disposed of at the end of the work day. The SO will be responsible for ensuring decontamination of PPE before reuse.

7. All respirators will be individually assigned and not interchanged between workers without cleaning and sanitizing.

8. EnviroTrac, subcontractor, and service personnel unable to pass a fit test as a result of facial hair or facial configuration will not enter or work in an area that requires respiratory protection.

9. EnviroTrac will ensure that all project personnel will have vision or corrected vision to at least 20/40 in one eye.

10. On-Site personnel found to be disregarding any provision of this plan will, at the request of the SO, be barred from the project.

11. Used disposable outerwear such as coveralls, gloves, and boots will not be reused. Used disposable outerwear will be removed upon leaving the hazardous work zone and will be placed inside disposable containers provided for that purpose. These containers will be stored at the Site at the designated staging area and the properly disposed at the completion of the project.

12. Protective coveralls that become torn or badly soiled will be replaced immediately.

13. Eating, drinking, chewing gum or tobacco, smoking, etc., will be prohibited in the exclusion and chemical reduction zones.

14. All personnel will thoroughly cleanse their hands, face, and forearms, and other exposed areas prior to eating, smoking or drinking.

15. Workers who have worked in a hazardous work zone will shower at the completion of the work day.

16. All personnel will wash their hands, face, and forearms before using toilet facilities.

17. No alcohol, firearms, or drugs (without prescriptions) will be allowed on Site at any time.

18. All personnel who are on medication will report it to the SO who will make a determination as to whether or not the individual will be allowed to work and in what capacity. The SO may require a letter from the individual's personal physician stating what limitations (if any) the medication may impose on the individual.

B. Engineering Controls - Air Emissions

When intrusive activities involving impacted soils are conducted, EnviroTrac will monitor and record control air emissions. If recorded levels are above established action levels as set forth in the Air Monitoring Plan (AMP), work will be halted the cause(s) of the exceedance(s) will be determined and appropriate engineering controls will be instituted.

8.0 PERSONAL PROTECTIVE EQUIPMENT

A. Levels of Protection

It is anticipated that Level D protection will be required in this remediation. Although Levels A, B, and C are not planned, Site conditions may be encountered that require their use. The following sections described the requirements of each level of protection.

1. Level A Protection

a. PPE:

i. Supplied-air respirator approved by the Mine Safety and Health Administration (MSHA) and NIOSH. Respirators may be:

- Positive-pressure SCBA; or
- Positive-pressure airline respirator (with escape bottle for Immediately Dangerous to Life and Health [IDLH] or potential for IDLH atmosphere).

ii. Fully encapsulating chemical-resistant suit.

iii. Coveralls.

iv. Cotton long underwear.*

v. Gloves (inner), chemical-resistant.

vi. Boots, chemical-resistant, steel toe and shank. (Depending on suit construction, worn over or under suit boot.)

vii. Hard hat (under suit).*

viii. Disposal gloves and boot covers (worn over fully encapsulating suit).

ix. Cooling unit.*

x. Two-way radio communications (inherently safe).*

* Optional

b. Criteria for Selection:

Meeting any of these criteria warrants use of Level A protection:

a. The chemical substance has been identified and requires the highest level of protection for skin, eyes, and the respiratory system based on:

- Measures (or potential for) high concentration of atmospheric

vapors, gases, or particulates, or

- Site operations and work functions that involve a high potential for splash, immersion, or exposure to unexpected vapors, gases, or particulates of materials highly toxic to the skin.

b. Substances with a high degree of hazard to the skin are known or suspected to be present, and skin contact is possible.

c. Operations will be conducted in confined, poorly ventilated areas until the absence of substances requiring Level A protection is determined.

d. Direct readings on field Flame Ionization Detectors (FID) or Photoionization Detectors (PID) and similar instruments indicate high levels of unidentified vapors and gases in the air.

2. Level B Protection

a. PPE:

i. Positive-pressure SCBA (MSHA/NIOSH approved); or

ii. Positive-pressure airline respirator (with escape bottle for IDLH or potential for IDLH atmosphere) MSHA/NIOSH approved;

iii. Chemical-resistant clothing (overalls and long-sleeved jacket; coveralls or hooded, one- or two-piece chemical-splash suit; disposable chemical-resistant, one-piece suits);

iv. Cotton long underwear;*

v. Coveralls;

vi. Gloves (outer), chemical-resistant;

vii. Gloves (inner), chemical-resistant;

viii. Boots (inner), leather work shoe with steel toe and shank;

ix. Boots (outer), chemical-resistant, (disposable);

x. Hard hat (face shield*);

xi. 2-way radio communication;* and

xii. Taping between suit and gloves, and suit and boots.

* Optional

b. Criteria for Selection:

Any one of the following conditions warrants the use of Level B Protection:

i. The type and atmospheric concentration of toxic substances have been identified and require a high level of respiratory protection, but less skin protection than Level A. These atmospheres would:

- Have IDLH concentrations; or
- Exceed limits of protection afforded by an air-purifying mask; or
- Contain substances for which air-purifying canisters do not exist or have a low removal efficiency; or
- Contain substances requiring air-supplied equipment, but substances and/or concentrations do not represent a serious skin hazard.

ii. The atmosphere contains less than 19.5% oxygen.

iii. Site operations make it highly unlikely that the work being done will generate high concentrations of vapors, gases or particulates, or splashes of material that will affect the skin of personal wearing Level B protection.

iv. Working in confined spaces.

v. Total atmospheric concentrations, sustained in the breathing zone, of unidentified vapors or gases range from 5 ppm above background to 500 ppm above background as measured by direct reading instruments such as the FID or PID or similar instruments, but vapors and gases are not suspected of containing high levels of chemicals toxic to skin.

3. Level C Protection

a. PPE:

i. Full-face, air-purifying, cartridge- or canister-equipped respirator (MSHA/NIOSH approved) with cartridges appropriate for the respiratory hazards;

ii. Chemical--resistant clothing (coveralls, hooded, one-piece or two-piece chemical splash suit; chemical-resistant hood and apron; disposable chemical-resistant coveralls);

iii. Coveralls;

iv. Cotton long underwear;*

v. Gloves (outer), chemical-resistant;

vi. Gloves (inner), chemical-resistant;

vii. Boots (inner), leather work shoes with steel toe and shank;

viii. Boots (outer), chemical-resistant (disposable);*

ix. Hard hat (face shield);*

x. Escape SCBA of at least 5-minute duration;

xi. 2-way radio communications (inherently safe);* and

xii. Taping between suit and boots, and suit and gloves.

*Optional

b. Criteria for Selection:

Meeting all of these criteria permits use of Level C protection:

i. Measured air concentrations of identified substances will be reduced by the respirator to, at or below, the substance's Threshold Limit Value (TLV) or appropriate occupational exposure limit and the concentration is within the service limit of the canister.

ii. Atmospheric contaminant concentrations do not exceed IDLH levels.

iii. Atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect the small area of the skin left unprotected by chemical-resistant clothing.

iv. Job functions do not require SCBA.

v. Total readings register between background and 5 ppm above background as measured by instruments such as the FID or PID.

vi. Oxygen concentrations are not less than 19.5% by volume.

vii. Air will be monitored continuously.

4. Level D Protection

a. PPE:

i. Coveralls, chemical resistant;

ii. Gloves (outer), chemical resistant;

iii. Gloves (inner), chemical resistant;*

iv. Boots (inner), leather work shoes with steel toe and shank;

v. Boots (outer), chemical resistant (disposable);*

vi. Hard hat;

vii. Face shield;*

viii. Safety glasses with side shields or chemical splash goggles;* and

ix. Taping between suit and boots, and suit and gloves.

*Optional

b. Criteria for Selection:

i. No atmospheric contaminant is present.

ii. Direct reading instruments do not indicate any readings above background.

iii. Job functions have been determined not to require respirator protection.

5. Anticipated Levels of Protection

It is anticipated that the work will be performed in Level D. A respirator will be immediately available in the event that air monitoring indicates an upgrade to Level C is required. The determination of the proper level of protection for each task will be the responsibility of the HSC and SO. These task specific levels of protection are provided below:

PERSONAL PROTECTIVE EQUIPMENT BY TASK	
Task	**PPE**
All Site Tasks	• **Hard hats** are to be worn, if required by the location or activity per to EnviroTrac's Hardhat Policy. • **Safety glasses with side shields** (ANSI Z-87 + certified) or full-face safety shields are to be worn at all times while on-Site. • **Proper gloves** will be provided and used, as required. Abrasion resistant gloves (i.e., leather or similar) and chemical resistant, gauntlet style gloves (i.e., nitrile/neoprene/butyl rubber) will be used as tasks require. • **Safety boots** (ANSI Z-41, ASTM F-249, or ASTM F-2413 compliant) are to be worn, as required by the activity, laced and tied. • **High-visibility attire**, i.e., Class 2, Safety Vests, are to be worn when employees are exposed to vehicular traffic. • **Long pants and sleeved shirts** will be worn while on Site.
Drilling Operations and pre-clearing boreholes	• **Same as above, and to include:** • **Hearing Protection** NRR to protect against noise levels generated by drilling operations. • **Faceshield attached to hardhat, in addition to safety glasses**
Elevated Air Monitoring Results	• **Respirators equipped with HEPA and Organic Vapor cartridges**

6. Safety Equipment Specifications

Prior to purchasing any equipment or supplies required by this HASP, the project manager will be notified of the type, model and manufacturer/supplier of that particular safety equipment that is proposed to be used or purchased for use on this project. The specifications for PPE that, if deemed necessary due to Site/project conditions, will be supplied to the project manager and which differ from the minimum requirements are shown below.

PERSONAL PROTECTIVE EQUIPMENT SPECIFICATIONS				
Description	**Manufacturer**	**Model Number**	**Size**	**Comments**
Tyvek coveralls	Kappler/Abanda	1427/1428	xl/lg	NA
Saranex coveralls	Kappler/Abanda	77427/77428/77434	xl/lg	NA
Sijal acid suit	Chemtex Bata	91522-G	xl/lg	NA
Surgical gloves	Best	7005	xl/lg	NA
Neoprene gloves	Edmont	8-354	xl/lg	NA
Nitrile gloves	Granet	1711	10	NA
Butyl gloves	North	B-161	10	NA
Viton gloves	North	F-124	10/11	NA
Long gauntlet neoprene	Edmont	19-938	xl	NA
Cotton work gloves	North	Grip-N/K511M	men's	or equal
Latex booties	Rainfair	1250-Y	xl	NA
PAPR pesticide cartridges	Racal	AP-3	NA	NA
PAPR asbestos cartridges	Racal	SP-3	NA	NA
APR organic cartridges	MSA	GMC-H	NA	NA
APR asbestos cartridges	MSA	Type H	NA	NA
APR pesticide cartridges	MSA	GMP	NA	NA

9.0 PERSONAL HYGIENE AND DECONTAMINATION

A. Personnel Decontamination

Full decontamination facilities will be provided at all hazardous zones. The facilities will consist of an entrance from the exclusion zone followed by a series of stations as described below.

1. Gross contamination will be removed in the Exclusion Zone to the extent practical. Care will be taken not to compromise personal protective equipment or encapsulating materials while removing gross contamination.

2. Specific points to enter and exit the Contamination Reduction Zone will be established. Securing the flow through the decontamination area will reduce the likelihood of contamination leaving the area, as well as facilitate the use of decontamination supplies and materials, and the collection of waste and rinsate. An

emergency exit will be established to allow for immediate evacuation of the area, will the need arise.

3. Primary Decontamination: A rinsate of a compatible solution that does not adversely affect what is being decontaminated, especially personnel and personal protective equipment will be used to remove as much of the contamination as possible. The effectiveness of the decontamination will be visually verified and, if required by the nature of the contaminants, samples will be collected and analyzed to ensure sufficient decontamination.

4. Encapsulating material and outer protective clothing will be removed and isolated: For equipment, machinery, tools, supplies, and materials that have been encapsulated (e.g., wrapped in plastic), the encapsulating material will be removed with care to keep contain the contaminated side of the material. The material will be collected in a compatible storage container and disposed of accordingly. For personnel: The outer layer of protective clothing will be removed in the reverse order it was put on; outer gloves, over boots, outer layer of protective clothing, etc. Special care will be taken to reduce the risk of contaminating the worker. Required levels of protection until the worker is decontaminated, such as respiratory protection and safety eye wear will be maintained.

5. Under clothing, if necessary will be removed, and either cleaned or disposed of accordingly.

6. Personnel hygiene: To ensure decontamination, workers will shower/wash with special attention to given to hair, fingernails, and areas such as underarms and groin. Liquid soap will be used for personnel showers to prevent the potential of cross contamination from bar soap. Shower/wash water is to be collected and disposed of accordingly. Depending on the nature of the contaminants and worker exposure, this step may be accomplished by personal hygiene.

B. Disposal of Spent Clothing and Material

1. Contaminated clothing, used respirator cartridges and other disposable items will be put into drums/containers for transport and proper disposal in accordance with TSCA and RCRA requirements.

2. Containers/55-gallon capacity drums will conform to the requirements of 40 CFR Part 178 for Transportation of Hazardous Materials. The containers/drums containing excavated and other hazardous material will be transported to the staging area.

C. Posting Regulations

1. Signs will be posted at the perimeter of the Exclusion Zone that state "Warning, Hazardous Work Area, Do Not Enter Unless Authorized." In addition, a notice directing visitors to sign in will be posted at the project Site. Also, a sign will be posted stating that any questions about the Site will be directed to the New York State Department of Environmental Conservation.

2. Safety regulations and safety reminders will be posted at conspicuous locations

throughout the project area. The following safety regulations and safety reminders are at a minimum to be posted around the job Site:

10.0 SAFETY REGULATIONS

(To be posted for project personnel)

The main safety emphasis is on preventing personal contact with gases, soils, sludge and water. Towards that end, the following rules have been established.

A. Regulations

1. Eating, drinking, and smoking on the Site is PROHIBITED except in specifically designated areas.

2. All project personnel on the Site will wear clean or new gloves daily.

3. If you get wet to the skin, you will wash the affected area with soap and water immediately. If clothes in touch with the skin are wet, these will be changed.

4. You will wash your hands and face before eating, drinking or smoking.

5. Observe regulations on washing and removing boots before entering the dressing room or a clean area and showering before going home.

B. Recommendations

1. Do not smoke on Site with dirty hands; better yet, do not smoke.

2. Check for any personal habit which could get soil or water into your body.

   Examples: food off your fingers, wiping your face or nose with a dirty hand or running a dirty hand through your hair.

3. Check that any regularly worn clothing is clean. Examples include dirty watchbands, neck chains and a dirty liner on your safety helmet. Safety practices with poisonous chemicals can be summed up with a few words:

   Don't breathe in chemical odors and don't touch the water, soil, and sludge. If you do get dirty or wet, clean up as soon as possible.

C. Safety Reminder for toxic chemicals

(Post for Project Personnel)

Chemicals can't cause problems unless you breathe them, eat them, or put them on your skin.

1. Chemical in Gases, Soils, Sludge, and Water

Don't let them go into your mouth, nose, or stay on your skin. Use common personal hygiene.

a. Don’t eat or drink on the Site.

b. No smoking in the area of work.

c. Wear protective clothing.

d. Glove liners will be clean.

e. Wash your hands whenever practical. Wash before eating, drinking, or smoking.

f. Don’t carry chemicals home to your family. (For example, on clothing, mud in the car, dirty hands.)

g. Follow strictly the HASP.

11.0 EQUIPMENT DECONTAMINATION

A. General

1. All equipment and material used in this project will be thoroughly washed down in accordance with established federal and state procedures before it is removed from the project. With the exception of the excavated materials, all other contaminated debris, clothing, etc. that cannot be decontaminated will be disposed by a method permitted by appropriate regulatory agencies. All vehicles and equipment used in the "Dirty Area" will be decontaminated to the satisfaction of the SO in the decontamination area on Site prior to leaving the project. Written certification will be provided that each piece of equipment has been decontaminated prior to removal from the Site.

2. Decontamination will take place within the designated equipment and materials decontamination area. The decontamination will consist of removing materials (e.g. mud etc.) using a brush and an approved water soluble soap. Degreasing, followed by high-pressure, hot-water cleaning, supplemented by detergents will be conducted as appropriate. Wash units will be portable, high-pressure with a self-contained water storage tank and pressurizing system (as required). Each unit will be capable of heating wash waters to 180 degrees Fahrenheit and providing a nozzle pressure of 150 psi.

3. Personnel engaged in vehicle decontamination will wear protective clothing and equipment as determined in the HASP.

12.0 AIR MONITORING PROGRAM (AMP)

This air monitoring program (AMP) has been developed to ensure that the proper level of personnel protective equipment will be used, to document that the level of on-Site worker protection is adequate, and to assess and prevent the potential migration of contaminants to off-Site receptors as a result of Site work. The AMP includes both real-time and documentation air monitoring (personal and area sampling as needed). The purpose of real-time monitoring will be to determine if an upgrade (or downgrade) of PPE is required while performing on-Site invasive work and to implement engineering controls, protocols, or emergency procedures if established action levels are encountered. As part of the AMP, documentation monitoring will be conducted as warranted to ensure that adequate PPE is being used and to determine if engineering controls are mitigating the migration of contamination to off-Site receptors.

A. On-Site Worker Air Monitoring

For the On-Site Worker Air Monitoring for this project, a Photoionization Detector (PID) will be the employed. The instrument can detect and display the relative concentration level of VOCs in the atmosphere and will be used during invasive work including (e.g., drilling and collection of soil samples), to monitor the air in the breathing zone (i.e., from a height of 3 to 5 feet) to assess on-Site worker exposure to VOCs, (i.e., the principal chemicals of concern at the Site based on historic testing results). The equipment will be calibrated at least daily and in accordance with the manufacturer's specifications. On-Site worker action limits and response will be established as follows:

Parameter	Action Level	Action
Total Organic Vapors	0 ppm to < 1 ppm	Normal operations; record breathing zone monitoring measurements every hour.
	> 1 ppm to 5 ppm (sustained for 5 min)	Increase recording frequency to at least every 15 minutes and use benzene colorimetric tube to screen for presence of benzene.
	≥ 5 ppm to ≤ 50 ppm (sustained for 5 min)	Screen for the presence of benzene using colorimetric tube.
	> 50 ppm (sustained for 5 min)	Upgrade to level C PPE, continue screening for benzene. Stop work, evacuate work area, investigate cause of reading, reduce through engineering controls. Do not resume work until hazardous atmosphere has been controlled.
Visible Dust	Determined by on-Site SO	Stop work, institute dust containment/mitigation procedures

The potential implementation of VOC personal documentation sampling will be determined by the SO and project manager based on conditions encountered during initiation of invasive activities or as a result of changing field conditions.

B. Community Air Monitoring

The Community Air Monitoring Plan (CAMP) provided in Appendix B of the RAWP addresses potential project air emissions into the off-Site community that may occur during the implementation of the project and is consistent with the New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan (DER-10 Appendix 1A) guidance for evaluation of potential airborne contaminant releases as a direct result of pre-design investigative and subsequent remedial activities.

13.0 EMERGENCY EQUIPMENT AND FIRST AID REQUIREMENTS

A. Communications

1. Telephone communication will be provided at the Site field office. Emergency numbers, such as police, sheriff, fire, ambulance, hospital, poison control, NYSDEC, EPA, NYSDOH, and utilities, applicable to this Site will be prominently posted near the telephone.

2. A signaling system will be established for emergency purposes.

B. Emergency Show and Emergency Eye Wash

1. One portable eyewash/body wash facility will be provided and maintained per active hazardous work zone. The facility will have a minimum water capacity of 10 gallons and will conform to OSHA regulations 29 CFR 1910.151. The portable eyewash/body wash facility will be manufactured/ supplied by Direct Safety Company, Lab Safety Supply Company, or other appropriate suppliers.

C. Fire Extinguishers

1. At least one fire extinguisher will be provided and maintained in the project office and one at each active hazardous work zone. The fire extinguishers will be a 20-pound Class ABC dry fire extinguisher with UL-approval per OSHA Safety and Health Training Standards 29 CFR 1910.157. The fire extinguisher will be manufactured/supplied by Direct Safety Company, Lab Safety Supply Company, or other appropriate suppliers.

D. First Aid Kit

1. One 24-unit (minimum size) "industrial" or "Contractor" first aid kit, will be provided and located in the project office and at each and every hazardous work zone as required by OSHA requirements 29 CFR 1910.151. The first aid kit will be manufactured/supplied by Norton, Scott, or other appropriate suppliers.

E. Emergency Inventory

1. In addition to those items specified elsewhere, the SO will maintain the following inventory of equipment and protective clothing for use at the Site in the event of emergencies:

    a. Washable coveralls;

    b. Gloves (outer);

    c. Gloves (inner);

    d. SCBA;

    e. Face shields;

    f. Safety glasses;

    g. Respirators and appropriate cartridges;

    h. Disposable coveralls;

    i. Chemical-resistant boots and latex boot covers;

    j. Hard hats

14.0 EMERGENCY RESPONSE/CONTINGENCY PLAN AND PROCEDURES

A. Daily Work

1. During the process of work, the quality of the air in and around each active hazardous operation prior to personnel entering these areas will be monitored. Sampling will be conducted on a continuous basis. Based on the air monitoring data, the proper level of protection will be chosen by the SO.

B. Emergency Vehicle Access

1. In the event that emergency services vehicles (police, fire, ambulance) need access to a location which is blocked by the working crew operations, those operations (equipment, materials, etc.) will be immediately moved to allow those vehicles access. Emergency crews will be briefed as to Site conditions and hazards by the

SO. All vehicles and personnel will be decontaminated prior to leaving the Site.

A Site briefing will be scheduled with the local Fire Department at the completion of mobilization to familiarize emergency response personnel with his operations and Site layout.

C. Personal Injury Response Plan

1. In cases of personal injuries, the injured person or the crew personnel in charge will notify the SO. The SO will assess the seriousness of the injury, give first aid treatment if advisable, consult by telephone with a physician if necessary, and arrange for hospitalization if required. The SO will arrange for an ambulance if required.

2. If soiled clothing cannot be removed, the injured person will be wrapped in blankets for transportation to the hospital.

3. Personnel, including unauthorized personnel, having skin contact with chemically contaminated liquids or soils will be flushed with water after any wet or soiled clothing has been removed.

4. These personnel will be observed by the SO to ascertain whether there are any symptoms resulting from the exposure. If there is any visible manifestation of exposure such as skin irritation, the project personnel will refer to a consulting physician to determine whether the symptoms were the result of a delayed or acute exposure, a secondary response to exposure such as skin infection, or occupational dermatitis. All episodes of obvious chemical contamination will be reviewed by the SO in order to determine whether changes are needed in work procedures.

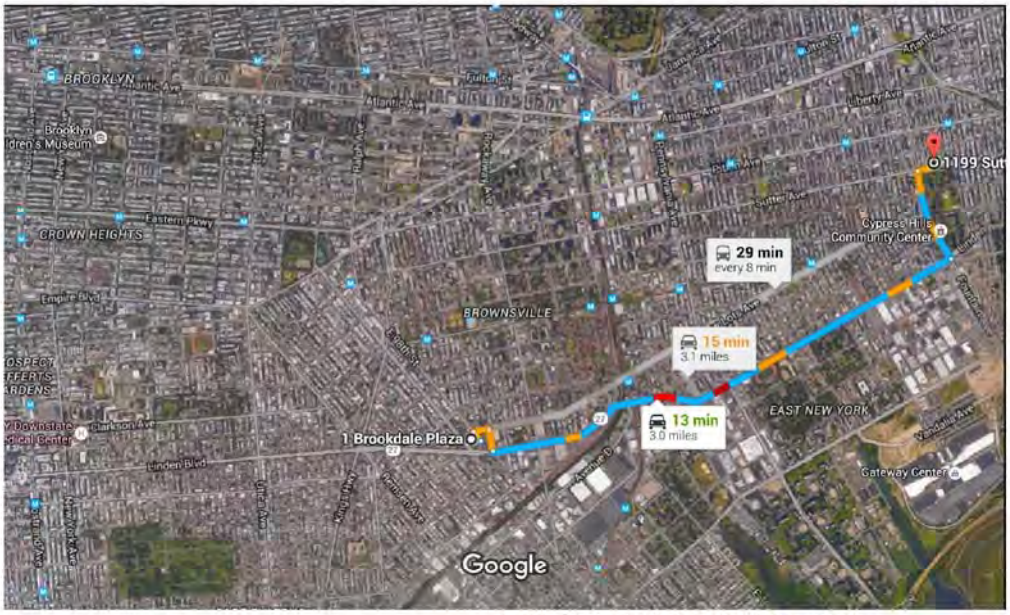
D. Route to the Hospital

The nearest hospital to the Site is:
Brookdale Hospital
1 Brookdale Plaza
Brooklyn, NY 11212
(718) 240-5000

Directions to Brookdale Hospital from 1199 Sutter Avenue, Brooklyn, NY:

Depart Sutter Ave toward Chestnut St. (525 ft)
Turn Right onto Euclid Ave (0.3 mi)
Turn Right onto RT-27 W / Linden Blvd. (1.8 mi)
Keep straight onto Linden Blvd. (0.3 mi)
Keep left to stay on Linden Blvd (0.4 mi)
Bear right onto Rockaway Pkwy (220 ft)
Arrive at Rockaway Pkwy on the right

Google Maps 1 Brookdale Plaza, Brooklyn, NY to 1199 Sutter Ave, Brooklyn, NY 11208 Drive 3.0 miles, 13 min



Imagery ©2016 Google, Map data ©2016 Google 2000 ft

via Linden Blvd 11 min without traffic	13 min 3.0 miles
via New Lots Ave and Linden Blvd 12 min without traffic	15 min 3.1 miles
2:50 PM–3:19 PM B13	29 min

https://www.google.com/maps/dir/1+Brookdale+Plaza,+Brooklyn,+NY/1199+Sutter+Ave,+Brooklyn,+NY+11208/@40.6634748,-73.9097241,4329m/data=!3m2!1... 1/1

A map with written directions to the nearest hospital or emergency medical treatment facility will be posted in conspicuous places in the Support Zone.

E. Fire Service

Fire-fighting and fire protection measures will be discussed with the local Fire Chief. If there is a fire, the crewmen or their person in charge will immediately call the SO. The SO will immediately call the fire personnel. The air downwind from any fire or explosion will be monitored immediately in order to protect workers and the nearby community. If personal injuries result from any fire or explosion, the procedures outlined in the Personal Injury Response Plan will be followed.

F. Master Telephone List

The attached master telephone list will be completed and prominently posted at the field office. The list will have telephone numbers of all project personnel, emergency services including hospital, fire, police, and utilities. In addition, two copies with telephone numbers are to be given to the NYSDEC for emergency reference purposes.

Emergency Service	Telephone Number
EnviroTrac Emergency Hot-line	(800) 652-5140
Fire Department	911
Police Department	911
Ambulance	911
Hospital/Emergency Care Facility	(718) 240-5000
Poison Control Center	(800) 336-6997
Chemical Emergency Advice	(800) 424-9300 (CHEMTREC)
New York State Dept. of Environmental Conservation - Central Office Albany	(518) 402-9614
New York State Dept. of Health - Albany	(518) 402-7860

15.0 HEAT STRESS MONITORING

A. Site personnel who wear protective clothing allow body heat to be accumulated with an elevation of the body temperature. Heat cramps, heat exhaustion, and heat stroke can be experienced, which, if not remedied, can threaten life or health. Therefore, an American Red Cross Standard First Aid book or equivalent will be maintained on Site at all times so that the SO and Site personnel will be able to recognize symptoms of heat emergencies and be capable of controlling the problem. The SO will be trained in first aid and CPR from the American Red Cross (or an equivalent training program).

B. When protective clothing is worn, especially Levels A and B, the suggested guidelines for ambient temperature and maximum wearing time per excursion are:

Maximum Wearing Time Per Excursion

Temperature (EF)	(Minutes)
Above 90	15
85 to 90	30
80 to 85	60

70 to 80	90
60 to 70	120
50 to 60	180

C. One method of measuring the effectiveness of employees' rest-recovery regime is by monitoring the heart rate. The "Brouha guideline" is one such method:

1. During a 3-minute period, count the pulse rate for the last 30 seconds of the first minute, the last 30 seconds of the second minute, and the last 30 seconds of the third minute;

2. Double the count;

D. If the recovery pulse rate during the last 30 seconds of the first minute is at 110 beats/minute or less and the deceleration between the first, second, and third minutes is at least 10 beats/minute, the work-recovery regime is acceptable. If the employee's rate is above that specified, a longer rest period is required, accompanied by an increased intake of fluids.

E. In the case of heat cramps or heat exhaustion, "Gatorade" or its equivalent is suggested as part of the treatment regime. The reason for this type of liquid refreshment is that such beverages will return much-needed electrolytes to the system. Without these electrolytes, body systems cannot function properly, thereby increasing the represented health hazard.

F. This liquid refreshment will be stored in a cooler at the edge of the decontamination zone in plastic squeeze bottles. The plastic bottles will be marked with individual's names. Disposable cups with lids and straws may be used in place of the squeeze bottles. Prior to drinking within the decontamination zone, the project personnel will follow the following decontamination procedures:

1. Personnel will wash and rinse their outer gloves and removed them;

2. Personnel will remove their hard hats and respirators and place them on the table;

3. Personnel will remove their inner gloves and place them on the table;

4. Personnel will wash and rinse their face and hands;

5. Personnel will carefully remove their personal bottle or cup from the cooler to ensure that their outer clothes do not touch any bottles, cups, etc.

6. The used bottle or cups will not be returned to the cooler, but will be placed in a receptacle or container to be cleaned or disposed of.

7. Personnel will replace their respirators, hard hats, gloves and tape gloves prior to re-entering the hazardous zone.

G. When personnel are working in situations where the ambient temperatures and humidity are high and especially in situations where protection Levels A, B, and C are required--the SO will:

1. Assure that all employees drink plenty of fluids ("Gatorade" or its equivalent);

2. Assure that frequent breaks are scheduled so overheating does not occur; and

3. Revise work schedules, when necessary, to take advantage of the cooler parts of the day (i.e., 5:00 a.m. to 1:00 p.m., and 6:00 p.m. to nightfall).

16.0 COLD STRESS MONITORING

A. The SO will use the equivalent chill temperature when determining the combined cooling effect of wind and low temperatures on exposed skin or when determining clothing insulation requirements.

B. Site personnel working continuously in the cold are required to warm themselves on a regular basis in the on-Site hygiene facility. Warm, sweet drinks will also be provided to Site personnel to prevent dehydration. The SO will follow the work practices and recommendations for cold stress threshold limit values as stated by the 1991-1992 Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices by the American Conference of Governmental Industrial Hygienists or equivalent cold stress prevention methods.

Whole-body protection will be provided to all Site personnel that have prolonged exposure to cold air. The right kind of protective clothing will be provided to Site personnel to prevent cold stress. The following dry clothing will be provided as deemed necessary by the SO:

1. Appropriate underclothing (wool or other);

2. Outer coats that repel wind and moisture;

3. Face, head, and ear coverings;

4. Extra pair of socks;

5. Insulated safety boots; and

6. Glove liners (wool) or wind- and water-repellant gloves.

17.0 LOGS, REPORTS AND RECORD KEEPING

A. Security Log

1. A daily log of security incidents and visitors granted access to the Site will be

maintained, as well as a log of all personnel entering and exiting the Site.

2. All approved visitors to the Site will be briefed by the SO on safety and security, provided with temporary identification and safety equipment, and escorted throughout their visit. Site visitors will not be permitted to enter a hazardous work zone.

3. Project Site will be posted, "Warning: Hazardous Work Area, Do Not Enter Unless Authorized," and access restricted by the use of a snow fence.

B. Safety Log

1. The SO will maintain a bound safety logbook. The log will include all health and safety matters on Site and include, but not be limited to, the following information:

    a. Date and weather conditions on Site;

    b. A description of the proposed work for the day;

    c. Times when Site personnel arrive and depart;

    d. Air monitoring data;

    e. Heat and/or cold stress monitoring;

    f. Decontamination procedures;

    g. Type and calibration of air sampling/monitoring equipment used;

    h. Safety meeting summaries; and

    i. Accidents.

C. Emergency or Accident Report

Any emergency or accident will be reported immediately to the SO and HSC. The project manager will also be notified. A written report will be submitted, but no later than 24 hours of its concurrence. The report will include, but not be limited to, the nature of the problem, time, location, areas affected, manner and methods used to control the emergency, sampling and/or monitoring data, impact, if any, to the surrounding community, and corrective actions the that will be instituted to minimize future occurrences. All spills will be treated as emergencies.

D. Daily Work Report

1. EnviroTrac will maintain a daily work report that summarizes the following:

    a. Work performed;

    b. Level of protection;

c. Air monitoring results;

d. Safety-related problems; and

e. Corrective actions implemented.

18.0 COMMUNITY PROTECTION PLAN

A. General

As part of this HASP, a Community Protection Plan (CPP) was developed that outlines those steps to be implemented to protect the health and safety of surrounding human population and the environment.

B. Air Monitoring

The CAMP provided in Appendix B of the RAWP addresses potential project air emissions into the off-Site community that may occur during the implementation of the project and is consistent with the New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan (DER-10 Appendix 1A) guidance for evaluation of potential airborne contaminant releases as a direct result of pre-design investigative and subsequent remedial activities.

C. Odor

If odor complaints are received from nearby residences during Site activities either odor masking agents or other odor control methods will be used subject to ENGINEER's review. Odor suppression methods will be employed during each day that odor complaints are received.

D. Off-Site Spill Response

As part of the HASP a Spill Response Plan, also coordinated with local officials, in case of an off-Site spill of either liquid or solid wastes has been prepared. The plan includes transportation routes and times, as well as the minimum requirements set forth in the Subpart titled "On-Site Spill Containment Plan." The driver will be supplied with Safety Data Sheets (SDSs), a 24-hour emergency phone number, and instructions for reporting emergencies to local agencies and the project Site.

19.0 CONFINED SPACE WORK

The need to conduct confined space work is not envisioned for this project. However, in the event that a need arises the following procedures will be employed and augmented as warranted.

A. Evaluate the work areas and determine if there are any permit-required confined spaces. If it is determined that personnel will not need to enter a permit-required confined space, appropriate measures to prevent personnel from entering such will be taken. If it is determined that personnel will need to enter a permit-required confined space, a written permit-required confined space program will developed by the SO and HSC and implemented.

B. The written program will comply with 29 CFR 1910.146 and will include the following:

1. Implement methods to prevent unauthorized entry;

2. Identify and evaluate the hazards of permit-required confined spaces before personnel entry;

3. Develop and implement procedures for safe permit-required confined space entry;

4. Provide the appropriate equipment to evaluate permit-required confined spaces;

5. Evaluate permit-required confined spaces when entry operations are conducted;

6. Provide at least one attendant outside the permit-required confined space which will be entered;

7. Designate the personnel who will have active roles in entry operations;

8. Develop and implement procedures for obtaining rescue and emergency services;

9. Develop and implement a system for the preparation, issuance, use, and collection of entry permits;

10. Develop and implement procedures to coordinate entry operations when personnel from more than one employer are working;

11. Develop and implement procedures for concluding the entry;

12. Review and revise entry operations if measures may not protect personnel; and

13. Review the permit-required confined space program to ensure personnel are protected from the hazards present.

C. Copies of the permit-required confined space program and employee training certificates are presented in Appendix E.

20.0 SPILL CONTAINMENT PLAN

As part of this HASP a site specific Spill Containment Plan (SCP) has been prepared to address potential spills and discharges that may occur as a result of onsite transport, storage and/handling of the permanganate solution and other regulated materials. A copy of the SPC is presented in Appendix E.

Figures

TOPOGRAPHIC MAP

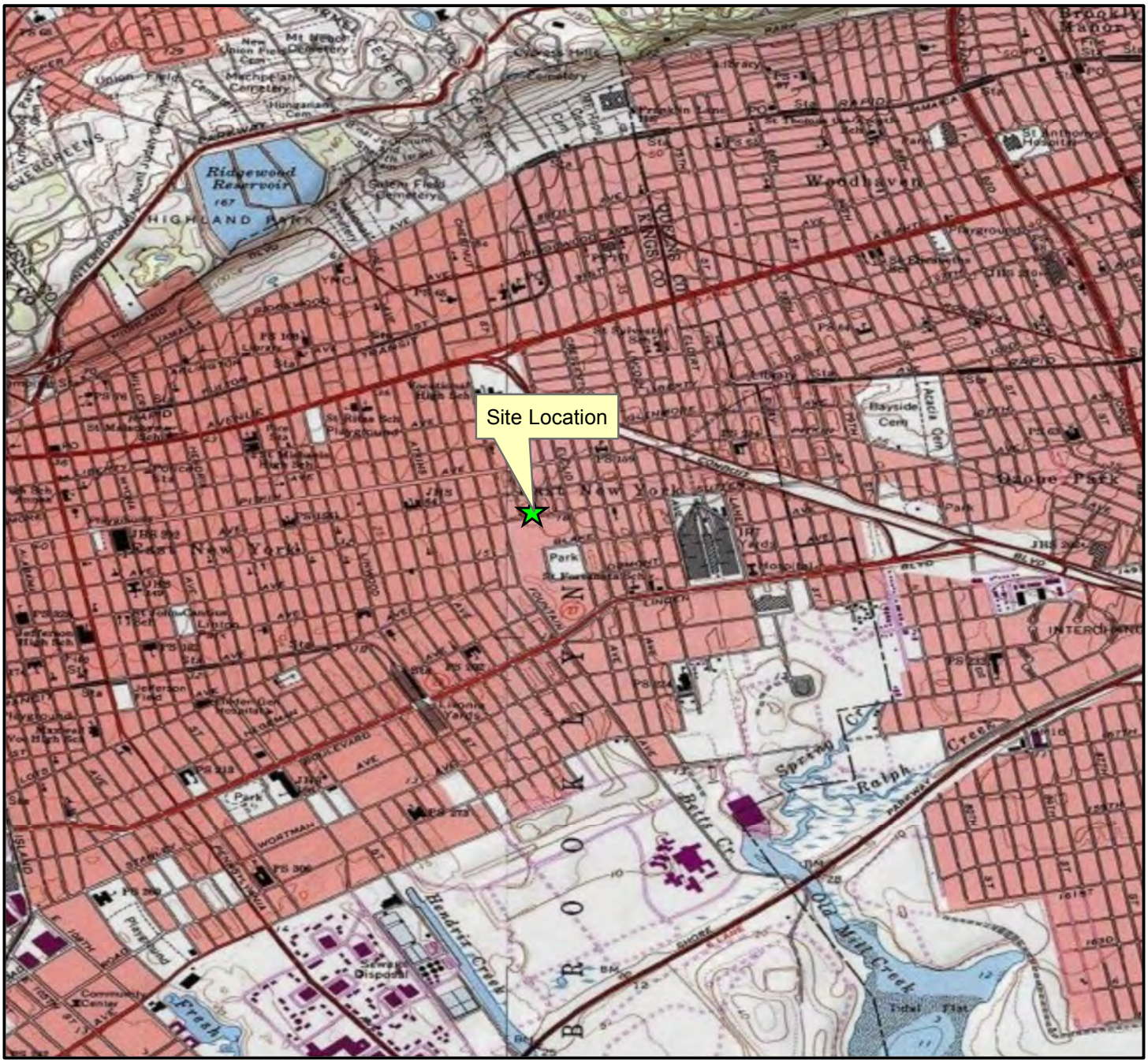


Figure 1
Topographic Map

1199 Sutter Avenue
Brooklyn, NY 11208

USGS Quadrangle:
Brooklyn

Approx. Elevation:
19 feet

N
W E
S

EnviroTrac
Environmental Services
5 Old Dock Road
Yaphank, NY 11980
P: 631-924-3001 F:631-924-5001

STATE OF NEW YORK
DALE C. KONAS
LICENSED PROFESSIONAL ENGINEER
No. 081035

1/8/19

CRYSTAL STREET

SIDEWALK OVERHANG

SIDEWALK OVERHANG

VMP-1 −0.150

SVE/SSD-1

SUPERMARKET BASEMENT

SVE/SSD-2

VMP-2 −0.786

BLOWERS

MW-3S

MW-3D

VMP-5 −0.840

SVE/SSD-3

SVE/SSD-4

VMP-6 −0.031

SVE/SSD-7

MW-4S

SVE/SSD-5

SVE/SSD-6

VMP-3 −1.588

MW-10S

VMP-7 −0.075

VMP-4 −1.199

SVE/SSD-8

DELICATESSEN

NAIL SALON

DENTIST OFFICE

SIDEWALK

MW-1S

MW-1D

MW-2D

MW-2S

MW-11S

FORMER DRY CLEANERS (CURRENT LAUNDROMAT)

CHESTNUT STREET

REMEDIATION SHED LOCATION

MW-9S

North

SUTTER AVENUE

LEGEND:

- BCP AGREEMENT SITE PROPERTY OUTLINE
- GROUNDWATER MONITORING WELL
- VAPOR MONITORING POINT
- EXISTING SVE/SSDS PIPING
- EXISTING SVE/SSDS WELL
- −0.150 VACUUM (IN INCHES OF WATER) SAMPLE DATE: 5/25/2017
- AIR SPARGE WELL
- SOIL VAPOR EXTRACTION WELL
- SVE PIPING
- AS PIPING
- 30 FT. SVE RADIUS OF INFLUENCE
- 20 FT. AS RADIUS OF INFLUENCE

NOTE:

COVER SYSTEM CONSISTS OF PAVED CONCRETE AND ASPHALT AND BUILDING FOUNDATION PRESENT WITHIN THE SITE BOUNDARY.

EnviroTrac
ENVIRONMENTAL SERVICES
5 OLD DOCK ROAD, YAPHANK, NEW YORK 11980
PHONE: (631)924-3001 FAX: (631)924-5001

0 15 30
SCALE IN FEET

DATE: 10/30/2018

REVISED BY: BS

1199 SUTTER AVENUE
BROOKLYN, NEW YORK

AS-BUILT: ENGINEERING CONTROLS LOCATIONS SVE/AS REMEDIATION SYSTEM/SSDS MITIGATION SYSTEM AND COVER SYSTEM

FIGURE # 2

Appendix A
HSC Qualifications

Version 1.0 – 6/20/2016

Corporate Resume

Michael A. Clark
MS, CHMM

Director Health & Safety

Please Contact:

6 Terri LN, STE 350

Burlington, NJ 08016

609-387-5553

Or visit our website:

envirotrac.com

Solutions in Action

Experience Summary

- Directed Company Safety & Health Operations for Construction, Manufacturing, Transportation, Facility & Emergency Response Operations
- Directed EHS Program for Materials & Metals Recovery/Recycling Operations, Successfully Obtained ISO 14001 Certification
- Managed Hazardous Material & Waste & Petroleum Storage Operations, Including Emergency Response Programs & Remedial Activities for 300+ sites
- Experience Trainer for Safety Programs

Education

- MS Environmental Science, NJ Institute of Technology, 1994
- BS Biology & Chemistry, Rowan University, NJ, 1987

Mr. Clark has over 25 years experience in the environmental, health and safety field managing and directing programs for Fortune 100 corporations, manufacturing and construction companies and consulting firms. He currently is the Corporate Director of EnviroTrac's Health and Safety program.

Safety is a strategic part of EnviroTrac's operations and as Director of Health and Safety, Michael ensures that our safety program focuses on our employees to ensure that they have the training, knowledge and the tools to perform their jobs safely.

Using a behavior-based safety model, EnviroTrac employees are taught to take responsibility and accountability for their own safe work practices. Task-specific hazards are identified and employees are trained, updated and refreshed on how to recognize hazards and mitigate risks.

As Director of Health and Safety Mr. Clark has developed and implemented: accident reporting, investigating, & root cause analysis procedures; ground disturbance procedures for subsurface investigation, drilling, and trenching & excavation; safe driving and behind-the-wheel training; in-house OSHA HazWOPER training; traffic control and work area protection; respiratory protection; confined space entry; personal protection equipment requirements and various other safety programs.

EnviroTrac uses a network of Safety Coordinators to oversee the safety program in each of the EnviroTrac regional offices. Mr. Clark personally manages this network and continuously reviews and updates the Health & Safety program so that the practices, policies and procedures meet or exceed laws, regulations, client-specific requirements and maintain our own standards for the health and safety of our employees.

Think before you act, remember - Safety First!!!

Experience highlight 2015

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Professional Certifications

Certified Hazardous Materials Manager (CHMM), Institute of Hazardous Materials Management - Master's Level

Advanced Safety Certification, National Safety Council

40-hour HazWOPER certificate and subsequent 8-hr refresher training

Fundamentals of Industrial Hygiene - Harvard School of Public Health

Industrial Ventilation Workshop - AIHA

Advanced IAQ/HVAC Diagnostics Training Course - HL Turner Group

Implementing the ISO 14001:2004 Program workshop

Professional Highlights and Selected Projects

- Mr. Clark has directed the health and safety program for construction projects and facility operations throughout all five boroughs of New York City. He developed and implemented programs that addressed heavy equipment/construction operations, traffic control and work area protection, confined space entry, working at heights, exposure to heat/cold, hazardous materials, hazardous and regulated waste, personal safety and other factors unique an extreme urban environment.

- Mr. Clark has prepared heath and safety worksite from a wide range of hazardous material impacted projects, including PCB exposure monitoring for both airborne and surface contact; industrial processing exposure to mercury vapor and surface contamination; benzene exposure assessments for environmental remediation workers; and asbestos and lead management plans to control worker exposure while managing these materials in place.
-
- In addition to his focus on safe work environments, Mr. Clark implemented a safe driving program for operations in New York City. The program addressed the re-

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Michael A. Clark
MS, CHMM

Director Health & Safety

Please Contact:

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quirements of operating vehicles in the most congested urban area of the country and used both classroom training and behind-the-wheel instruction to educate drivers on techniques to safely operate in this unique environment. Following the training, motor vehicle accidents for the company in that market decreased by 30%, resulting in overall cost savings estimated at over $100,000 per year.

- Developed and administered Respiratory Protection Programs for multiple companies encompassing hundreds of employees. These programs have included hazard identification, employee medical monitoring, baseline and periodic biological monitoring, respirator selection and change schedules, and annual review and update of the program as required by OSHA. Mr. Clark is a “Competent Person” as defined by OSHA to administer respirator fit tests and manage a respiratory protection program.

- Conducted over 200 indoor air quality and industrial ventilation investigations and implemented exposure control and remediation actions for worker exposure to: heavy metals, VOC’s and other hazardous materials, confined spaces contaminated with hazardous materials, sick building syndrome and mold contamination and industrial ventilation controls during manufacturing processes.

- Developed the in-house EnviroTrac 40-hour OSHA Hazardous Waste Operations and Emergency Response (HazWOPER) certification and 8-hour annual refresher training programs that complies with the requirements of 29CFR 1910.120, Appendix A recommendations. Mr. Clark personally delivers both the 40-hour and 8-hour training to EnviroTrac employees.

- In addition to his work in safety, Mr. Clark also has extensive experience in the environmental field managing petroleum storage operations, air and water environmental discharge permitting and emergency response operations for hazmat spills and releases.

- His experience includes the installation, upgrade and removal of under and above ground storage systems, developing and updating SPCC plans and inspection plans

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and monitoring systems. Mr. Clark has managed multiple remediation activities from full site excavation of contaminated soils, to pump and treat systems, underground injection and extraction systems and passive remediation and monitoring.

- Mr. Clark has obtained over 500 air and water discharge permits from environmental state agencies, implemented and audited programs for compliance to permit requirements and prepared discharge reports to the appropriate agencies. Type of permits include: Federal Title V Air Discharge Permit, NPDES water discharge permits, and minor source permits in Washington DC, MA, MD, NH, NJ, PA, and RI.

- During the restoration efforts at *Ground Zero* in NYC after the attacks of 9/11/01, Mr. Clark managed the decontamination of the Verizon telecommunications hub at the World Trade Center Complex that facilitated the restoration of 2M data and 1.5 M voice lines to re-establish communications for lower Manhattan and Wall St.

- While directing the environmental operations for a materials and metals recovery/ recycling firm, Mr. Clark developed and implemented the company's environmental program under the strict requirements of ISO 14001:2004. The program applied for and successfully passed the ISO audit with no "non-compliance" issues identified by the Accreditation body and was issued an ISO 14001 certification.

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Appendix B
EnviroTrac's Practice for Ground Disturbance

Version 1.0 – 6/20/2016

28 GROUND DISTURBANCE PROGRAM

28.1 Purpose

To clearly specify under what conditions the employees of EnviroTrac may conduct operations where any indentation, interruption, intrusion, excavation, construction, or other activity results in the penetration of the ground at any depth.

This document also covers the hazards, procedures, and training associated with the entering of trenches and excavations by employees of EnviroTrac, as defined under 29 CFR 1926 Subpart P. It is intended to provide the guidelines that protect employees from the hazards of entrapment and engulfment when working around trenches and excavations.

28.2 Identification of Underground Installations

It is the policy of EnviroTrac that prior to any operations that disturb more than one foot below surface grade that all underground installations are to be identified. Before any ground disturbance activities, available records will be referenced and operator personnel and/or others that may be familiar with the property will be contacted to determine the existence and location of underground installations such as facilities/tanks/pipelines and utilities in the vicinity of the work area to verify, as far as is reasonable and practicable, the existence of known underground installations.

Areas where hand tools are used for ground disturbance operations, such as shovels, hand augers, etc., will be visually assessed for possible underground installations, utilities, and/or facilities. If underground installations are identified as having hazardous energy, such as electrical power, hydraulic pressure, chemical pipe lines, etc., than procedures to control that hazardous energy will be instituted as required in Section 26 – Control of Hazardous Energy Sources (Lockout / Tagout).

Ground disturbance operations that use mechanical equipment pose a greater threat to underground installations. Prior to ground disturbance operations using mechanical equipment, local requirements for identification of underground utilities will be followed, such as notifying a “One Call Center”, “Call Before Your Dig”, etc. or engaging a third party utility mark out contractor. The Regional Safety Coordinator will maintain current underground utility identification requirements for the regional operations.

<u>Exposing Underground Installations</u>

All underground installations within the dig zone or a drill zone will be hand exposed or vacuum excavated (pothole) to sufficiently verify location, line size, and alignment of underground installations. Care has to be taken during the process of exposing underground installations; damage could occur if cautious work procedures are not followed. The process to expose any installations is to be selected based on site conditions/risks.

The pothole(s) will be made large enough and suitably spaced to accurately determine location, depth, orientation, and facility size. The bottom and sides of the pothole are to be adequately illuminated to determine the presence or absence of underground facilities. Visually confirm the presence or absence of underground facilities continuously during potholing. Use a commercial jacking tool or A-frame and winch to extract a hand auger if the force required to extract the tool exceeds personal lifting limits (50 pounds).

Boreholes will be cleared to a minimum of 5 feet and 110 percent of the mechanical drilling tool diameter, or to the client's/facility's requirements, if different. If a boring is located within 2 feet of an underground facility, a protective casing will be placed in the cleared boring prior to mechanical drilling to guide the drilling tool instead of exposing the underground facility.

28.3 Overhead Utilities and other Overhead Hazards

Overhead utilities pose several hazards including electrical shock or burn, electrical arc or blast, and disruption of services provided by the overhead utilities. All work sites will be assessed for hazards associated with the overhead utilities including all means of access to and egress from the site.

In addition, other overhead and low clearance facilities and structures will be evaluated and assessed for hazards associated with the type of work being performed including all means of access to and egress from the site.

For work areas with overhead utilities, all work performed by EnviroTrac personnel or contractors will not violate the **Minimum Approach Distances** specified in the table below:

Nominal voltage in kilovolts (kV)	Distance: Phase to ground exposure
0.05 to 1.0	Avoid contact
1.1 to 15.0	2'-1" (0.64m)
15.1 to 36.0	2'-4" (0.72m)
36.1 to 46.0	2'-7" (0.77m)
46.1 to 72.5	3'-0" (0.90m)
72.6 to 121	3'-2" (0.95m)
138 to 145	3'-7" (1.09m)
161 to 169	4'-0" (1.22m)
230 to 242	5'-3" (1.59m)
345 to 362	8'-6" (2.59m)
500 to 550	11'-3" (3.42m)
764 to 800	14'-11" (4.53m)

Reference Table R-6 in 29 CFR 1910.269(l)(10)

The specific voltage of a line cannot be visually determined strictly by the placement of the line on the utility pole. Contact the local power company to determine specific voltages of power lines if the scope of work or access to or egress from the site could affect overhead utilities.

If Minimum Approach Distances cannot be maintained during the scope of the work, the lines are to be de-energized by the utility company who will need to certify, in writing, that the lines have been de-energized. To prevent damage, provisions will have to be made so de-energized lines are not contacted.

If the scope of work will bring workers or equipment near the Minimum Approach Distances, these areas will be demarcated and/or cordoned off to prevent crossing into unsafe areas. Spotters will be used if demarcation is not sufficient to prevent encroachment into these areas. The sole responsibility of the

spotter will be to warn workers and/or equipment operators that the Minimum Approach Distances may be encroached.

Equipment and vehicles will not be parked overnight or refueled under energized power lines.

In the event of a downed utility line (power or communication), a “circle of safety” will be maintained at a minimum of a 30-foot radius from the downed line. Contact emergency services (911) to report the downed line. Communication lines can become energized when dislodged from the pole or if in contact with power lines.

Other Overhead Hazards

Communication Lines:

Communications lines (generally the lines closest to the ground) usually do not transmit hazardous voltage under normal operating conditions. These lines can cause obstructions that may dislodge loads and/or equipment if contacted. In addition, the company may incur liability for disruption of service if these lines are broken.

Guy Wire:

Guy lines are used to support utility poles and are composed of braded steel cables generally under tension. These lines are not energized under normal operating conditions but may cause damage to equipment or personal injury if contacted.

Demark all Guy Lines in work areas and access to or egress from the site. Spotters will be used if demarcation is not sufficient to prevent contact with Guy Lines.

Building Overhang, Canopies, Bridges, Overpasses, Signs, etc.

In addition to overhead utilities, the project is to be assessed for other overhead hazards that may interfere with the scope of work. These hazards include: canopies, building overhang, signs, bridges, overpass and other hazards. The Project Manager will assess or have the work site assessed for these overhead hazards and include provisions in the work plan to prevent contact, damage, or encroachment of safe Minimum Approach Distances.

28.4 Traffic Control in Construction Sites

Limited space in a construction site increases the potential for worker injury and property damage from vehicle accidents and collisions. To alleviate this, construction sites are to be designed to facilitate vehicle flow and to limit backing.

When vehicles are required to back, a spotter should be used to clear a path of travel. Construction vehicles are to be equipped with a backup beeper. Workers are to wear high visibility apparel (i.e., safety vests), either Class I, II, or III depending on the speed limit of the work site and adjacent traffic areas.

The swing radius of construction equipment is to be demarked so workers are aware of the area and do not enter while equipment is operating. Workers will seek and receive acknowledgement from equipment operators prior to entering the swing radius. Equipment operators will stop operations when workers or equipment enters the swing area.

Operations adjacent to an active traffic area will follow the requirements of EnviroTrac's Work Zone Protection program and the requirements of the USDOT Uniform Traffic Control Manual.

28.5 Environmental Drilling

Work Zone Designation

A Work Zone will be established and controlled around environmental drilling activities that allow only authorized personnel access to the zone. The driller will *Stop Work* when an unauthorized person enters the drilling zone. Follow the procedures listed in the ET Stop Work Practice. The current version of the practice is located on the Safety Portal.

Where open auger operations are used, the driller will establish additional controls such as risk-assessed procedures, signals, an area guard, or other effective means to verify that personnel are clear of the auger any time it is rotating.

Inspection of Drilling Equipment

The driller will inspect the drilling equipment on a daily basis or before each new setup by using an inspection checklist. The inspection will verify that the equipment is in good working order; pressurized hoses are in good condition, and safeguards and kill switches are in place and operational. Any substandard items will be corrected prior to drilling.

Drill Rig Operator

The drill rig operator will remain at the controls unless the rig is shut down. While the drill rig is running, the drill rig operator will not use a mobile phone or radio. The drill rig operator will not wear loose objects or clothing that could inadvertently activate the rig clutch or controls.

Performing Drilling Operations

Prior to conducting drilling operations on site, a Pre-Drilling Site Walkover will be conducted by the drilling operators and a person familiar with the site, preferably the site owner/operator.

During the site walkover, the following will be reviewed, documented, and discussed with the Workforce during the Tailgate Safety Meeting:

- Emergency provisions including the location and operation of emergency shut-offs.
- Ground conditions and topography of locations where drilling rig is to located.
- Overhead utilities and/or obstructions.
- Lay down of materials and supplies including the process to secure of drilling rods and flights, and sampling and waste barrels from falling or rolling.
- Access and egress for the site and muster points in the event of emergency.

If during the site walkover it is determined that the proposed scope of work may impact underground facilities, the project will be re-evaluated for the necessity of data collection versus the risk from impacting underground facilities. If revised or alternative locations are selected, another site walkover will be conducted.

During drilling operations, caution must be taken when drilling between the cleared depth and 20' as underground facilities may still be present. Provisions must be made to communicate during high-noise conditions including the agreement on the meaning of hand signals.

Climbing the Rig

In the event it is necessary to the climb the drilling rig for maintenance or repair, follow procedures listed below:

- If the lowest part of the worker will be higher than 6', Working At Heights provisions will be required and the provisions of the ET Working At Heights practice will be followed.
- If work on the mast is to proceed, the drill rig will be shut down and locked out before any work on the rig, including the mast can proceed.

28.6 Trenching and Excavation

This section defines the conditions under which employees may enter trenches and excavations. The Excavation Awareness Program described herein is based upon the following government regulations and industry standards:

- CFR Title 29 Part 1926 Subpart P - Excavations
- CFR Title 29 Part 1926.650- Scope, applications, definitions
- CFR Title 29 Part 1926.651- General requirements
- CFR Title 29 Part 1926.652- Requirements for protective systems

The following definitions are included in the above regulations, and are considered pertinent to this program:

- EXCAVATION: Any man-made cut, cavity, trench or depression in the earth surface, made by earth removal.
- TRENCH: A narrow excavation made below the surface of the ground. In general, the depth is greater than the width, but the width cannot exceed 15 feet.
- BENCHING: A method of protecting employees from cave-ins by excavating the sides of an excavation to form one or a series of horizontal steps.
- SHIELDING: A structure that is able to withstand the forces imposed by a cave-in and thereby protects employees within the structure.
- SHORING: A structure that supports the sides of an excavation and which are designed to prevent cave-ins.
- SLOPING: A method of protecting employees from cave-ins by excavating to form sides of an excavation that is inclined away from the bottom of the excavation so as to prevent cave-ins.
- STABLE ROCK: Natural solid mineral material that can be excavated with vertical sides and will remain intact while exposed.
- COMPETENT PERSON: Defined by OSHA as a person capable of identifying existing and predictable hazards in the surroundings, or working conditions that are unsanitary, hazardous, or dangerous to employees. Authorized to take prompt corrective measures to eliminate existing and predictable hazards and to stop work when required. A competent person should have and be able to demonstrate the following:
    1. Training, experience, and knowledge of:
        a. Soil Analysis
        b. Use of protective systems
    2. Ability to detect:
        a. Conditions that could result in cave-ins
        b. Failures in protective systems
        c. Hazardous atmospheres

d. Other hazards including those associated with confined spaces

Any excavation five feet deep or deeper is not considered safe from cave-ins unless one or more of the following conditions exist:

- It is made entirely of stable rock.
- It has been inspected daily by a competent person and pronounced safe.
- Protective systems are installed which have the capacity to protect workers from cave-ins, which include: sloping, benching, shielding, and shoring that have been inspected daily by a competent person and pronounced safe.

Any excavation four feet deep or deeper that requires human occupancy will require a Competent Person to classify the soil and/or rock deposits of the excavation area as Stable Rock, Type A, Type B, or Type C in accordance with the definitions set forth in 1926 CFR Subpart P Appendix A paragraph (b). Protective systems will be selected based on the flow chart listed in 1926 CFR Subpart P, Appendix F – Selection of Protective Systems. For excavations greater than 20 feet, protective systems will be designed by a Professional Engineer. All protective systems will meet or exceed the minimum standards as specified in 1926 CFR Subpart P:

- Appendix B – Sloping and Benching,
- Appendix C – Timer Shoring for Trenches,
- Appendix D – Aluminum Hydraulic Shoring for Trenches, or
- Appendix E – Alternatives to Timber Shoring.

Atmospheric Testing of Excavation and Trenches

Any excavation, including trenches, four feet deep or deeper that requires human occupancy located in an area where hazardous atmospheres could reasonably be expected to exist, such as landfills, hazardous materials storage facilities, hazardous waste sites, and other environmental remediation areas may only be entered after the atmospheres in those excavations are tested to ascertain that the oxygen content in the excavation is greater than 19.5% and the combustible gas concentration is less than 10% of the LEL of the gas present.

Additional air monitoring is to be conducted for the presence of airborne toxins suspected based on the contamination present at the area of ground disturbance. Engineering controls will be instituted to alleviate employee exposure or, if not feasible, sufficient personal protective equipment will be worn to control worker exposure.

Access, Egress, and Crossings of Excavation or Trench

Any excavation four feet deep or deeper that requires human occupancy must have a ladder, ramp, or other safe means of egress located so that each employee need travel no more than 25 feet in any direction to reach a means of escape.

Crossings over the excavation or walkways within six (6) feet of the excavation are to be designed with handrails that meet OSHA requirements for fall protection.

Water Accumulation in Excavation or Trench

In the event water accumulates in the excavation, the following requirements for controlling this

accumulation must be provided if personnel are to enter or work in the excavation:

- Personnel must not work in excavations where standing water has accumulated,
- Water removal or de-watering equipment, such as pumps, are installed and monitored by a competent person,
- Personnel must exit from excavations during rainstorms,
- Trenches must be carefully inspected by a competent person after each rain and before personnel are permitted to re-enter.

Suspended Loads

Workers in the excavation and other areas of the worksite are to be protected against falling loads and are not allowed to be under or in the swing radius of any equipment working with a load.

Authority and Administration

Within EnviroTrac, the Director of Health and Safety, and the designated Regional Health and Safety Coordinators will be responsible for the generation and execution of all portions of the program, and will have the necessary authority to assure that all requirements of this program are properly fulfilled, will administer this program.

28.7 Excavation Entering Procedure

It will be the policy of EnviroTrac not to allow any of its employees to enter excavations for any reason unless that excavation meets the conditions for being safe from cave-in, has been tested to assure that the atmosphere is safe, and has a proper means of ingress/egress as outlined above.

When EnviroTrac is employed as the prime/sole contractor at a facility where excavations are or will be present, the EnviroTrac designated Competent Person will have the responsibility to ascertain that all excavations meet the requirements of the above regulations prior to any employee or contractor entering into such excavations. The Competent Person will perform daily inspections of the excavations or immediately after a rain event using the Trench Inspection and Entry Authorization form located at the end of the this practice.

When EnviroTrac is employed as a sub-contractor at a facility where the client has the responsibility for determining the hazards at the site or location associated with excavations, and consequently controls the compliance to the pertinent excavation regulations, EnviroTrac employees will enter such excavations only if the excavations has been inspected and cleared by the Competent Person and the employee is satisfied that the excavations are safe and meet the conditions for being safe from cave-in.

Should contractors, clients or others request an employee to enter an excavation that the employee does not feel is safe and free from cave-in hazards, the employee is to state that he/she does not consider the excavation safe, inform his/her supervisor and/or the Project Manager, and await further instructions.

28.8 Alternatives to Excavation Entry

Sampling in excavations should always be performed utilizing construction equipment such as backhoes or long handled samplers wherever possible. Entering excavations should always be the last

alternative, and must never be undertaken without first ensuring that the excavation is safe from cave-in.

28.9 Employee Training

All employees who are required to enter excavations for any reason will successfully complete an Excavation Awareness Training Program, which will include, but not be limited to the following topics,:

- The contents of 29 CER 1926 Subpart P
- The contents of this EXCAVATION AWARENESS PROGRAM.
- The dangers of excavation entry.
- Alternatives to entering excavations for sampling.

EnviroTrac employees must be made aware of the danger of sidewall collapse for persons standing near the excavation during training. The awareness training will include Control of Hazardous Energy (Lockout/Tagout) for operations that require ground disturbance and include local and pertinent requirements for underground utility identification and mark out.

Documentation of training will be maintained by the EnviroTrac's Safety Department and will include the employee's name; date(s) of training; subject, curriculum, handouts, and pertinent training materials; and trainer's name and title.

The Regional Health and Safety Coordinator will conduct periodic inspection of random work sites to ascertain that this Excavation Awareness Program is conscientiously being followed.

28.10 Program Evaluation

The Corporate Health and Safety staff will review all aspects of this Excavation Awareness Program at least annually to assure its effectiveness. Whenever modifications in work scope, equipment changes or modification, revision of federal regulations or standards, or any action that would necessitate a change in any of the contents of this Excavation Awareness Program occur, such changes will be made, and everyone affected by those changes notified and retrained, if necessary. All such modifications will be made in writing, and the nature of the modification noted and dated.

28.11 Enforcement

The following disciplinary actions will be administered to employees found to be willfully negligent or not complying with the provisions of this policy:

- First Offense: If the violation is correctable, the employee will receive a written warning detailing the nature of the offense, which will be documented in the employee's personnel file. In addition, if the violation is not correctable, the employee will be dismissed from the site and sent home for the day without pay.
- Second Offense: The employee will receive a written warning detailing the nature of the offense, documented to their personnel file, and one day off without pay, regardless of whether the violation is correctable.
- Third Offense: The employee will receive a written warning detailing the nature of the offense, documented to their personnel file, and one week off without pay, regardless of whether the violation is correctable.

- Fourth Offense: The employee will be terminated with cause.

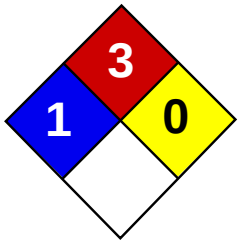
Should willful noncompliance or negligence to the provisions of this policy result in injury or increased risk to another individual then disciplinary action will be more severe than the normal sequence of the above procedures may be administered. All of the above disciplinary steps will be administered within the scope and intent of written company personnel policies.

EnviroTrac Environmental Services

TRENCH INSPECTION AND ENTRY AUTHORIZATION FORM

LOCATION:				**DATE:**	
TIME OF INSPECTION(S)					
WEATHER CONDITIONS:				**APPROX. TEMP.:**	
CREW LEADER:				**SUPERVISOR:**	
DIMENTIONS:	**DEPTH =**			Yes No	**HAZARDOUS CONDITIONS**
	TOP =	W	L	❑ ❑	..... Saturated soil / standing or seeping water
	BOTTOM =	W	L	❑ ❑	..... Cracked or fissured wall(s)
SOIL TYPE:		**TESTED:**		❑ ❑	..... Bulging wall(s)
❑ Solid rock (most stable)		❑ Yes		❑ ❑	..... Floor heaving
❑ Average soil		❑ No		❑ ❑	..... Frozen soil
❑ Fill material				❑ ❑	..... Super-imposed loads
❑ Loose sand				❑ ❑	..... Vibration
				❑ ❑	..... Depth greater than 10'
PROTECTION METHODS:				**PLACEMENT OF SPOILS & EQUIPMENT**	
(Walls MUST be vertical—NO voids)				❑ ❑	..... Spoils at least 2 feet from edge of trench
SHORING				❑ ❑	..... Equipment at least 2 feet from edge
❑ Timber				❑ ❑	..... Backhoe at end of trench
❑ Pneumatic				❑ ❑	..... Compressor, etc. at remote location
❑ Hydraulic				**LADDER LOCATION**	
❑ Screw Jacks				❑ ❑	..... Located in protected area
❑ Trench Shield				❑ ❑	..... Within 25 feet of safe travel
UNEVEN, IRREGULAR WALLS				❑ ❑	..... Secured
❑ Trench Box				❑ ❑	..... Extends 36 inches above the landing
Sloping: ❑ **q 1:1 (45°)** ❑ **q 1 ½:1 (34°)**				❑ ❑	..... Leads to safe landing
Yes No	**ENVIRONMENTAL CONDITIONS:**			**OTHER:**	
❑ ❑	Gas detector used?			❑ ❑	Shoring equip. & matls inspected prior to use?
❑ ❑	Confined space permit issued?			❑ ❑	Is trench SAFE to enter?
COMMENTS:					
				Work Order #	
NOTE	All unsafe conditions must be corrected prior to trench entry. If any hazardous conditions are observed, the trench must be immediately evacuated and no one is allowed to re-enter until corrective action has been taken.			**Certification by Competent Person** **Excavation Entry Authorized By:** _____ **Designated Competent Person**	

Appendix C
Safety Data Sheets



Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
Acetone MSDS

Section 1: Chemical Product and Company Identification

Product Name: Acetone

Catalog Codes: SLA3502, SLA1645, SLA3151, SLA3808

CAS#: 67-64-1

RTECS: AL3150000

TSCA: TSCA 8(b) inventory: Acetone

CI#: Not applicable.

Synonym: 2-propanone; Dimethyl Ketone; Dimethylformaldehyde; Pyroacetic Acid

Chemical Name: Acetone

Chemical Formula: C3-H6-O

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Acetone	67-64-1	100

Toxicological Data on Ingredients: Acetone: ORAL (LD50): Acute: 5800 mg/kg [Rat]. 3000 mg/kg [Mouse]. 5340 mg/kg [Rabbit]. VAPOR (LC50): Acute: 50100 mg/m 8 hours [Rat]. 44000 mg/m 4 hours [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female, Reproductive system/toxin/male [SUSPECTED]. The substance is toxic to central nervous system (CNS). The substance may be toxic to kidneys, the reproductive system, liver, skin. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Get medical attention.

Skin Contact:
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Cold water may be used.Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 465°C (869°F)

Flash Points: CLOSED CUP: -20°C (-4°F). OPEN CUP: -9°C (15.8°F) (Cleveland).

Flammable Limits: LOWER: 2.6% UPPER: 12.8%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances: Highly flammable in presence of open flames and sparks, of heat.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Slightly explosive in presence of open flames and sparks, of oxidizing materials, of acids.

Fire Fighting Media and Instructions:
Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards: Vapor may travel considerable distance to source of ignition and flash back.

Special Remarks on Explosion Hazards:
Forms explosive mixtures with hydrogen peroxide, acetic acid, nitric acid, nitric acid + sulfuric acid, chromic anydride, chromyl chloride, nitrosyl chloride, hexachloromelamine, nitrosyl perchlorate, nitryl perchlorate, permonosulfuric acid, thiodiglycol + hydrogen peroxide, potassium ter-butoxide, sulfur dichloride, 1-methyl-1,3-butadiene, bromoform, carbon, air, chloroform, thitriazylperchlorate.

Section 6: Accidental Release Measures

Small Spill:
Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container.

Large Spill:
Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, reducing agents, acids, alkalis.

Storage:
Store in a segregated and approved area (flammables area) . Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Keep away from direct sunlight and heat and avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 500 STEL: 750 (ppm) from ACGIH (TLV) [United States] TWA: 750 STEL: 1000 (ppm) from OSHA (PEL) [United States] TWA: 500 STEL: 1000 [Austalia] TWA: 1185 STEL: 2375 (mg/m3) [Australia] TWA: 750 STEL: 1500 (ppm) [United Kingdom (UK)] TWA: 1810 STEL: 3620 (mg/m3) [United Kingdom (UK)] TWA: 1800 STEL: 2400 from OSHA (PEL) [United States]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Fruity. Mint-like. Fragrant. Ethereal

Taste: Pungent, Sweetish

Molecular Weight: 58.08 g/mole

Color: Colorless. Clear

pH (1% soln/water): Not available.

Boiling Point: 56.2°C (133.2°F)

Melting Point: -95.35 (-139.6°F)

Critical Temperature: 235°C (455°F)

Specific Gravity: 0.79 (Water = 1)

Vapor Pressure: 24 kPa (@ 20°C)

Vapor Density: 2 (Air = 1)

Volatility: Not available.

Odor Threshold: 62 ppm

Water/Oil Dist. Coeff.: The product is more soluble in water; log(oil/water) = -0.2

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water.

Solubility: Easily soluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Excess heat, ignition sources, exposure to moisture, air, or water, incompatible materials.

Incompatibility with various substances: Reactive with oxidizing agents, reducing agents, acids, alkalis.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 3000 mg/kg [Mouse]. Acute toxicity of the vapor (LC50): 44000 mg/m3 4 hours [Mouse].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH. DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female, Reproductive system/toxin/male [SUSPECTED]. Causes damage to the following organs: central nervous system (CNS). May cause damage to the following organs: kidneys, the reproductive system, liver, skin.

Other Toxic Effects on Humans:
Hazardous in case of skin contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:
May affect genetic material (mutagenicity) based on studies with yeast (S. cerevisiae), bacteria, and hamster fibroblast cells. May cause reproductive effects (fertility) based upon animal studies. May contain trace amounts of benzene and formaldehyde which may cancer and birth defects. Human: passes the placental barrier.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: May cause skin irritation. May be harmful if absorbed through the skin. Eyes: Causes eye irritation, characterized by a burning sensation, redness, tearing, inflammation, and possible corneal injury. Inhalation: Inhalation at high concentrations affects the sense organs, brain and causes respiratory tract irritation. It also may affect the Central Nervous System (behavior) characterized by dizziness, drowsiness, confusion, headache, muscle weakeness, and possibly motor incoordination, speech abnormalities, narcotic effects and coma. Inhalation may also affect the gastrointestinal tract (nausea, vomiting). Ingestion: May cause irritation of the digestive (gastrointestinal) tract (nausea, vomiting). It may also

affect the Central Nevous System (behavior), characterized by depression, fatigue, excitement, stupor, coma, headache, altered sleep time, ataxia, tremors as well at the blood, liver, and urinary system (kidney, bladder, ureter) and endocrine system. May also have musculoskeletal effects. Chronic Potential Health Effects: Skin: May cause dermatitis. Eyes: Eye irritation.

Section 12: Ecological Information

Ecotoxicity:
Ecotoxicity in water (LC50): 5540 mg/l 96 hours [Trout]. 8300 mg/l 96 hours [Bluegill]. 7500 mg/l 96 hours [Fatthead Minnow]. 0.1 ppm any hours [Water flea].

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Acetone UNNA: 1090 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause reproductive harm (male) which would require a warning under the statute: Benzene California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Benzene California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Benzene, Formaldehyde Connecticut hazardous material survey.: Acetone Illinois toxic substances disclosure to employee act: Acetone Illinois chemical safety act: Acetone New York release reporting list: Acetone Rhode Island RTK hazardous substances: Acetone Pennsylvania RTK: Acetone Florida: Acetone Minnesota: Acetone Massachusetts RTK: Acetone Massachusetts spill list: Acetone New Jersey: Acetone New Jersey spill list: Acetone Louisiana spill reporting: Acetone California List of Hazardous Substances (8 CCR 339): Acetone TSCA 8(b) inventory: Acetone TSCA 4(a) final test rules: Acetone TSCA 8(a) IUR: Acetone

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):
R11- Highly flammable. R36- Irritating to eyes. S9- Keep container in a well-ventilated place. S16- Keep away from sources of ignition - No smoking. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References:
-Material safety data sheet issued by: la Commission de la SantÃ© et de la SÃ©curitÃ© du Travail du QuÃ©bec. -The Sigma-Aldrich Library of Chemical Safety Data, Edition II. -Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987. LOLI, RTECS, HSDB databases. Other MSDSs

Other Special Considerations: Not available.

Created: 10/10/2005 08:13 PM

Last Updated: 05/21/2013 12:00 PM

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Material Safety Data Sheet
cis-1,2-Dichloroethylene, 97%

ACC# 97773

Section 1 - Chemical Product and Company Identification

MSDS Name: cis-1,2-Dichloroethylene, 97%
Catalog Numbers: AC113380000, AC113380025, AC113380100
Synonyms: cis-Acetylene dichloride.
Company Identification:

Acros Organics N.V.
One Reagent Lane
Fair Lawn, NJ 07410

For information in North America, call: 800-ACROS-01
For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
156-59-2	cis-1,2-Dichloroethylene	97	205-859-7

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: Clear liquid. Flash Point: 6 deg C.
Warning! Flammable liquid and vapor. Harmful if inhaled. Unstabilized substance may polymerize. Causes eye and skin irritation. May be harmful if swallowed. May cause respiratory tract irritation.
Target Organs: Central nervous system, respiratory system, eyes, skin.

Potential Health Effects

Eye: Causes moderate eye irritation.
Skin: Causes moderate skin irritation. May cause dermatitis.
Ingestion: May cause gastrointestinal irritation with nausea, vomiting and diarrhea. May be harmful if swallowed. May cause central nervous system depression.
Inhalation: May cause respiratory tract irritation. May cause narcotic effects in high concentration. Eye irritation, vertigo, and nausea were reported in humans exposed at 2200 ppm.
Chronic: Not available. Some German investigators reported fatty degeneration of the liver upon repeated narcotic doses in rats and

Section 4 - First Aid Measures

Eyes: In case of contact, immediately flush eyes with plenty of water for a t least 15 minutes. Get medical aid.
Skin: In case of contact, flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical aid if irritation develops and persists. Wash clothing before reuse.
Ingestion: If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical aid.
Inhalation: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is

difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors may form an explosive mixture with air. Use water spray to keep fire-exposed containers cool. Flammable liquid and vapor. Fire or excessive heat may result in violent rupture of the container due to bulk polymerization. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas. Hazardous polymerization may occur under fire conditions.
Extinguishing Media: Use water fog, dry chemical, carbon dioxide, or regular foam.
Flash Point: 6 deg C (42.80 deg F)
Autoignition Temperature: 440 deg C (824.00 deg F)
Explosion Limits, Lower:9.70 vol %
Upper: 12.80 vol %
NFPA Rating: (estimated) Health: 2; Flammability: 3; Instability: 2

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/ Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Remove all sources of ignition. Use a spark-proof tool. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Avoid ingestion and inhalation. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames. Use only with adequate ventilation. Pure vapor will be uninhibited and may polymerize in vents or other confined spaces.
Storage: Keep away from sources of ignition. Store in a tightly closed container. Flammables-area. Store protected from light and air.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use process enclosure, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
cis-1,2-Dichloroethylene	200 ppm TWA	none listed	none listed

OSHA Vacated PELs: cis-1,2-Dichloroethylene: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear chemical splash goggles.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are

exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Liquid
Appearance: Clear
Odor: Pleasant odor
pH: Not available.
Vapor Pressure: 201 mm Hg @ 25 deg C
Vapor Density: 3.34 (air=1)
Evaporation Rate:Not available.
Viscosity: Not available.
Boiling Point: 60 deg C @ 760 mm Hg
Freezing/ Melting Point:-80 deg C
Decomposition Temperature:Not available.
Solubility: Insoluble.
Specific Gravity/ Density:1.2800
Molecular Formula:C2H2Cl2
Molecular Weight:96.94

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures. This material is a monomer and may polymerize under certain conditions if the stabilizer is lost.
Conditions to Avoid: Light, ignition sources, exposure to air, excess heat.
Incompatibilities with Other Materials: Strong oxidizing agents, strong bases, copper.
Hazardous Decomposition Products: Hydrogen chloride, phosgene, carbon monoxide, carbon dioxide.
Hazardous Polymerization: May occur.

Section 11 - Toxicological Information

RTECS#:
CAS# 156-59-2: KV9420000
LD50/ LC50:
CAS# 156-59-2:
    Inhalation, rat: LC50 = 13700 ppm;
.

Carcinogenicity:
CAS# 156-59-2: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No data available.
Teratogenicity: No data available.
Reproductive Effects: No data available.
Mutagenicity: No data available.
Neurotoxicity: No data available.
Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	DOT regulated - small quantity provisions apply (see 49CFR173.4)	1,2-DICHLOROETHYLENE
Hazard Class:		3
UN Number:		UN1150
Packing Group:		II

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 156-59-2 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
None of the chemicals in this material have an RQ.
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
Section 313 No chemicals are reportable under Section 313.
Clean Air Act:
This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
None of the chemicals in this product are listed as Hazardous Substances under the CWA.
None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.
OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA.
STATE
CAS# 156-59-2 can be found on the following state right to know lists: Pennsylvania, Massachusetts.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/ International Regulations

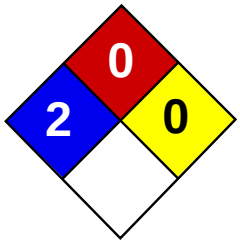
European Labeling in Accordance with EC Directives
Hazard Symbols:
XN F
Risk Phrases:
R 11 Highly flammable.
R 20 Harmful by inhalation.
R 52/53 Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Phrases:
S 16 Keep away from sources of ignition - No smoking.
S 29 Do not empty into drains.
S 7 Keep container tightly closed.
S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.

WGK (Water Danger/Protection)
CAS# 156-59-2: No information available.
Canada - DSL/NDSL
CAS# 156-59-2 is listed on Canada's NDSL List.
Canada - WHMIS
WHMIS: Not available.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.
Canadian Ingredient Disclosure List

Section 16 - Additional Information

MSDS Creation Date: 2/09/1998
Revision #5 Date: 3/16/2007



Health	2
Fire	0
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
Chloroform MSDS

Section 1: Chemical Product and Company Identification

Product Name: Chloroform

Catalog Codes: SLC1888, SLC5044

CAS#: 67-66-3

RTECS: FS9100000

TSCA: TSCA 8(b) inventory: Chloroform

CI#: Not available.

Synonym: Trichloromethane; Methane, trichlor-

Chemical Name: Chloroform

Chemical Formula: CHCl3

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Chloroform	67-66-3	100

Toxicological Data on Ingredients: Chloroform: ORAL (LD50): Acute: 695 mg/kg [Rat]. 36 mg/kg [Mouse]. 820 mg/kg [Guinea pig]. DERMAL (LD50): Acute: >20000 mg/kg [Rabbit]. VAPOR (LC50): Acute: 47702 mg/m 4 hours [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects: Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

Potential Chronic Health Effects: CARCINOGENIC EFFECTS: Classified + (Proven.) by NIOSH. Classified A3 (Proven for animal.) by ACGIH, 2B (Possible for human.) by IARC. Classified 2 (Some evidence.) by NTP. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to kidneys, liver, heart. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact: Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention.

Skin Contact: In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact: Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek medical attention.

Ingestion: Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances: Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: May explode if it comes in contact with aluminum powder, lithium, perchlorate, pentoxide, bis(dimethylamino)dimethylstannane, potassium, potassium-sodium alloy, sodium (or sodium hydroxide or sodium methoxide), and methanol

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions: Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as metals, alkalis.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area. Sensitive to light. Store in light-resistant containers.

Section 8: Exposure Controls/Personal Protection

Engineering Controls: Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection: Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill: Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: TWA: 10 (ppm) [Australia] Inhalation TWA: 2 (ppm) from OSHA (PEL) [United States] Inhalation STEL: 9.78 (mg/m3) from NIOSH Inhalation STEL: 2 (ppm) from NIOSH Inhalation TWA: 9.78 (mg/m3) from OSHA (PEL) [United States] Inhalation TWA: 10 (ppm) from ACGIH (TLV) [United States] [1999] Inhalation TWA: 2 (ppm) [United Kingdom (UK)] Inhalation TWA: 9.9 (mg/m3) [United Kingdom (UK)] InhalationConsult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Pleasant. Sweetish. Etheric. Non-irritating

Taste: Burning. Sweet.

Molecular Weight: 119.38 g/mole

Color: Colorless. Clear

pH (1% soln/water): Not available.

Boiling Point: 61°C (141.8°F)

Melting Point: -63.5°C (-82.3°F)

Critical Temperature: 263.33°C (506°F)

Specific Gravity: 1.484 (Water = 1)

Vapor Pressure: 21.1 kPa (@ 20°C)

Vapor Density: 4.36 (Air = 1)

Volatility: Not available.

Odor Threshold: 85 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 2

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials, Light

Incompatibility with various substances: Reactive with metals, alkalis.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Light Sensitive. Incompatible with triisopropyl phosphine, acetone, disilane, fluorine, strong bases and reactive metals (aluminum, magnesium in powdered form), light.

Special Remarks on Corrosivity: It will attack some forms of plastics, rubber, and coatings.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Eye contact. Inhalation.

Toxicity to Animals: WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 36 mg/kg [Mouse]. Acute dermal toxicity (LD50): >20000 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 47702 mg/m 4 hours [Rat]. 3

Chronic Effects on Humans: CARCINOGENIC EFFECTS: Classified + (Proven.) by NIOSH. Classified A3 (Proven for animal.) by ACGIH, 2B (Possible for human.) by IARC. Classified 2 (Some evidence.) by NTP. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. May cause damage to the following organs: kidneys, liver, heart.

Other Toxic Effects on Humans: Hazardous in case of skin contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: May affect genetic material (possible mutangen) and cause adverse reproductive effects(embryotoxicity and fetotoxicity) Suspected carcinogen (tumorigenic) and teratogen based on animal data. Human: passes the placental barrier, detected in maternal milk.

Special Remarks on other Toxic Effects on Humans: Acute Potential Health Effects: Skin: Causes skin irritation and may cause chemical burns. Eye: Causes eye irritation, burning pain and reversible injury to corneal epithelium. Inhalation: Causes irritation of the respiratory system (mucous membranes). May affect behavior/Nervous system (CNS depressant, fatigue, dizziness, nervousness, giddiness, euphoria, loss of coordination and judgement, weakness, hallucinations, muscle contraction/spasticity, general anesthetic, spastic paralysis, headache), anorexia (neurological and gastrointestinal symtoms resembling chronic alcoholism), and possibly coma and death. May affect the liver, kidneys and gastrointestinal tract (nausea, vomiting). Ingestion: Causes gastrointestinal tract irritation (nausea, vomiting). May affect the liver, urinary system (kidneys), respiration, behavior/nervous system (symptoms similar to inhalation),and heart. Chronic Potential Health Effects: Inhalation: Prolonged or repeated inhalation may affect the liver (hepatitis, jaundice, hepatocellular necrosis), metabolism (weight loss), respiration (fibrosis, pneumoconoisis), behavior/central nervous system (symptoms similar to acute inhalation), blood, musculoskeletal system, and kidneys. Ingestion: Prolonged or repeated ingestion may affect the liver, kidneys, metabolism (weight loss), endocrine system (spleen), blood (changes in cell count).

Section 12: Ecological Information

Ecotoxicity: Ecotoxicity in water (LC50): 43.8 mg/l 96 hours [Trout].

BOD5 and COD: Not available.

Products of Biodegradation: Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are as toxic as the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal: Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Chloroform UNNA: UN1888 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations: California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Chloroform California prop. 65 (no significant risk level): Chloroform: 0.02 mg/day (value) California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Chloroform New York release reporting list: Chloroform Rhode Island RTK hazardous substances: Chloroform Pennsylvania RTK: Chloroform Massachusetts RTK: Chloroform New Jersey: Chloroform California Director's List of Hazardous Subtances (8 CCR 339): Chloroform Tennessee: Chloroform TSCA 8(b) inventory: Chloroform TSCA 8(d) H and S data reporting: Chloroform: effective: 6/1/87; sunset: 6/1/97 SARA 302/304/311/312 extremely hazardous substances: Chloroform SARA 313 toxic chemical notification and release reporting: Chloroform CERCLA: Hazardous substances.: Chloroform: 10 lbs. (4.536 kg)

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC): R20/22- Harmful by inhalation and if swallowed. R38- Irritating to skin. R40- Possible risks of irreversible effects. S36/37- Wear suitable protective clothing and gloves.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 0

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment: Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

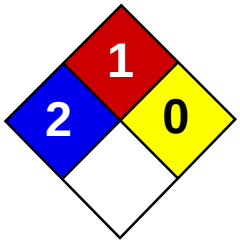
Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:16 PM

Last Updated: 05/21/2013 12:00 PM



Health	2
Fire	1
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
Trichloroethylene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Trichloroethylene

Catalog Codes: SLT3310, SLT2590

CAS#: 79-01-6

RTECS: KX4560000

TSCA: TSCA 8(b) inventory: Trichloroethylene

CI#: Not available.

Synonym:

Chemical Formula: C2HCl3

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Trichloroethylene	79-01-6	100

Toxicological Data on Ingredients: Trichloroethylene: ORAL (LD50): Acute: 5650 mg/kg [Rat]. 2402 mg/kg [Mouse]. DERMAL (LD50): Acute: 20001 mg/kg [Rabbit].

Section 3: Hazards Identification

Potential Acute Health Effects: Hazardous in case of skin contact (irritant, permeator), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Classified + (PROVEN) by OSHA. Classified A5 (Not suspected for human.) by ACGIH. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to kidneys, the nervous system, liver, heart, upper respiratory tract. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

Skin Contact:
After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: 420°C (788°F)

Flash Points: Not available.

Flammable Limits: LOWER: 8% UPPER: 10.5%

Products of Combustion: These products are carbon oxides (CO, CO2), halogenated compounds.

Fire Hazards in Presence of Various Substances: Not available.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Absorb with an inert material and put the spilled material in an appropriate waste disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapour/

spray. Wear suitable protective clothing In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes

Storage:
Keep container dry. Keep in a cool place. Ground all equipment containing material. Carcinogenic, teratogenic or mutagenic materials should be stored in a separate locked safety storage cabinet or room.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 50 STEL: 200 (ppm) from ACGIH (TLV) TWA: 269 STEL: 1070 (mg/m3) from ACGIH Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Not available.

Taste: Not available.

Molecular Weight: 131.39 g/mole

Color: Clear Colorless.

pH (1% soln/water): Not available.

Boiling Point: 86.7°C (188.1°F)

Melting Point: -87.1°C (-124.8°F)

Critical Temperature: Not available.

Specific Gravity: 1.4649 (Water = 1)

Vapor Pressure: 58 mm of Hg (@ 20°C)

Vapor Density: 4.53 (Air = 1)

Volatility: Not available.

Odor Threshold: 20 ppm

Water/Oil Dist. Coeff.: The product is equally soluble in oil and water; log(oil/water) = 0

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, methanol, diethyl ether, acetone.

Solubility:
Easily soluble in methanol, diethyl ether, acetone. Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity:
Extremely corrosive in presence of aluminum. Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
Acute oral toxicity (LD50): 2402 mg/kg [Mouse]. Acute dermal toxicity (LD50): 20001 mg/kg [Rabbit].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified + (PROVEN) by OSHA. Classified A5 (Not suspected for human.) by ACGIH. The substance is toxic to kidneys, the nervous system, liver, heart, upper respiratory tract.

Other Toxic Effects on Humans: Hazardous in case of skin contact (irritant, permeator), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Passes through the placental barrier in human. Detected in maternal milk in human.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Trichloroethylene : UN1710 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Trichloroethylene California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Trichloroethylene Pennsylvania RTK: Trichloroethylene Florida: Trichloroethylene Minnesota: Trichloroethylene Massachusetts RTK: Trichloroethylene New Jersey: Trichloroethylene TSCA 8(b) inventory: Trichloroethylene CERCLA: Hazardous substances.: Trichloroethylene

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):
CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC). CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):
R36/38- Irritating to eyes and skin. R45- May cause cancer.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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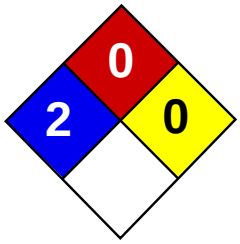

Health	2
Fire	0
Reactivity	0
Personal Protection	G

Material Safety Data Sheet
Tetrachloroethylene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Tetrachloroethylene

Catalog Codes: SLT3220

CAS#: 127-18-4

RTECS: KX3850000

TSCA: TSCA 8(b) inventory: Tetrachloroethylene

CI#: Not available.

Synonym: Perchloroethylene; 1,1,2,2-Tetrachloroethylene; Carbon bichloride; Carbon dichloride; Ankilostin; Didakene; Dilatin PT; Ethene, tetrachloro-; Ethylene tetrachloride; Perawin; Perchlor; Perclene; Perclene D; Percosolvel; Tetrachloroethene; Tetraleno; Tetralex; Tetravec; Tetroguer; Tetropil

Chemical Name: Ethylene, tetrachloro-

Chemical Formula: C2-Cl4

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Tetrachloroethylene	127-18-4	100

Toxicological Data on Ingredients: Tetrachloroethylene: ORAL (LD50): Acute: 2629 mg/kg [Rat]. DERMAL (LD): Acute: >3228 mg/kg [Rabbit]. MIST(LC50): Acute: 34200 mg/m 8 hours [Rat]. VAPOR (LC50): Acute: 5200 ppm 4 hours [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of skin contact (irritant), of inhalation. Slightly hazardous in case of skin contact (permeator), of eye contact (irritant), of ingestion.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH. Classified 2A (Probable for human.) by IARC, 2 (anticipated carcinogen) by NTP. MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to kidneys, liver, peripheral nervous system, respiratory tract, skin, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact:
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Absorb with an inert material and put the spilled material in an appropriate waste disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Do not ingest. Do not breathe gas/fumes/ vapor/spray. Avoid contact with skin. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents, metals, acids, alkalis.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.

Personal Protection:
Safety glasses. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 25 (ppm) from OSHA (PEL) [United States] TWA: 25 STEL: 100 (ppm) from ACGIH (TLV) [United States] TWA: 170 (mg/m3) from OSHA (PEL) [United States] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Ethereal.

Taste: Not available.

Molecular Weight: 165.83 g/mole

Color: Clear Colorless.

pH (1% soln/water): Not available.

Boiling Point: 121.3°C (250.3°F)

Melting Point: -22.3°C (-8.1°F)

Critical Temperature: 347.1°C (656.8°F)

Specific Gravity: 1.6227 (Water = 1)

Vapor Pressure: 1.7 kPa (@ 20°C)

Vapor Density: 5.7 (Air = 1)

Volatility: Not available.

Odor Threshold: 5 - 50 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 3.4

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility:
Miscible with alcohol, ether, chloroform, benzene, hexane. It dissolves in most of the fixed and volatile oils. Solubility in water: 0.015 g/100 ml @ 25 deg. C It slowly decomposes in water to yield Trichloroacetic and Hydrochloric acids.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, metals, acids, alkalis.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Oxidized by strong oxidizing agents. Incompatible with sodium hydroxide, finely divided or powdered metals such as zinc, aluminum, magnesium, potassium, chemically active metals such as lithium, beryllium , barium. Protect from light.

Special Remarks on Corrosivity: Slowly corrodes aluminum, iron, and zinc.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 2629 mg/kg [Rat]. Acute dermal toxicity (LD50): >3228 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 5200 4 hours [Mouse].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH. Classified 2A (Probable for human.) by IARC, 2 (Some evidence.) by NTP. MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast. May cause damage to the following organs: kidneys, liver, peripheral nervous system, upper respiratory tract, skin, central nervous system (CNS).

Other Toxic Effects on Humans:
Hazardous in case of skin contact (irritant), of inhalation. Slightly hazardous in case of skin contact (permeator), of ingestion.

Special Remarks on Toxicity to Animals:
Lowest Publishe Lethal Dose/Conc: LDL [Rabbit] - Route: Oral; Dose: 5000 mg/kg LDL [Dog] - Route: Oral; Dose: 4000 mg/kg LDL [Cat] - Route: Oral; Dose: 4000 mg/kg

Special Remarks on Chronic Effects on Humans:
May cause adverse reproductive effects and birth defects(teratogenic). May affect genetic material (mutagenic). May cause cancer.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: Causes skin irritation with possible dermal blistering or burns. Symtoms may include redness, itching, pain, and possible dermal blistering or burns. It may be absorbed through the skin with possible systemic effects. A single prolonged skin exposure is not likely to result in the material being absorbed in harmful amounts. Eyes: Contact causes transient eye irritation, lacrimation. Vapors cause eye/conjunctival irritation. Symptoms may include redness and pain. Inhalation: The main route to occupational exposure is by inhalation since it is readily absorbed through the lungs. It causes respiratory tract irritation, . It can affect behavior/central nervous system (CNS depressant and anesthesia ranging from slight inebriation to death, vertigo, somnolence, anxiety, headache, excitement, hallucinations, muscle incoordination, dizziness, lightheadness, disorentiation, seizures, enotional instability, stupor, coma). It may cause pulmonary edema Ingestion: It can cause nausea, vomiting, anorexia, diarrhea, bloody stool. It may affect the liver, urinary system (proteinuria, hematuria, renal failure, renal tubular disorder), heart (arrhythmias). It may affect behavior/central nervous system with symptoms similar to that of inhalation. Chronic Potential Health Effects: Skin: Prolonged or repeated skin contact may result in excessive drying of the skin, and irritation. Ingestion/Inhalation: Chronic exposure can affect the liver(hepatitis,fatty liver degeneration), kidneys, spleen, and heart (irregular heartbeat/arrhythmias, cardiomyopathy, abnormal EEG), brain, behavior/ central nervous system/peripheral nervous system (impaired memory, numbness of extremeties, peripheral neuropathy and other

Section 12: Ecological Information

Ecotoxicity:
Ecotoxicity in water (LC50): 18.4 mg/l 96 hours [Fish (Fatthead Minnow)]. 18 mg/l 48 hours [Daphnia (daphnia)]. 5 mg/l 96 hours [Fish (Rainbow Trout)]. 13 mg/l 96 hours [Fish (Bluegill sunfish)].

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Tetrachloroethylene UNNA: 1897 PG: III

Special Provisions for Transport: Marine Pollutant

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Tetrachloroethylene California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Tetrachloroethylene Connecticut hazardous material survey.: Tetrachloroethylene Illinois toxic substances disclosure to employee act: Tetrachloroethylene Illinois chemical safety act: Tetrachloroethylene New York release reporting list: Tetrachloroethylene Rhode Island RTK hazardous substances: Tetrachloroethylene Pennsylvania RTK: Tetrachloroethylene Minnesota: Tetrachloroethylene Michigan critical material: Tetrachloroethylene Massachusetts RTK: Tetrachloroethylene Massachusetts spill list: Tetrachloroethylene New Jersey: Tetrachloroethylene New Jersey spill list: Tetrachloroethylene Louisiana spill reporting: Tetrachloroethylene California Director's List of Hazardous Substances: Tetrachloroethylene TSCA 8(b) inventory: Tetrachloroethylene TSCA 8(d) H and S data reporting: Tetrachloroethylene: Effective date: 6/1/87; Sunset date: 6/1/97 SARA 313 toxic chemical notification and release reporting: Tetrachloroethylene CERCLA: Hazardous substances.: Tetrachloroethylene: 100 lbs. (45.36 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R40- Possible risks of irreversible effects. R51/53- Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. S23- Do not breathe gas/fumes/vapour/spray S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S37- Wear suitable gloves. S61- Avoid release to the environment. Refer to special instructions/Safety data sheets.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 0

Reactivity: 0

Personal Protection: g

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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Appendix D
Permit-required confined space program and employee training certificates

Version 1.0 – 6/20/2016

29 CONFINED SPACE ENTRY PROGRAM

29.1 Purpose

To clearly specify a confined space and a permit-required confined space and under what conditions the employees of EnviroTrac may enter a permit-required confined space.

29.2 Scope

This document covers the hazards, procedures, and training associated with the entering of confined spaces for any reason by EnviroTrac employees. Confined space entry occurs when any part of a person's body breaks the plane of an opening into a confined space. It is intended to provide the guidelines under which employees can protect themselves from hazardous atmospheres, entrapment, engulfment, external energy sources, and other hazards when working in confined spaces.

29.3 Administration and General Information

It is the policy of EnviroTrac that "confined spaces" are to be eliminated as soon as practically possible from any work site where they are encountered. This program defines and outlines the conditions and methods under which employees may enter confined spaces for sampling and equipment installation and removal. The Confined Space Entry Program described herein is based upon the following government regulations and publication:

- CFR Title 29 Part 1910.146, Permit Required Confined Spaces
- CFR Title 29 Part 1910.147, The Control of Hazardous Energy (Lockout/Tagout)
- A Guide to Safety in Confined Spaces - DHHS (NIOSH) Publication No. 87-113
- OSHA Permit-Required Confined Spaces (OSHA 3138-01R 2004)

Within EnviroTrac, this program will be administered by the Director of Health and Safety and the designated Regional Health and Safety Coordinators, who together will be responsible for the generation and execution of all portions of the program, and who will have the necessary authority to assure that all requirements of this program are properly fulfilled.

The following definitions, taken directly from 29CFR 1910.146, are pertinent to this program:

CONFINED SPACE is a space that:

1. Is large enough and so configured that an employee can bodily enter and perform assigned work
2. Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry)
3. Is not designed for continuous employee occupancy.

PERMIT-REQUIRED CONFINED SPACE has one or more of these characteristics:

1. Contains or has the potential to contain a hazardous atmosphere;
2. Contains a material with the potential to engulf someone who enters the space;
3. Has an internal configuration that might cause an entrant to be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a smaller cross section; and/or

4. Contains job-introduced hazards, such as: welding, cutting, grinding, hot riveting, burning, heating or the introduction of sources of ignition within the confined space, or the use of flammable or toxic cleaning solutions.
5. Contains any other recognized serious safety or health hazards.

Worksites will be inspected for spaces that meet the definition of a permit-required confined space and any EnviroTrac employee that is exposed to these areas will be informed existence, location and the hazards they pose. Areas will be identified with signs stating: “DANGER—PERMIT-REQUIRED CONFINED SPACE—AUTHORIZED ENTRANTS ONLY”

If a confined space is entered for the purpose of eliminating hazards of the space, it is considered a permit required confined space until the hazards have been removed and the entrants have vacated the space. Once all the hazards have been removed, the confined space is subject to reclassification. A permit is not required if the hazards can be eliminated without entering the space.

EnviroTrac employees that are required to enter a permit-require confined space are required to follow all requirements of this practice, unless:

1. The only hazard posed by the space is an actual or potential hazardous atmosphere that continuous forced air ventilation alone is sufficient to maintain that space safe for entry.
   a. The space must be inspected and documented that there are no other potential hazards exist other than the potential atmosphere that be rendered safe by ventilation.
   b. The determination and supporting data is to be made available to each employee who enters the permit space or to that employee's authorized representative.
   c. Entry to the space will not require: testing of the atmosphere prior to entrance or during continuous ventilation, a completed permit for entry, an entry supervisor or attendants, or rescue personnel or equipment.
2. The permit-required confined space is reclassified as a non-permit confined space.

   If the permit space poses no actual or potential atmospheric hazards and if all hazards within the space are eliminated without entry into the space, the permit space may be reclassified as a non-permit confined space for as long as the non-atmospheric hazards remain eliminated.

   The reclassification is to be documented and approved by the Director of Health and Safety that all hazards in a permit space have been eliminated, the documentation will contain the date, the location of the space, and the signature of the person making the determination. The re-classification will be made available to each employee entering the space or to that employee's authorized representative.

29.4 Atmosphere Monitoring

It will be the policy of EnviroTrac not to allow any of its employees to enter permit-required confined spaces for any reason until a confined space permit has been completed.

The permit requires that the atmosphere is sampled at the top, center, and bottom of the space to determine oxygen content and combustible or toxic atmospheres. The following monitoring must be conducted, in this order:

- OXYGEN CONTENT: Check using a direct reading Oxygen Meter, the concentration of oxygen inside of the confined space is to be between 19.5% and 23.5%. If the confined space atmosphere cannot be ventilated to achieve an oxygen concentration of at least 19.5%, entry will only be made using a Supplied Air Respirator with an escape bottle, or an SCBA. If the oxygen concentration cannot be lowered below *23.5%,* the confined space will not be entered.
- COMBUSTIBLE GAS CONCENTRATION: Check using a direct reading Combustible Gas Meter, the concentration of combustible gas in the confined space is not to exceed 10% of the lower explosive limit (LEL) of the gas present in the confined space. Should the combustible gas concentration exceed 10% of the LEL, employees will not enter the confined space unless ventilation can successfully lower the concentration below 10% of the LEL.
- TOXIC VAPOR CONCENTRATION: Using either a Photoionization Detector (PID) or Flame Ionization Detector (FID), the confined space will be sampled for the presence of toxic vapors. If a contaminant in the space is known, and the concentration of that substance is measured at levels above published permissible exposure limits (i.e., OSHA PELs), and the confined space cannot be ventilated to lower the concentration to below published exposure limits, appropriate air purifying or supplied air respirators must be used to enter the space. The specific respiratory protection required must be determined on a site-by-site basis for each confined space and conform to EnviroTrac's Respiratory Protection program (Section 19).

In addition to a hazardous atmosphere, a confined space may contain hazardous materials or physical hazards, such as low ceilings or pipes where a worker may strike his or her head. Personal Protective Equipment to be worn to protect employees from these hazardous conditions.

Heat and cold stress may impact workers in confined spaces. Follow EnviroTrac's Heat and Cold Stress Practice (Section 25).

29.5 Emergency Response Protocol

Emergency response to incidents in a permit-required confined space is to be coordinated prior to entry. Rescue services must be either be: 1) provided by the host facility (stated in contract agreement), or 2) provided by an outside service which is given an opportunity to examine the entry site, practice rescue, and decline as appropriate. EnviroTrac does not perform in-house emergency response services.

Rescue services are to be evaluated for capabilities to respond to particular permit-required confined space rescue scenario and have the capability to reach the victim(s) within a time frame that is appropriate for the permit space hazard(s) identified. Rescue services are required to be on site for all IDLH conditions while work is being performed.

The medical facility to be used in the event of an incident is to be provided with copies of SDSs of hazardous materials that an injured *Entrant* may have been exposed.

The *Entry Supervisor* will coordinate with the Emergency Response Teams prior to allowing employees to enter the confined space. The telephone numbers will be on the Confined Space Entry Permit and in the possession of the *Attendant* during confined space entry, and a telephone or radio will be at the site to provide communications with emergency response teams.

29.6 Confined Space Entry Procedures

Whenever employees of EnviroTrac are required to enter confined spaces for any reason, a permit will be developed prior to site entry, to address the following procedures:

- The Confined Space Entry project has a minimum of three positions:

  The *Entry Supervisor* establishes the terms of the confined space entry and prepares the permit. The *Entry Supervisor* manages the project, determines the space hazards and mitigations, verifies emergency plans and availability of rescue services, and cancels the permit after entry operations are complete.

  The *Entrant* enters the confined space and will be equipped with a body harness and lifeline, and the appropriate Personal Protective Equipment dictated by the atmosphere and other hazards present inside the confined space. The *Entrant* is to Stop Work and exit the space if conditions are felt to be unsafe or provisions of the confined space entry permit are not followed.

  The *Attendant* remains outside the confined space, in control of the lifeline, in constant communication with the entrant, and alert for signs that the entrant is experiencing adverse problems associated with the conditions inside the confined space. The Attendant will not leave the entrance of the confined space while an Entrant is inside unless replaced by another qualified Attendant. One Attendant will be assigned to each confined space entry; Attendants will not be allowed to monitor more than one confined space.

- Provisions for emergency rescue will be established during the project planning by the Entry Supervisor. Rescue services must be either be: 1) provided by the host facility, or 2) provided by an outside service which is given an opportunity to examine the entry site, practice rescue, and decline as appropriate. Rescue services are required to be on site for all IDLH conditions while work is being performed.

- When hazardous energy sources, such as electrical, mechanical, chemical, thermal, pneumatic, hydraulic, or stored are present in a confined space, procedures to control that hazardous energy will be used as required in Section 26 – Control of Hazardous Energy Sources (Lockout / Tagout) or a protective shield, barrier, or other insulating device/material will be used to protect workers from the potential energy source.

- The EnviroTrac Confined Space Entry Permit will be completed by the *Entry Supervisor* and is required to be present at the confined space until the assignment is completed. The Attendant and Entrant will complete the EnviroTrac Confined Space Pre-Entry Checklist. A copy of both documents is located at the end of this practice and on the Safety Portal.

- A Work Zone will be established around the entrance of the Confined Space to allow adequate room for the Attendant; equipment, materials, and supplies; rescue and monitoring equipment; and emergency rescue services. Where required, the Work Zone will use barriers and other traffic control devices to control vehicular and pedestrian traffic.

- Any conditions making it unsafe to remove an entrance cover is to be eliminated before the cover is removed. When entrance covers are removed, the opening is to be promptly guarded by a railing, temporary cover, or other temporary barrier that will prevent an accidental fall through the opening and that will protect each employee working in the space from foreign

objects entering the space.

- Atmospheric monitoring will have been conducted and provisions to protect *Entrants*. . *Entrants* will have the opportunity to participate in and review monitoring equipment calibration data and testing before entry.
- Continuous positive ventilation will be used to supply air into the space for the duration of the time *Entrants* are in the space. The air will be tested periodically and if the atmosphere changes to something not expected, all *Entrants* will be removed from the space and a new confined space entry permit will be developed.
- The space will be continuously evaluated by the *Entrant(s)* and the *Attendant(s)* for changes that could affect confined space entry. Any changes observed or suspected must be addressed or the permit and entry into the confined space terminated. Any changes in conditions are to be noted on the permit.
- The *Entry Supervisor* will cancel the entry permit when the assignment is completed or when new conditions exist. New conditions must be noted on the canceled permit and used in revising the permit space program. Canceled entry permits will be retained for at least one year.

Should the *Entrant* be overcome by conditions within the confined space, the standby employee will either remove the *Entrant* with the lifeline or will summon assistance from professional emergency response personnel as listed on the Confined Space Entry permit. The stand by employee will not enter the confined space or leave the space unattended unless replaced by another qualified stand by employee.

When EnviroTrac is employed as the prime/sole contractor at a facility where confined spaces are or will be present, the Project Manager, in conjunction with the Corporate Health and Safety Director or Regional Health and Safety Coordinator, will have the responsibility to ascertain that all the requirements of this program are fulfilled prior to any employee entering into such confined spaces.

When EnviroTrac is employed as a sub-contractor or there are multiple employers working in the same confined space, one person will be designated as a *Person-In-Charge* to coordinate all activities for multiple contractors. No contractors will be allowed to perform work unless it is coordinated through the Person-In-Charge.

Should contractors, clients or others request an employee to enter confined spaces which the employee does not feel meet the above entry program requirements, they should inform those requesting them to enter that they do not consider the confined space safe for entry, inform their supervisor and await further instructions. Employees will enter such confined spaces only if they are satisfied that the provisions of this program are fulfilled.

29.7 Confined Space Energy Isolation

Any hazardous energy within the confined space will be controlled as required by 29CFR 1910.147 and by EnviroTrac's Control of Hazardous Energy practice (Section 27). Examples of controlling hazardous energy include:

- Electrical energy devices must be de-energized, and the switching either locked out and/or tagged out.
- Hydraulic energy devices must be de-energized as above, lines capped or blanked, and the stored energy in the systems released of the devices blocked.
- Hydrostatic or pneumatic energy devices must be de-energized, and lines either capped or blanked.
- All other sources of hazardous energy need to be identified and controlled prior to allowing anyone into the confined space.

It will be the policy of EnviroTrac not to permit employees to enter confined spaces that contain the potential for hazardous energy devices without engineering controls. Confined spaces containing well heads with electrically operated pumps may be entered providing the pumps have intrinsically safe or explosion proof motors and the electrical circuits are protected with ground fault circuit interrupters (GFCI).

29.8 Employee Training

All employees who are required to enter confined spaces for any reason will successfully complete a Confined Space Entry Training Program, training be conducted prior to initial assignment, prior to a change in assigned duties, and if a new hazard has been created or special deviations have occurred, and will include, but not be limited to the following topics:

- The contents of this Confined Space Entry Program
- The hazards of confined space entry
- Temperature extremes in confined space
- Duties of the entrant and standby personnel
- Isolation and control of hazardous energy in the confined space
- Rescue methods for confined space entry

Employees will be required to demonstrate competency on confined space entry training through either skills demonstration or a written examination.

Documentation of training will be maintained by the EnviroTrac's Safety Department and will include the employee's name; date(s) of training; subject, curriculum, handouts, and pertinent training materials; and trainer's name and title.

The Regional Health and Safety Coordinator will conduct periodic inspection of random work sites to ascertain that this Confined Space Entry Program is conscientiously being followed.

29.9 Program Evaluation

The Corporate Health and Safety staff will review all aspects of this Confined Space Entry Program at least annually to assure its effectiveness and update the program accordingly. Whenever modifications revisions of federal or applicable state regulations or standards, or any action that would necessitate a change in any of the contents of this practice occur, such changes will be made. , Everyone affected by changes to this program will be notified and retrained, if necessary. All such modifications will be made in writing, and the nature of the modification noted and dated. Examples of program review include: any

unauthorized entry of a confined space, a hazard not covered by the permit, the occurrence of an injury or near miss, employee complaints.

Canceled confined space entry permits will be retained for one year and be used in the aforementioned review to ensure that employees are protected. The cancelled permits will be reviewed for any unauthorized entry of a confined space, terminated permits due to hazards not covered by the permit, the occurrence of an injury or near miss, or employee complaints.

29.10 Enforcement

The following disciplinary actions will be administered to employees found to be willfully negligent or not complying with the provisions of this policy:

- First Offense: If the violation is correctable, the employee will receive a written warning detailing the nature of the offense, which will be documented in the employee's personnel file. In addition, if the violation is not correctable, the employee will be dismissed from the site and sent home for the day without pay.
- Second Offense: The employee will receive a written warning detailing the nature of the offense, documented to their personnel file, and one day off without pay, regardless of whether the violation is correctable.
- Third Offense: The employee will receive a written warning detailing the nature of the offense, documented to their personnel file, and one week off without pay, regardless of whether the violation is correctable.
- Fourth Offense: The employee will be terminated with cause.

Should willful noncompliance or negligence to the provisions of this policy result in injury or increased risk to another individual then disciplinary action will be more severe than the normal sequence of the above procedures may be administered. All of the above disciplinary steps will be administered within the scope and intent of written company personnel policies.

EnviroTrac Environmental Services
Health and Safety Program

CONFINED SPACE ENTRY PERMIT

Page 1 of 2

1. Permit Space To Be Entered
2. Purpose of Entry
3. Date of Entry — Authorized Duration of Entry Permit
4. Authorized Entrants
5. Attendants(s)
6. Name of Current Entry Supervisor(s) — 1. Time — 2. Time

Entry Supervisor who Originally Authorized Entry — *Signature or Initials*

7. Record hazards of the permit space to be entered. Hazard	Yes	No	N/A
A. Lack of Oxygen	☐	☐	☐
B. Combustible Gases	☐	☐	☐
C. Combustible Vapors	☐	☐	☐
D. Combustible Dusts	☐	☐	☐
E. Toxic Gases	☐	☐	☐
F. Toxic Vapors	☐	☐	☐
G. Chemical Contact	☐	☐	☐
H. Electrical Hazards	☐	☐	☐
I. Mechanical Exposure	☐	☐	☐
J. Temperature	☐	☐	☐
K. Engulfment	☐	☐	☐
L. Entrapment	☐	☐	☐
M. Others	☐	☐	☐
	☐	☐	☐
	☐	☐	☐
	☐	☐	☐
	☐	☐	☐
	☐	☐	☐

8. Check or list the measures used to isolate the permit space and to eliminate or control permit space hazards before entry.	
☐	A. Purge-Flush and Vent
☐	B. Ventilation
☐	C. Lockout/Tag Out
☐	D. Inerting
☐	E. Blanking, Blocking, Bleeding
☐	F. External Barricades
☐	G. Confined Space Identification/Signs

DO NOT DESTROY THIS PERMIT - PERMIT MUST BE RETAINED FOR ONE YEAR AFTER CANCELLED

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Health and Safety Program

CONFINED SPACE ENTRY PERMIT

9. Acceptable Entry Conditions

10. Test(s) To Be Taken	Permissible Entry Levels	Test 1	Test 2	Test 3	Test 4
A. Percent of Oxygen	19.5% to 23.5%				
B.					
C.					
D.					
E.					
F.					
G.					
H.					
I.					
Name or Initials of Tester					
Test Times					

11. Rescue and Emergency Services Available:

Name _____ Name _____

Telephone _____ Telephone _____

12. Communication procedures to be used by authorized entrants and attendants.

13. Equipment supplied to the employee.

Yes	No	N/A	Equipment		Description		
☐	☐	☐	(i)	Gas Test and Monitoring	Name _____ Serial/Unit No. _____		Model/Type _____
☐	☐	☐	(ii)	Ventilating			
☐	☐	☐	(iii)	Communications			
☐	☐	☐	(iv)	Personal Protective Equipment	☐ Safety Harness With Life Lines ☐ Respiratory	☐ Hard Hats ☐ Eye ☐ Ear ☐ Face	☐ Hand ☐ Foot ☐ Clothing
☐	☐	☐	(v)	Lighting			
☐	☐	☐	(vi)	Barriers/ Shields	☐ Pedestrian	☐ Vehicle	☐ Other
☐	☐	☐	(vii)	Safe Ingress/Egress	☐ Ladders		
☐	☐	☐	(viii)	Rescue and Emergency	☐ Lifelines	☐ Hoists	☐ Resuscitators-Inhalator
☐	☐	☐	(ix)	Other Safety Equipment			

14. Other information for this particular confined space to ensure employee safety.

15. Additional Permits Required. ☐ Hot Work ☐ Other

THIS CONFINED SPACE ENTRY PERMIT HAS BEEN CANCELLED:

BY _____ _____ AM PM _____
Entry Permit Supervisor Time Date

DO NOT DESTROY THIS PERMIT - PERMIT MUST BE RETAINED FOR ONE YEAR AFTER CANCELLED

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EnviroTrac Environmental Services
Health and Safety Program

CONFINED SPACE PRE-ENTRY CHECKLIST

LOCATION _____ DATE_____ TIME_____

ENTRY SUPERVISOR_____ PHONE_____

Mark the appropriate column: X Yes, X No, or X N/A Not Applicable.	Yes	No	N/A
1. Is a "DANGER CONFINED SPACE" sign posted to identify the site as requiring a confined space entry permit to occupy the area?	☐	☐	☐
2. Is a written permit space entry program developed and implemented that complies with Section 1910.146(c)(4)?	☐	☐	☐
3. Is the written program available for inspection by employees and their representatives?	☐	☐	☐
4. Have all ENTRANTS been provided training and acquired the understanding, knowledge and skills necessary for the safe performance of the duties assigned in Section 1910.146(h)?	☐	☐	☐
5. Have all ATTENDANTS been provided training and acquired the understanding, knowledge and skills necessary for the safe performance of the duties assigned in Section 1910.146(i)?	☐	☐	☐
6. Have all ENTRY SUPERVISORS been provided training and acquired the understanding, knowledge and skills necessary for the safe performance of the duties assigned in Section 1910.146(j)?	☐	☐	☐
7. Is the only hazard an actual or potential hazardous atmosphere?	☐	☐	☐
8. Will continuous forced air ventilation alone be sufficient to maintain the permit space safe for entry?	☐	☐	☐
9. Has monitoring and inspection data been developed to eliminate the hazardous atmosphere through forced air ventilation?	☐	☐	☐
10. Has the permit space been isolated?	☐	☐	☐
11. Have steps been taken for purging, inerting, flushing or ventilating the permit space to eliminate or control atmospheric hazards?	☐	☐	☐
12. Is monitoring available to verify that conditions are acceptable for entry throughout the duration of an authorized entry?	☐	☐	☐
13. Are employees trained on how to maintain and properly use testing and monitoring equipment?	☐	☐	☐

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EnviroTrac Environmental Services
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Mark the appropriate column: X Yes, X No, or X N/A Not Applicable.	Yes	No	N/A
14. Is ventilating equipment needed to obtain acceptable entry?	☐	☐	☐
15. Is communication equipment necessary and available for use between attendant and entrant?	☐	☐	☐
16. Are the entrants provided with personal protective equipment to be adequately protected insofar as feasible engineering and work practice controls allow?	☐	☐	☐
17. Has adequate lighting equipment been supplied to allow a safe work area and allow a quick exit in an emergency?	☐	☐	☐
18. Has the area been secured with barriers and shields from pedestrian, vehicle or other barriers to protect the entrants from external hazards?	☐	☐	☐
19. Is the confined space provided with equipment, such as ladders, needed for safe ingress and egress by authorized entrants?	☐	☐	☐
20. Is there other training, equipment or services needed to provide safe confined space entry?	☐	☐	☐

SAFETY EQUIPMENT CHECKLIST

☐ Safety Harness with Attached Life Lines

☐ Respirator and type _____

☐ Hard Hat
☐ Eye Protection
☐ Hand Protection

☐ Other (specify)

☐ Ear Protection

☐ Foot Protection
☐ Protective Clothing
☐ Ventilator
☐ Resuscitator
☐ Communications Equipment
☐ Gas Tester with Alarms

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EnviroTrac Environmental Services
Health and Safety Program

GAS TESTS TAKEN

	GAS	PERMISSIBLE ENTRY LEVEL	YES	NO	INSTRUMENT USED	ACTUAL READING	TESTED BY
1.	Oxygen %	19.5% to 23.5%	☐	☐			
2.			☐	☐			
3.			☐	☐			
4.			☐	☐			
5.			☐	☐			
6.			☐	☐			
7.			☐	☐			
8.			☐	☐			
9.			☐	☐			
10.			☐	☐			

Calibrated direct-reading instruments used to test confined space atmosphere:

1. Name _____ Name _____
   Make _____ Make _____
   Serial No. _____ Serial No. _____
   Last Calibration Date _____ Last Calibration Date _____

RESCUE AND EMERGENCY SERVICES

1. Contacts in the event of an emergency include name and telephone number.

A. _____ C._____
_____ _____
_____ _____

B. _____ D._____
_____ _____
_____ _____

2. Rescue services available for this confined space entry.

☐ employee ☐ outside rescue service

3. Rescue Equipment available:

☐ Oxygen ☐ Chest/full body harness
☐ Resuscitator – Inhalator ☐ Retrieval line properly installed
☐ First Aid Equipment ☐ Wristlets when it is the safest and most effective alternative
☐ De-Fibrillator

Additional rescue equipment available

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EnviroTrac Environmental Services
Health and Safety Program

NOTES

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APPENDIX G – COMMUNITY AIR MONITORING PLAN

AAA SUTTER REALTY, LLC

1199 SUTTER AVENUE, BROOKLYN

KINGS COUNTY, NEW YORK

Community Air Monitoring Plan

NYSDEC BCP Number: C224141

Prepared for:
AAA SUTTER REALTY, LLC
153-157 Seventh Street
Garden City, New York 11530

Prepared by:
EnviroTrac Engineering PE PC
5 Old Dock Road, Yaphank, New York 11980
631-924-3001

JUNE 2018

EnviroTrac
Environmental Services

This 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. It 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.

Reliance on the procedures specified in the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Proposed Monitoring

Real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) will be conducted during implementation of the RAWP to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses) from potential airborne contaminant releases as a direct result of the remedial work activities.

Continuous monitoring will be required for all ground intrusive activities including, but not necessarily limited to, the installation of soil vapor extraction (SVE) wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of groundwater samples. In some instances, depending upon the proximity of potentially exposed individuals and/or field observations during implementation of such work, continuous monitoring may be required during these activities.

<u>VOC Monitoring, Response Levels, and Actions</u>

VOCs will be monitored at the downwind perimeter of the work area on a continuous basis during intrusive activities (e.g., injection/monitoring well installations). Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions. The equipment will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below:

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities will 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.

- 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 will 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.

- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations will be monitored continuously at the upwind and downwind perimeters of the work area at temporary particulate monitoring stations during work activities (e.g., SVE well installations).

The particulate monitoring will 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 will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration will be visually assessed during all work activities:

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/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 will be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work will 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 mcg/m^3 of the upwind level and in preventing visible dust migration.

Special Requirements 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 must 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 should be considered to prevent exposures related to the work activities and to control dust and odors. Consideration should 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 should occur within the occupied structure(s). Background readings in the occupied spaces must be taken prior to commencement of the planned work. Any unusual background readings should be discussed with New York State Department of Health (NYSDOH) prior to commencement of the work.

If total particulate concentrations opposite the walls of occupied structures or next to intake vents exceed 150 mcg/m3, work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 mcg/m3 or less at the monitoring point.

All readings will be recorded and available for the New York State Department of Environmental Conservation (NYSDEC) and the NYSDOH personnel to review.

APPENDIX H

O&M MANUAL (FOR EACH ACTIVE EC)

AIR SPARGE & SOIL VAPOR EXTRACTION SYSTEM

OPERATION AND MAINTENANCE MANUAL

Project:

1199 Sutter Avenue
Brooklyn, NY

Prepared By:

EnviroTrac PE PC
5 Old Dock Road
Yaphank, NY 11980

November, 2018

Table of Contents

Section 6 –Enclosure Ventilation

- Dayton **1HLA3** Exhaust Fan Operating Instructions and Parts Manual
- PECO **TF115-001** Thermostat Specifications

Section 7 – System Drawings

- System Layout Drawing
- Process and Instrumentation Diagram
- Electrical Single Line Diagram

1. Soil Vapor Extraction Equipment

AIRTECH® VACUUM

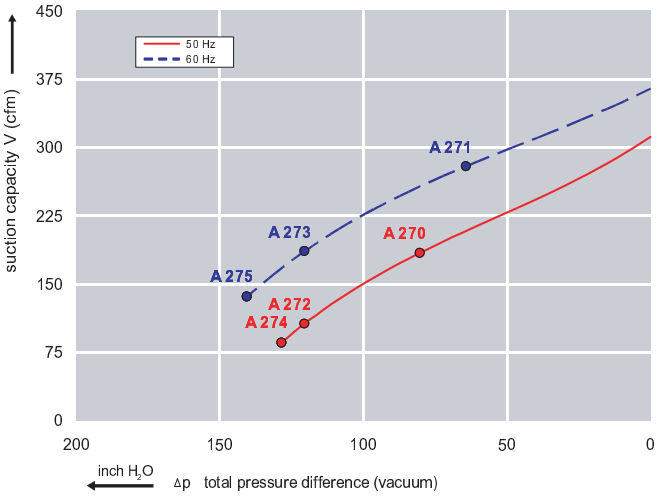
3BA1800

Vacuum/Pressure Regenerative Blower

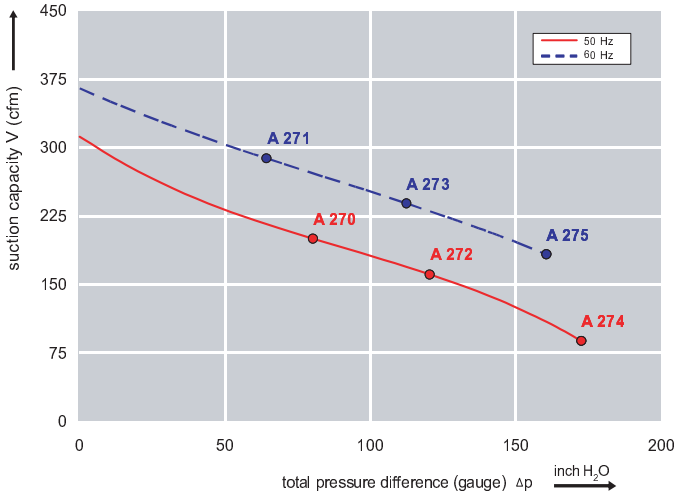
Features:

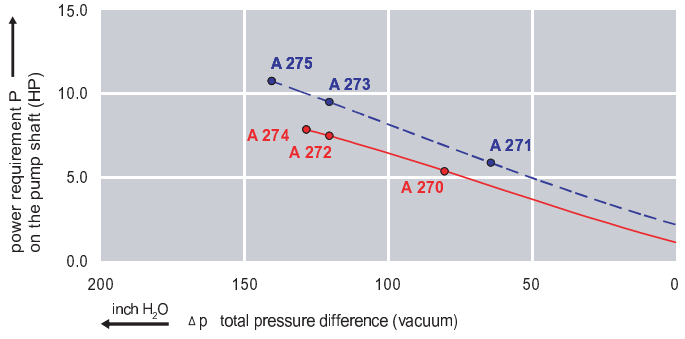
- Cooler running, outboard bearing provides maintenance-free operation
- Environmentally friendly oil-free technology
- Extremely quiet operation
- All motors are standard TEFC with Class F insulation, UL recognized, CE Compliant
  Explosion-Proof motors available
- Custom construction blowers are available
- Rugged die cast aluminum construction

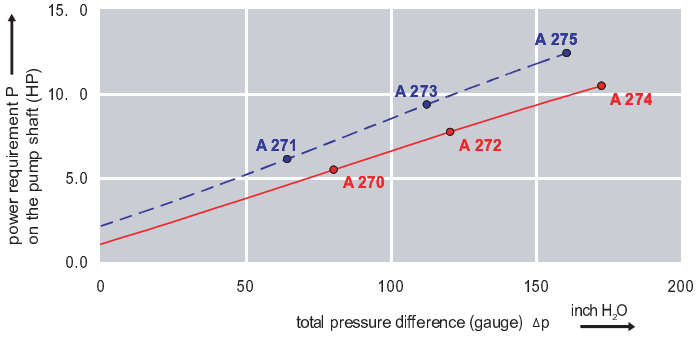
Performance curve for Vacuum pump

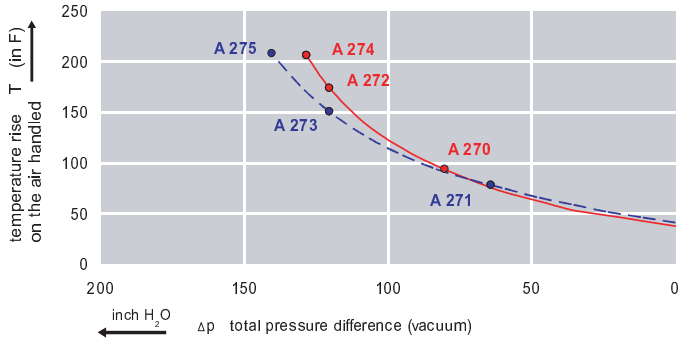


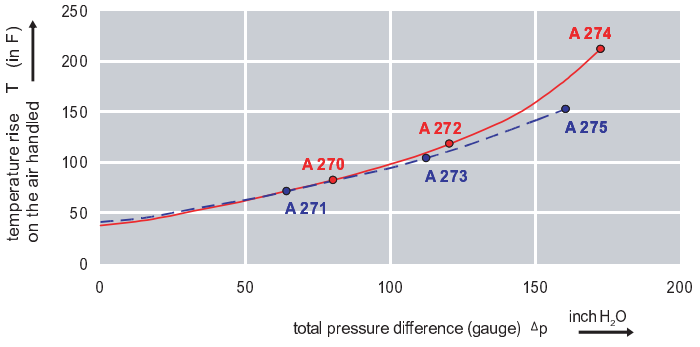
Performance curve for Compressor







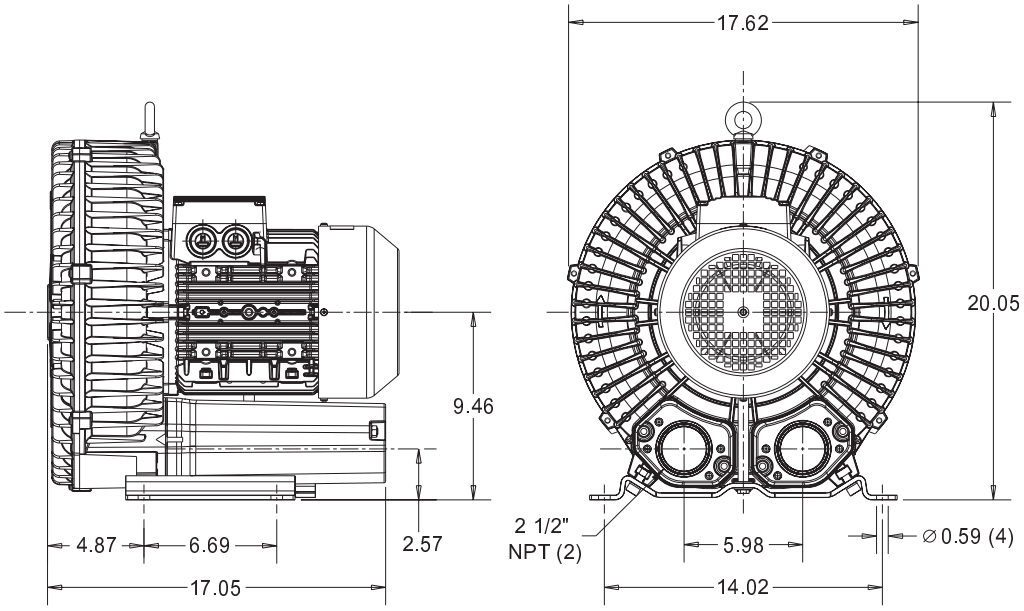




3BA1800

Vacuum/Pressure Regenerative Blower

Dimensions: (inches)



Recommended Accessories:

Relief valve:

VC88Z or VC81Z (Vacuum)

PC88Z or PC81Z (Pressure)

Filter:

ATF-250-15124/1 (Vacuum)

AFS-230-250-10 (Pressure)

Specifications subject to change without notice. Please contact factory for specification updates.

Selection & Ordering Data - Type 3BA1800

Curve No.	Order No.	Frequency Hz	Rated power HP	Input Voltage V		Input Current A		Permissible total differential pressure Vacuum inch H2O	Permissible total differential pressure Compressor inch H2O	Sound pressure level	lbs
3~ 50/60 Hz IP55 insulation material class F											
A 270	3BA1800-7AT06	50	5.36	200D ... 240D	345Y ... 415Y	15.6D	9.0Y	-80	80	70	128
A 271	3BA1800-7AT06	60	6.16	220D ... 250D	415Y ... 460Y	15.2D	8.5Y	-64	64	74	128
A 272	3BA1800-7AT16	50	7.37	200D ... 240D	345Y ... 415Y	23.0D	13.3Y	-120	120	70	143
A 273	3BA1800-7AT16	60	8.44	220D ... 250D	415Y ... 460Y	20.0D	11.2Y	-120	112	74	143
A 274	3BA1800-7AT26	50	10.05	200D ... 240D	345Y ... 415Y	29.0D	16.7Y	-128	173	70	150
A 275	3BA1800-7AT26	60	11.52	220D ... 250D	415Y ... 460Y	27.5D	15.0Y	-141	161	74	150

Suitable for 208 Volt Operation

All curves are rated at 14.7 psia and 68° F ambient conditions and are reported in SCFM referenced to 68° F and 14.696 psia sea level conditions. Curve values are nominal, actual performance may vary by up to 10% of the values indicated. For inlet temperatures above approximately 80 °F or for handling gases other than air, please contact your Airtech sales representative for assistance.

AIRTECH®
VACUUM

Operating and Maintenance Instructions

3BA Regenerative Blowers

INSTALLATION & OPERATING MANUAL
3BA REGENERATIVE BLOWERS

Table of Contents

1. Safety

1.1 General Safety Precautions

WARNING: Improper operation of 3BA units can result in serious or even fatal injuries. Please make sure all personnel have read and understood this manual before operating the unit.

All personnel should familiarize themselves with the units' specifications and be careful not to exceed the unit's capacity.

Transport, installation, operation, shut-down, maintenance and disposal of 3BA units should be carried out by qualified professionals.

Do not attempt to start or run the unit unless it has been completely assembled. Particular attention should be paid to: the vacuum pump/compressor cover, the muffler on the inlet and discharge connections, and the fan guard.

The standard 3BA unit must never come into contact with flammable substances.

1.2 Clothing and Protective Gear

It is recommended that all personnel wear proper protective gear while operating the unit. This may include eye protection, gloves and helmets.

Please be aware that it is possible for hair and clothing to be pulled into the unit. Avoid wearing loose-fitting clothing near the unit while it is operating and wear a hairnet if necessary.

1.3 Electrical Safety

Electrical installation should only be done by qualified electricians. Before doing any electrical work on a 3BA unit, please ensure that **power to the unit has been disconnected.** Do not attempt to open the unit's terminal box until you have made certain that the unit is not connected to a power source.

The terminal box must be kept free of dirt and moisture at all times. Make sure the terminal box cover and cable entries are tightly sealed so they remain dustproof and waterproof. Check the terminal box regularly to make sure it is sealed and free of debris and moisture.

1.4 Vacuum and Gauge Pressure Safety

In order to avoid dangerous situations associated with vacuum and gauge pressure, please utilize secure mounting elements, connections, lines, fittings, and containers. Pipes/hoses must be securely connected to the inlet and discharge connections. The inlet and discharge connections and the pipes/hoses connected to them must not be closed, clogged, or soiled. Check regularly to ensure that these connections and mountings are not becoming unseated. If necessary, support pipes and hoses to ensure that there is no tension on the connections. **Failure to observe these precautions can lead to sudden evacuation of hazardous fluids or dangerous suction that can pull hair or clothing into the unit.**

1.5 Installation/Start-up

The unit and any lines connected to it must be securely installed. In particular, the feed pipes must be securely routed, e.g. in cable ducts, in the floor, etc.

If a separate control panel or other such interface will be used to start and stop the unit, it should be installed in an area with an unobstructed view of the unit to ensure that it is not switched on while being serviced.

Excess vibration can cause damage to the unit and/or unsafe conditions. Install the unit on a solid foundation or a solid mounting surface. Check screw glands/unions for strength and firm seating.

Cables and pipes should be installed in a recess in the floor or duct so they do not present a tripping hazard.

To ensure sufficient cooling of the unit, ventilation screens and openings must remain clear. Ensure that discharge air from other units cannot be pulled into the unit.

Make sure that the inlet and pressure lines are clearly marked to avoid confusion. **Interchanged inlet and pressure lines can lead to damage to the unit and/or serious injury.**

Install a filter in the inlet pipe and replace it regularly. If particulates or debris enter the unit, the blades of the impellers can be damaged and blades could potentially break off, potentially creating a hazardous situation.

If re-starting the unit after it has been idle for a long period of time, measure the insulation resistance of the motor. If values are less than 1 k Ω per volt of nominal voltage, the winding may be too dry.

If the unit is installed or stored in an environment with a temperature of over 104°F (40°C) be aware that the winding may be damaged and the grease might need to be changed more often.

1.6 Maintenance Procedures

Before beginning work on the pump-motor unit, please take the following precautions:

- Make sure power has been completely disconnected
- Wait for the unit to come to a complete stop.
- Allow the unit time to cool.
- Shut off lines and release pressure
- Make certain that no vacuum or gauge pressure is present in the lines/tanks to be opened.
- Make sure that no fluids can escape

Please note that the rotating impeller is accessible when the inlet and discharge connections are open. Do not reach into the unit through open connections or insert objects into the unit through any openings. Serious injury could occur. If the unit is running without piping or tubing, provide the inlet and discharge of the unit with either additional mufflers or piping of a sufficient length to prevent access to the impeller.

Check regularly to ensure the terminal box is free of any dirt or foreign substances and there is no moisture or humidity present. Make certain the terminal box cover and cable entries are tightly closed.

1.7 Hot Surfaces

During operation, the surface of the unit can reach temperatures of 320° F (160° C). It is advisable to cover the unit with suitable touch protection (e.g. a perforated plate or wire cover). Do not touch the unit during operation, and allow time to cool after shut-down. Temperature-sensitive parts such as lines or electronic components should not come into contact with the surface of the unit.

1.8 Hearing Protection

Make certain any missing or defective silencers are replaced. Noise emitted by the unit can cause serious hearing damage. Conduct a noise measurement test while the unit is running. If the unit operates over 90 dB(A), please place a warning sign in the area where the unit has been installed and make certain that

any personnel working in the vicinity wear ear protection at all times while the unit is running.

1.9 Safety Guidelines for Transport of the unit:

Prior to transport and handling, please make sure that all components are properly assembled and secure. Any machinery used to transport these units must have the proper lifting capacity. Please consult the table on page 27 to find the weight of the unit being handled. Do not stand or walk under suspended loads.

If a 3BA unit has come in contact with any dangerous substances, it must be decontaminated before being sent to Airtech for repair evaluation.

2 Technical Data

These operating instructions cover the Airtech 3BA side channel vacuum pumps and compressors supplied with standard TEFC motors. Other configurations are available including V-belt driven units, units with explosion proof motors, mechanical seals, magnetic drives, coatings and modifications for high pressure service. Airtech can provide any combination of modifications to meet your application requirements. Such blowers, however, are outside the scope of this manual.

Description

All regenerative blowers are dynamic compression devices and utilize a non-contacting impeller to accelerate the gas and a specially designed housing to compress the gas. Cooling is accomplished by using the motor fan to blow air over the housing. In larger models, the housing is specially designed with cooling fins to allow a wider range of operation. Both the inlet and outlet ports have built-in silencers and mesh screens. Both the inlet and outlet have an inside connection thread corresponding to DIN ISO 228. On larger units, multiple suction and discharge connection configurations may be available.

The wetted parts are constructed of Aluminum on all models. The blower shares a bearing with the motor. The seal between the bearing and the motor is not gas tight in most models, therefore these blowers are not recommended for handling of toxic or explosive gases. (Contact Airtech Vacuum, Inc. for additional options if explosive or toxic gases will be handled.)

A full range of accessory items are available, including vacuum or pressure relief valves, check valves, suction filters, motor starters, vacuum/pressure cross-over valves, and in-line filters.

Application/Installation Environment

CAUTION! These blowers are designed for use in general industry. Suitable personnel protection according to OSHA requirements is provided, but the equipment should not be operated in residential settings.

Airtech blowers can be operated as either vacuum pumps or compressors. They are suitable for use with air having a relative humidity up to 90 percent, but not generally suitable for handling corrosive or erosive gases. Special versions for toxic or aggressive gases may be available. Use of the standard blower in aggressive environments may cause damage to the blower or exposure to gases being handled in the local environment.

CAUTION! Dangerous (flammable or explosive) or aggressive (corrosive) gases should not be handled by the standard blower.

Handling of flammable or aggressive gases and vapors may be possible by using a specially configured or modified blower. Contact factory for additional information. The standard blower is not suitable for operation in explosive environments as defined by NFPA 70. Contact factory for assistance.

CAUTION! The ambient and suction temperatures should be between 40 and 105 F. For temperatures outside this region, please contact the factory.

The maximum permissible pressure difference for vacuum or pressure is dependant on the motor rating (See Tables 1 to 4 for detailed information by model number.) and power supply frequency. The figures in Tables 1 to 4 are computed assuming an ambient temperature of 77 F (25 C) and a local barometric pressure of 1013 mbar (sea level). Operation at an ambient temperature of 104 F (40C) is the maximum permissible, and will result in a reduction of 10 percent on maximum vacuum or pressure attainable by the unit. For temperatures between 77 F and 104 F, reduce the maximum pressure reduction is a linear function of temperature.

Table 1. Three-phase, Single Stage, 50 Hertz

Model	Rated Power HP/kW	Voltage	Motor Current (Amps)	Open Flow Capacity CFM/m3/hr	Maximum Pressure (mbar)	Sound Pressure Level (dBA)
3BA1300-7AT06	.33/.25	200-240/345-415	2.1/1.2	48/82	-100/100	53
2BA1300-7AT16	.54/.4	200-240/345-415	2.6/1.5	48/82	-120/130	53
3BA1400-7AT06	.94/.7	200-240/345-415	3.8/2.2	84/142	-120/120	63
2BA1400-7AT16	1.15/.85	200-240/345-415	4.2/2.4	84/142	-160/160	63
3BA1400-7AT26	1.75/1.3	200-240/345-415	5.7/3.3	84/142	-170/200	63
3BA1500-7AT06	1.15/.85	200-240/345-415	4.2/2.4	120/204	-100/100	64
3BA1500-7AT16	1.75/1.3	200-240/345-415	5.7/3.3	120/204	-170/170	64
3BA1500-7AT26	2.15/1.6	220-250/415-460	7.5/4.3	120/204	-200/190	64
3BA1500-7AT36	2.96/2.2	200-240/345-415	9.7/5.6	120/204	-220/270	64
3BA1530-7AT16	1.75/1.3	200-240/345-415	5.7/3.3	165/280	-120/110	65
3BA1530-7AT26	2.15/1.6	200-240/345-415	7.5/4.3	165/280	-160/150	65
3BA1530-7AT36	2.96/2.2	200-240/345-415	9.7/5.6	165/280	-220/230	65
3BA1600-7AT06	2.15/1.6	200-240/345-415	8.5/4.9	188/320	-160/150	69
3BA1600-7AT16	2.96/2.2	200-240/345-415	9.7/5.6	188/320	-190/190	69
3BA1600-7AT26	4.04/3.0	200-240/345-415	12.5/7.2	188/320	-260/270	69
3BA1600-7AT36	5.4/4.0	200-240/345-415	13.0/7.5	188/320	-290/360	69
3BA1630-7AT06	2.15/1.6	200-240/345-415	8.5/4.9	240/408	-160/150	69
3BA1630-7AT16	2.96/2.2	200-240/345-415	9.7/5.6	240/408	-190/190	69
3BA1630-7AT26	4.04/3.0	200-240/345-415	12.5/7.2	240/408	-260/270	69
3BA1630-7AT36	5.4/4.0	200-240/345-415	15.6/9.0	240/408	-260/290	69
3BA1800-7AT06	5.4/4.0	200-240/345-415	15.6/9.0	280/476	-200/200	70
3BA1800-7AT16	7.4/5.5	200-240/345-415	23/13.3	280/476	-300/300	70
3BA1800-7AT26	10/7.5	200-240/345-415	29/16.7	280/476	-320/430	70
3BA1830-7AT06	5.4/4	200-240/345-415	15.6/9	400/680	-150/140	76
3BA1830-7AT16	7.4/5.5	200-240/345-415	23/13.3	400/680	-200/190	76
3BA1830-7AT26	10/7.5	200-240/345-415	29/16.7	400/680	-270/260	76
3BA1900-7AT06	10.8/8	200-240/345-415	31.5/18.2	568/965	-190/190	74
3BA1900-7AT16	16.8/12.5	200-240/345-415	48.5/28	568/965	-290/280	74
3BA1900-7AT36	25/18.5	200-240/345-415	64.5/37	568/965	-362/462	74
3BA1930-7AT16	16.8/12.5	200-240/345-415	48.5/28	744/1264	-290/280	71
3BA1930-7AT36	25/18.5	200-240/345-415	64.5/37	744/1264	-310/310	71
3BA1930-7AT36	25/18.5	200-240/345-415	64.5/37	744/1264	-310/310	71
3BA7310-0AT167	.75/.55	200-240/345-415	2.8/1.6	40/68	-250/250	57
3BA7410-0AT167	1.5/1.1	200-240/345-415	5.4/3.1	50/84	-300/380	58
3BA7510-0AT168	2/1.5	200-240/345-415	7.5/4.3	70/120	-370/650	64
3BA7510-0AT268	3/2.2	200-240/345-415	9.7/5.6	70/120	-310/430	64
3BA7610-0AT168	3/2.2	200-240/345-415	9.7/5.6	96/163	-310/430	65
3BA7610-0AT368	4.4/3.3	200-240/345-415	13/7.5	96/163	-500/750	65

Table 2. Three-phase, Single-stage, 60 Hz

Model	Rated Power HP/kW	Voltage	Motor Current (Amps)	Open Flow Capacity CFM/m3/hr	Maximum Pressure (mbar)	Sound Pressure Level (dBA)
3BA1300-7AT06	.39/.29	220-250/415-460	1.74/1.0	60/102	-100/100	56
2BA1300-7AT16	.67/.5	220-250/415-460	2.6/1.5	60/102	-150/160	56
3BA1400-7AT06	1.12/.83	220-250/415-460	3.75/2.15	105/179	-130/130	64
3BA1400-7AT16	1.28/.95	220-250/415-460	4.35/2.5	105/179	-160/160	64
3BA1400-7AT26	2/1.5	220-250/415-460	5.5/3.2	105/179	-210/200	64
3BA1500-7AT06	1.28/.95	220-250/415-460	4.35/2.5	150/255	-80/70	70
3BA1500-7AT16	2/1.5	220-250/415-460	5.5/3.2	150/255	-150/140	70
3BA1500-7AT26	2.7/2.05	220-250/415-460	7.5/4.4	150/255	-220/210	70
3BA1500-7AT36	3.4/2.55	220-250/415-460	9.0/5.3	150/255	-260/290	70
3BA1530-7AT16	2/1.5	220-250/415-460	5.7/3.3	200/340	-90/80	71
3BA1530-7AT26	2.7/2.05	220-250/415-460	7.6/4.4	200/340	-260/270	70
3BA1530-7AT36	3.4/2.55	220-250/415-460	10.3/6.0	200/340	-260/250	70
3BA1600-7AT06	2.7/2.05	220-250/415-460	7.5/4.4	235/400	-160/150	72
3BA1600-7AT16	3.4/2.55	220-250/415-460	9.0/5.3	235/400	-190/190	72
3BA1600-7AT26	4.6/3.45	220-250/415-460	12.0/6.5	235/400	-240/230	72
3BA1600-7AT36	6.1/4.6	220-250/415-460	15.2/8.5	235/400	-320/310	72
3BA1630-7AT06	2.7/2.05	220-250/415-460	7.5/4.4	300/510	-160/150	72
3BA1630-7AT16	3.4/2.55	220-250/415-460	9.0/5.3	300/510	-190/190	72
3BA1630-7AT26	4.6/3.45	220-250/415-460	12.0/6.5	300/510	-240/230	72
3BA1630-7AT36	6.1/4.6	220-250/415-460	15.2/8.5	300/510	-260/260	72
3BA1800-7AT06	6.1/4.6	220-250/415-460	15.2/8.5	350/595	-160/160	74
3BA1800-7AT16	8.4/6.3	220-250/415-460	20/11.2	350/595	-300/280	74
3BA1800-7AT26	11.5/8.6	220-250/415-460	27.5/15	350/595	-350/400	74
3BA1830-7AT06	6.2/4.6	220-250/415-460	15.2/8.5	500/850	-90/90	79
3BA1830-7AT16	8.4/6.3	220-250/415-460	20/11.2	500/850	-180/180	79
3BA1830-7AT26	11.5/8.6	220-250/415-460	27.5/15	500/850	-270/260	79
3BA1900-7AT06	12.1/9	220-250/415-460	31.5/18.2	710/1207	-150/140	79
3BA1900-7AT16	19.5/14.5	220-250/415-460	50/29	710/1207	-270/260	79
3BA1900-7AT36	28.7/21.3	220-250/415-460	68/39	710/1207	-382/422	79
3BA1930-7AT16	19.5/14.5	220-250/415-460	50/29	930/1581	-270/260	75
3BA1930-7AT36	28.7/21.3	220-250/415-460	68/39	930/1581	-300/280	75
3BA7210-0AT167	1.1/.83	220-250/415-460	3.75/2.15	35/60	-270/320	62
3BA7310-0AT167	1.1/.83	220-250/415-460	3.75/2.15	48/82	-260/250	62
3BA7410-0AT167	2/1.5	220-250/415-460	5.5/3.2	60/102	-340/370	62

When operating at altitudes above 3280 feet (1000 m) above mean sea level, contact Airtech Inc.

CAUTION! Operation of the unit outside the recommended range of pressures and ambient conditions will result in shorted operating life.

Table 3. 3 Phase, Two/Three Stage, 50 Hertz

Model	Rated Power HP/kW	Voltage	Motor Current (Amps)	Open Flow Capacity CFM/m3/hr	Maximum Pressure (mbar)	Sound Pressure Level (dBA)
3BA1310-7AT26	.94/.7	200-240/345-415	3.8/2.2	48/81.6	-120/120	55
3BA1410-7AT36	2.15/1.6	200-240/345-415	7.5/4.3	84/142.8	-200/190	66
3BA1410-7AT46	2.96/2.2	200-240/345-415	9.7/5.6	84/142.8	-320/420	66
3BA1510-7AT46	4.04/3.0	200-240/345-415	12.5/7.2	121.6/206.7	-340/410	72
3BA1510-7AT56	5.39/4.0	200-240/345-415	17.4/10	121.6/206.7	-390/440	72
3BA1610-7AT36	2.9/2.2	200-240/345-415	9.7/5.6	188/319.6	-190/190	73
3BA1610-7AT26	4.04/3.0	200-240/345-415	12.5/7.2	188/319.6	-260/270	73
3BA1610-7AT36	5.39/4.0	200-240/345-415	13.0/7.5	188/319.6	-290/360	73
3BA1610-7AT46	7.41/5.5	200-240/345-415	23/13.3	188/319.6	-420/500	73
3BA1610-7AT56	10.1/7.5	200-240/345-415	29/16.7	188/319.6	-420/610	73
3BA1640-7AT36	5.39/4.0	200-240/345-415	13.0/7.5	280/476	-290/360	74
3BA1640-7AT46	7.41/5.5	200-240/345-415	23/13.3	280/476	-420/500	74
3BA1640-7AT56	10.1/7.5	200-240/345-415	29/16.7	280/476	-420/610	74
3BA1810-7AT16	7.4/5.5	200-240/345-415	23/13.3	280/476	-420/500	74
3BA1810-7AT26	10.1/7.5	200-240/345-415	29/16.7	280/476	-320/430	74
3BA1810-7AT36	14.8/11	200-240/345-415	29/16.7	280/476	-430/600	74
3BA1810-7AT46	20.2/15	200-240/345-415	56.5/32.5	280/476	-460/670	74
3BA1840-7AT26	10.1/7.5	200-240/345-415	29.0/16.7	280/476	-320/430	74
3BA1840-7AT36	14.8/11.0	200-240/345-415	48.5/28.0	280/476	-430/600	74
3BA1910-7AT16	16.8/12.5	200-240/345-415	48.5/28	624/1061	-290/280	74
3BA1910-7AT36	26.95/20.0	200-240/345-415	69/40	624/1061	-443/502	74
3BA1910-7AT46	33.51/24.98	200-240/345-415	90/52	624/1061	-443/592	84
3BA19437AT26	20.1/15	200-240/345-415	59/34	1200/2040	-160/170	75
3BA19437AT36	26.8/20	200-240/345-415	69/40	1200/2040	-250/230	75
3BA19437AT46	33.5/25	200-240/345-415	90/52	1200/2040	-310/280	75
3BA7220-0AT567	2/1.5	200-240/345-415	7.5/4.3	28/48	-370/650	58
3BA7320-0AT467	1.5/1.1	200-240/345-415	5.4/3.1	40/68	-300/380	58
3BA7320-0AT567	2/1.5	200-240/345-415	7.5/4.3	40/68	-480/450	59
3BA7420-0AT267	2/1.5	200-240/345-415	7.5/4.3	50/84	-480/450	61
3BA7420-0AT567	4.4/3.3	200-240/345-415	13/7.5	50/84	-500/750	61
3BA7520-0AT268	3/2.2	200-240/345-415	9.7/5.6	70/120	-470/460	64
3BA7620-0AT368	4.4/3.3	200-240/345-415	13/7.5	96/163	-500/750	68
3BA7620-0AT468	5.4/4	200-240/345-415	14/8.1	96/163	-370/650	67
3BA7620-0AT568	7.5/5.5	200-240/345-415	19.9/11.5	96/163	-520/750	68
3BA7630-0AT668	10.1/7.5	200-240/345-415	29/16.7	96/163	-420/610	77

Table 4. 3 Phase, Two/Three Stage, 60 Hertz

Model	Rated Power HP/kW	Voltage	Motor Current (Amps)	Open Flow Capacity CFM/m3/hr	Maximum Pressure (mbar)	Sound Pressure Level (dBA)
3BA1310-7AT26	1.11/.83	220-250/415-460	3.75/2.15	60/102	-130/130	61
3BA1410-7AT36	2.7/2.05	220-250/415-460	7.5/4.4	105/179	-220/210	69
3BA1410-7AT46	3.4/2.55	220-250/415-460	9.0/5.3	105/179	-350/440	69
3BA1510-7AT46	4.6/3.45	220-250/415-460	12.0/6.5	152/258	-380/360	74
3BA1510-7AT56	6.1/4.6	220-250/415-460	15.2/8.5	152/258	-410/480	74
3BA1610-7AT36	3.4/2.55	220-250/415-460	9.0/5.3	235/400	-190/190	76
3BA1610-7AT26	4.6/3.45	220-250/415-460	12.0/6.5	235/400	-240/230	76
3BA1610-7AT36	6.4/4.8	220-250/415-460	16.5/9.8	235/400	-320/310	76
3BA1610-7AT46	8.4/6.3	220-250/415-460	20/11.2	235/400	-440/440	76
3BA1610-7AT56	11.5/8.6	220-250/415-460	27.5/15.0	235/400	-440/670	76
3BA1640-7AT36	6.1/4.6	220-250/415-460	15.2/8.5	350/595	-320/310	78
3BA1640-7AT46	8.4/6.3	220-250/415-460	20.0/11.2	350/595	-440/440	78
3BA1640-7AT56	11.5/8.6	220-250/415-460	27.5/15.0	350/595	-440/670	78
3BA1810-7AT16	8.4/6.3	220-250/415-460	20.0/11.2	350/595	-440/440	78
3BA1810-7AT26	11.5/8.6	220-250/415-460	27.5/15.0	350/595	-350/400	78
3BA1810-7AT36	17/12.6	220-250/415-460	50.2/29.0	350/595	-460/600	78
3BA1810-7AT46	23.3/17.3	220-250/415-460	60.0/34.5	350/595	-490/750	78
3BA1840-7AT26	11.5/8.6	220-250/415-460	27.5/15.0	350/595	-350/400	78
3BA1840-7AT36	17/12.6	220-250/415-460	50.2/29.0	350/595	-460/600	78
3BA1910-7AT16	19.5/14.5	220-250/415-460	50.0/29.0	780/1326	-270/260	84
3BA1910-7AT36	31/23	220-250/415-460	72 /42	780/1326	-443/433	84
3BA1910-7AT46	38.9/28.9	220-250/415-460	90/52	780/1326	-443/542	84
3BA19437AT26	23.4/17.5	220-250/415-460	63/36.5	1440/2447	-120/110	84
3BA19437AT36	30.8/23	220-250/415-460	72/42	1440/2447	-190/180	84
3BA19437AT46	38.8/28.9	220-250/415-460	90/52	1440/2447	-265/230	84
3BA7220-0AT567	2.7/2.05	220-250/415-460	7.5/4.4	35/60	-500/740	62
3BA7320-0AT467	2/1.5	220-250/415-460	5.5/3.2	48/82	-340/370	63
3BA7320-0AT567	2.7/2.05	220-250/415-460	7.5/4.4	48/82	-430/410	63
3BA7420-0AT267	2.7/2.05	220-250/415-460	7.5/4.4	60/102	-430/410	66
3BA7420-0AT567	5.1/3.8	220-250/415-460	13.5/7.8	60/102	-510/850	66
3BA7520-0AT268	3.4/2.55	220-250/415-460	9/5.3	84/143	-500/450	70
3BA7620-0AT368	5.1/3.8	220-250/415-460	13.5/7.8	115/196	-510/850	71
3BA7620-0AT468	6.1/4.6	220-250/415-460	15.2/8.5	115/196	-480/500	71
3BA7620-0AT568	8.4/6.6	220-250/415-460	22.5/12.6	115/196	-520/820	72
3BA7630-0AT668	11.5/8.6	220-250/415-460	27.5/15	115/196	-440/670	80

Table 5. Single Phase, 50 Hertz

Model	Rated Power HP/kW	Voltage	Motor Current (Amps)	Open Flow Capacity CFM/m3/hr	Maximum Pressure (mbar)	Sound Pressure Level (dBA)
3BA1100-7AS05	0.27/0.2	230	1.45	24/40	-60/70	50
3BA1200-7AS05	0.33/0.25	115/230	3.5/1.7	35/60	-100/100	50
3BA1300-7AS15	0.5/0.37	115/230	5.4/2.7	48/82	-110/110	53
3BA1330-7AS15	0.5/0.37	115/230	5.4/2.7	60/102	-110/110	54
3BA1400-7AS25	1.47/1.09	115/230	13/6.5	84/142	-149/189	64
3BA1410-7AS25	2/1.49	115/230	22/11	84/142.8	-279/259	66
3BA1500-7AS35	2/1.49	115/230	22/11	120/204	-189/199	64
3BA7210-0AS75	0.74/0.55	115/230	13/6.5	28/48	-229/289	57
3BA7220-0AS75	2/1.49	115/230	19.4/9.7	29/49	-371/600	57
3BA7310-0AS75	1.26/0.93	115/230	15.2/7.6	40/68	-249/351	58
3BA7320-0AS75	2/1.49	115/230	19.4/9.7	40/68	-401/550	59
3BA7410-OAS45	1.47/1.09	115/230	13/6.5	50/84	-299/381	59

Table 6. Single Phase, 60 Hertz

Model	Rated Power HP/kW	Voltage	Motor Current (Amps)	Open Flow Capacity CFM/m3/hr	Maximum Pressure (mbar)	Sound Pressure Level (dBA)
3BA1100-7AS05	0.31/0.23	230	1.3	30/51	-75/80	53
3BA1200-7AS05	0.38/0.28	115/230	5/2.8	48/82	-112/112	53
3BA1300-7AS15	0.6/0.44	115/230	6.0/3.0	60/102	-130/139	56
3BA1330-7AS15	0.6/0.44	115/230	6.0/3.0	74/126	-130/139	57
3BA1400-7AS25	1.74/1.29	115/230	14.0/7.0	105/179	-179/189	64
3BA1410-7AS25	2.35/1.75	115/230	24.0/12.0	105/179	-249/229	69
3BA1500-7AS35	2.35/1.75	115/230	24.0/12.0	150/255	-179/179	70
3BA7210-0AS75	0.84/0.63	115/230	14.2/7.1	35/60	-259/309	62
3BA7220-0AS75	2.35/1.75	115/230	20.6/10.3	35/60	-421/660	62
3BA7310-0AS75	1.47/1.09	115/230	18.0/9.0	48/82	-279/391	62
3BA7320-0AS75	2.35/1.75	115/230	20.6/10.3	48/82	-391/541	63
3BA7410-OAS45	1.74/1.29	115/230	14.0/7.0	60/102	-338/391	62

Operation of any blower is possible at 87 Hertz without modification in most cases. When using a VFD to operate the blower at this frequency, refer to the nameplate for limits on vacuum and pressure, current draw and motor performance.

If your specific model number is not listed above, please consult the nameplate on the unit for electrical data. If the model you are installing is listed above, please confirm the data on the nameplate. Data in Tables 1 through 4 is subject to change and is approximate. Be sure to confirm necessary operating data what that on the nameplate before commissioning the unit.

CAUTION! Do not operate any 3BA blower above 87 Hz without consultation with the factory. Failure of the blower motor is possible when operating out of range. Consult with the factory for assistance.

Expected temperature rise of the handled gas at maximum allowable pressure differential and when operating at sea level is indicated below:

Table 7: Single Stage – Approximate Temperature Rise

Blower Model	Maximum Rise at 50 Hz speed		Maximum Rise at 60 Hz speed	
	Degrees F	Degrees C	Degrees F	Degrees C
3BA1100-7..0.	115	64	136	76
3BA1200-7..0.	65	36	101	56
3BA1300-7..0.	90	50	77	43
3BA1300-7..1.	90	50	140	78
3BA1300-7..2.	90	50	158	88
3BA1400-7..0.	99	55	86	48
3BA1400-7..1.	129	72	122	68
3BA1400-7..2.	149	83	167	93
3BA1500-7..0.	86	48	72	40
3BA1500-7..1.	115	64	97	54
3BA1500-7..2.	138	77	122	68
3BA1500-7..3.	203	113	180	100
3BA1500-7..6.	248	138	248	138
3BA1600-7..0.	81	45	68	38
3BA1600-7..1.	145	81	104	58
3BA1600-7..2.	171	95	176	98
3BA1600-7..3.	225	125	185	103
3BA1600-7..6.	248	138	194	108
3BA1600-7..7.	248	138	248	138
3BA1800-7..0.	104	58	104	58
3BA1800-7..1.	153	85	185	103
3BA1800-7..2.	248	138	221	123
3BA1900-7..0.	97	54	95	53
3BA1900-7..1.	182	101	155	86
3BA1900-7..3.	230	128	212	118
3BA1943-7..2.	85	47	75	42
3BA1943-7..3.	130	72	100	56
3BA1943-7..4.	180	100	140	78
3BA7210-0..1..	126	70	142	79
3BA7310-0..1..	142	79	142	79
3BA7310-0..2..	178	99	187	104
3BA7410-0..1..	194	108	214	119
3BA7510-0..1..	199	111	232	129
3BA7510-0..2..	248	138	234	130
3BA7610-0..1..	244	136	255	142
3BA7610-0..3..	244	136	255	142

Table 8: Two/Three Stage – Approximate Temperature Rise

Blower Model	Maximum Rise at 50 Hz speed		Maximum Rise at 60 Hz speed	
	Degrees F	Degrees C	Degrees F	Degrees C
3BA1310-7..2.	127	71	165	92
3BA1410-7..3.	154	86	149	83
3BA1410-7..4.	181	101	180	100
3BA1510-7..4.	190	106	176	98
3BA1510-7..5.	194	108	201	112
3BA1610-7..1.	92	51	86	48
3BA1610-7..2.	129	72	118	66
3BA1610-7..3.	176	98	167	93
3BA1610-7..4.	221	123	190	106
3BA1610-7..5.	246	137	266	148
3BA1610-7..7.	176	98	167	93
3BA1610-7..8.	176	98	248	138
3BA1810-7..1.	113	63	80	45
3BA1810-7..2.	185	103	140	78
3BA1810-7..3.	248	138	248	138
3BA1910-7..1.	119	66	115	64
3BA1910-7..2.	203	113	169	94
3BA1910-7..3.	248	138	274	152
3BA1910-7..4.	248	138	274	152
3BA7220-0..2..	131	73	171	95
3BA7220-0..5..	165	92	230	128
3BA7320-0..5..	178	99	255	142
3BA7420-0..2..	192	107	176	98
3BA7420-0..5..	250	139	243	135
3BA7520-0..2..	192	107	216	120
3BA7520-0..7..	257	143	230	128
3BA7620-0..3..	255	142	259	144
3BA7620-0..5..	255	142	262	146
3BA7630-0..6..	248	138	248	138

Table 9: Tightening Torque Specifications

For non-electrical connections

Thread	Ft-lbs maximum torque	Nm maximum torque
M4	2.43	3.3
M5	3.25	4.4
M6	6.49	8.8
M8	19.47	26.4
M10	34.10	46.2
M12	56.76	77

For electrical connections

Thread	Ft-lbs torque	Nm torque
M4	0.6 to 0.9	0.8 to 1.2
M5	1.3 to 1.8	1.3 to 1.8

For metal threaded glands/unions

Thread	Ft-lbs maximum torque	Nm maximum torque
M12x1.5	3 to 4.5	4 to 6
M16x1.5	3.7 to 5.5	5 to 7.5
M20x1.5	4.4 to 6.6	6 to 9
M32x1.5	5.9 to 8.9	8 to 12
M40x1.5	5.9 to 8.9	8 to 12

For plastic threaded glands/unions

Thread	Ft-lbs maximum torque	Nm maximum torque
M12x1.5	1.5 to 2.6	2 to 3.5
M16x1.5	2.2 to 3	3 to 4
M20x1.5	3 to 3.7	4 to 5
M32x1.5	3.7 to 5.2	5 to 7
M40x1.5	3.7 to 5.2	5 to 7

Operating above the indicated maximum pressure or vacuum would overload the motor and/or overheat the unit. In addition to the maximum allowable pressure difference, careful consideration should be given to matching the motor protection devices (provided by others) to the expected current draw. In no case should the blower be operated with inadequate motor overload protection.

Since regenerative blowers are dynamic compression devices, the performance limits shown in Tables 1 to 4 are applicable only for a gas with the same specific gravity, dynamic viscosity and chemical characteristics as air. For gases with different physical properties than air, the limits will be different from those shown in the tables. Please contact Airtech for assistance in determining the proper blower size and configuration if handling gases other than air.

A vacuum relief valve or pressure relief valve should always be installed at the suction or discharge of the regenerative blower. This will prevent operation outside the applicable ranges shown in Tables 1 to 4. If the relief valves were not specified in the ordering process, please contact Airtech for details, price and availability of the needed valves before commissioning the unit. Failure to use the proper relief valve may result in failure of the blower due to operation outside the applicable limits; any such failure is outside the scope of Airtech's standard warranty.

WARNING! Be sure to install the necessary personnel protection devices if unexpected shut-down of the unit presents danger of death or injury.

3. Installation

As illustrated in Figure 1, the Airtech 3BA blower can be installed in any physical configuration.

CAUTION! Regenerative blowers can have surface temperatures in excess of 320° F. To avoid burns or other physical injury, take care to avoid contact with the surfaces of the blower during and immediately after operation.

To ensure adequate cooling of the blower during operation, install the blower with the minimum clearance as indicated in the table below.

Minimum installation clearances, 3BA blowers

Range	Distance from fan guard to closest obstruction. (inches/mm)	Distance from cover (opposite of fan) to closest obstruction. (inches/mm)
3BA11 through 3BA14	1.4/34	0.79/20
3BA15 through 3BA19	2.1/53	1.57/40
3BA72 and 3BA73	1.3/34	1.18/30
3BA74 through 3BA76	2.1/54	1.18/30

Please note that it may be desirable, where possible, to allow for larger clearances to allow access for maintenance or repair personnel. The noted clearances are to ensure adequate air flow for cooling only and are a minimum requirement.

Failure to allow for the noted clearances may result in premature failure of the blower due to lack of cooling, even if all other precautions are taken as recommended. For specific advice about installations requiring closer clearances, please contact Airtech, Inc. for recommendations.

Airtech regenerative blowers can be mounted in any configuration, either horizontally or vertically mounted. It is not usually necessary to bolt the smaller blowers to a rigid surface during operation, though this may be desirable to reduce pipe vibration, movement and noise. Larger models should be bolted in place, especially when installed vertically, to prevent possible rotation, damage or injury due to start-up torque.

CAUTION! For installations at altitudes greater than 3250 Feet above sea level there will be a loss in capacity. Please contact your factory representative for assistance in determining the extent of the loss of capacity likely at your specific location.

WARNING! Be sure to follow all local codes and regulations with respect to installation and operation of the blower. The blower motor should be wired to a branch circuit disconnect and all other safety devices recommended by the relevant sections of NFPA 70, National Electrical Code, and in accordance with all applicable state and local regulations and requirements.

3.1 Installation Procedure

Perform the installation exactly in accordance with the following steps:

1. For vacuum operation, connect the suction pipe to connection A, and for pressure operation connect the pressure pipe to connection B (See Figure 1). Install startup screens before startup to protect pump from debris.

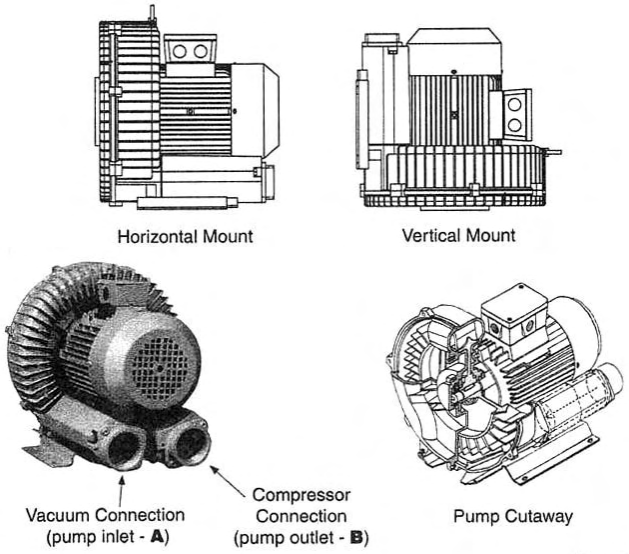


Figure 1

CAUTION! Design your piping system to avoid unnecessary pressure loss, which may significantly affect the operation of any regenerative blower. Contact your Airtech representative for assistance in designing and configuring an appropriate piping system for your application.

For alternation between vacuum and pressure in any application, changeover valves are available. Use of the changeover valve allows the same connection to be used for both vacuum and pressure.

2. The electrical data shown in Tables 1 to 4 (pages 10-14) should be confirmed by examination of the motor data plate on your 3BA blower. The standard motor features Class F insulation as a standard and are UL recognized for applications in both Canada and the United States (CUL). Motors are IEC design IP55, equal to a NEMA TEFC motor design. The connection diagram for the motors can be found in the inside of the terminal box cover. Be sure to confirm that your electrical supply has sufficient capacity to operate the blower according to the nameplate requirements.

3. A magnetic motor starter should always be used to connect the motor to the power supply. It is advisable to use thermal overload motor starters to provide maximum protection for the motor and wiring. All cabling used on starters should be secured with good quality cable clamps.

We recommend that the motor starters used feature a time delay trip on high amperage to avoid nuisance trips on start-up. When the unit is started cold, over amperage may be experienced for a short time due to the higher resistance of the windings at lower temperatures.

If using a change over or solenoid valve, ensure that the voltage connected to the valve matches that shown on the valve instructions or nameplate. Most valves are rated for 110 Volts 60Hz or 220 Volts 50 Hz. Connection of these valves to higher voltages may result in immediate valve failure.

WARNING! The electrical installation should be made by a qualified electrician and in complete compliance with all NFPA 70 (National Electrical Code) requirements along with all state and local code requirements. The main disconnect and motors starters are assumed to be provided by others.

4. Install the necessary relief valves and confirm their proper operation.

4. Start-up

CAUTION! Do not start the blower motor more than 10 times in one hour. If multiple and frequent start-ups are required by your application, install a minimum run timer in the motor control circuit to avoid decreased motor life and possible fire due to over-starting of the motor.

1.1 Start-up Procedure

1. Before operation, confirm the correct direction of rotation by jogging (switching rapidly on and off) the motor and observing the motor fan rotation in the same direction as the arrow. If the direction of rotation is incorrect, lock out the power and switch two leads (three phase) or rewire (single phase) to effect the opposite rotation direction. Recheck the direction of rotation before proceeding.

2. Do not operate the blower at pressure or vacuum ranges that exceed those shown in Tables one through four for the model being installed. This can be achieved by use of the recommended relief valve shown in Table 5.

Note: Relief valves that have been factory pre-set have a label indicating the set pressure and an arrow indicating the direction of flow. The arrow will point into the pipe when installed in vacuum applications and out of the pipe when installed in pressure applications. Do not re-set the relief valve if it has been pre-set from the factory.

In the event the relief valve setting needs to be reset, adjust the set screw to increase or decrease the tension on the spring. Place the blower in operation and note the current draw of the motor. When the current draw of the motor is near the maximum noted on the motor nameplate, tighten the locking nut on the valve and proceed.

3. When checking the current draw of the motor with an ammeter, be sure to confirm the voltage at the motor junction box. Low voltage conditions may result in difficulty starting or in unexpected motor failure or motor starter trips.

1.2 Potential Risks For Operators

Noise emission: Free field noise limits are indicated in Tables 1-4 (pages 10-14). Hearing protection is not normally required at the expected noise generation levels in the table; however, local conditions may result in higher ambient noise. If this is the case and local noise exceeds OSHA recommended levels for expected exposure time (typically 85 dBA for eight hours), hearing protection should be used.

5. Maintenance and Servicing

WARNING! Be sure the power supply is disconnected and locked out before attempting to do any maintenance on the unit. It is critical that the unit be locked out from starting during maintenance as severe injury or death could result from exposure to high voltage or rotating parts.

CAUTION! Allow the blower to cool to a surface temperature of less than 100 F before attempting maintenance. Prolonged exposure to temperatures above 120F can cause severe burns.

Clean the blower surfaces periodically to avoid build up of dust or other debris. Build up of debris can cause overheating and premature failure of the blower.

If an inlet filter is being use, ensure that it remains clean during operation by examining the filter cartridge for debris build up. Replace dirty or clogged filter cartridges.

On pressure units, periodically clean the inlet mesh screen to avoid loss of capacity. If an external inlet filter is used, the filter element should be cleaned monthly or as frequently as required by local conditions. Excessive pressure drop will develop from use of clogged or dirty filters. This pressure drop will degrade blower performance and increase operating temperatures, leading possibly to premature pump failure.

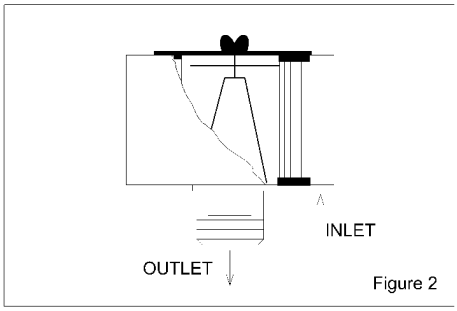


Figure 2

To replace the filter, remove the wing nut and cover. Remove the element and either clean with compressed air or replace. Reassemble in reverse order.

For vacuum applications, the optional in-line vacuum filter must be cleaned regularly, depending on local conditions. Cleaning can be achieved by blowing out with compressed air. If cleaning is not possible, replace the cartridge. Access the cartridge by unhooking the relevant clips and removing the cover.

CAUTION! Do not attempt to check the filter cartridge during operation of the blower. Only check the cartridge after disconnecting the power from the blower and locking out the power to prevent an unexpected start.

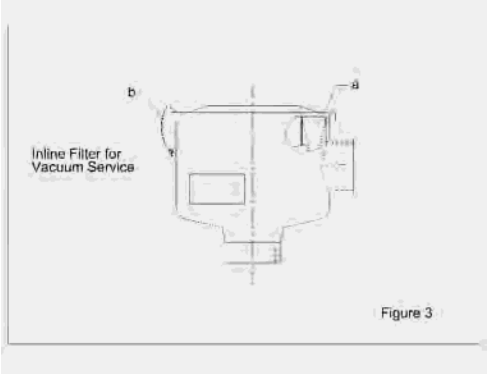


Figure 3

Bearings are grease-packed for life.

5.1 Troubleshooting Chart

Fault	Cause	Remedy	Responsible Party
Motor does not start, no noise.	Two or more power legs interrupted	Check fuses, terminals, etc.. for source of interruption and correct.	Electrician
Motor does not start, humming noise.	One power supply lead interrupted	Check fuses, terminals, etc.. for source of interruption and correct.	Electrician
	Impeller is jammed.	Open blower cover, remove debris, clean.	Service Technician
		Check impeller clearance and reset if necessary.	
	Defective Impeller	Replace impeller.	Service Technician
	Defective Bearing	Replace defective bearing.	Service Technician
Trip of motor starter at start-up	Incorrect starter setting	Ensure starter setting is correct (check current on nameplate)	Electrician
	Winding short-circuit	Megger motor	Electrician
	Motor overloaded due to operation of pump at excessive differential pressures.	Inspect filters, mufflers and connection pipes and clean as required. Check relief valve operation. Reset or replace as necessary.	Operator
	Impeller Jammed	See above fault Motor does not start, humming noise, cause jammed impeller.	Operator
Excessive Power Consumption	Lime or other deposits	Decalcify or clean unit as required (see Maintenance Chart)	Operator
No Vacuum or Pressure.	Severe leak in system	Close off pump and run deadheaded to confirm pump is operating properly. If so, find and fix leak in the system.	Operator
	Wrong direction of rotation	Check air flow direction and change direction of rotation if necessary.	Operator Electrician

Fault	Cause	Remedy	Responsible Party
Insufficient Vacuum	System too small	Use larger system	Operator
	Inlet piping too long or too small.	Increase pipe diameter to reduce pressure loss in inlet piping. Contact Airtech for assistance in determining correct pipe size.	Operator
	Leak at connection to vacuum system.	Check for leaks and repair if necessary.	Operator
	Density of gas handles different from air.	Consider increased limits on operation due to density differences. Consult Airtech, Inc. for assistance.	Airtech Engineering
	Change in impeller geometry due to erosion	Clean impeller and examine for wear. Replace if necessary.	Service Technician
	Inlet filter clogged.	Change filter element; remove clog.	Operator
	Vacuum relief valve incorrectly set.	Reset or replace vacuum relief valve. Contact Airtech for assistance.	Operator
	Seal defective.	Replace seal.	Service Technician
Abnormal flow noises.	Flow speed too high.	Clean pipes or use larger pipes to connect unit to process.	Operator
	Muffler soiled.	Clean muffler inserts, replace if necessary.	Operator
Abnormal running noise	Ball bearing defective or insufficient lubrication on bearing.	Replace bearing if required.	Service Technician
Compressor leaky	Seals on muffler defective.	Tighten muffler connection. Replace gasket if necessary.	Operator
	Seals in motor area defective	Replace as necessary.	Service Technician

WARNING! Before attempting an on-site repair, ensure that a qualified electrician has disconnected the motor from the power supply so that accidental starting of the motor is impossible.

After repairing the unit, be sure to follow the instructions noted in this manual in the **Installation** section (page 20).

5.2 Lifting

For smaller units (less than 65 lbs/ 30 kgs), it may be possible to lift the units manually. When doing so, be sure to understand the weight of the unit being lifted and to follow good lifting safety procedures.

Model	Weight Lbs/kgs	Model	Weight Lbs/kgs
3BA1300-7AT06	20/9	3BA1310-7AT26	33/15
2BA1300-7AT16	22/10	3BA1410-7AT36	55/25
3BA1400-7AT06	29/13	3BA1410-7AT46	59.5/29
3BA1400-7AT26	37.5/17	3BA1510-7AT46	86/39
3BA1500-7AT06	40/18	3BA1510-7AT56	97/44
3BA1500-7AT16	46.5/21	3BA1610-7AT26	104/47
3BA1500-7AT26	51/23	3BA1610-7AT36	119/54
3BA1500-7AT36	55/25	3BA1610-7AT46	163/74
3BA1600-7AT06	57.5/26	3BA1610-7AT56	172/78
3BA1600-7AT16	64/29	3BA1640-7AT36	128/58
3BA1600-7AT26	75/34	3BA1640-7AT46	172/78
3BA1600-7AT36	90.5/41	3BA1640-7AT56	181/82
3BA1800-7AT06	128/58	3BA1810-7AT16	250/113
3BA1800-7AT16	143/65	3BA1810-7AT26	260/118
3BA1800-7AT26	150/68	3BA1810-7AT36	316/143
3BA1900-7AT06	265/120	3BA1810-7AT46	341/155
3BA1900-7AT16	314/142	3BA1840-7AT26	260/118
3BA19437AT26	417/190	3BA1840-7AT36	316/143
3BA19437AT36	463/210	3BA1910-7AT16	409/186
3BA19437AT46	509/231	3BA1910-7AT36	455/206
3BA7210-0AT167	35.3/16	3BA1910-7AT46	500/226
3BA7310-0AT167	35.3/16	3BA7220-0AT567	61.7/28
3BA7410-0AT167	50.7/23	3BA7320-0AT567	66.1/30
3BA7510-0AT168	57.3/26	3BA7420-0AT267	72.7/33
3BA7510-0AT268	63.9/29	3BA7420-0AT567	86/39
3BA7610-0AT168	70.5/32	3BA7520-0AT268	88.2/40
3BA7610-0AT368	77.2/35	3BA7620-0AT368	106/48
		3BA7620-0AT568	143/65
		3BA7630-0AT668	207/94

When lifting 3BA15 through 3BA19 (but not 3BA1943 units) or the 3BA75 through the 3BA76, use the eye bolt provided (eye bolts are not included on smaller units). One attachment point should be sufficient. Ensure that the crane is rated for the weight being lifted.

For the 3BA1943, use the eye bolt and the holes in the feet of the blower to lift and maintain a balanced load.

5.3 Storage

The 3BA units should be stored in a clean, dry environment. If stored in an area with a humidity of greater than 80 percent, store in a closed container with desiccant drying agents to avoid damage.

5.4 Disposal

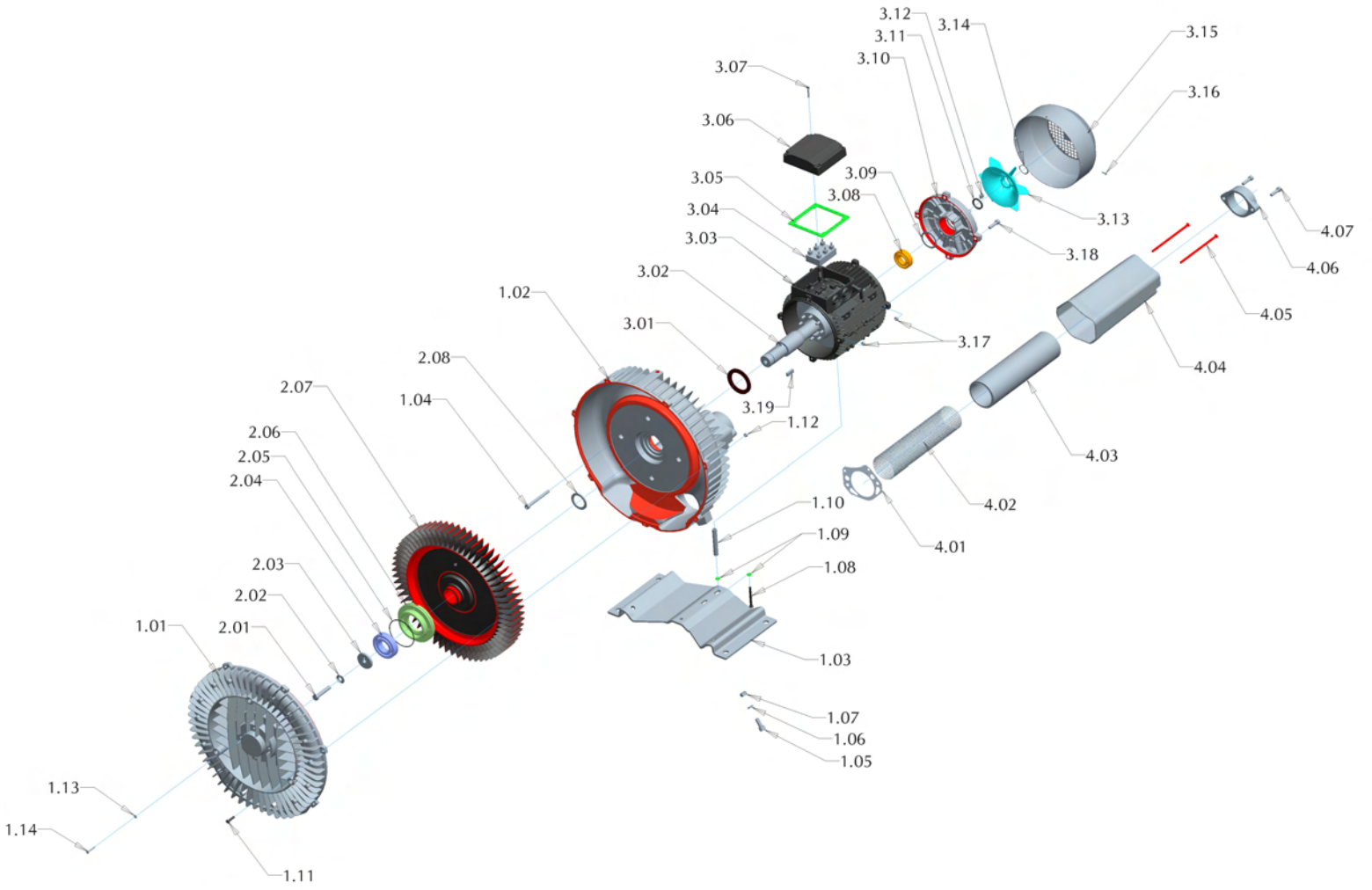
Dispose in accordance with all local health and safety regulations.

Spare parts list are available from your local Airtech service center. Please contact your local Airtech representative for assistance.

For additional assistance, please contact:

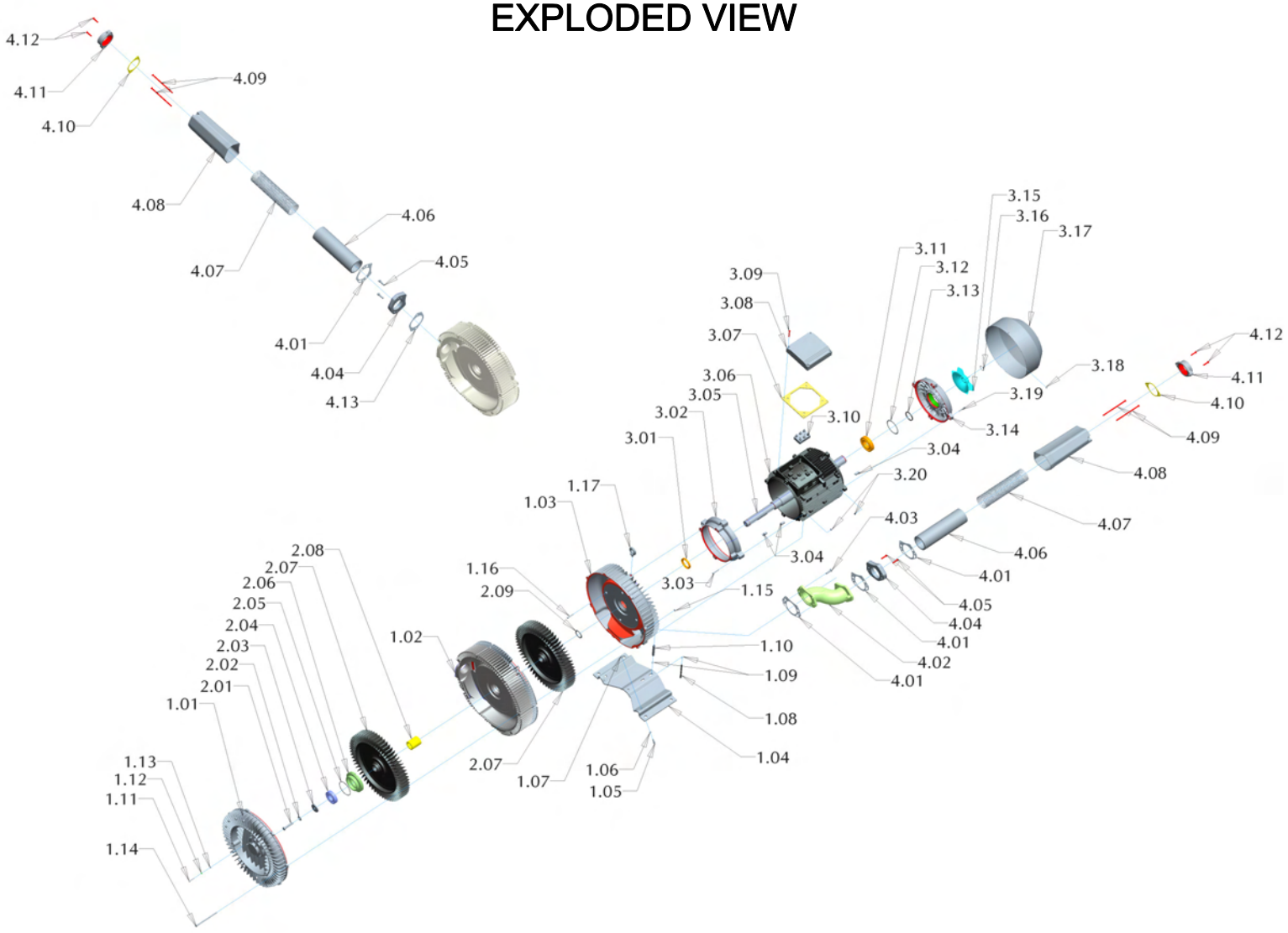
Airtech, Inc.,
301 Veterans Boulevard
Rutherford, NJ, 07070
Phone: 1-201-569-1173
Fax: 201-569-1696.

3BA1 SINGLE STAGE
EXPLODED VIEW



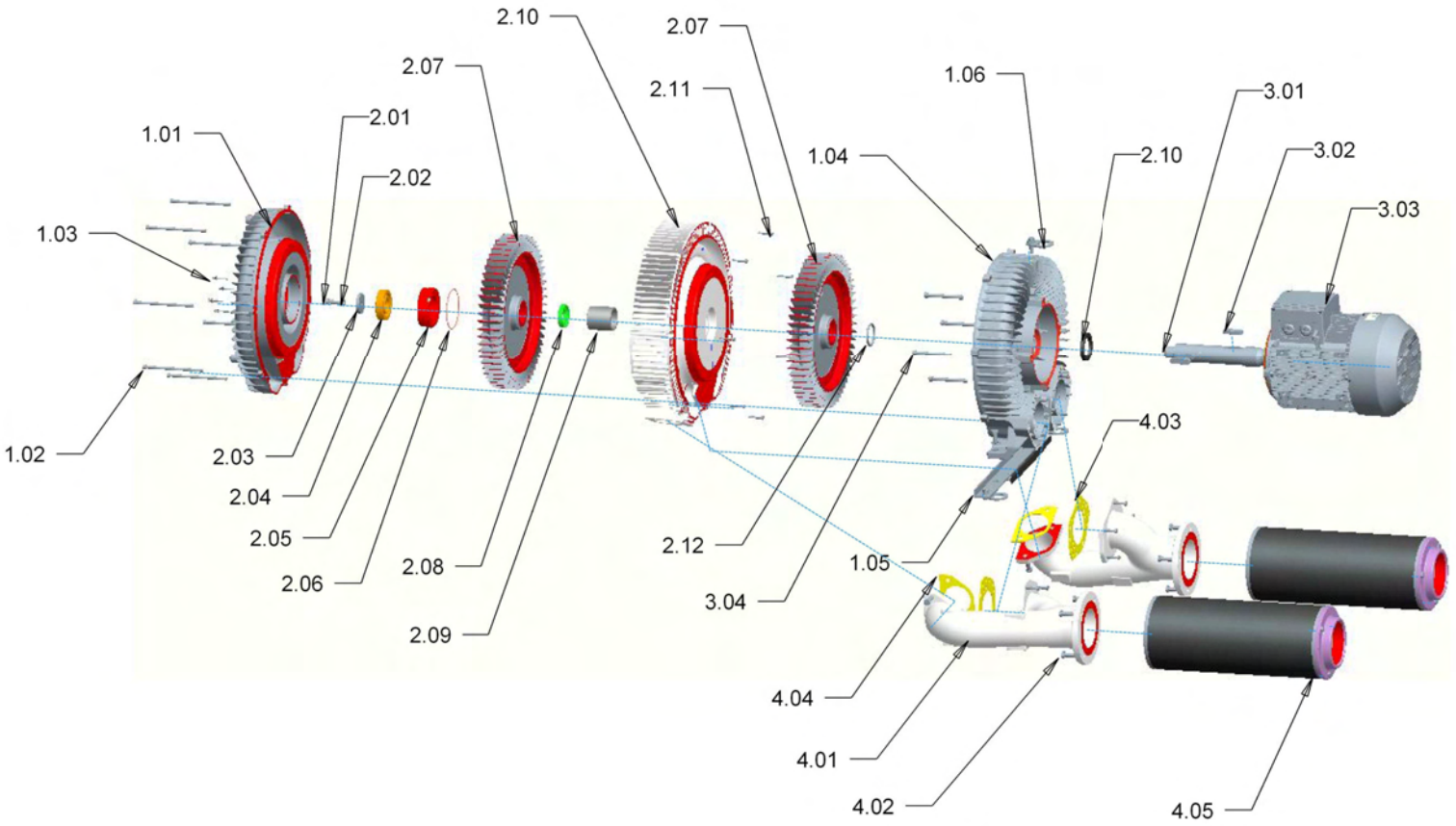
No.	Qty.	Description	No.	Qty.	Description
1.01	1	Cover	3.03	1	Stator
1.02	1	Housing	3.04	1	Terminal Block
1.03	1	Mounting Plate	3.05	1	Motor Terminal Box Gasket
1.04	4	Motor Mounting Screw	3.06	1	Cover For Terminal Box
1.05	2	Mouting Plate Screw	3.07	4	Terminal Box Cover Screw
1.06	2	Mounting Plate Washer	3.08	1	Rear Bearing
1.07	2	Mouting Plate Nut	3.09	1	Bearing Preloading Ring
1.08	1	Stator Support Screw	3.10	1	End Shield
1.09	2	Stator Support Washer	3.11	1	Tolerance Ring
1.10	1	Stator Support Sleeve	3.12	1	Shaft Key
1.11	8	Cover Mounting Screw	3.13	1	External Fan
1.12	8	Cover Mounting Nut	3.14	1	Retaining Ring
1.13	4	Bearing Cover Washer	3.15	1	Fan Cowl
1.14	4	Bearing Cover Screw	3.16	4	Fan Cowl Screw
2.01	1	Shaft Screw	3.17	8	Stator Nut
2.02	1	Shaft Lock Washer	3.18	4	End Shield Screw
2.03	1	Disc	3.19	1	Parallel Key
2.04	1	Bearing	4.01	2	Silencer Gasket
2.05	1	Bearing Cover O-Ring	4.02	2	Silencer Insert
2.06	1	Bearing Cover	4.03	2	Silencer Insert Filler
2.07	1	Impeller	4.04	2	Silencer Casing
2.08	1	Disc	4.05	4	Silencer Screw
3.01	1	Seal	4.06	2	Flange
3.02	1	Motor Rotor	4.07	4	Flange Screw

3BA1 TWO STAGE
EXPLODED VIEW



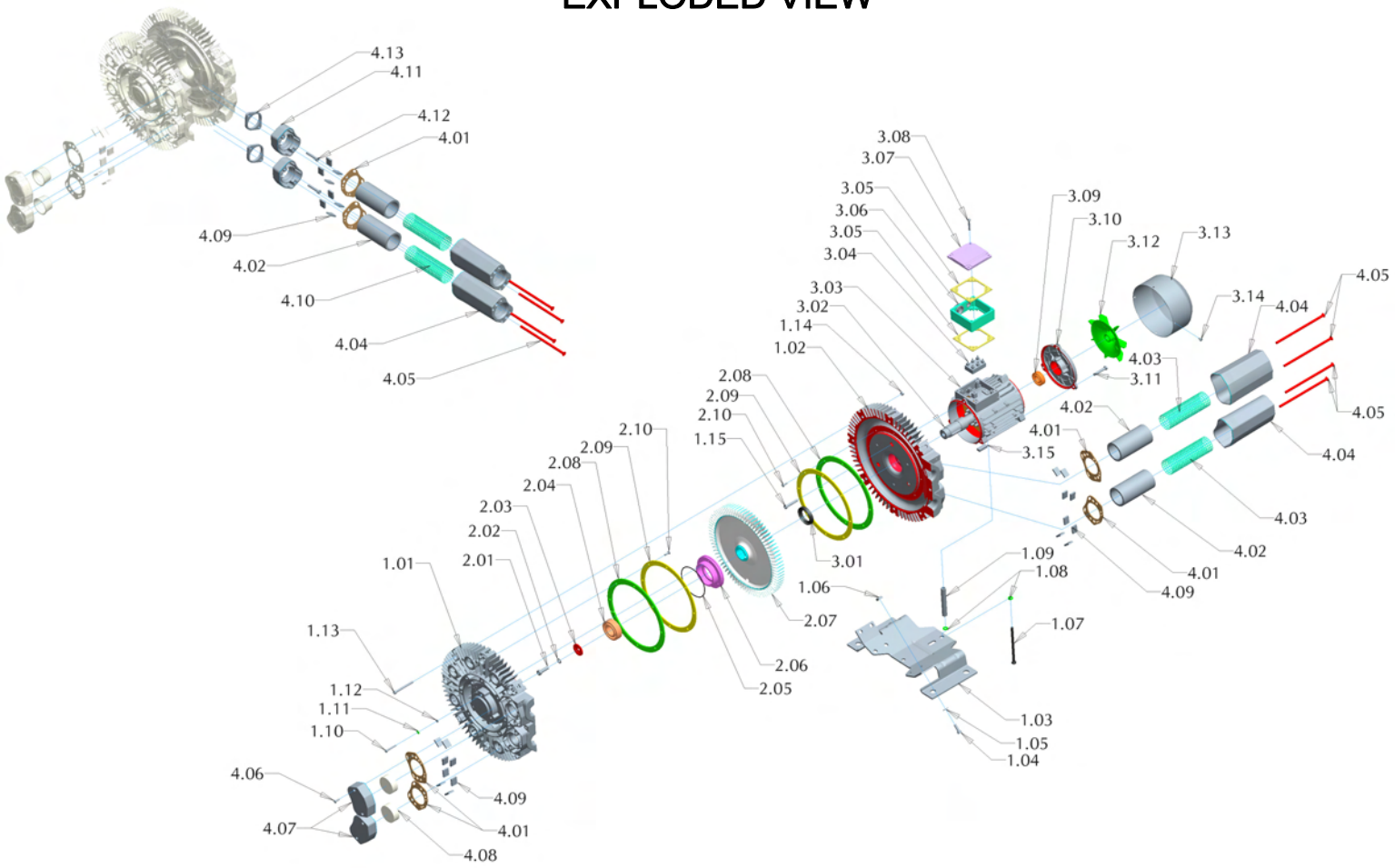
No.	Qty.	Description	No.	Qty.	Description
1.01	1	Cover	3.05	1	Motor Rotor
1.02	1	Center Section	3.06	1	Stator
1.03	1	Blower Housing	3.07	1	Motor Terminal Box Gasket
1.04	1	Mounting Plate	3.08	1	Cover For Terminal Box
1.05	2	Plate Mounting Screw	3.09	4	Terminal Box Cover Screw
1.06	2	Mouting Plate Washer	3.10	1	Terminal Block
1.07	2	Mounting Plate Nut	3.11	1	Rear Bearing
1.08	1	Stator Support Screw	3.12	1	End Shield Seal
1.09	2	Stator Support Washer	3.13	1	Rotary Shaft Lip Seal
1.10	1	Stator Support Sleeve	3.14	1	End Shield
1.11	4	Bearing Cover Screw	3.15	1	External Fan
1.12	4	Bearing Screw Washer	3.16	1	Retaining Ring
1.13	4	Bearing Ring Seal	3.17	1	Fan Cowl
1.14	8	Cover Mounting Screw	3.18	4	Fan Cowl Screw
1.15	8	Cover Mounting Nut	3.19	4	End Shield Screw
1.16	4	Motor Mounting Screw	3.20	8	Stator Nut
1.17	1	Lifting Ring	4.01	4	Silencer Gasket
2.01	1	Shaft Screw	4.02	1	Silencer Attachment
2.02	1	Shaft Lock Washer	4.03	2	Silencer Attachment Screw
2.03	1	Disc	4.04	2	Silencer Flange
2.04	1	Bearing	4.05	4	Silencer Flange Screw
2.05	1	Bearing Cover O-Ring	4.06	2	Silencer Insert Filler
2.06	1	Bearing Cover	4.07	2	Silencer Insert
2.07	2	Impeller	4.08	2	Silencer Casing
2.08	1	Sleeve	4.09	4	Silencer Screw
2.09	1	Disk	4.10	2	Flange Gasket
3.01	1	Shaft Seal Ring	4.11	2	Flnage
3.02	1	Motor Attachment	4.12	4	Flange Screw
3.03	4	Motor Attachment Screw	4.13	1	Side Silencer Gasket
3.04	3	Parallel Key			

3BA1943 TWO STAGE
EXPLODED VIEW



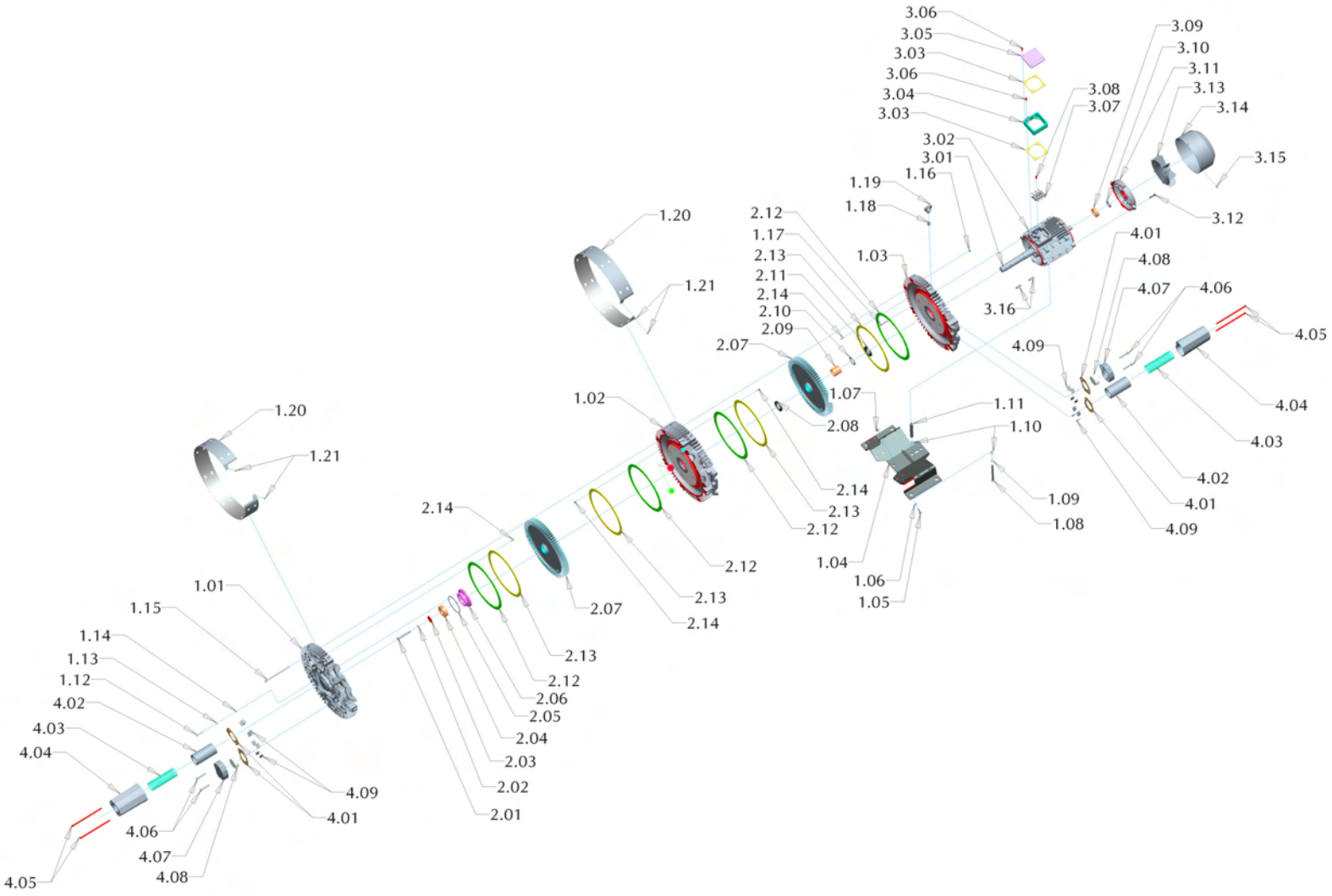
No.	Qty.	Description
1.01	1	Front Housing
1.02	7	Cover Mounting Screw
1.03	4	Bearing Cover Screw
1.04	1	Rear Housing
1.05	1	Lifting Bar
1.06	1	Lifting holder
2.01	1	Shaft Screw
2.02	1	Shaft Lock Washer
2.03	1	Disc
2.04	1	Bearing
2.05	1	Bearing Housing
2.06	1	Bearing Cover O-Ring
2.07	2	Impeller
2.08	1	Rotary Shaft Seal
2.09	1	Sleeve
2.10	1	Center Casing
2.11	7	Center Casing Cover Screw
2.12	1	Sealing Ring
3.01	1	Shaft
3.02	1	Shaft Key
3.03	1	Motor
3.04	4	Motor Screw
4.01	2	Elbow Pipe
4.02	20	Elbow Pipe Screw
4.03	2	Gasket
4.04	2	Gasket
4.05	1	Silencer Housing

3BA7 SINGLE STAGE
EXPLODED VIEW



No.	Qty.	Description	No.	Qty.	Description
1.01	1	Cover	3.03	1	Stator
1.02	1	Housing	3.04	1	Terminal Block
1.03	1	Mounting Plate	3.05	2	Motor Terminal Box Gasket
1.04	4	Plate Mounting Screw	3.06	1	Terminal Box
1.05	4	Mouting Plate Washer	3.07	1	Cover For Terminal Box
1.06	4	Mounting Plate Nut	3.08	4	Terminal Box Cover Screw
1.07	1	Stator Support Screw	3.09	1	Rear Bearing
1.08	2	Stator Support Washer	3.10	1	End Shield
1.09	1	Stator Support Sleeve	3.11	3	End Shield Screw
1.10	3	Bearing Cover Screw	3.12	1	External Fan
1.11	3	Bearing Screw Washer	3.13	1	Fan Cowl
1.12	3	Bearing Ring Seal	3.14	4	Fan Cowl Screw
1.13	8	Cover Mounting Screw	3.15	1	Parallel Key
1.14	8	Cover Mounting Nut	4.01	4	Silencer Gasket
1.15	3	Motor Mounting Screw	4.02	2	Silencer Insert Filler
2.01	1	Shaft Screw	4.03	2	Silencer Insert
2.02	1	Shaft Lock Washer	4.04	2	Silencer Casing
2.03	1	Disc	4.05	4	Silencer Screw
2.04	1	Bearing	4.06	4	Flange Screw
2.05	1	Bearing Cover O-Ring	4.07	2	Flange Cap
2.06	1	Bearing Cover	4.08	2	Flange Filler
2.07	1	Impeller	4.09	16	Filler
2.08	2	Teflon Seal	4.10	2	Silencer Insert
2.09	2	Retaining Ring	4.11	2	Flange
2.10	16	Inner Seal Screw	4.12	4	Flange Screw
3.01	1	Shaft Seal Ring	4.13	2	Flange Gasket
3.02	1	Motor Rotor			

3BA7 TWO STAGE
EXPLODED VIEW



No.	Qty.	Description	No.	Qty.	Description
1.01	1	Cover	2.10	1	Disk
1.02	1	Center Section	2.11	1	Shaft Seal Ring
1.03	1	Housing	2.12	4	Teflon Seal
1.04	1	Mounting Plate	2.13	4	Retaining Ring
1.05	4	Plate Mounting Screw	2.14	32	Inner Seal Screw
1.06	4	Mouting Plate Washer	3.01	1	Motor Rotor
1.07	4	Mounting Plate Nut	3.02	1	Stator
1.08	1	Stator Support Screw	3.03	2	Motor Terminal Box Gasket
1.09	1	Stator Support Lock Washer	3.04	1	Terminal Box
1.10	2	Stator Support Washer	3.05	1	Cover For Terminal Box
1.11	1	Stator Support Sleeve	3.06	8	Terminal Box Screw
1.12	3	Bearing Cover Screw	3.07	1	Terminal Block
1.13	3	Bearing Screw Washer	3.08	1	Terminal Block Screw
1.14	3	Bearing Ring Seal	3.09	1	Rear Bearing
1.15	8	Cover Mounting Screw	3.10	1	End Shield Disk
1.16	8	Cover Mounting Nut	3.11	1	End Shield
1.17	4	Motor Mounting Screw	3.12	4	End Shield Screw
1.18	1	Lifting Ring Nut	3.13	1	External Fan
1.19	1	Lifting Ring	3.14	1	Fan Cowl
1.20	2	Blower Cowl	3.15	4	Fan Cowl Screw
1.21	4	Blower Cowl Screw	3.16	2	Parallel Key
2.01	1	Shaft Screw	4.01	4	Silencer Gasket
2.02	1	Shaft Lock Washer	4.02	2	Silencer Insert Filler
2.03	1	Disc	4.03	2	Silencer Insert
2.04	1	Bearing	4.04	2	Silencer Casing
2.05	1	Bearing Cover O-Ring	4.05	4	Silencer Screw
2.06	1	Bearing Cover	4.06	4	Flange Screw
2.07	2	Impeller	4.07	2	Flange Cap
2.08	1	Rotary Shaft Seal	4.08	2	Flange Filler
2.09	1	Sleeve	4.09	16	Filler

Airtech, Inc. (“Company”) Warranty Statement

Company warrants that on the date of shipment to Purchaser the goods will be of the kind and quality described herein, merchantable, and free of all defects in workmanship and materials.

If within one year from the date of initial operation, but not more than eighteen months from date of shipment by the Company, of any item of the goods, Purchaser discovers that such item was not as warranted above and promptly notifies Company in writing thereof, Company shall remedy such defect by, at the Company’s option, adjustment, repair or replacement of the item and any affected part of the good. Purchaser shall assume all responsibility and expense for removal, reinstallation and freight in connection with the foregoing remedy. The same obligations and conditions shall extend to replacement items furnished by the Company hereunder. Company shall have the right of disposal of items replaced by it. Purchaser shall grant Company access to the goods at all reasonable times in order for Company to determine any defect in the goods. In the event that adjustment, repair or replacement does not remedy the defect, the Company and Purchaser shall negotiate in good faith an equitable adjustment in the contract price.

The Company’s responsibility does not extend to any item of the goods which has not been manufactured and sold by the Company. Such item shall be covered only by the express warranty, if any, by the manufacturer thereof. The Company and its suppliers shall also have no responsibility if the goods have been improperly stored, handled or installed, or if the goods have not been operated or maintained according to their ratings or according to the instructions in Company or supplier furnished manuals, or if unauthorized repairs or modifications have been made to the goods.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES (EXCEPT TITLE) INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS, AND CONSTITUTES THE ONLY WARRANTY OF COMPANY WITH RESPECT TO THE GOODS.

The forgoing states Purchaser’s exclusive remedy against Company and its suppliers for any defect in the good or for failure of the goods to be as warranted, whether Purchaser’s remedy is based on contract, warranty, failure of such remedy to achieve its essential purpose, tort (including negligence), strict liability, indemnity, or any other legal theory, and whether arising out of warranties, representations, instructions, installations, or defects from any cause.

Neither Company nor its suppliers shall be liable, whether in contract, warranty, failure of a remedy to meet its essential purpose, tort (including negligence), strict liability, indemnity or any other legal theory, for loss of use, revenue or profit or for cost of capital or of substitute use or performance or for indirect, liquidated, incidental or consequential damages or for any other loss or cost of a similar type, or for claims by Purchaser for damages of Purchaser’s customers.

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airtech@airtechusa.com

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2121 Newmarket Pkwy. Suite 110
Marietta, GA 30067
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airtechsouth@airtechusa.com

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42 Digital Drive #9
Novato, CA 94949
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Spain
Tel: +34 93 797 17 66
Fax: +34 93 797 17 54
www.hpe-technology.com

www.airtechusa.com

Moisture Separator #AWS80-4

ESD Waste2Water, Inc.
Partnership for a Cleaner Tomorrow

Air / Water Separators

ESD Waste2Water, Inc. ESD custom fabricates Air / Water Separators for Soil Vapor Extraction and Dual Phase Extraction applications. Made of structurally sound, light-weight marine grade 5052 aluminum, our separators can withstand full vacuum applications and are completely corrosion resistant. Unlike carbon steel based separators, ESD Separators resist both internal chemical corrosion and the harshest external environmental conditions. The aesthetic qualities of ESD Separators are never compromised by oxidation. ESD Separators never experience corrosive pitting leaks, because our designs render expensive internal/external epoxy mastic coatings entirely unnecessary.

ESD Separators are available in many standard sizes and can be custom designed with a wide variety of options, including pump out systems, level gauging, additional particulate filtration, and baffling for high entrained

UL® Certified to UL-508A Standards

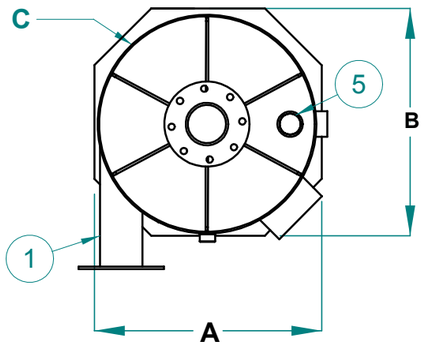
Thank you for allowing ESD to provide a solution to your equipment needs.

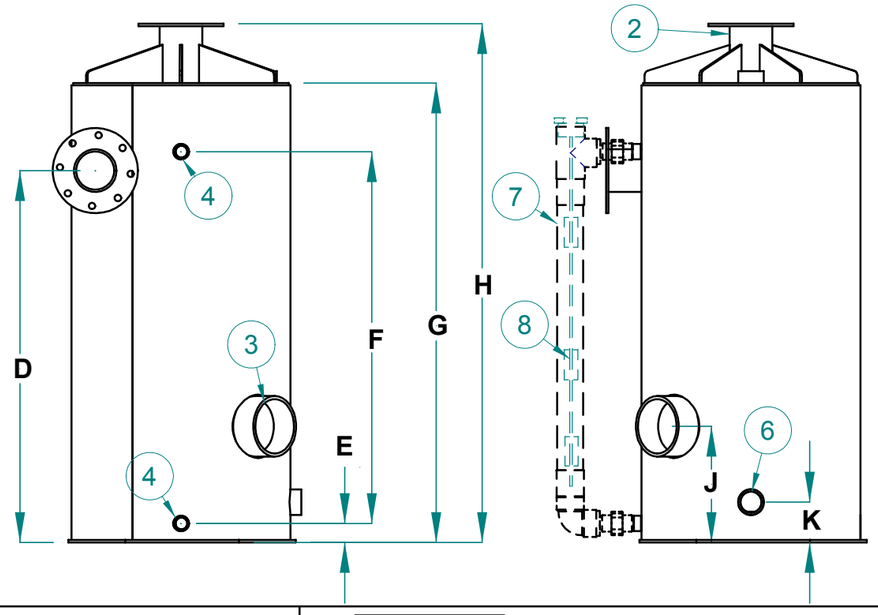
ESD Waste2Water, Inc.
495 Oak Road
Ocala, FL 34472
Tel: 800.277.3279 Fax: 352.680.9278
www.waste2water.com

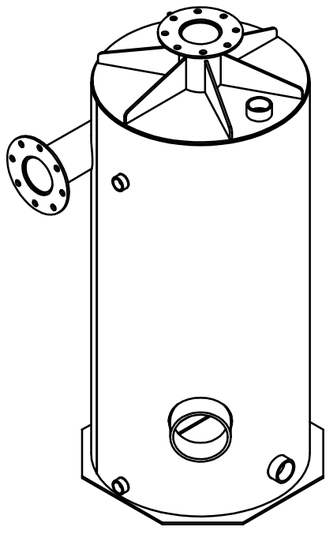
STANDARD AWS SPECIFCATION

TYPE	WORKING VOLUME @(LSH)	AVAILABLE CONNECTION TYPE																CLEAN OUT PIPE	A	B	C (DIA.)	D	E	F	G	H	J
		FLANGE						MNPT					FNPT														
		2"	3"	4"	6"	8"	10"	2"	3"	4"	6"	8"	2"	3"	4"	6"	8"										
AWS30	12 GAL	X	X	X	-	-	-	X	X	X	-	-	X	X	X	-	-	6"	-	-	16 1/4"	25"	2"	19"	30"	33 1/2"	6"
AWS60	24 GAL	X	X	X	X	-	-	X	X	X	X	-	X	X	X	-	-	6"	24"	24"	23"	25"	2"	23"	30"	36 1/2"	6"
AWS80	47 GAL	X	X	X	X	-	-	X	X	X	X	-	X	X	X	-	-	8"	24"	24"	23"	39"	2"	39"	48"	54 3/4"	12"
AWS120	50 GAL	X	X	X	X	X	-	X	X	X	X	-	X	X	X	-	-	8"	24"	24"	23"	49"	2"	49"	60"	66 3/4"	12"
AWS220	107 GAL	-	X	X	X	X	X	X	X	X	X	-	X	X	X	-	-	8"	34"	34"	33 1/2"	49"	2"	49"	60"	66 3/4"	12"

RECOMMENED AIR FLOW (ACFM)						
	2"	3"	4"	6"	8"	10" *
ACFM	120	280	320	500	750	1000







ITEM #	DESCRIPTION
1	INLET PIPE (SEE TABLE FOR AVAILABLE SIZE AND CONNECTION TYPE)
2	OUTLET PIPE (SEE TABLE FOR AVAILABLE SIZE AND CONNECTION TYPE)
3	CLEAN OUT
4	1" FNPT (MULTI LEVEL PROBE)
5	2" FNPT
6	2" FNPT
7	SIGHT TUBE 2" CLEAR PVC
8	MULTI LEVEL PROBE

NOTES:
1.MATERIAL : 1/8" & 3/16" ALUMINUM SHT 5052
2. PROBE (SIGHT TUBE) : 2" CLEAR PVC
3. CUSTOM SIZES AVAILABLE

ESD Waste2Water, Inc.

495 Oak Road
Ocala, FL 34472
Phone (800) 277-3279
Fax (352) 680-0059

SCALE VERIFCATION

THIS BAR REPRESENTS ONE INCH ON ORIGNAL DRAWING

1"

USE TO VERIFY DRAWING

SIZE: B **SHEET #:** 1 OF 1

SCALE: NTS

UPDATED BY:

DRAWN BY: J.ANDREWS

APPROVED BY: N/A

COMPLETED: 06/15/10

UPDATED:

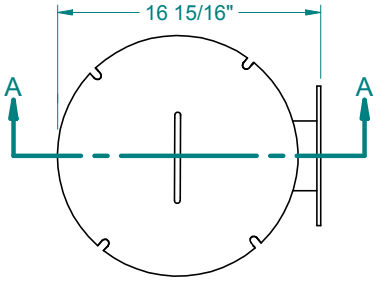
AWS SPECIFICATIONS
GENERAL LAYOUT

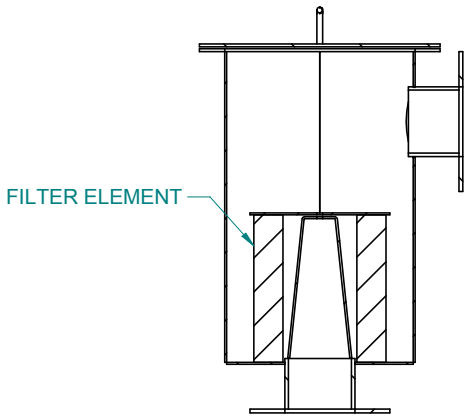
JOB NUMBER:

PRODUCT NUMBER: **AWS**

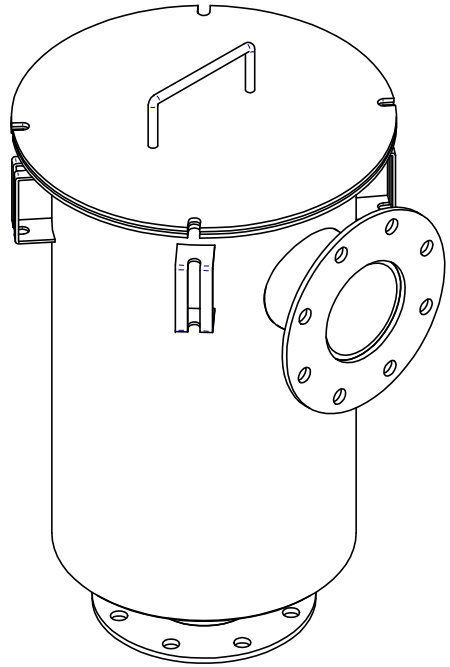
FILE NAME: "AWS SPEC.dft"

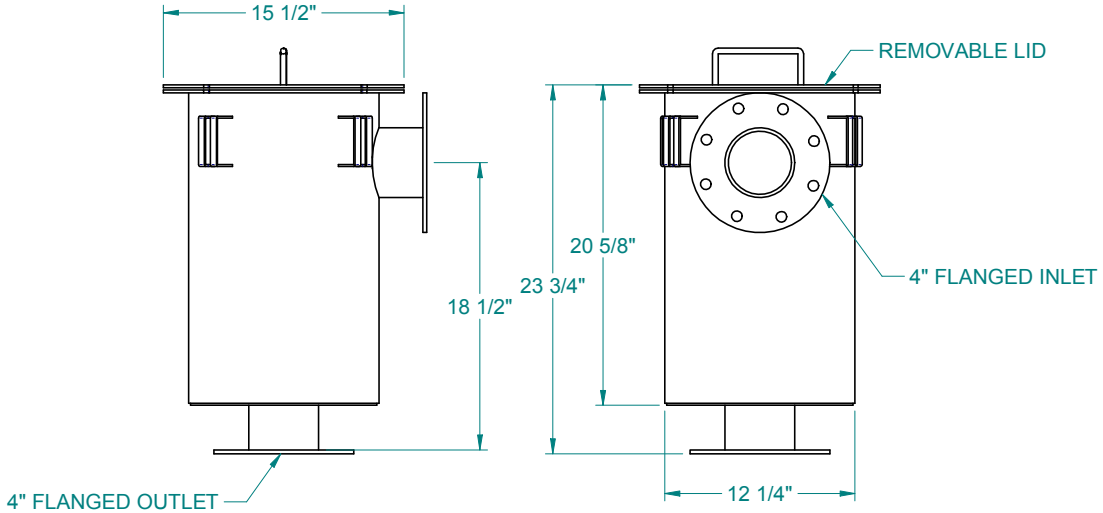
SVE Filter Housing #IPF400-F





SECTION A-A





REVISION HISTORY:		
REVISION:	DESCRIPTION:	DATE:

ESD Waste2Water, Inc.
495 Oak Road
Ocala, FL 34472
Phone (800) 277-3279
Fax (352) 680-0059

SHEET #: 1 OF 1	SIZE: B	SCALE:
DRAWN: J. Andrews		
APPROVED BY:		
UPDATED BY:		
COMPLETED: 11/27/07		

TITLE: **IPF 400 FLANGED 235 FILTER**

JOB NUMBER:

PRODUCT NUMBER: **IP05**

FILE NAME: "IPF400 Flanged 235 - PRES.dft"

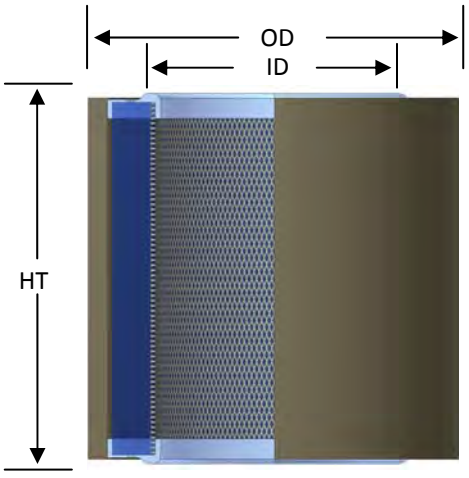
Replacement Elements
35 - 6600 SCFM Flow Range

Small Elements
with Molded Endcaps

Compact & Large Elements
with Metal Endcaps

Features

- Pleated media for high dirt holding capacity
- Polyester: Reinforced with epoxy coated steel wire on both sides of cloth
- Paper: Heavy duty industrial strength paper surrounded by heavy gauge galvanized expanded metal
- 40 - 50% increased dust loading capacity with prefilter (part number suffix P)
- Optimal surface area per given size



Technical Specifications

- Polyester: 99%+ removal efficiency to 5 micron
- Paper: 99%+ removal efficiency to 2 micron
- Temp (continuous): min -26°F (-15°C), max 220°F (104°C)
- Filter change out differential: 15-20" H2O over initial Δ P

Polyester Media Benefits

- Washable with lukewarm water & mild detergent
- Less maintenance due to longer durability
- Moisture resistant
- Handles hot air and oil mist from unload cycle of reciprocating/ piston compressor

Paper Media Benefits

- Optimal surface area per given size
- Higher efficiency than many alternative media
- Cost effective

www.solbergmfg.com • sales@solbergmfg.com • Sales: 630.773.1363 • Fax: 630.773.0727

Replacement Elements—up to 300 SCFM flow

Element Part Number		Element SCFM	Surface Area ft²		Dimensions - inches			STD Endcap
Polyester	Paper	Rating	Polyester	Paper	ID	OD	HT	Features
15P	14P	35	0.50	1.12	3	4 3/8	2 5/16	M
19P	18P	100	1.50	3.00	3	4 3/8	4 3/4	M
31P	30P	195	2.30	6.20	3 5/8	5 3/4	4 3/4	M
35P	34P	275	4.00	11.00	4 3/4	7 7/8	4 13/16	M
231P	230P	300	4.50	11.8	3 5/8	5 3/4	9 1/2	M

Note: Also available in wire mesh. Example part number for wire mesh: 230S

Dimension tolerance ± 1/4”

See Element Technical Data section for maintenance guidelines

Replacement Elements—up to 6600 SCFM flow

Element Part Number		Element SCFM	Surface Area ft²		Dimensions - inches			STD Endcap
Polyester	Paper	Rating	Polyester	Paper	ID	OD	HT	Features
235P	234P	570	8.3	22.8	4 3/4	7 7/8	9 5/8	M
335P	334P	800	12	34	4 3/4	7 7/8	14 1/2	M
237	236	550	8.6	22.6	4 2/3	7 3/4	8 1/2	GBN
239P	238P	570	11.5	52	4 7/8	9 1/4	10	GBN
245P	244P	880	14	35.5	6	9 3/4	9 5/8	GN | M
345P	344P	1100	22.1	57	6	9 3/4	14 1/2	GN
275P	274P	1100	19	45.4	8	11 3/4	9 5/8	GN
375P	374P	1500	28	68.1	8	11 3/4	14 1/2	GN
377P	376P	1825	50	125	9	14 5/8	14 1/2	GN
385P	384P	3300	50	140	14	19 5/8	14 1/2	GN
485P	484P	4705	75	200	14	19 5/8	21 1/2	GN
685P	--	6600	100	--	14	19 5/8	28 1/2	GN

Note: Most are available in wire mesh. Example part number for wire mesh: 244S

Dimension tolerance ± 1/4

See Element Technical Data section for maintenance guidelines

Endcap Information

M = Molded plastisol

B = Closed one end with **b**olt hole, open on other end

G = **G**alvanized metal endcaps

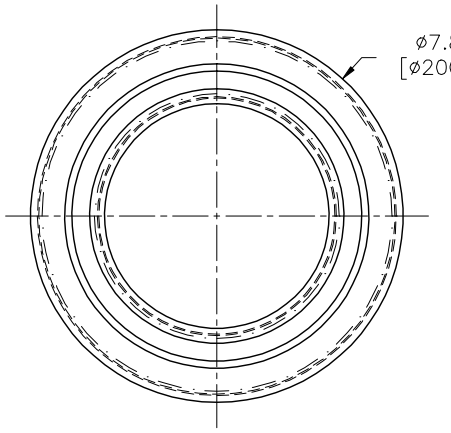
N = Neoprene gaskets on open end(s)

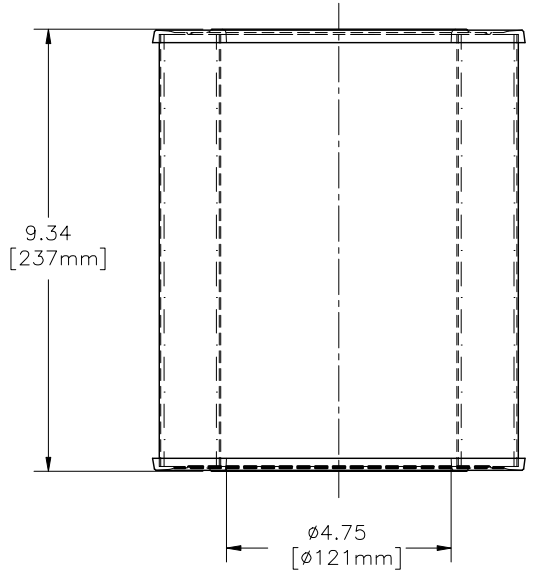
Additional Media Options

- 1, 4, 25, and 100 micron Polyester
- HEPA
- Stainless steel wire mesh
- High temperature Nomex
- Stainless steel Nomex reinforced by stainless steel wire mesh & expanded metal
- Polypropylene
- Activated carbon

Note: Model offerings and design parameters may change without notice. See www.solbergmfg.com for most current offering.

REVISIONS						
ZONE	REV	DESCRIPTION	ECN #	CHG BY	DATE	APP'D





REPLACEMENT ELEMENT# 235P	
MATERIAL	PAPER
CFM FLOW	570
SURFACE AREA	8.3 SQ. FT.
I.D.	SEE DRAWING
O.D.	SEE DRAWING
HEIGHT	SEE DRAWING

UNLESS OTHERWISE SPECIFIED:
–DIMENSIONS ARE IN INCHES
–REF: APPROXIMATE DIMENSIONS, NO TOLERANCES APPLY
–TOLERANCES ARE:
DECIMALS: .XX ±.25, .XXX ±.125
ANGLES ±2°

CUSTOMER APPROVAL:

SOLBERG MANUFACTURING INC.
1151 W. ARDMORE AVE.
ITASCA, IL 60143
630/773-1363

DESCRIPTION:
235P Element

SALES REP.: E. MURO

APPROVALS	DATE
DRAWN: CRW	11/18/03
APPROVED: T.S.	11/18/03

SHEET: 1 of 1 | SHEET SIZE: C | SCALE: 1:2

DRAWING NUMBER: SD11224 | REV: —

2. Soil Vapor Extraction Instrumentation/Switches

SVE Manifold Vacuum Gauges (0-100” H2O)
Model#25-200-100-In.H2O Vac

SVE Pressure Gauge (0-30” H2O)
Model#25-200-30-In.H2O

GENERAL INFORMATION

NOSHOK 200 Series Diaphragm Gauges are designed for extremely low pressure or vacuum measurement. The ultra sensitive diaphragm capsules are rated for pressure (or vacuum) as low as 0-10 **inches of water** and as high as 0-10 **psi**.

The cases are constructed of black painted steel on the 2 ½" size and 304 Stainless Steel on the 4" size. The lenses are molded plexiglass on the 2½" size and instrument glass on the 4" size for strength and clarity. The diaphragm capsules are phosphor bronze and when coupled to the precision all-brass movements, provide extremely accurate indication over the service life of the gauge.

Available options include a recalibrator on the 2½" size (accessible through the front of the dial) and overpressure protection of up to 200% of the dial range. Mounting options include 304 stainless steel or black steel triangular bezels and U-Clamps in addition to chrome or black steel front flanges.

Applications for **NOSHOK 200 Series Gauges** include medical, biomedical, heating-ventilating and air conditioning, gas distribution, filtration, burner and gas combustion service, waste water treatment and everywhere low pressure and vacuum measurement is required.

Installation

Prior to pressure gauge installation, the following conditions should be considered: temperature, humidity, vibration, pulsation, shock, and other climatic and environmental conditions of the application, as well as the potential need for protective accessories and/or special installation requirements.

Always use a wrench on the gauge socket when installing a NOSHOK pressure gauge into position; never use force on the gauge case to tighten into position. This may result in a loss of accuracy, excessive friction and/or mechanical damage to the measuring element and case of the NOSHOK pressure gauge. When surface or panel mounting a gauge, be sure the surface is flat and the panel cutout and/or the mounting hole configuration is correct (please refer to the NOSHOK Pressure Gauge catalog NK95G for these specifications). If the surface is uneven or the panel cutout is larger than the gauges diameter, use an adapter ring to remove mounting strain and/or adapt the gauge to the larger diameter panel cutout. When connecting a gauge to a rigid pipe service, use flexible tubing where possible as a connector to eliminate plumbing strain. Rapid pressure pulsation and extreme mechanical vibration may be damaging to some NOSHOK pressure gauge movement gearing, bushings, and linkage. In extreme cases, steps should be taken to dampen these forces. In pressure ranges over 600 psi, a NOSHOK orifice is recommended for pulsation dampening, but in extreme pulsation applications a NOSHOK Piston Type Pressure Snubber may be required.

When installing a gauge into a corrosive situation be sure to select a pressure gauge or pressure gauge and diaphragm seal combination suitable for your application. Gauges to be used on high temperature service should have a five foot or longer leg of pipe or tubing connecting the gauge to dissipate heat and protect the gauge measuring element from damage.

A gauge to be used on steam pressure service should be installed with a water filled NOSHOK pigtail steam siphon between the gauge and the steam line.

Maintenance

Apart from occasional calibration, NOSHOK pressure gauges require little or no maintenance. Some applications may be more aggressive than others, resulting in an increased frequency in the need for calibration. The environmental limitations for the specific NOSHOK pressure gauge series should be observed in all cases, and gauges applied in situations outside these requirements may result in premature wear and/or failure of the gauge.

Warranty

All NOSHOK pressure gauges carry a one or three year warranty. NOSHOK warrants for three years our 300, 500, 600, 700 and 900 series liquid filled pressure gauges to be free from defects in materials and workmanship, to remain within the cataloged accuracy and performance specifications, and to maintain the integrity of the hermetically sealed case preventing leakage. NOSHOK warrants for one year our 100, 200, 400, 600, 700, and 800 series non-liquid filled pressure gauge. Certain limitations do apply; for more information please consult page three of the NOSHOK Pressure Gauges catalog (NK95G).

Please do not hesitate to contact us with any additional questions.

The Instrumentation Company
NOSHOK INCORPORATED

1010 WEST BAGLEY ROAD
BEREA, OHIO 44017
440/243-0888 FAX 440/243-3472
E-MAIL: noshok@noshok.com
WEBSITE: www.noshok.com

ASHCROFT®

Low Pressure Diaphragm Gauge
Series 1490, ASME B 40.1
Grade A (±2-1-2% of span)

- ***2½˝ and 3½˝ dial size***
- ***Glass-filled polysulfone case material, won't rust or dent***
- ***Beryllium copper diaphragm***
- ***Brass socket***
- ***Wetted materials of beryllium copper, brass, polysulfone and RTV silicone***
- ***Exclusive autoclavable feature***

The Ashcroft® Type 1490 low pressure diaphragm gauge is designed to measure pressure from 10 in.H_2O to 15 psi, both positive and negative pressures. This gauge uses a very sensitive diaphragm capsule to measure low pressure and vacuum. The gauge is specifically designed for use whenever the pressure medium is a gas that is not corrosive to beryllium copper, brass, polysulfone and RTV silicone. The polysufone case is suitable for intermittent or continuous service on natural gas provided a .013˝ throttle plug is installed in the socket. Typical applications are, but not limited to, vacuum pumps, gas leak detectors, air compressors, air filters, gas burners, gas measurement, vacuum ovens, suction regulators and respirators.

SELECTION TABLE

DIAL SIZE		TYPE		WETTED MATERIAL		CONN. SIZE & TYPE		CONNECTION LOCATION		RANGES		OPTIONAL FEATURES	
Code	Desc.	Code	Description	Code	Description	Code	Description	Code	Description	Code	Description	Code	Description
25 35	2½˝ 3½˝	1490	Low Pressure Diaphragm Gauge	A	Beryllium Copper Brass Polysulfone RTV Silicone	01 02 HD HE HF HG HH	⅛ NPT ¼ NPT ⅛˝ I.D.Tubing Hose Barb(2,3) 3/16˝ I.D.Tubing Hose Barb(2,3) ¼˝ I.D.Tubing Hose Barb(2,3) ¼˝ O.D. Polytube Hose Barb(2,3) 10-32-2B Female Thread(2,3,5)	L B T D E	Lower Center Back Top 3 O'Clock 9 O'Clock	10 IW	0 to 10 in.H_2O See Chart for Entire List of Ranges	XAK XAN XDA XNH XNN XTU(1,3) XTS(5) XUC(2) XZY	Autoclavable(4) 1% Opt. Accuracy Dial Marking Stain. Steel Tag Paper Tag Throttle Plug Throttle Screw U-clamp FlutterGuard™

(1) A throttle plug must be installed in the socket whenever the gauge is used for intermittent or continuous service on natural gas.
(2) U-clamp furnished when hose barb or female thread is specified. **EXAMPLES: 25 1490A 02L 10 IW XNH**
(3) Throttle plug not available with hose barb or female thread connections.
(4) Autoclavacable at 275° for 30 minutes up to 5 times. Polysulfone window will be supplied.
(5) .020 throttle screw available with HH connection only.

STANDARD RANGES

Pressure	Figure Intervals	Minor Graduation
0/10 in.H_2O	1	0.1
0/15 in.H_2O	5	0.2
0/30 in.H_2O	5	0.5
0/60 in.H_2O	10	1
0/100 in.H_2O	10	1
0/160 in.H_2O	20	2
0/200 in.H_2O	20	2
0/300 in.H_2O	50	5
0/10 oz./in.²	1	0.1
0/15 oz./in.²	5	0.2
0/30 oz./in.²	5	0.5
0/60 oz./in.²	10	1
0/100 oz./in.²	10	1
0/160 oz./in.²	20	2
0/250 oz./in.²	50	5
0/3 psi	0.5	0.05
0/5 psi	1	0.1
0/10 psi	1	0.1
0/15 psi	5	0.2

STANDARD RANGES (Cont.)

Vacuum	Figure Intervals	Minor Graduation
15/0 in.H_2O	5	0.2
30/0 in.H_2O	5	0.5
60/0 in.H_2O	10	1
100/0 in.H_2O	10	1
200/0 in.H_2O	20	2
15/0 oz./in.²	5	0.2
30/0 oz./in.²	5	0.5
60/0 oz./in.²	10	1
100/0 oz./in.²	10	1
Compound		
–30/30 in.H_2O	10	1
–30/30 in.oz./in.²	10	1
–10/10 in.H_2O	2	0.2
Dual Scale		

Range		Graduations			
		Inner Scale		Outer Scale	
Inner Scale	Outer Scale	Figure Intervals	Minor Grad.	Figure Intervals	Minor Grad.
0/9 oz./in.²	0/15 in.H_2O	1	0.2	5	0.2
0/20 oz./in.²	0/35 in.H_2O	5	0.5	5	0.5
0/35 oz./in.²	0/60 in.H_2O	5	0.5	10	1
0/60 oz./in.²	0/100 in.H_2O	10	1	10	1

Other ranges available on request. Consult factory.

STANDARD METRIC RANGES

Pressure	Figure Intervals	Minor Graduation
0/60 cm. H_2O	10	1
0/2.5 kPa	0.5	0.05
0/4 kPa	1	0.1
0/10 kPa	1	0.1
0/16 kPa	2	0.2
0/25 kPa	5	0.5
0/40 kPa	10	1
0/100 kPa	10	1
Vacuum		
2.5/0 kPa	0.5	0.05
4/0 kPa	1	0.1
10/0 kPa	1	0.1
16/0 kPa	2	0.2
25/0 kPa	5	0.5
40/0 kPa	10	1
100/0 kPa	10	1
Compound		
–10/60 cm H_2O	10	1
–10/80 cm H_2O	10	1
–20/40 cm H_2O	10	1
–10/100 cm H_2O	10	1
–10/120 cm H_2O	20	2

TO ORDER THESE LOW PRESSURE DIAPHRAGM GAUGES:

Select: 25 1490 A 02L XXX 10 IW

1. Dial size – 2½ (25), 3½ (35)
2. Case type
3. Wetted material
4. Connection size – ¼ (02), ⅛ (01)
5. Connection location – Lower (L), Back (B)
6. Optional features – see page 176
7. Standard pressure range – 10 in.H_2O

Consult factory for guidance in product selection
Phone (203) 385-0217, Fax (203) 385-0602 or
visit our web site at www.ashcroft.com

DRESSER Instruments

SVE Air Flow Meter #550608

Measurement Accessories

Blower Connection Key
NPT – American National Standard Taper Pipe Thread (Male)
NPSC – American National Standard Straight Pipe Thread for Coupling (Female)
SO – Slip On (Smooth – No Threads)

Air Flow Meter

FEATURES

- Direct reading in SCFM
- Low pressure drop (2-4" typical) across the flow meter
- Non-clogging, low impedance air stream
- Light weight aluminum
- No moving parts
- Large easy-to-read dial
- Accurate within 2% at standard conditions
- Good repeatability
- Available in 2", 3" and 4" sizes
- Factory configured for quick installation
- .048" Allen key supplied for gauge adjustment

OPTIONS

- Corrosion-resistant version with Chem-Tough™ or in stainless steel
- FDA-approved Food Tough™ surface conversion

BENEFITS

- OPTIMIZE SYSTEM EFFICIENCY
  Measuring the correct air flow can assist you in fine-tuning to your system's optimal efficiency.
- BALANCE MULTI-PIPING SYSTEMS
  When evacuating CFM from more than one pipe, different run lengths or end system impedance can cause one pipe to handle more CFM than the other. With an accurate CFM reading, piping can be balanced by bleeding air in/out or by creating an extra impedance.
- DETECT CHANNELING OR PLUGGING
  For systems in which channeling or plugging can occur, a change in the CFM measured can help indicate the unseen changes in your system.

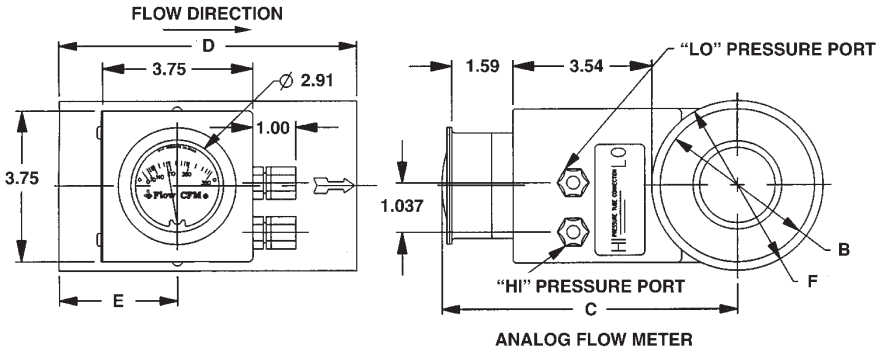
Current Models		Flow Range (SCFM)	B Threads	C Length	D Width	E	F
Model	Part #						
FM20C030Q	550599	6-30	2" - 11.5 NPSC	7.18"	7.0"	2.0"	3.75"
FM20C045Q	550600	9-45					
FM20C065Q	550601	13-65					
FM20C125Q	550602	25-125			5.6"		
FM20C175Q	550603	35-175					
FM20C225Q	550604	45-225					
FM30C250Q	550605	50-250	3" - 8 NPSC	7.52"	7.4"	2.5"	4.43"
FM30C350Q	550606	70-350					
FM30C475Q	550607	95-475					
FM40C450Q	550608	90-450	4" - 8 NPSC	8.00"	7.7"	2.7"	5.43"
FM40C600Q	550609	120-600					
FM40C850Q	550610	170-850					

Rev. 2/04

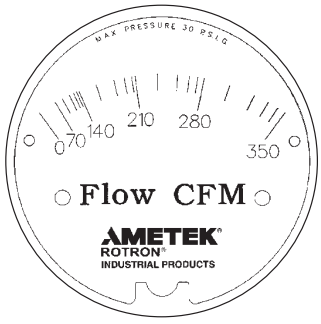
Blower Model Reference Key	
A = SPIRAL	E = DR/EN/CP 656, 6, 623, S7
B = DR/EN/CP 068, 083, 101, 202	F = DR/EN/CP 707, 808, 858, S9, P9 (Inlet Only)
C = DR/EN/CP 303, 312, 313, 353	G = DR/EN/CP 823, S13, P13 (Inlet Only)
D = DR/EN/CP 404, 454, 513, 505, 555, 523	H = DR/EN/CP 909, 979, 1223, 14, S15, P15 (Inlet Only)

Measurement Accessories

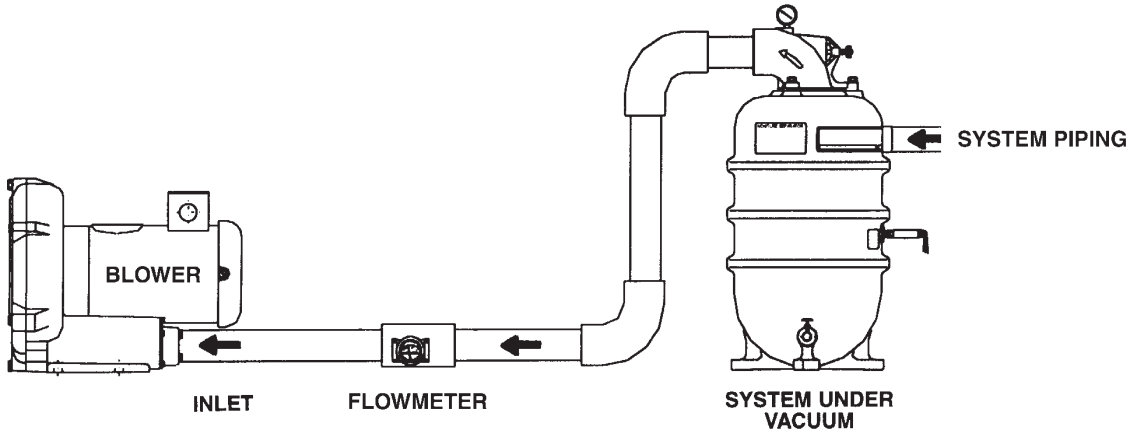
TYPICAL FLOW METER ARRANGEMENT



ANALOG FLOW METER



TYPICAL GAUGE FACE



HIGH TEMPERATURE/PRESSURE CORRECTION

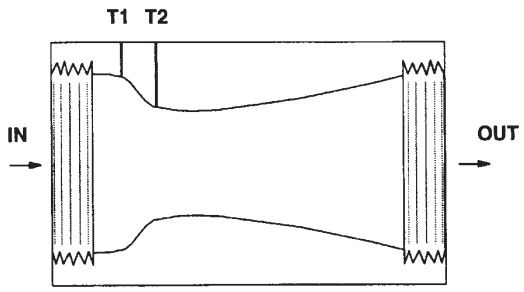
$$SCFM_2 = \frac{SCFM_1}{\sqrt{\left(\frac{14.7}{Pf_2}\right) \times \left(\frac{530}{Tf_2 + 460}\right)}}$$

Pf_2 = Absolute Pressure in PSIA

Tf_2 = Temperature in °F

- Use on inlet to limit need to correct for high pressure or elevated outlet temperature
- Standard model limits = 140°F and 30 PSIG

HOW IT WORKS



Rotron's flow meter is a venturi style design. After air enters the inlet, the pressure is measured in the T1 tap. The second tap, T2, measures the pressure at the throat. The differential between T1 and T2 registers across a special calibrated CFM gauge to provide accurate readings. The throat is then expanded back to the original size to keep pressure loss to under 2-4 IWG.

OPERATION & MAINTENANCE MANUAL

ROTRON® INDUSTRIAL PRODUCTS
75 North Street, Saugerties, NY 12477 U.S.A.
Telephone: 845 -246-3401 Fax: 845-246-3802
e-mail: rotronindustrial@ametek.com website: www.rotronindustrial.com

Air Flow Meter

Thank you for purchasing an AMETEK Rotron Flow Meter. When matched with the correct Rotron blower, and properly installed and maintained, this meter will quickly and accurately measure the pipe flow. To ensure good results, please take the time to read these instructions before starting the installation of your air flow meter.

Sizing for Optimal Efficiency

Current Models		Flow Range (SCFM)	Threads	Length	Width	Gauge Part #	Body Style	Prior Models	
Model	Part #							Model	Part #
FM20C030Q	550599	6-30	2.0" 11.5 NPSC	6.94"	5.49"	550321	A	FM20A030Q	550312
FM20C045Q	550600	9-45				550322		FM20A045Q	550313
FM20C065Q	550601	13-65				550323		FM20A065Q	550314
FM20C125Q	550602	25-125	2.0" 11.5 NPSC	5.34"	5.49"	550290	B	FM20A125Q	550256
FM20C175Q	550603	35-175				550291		FM20A175Q	550255
FM20C225Q	550604	45-225				550292		FM20A225Q	550254
FM30C250Q	550605	50-250	3.0" 8.0 NPSC	7.38"	7.62"	550293	C	FM30A250Q	550259
FM30C350Q	550606	70-350				550294		FM30A350Q	550258
FM30C475Q	550607	95-475				550295		FM30A475Q	550257
FM40C450Q	550608	90-450	4.0" 8.0 NPSC	7.68"	8.62"	550296	D	FM40A450Q	550262
FM40C600Q	550609	120-600				550297		FM40A600Q	550261
FM40C850Q	550610	170-850				550298		FM40A850Q	550260

Installation

1. **Piping** – The flow meter should be installed horizontally on the inlet side of the blower. Since this device is directional, please observe the flow direction arrow. Rotron suggests using a length of straight pipe equivalent to three to five pipe diameters prior to the meter for any elbows, valves, etc., unless there is a tee. If there is a tee, the suggested equivalent length is eight to ten pipe diameters. The flow meter should have two pipe diameters of straight pipe after the flow exits the meter before any elbows, tees, valves, etc.

2. **Continuous Service** – Moisture and debris should not be allowed to enter the tubes leading into the gauge, as it may affect the gauge. Orient the gauge between 10 o'clock and 2 o'clock when viewed from end. (See Figure 1).

   If the gauge does not read zero, gently press down on gauge cover while turning counterclockwise to remove cover. Zero the gauge with the Allen wrench and reattach cover.

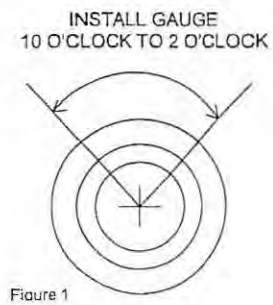


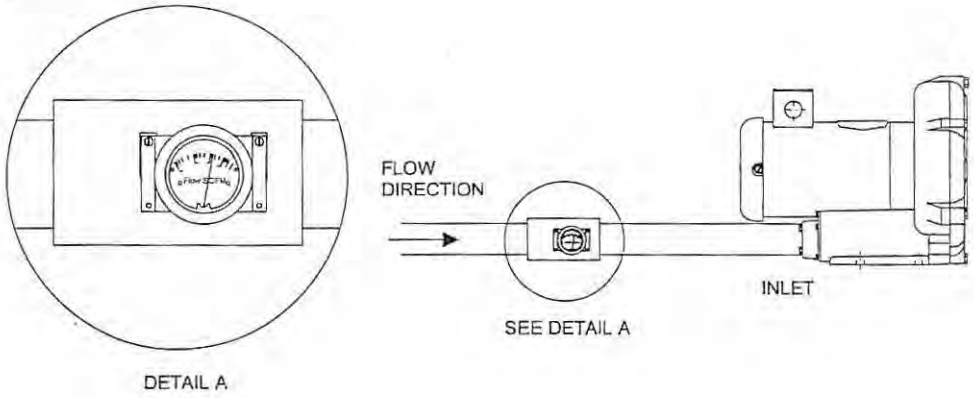
Figure 1

3. Interchangeability – Gauges within a body style are interchangeable to better match your systems actual flow rate to the Gauge Scale. For example:

Body Style	*Gauges Available*	*Flow Range Available*
A	550599	6-30 SCFM
A	550600	9-45 SCFM
A	550601	13-65 SCFM

Similar options for each body style are available **Gauges** may be purchased separately and field installed without removing the flow meter from the piping.

Typical Arrangement



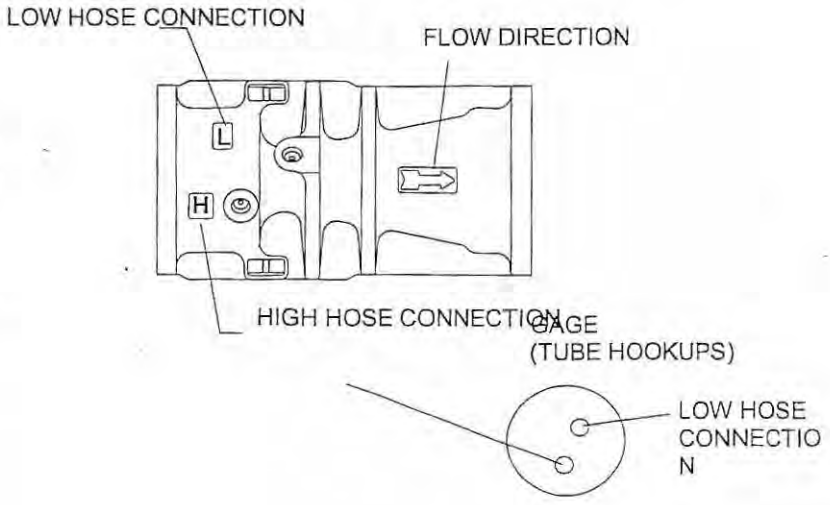
Operation

Rotron's Flow Meter is a venturi style design. After air enters the inlet, the pressure is measured in the high-pressure tap. The second tap measures the pressure at the throat. The differential between the taps registers across a specially calibrated gauge to provide accurate readings. The throat is then expanded back to the original size to keep pressure loss to under 2-4 IWG.

Maintenance

This air flow meter has been designed to require minimal maintenance. During normal operation, little maintenance is required. Care should be taken to ensure no debris enters the meter.

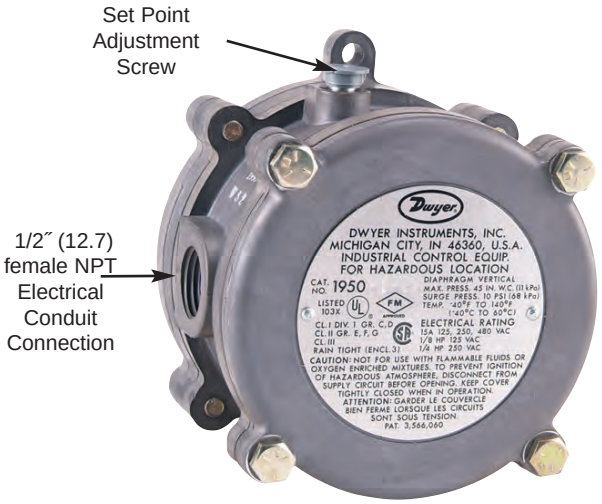
If the tubes become plugged, remove and clean. Do not switch the low and high hoses. Note proper orientation of hoses.



Bulletin E-57

Series 1950 Explosion-Proof Differential Pressure Switches

Specifications - Installation and Operating Instructions



Series 1950 Explosion-Proof Differential Pressure Switches combine the best features of the Dwyer Series 1900 Pressure Switch with an integral explosion-proof and weather-proof housing. Each unit is UL & CSA listed; FM approved for use in Class I, Groups C & D; Class II, Groups E, F, & G; and Class III atmospheres (NEMA 7 & 9). They are totally rain-tight for outdoor installations. Twelve models allow set-points from .03 to 20 inches w.c. and from .5 to 50 psi (3.4 to 345 kPa).

Easy access to the SPDT switch for electrical hook-up is provided by removing the top plate of the three-part aluminum housing. Adjustment to the set point of the switch can be made without disassembling the housing. The unit is very compact, about half the weight and bulk of equivalent conventional explosion-proof switches.

CAUTION

For use only with air or compatible gases. Use of the Model 1950 switch with explosive media connected to the Low pressure port (including differential pressure applications in such media) is not recommended. Switch contact arcing can cause an explosion inside the switch housing which, while contained, may render the switch inoperative. If switch is being used to sense a single positive pressure relative to atmosphere, run a line from the low pressure port to a non-hazardous area free of combustible gases. This may increase response time on -0 and -00 models.

NOTE: The last number-letter combination in the model number identifies the switch's electrical rating (number) and diaphragm material (letter). The 2F combination is standard as described in the physical data above. In case of special models, a number 1 rating is the same as 2; a number 3 or 4 rating is 10A 125, 250, 480 VAC; 1/8 H.P. 125 VAC; 1/4 H.P. 250 VAC; a number 5 or 6 rating is 1A 125 VAC. Letter B indicates a Buna-N diaphragm; N = Neoprene; S = Silicone; and V = Viton®.

UL and CSA Listed, FM Approved For
CL. I GR. C, D - CL. II GR. E, F, G - CL. III

Series 1950 Switches

Operating ranges and deadbands

To order specify Model Number	Operating Range: Inches, W.C.	Approximate Dead Band	
		At Min. Set Point	At Max. Set Point
1950-02-2S	0.03 to 0.10	0.025	0.05
1950-00-2F	0.07 to 0.15	0.04	0.05
1950-0-2F	0.15 to 0.5	0.10	0.15
1950-1-2F	0.4 to 1.6	0.15	0.20
1950-5-2F	1.4 to 5.5	0.3	0.4
1950-10-2F	3.0 to 11.0	0.4	0.5
1950-20-2F	4.0 to 20.0	0.4	0.6

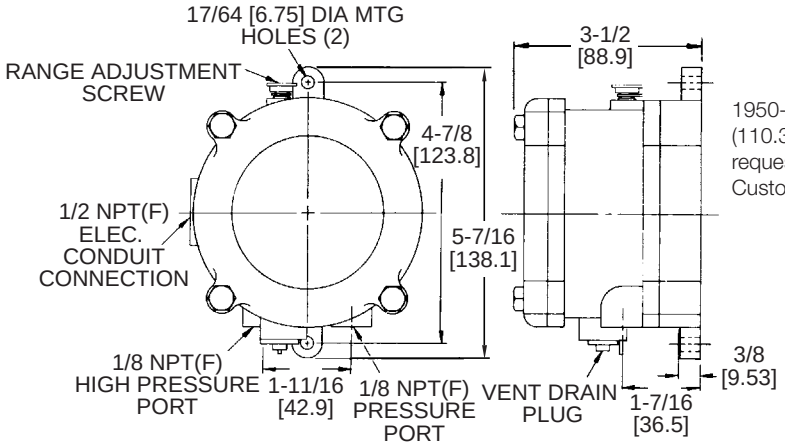
Model Number	Operating Range: PSI	Approximate Dead Band	
		Min. Set Point	Max. Set Point
1950P-2-2F	0.5 to 2.0	0.3 psi	0.3 psi
1950P-8-2F	1.5 to 8.0	1.0 psi	1.0 psi
1950P-15-2F	3.0 to 15.0	0.9 psi	0.9 psi
1950P-25-2F	4.0 to 25.0	0.7 psi	0.7 psi
1950P-50-2F	15.0 to 50	1.0 psi	1.5 psi

SPECIFICATIONS

Service: Air and non-combustible, compatible gases.
Wetted Materials: Consult factory.
Temperature Limits: -40 to 140°F (-40 to 60°C); 0 to 140°F (-17.8 to 60°C) for 1950P-8, 15, 25, and 50. -30 to 130°F (-34.4 to 54.4°C) for 1950-02.
Pressure Limits:
Continuous: 1950's - 45″ w.c. (0.11 bar);
1950P's - 35 psi (2.41 bar); 1950P-50 only - 70 psi (4.83 bar).
Surge: 1950's - 10 psi (0.69 bar), 1950P's - 50 psi (3.45 bar), 1950P-50 only - 90 psi (6.21 bar).
Enclosure Rating: IP64, NEMA 3, 7 and 9.
Switch Type: Single-pole double-throw (SPDT).
Electrical Rating: 15 A @, 125, 250, 480 VAC, 60 Hz. Resistive 1/8 HP @ 125 VAC, 1/4 HP @ 250 VAC, 60 Hz.
Electrical Connections: 3 screw type, common, normally open and normally closed.
Process Connections: 1/8″ female NPT.
Mounting Orientation: Diaphragm in vertical position. Consult factory for other position orientations.
Set Point Adjustment: Screw type on top of housing.
Weight: 3.25 lb (1.5 kg); 1950-02 model, 4.4 lb (2 kg).
Agency Approvals: CE, UL, CSA, FM.

RESPONSE TIME: Because of restrictive effect of flame arrestors, switch response time may be as much as 10-25 seconds where applied pressures are near set point.

DWYER INSTRUMENTS, INC.
P.O. BOX 373 • MICHIGAN CITY, INDIANA 46361, U.S.A.
Phone: 219/879-8000 **www.dwyer-inst.com**
Fax: 219/872-9057 **e-mail: info@dwyer-inst.com**



1950-02: 7-3/4″ (196.9) dia. x 4-11/32″ (110.3) depth. For complete dimensions request drawing 28-700175-00 from our Customer Service Department

1950 Switch Outline Dimensions

INSTALLATION

1. Select a location free from excess vibration and corrosive atmospheres where temperatures will be within the limits noted under Specifications on reverse. Switch may be installed outdoors or in areas where the hazard of explosion exists. See reverse for specific types of hazardous service.

2. Mount standard switches with the diaphragm in a vertical plane and with switch lettering and Dwyer nameplate in an upright position. Some switches are position sensitive and may not reset properly unless they are mounted with the diaphragm vertical.

3. Connect switch to source of pressure, vacuum or differential pressure. Metal tubing with 1/4″ O.D. is recommended, but any tubing which will not restrict the air flow can be used. Connect to the two 1/8″ female NPT pressure ports as noted below:

A. Differential pressures - connect pipes or tubes from source of greater pressure to high pressure port marked HIGH PRESS, and from source of lower pressure to low pressure port marked LOW PRESS.

B. Pressure only (above atmospheric pressure) - connect tube from source of pressure to high pressure port. The low pressure port is left open to atmosphere.

C. Vacuum only (below atmospheric pressure) - connect tube from source of vacuum to low pressure port. The high pressure port is left open to atmosphere.

4. To make electrical connections, remove the three hex head screws from the cover and after loosening the fourth captive screw, swing the cover aside. Electrical connections to the standard single pole, double throw snap switch are provided by means of terminals marked “COM” (common), “NO” (norm open), “NC” (norm closed). The normally open contacts close and the normally closed contacts open when pressure increases beyond the set point. Switch loads for standard models should not exceed the maximum specified current rating of 15 amps resistive. Switch capabilities decrease with an increase in ambient temperature, load inductance, or cycling rate. Whenever an application involves one or more of these factors, the user may find it desirable to limit the switched current to 10 amps or less in the interest of prolonging switch life.

ADJUSTMENT: To Change the Set point

1. Remove the plastic cap and turn the slotted Adjust-ment Screw at the top of the housing clockwise to raise the set point pressure and counter-clockwise to lower the set point. After calibration, replace the plastic cap and re-check the set point.

2. The recommended procedure for calibrating or checking calibration is to use a “T” assembly with three rubber tubing leads, all as short as possible and the entire assembly offering minimum flow restriction. Run one lead to the pressure switch, another to a manometer of known accuracy and appropriate range, and apply pressure through the third tube. Make final approach to the set point very slowly. Note that manometer and pressure switch will have different response times due to different internal volumes, lengths of tubing, fluid drainage, etc. Be certain the switch is checked in the position it will assume in use, i.e. with diaphragm in a vertical plane and switch lettering and Dwyer nameplate in an upright position.

3. For highly critical applications check the set point adjustment and if necessary, reset it as noted in step A.

MAINTENANCE

The moving parts of these switches need no maintenance or lubrication. The only adjustment is that of the set point. Care should be taken to keep the switch reasonably clean. Periodically the vent drain plug should be rotated, then returned to its original position. This will dislodge deposits which could accumulate in applications where there is excessive condensation within the switch. The Series 1950 Explosion-Proof Differential Pressure Switch is not field serviceable and should be returned if repair is needed (field repair should not be attempted and may void warranty). Be sure to include a brief description of the problem plus any relevant application notes. Contact customer service to receive a return goods authorization number before shipping.

Printed in U.S.A. 3/05 FR# 26-440332-00 Rev. 10

DWYER INSTRUMENTS, INC.
P.O. BOX 373 • MICHIGAN CITY, INDIANA 46361, U.S.A.
Phone: 219/879-8000 **www.dwyer-inst.com**
Fax: 219/872-9057 **e-mail: info@dwyer-inst.com**

Bimetal Thermometer
Model TI.20, All Stainless Steel Construction

Application

- Suitable fluid medium which does not corrode 304 stainless steel

Special features

- Back connection without external reset
- Industrial design
- All Stainless steel construction

Thermometer TI.20

Standard version

Size
2" (50.8 mm) - Type TI.20

Accuracy
± 1.0% full scale value (ASME B40.3)

Min. / Max. Ranges
-100 °F to 1000 °F (and equivalent Celsius)

Working Range
Steady: full scale value
Short time: 110% of full scale value

Under / Over Range Protection
Temporary over or under range tolerance of 50% of scale up to 500 °F (260°C). For ranges above 500°F, maximum over range is 800°F; continous. 1000°F intermittent.

Connection
Material: 304 stainless steel
Center back mount (CBM)
ı" NPT

Stem
Material: 304 stainless steel
Diameter: ı" (6.35 mm)
Length: 2 ½" to 24" (63.5 mm to 609.6 mm)

Measuring Element
Bi-metal helix

Case
Material: 304 stainless steel; hermetically sealed per ASME B40.3 standard

Dial
White aluminum, dished, with black markings

Pointer
Black aluminum

Standard Scales
Single: Fahrenheit or Celsius
Dual: Fahrenheit (outer) and Celsius (inner)

Window
Flat instrument glass

Weight
2" - 5 oz.; Add 1 oz. for every 2" of stem length

Dampening
Inert gel to minimize pointer oscillation

Order Options (min. order may apply)
Special scales and dial markings; Acrylic windows
Calibration certification traceable to NIST

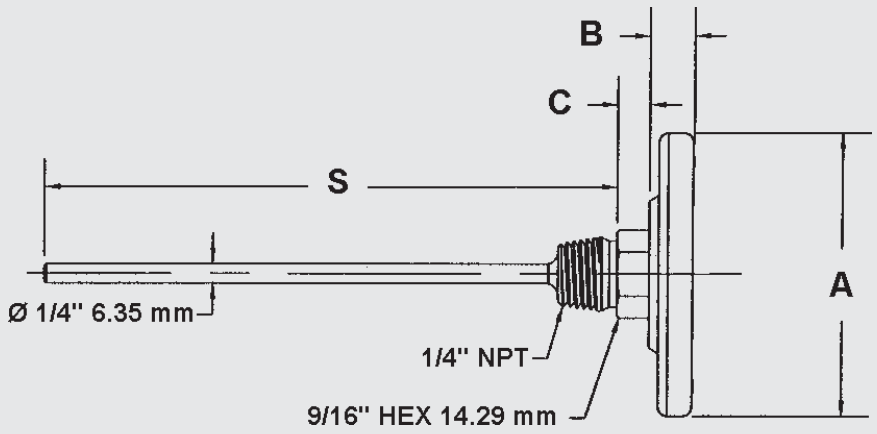
Warranty
Limited one year warranty as stated in WIKA's Terms & Conditions of Sale.

STANDARD RANGES		
Fahrenheit Single Scale	Dual Scale F & C F Outer, C Inner	Celsius Single Scale
-100/150 F	-100/150 F & -70/70 C	-50/50 C
-40/120 F-	40/120 F & -40/50 C	-20/120 C
0/140 F	0/140 F & -20/60 C	0/50 C
0/200 F	0/200 F & -15/90 C	0/100 C
0/250 F	0/250 F & -20/120 C	0/150 C
20/240 F	20/240 F & -5/115 C	0/200 C
25/125 F	25/125 F & -5/50 C[1]	0/250 C
50/300 F	50/300 F & 10/150 C	0/300 C
50/400 F	50/400 F & 10/200 C	0/450 C[1]
50/550 F	50/500 F & 10/260 C	100/550 C[1]
150/750 F	150/750 F & 65/400 C	
200/1000 F[1]	200/1000 F & 100/540 C[1]	

[1]Not recommended for continous service over 800°F (425°C)

Dimensions

Standard versions



WIKA TYPE	DIAL SIZE	A	B	C	S (Stem Length)
20	2" (50.8 mm)	2- 1/16" (52.4 mm)	7/16" (11.1 mm)	1/4" (6.4 mm)	As Specified

STEM LENGTH
2½" (63.5 mm)
4" (101.6 mm)
6" (152.4 mm)
9" (228.6 mm)
12" (304.8 mm)
15" (381.0 mm)
18" (457.2 mm)
24" (609.6 mm)

Note: Thermowells for temperature instruments are recommended for all process systems where pressure, velocity, or viscous, abrasive and corrosive materials are present individually or in combination. A properly selected thermowell protects the temperature instrument from possible damage resulting from these process variables. Furthermore, a thermowell permits removal of the temperature instrument for replacement, repair or testing without effecting the process media or the system.

Ordering information
State computer part number (if available) /type number/size/range/connection size and locations/options required. WIKA reserves the right to make changes without prior notice.

WIKA Instrument Corporation
1000 Wiegand Boulevard
Lawrenceville, GA 30043
1-888-WIKA-USA /770-513-8200 (in GA)
Fax 770-338-5118
info@wika.com www.wika.com

3. Air Sparge Equipment

Aftercooler,1/4 HP
Air Cooled Aftercooler, Maximum Compressor Power 25 HP, Voltage @ 60 hz 115/230 Volts, Maximum Current Drawn 2.4/1.2 Amps, Maximum Flow @ 100 PSI 100 CFM, Male NPT Inlet/Outlet 1 1/2 Inches, Fan Power 1/12 HP, Height 42 1/4 Inches, Depth 15 1/2 Inches, Width 26 1/8 Inches

~~Grainger Item #~~	~~**5Z760**~~
Brand	THERMAL TRANSFER
Mfr. Model # UPA-100-1	~~UPA-100-81408~~
Ship Qty.	1
Sell Qty. (Will-Call)	1
Ship Weight (lbs.)	67.7

Item	Air Cooled Aftercooler
Max. Compressor HP	25
Max. Flow CFM @ 100 PSI	100
NPT Inlet/Outlet Air (In.)	1 1/2
Min. Pressure (PSI)	80
Max. Pressure (PSI)	250
Max. Temp. (F)	350
Fan HP	1/12
Voltage	115/230
Max. Amps	2.4/1.2
Tube Material	Copper
Fin Material	Aluminum
Junction Box	Single Point Electrical
Width (In.)	26 1/8
Height (In.)	42 1/4
Depth (In.)	15 1/2
Standards	UL Listed, CSA Certified
Application	Removes Harmful Water, Oil and Contaminants from Compressed Air System
Includes	Ambient Air Filter and Mounting Legs

Please read and save these instructions. Read carefully before attempting to assemble, install, operate or maintain the product described. Protect yourself and others by observing all safety information. Failure to comply with instructions could result in personal injury and/or property damage! Retain instructions for future reference.

ThermaSys HEAT TRANSFER Thermal Transfer Products

Air-Cooled Aftercoolers

ENGLISH

Description

This Thermal Transfer air-cooled aftercooler will reduce the temperature of incoming compressed air and remove water and oil vapors.

General Safety Information

1. Do not operate aftercooler at a pressure greater than 250 PSI, or at a temperature greater than 350°F.
2. Do not touch hot compressor discharge line or aftercooler inlet manifold while compressor is in operation.
3. Release all pressure from the system prior to installing aftercooler or before servicing after installation.
4. Do not operate the aftercooler with fan guard(s) removed or remove fan guard(s) without first disconnecting the power supply.
5. All wiring must comply with all local codes. Unit MUST be grounded with appropriately sized ground wire.
6. A pressure relief valve MUST be installed between the compressor discharge and all piping.

Unpacking

After unpacking air-cooled aftercooler, legs, hardware kit and filter (not included on 5Z757& 5Z758) from box, carefully inspect all components for damage that may have occurred in transit.

Assembly

Assemble legs (or hanger brackets on 5Z761 and 5Z762 only) to the aftercooler with the hardware kit provided (See Figure 1). The 5Z757 through 5Z760 can be mounted for vertical or horizontal air flow. Be careful not to damage the finned coil surface during assembly and installation of the aftercooler.

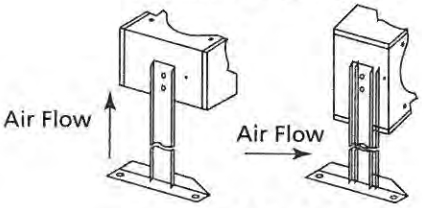
1. All models may be installed indoors or in sheltered outdoor locations. When used to reclaim waste heat, it is recommended that the unit be mounted 7-14 feet above the floor for proper heat distribution.
2. Do not locate in corrosive atmospheres or in confined spaces. Unit should be installed a minimum of 12 inches from walls or other obstructions to air flow.

⚠ CAUTION ***Use backup wrench on air connections to prevent twisting manifolds.***

3. Piping should be sized based on air flow and pressure drop requirements and not on the aftercooler's supply and return connection sizes. The piping must also be properly supported to prevent manifold stress.
4. Flexible connectors should be installed to prevent the stressing of manifolds. (Must be properly installed to validate warranty).
5. Piping should include isolation and safety valves to permit maintenance on the aftercooler.

MODELS 5Z757 & 5Z758

MODELS 5Z759 & 5Z760



MODELS 5Z761 & 5Z762

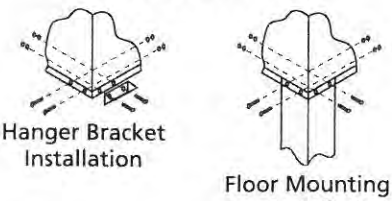


Figure 1 – Assembly Illustration

Air-Cooled Aftercoolers

Assembly (Continued)

6. Arrange the outlet pipe so that the moisture that will condense within the aftercooler can drain freely by gravity.
7. A separator/trap/drain should be installed in the outlet piping of the aftercooler to remove condensate.

Electrical

⚠ CAUTION ***To prevent possible shock, it is important to properly ground this unit using grounding screw provided.***

1. Connect motor only to a power supply of the same characteristics as shown on the motor nameplate. Be sure to provide proper fusing to prevent motor burnout.
2. In a typical compressor aftercooler installation, the aftercooler is interlocked to the compressor so it runs whenever the compressor is turned on.
3. Where ambient temperatures fall below freezing, a start-stop thermostatic fan motor control is recommended. This control should sense ambient temperatures and will help prevent moisture freezing in the tube core.

Operation

Before putting unit into operation make sure that:

1. Turn fan by hand to eliminate possible motor burnout in the event that the fan has been damaged in shipment. Observe operation after motor is started for the first time.
2. Inlet and outlet piping is connected correctly so that outlet air is directed toward separator.
3. Sufficient supply of coolest possible ambient air is available at all times.
4. Compressed air flow does not exceed the rated capacity of the aftercooler for desired approach temperature.

Maintenance

Inspect the unit regularly for loose bolts and connections, rust, and corrosion and dirty or clogged heat transfer surface (cooling coil).

HEAT TRANSFER SURFACE

Dirt and dust should be removed by brushing the fans and tubes and blowing loose dirt off with an air hose. Should the surface be greasy, the motor should be removed and the fins and tubes brushed or sprayed with a non flammable degreasing fluid. Follow with a hot water rinse and dry thoroughly. A steam hose may also be used effectively.

FILTER

Inspect and replace filter on a regular basis to prevent excessive cooling air restriction. To change filters, remove existing filter by pulling off of retaining clips (make sure retaining clips remain attached to core). Apply new filter by pressing it on to retainer clips making sure filter is secure.

Figure 2 – Filter Clip

INTERNAL CLEANING

Once a year, piping should be disconnected and a degreasing agent circulated through the unit to remove sludge from internal tube surfaces to return the unit to full capacity. A thorough cleaning of the entire system in the same manner is desirable to avoid carry-over from uncleaned piping. The strainer or any filter devices should be removed and serviced following this cleaning operation.

MOTOR

Keep outside surface free of dirt and grease so motor will cool properly. Make sure cooling air over motor is not obstructed. Sleeve bearing motors are normally furnished and require lubrication every six months. Add a few drops of SAE 20 oil to each bearing.

CASING FAN AND MOTOR

Dirt and grease should be removed from these parts. Rusty or corroded surfaces should be sanded clean and repainted.

Caustic cleaners should not be used to clean these heat exchangers.

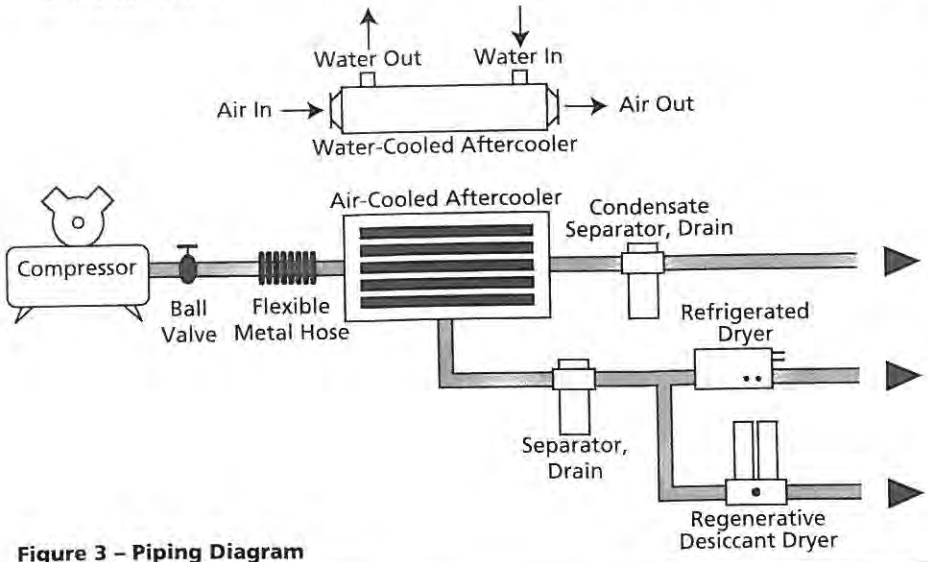


Figure 3 – Piping Diagram

Models 5Z757 through 5Z762

Specifications

Aftercooler maximum performance capacities in SCFM

Approach Temp.	200°F Inlet Temp.				250°F Inlet Temp.				300°F Inlet Temp.				350°F Inlet Temp.			
	5	10	15	20	5	10	15	20	5	10	15	20	5	10	15	20
5Z757	11	22	35	35	8	16	20	35	6	12	19	26	5	10	15	21
5Z758	17	36	43	43	12	27	35	42	10	20	31	42	8	16	26	35
5Z759	28	50	70	72	22	35	50	70	18	32	45	57	15	28	39	50
5Z760	66	111	125	125	52	88	100	125	44	74	100	125	38	64	86	108
5Z761	73	125	172	215	63	110	150	187	55	95	130	160	50	86	120	148
5Z762	120	207	285	355	100	175	240	300	84	145	204	250	78	135	185	231

Above specifications based on standard air 68°F, 36% RH, 14.7 PSIA.
Maximum pressure drop less than 3 PSI all models.

ENGLISH

Dimensions

Model	Fan Motor HP	Fan Motor Volts, 60 hZ	Inlet & Outlet	Height	Width	Depth	Approx. Shipping Weight
5Z757	1/12	115/230	.50 MPT	21.89"	20.35"	9.58"	24 lbs.
5Z758	1/12	115/230	.50	21.89	20.35	9.58	30
5Z759	1/12	115/230	1.00	42.18	26.11	15.40	61
5Z760	1/12	115/230	1.50	42.18	26.11	15.40	68
5Z761	1/4	115	1.50	46.50	43.21	18.50	140
5Z762	(2) 1/4	115	2.00	49.50	43.70	18.50	200

Troubleshooting Chart

Symptom	Possible Cause(s)	Corrective Action
Motor fails to start	1. Unit wired improperly	1. Check wiring
	2. Fan restriction	2. Check fan or fan guard for damage—repair or replace
Improper cooling	1. Dirt built up on core or on inside of tubes	1. See Maintenance instructions for cleaning procedures
	2. Dirty filter	2. See Maintenance instructions for changing procedures
	3. Air plumbed backwards	3. Check plumbing and correct
	4. Unit undersized	4. Check specifications for proper application
Leaking at connections	1. Not tight	1. Tighten carefully
	2. No thread sealant	2. Remove pipe, apply thread sealant and reinstall

For Replacement Parts call 1-800-323-0620

24 hours a day - 365 days a year

Please provide following information:
-Model number
-Serial number
-Part descriptions and number as shown in parts list

Address parts correspondence to:
Grainger Parts Operations
P.O. Box 3074
1657 Shermer Road
Northbrook, IL 60065-3074 U.S.A.

Replacement Parts List

Description	Part Number for Model 5Z757	5Z758	5Z759	5Z760	5Z761	5Z762	Qty.	5Z761 Qty.	5Z762 Qty.
Motor	67312	67312	67312	67312	66098	66098	1	1	2
Fan Guard	66832	66832	66446	66446	60406	60406	1	1	2
Fan Blade	66468	66468	66468	66468	65531	65531	1	1	2
Motor Mount	66838	66838	42720	42720	—	—	1	part of cabinet	part of cabinet
Cabinet Assembly with Legs	81847	81847	81846	81846	66914	66915	1	1	1
Replacement Filter	—	—	66910	66910	66911	66912	1	1	1
Filter Retainer	—	—	66906	66906	66906	66906	1	4	4
Filter Retainer Disc	—	—	66909	66909	66909	66909	1	4	4
Core Assembly	66829	66830	66467	66465	45974	45981	1	1	1

Notes

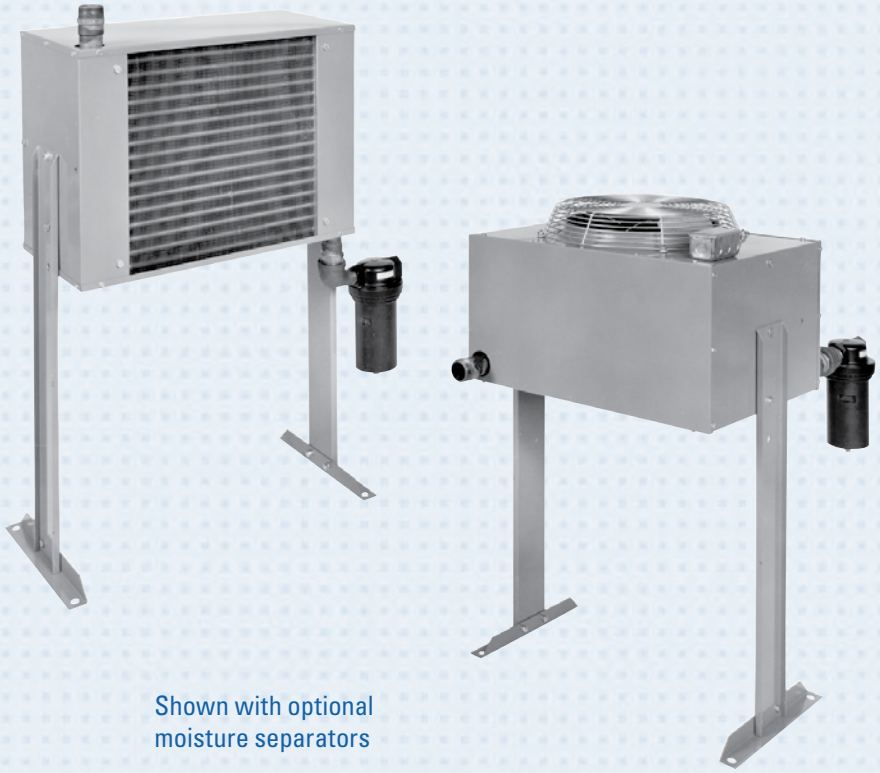
Manufactured by Thermal Transfer Products
Racine, Wisconsin 53406 U.S.A.

ThermaSys HEAT TRANSFER Thermal Transfer Products

COPPER TUBE CONSTRUCTION

Features

- **Full Line of Sizes and Features**
- **Energy Efficient**
- **High Performance**
- **Low flows to 100 CFM**
- Horizontal or Vertical Air Flow
- Lightweight, may be Shipped UPS
- Ratings Based on Comprehensive Testing
- Attractive, Durable Baked Enamel Finish
- Floor or Suspended Mounting



Shown with optional moisture separators

Ratings

Maximum Operating Pressure 250 PSIG
Maximum Operating Temperature 350° F

Materials

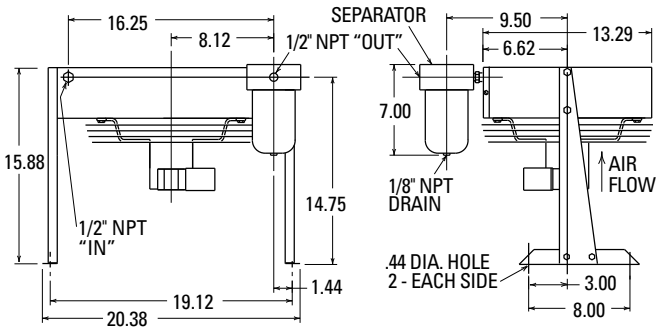
Cabinet Steel with Baked Enamel Finish
Core Aluminum Fins on Copper Tubes
Fan Heave Gauge Aluminum with Steel Hub
Motor Open Vented
Fan Guard Zinc Chromate Plated Steel

How to Order

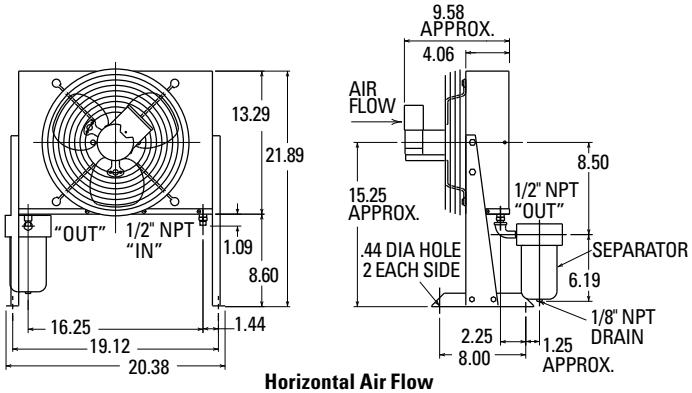
UPA	–	
Model Series UPA		Model Size Selected

Dimensions

Models UPA-20 & UPA-35

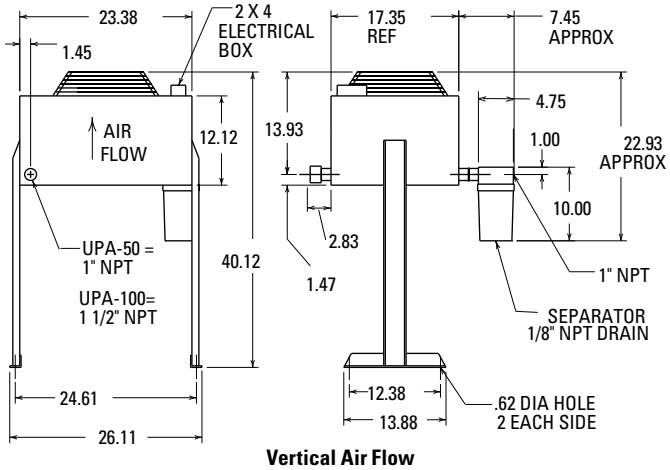


Vertical Air Flow

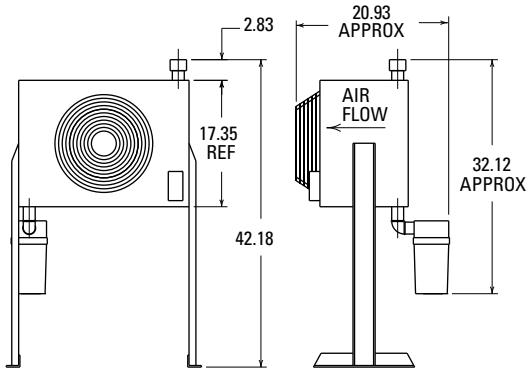


Horizontal Air Flow

Models UPA-50 & UPA-100



Vertical Air Flow



Horizontal Air Flow

Note: We reserve the right to make reasonable design changes without notice. All dimensions are in inches.

Capacity Selection Chart Max. SCFM @ 5, 10, 15 and 20°F Approach

Inlet Temp. °F		150				200				250				300				350				Recommended Optional Separator Model Number
Approach Temp. °F		5	10	15	20	5	10	15	20	5	10	15	20	5	10	15	20	5	10	15	20	
Model Number	UPA-20	17	35*	35*	35*	11	22	35	35*	8	16	20	35	6	12	19	26	5	10	15	21	S-50M or AD
	UPA-35	29	43*	43*	43*	17	36	43*	43*	12	27	35	42*	10	20	31	42*	8	16	26	35	
	UPA-50	43	72	72*	72*	28	50	70	72*	22	35	50	70	18	32	45	57	15	28	39	50	S-100M or AD
	UPA-100	95	125*	125*	125*	66	111	125*	125*	52	88	100	125*	44	74	100	125	38	64	86	108	

Above specifications are based on 80 to 125 PSIG operating pressures. Maximum pressure drop, less than 3 psi.
A flexible metal hose must be properly installed between the compressor and aftercooler to validate warranty.
**Maximum ratings restricted by pressure drop, actual thermal capacities are higher.*

Electric Motor & Fan Data

Model	Fan CFM	Motor H.P.	Voltage	Phase	Full Load Amps	Hz	RPM	Nema Frame	Thermal Overload	Approx. Shipping Weight (Lbs.)
UPA-20	615	1/12	115/230	1	2.4/1.2	60	1550	Custom	Yes	25
UPA-35										27
UPA-50	945				2.7/1.4	50	1300			61
UPA-100										67

Published electrical ratings are approximate, and may vary because of motor brand. Actual ratings are on motor nameplate.

Air Cooled Compressed Air Aftercoolers — AA-35 – AA-300 & UPA-20 – UPA-100

General Information

1. Air cooled aftercoolers are built for operation with maximum air pressure of 250 psi and temperature of 350°F.
2. The motors furnished are built for fan duty. Consideration should be given to the installation location so motors are not subjected to extreme temperatures.
3. Air cooled aftercoolers are generally installed at floor level. If the unit is to be used to reclaim waste heat for space heating, it is recommended that the unit be mounted 7 to 14 feet above the floor, depending on the structure, for proper heat distribution.

Installation

1. Air cooled aftercoolers are designed for mounting either by mounting legs, or by suspension from brackets attached to the cabinet. (Hanger rod not included.)
2. Aftercoolers should not be located in corrosive atmospheres as rapid deterioration of casing, cooling coil, fan and motor may take place resulting in reduced life.
3. Piping should be sized based on air flow and pressure drop requirements and not on the aftercooler's supply and return connection size. The piping must also be properly supported to prevent manifold stress.
4. A strainer located ahead of the aftercooler should be installed to trap scale, dirt or sludge that may be present in piping and equipment, or that may accumulate with use.
5. A separator/trap/drain should be installed in the outlet piping of the aftercooler to remove condensate.
6. Flexible connectors should be installed to prevent the stressing of manifolds. (Must be properly installed to validate warranty.)
7. Arrange the outlet pipe so that the moisture that condenses within the aftercooler can drain freely by gravity.
8. For proper air flow, a minimum of 12" clearance should be allowed between the aftercooler fan and any wall or obstructions.

Electrical

1. CAUTION To prevent possible electrical shock, it is important to properly ground this unit using grounding screw provided. Be sure not to disconnect the motor grounding wire when making this connection.
2. Connect motor only to a power supply of the same characteristics as shown on the motor nameplate. Be sure to provide proper fusing to prevent possible motor burnout. Before starting motor, follow manufacturer's recommendations. Turn fan manually to eliminate possible motor burnout in the event the fan has been damaged in shipment. Observe operation after motor is started for the first time.
3. In a typical compressor aftercooler installation, the aftercooler is interlocked to the compressor so it runs whenever the compressor is turned on.

Maintenance Inspect the unit regularly for loose bolts and connections, rust and corrosion, and dirty or clogged heat transfer surfaces (cooling coil).

Heat Transfer Surface Dirt and dust should be removed by brushing the fins and tubes and blowing loose dirt off with an air hose. Should the surface be greasy, the motor should be removed and the fins and tubes brushed or sprayed with a non-flammable degreasing fluid. Follow with a hot water rinse and dry thoroughly. A steam hose may also be used effectively.

Casing, Fan and Motor Dirt and grease should be removed from these parts. Rusty or corroded surfaces should be sanded clean and repainted.

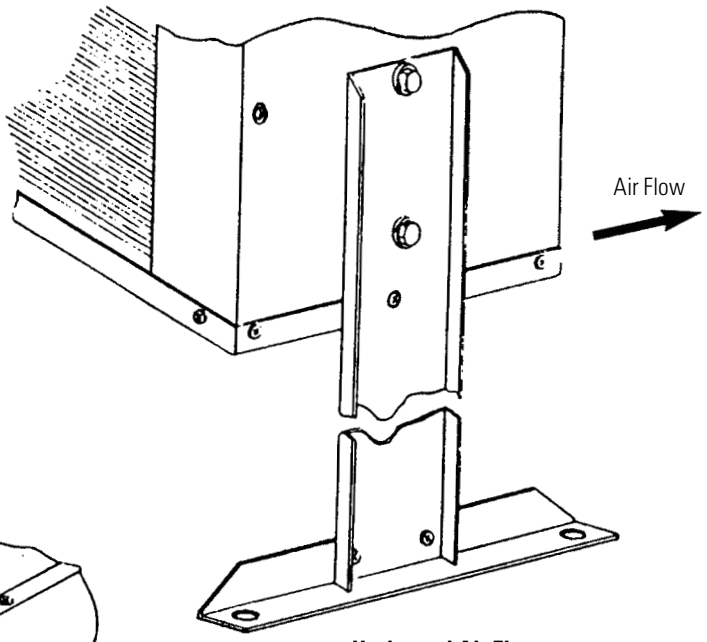
Internal Cleaning Once a year piping should be disconnected and a degreasing agent or flushing oil circulated through the unit to remove sludge from turbulators and internal tube surfaces to return the unit to full capacity. A thorough cleaning of the entire system in the same manner is preferable to avoid carry-over from uncleaned piping, pump and accessories. The strainer of any filtering devices should be removed and serviced following this cleaning operation. Caustic cleaners should not be used to clean these heat exchangers.

Motor Keep outside surface free of dirt and grease so motor will cool properly. Make sure cooling air over motor is not obstructed. Sleeve bearing motors are normally furnished and require lubrication every 6 months. Add a few drops of SAE 20 oil to each bearing. When TEFC Motors are furnished, they are normally prelubricated ball bearing motors and require no grease for about 5 to 10 years.

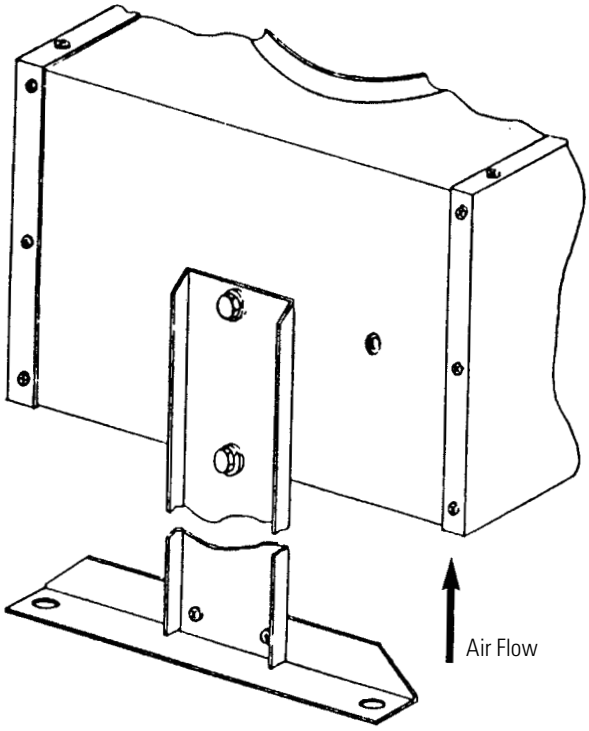
Repair or Replacement of Parts When ordering replacement parts or making inquiry regarding service, mention model number, serial number and the original purchase order number. Any reference to the motor must carry full nameplate data.

Models UPA 50 & UPA 100

Leg Installation



Horizontal Air Flow
Leg Installation



Vertical Air Flow
Leg Installation

Air Sparge Solenoid Valves #205TF

205 SERIES ELECTRICAL GLOBE

1" (25MM) PLASTIC MODELS

205TF
FLOW CONTROL

FOR PETE'S SAKE, LET'S ONLY DO THIS ONCE.

The 205 Series 1-inch plastic valve is the irrigation industry's time-tested leader for dependable operation in potable and dirty water applications. With a proven track record of success in a wide range of environments, these debris-tolerant valves are available with flow control as an optional feature. Constructed of heavy-duty, corrosion- and UV-resistant PVC, the 205 Series features a high-flow, low-friction-loss-design that has a pressure range of 10-150 psi and flow range of .25-30 GPM. A manual bleed and a rugged, nylon-reinforced Buna-N diaphragm add to this valve's wide popularity. Irritrol. Get more done.

KEY FEATURES & BENEFITS

HEAVY-DUTY, CORROSION AND UV-RESISTANT PVC CONSTRUCTION
Proven durability

HIGH-FLOW, LOW-FRICTION-LOSS DESIGN
More efficient system design and low-flow capability

RUGGED, NYLON-REINFORCED BUNA-N DIAPHRAGM
Ensures a leak-proof seal

AVAILABLE IN FEMALE NPT OR SLIP CONFIGURATIONS (NO MALE PIPE ADAPTER REQUIRED)
Will handle all regional installation variances

ADDED FEATURES

- Buna-N valve seat seal
- Manual external bleed
- Debris-tolerant design
- Optional flow control allows precise adjustment and manual shutoff
- Encapsulated injection-molded solenoid with a captive hex plunger
- Removable, tamper-resistant flow control handle
- Easily serviced without removal from the system
- Five-year warranty

OPERATING SPECIFICATIONS

- Flow range: 0.25-30 GPM (1-115 L/M)
- Pressure range: 10-150 psi (0,7-10 Bars)

ELECTRICAL SPECIFICATIONS

- Solenoid: 24 V ac
- Inrush volt-amp: 24 V ac-9.6 VA
- Inrush current: .4 amp
- Holding volt-amp: 24 V ac-4.8 VA
- Holding current: .2 amp

OPTIONAL ACCESSORIES

- IBOC300-9V battery operated "on valve" controller
- Recycled-water solenoid kit (RW60-KIT); purple solenoid with purple warning tag
- DC latching solenoid (E2003). *Note: Maximum pressure for a valve that utilizes E2003 latching solenoid is 120 psi (8 Bars).*

SPECIFYING INFORMATION

205 - X - X

MODEL	CONFIGURATION	FLOW CONTROL
205S	Slip Connection	NO
205SF	Slip Connection	YES
205T	NPT Threads	NO
205TF	NPT Threads	YES

DIMENSIONS

H	5 1/8" (130mm)
W	2 3/4" (70mm)
L	5" (127mm)

Flow Rate-GPM

Model	Size	.25	2	5	10	15	20	30
205 Series	1"	5.40	3.82	3.00	2.20	1.90	3.10	5.10

Pressure Loss-PSI

1) When designing a system, the industry standard for flow rate velocity through pipes and fittings is 5 FPS.

METRIC

Flow L/M	205	
	Bar	kPa
1	0,37	37,2
8	0,24	24,3
20	0,21	20,7
40	0,16	15,9
60	0,14	13,9
80	0,23	22,7
100	0,37	36,9
120	0,52	52,2
140	0,71	70,8

205T Threaded

 Form No TL1454

Small Compact Filter Silencers
w/ Standard Filter Design
"FS" Series 1/2" - 3" MPT

APPLICATIONS & EQUIPMENT

- Industrial & Severe Duty
- Piston Compressors
- Screw Compressors
- Blowers - Side Channel & P.D.
- Hydraulic Breathers – fine filtration
- Engines
- Construction\Contractor Industry
- Workshop
- Medical\Dental Industry
- Pneumatic Conveying
- Waste Water Aeration
- Nailers and Staplers
- Vacuum Vent Breathers

FEATURES & SPECIFICATIONS

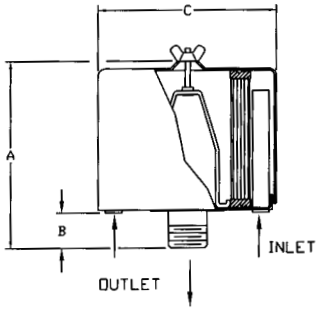
- Polyester: 99%+ removal efficiency standard to 5 micron
- Paper: 99%+ removal efficiency standard to 2 micron
- Fully drawn weatherhood - no welds to rust or vibrate apart
- Tubular silencing design - tube is positioned to maximize attenuation and air flow while minimizing pressure drop
- Durable carbon steel construction with baked enamel finish and powder coated weatherhood
- Interchangeable media: Polyester, Paper, HEPA
- Several element sizes available per given connection (safety factor)
- Temp (continuous): min -15°F (-26°C) max 220°F (104°C)
- Filter change out differential: 10"-15" H_2O over initial delta P
- Pressure drop graphs available upon request

OPTIONS (Inquiries Encouraged)

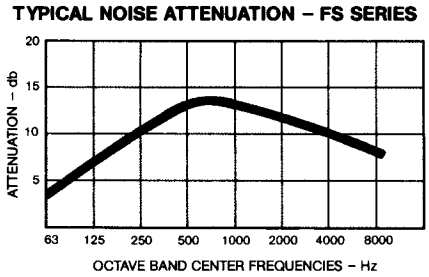
- 1/8" tap holes
- Pressure Drop Indicator
- Available in ***Stainless Steel***
- Epoxy coated housings
- Various media available
- Special connections, BSPT

CONFIGURATION

DRAWING



Dimension tolerance ± 1/4"



- Noise attenuation may vary due to the wide range of applications and machines

I = Industrial Duty S = Severe Duty

	with Polyester Element	with Paper Element	MPT Outlet	DIMENSIONS - inches A	B	C	Rated Flow SCFM Piston	Screw, Blower, Fan	Element Rating	No. of Silencing Tubes	Approx. Wt. lbs
I	FS-15-050	FS-14-050	1/2"	4	1 1/2	6	10	10	35	1	2
I	FS-15-075	FS-14-075	3/4"	4	1 1/2	6	20	25	35	2	2
I	FS-15-100	FS-14-100	1"	4	1 1/2	6	25	35	35	3	2
S	FS-19P-100	FS-18P-100	1"	6 5/8	1 5/8	6	35	55	100	3	3
I	FS-19P-125	FS-18P-125	1 1/4"	6 5/8	1 5/8	6	55	70	100	5	3
I	FS-19P-150	FS-18P-150	1 1/2"	6 5/8	1 5/8	6	70	85	100	5	4
I	FS-31P-200	FS-30P-200	2"	7 1/4	2 1/4	10	85	135	195	5	8
S	FS-231P-200	FS-230P-200	2"	12 1/4	2 1/4	10	135	135	300	5	14
S	FS-231P-250	FS-230P-250	2 1/2"	12 1/2	2 1/2	10	195	195	300	9	15
I	FS-231P-300	FS-230P-300	3"	13	3	10	200	300	300	9	15

Note: Model offerings and design parameters may change without notice.

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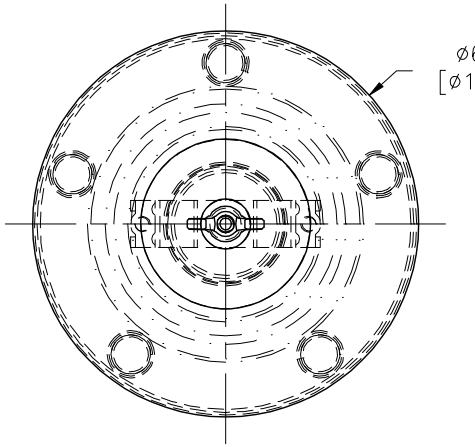
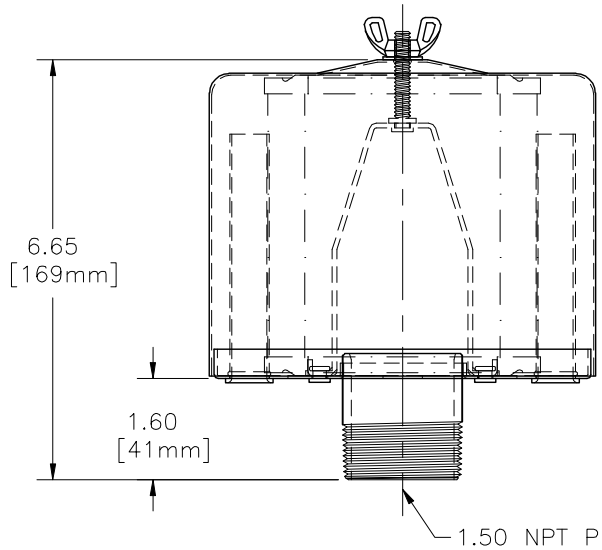
Sales/Service: 630.773.1363 ♦ Fax: 630.773.0727
E-mail: sales@solbergmfg.com ♦ Web Site: www.solbergmfg.com

REVISIONS						
ZONE	REV	DESCRIPTION	ECN #	CHG BY	DATE	APP'D





REPLACEMENT ELEMENT# 19P	
MATERIAL	POLYESTER
CFM FLOW	100
SURFACE AREA	1.50 SQ. FT.
I.D.	3.00
O.D.	4.38
HEIGHT	4.75

MODEL#	HOUSING MATERIAL	FINISH
FS-19P-150	CARBON STEEL	BAKED ENAMEL GREY

UNLESS OTHERWISE SPECIFIED:
-DIMENSIONS ARE IN INCHES
-REF: APPROXIMATE DIMENSIONS, NO TOLERANCES APPLY
-TOLERANCES ARE:
DECIMALS: .XX ±.25, .XXX ±.125
ANGLES ±2°

CUSTOMER APPROVAL:

SOLBERG MANUFACTURING INC.
1151 W. ARDMORE AVE.
ITASCA, IL 60143
630/773-1363

DESCRIPTION:
FS-19P-150

SALES REP.: D. WELLS

APPROVALS	DATE
DRAWN: CRW	04/21/03
APPROVED:	

SHEET: 1 of 1 | SHEET SIZE: C | SCALE: 1:1

DRAWING NUMBER: SD10992 | REV: —

4. Air Sparge Instrumentation/Switches

Series VFC & VFCII

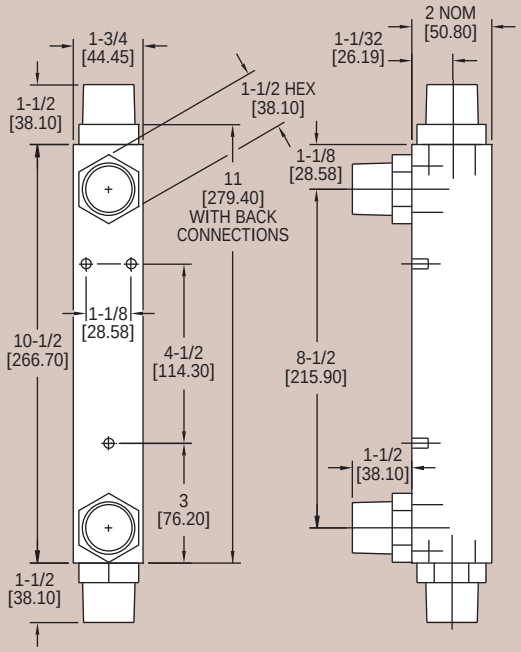
Visi-Float® Flowmeters

Used to Indicate Air or Water Flow

VFCII with 1″ MNPT End Connections

VFC with 1″ FNPT End Connections

VFC with 1″ FNPT Back Connections



The accurate and durable VFC Visi-Float® flowmeter contains a stainless steel guide rod and large diameter float for excellent stability and visibility in high flow rates. The large 5″ scale provides a ±2% full scale accuracy for precision measurement required in medical or laboratory applications. The VFC models have PVC 1″ female NPT connections. VFC II units are equipped with acetal thermoplastic 1″ male NPT fittings. VFC II fittings also include hex wrench flats to prevent stripped threads. All models have metal mounting inserts on the back for panel mounting. Units may also be supported directly by system piping.

How To Order
Series—Range No.—Option
Example: VFC-123-EC
Series VFC with 10-100 SCFM Air Range and 1″ female NPT End Connections

VFC Series

Model	Description
VFC-X	VFC with 1″ FNPT Back Connections
VFCII-X	VFCII with 1″ MNPT Back Connections
VFC-X-EC	VFC with 1″ FNPT In-Line End Connections
VFCII-X-EC	VFCII with 1″ MNPT In-Line End Connections

SPECIFICATIONS
Service: Compatible gases & liquids.
Wetted Materials:
Body: Acrylic plastic;
O-ring: Buna-N (fluoroelastomer available);
Metal parts: Stainless steel;
Float: SS.
Fittings: VFC: PVC; VFCII: Acetal thermoplastic.
Temperature & Pressure Limits: 100 psig (6.9 bar) @ 120°F (48°C).
Accuracy: 2% of full scale.
Process Connection: VFC: 1″ female NPT back connections. End connections optional; VFCII: 1″ male NPT back connections. End connections optional.
Scale Length: 5″ typical length.
Mounting Orientation: Mount in vertical position.
Weight: 24 to 25 oz (.68 to .71 kg).

Popular Ranges

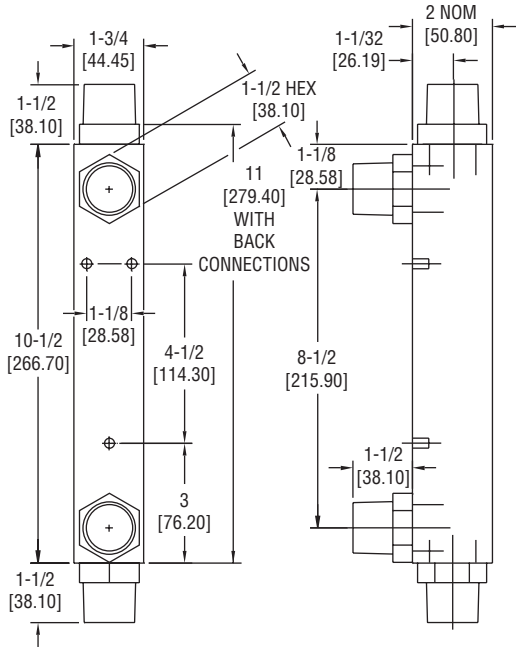
Model VFC — 5″ Scale			
Range No.	**Range SCFM Air**	**Range No.**	**Range GPM Water**
121	4-25	141	.5-5
122	5-50	142	1-10
123	10-100	143	2-20
	LPM Air		**LPM Water**
131	60-700	151	2-20
132	200-1400	152	4-40
133	300-2800	153	10-75

OPTIONS
-VIT, Fluoroelastomer O-Rings
-FDA, 316 SS Float & Guide Rod (only available on VFCII with fluoroelastomer O-Rings)

VFC Series Visi-Float® Flowmeter

Specifications - Installation and Operating Instructions

Back Connections



Dwyer Series VFC Visi-Float® flowmeters are available in two basic styles, either back or end connected with direct reading scales for air or water. Installation, operation, and maintenance are simple and require only a few common sense precautions to assure long, accurate, trouble-free service.

CALIBRATION

All Dwyer flowmeters are calibrated at the factory and normally will remain within their accuracy tolerance for the life of the device. If at any time you wish to re-check its calibration, do so only with instruments or equipment of certified accuracy. Do not attempt to check the Dwyer Visi-Float® flowmeter with a similar flowmeter as even minor variations in piping and back pressure can cause significant differences between the indicated and actual readings. If in doubt, your Dwyer flowmeter may be returned to the factory and checked for conformance at no charge.

LOCATION

Select a location where the flowmeter can be easily read and where the temperature will not exceed 120°F (49°C). The mounting surface and piping to the flowmeter should be free from vibration which could cause fatigue of fittings or mounting inserts. Piping must be carefully arranged and installed to avoid placing stress on fittings and/or flowmeter body. Avoid locations or applications with strong chlorine atmospheres or solvents such as benzene, acetone, carbon tetrachloride,etc. Damage due to contact with incompatible gases or liquids is not covered by warranty. Compatibility should be carefully determined before placing in service.

SPECIFICATIONS

Service: Compatible gases & liquids.

Wetted Materials:

Body: Acrylic plastic.

O-Ring: Buna-N (Viton® available).

Metal Parts: Stainless steel.

Float: Stainless steel.

Temperature & Pressure Limits: 100 psig (6.9 bar) @ 120°F (48°C).

Accuracy: 2% of full scale.

Process Connection: VFC: 1″ female NPT back connections. End connections optional. VFCII: 1″ male NPT back connections. End Connections optional.

Scale Length: 5″ typical length.

Mounting Orientation: Mount in vertical position.

Weight: 24-25 oz (.68-.71 kg).

PIPING

Inlet Piping:

It is good practice to approach the flowmeter inlet with as few elbows, restrictions and size changes as possible. Inlet piping should be as close to the flowmeter connection size as practical to avoid turbulence which can occur with drastic size changes. The length of inlet piping has little effect on normal pressure fed flowmeters.

For vacuum service, the inlet piping should be as short and open as possible to allow operation at or near atmospheric pressure and maintain the accuracy of the device. Note that for vacuum service, any flow control valve used must be installed on the discharge side of the flowmeter.

DWYER INSTRUMENTS, INC.
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Fax: 219/872-9057

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e-mail: info@dwyer-inst.com

Discharge Piping
Piping on the discharge side should be at least as large as the flowmeter connection. For pressure fed flowmeters on air or gas service, the piping should be as short and open as possible. This allows operation at or near atmospheric pressure and assures the accuracy of the device. This is less important on water or liquid flowmeters since the flowing medium is generally incompressible and back pressure will not affect the calibration of the instrument.

POSITION AND MOUNTING
All Visi-Float® flowmeters must be installed in a vertical position with the inlet connection at the bottom and outlet at the top.

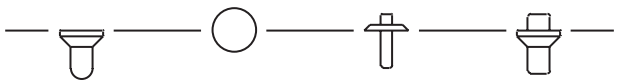
Surface Mounting
Drill three holes in panel using dimensions shown in drawing. Holes should be large enough to accommodate #10 - 32 machine screws. If back connected model, drill two additional holes for clearance of fittings. Install mounting screws of appropriate length from rear. Mounting screws must not be longer than the panel thickness plus $^3/_8$≤ (9.66 mm), or the screw will hit the plastic and may damage the meter. The screws will require additional force during the initial installation, since the insert boots are of a collapsed thread type and must be expanded into the plastic for the knurled surface to take hold. Insert boots will not have the proper 10-32 threads until the first screw has been inserted to expand the boot. Attach piping using RTV silicone sealant or Teflon® tape on threads to prevent leakage.

CAUTION: Do not overtighten fittings or piping into fittings. Maximum recommended torque is 10 ft. (lbs) (13.56 newton (meter)). Hand tighten only.

In Line Mounting
Both end connected and back connected models may be installed in-line supported only by the piping. Be sure that flowmeter is in a vertical position and that piping does not create excess stress or loading on the flowmeter fittings.

OPERATION
Once all connections are complete, introduce flow as slowly as possible to avoid possible damage. With liquids, make sure all air has been purged before taking readings. Once the float has stabilized, read flow rate by sighting across the largest diameter of the float to the scale graduations on the face of the device.

The standard technique for reading a Variable Area Flowmeter is to locate the highest point of greatest diameter on the float, and then align that with the theoretical center of the scale graduation. In the event that the float is not aligned with a grad, an extrapolation of the float location must be made by the operator as to its location between the two closest grads. The following are some sample floats shown with reference to the proper location to read the float.



Variable Area Flowmeters used for gases are typically labeled with the prefix “S” or “N”, which represents “Standard” for English units or “Normal” for metric units. Use of this prefix designates that the flowmeter is calibrated to operate at a specific set of conditions, and deviation from those standard conditions will require correction for the calibration to be valid. In practice, the reading taken from the flowmeter scale must be corrected back to standard conditions to be used with the scale units. The correct location to measure the actual pressure and temperature is at the exit of the flowmeter, except under vacuum applications where they should be measured at the flowmeter inlet. The equation to correct for nonstandard operating conditions is as follows:

$$Q_2 = Q_1 \times \sqrt{\frac{P_1 \times T_2}{P_2 \times T_1}}$$

Where: Q_1 = Actual or Observed Flowmeter Reading
Q_2 = Standard Flow Corrected for Pressure and Temperature
P_1 = Actual Pressure (14.7 psia + Gage Pressure)
P_2 = Standard Pressure (14.7 psia, which is 0 psig)
T_1 = Actual Temperature (460 R + Temp °F)
T_2 = Standard Temperature (530 R, which is 70°F)

Example: A flowmeter with a scale of 10-100 SCFH Air. The float is sitting at the 60 grad on the flowmeter scale. Actual Pressure is measured at the exit of the meter as 5 psig. Actual Temperature is measured at the exit of the meter as 85°F.

$$Q_2 = 60.0 \times \sqrt{\frac{(14.7 + 5) \times 530}{14.7 \times (460 + 85)}}$$

Q_2 = 68.5 SCFH Air

MAINTENANCE
The only maintenance normally required is occasional cleaning to assure proper operation and good float visibility.

Disassembly
The flowmeter can be completely disassembled by removing the connection fittings and top plug. When lifting out the float guide assembly, be careful not to lose the short pieces of plastic tubing on each end of the guide rod which serve as float stops.

Cleaning
The flowmeter body and all other parts can be cleaned by washing in a mild soap and water solution. A soft bristle bottle brush will simplify cleaning of the flow tube. Avoid benzene, acetone, carbon tetrachloride, gasoline, alkaline detergents, caustic soda, liquid soaps, (which may contain chlorinated solvents), etc., and avoid prolonged immersion.

Re-assembly
Install the lower fitting and then the float and float guide. Finally install the upper fitting and plug being certain that both ends of the float guide are properly engaged and the float is correctly oriented. A light coating of silicone stop cock grease or petroleum jelly on the “O” rings will help maintain a good seal as well as ease assembly.

ADDITIONAL INFORMATION
For additional flowmeter application information, conversion curves, correction factors and other data covering the entire line of Dwyer flowmeters, please request a dwyer full-line catalog.

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Bimetal Thermometer
Model TI.20, All Stainless Steel Construction

Application

- Suitable fluid medium which does not corrode 304 stainless steel

Special features

- Back connection without external reset
- Industrial design
- All Stainless steel construction

Thermometer TI.20

Standard version

Size
2" (50.8 mm) - Type TI.20

Accuracy
± 1.0% full scale value (ASME B40.3)

Min. / Max. Ranges
-100 °F to 1000 °F (and equivalent Celsius)

Working Range
Steady: full scale value
Short time: 110% of full scale value

Under / Over Range Protection
Temporary over or under range tolerance of 50% of scale up to 500 °F (260°C). For ranges above 500°F, maximum over range is 800°F; continous. 1000°F intermittent.

Connection
Material: 304 stainless steel
Center back mount (CBM)
ı" NPT

Stem
Material: 304 stainless steel
Diameter: ı" (6.35 mm)
Length: 2 ½" to 24" (63.5 mm to 609.6 mm)

Measuring Element
Bi-metal helix

Case
Material: 304 stainless steel; hermetically sealed per ASME B40.3 standard

Dial
White aluminum, dished, with black markings

Pointer
Black aluminum

Standard Scales
Single: Fahrenheit or Celsius
Dual: Fahrenheit (outer) and Celsius (inner)

Window
Flat instrument glass

Weight
2" - 5 oz.; Add 1 oz. for every 2" of stem length

Dampening
Inert gel to minimize pointer oscillation

Order Options (min. order may apply)
Special scales and dial markings; Acrylic windows
Calibration certification traceable to NIST

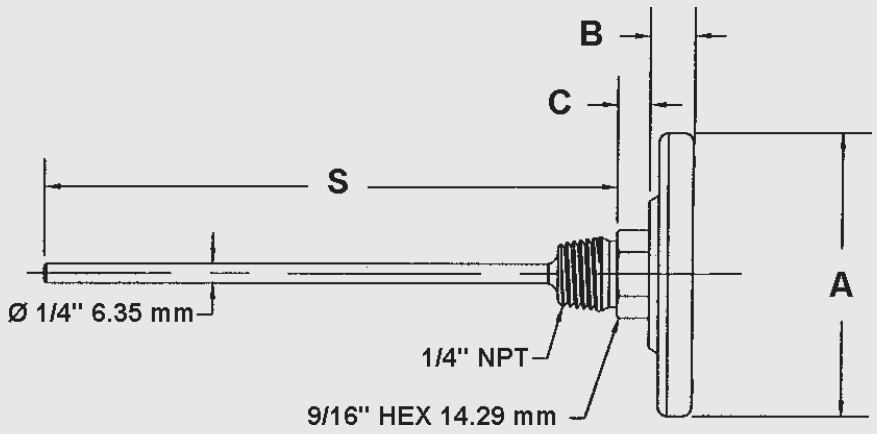
Warranty
Limited one year warranty as stated in WIKA's Terms & Conditions of Sale.

STANDARD RANGES		
Fahrenheit Single Scale	Dual Scale F & C F Outer, C Inner	Celsius Single Scale
-100/150 F	-100/150 F & -70/70 C	-50/50 C
-40/120 F-	40/120 F & -40/50 C	-20/120 C
0/140 F	0/140 F & -20/60 C	0/50 C
0/200 F	0/200 F & -15/90 C	0/100 C
0/250 F	0/250 F & -20/120 C	0/150 C
20/240 F	20/240 F & -5/115 C	0/200 C
25/125 F	25/125 F & -5/50 C[1]	0/250 C
50/300 F	50/300 F & 10/150 C	0/300 C
50/400 F	50/400 F & 10/200 C	0/450 C[1]
50/550 F	50/500 F & 10/260 C	100/550 C[1]
150/750 F	150/750 F & 65/400 C	
200/1000 F[1]	200/1000 F & 100/540 C[1]	

[1]Not recommended for continous service over 800°F (425°C)

Dimensions

Standard versions



WIKA TYPE	DIAL SIZE	A	B	C	S (Stem Length)
20	2" (50.8 mm)	2- 1/16" (52.4 mm)	7/16" (11.1 mm)	1/4" (6.4 mm)	As Specified

STEM LENGTH
2½" (63.5 mm)
4" (101.6 mm)
6" (152.4 mm)
9" (228.6 mm)
12" (304.8 mm)
15" (381.0 mm)
18" (457.2 mm)
24" (609.6 mm)

Note: Thermowells for temperature instruments are recommended for all process systems where pressure, velocity, or viscous, abrasive and corrosive materials are present individually or in combination. A properly selected thermowell protects the temperature instrument from possible damage resulting from these process variables. Furthermore, a thermowell permits removal of the temperature instrument for replacement, repair or testing without effecting the process media or the system.

Ordering information
State computer part number (if available) /type number/size/range/connection size and locations/options required. WIKA reserves the right to make changes without prior notice.

WIKA Instrument Corporation
1000 Wiegand Boulevard
Lawrenceville, GA 30043
1-888-WIKA-USA /770-513-8200 (in GA)
Fax 770-338-5118
info@wika.com www.wika.com

Bourdon Tube Pressure Gauges
Dry or Liquid Filled Gauge with SAE Connection
Type 212.53S - Dry Case
Type 213.53S - Liquid-filled Case

Applications

- Intended for adverse service conditions where pulsating or vibration exists (with liquid filling)
- Hydraulics & compressors
- Suitable for gaseous or liquid media that will not obstruct the pressure system

Special features

- Vibration and shock resistant (with liquid filling)
- 7/16” -20 SAE connection
- Pressure ranges up to 15,000 psi

Bourdon Tube Pressure Gauge Model 213.53S

Description

Design
ASME B40.100 & EN 837-1

Sizes
2½” (63 mm)

Accuracy class
± 2/1/2% of span (ASME B40.100 Grade A)

Ranges
Vacuum / Compound to 200 psi
Pressure from 15 psi to 15,000 psi
or other equivalent units of pressure or vacuum

Working pressure
Steady: 3/4 scale value
Fluctuating: 2/3 full scale value
Short time: full scale value

Operating temperature
Ambient: -40°F to +140°F (-40°C to +60°C) - dry
-4°F to +140°F (-20°C to +60°C) - glycerine filled
-40°F to +140°F (-40°C to +60°C) - silicone filled
Medium: +140°F (+60°C) maximum

Temperature error
Additional error when temperature changes from reference temperature of 68°F (20°C) ±0.4% for every 18°F (10°C) rising or falling. Percentage of span.

Weather protection
Weather tight (NEMA 4X / IP 65)

Pressure connection
Material: copper alloy
Lower mount (LM)
7/16” - 20 SAE with o-ring, washer and lock nut

Bourdon tube
Material: copper alloy
≤ 1,000 PSI: C-type
≥ 1,500 PSI: helical type

Movement
Copper alloy

Dial
White ABS with stop pin and with black lettering

Pointer
Black aluminum

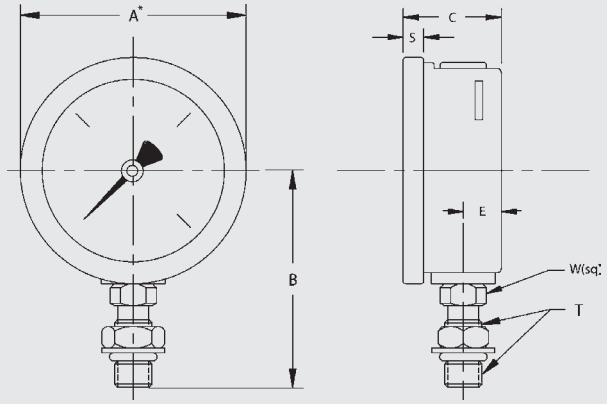
Case
304 stainless steel with vent plug and stainless steel crimp ring. Suitable for liquid filling. Case connection sealed with EPDM o-ring (glycerine filled) or Viton o-ring (dry or silicone filled).

Window
Polycarbonate with Buna-N gasket

Case fill
Glycerine 99.7% - Type 213.53S

Optional extras
- Brass restrictor
- External zero adjustment (2½" only)
- Red drag pointer or mark pointer
- Silicone or Fluorolube case filling
- Custom dial layout
- Other pressure scales available
  bar, kPa, MPa, kg/cm² and dual scales

Dimensions



Size		A	B	C	E	S	T	W	Weight	
2.5"	mm	69	61.2	31	13	6		14	0.38 lb.	dry
	in	2.69	2.41	1.23	0.51	0.24	7/16-20	0.55	0.46 lb.	filled

Ordering information
Pressure gauge model / Nominal size / Scale range / Size of connection / Optional extras required
Specifications and dimensions given in this leaflet represent the state of engineering at the time of printing.
Modifications may take place and materials specified may be replaced by others without prior notice.

WIKA Instrument Corporation
1000 Wiegand Boulevard
Lawrenceville, GA 30045
Tel (770) 513-8200 Toll-free 1-888-WIKA-USA
Fax (770) 338-5118
E-Mail info@wika.com
www.wika.com

400 Series Temperature Controls

Types: B400, B402, B403, C400, C402,C403, E400, E402, E403, F400, F402, F403

UNITED ELECTRIC CONTROLS

Installation and Maintenance Instructions

Please read all instructional literature carefully and thoroughly before starting. Refer to the final page for the listing of Recommended Practices, Liabilities and Warranties.

GENERAL

Types B & C (Immersion Stem)
Temperature variations are sensed by a liquid filled sensor which expands or contracts against a bellow which in turn actuates or deactuates one, two or three snap-action switches at a predetermined set point(s). Set points are adjusted by turning an internal calibrated pointer and dial (B type) or internal adjustment screw (C type).

Type E & F (Bulb & Capillary)
Temperature variations of a liquid filled sensing bulb are hydraulically transmitted to a bellow which either actuates or deactuates one, two, or three snap-acting switches at a pre-determined set point(s). Set points are adjusted by turning an internal calibrated pointer and dial (E type) or internal adjustment screw (F type).

PART I - Installation

Tools Needed
Screwdriver
Hammer
Adjustable wrench

MOUNTING

INSTALL UNIT WHERE SHOCK, VIBRATION AND TEMPERATURE FLUCTUATIONS ARE MINIMAL. ORIENT UNIT SO THAT MOISTURE IS PREVENTED FROM ENTERING THE ENCLOSURE. DO NOT MOUNT UNIT IN AMBIENT TEMPERATURES EXCEEDING PUBLISHED LIMITS.

400 Series temperature controls can be mounted in any position, provided the electrical conduit is not facing up. The preferred mounting position is vertical (temperature connection down).

A 3/4" NPT E/C is provided on the right of the enclosure in addition to the two (2) cast-in knockouts for 1/2" electrical conduit that are located on the left side and rear of the enclosure. These can easily be knocked out by placing the blade of a screwdriver in the groove and tapping sharply with a hammer.

Mount the unit via the (2) 1/4" screw clearance holes on the enclosure (see dimensions). Units may also be mounted via the NPT on the immersion stem.

ALWAYS HOLD A WRENCH ON THE IMMERSION STEM HEX WHEN MOUNTING UNIT. DO NOT TIGHTEN BY TURNING ENCLOSURE. THIS WILL DAMAGE SENSOR AND WEAKEN SOLDERED OR WELDED JOINTS.

For remote mounting, fully immerse the bulb and 6" of capillary in the control zone. For best control, it is generally desirable to place the bulb close to the heating or cooling source in order to sense temperature fluctuations quickly. Be sure to locate the bulb so that it will not be exposed to temperatures beyond the instruments range limits.

WIRING

DISCONNECT ALL SUPPLY CIRCUITS BEFORE WIRING UNIT. WIRE UNITS ACCORDING TO NATIONAL AND LOCAL ELECTRICAL CODES. MAXIMUM RECOMMENDED WIRE SIZE IS 14 AWG. THE RECOMMENDED TIGHTENING TORQUE FOR FIELD WIRING TERMINALS IS 7 TO 17 IN-LBS.

ELECTRICAL RATINGS STATED IN LITERATURE AND ON NAMEPLATE SHOULD NEVER BE EXCEEDED. OVER-LOAD ON A SWITCH CAN CAUSE FAILURE ON THE FIRST CYCLE.

Connect conduit to the case and wire directly to the switch terminals according to local and national electrical codes. Bring the wires up to terminals from the rear of the case. (See Figure 1.) If manual reset switch or DPDT options are used, lead wires are supplied, color coded as follows:

	Switch 1	**Switch 2**
Common	Violet	Yellow
Normally Open	Blue	Orange
Normally Closed	Black	Red

ALLOW ENOUGH SLACK SO AS NOT TO AFFECT SWITCH MOVEMENT WHEN MAKING SETTING ADJUSTMENTS AND ENSURE THAT THE WIRES ARE NOT TOUCHING THE COVER WHEN INSTALLED.

NOTE: For larger wire gauges, a one time shift may be experienced or expected due to space limitations within the enclosure. Verify setpoint after installation.

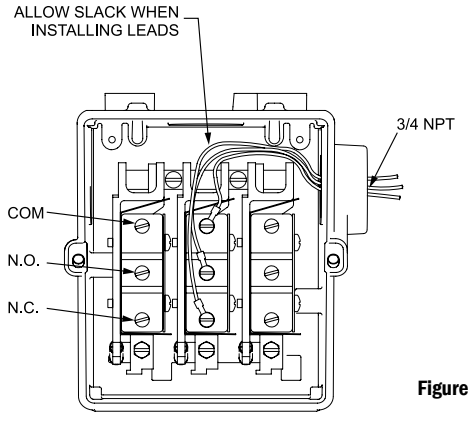


Figure 1

NOTE: The middle switch assembly is omitted for dual switch controllers. The outer two switch assemblies are omitted for single switch controllers. Type "C" and "F" controls have internal hex screw adjustments and type "B" and "E" have cam assemblies for internal calibrated adjustments, via a reference dial.

Types with Terminal Block (Option M100)
Types with Terminal Block option M100, only available with single and dual switches. Not available with all options.

PART II - Adjustments

Tools Needed
Screwdriver

NOTE: For set point adjustments and re-calibration, insert bulb or immersion stem into a calibrated temperature bath. Allow temperature to stabilize for 10 minutes.

Type C400 & F400
Remove cover. Switch has screw adjustments inside enclosure. If switch transfer point differs from actual temperature, adjust setting. To RAISE the temperature setting turn the screw IN (clockwise) and to LOWER the setting turn the screw OUT (counter clockwise). When making adjustments, do not exceed the maximum temperature rating on nameplate (see Figure 2).

Types C402, C403, F402 & F403
Remove cover. Follow same procedure as paragraph above. Switches may be set together or apart, up to 100% of range scales. On dual switch models, either switch may be set high. On triple switch models, the third (middle) switch has no over-travel mechanism and must always be set to the highest temperature when switches are set apart. Altering the setting of one switch will usually have little effect on the other(s), however re-adjustment may be desired at a critical temperature setting (see Figure 2).

Types B400, B402, B403, E400, E402 & E403
Controls are factory calibrated for maximum accuracy at the dial midpoint. Switches may be set together or apart up to 100% of the range scale. On dual switch models either switch may be set high. On triple switch models, the third (middle) switch has no over-travel mechanism and must always be set to the highest temperature when the switches are set apart. Altering the setting of one switch will usually have little effect on the other(s), however re-calibration may be desired at a critical setting.

To re-calibrate, turn pointer to desired set point. If the actual temperature and set point temperature do not agree, turn zero adjustment screw clockwise to raise and counter clockwise to lower set temperature setting (See Figure 2)

Types With Manual Reset (Option 1530)
These optional models incorporate a snap switch that, when actuated, remains tripped until temperature decreases and the reset button is manually depressed to the reset position. On multi-switch units, this switch must be set to the highest setting.

Re-Calibration Adjustment

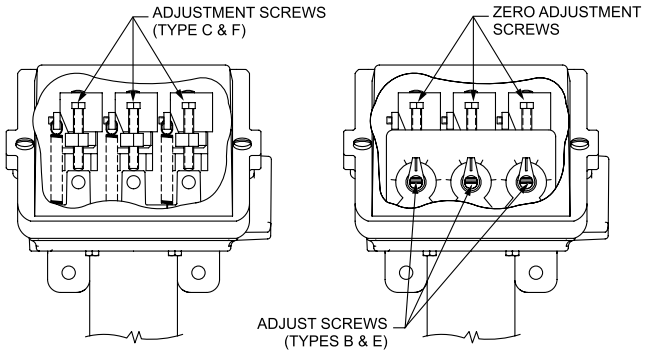
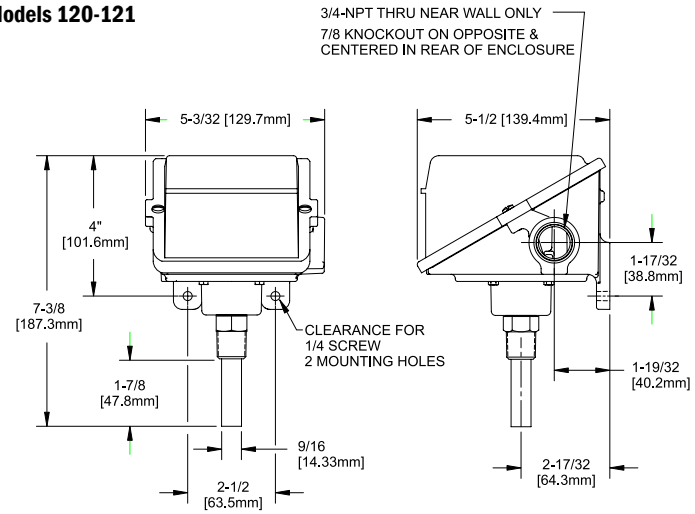


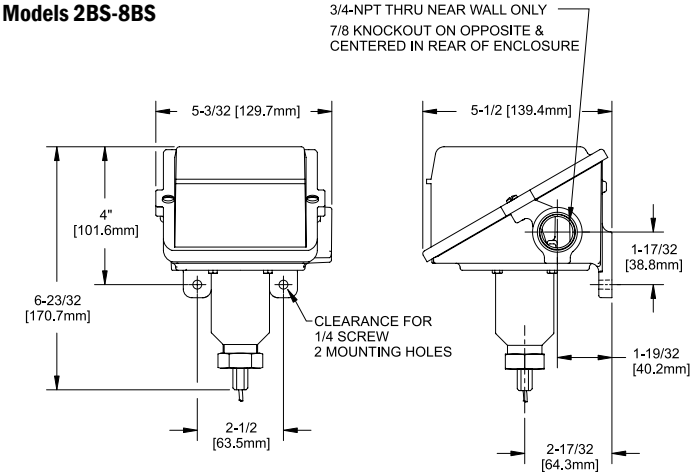
Figure 2

Dimensional Drawings

Models 120-121



Models 2BS-8BS



RECOMMENDED PRACTICES AND WARNINGS

United Electric Controls Company recommends careful consideration of the following factors when specifying and installing UE pressure and temperature units. Before installing a unit, the Installation and Maintenance instructions provided with unit must be read and understood.

- To avoid damaging unit, proof pressure and maximum temperature limits stated in literature and on nameplates must never be exceeded, even by surges in the system. Operation of the unit up to maximum pressure or temperature is acceptable on a limited basis (e.g., start-up, testing) but continuous operation must be restricted to the designated adjustable range. Excessive cycling at maximum pressure or temperature limits could reduce sensor life.
- A back-up unit is necessary for applications where damage to a primary unit could endanger life, limb or property. A high or low limit switch is necessary for applications where a dangerous runaway condition could result.
- The adjustable range must be selected so that incorrect, inadvertent or malicious setting at any range point cannot result in an unsafe system condition.
- Install unit where shock, vibration and ambient temperature fluctuations will not damage unit or affect operation. When applicable, orient unit so that moisture does not enter the enclosure via the electrical connection. When appropriate, this entry point should be sealed to prevent moisture entry.
- Unit must not be altered or modified after shipment. Consult UE if modification is necessary.
- Monitor operation to observe warning signs of possible damage to unit, such as drift in set point or faulty display. Check unit immediately.
- Preventative maintenance and periodic testing is necessary for critical applications where damage could endanger property or personnel.
- Electrical ratings stated in literature and on nameplate must not be exceeded. Overload on a switch can cause damage, even on the first cycle. Wire unit according to local and national electrical codes, using wire size recommended in installation sheet.
- Do not mount unit in ambient temp. exceeding published limits.

LIMITED WARRANTY

Seller warrants that the product hereby purchased is, upon delivery, free from defects in material and workmanship and that any such product which is found to be defective in such workmanship or material will be repaired or replaced by Seller (Ex-works, Factory, Watertown, Massachusetts. INCOTERMS); provided, however, that this warranty applies only to equipment found to be so defective within a period of 24 months from the date of manufacture by the Seller. Seller shall not be obligated under this warranty for alleged defects which examination discloses are due to tampering, misuse, neglect, improper storage, and in any case where products are disassembled by anyone other than authorized Seller's representatives. EXCEPT FOR THE LIMITED WARRANTY OF REPAIR AND REPLACEMENT STATED ABOVE, SELLER DISCLAIMS ALL WARRANTIES WHATSOEVER WITH RESPECT TO THE PRODUCT, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

LIMITATION OF SELLER'S LIABILITY

Seller's liability to Buyer for any loss or claim, including liability incurred in connection with (i) breach of any warranty whatsoever, expressed or implied, (ii) a breach of contract, (iii) a negligent act or acts (or negligent failure to act) committed by Seller, or (iv) an act for which strict liability will be inputted to seller, is limited to the "limited warranty" of repair and/or replacement as so stated in our warranty of product. In no event shall the Seller be liable for any special, indirect, consequential or other damages of a like general nature, including, without limitation, loss of profits or production, or loss or expenses of any nature incurred by the buyer or any third party.

UE specifications subject to change without notice.

UNITED ELECTRIC CONTROLS

180 Dexter Avenue, P.O. Box 9143
Watertown, MA 02471-9143 USA
Telephone: 617 926-1000 Fax: 617 926-2568
http://www.ueonline.com

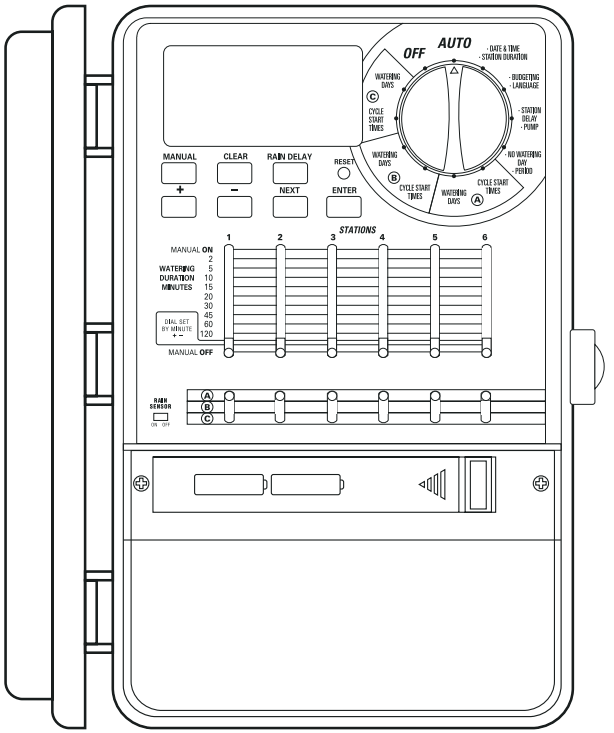
5. System Timers

INSTALLATION MANUAL/USER'S MANUAL

Sprinkler Timers by Orbit®

MANUAL DE INSTALACIÓN / MANUAL DEL USUARIO

Controladores para sistemas de aspersión Orbit®



MODELS:

57004, 57006, 57008, 57012, 57122, 57254, 57256, 57258, 57252, 57292, 57294, 57296, 57606, 57332, 57344, 57346, 57348, 57342, 57334, 57336, 57338, 57298, 57392, 57396, 57384, 57386, 57388, 57382, 91024, 91026, 91028, 91016, 91012, 94004, 94006, 94008, 94002, 94024, 94026, 94028, 94022

Table of Contents

Section 1: Introduction

Thank you for selecting an Orbit® sprinkler timer. Orbit® designers have combined the simplicity of slide switches with the accuracy of digital electronics, giving you a sprinkler timer that is both easy to program and extremely versatile.

Please read the manual completely before you install or use this sprinkler timer.

To assist you we have included some notable features to this manual.

1. Glossary of the most common terms (see page 19)
2. **Blue Text** relates to the buttons used for programming
3. **Blue Underlined Text** relates to stop positions for both rotary dial and slide switches.

Controls Commonly Used

A Digital Display with Text Messaging
A large LCD (Liquid Crystal Display) shows the time of day and indicates many of the programming settings. Interactive text messaging simplifies programming and current sprinkler timer status.

B Programming Buttons
These 7 buttons are used for programming and other operations.

C Rotary Dial
This dial is used for programming, reviewing and operating the sprinkler timer.

D Slide Switches – Watering Duration
The vertical slide switches permit the following functions:

1. To set the watering duration for each station
2. To manually run an individual station
3. "Dial Set by Minute" – Permits 1 minute increment time settings, using the **+** or **–** buttons.

E Program Slide Switches
The program slide switches allows the user to switch to one of three programs A, B or C.

F Rain Delay
This button also acts as a shift key for the rotary dial stop positions in purple.

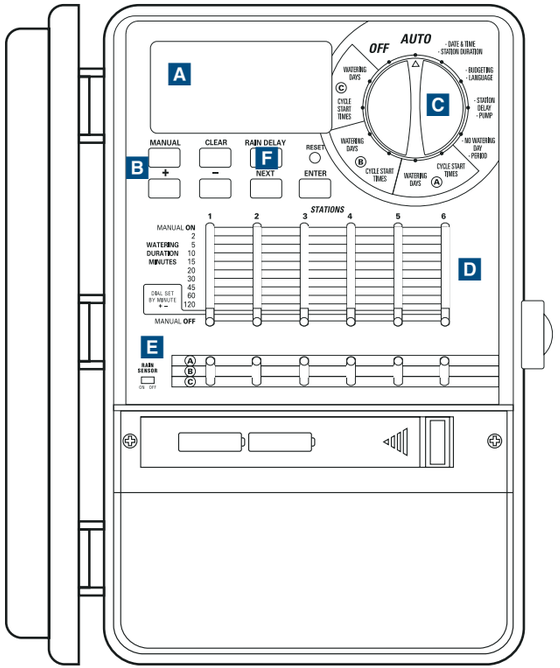


Figure 1: Front view of sprinkler timer

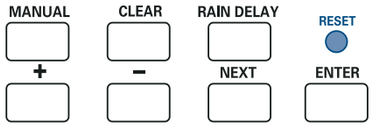


Figure 2: Programming Keys

Section 2: Getting Started

Programming the sprinkler timer can be accomplished in just a few basic steps. Before you begin programming, it is important to:

- Install the batteries
- Reset the sprinkler timer
- Select the preferred language
- Set the time of day and date
- Determine a watering plan.

Installing the Batteries

This sprinkler timer requires two AA alkaline batteries to store the program in memory during AC power loss. Fully charged batteries should provide sufficient power for approximately one year of protection. Annual battery replacement is recommended.

- Slide the battery cover to the left *[See Figure 1]*
- Insert two AA alkaline batteries
- Replace the battery cover

Weak or missing batteries can cause the time, date, and program to be erased after a power failure. If this happens, you will need to install fully charged batteries and reprogram the sprinkler timer.

Note: *Batteries only retain the program in memory. They will not operate the valves in your sprinkling system.*

Resetting the Sprinkler Timer

If this is the first time the sprinkler timer has been programmed, you should press the small recessed button labeled **RESET**. Pressing reset does not affect the factory installed fail-safe program. *[See Figure 2]*

Do not press the reset button again unless you want to completely remove all your programming.

Select the Preferred Language

The language of the LCD display can be set for English, Spanish and French.

1. Turn the rotary dial to **Language** position.
2. Press the **RAIN DELAY** button once.
3. Press the **NEXT** button until you reach the desired language *[See Figure 3]*
4. Press **ENTER** to confirm your selection.
5. Press the **RAIN DELAY** button or turn the rotary dial to exit this mode.

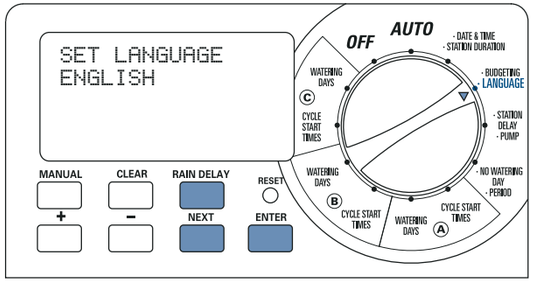


Figure 3: LCD Display Language Selection

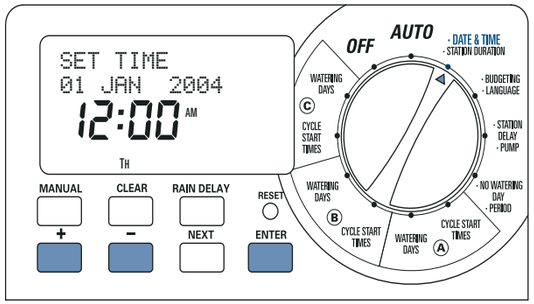


Figure 4: LCD Display Setting Time

Set the Time of Day and Date

Turn the rotary dial to the **DATE & TIME** position. *[See Figure 4]*

- Press and hold the **+** button to advance the clock to the correct time of day. Use the **–** button to go in reverse. When the correct time of day is reached, press the **ENTER** button to lock in the time.
- Press the **+** and **–** buttons to set the correct year, then press **ENTER**.
- Press the **+** and **–** buttons to set the correct month, then press **ENTER**.
- Press the **+** and **–** buttons to set the correct date, then press **ENTER**.

The display will show the correct time and date.

Caution: *If a watering schedule is not entered into the sprinkler timer, the factory installed fail-safe program will turn on each station every day at 5:00am for 10 minutes. To avoid accidental watering, either turn the rotary switch to **OFF** or enter a watering schedule.*

Determine a Watering Plan

To help you visualize how best to program the sprinkler timer, it might be helpful to make a watering plan on paper. This will help you establish which days and times you want to water.

1. For each station (or valve) write down the watering location, the type of sprinkler head and the plants to be watered.
2. Using this list, determine the recommended watering duration (for each type of sprinkler head and the vegetation to be watered) and frequency for each station.

Important: *Identify any imposed watering restrictions through your local water district.*

3. Determine, based on step 2, the ideal watering option for each station (Days of Week, Watering Interval or Odd/Even Days).

Based on the above information your water program may look like this:

Station	Program	Watering Option	Days	Start Time	Duration Minutes	Location	Sprinkler	Plants
1	A	Days of Week	M, W, Sat	5:00 AM	15 min	Front Strip	Spray Heads	Grass
2	A	Days of Week	M, W, Sat		15 min	Front, North	Spray Heads	Grass
3	A	Days of Week	M, W, Sat		15 min	Front, South	Spray Heads	Grass
4	B	Odd/Even	Every other day	6:45 AM	30 min	Back, North	Gear Drive	Grass
5	B	Odd/Even	Every other day		30 min	Back, South	Gear Drive	Grass
6	C	Interval	Every 5 days	9:00 PM	30 min	Front	Shrub Head	Shrubs and Flowers

Take the information above and record your water plan on the supplied label and place it on the inside of your timer.

Section 3: Programming

This sprinkler timer allows the flexibility of using 3 separate programs A, B, and C. You may program one or all based on your watering needs.

1. Start Times for Program A, B, or C

Note: *The cycle start time is the time the program begins watering the first station. Cycle start times do not correspond to specific stations. If you enter more than one cycle start time, all stations programmed to operate will water again (in sequence).*

The way you set the cycle start time is the same for all programs. To set the cycle start times for each program you will be using, do the following:

- Turn the rotary selector to the **CYCLE START TIMES** position in the program that you want to set up. The display will show an A or B or C depending on which program you have selected. *[See Figure 5]*

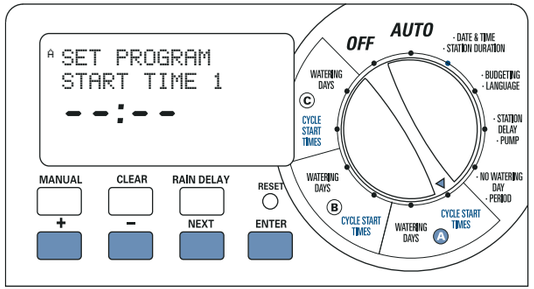


Figure 5: Setting start time

- Set the time you want to begin watering for cycle start time 1 using the **+** or **–** buttons, then press the **ENTER** button. For additional cycle start times, simply press **NEXT** to advance to the next cycle start time and repeat this procedure by using the **+** and **–** buttons to enter the time and then press **ENTER**.

Important: *Additional start times will repeat the watering program. Generally, only one cycle start time is required for each program (A, B, or C).*

Note: You cannot set a cycle start time for each station. Stations can be assigned to either Program A or B or C. Each program can have up to four cycle start times. Stations assigned to a program will turn on sequentially according to the cycle start times assigned.

2. Selecting the Watering Frequency in Programs A, B, or C

This sprinkler timer will allow you to select watering frequency based on "Day(s) of the Week", "Intervals" (1 to 32 days), or "Odd or Even Days". All of these options are available to use in programs A, B and C.

By turning the dial to **WATERING DAYS** (in program A, B or C) the LCD displays the 3 watering options. *[See Figure 6]*

- **Mo Tu We Th Fr Sa Su** applies to **Day(s) of Week** watering option
- **Odd Even** applies to the **Odd or Even** watering option
- **Interval** applies to the **Interval** watering option

"DAY(S) OF WEEK" WATERING OPTION

The Day(s) of Week option allows you to select specific days of the week to water (e.g. Monday, Wednesday and Saturday).

To set Day(s) of Week Option:

- Turn the rotary dial to **WATERING DAYS** in **A**, **B**, or **C**.
- Press **NEXT** until the desired day of the week flashes. Press **ENTER** to select that day. Day(s) selected will have a water drop icon over the day of week. Continue until all the desired days are selected. *[See Figure 7]*

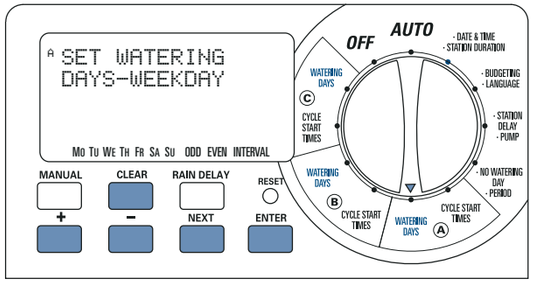


Figure 6: Selecting Watering Days

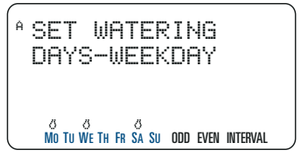


Figure 7: Selecting "Days of Week"

Important: *ODD, EVEN, INTERVAL do not apply to Day(s) of Week watering option*

- To delete a day, previously selected, press the **NEXT** key until the day flashes and press the **CLEAR** button to deselect the day.

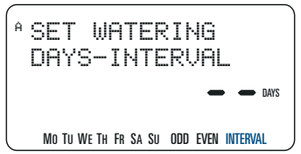


Figure 8: Selecting "Interval Watering"

"INTERVAL" WATERING OPTION

Interval watering is used to water at an interval from 1 to 32 days. An interval of 1 will water every day; an interval of 2 will water every other day, etc.

To set the watering "Interval":

- Turn the rotary dial to **WATERING DAYS** in **A**, **B**, or **C**.
- Press **NEXT** until "interval" flashes on the display. *[See Figure 8]*
- Select the "**INTERVAL**" by pressing the **+** or **–** buttons to the desired interval number and press **ENTER**.
- To remove a previous set interval, continue to press the **NEXT** button until "**INTERVAL**" flashes (in the lower right corner) and press **CLEAR**. Enter a new interval or continue to press the **NEXT** button to select a different watering option.

"ODD OR EVEN" WATERING OPTION

The sprinkler timer can be selected to only water on Odd days or Even days. The odd/even schedule is based on the date. You can also choose to water on odd or even days with spaced intervals.

Example: *If you select Odd days with an interval of 2. The program will water every other odd day (or every 4 days)*

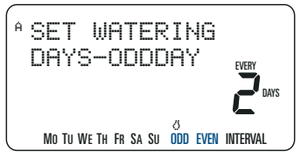


Figure 9: Selecting "Odd/Even Watering"

To set watering for ODD Days:

- Turn the rotary dial to **WATERING DAYS** in **A**, **B**, or **C**.
- Press **NEXT** until "**ODD**" flashes on the display. If you wish to water every odd day, press **ENTER** to confirm the programming. *[See Figure 9]*
- If you wish to water on odd days but less frequently than every other day, press **+** or **–** to set the interval from 1 through 5 for watering.
- Press **ENTER** to save.

To set watering for Even Days proceed with the above steps but select "**EVEN**" on the display.

Note: *The sprinkler timer will NOT water on the first day the program is entered or modified if the start time(s) have already passed.*

3. Set Watering Durations

This sprinkler timer allows 2 ways to set water duration for each station.

SLIDE SWITCH

- Slide each **Water Duration Slide Switch** to its desired time (from 2 to 120 minutes) for each station. *[See Figure 10]*

DIAL SET BY MINUTE

A watering duration can be set in one minute increments. To do so you must use the Dial Set by Minute function. The "Dial Set by Minute" station duration can be set for each individual station.

- Slide the **Watering Duration Slide Switch** to the **DIAL SET BY MINUTE** position (indicated by the solid white bar) for each station. *[See Figure 11]*
- Turn dial to the **•STATION DURATION**.
- Press **RAIN DELAY** button to access the Station Duration function.
- The LCD will allow you to set the watering duration for station 1.
- Using the **+** or **–** enter the watering duration for station 1 and press **ENTER** to save.
- Proceed and enter watering durations for the remaining stations.
- To delete the water duration for a station, press **ENTER** until the station appears in the LCD then press **CLEAR**.

Important: *If the slide switch is not in the "**Dial Set By Minute**" position, the timer will not use the entered duration.*

Note: *The watering duration setting will be used by programs A, B and C. You cannot enter different watering durations for program A, B and C.*

TIP:

- To inactivate a station, move the slide switch to the **MANUAL OFF** position.

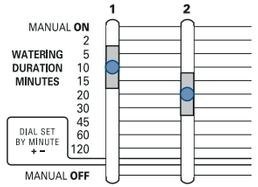


Figure 10: "Slide Switch durations" set at 10 minutes and 20 minutes

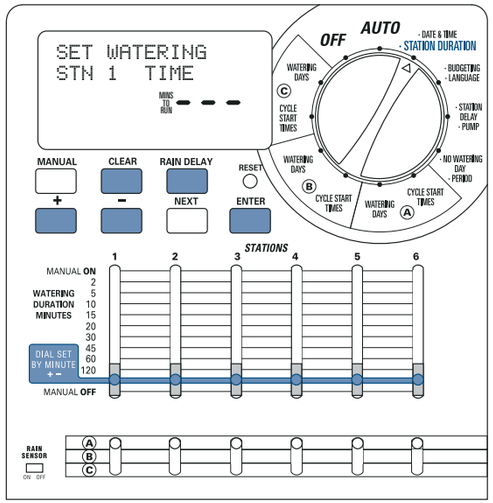


Figure 11: "Dial Set by Minute"

PROGRAM SLIDE SWITCHES

The **Program Slide Switches** allow you to select a program (A, B or C) for individual stations. *[See Figure 12]*

Using information collected in "Establishing a Water Plan" on page 5, select program "A", "B" or "C" for each station.

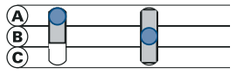


Figure 12: "Program Slide Switches" set on program A and B

REVIEWING AND CHANGING YOUR PROGRAM

The Orbit® sprinkler timer allows an easy to review watering plan. For example, to review Program "A" watering cycle start times, simply turn the rotary selector to the **CYCLE START TIMES** position in Program "A" and check the times that have been entered. Using the **NEXT** button, you can advance through the schedule without fear of disturbing any programming.

If you want to change the cycle start times, watering days, or watering intervals, simply follow the directions for that program modification.

After reviewing or changing a watering schedule, remember to turn the rotary selector back to **AUTO** if you want the sprinkler timer to automatically follow your plan.

Section 4: Automatic Operation and Commonly Used Features

Caution: *This appliance is not intended for use by young children or infirm persons without supervision. Young children should be supervised to ensure that they do not play with the appliance.*

Ready for Automatic Operation

After programming is complete, turn the rotary selector to **AUTO**. The sprinkler timer is now fully programmed and ready to use in the automatic mode. In automatic mode, each station will operate sequentially, starting with Program A.

IMPORTANT: This timer contains a Rain Sensor Bypass Switch. If the rain sensor switch is in the "on" position and no sensor is connected the sprinkler timer will not operate.

Station Advance

When the sprinkler timer is operating, press **NEXT** to end watering at the current station and move on to the next station.

Timer Off

Turn the Rotary Dial to the **OFF** position. This prevents the sprinkler timer from watering in Automatic and Manual modes.

Rain Delay

Rain delay allows you to delay your sprinkler timer from watering for a set period of time. Delay settings are 24, 48, and 72 hours and from 4-99 days.

ACTIVATE THE "RAIN DELAY" FUNCTION:

1. Ensure the rotary selector is on the **AUTO** position
2. Press the **RAIN DELAY** button to automatically delay watering for 24 hours. *[See Figure 13]*
3. If a longer Rain Delay is desired, use the **+** or **-** button to increase or decrease the setting.
4. Press **ENTER** or wait 30 seconds and the selected Rain Delay will begin.
5. The **CLEAR** button stops the Rain Delay and scheduled watering will resume.

At the end of the selected Rain Delay amount of time, automatic watering resumes.

Note: *Manual watering will override Rain Delay. When manual watering is complete, the Rain Delay will resume.*

While in rain delay mode, the sprinkler timer will display the remaining hours. No other buttons, besides **CLEAR**, will be accepted while the sprinkler timer is in the rain delay mode.

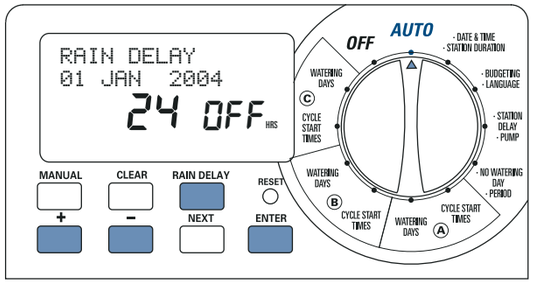


Figure 13: "Rain Delay" set for 24 hours

Water Budgeting

Water Budgeting is a simple way to adjust your watering duration to match seasonal watering needs. Water Budgeting works by increasing or decreasing watering duration for all stations in all programs. Adjustment range is from 20% to 200% by increments of 10%. The default value is 100%.

TO SET BUDGETING:

1. Turn rotary dial to •BUDGETING position *[See Figure 14]*
2. To increase or decrease the percentage, press the **+** or **-** button.
3. Press **ENTER** to save setting.

Section 5: Manual Operation

The Orbit® sprinkler timer allows you 2 options to operate your sprinklers manually.

Single station

Multiple stations

Note: *If a manual operation is started during an automatic program cycle, the automatic program cycle will be cancelled.*

Single Station

This option is most commonly used for testing a specific station or for additional watering of a specific station. Manual operation is accomplished by using the **Watering Duration Slide Switches.**

Important: *Only one station will be active at a time. The last station set to the MANUAL ON position will be active (watering).*

SINGLE STATION—WITHOUT WATERING DURATION

1. Ensure the rotary selector is on the AUTO position.
2. To activate the station, move the station **Watering Duration Slide Switch** to the MANUAL ON position (fully up). The display will indicate "**MANUAL ON**" and the station number being activated. *[See Figure 15]*
3. To turn off manual watering, move the **Watering Duration Slide Switch** to the MANUAL OFF position.
4. Remember to return the **Watering Duration Slide Switch** to the Watering Duration previously set for automatic operation.

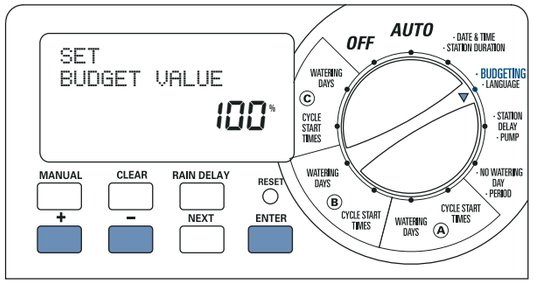


Figure 14: Set "Water Budgeting"

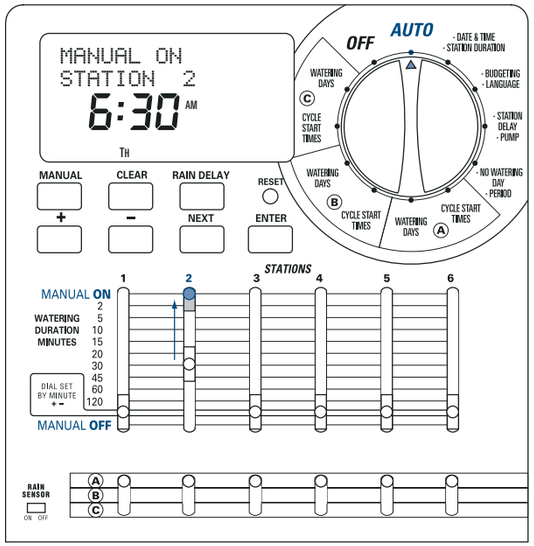


Figure 15: Manual Watering One Station

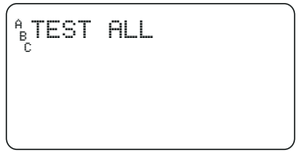


Figure 16: Display – "Test Cycle" selected

SINGLE STATION—WITH WATERING DURATION

1. Follow steps 1 and 2 above.
2. Move the station **Watering Duration Slide Switch** to the desired watering duration.
3. When watering is complete, return the **Watering Duration Slide Switch** to the Watering Duration previously set for automatic operation.

Multiple Stations

This option is most commonly used during unseasonably dry or hot weather. This option allows you to manually water without adjusting and resetting the **Watering Duration Slide Switches**.

MANUAL TEST

This feature allows the homeowner to run each station 1 minute to confirm all stations are working properly.

To Run a Test Cycle:

1. Ensure the rotary selector is on the AUTO position.
2. Press the **MANUAL** button once *[See Figure 16]*
3. Press **ENTER** to begin, and **CLEAR** to stop test cycle.

Note: *If no watering time is entered for a specific station, that station will be skipped.*

MULTIPLE STATIONS—WATER ALL STATIONS ONCE

This can be especially helpful if you happen to experience unusually warm weather. Each station will water once, in sequence, based on each station's **Watering Duration** setting.

Note: *Program settings (A, B, or C) will not affect whether a station waters or not. If you do not want a station to water, move the* ***Watering Duration Slide Switch*** *to the MANUAL OFF position.*

1. Ensure the rotary selector is on the AUTO position.
2. Press the **MANUAL** button once.
3. Continue to press the **NEXT** button until you see "**A B C Extra All**" *[See Figure 17]*.
4. Press the **ENTER** button, within 30 seconds, to activate manual watering.

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5. To interrupt or discontinue this cycle, press the **CLEAR** button once.

At the completion of this function, the sprinkler timer reverts back to your normal automatic watering plan.

Note: *If the manual operation is started during an automatic program cycle, the automatic program will be cancelled.*

Figure 17:
Display showing manual watering for all programs and all active stations

MULTIPLE STATIONS—WATER ONLY STATIONS ASSIGNED TO A SINGLE PROGRAM (A, B OR C)

For this example we will water all stations assigned to Program B. This procedure will be the same for both Program A and C.

1. Ensure the rotary selector is on the **AUTO** position.
2. Press the **MANUAL** button once.
3. Continue to press the **NEXT** button until you see "**B EXTRA ALL**" *[See Figure 18]*
4. Press the **ENTER** button, within 30 seconds, to activate manual watering.
5. To interrupt or discontinue this cycle, press the **CLEAR** button once.

Note: *In this example stations assigned to Program "B" will water one at a time in sequence.*

Figure 18:
Display showing manual watering,
for stations assigned to program B, selected

Section 6: Additional Features

No Watering

"No watering" allows the homeowner to input the restricted water day(s) and/or period (time), imposed by local water districts. This feature prevents the homeowner from watering during restricted days and times.

"NO WATERING" DAY(S) OF WEEK

When restricted day(s) are entered, all watering programs that fall on a restricted day will not water on that day.

To program "No Water Day(s)":

1. Turn the rotary dial to **NO WATERING**
2. Press the **NEXT** button until the desired day of week flashes and press **CLEAR**. *[See Figure 19]*

Note: *Days entered as No Watering days will* ***NOT*** *have a water drop icon above the day*

3. Repeat step 2 until the water drop icon is removed above all restricted days.
4. To remove a "No Watering" restriction from a day press the **NEXT** button until the day flashes and press the **ENTER** button.

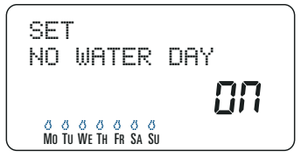

Figure 19: Display - "No Water Day"

"NO WATERING PERIOD/TIME"

When a restricted time is entered, all watering programs that fall on a restricted watering time will be shifted to a non-restricted day and/or time.

To program "No Watering Period/Time"

1. Turn the rotary dial to **NO WATERING**
2. Press the **RAIN DELAY** button once. *[See Figure 20]*
3. Enter the starting time of the "No Water Period" using the **+** and **–** buttons and press **ENTER** to accept time.
4. Next set the ending time of the "No Water Period" using the **+** and **–** buttons and press **ENTER** to accept time.
5. Return rotary dial to the **AUTO** position.

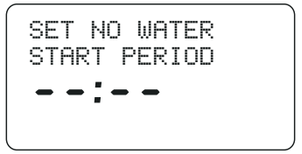

Figure 20: Display - No Water Period

Set Master Valve or Pump Start

This sprinkler timer allows each station to operate with or without pump. If a station is set to operate with the pump, it will start two seconds before the station does.

Note: *A Pump Start Relay is required to operate pump. (Sold separately)*

TO ACTIVATE "PUMP START" FOR EACH STATION:

1. Turn the rotary dial to the **•PUMP** position.
2. Press the **RAIN DELAY** button once. *[See Figure 21]*
3. If you want the pump to be active for the displayed station, press **ENTER**.
4. If you **do not** want the pump to be active for the displayed station press **CLEAR**.
5. Press **NEXT** to advance to the next station.
6. Turn the rotary dial to exit this setting.

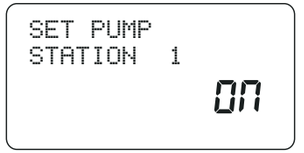

Figure 21: Display - Pump Start active for station 1

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Station Delay

This feature is commonly used by homeowners with cisterns or well water. The delay allows cisterns and wells adequate time to re-supply the reservoir.

Note: *Delays between stations can be programmed from 1 minute to 9 hours.*

TO PROGRAM STATION DELAY:

1. Turn the rotary dial to •**STATION DELAY** *[See Figure 22]*
2. To increase or decrease the time delay time between each station, press the **+** or **–** button.
3. Press the **ENTER** button to save the time delay setting.
4. Return the rotary dial to **AUTO**

Figure 22: Display – Station Delay

Section 7: Installation of Indoor Mount Sprinkler Timer

Before installation please have the following items and tools.

- 2 AA Batteries
- Phillips Screwdriver
- Wire Strippers

Installing the sprinkler timer in 5 easy steps

1. Selecting a Location
2. Mounting the Sprinkler Timer
3. Installing the Batteries
4. Connecting the Power Supply
5. Connecting Valve Wires to Sprinkler Timer

Note: For installation of OUTDOOR models see Appendix A

1. Selecting a Location

Select a location with the following criteria:

- Near an electrical outlet (Avoid using an outlet controlled by a switch)
- An indoor, dry location, where operating temperatures are not below 32° or above 158° Fahrenheit (0 degrees or above 70 degrees Celsius)
- Avoid direct sunlight
- Access to sprinkler wire (from valves)

2. Mounting the Sprinkler Timer

- Using the mounting template (included) mark the screw locations on the wall.
- Insert a No. 8 screw (included) in the upper mark, leaving the screw head about 1/8th (3mm) out from the wall. (Use the expanding anchors in plaster or masonry if necessary.)
- Slip the keyhole slot in the back of the sprinkler timer over the extended screw. *[See Figure 23]*
- Screw a No. 8 screw through the two holes located behind the batteries in the battery compartment.

3. Install the Batteries

Two AA alkaline batteries are required to retain the program in memory during power loss. Annual replacement is recommended.

- Remove the battery cover by sliding it to the left. *[See Figure 24]*
- Insert two AA alkaline batteries
- Replace the battery cover

Note: *Batteries alone will not operate the valves in your sprinkling system. The 24-volt transformer must be plugged in and have power to operate your system normally.*

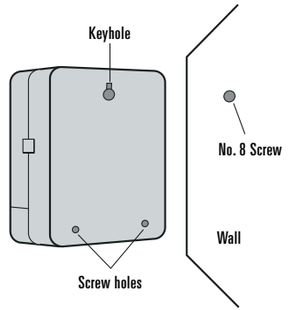

Figure 23: Mounting the Sprinkler Timer

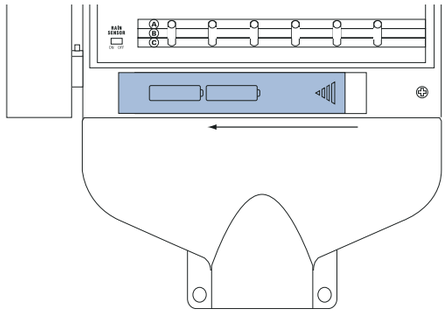

Figure 24: Battery Compartment

4. Connecting the Transformer

- With the cover off, find the two terminal holes labeled "**24VAC IN**" *[See Figure 25]*
- Insuring the transformer is not plugged in; insert one of two power leads (from the transformer) into each terminal.

Note: *It may be necessary to open the terminal to allow for wire insertion or removal. This is done by pressing upward on the tab located on top of the terminal.*

- Plug in the transformer.

Warning: Do not link two or more sprinkler timers together with one transformer.

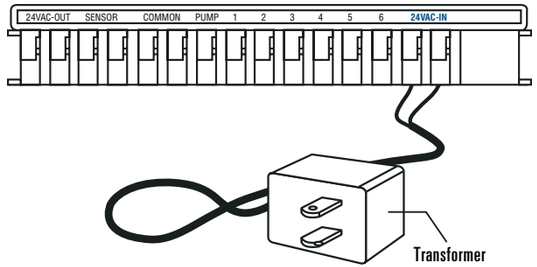

Figure 25: Connecting the Transformer

Section 8: Wiring Valves, Sprinkler Timer, Pump Start and Master Valves

1. Wiring the Electric Valves

Note: *If the distance between the sprinkler timer and valves is under 700' (210 m), use Orbit® sprinkler wire or 20 gauge (AWG) plastic jacketed thermostat wire to connect the sprinkler timer to the valves. If the distance is over 700' (210 m), use 16 gauge (AWG) wire.*

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- Taking the sprinkler wire, strip 1/2" (12 mm) of the plastic insulation off the end of each individual wire.
- Connect one wire from each valve (it doesn't matter which wire) to a single "Common" sprinkler wire (usually white) *[See Figure 26]*

Important: *All wires should be joined together using wire nuts, solder, and/or vinyl tape. For additional protection to waterproof connections, an Orbit® grease cap can be used.*

- Next connect the remaining wire from each valve to a separate colored sprinkler wire.
- To avoid electrical hazards, only one valve should be connected to each station.

Important: *The wire can be buried in the ground; however, for more protection wires can be pulled through PVC pipe and buried underground. Be careful to avoid burying the wires in locations where they could be damaged by digging or trenching in the future.*

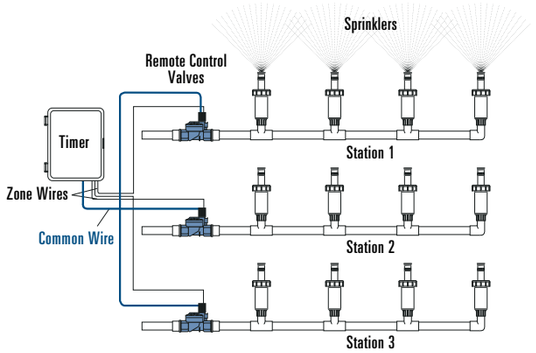


Figure 26: Connecting Sprinkler Wires to Valves

2. Connecting Valve Wires to the Sprinkler Timer

- Remove the terminal compartment cover.
- Strip 1/4" (6 mm) of the plastic insulation off the end of each wire.
- Determine which valve you want to connect to which station. Connect each sprinkler wire (excluding the "Common" wire) to a separate station terminal (numbered above each blue tab) by inserting the bare wire fully into the hole under each tab. *[See Figure 27]*
- It may be necessary to open the terminal to allow for wire insertion or removal. To do this, simply press upward on the tab located on top of the terminal.
- Connect the common wire to the terminal (white in color) labeled "COMMON".

Note: *Only insert one wire into each terminal. If more than two common wires are required, splice several together so only one wire runs into each of the two "Common" terminals. Protect the splice connection with a wire nut.*

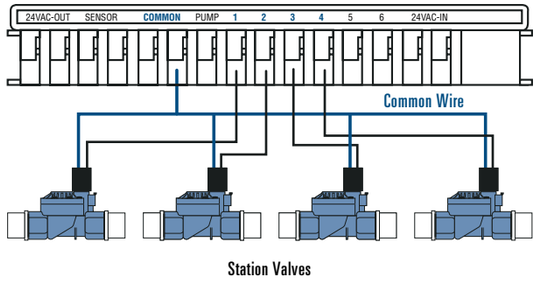


Figure 27: Connecting Sprinkler Wire

3. Pump Start & Master Valve

This sprinkler timer allows a master valve or pump start relay to operate whenever a station is on.

Note: *If you are activating a pump from this timer, you must purchase a Pump Start Relay.*

From the pump start relay (or master valve); connect one wire to the "**Pump**" terminal and the other wire to the "**Common**" terminal. *[See Figure 28]*

Section 9: Diagnostics Circuit Breaker

Smart-Scan® Diagnostic Fault Sensing

A diagnostic fault sensor will automatically scan for the presence of a faulty solenoid or wiring short in a valve during each watering sequence. If a faulty station is detected, the sprinkler timer will move to the next working station. Smart-Scan® also detects faulty wiring for the Pump or Master Control. Upon detection watering cycle is discontinued.

Fault Notification

- Faulty Station - "**FAULT STN**" and station number, is displayed. Note: When multiple faulty stations are detected, only the last faulty station will be displayed.
- Faulty wiring for pump/master control - "**PUMP FAULT**" is displayed.

Correcting the Fault:

1. First repair the short in the wiring or replace the faulty solenoid.
2. Test the station by operating a manual watering sequence.
3. If the short is not detected after a few seconds, the fault notification message will be terminated.
4. If the message continues, a short in the wiring still exists.

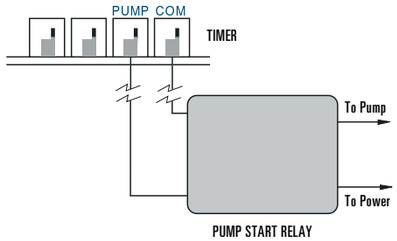


Figure 28: Connecting pump start or master valve

Internal Auto-Resetting Electronic Circuit Breaker

The sprinkler timer is equipped with an internal electronic self-resetting circuit breaker.

Possible causes of a circuit breaker tripping:

1. If lightning strikes nearby.
2. When the power supply has an electric spike.
3. If a station has a wiring short.

Whenever one of these conditions occurs, the electronic circuit breaker may trip causing the station output from the sprinkler timer to be halted momentarily. The batteries will continue to store the program information and activate the LCD. After a few moments, the sprinkler timer will automatically retest the circuit to see if the condition has stopped. If so, the circuit breaker will reset itself.

Section 10: Trouble Shooting

	Symptom	Cause	Correction
LCD Displays	POWER RESET	Power Surge	See Page 3
	FAULT STN	Faulty solenoid	Replace
		Short in sprinkler wire	Check wire connections
			Look for cuts in sprinkler wire or replace
	PUMP FAULT	Short in sprinkler wire going to pump	Look for cuts in sprinkler wire or replace
	NO AC	Transformer not plugged in (indoor models)	Ensure transform is securely plugged in
		Permanent wiring is not connected or connected improperly (outdoor models)	See Page 21
		Main residential power is not on	Check circuit breaker or fuse
	Blank or partial LCD	Missing or low battery and no AC power	Replace batteries and check AC power
		Reset button needs to be pushed	Re-enter program(s)
Watering Problems	One or more stations do not turn on	Programming incorrect	See Page 5
		Flow control stem on valve is turned off	Check valve
		Watering Duration Slide Switch is on "MANUAL OFF"	Slide the switch to a watering duration
		Watering Duration Slide Switch is on "DIAL SET BY MINUTE"	Enter a watering duration (See page 8) or slide the switch to a watering duration
		Program Slide Switch is not on the correct Program (A, B, C)	Slide the Program Switch to the correct program
		Sprinkler Wire is not connected to timer or valve	Connect wiring
		The rotary dial is not on "Auto"	Turn the dial to Auto
		Water Supply is not supplying water	Make sure main valve is turned on
	Stations turn on when they are not supposed to	Excessive Water Pressure	Install a pressure reducer
		More that one start time is programmed and/ or with overlapping "start times" or "programs"	Review programming (See page 9)
		Water Restrictions program is preventing watering	See Page 12
		Station Delay is active	See Page 14
	A Station will turn off	**Watering Duration Slide Switch** is on MANUAL ON	Slide Watering Duration Slide Switch to "MANUAL OFF"
		Valve may be clogged by debris	Clean Valve
	LCD shows watering program running but sprinklers do not turn on	Rain Sensor Bypass switch is "ON" but no rain sensor is connected.	Turn rain sensor switch "OFF"

Glossary of Terms

TERM	DEFINITION
Controller	See sprinkler timer
Cycle Start Time	The time the program begins watering the first station
Irrigation Valve, Automatic	Used in conjunction with sprinkler timers and are a convenient way of delivering water to lawns, plants and gardens
Master Valve	A valve that prohibits water from reaching "Station Valves"
Multiple Start times	A feature that allows a program to be operated multiple times on the same day
Overlapping Programs	When a "Start Time" is set before the previous program has completed
Program (A, B or C)	Consists of 1 or more "Start Time(s)," a "Watering Option" (Days of Week, Interval or Odd/Even Days) and what stations will water
Rain Delay	A feature that prevents the sprinkler timer from running it's scheduled watering program for a specific duration
Solenoid	The electrical part on an irrigation valve that opens and closes the valve
Sprinkler Timer	A device that is responsible for turning an automatic irrigation system on and off
Station	An area where the irrigation is all controlled by a single control valve
Valve	See irrigation valve
Watering Option	Consists of Days of Week, Interval or Odd/Even Days use in programming
Watering Program	See program
Watering Restriction	Specific days and/or times that local municipalities prohibit watering
Zones	See station

Appendix A: Installation of Indoor-Outdoor Sprinkler Timers

1. Selecting a Location

Select a location with the following criteria:

- Near a power source (if hard wiring) or electrical outlet (applicable only to U.S. retail timers)
- A location, where operating temperatures are not below 32° or above 158° Fahrenheit (0 degrees or above 70 degrees Celsius)
- A location, with at least 7" of space is to the left of the sprinkler timer box for the door to swing open after installation

Note: *The sprinkler timers are weather-resistant to UL-50 and ETL® Listed, but should not be placed in areas where continuous water could cause damage.*

- A location without direct sunlight
- Access to sprinkler wire (from valves)

Caution: Do not open the Sprinkler Timer when it is raining.

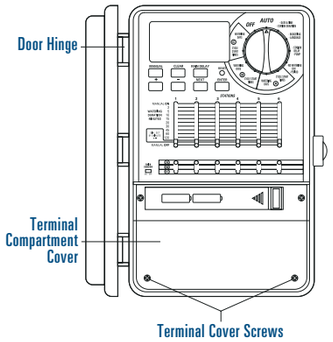


Figure A1: Terminal Cover Figure

2. Mounting Sprinkler Timer

- Using the mounting template (included) mark the screw locations on the wall.
- Insert a No. 8 screw (included) in the upper mark, leaving the screw head about 1/8th inch (3mm) out from the wall. (Use expanding anchors in plaster or masonry if necessary)
- Remove the "**Terminal Cover**" by unscrewing the two screws and pulling the plastic cover forward, this reveals the "**AC Sub Plate**". *[See Figure A1]*
- Remove the "**Rubber Weather Plug**" from "**AC Sub-Plate**". *[See Figure A2]*
- Slip the slotted keyhole, in the back of the Sprinkler Timer, over the screw. *[See Figure A3]*
- Making sure the Timer is level, place a No. 8 screw (included) in the center depression (located in the hole where the rubber plug was located) and tighten until the box is held firmly to the wall, but do not over-tighten.

To make installation easier the Sprinkler Timer has a removable door.

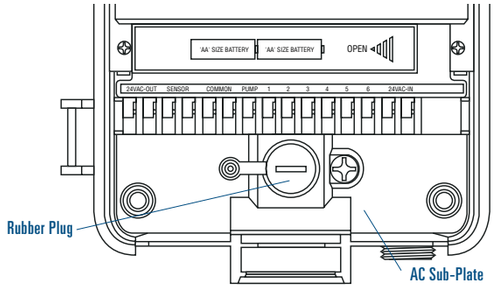


Figure A2: AC Sub-Plate

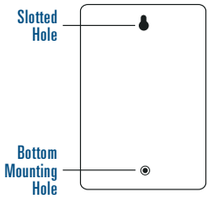


Figure A3: Back of Sprinkler Timer

3. Connecting Electrical Power

Caution: *For outdoor installation it is recommended that a qualified electrician completes wiring in accordance with electrical codes and regulation. This sprinkler timer is intended for use with a Ground Fault Interrupter (GFI) protected circuit when used outdoors.*

Check the model number of your sprinkler timer: various models are configured differently to meet national requirements. The model number can be found on the back of the housing, together with other useful information.

FIND YOUR MODEL BELOW AND GO TO THE APPROPRIATE SECTION

Models 57396, 57392, 57384, 57386, 57388, 57382
- Go to the Fitted Line Cord section below.

Models 57606, 57012, 91016, 91012
- For Indoor mounting go to Fitted Line Cord Installation section below
- For Outdoor mounting go to Preparing for Permanent Wiring section below

Models 57344, 57346, 57348, 57342, 94022, 94026, 94028
- Go to "Permanent Wiring" section

FITTED LINE CORD INSTALLATION

Replacement of the supply Cord*: If the supply cord is damaged it must be replaced by a service agent or similarly qualified person in order to avoid a hazard*

- **Indoor Locations** - Insert the line cord into Ground Fault Interrupter (GFI) outlet.
- **Outdoor Locations** - Insert the line cord into a power Ground Fault Interrupter (GFI) outlet connected to a GFI circuit.
- Proceed to Section 8 on page 15

PREPARING FOR PERMANENT WIRING

- Remove the "**Terminal Cover**" by unscrewing the two screws and pulling the plastic cover forward, this reveals the "**AC Sub-Plate**" *[See Figure 30]*
- Remove the "**AC Sub-Plate Cover**," by removing the screw (located to the right of the rubber plug).
- Loosen the screw on the "**Cord Restraint**" and the three screws on the terminal block and remove the "**Line Cord**" completely. *[See Figure A4]*
- Feed the three "**Pigtail**" wires of the pigtail through the "**Exit Nipple**," under the "**Cord Restraint**", and across to the terminal block. Connect the wires to the "**Terminal Block**" in the following manor:
  - Black "pigtail" wire – Connect to the "**L**" terminal (Hot)
  - White "pigtail" wire – Connect to the "**N**" terminal (Neutral)
  - Green "pigtail" wire – Connect to the "**E**" Terminal (Ground)
- Ensure that the terminal screws and the "**Cord Restraint**" relief screw are all firmly tightened.
- Replace the AC Sub-Plate and tighten screw (Do not force into place, if resistance is met check that no wires are trapped)
- Proceed to "Installation using Permanent Wiring".

INSTALLATION USING PERMANENT WIRING

Important: *The sprinkler timer has a built-in transformer that must be connected to an AC line voltage source. Check the back of the sprinkler timer box for power requirements. Local building and electrical codes usually require that an approved electrical conduit and electrical fittings be used to connect exterior wall-mounted equipment to AC power. Please check local codes. Any permanent connection should be made by a licensed electrical contractor in accordance with the requirements of the National Electrical Code and other state and local codes.*

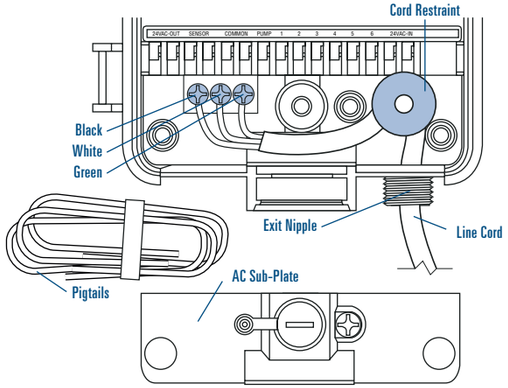


Figure A4: Removing "Line Cord"

Caution: *Do not connect the sprinkler timer to one phase of a three-phase power system used by a pump or other electrical equipment.*

Important: *This sprinkler timer has an Exit Nipple-mounted external power connection. Use this 1/2 inch (13mm) NPT nipple to connect the sprinkler timer to a standard electrical junction box (UL Listed or equivalent or comply with IEC or EN standards or equivalent).*

- Turn off the AC power at the AC circuit breaker and apply an appropriate safety lockout. Verify that the power has been turned off to the installation site using an AC voltmeter set for the correct measurement range.
- Use power feed wire of 14 gauge (AWG) minimum with a temperature rating of 155 degrees Fahrenheit (68 degrees Celsius) or higher.
- Install the conduit and associated fittings. Connect the AC electrical power wiring to the source by following all the right codes and local standards.
- Connect the junction box (not included) to the NPT nipple. *[See Figure A5]*
- Connect the source power conduit to the entrance of the junction box, following all the appropriate codes.
- Connect the source wires to the wires extending from the sprinkler timer.
- Take care to follow the correct color code. For USA: connect the Green for Ground, Black for Live, and White for Neutral. Often the source ground may be bare copper conductor rather than green wire. For Europe: Live is Brown and Neutral is Blue, there is no ground connection required. Be sure that all wires are connected to the proper source wire.
- Make sure all connections are made with code-approved insulated connectors.
- Be sure to place a weatherproof gasket and lid on the junction box.
- Proceed to Section 8 on page 15

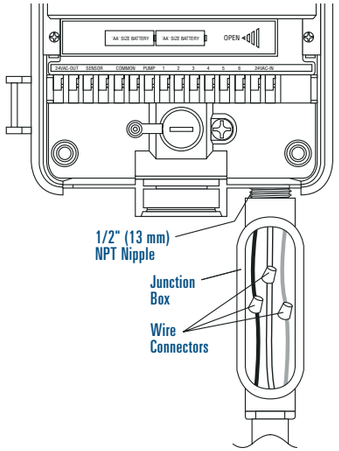


Figure A5: Using a Junction Box

Appendix B: Rain Sensor and the Rain Sensor Bypass Switch (Sensor sold separately)

A rain sensor or other type of micro-switch weather sensor may be connected to the sprinkler timer. The purpose of the sensor is to stop watering when precipitation is sufficient.

CONNECTING A RAIN SENSOR

- Connect the rain sensor wires to the wiring terminal ports (yellow in color) labeled "**Sensor**" *[See Figure B1]*

Note: *Refer to your rain sensor manual for specific wiring instructions.*

- Place the sensor on/off switch to the "**on**" position to begin operation.

RAIN SENSOR BYPASS

This sprinkler timer is equipped with a sensor override "on/off" switch. This switch is for use during maintenance and repairs, so the sprinkler timer can be operated even if the rain sensor is in active mode.

IMPORTANT: *If the rain sensor switch is in the "on" position and no sensor is connected, the sprinkler timer will not operate. To resume sprinkler timer operation place the switch in the off position.*

24 Volt Output Terminals

Orbit® Irrigation has equipped this sprinkler timer with 24 VAC output terminals. This allows direct 24 volt connection to the Sensor, avoiding the need to run a separate power source. This is not an input terminal and should only be used with an Environmental Sensor.

Caution:

1. Before connecting the sensor to the **24 VAC output** terminals, turn off the power supply to the sprinkler timer.
2. Only connect sensors requiring 24 volts. Connecting any device not 24 volt may cause damage to both sprinkler timer and sensor.
3. Please consult with the manufacture of the sensor you are attaching.
4. The appliance is not intended for use by young children or infirm persons without supervision
5. Young children should be supervised to ensure that they do not play with the appliance

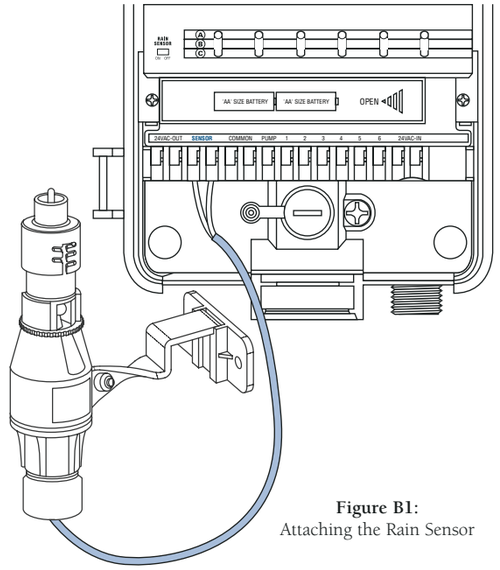
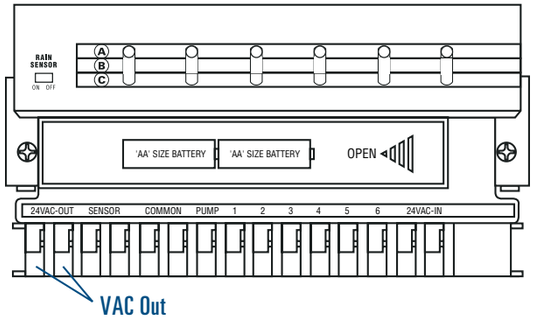


Figure B1:
Attaching the Rain Sensor



Help

Before returning this sprinkler timer to the store, contact Orbit® Technical Service at: 1-800-488-6156, 1-801-299-5555

Listings

The sprinkler timer is tested to UL-1951 (Models 57004, 57006, 57008, 57122) and UL-50 (Models 57606, 57012) standard and is ETL® listed. Appropriate international models are CSA® and CE® approved.

Trademark Notice

Control Star®, and Smart-Scan® are registered trademarks of Orbit® Irrigation Products, Inc. The information in this manual is primarily intended for the user who will establish a watering schedule and enter that schedule into the sprinkler timer. This product is intended to be used as an automatic sprinkler timer for activating 24 VAC irrigation valves, as described in this manual.

Orbit® Irrigation Limited Six Year Warranty

Orbit® Irrigation Products, Inc. warrants to its customers that its products will be free from defects in materials and workmanship for a period of six years from the date of purchase.

We will replace, free of charge, the defective part or parts found to be defective under normal use and service for a period of up to six years after purchase (proof of purchase required).

We reserve the right to inspect the defective part prior to replacement. Orbit® Irrigation Products, Inc. will not be responsible for consequential or incidental cost or damage caused by the product failure. Orbit® liability under this warranty is limited solely to the replacement or repair of defective parts.

To exercise your warranty, return the unit to your dealer with a copy of the sales receipt.

Safety of children: *The controller is not intended for use by young children or infirm person without supervision. Young children should be supervised to ensure they do not play with controller.*

6. Enclosure Ventilation

KDT Series

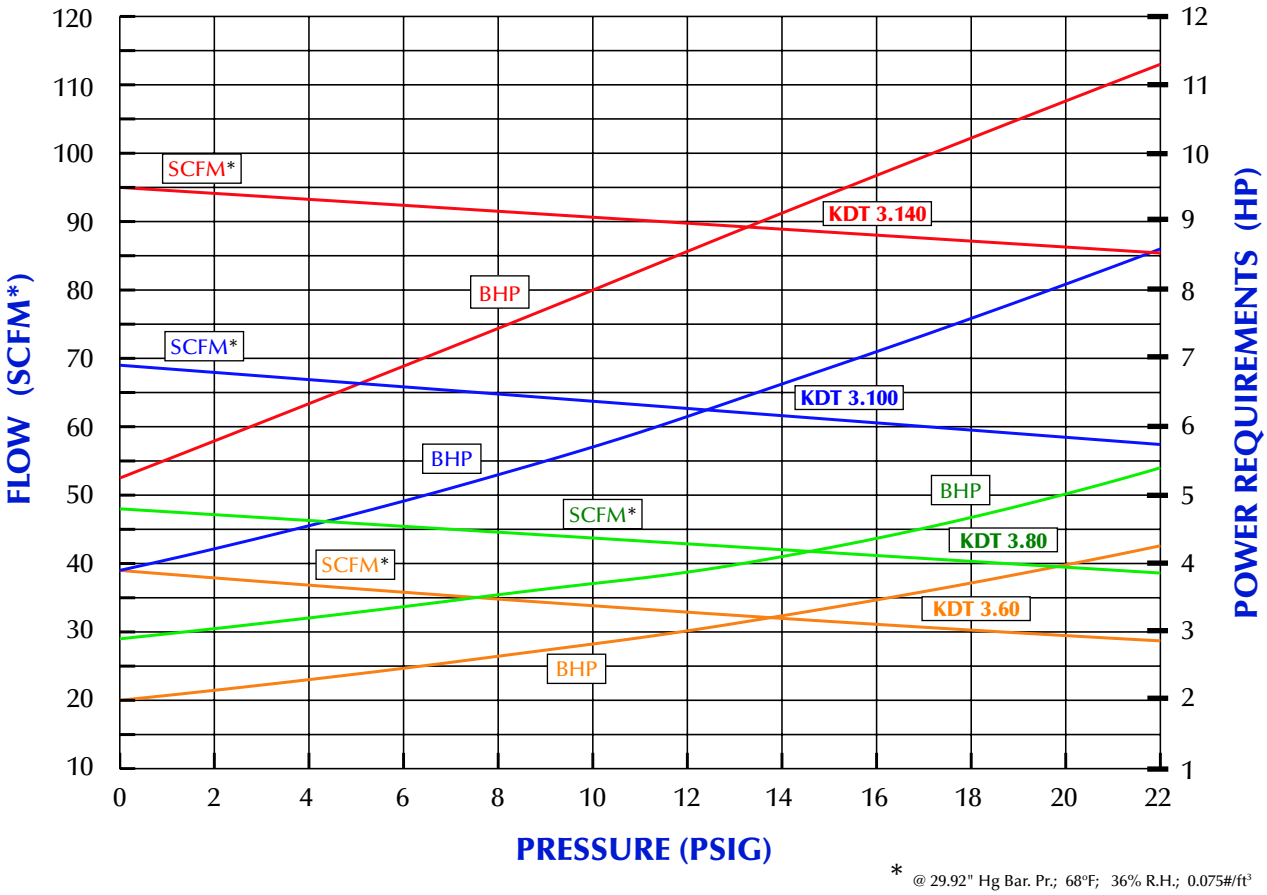
ISO 9001 Certified
CE Compliant

100% OIL-LESS COMPRESSORS

The Becker KDT series is a line of 100% Oil-less, rotary vane, low pressure compressors. They are designed to operate on a continuous basis throughout a pressure range from atmospheric pressure to 22 PSIG.

Each KDT unit is a direct drive compressor and is supplied with a TEFC flange mounted electric motor. Each unit is equipped with inlet and discharge filters, a pressure regulating valve, and vibration isolators as standard equipment, all of which are an integral part of the compressor.

The Becker KDT compressor is ideal for applications where air is the gas and where operation is in the low pressure range where high pressure compressors are less efficient. Applications for the KDT compressor include graphic arts, soil remediation, pneumatic conveying, robotics and material handling, packaging, and paper converting.



* @ 29.92" Hg Bar. Pr.; 68°F; 36% R.H.; 0.075#/ft³

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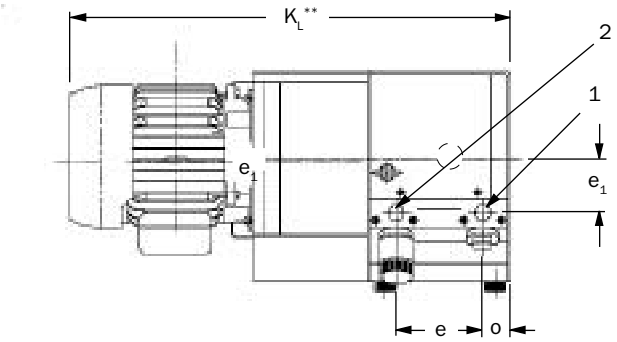
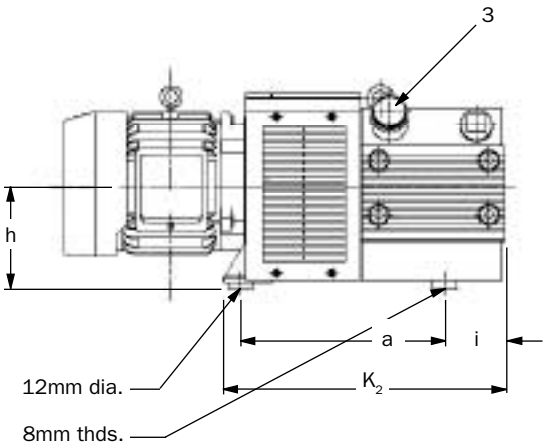
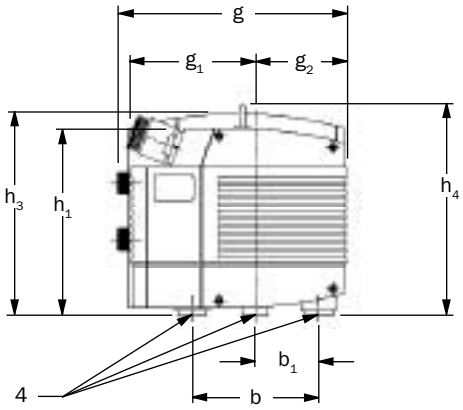
TECHNICAL DATA



Top View



Side View



End View (Opposite Motor End)

All data based on 60 Hz operation

	KDT 3.60	KDT 3.80	KDT 3.100	KDT 3.140
Flow (SCFM @ 0 PSIG)	39	48	69	95
Horsepower	5*	7 1/2*	10*	12*
Speed (RPM)	1740	1740	1740	1740
Maximum Pressure (PSIG)	22	22	22	22
Weight (lbs.)—w/o motor	104	108	156	172
Weight (lbs.)—w/ motor**	191*	265*	323*	368*
Noise Level (Max. dBA)	74	76	78	84
Outlet size (BSP, inches)	1	1	1 1/2	1 1/2
Dimensional Data	(Inches)			
a	12.83	12.83	15.67	15.67
b	7.5	7.5	9.65	9.65
b_1	3.75	3.75	4.82	4.82
e	5.43	5.43	7.5	7.5
e_1	2.56	2.56	3.75	3.75
g	13.9	13.9	18.5	18.5
g_1	7.68	7.68	8.78	8.78
g_2	5.55	5.55	9.06	9.06
h	6.38	6.38	6.38	6.38
h_1	11.38	11.38	11.7	11.7
h_3	12.28	12.28	13.0	13.0
h_4	12.9	12.9	13.25	13.25
i	3.78	3.78	5.5	5.5
k_2	17.64	17.64	22.17	22.17
k_L	28.2	30	34.15	36.6
o	1.81	1.81	2.36	2.36

Manufacturer reserves right to alter data without notice.
* Operation at lower pressure may use smaller motor.
** May vary with motor type and manufacturer

1 - Inlet Port
2 - Discharge Port
3 - Pressure Relief Valve
4 - Vibration Isolators

3LIT0006 • 2/00

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Operating Instructions
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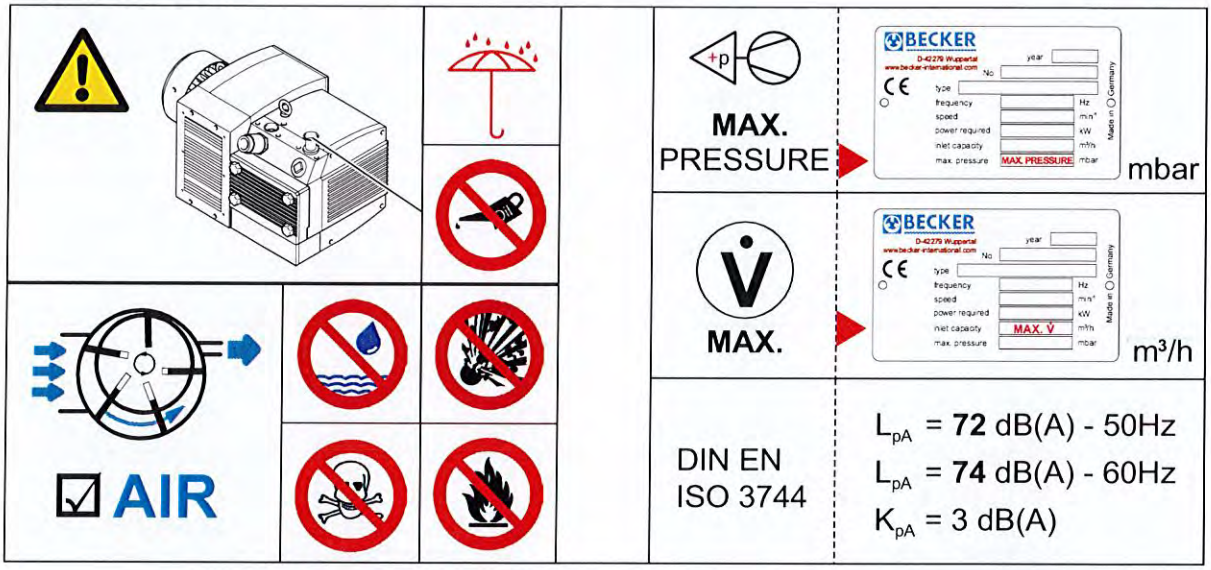
Istruzioni d'uso
Handleiding
Instrucciones para el manejo
Manual de instruções
Naudojimosi instrukcija
Kasutusjuhend
Lietošanas instrukcija
Driftsinstruks
Driftsinstruktioner
Käyttöohje
Driftsvejledning
Instrukcja obsługi

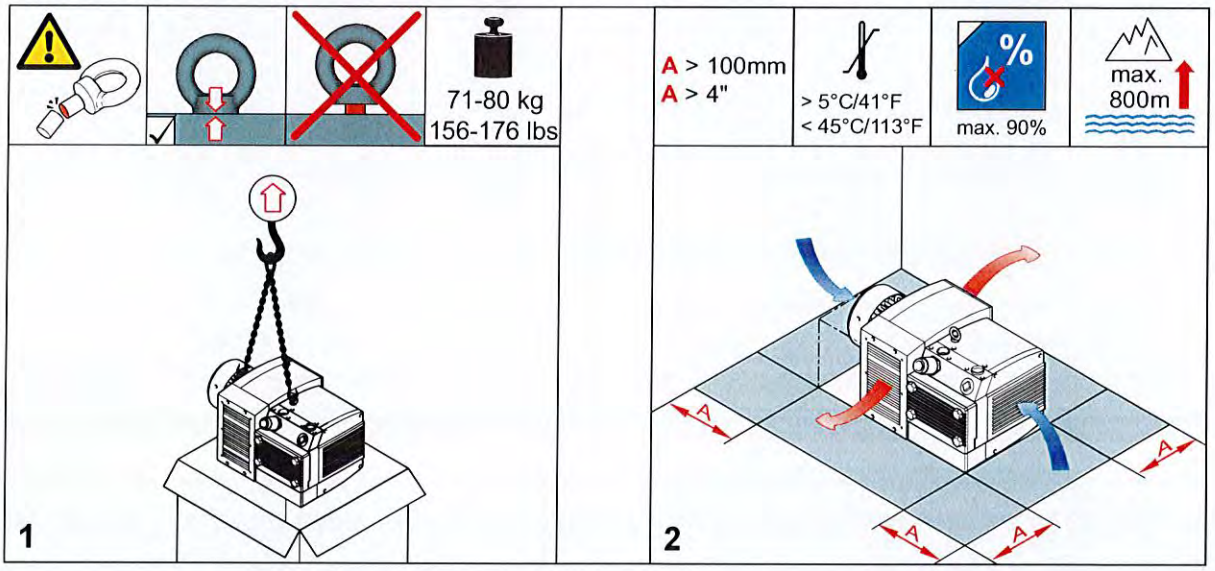
Kezelési útmutató
Návod k obsluze
Navodilo za uporabo
Návod na obsluhu
Upute za rad
Manual de operatii
Treoracha Oibriúcháin
Οδηγίες χρήσης
El Kitabi
Инструкции за експлоатация
Инструкция по эксплуатации
取扱説明書
사용설명서
使用说明书

KDT 3.60

2006/42/EG

DIN EN ISO 9001
001929 QM
DIN EN ISO 14001 2015





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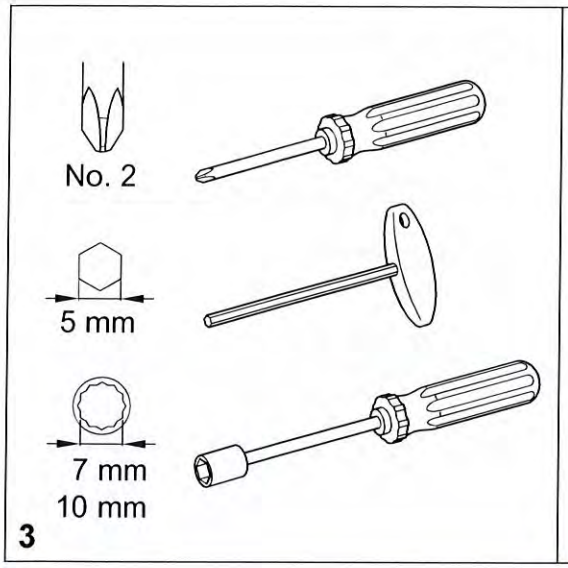
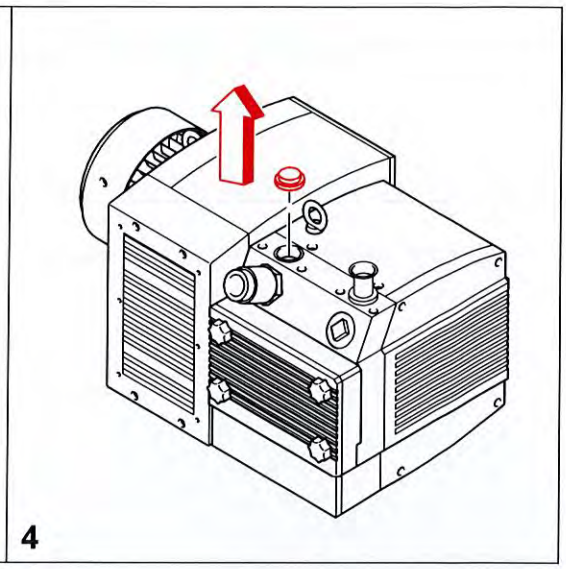

No. 2
5 mm
7 mm
10 mm
3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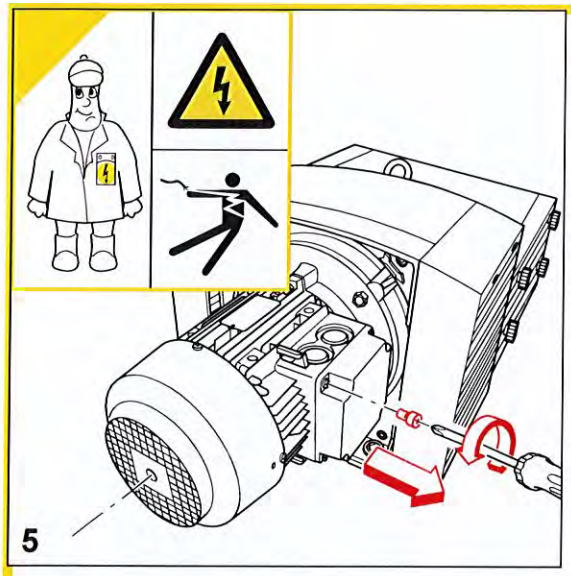
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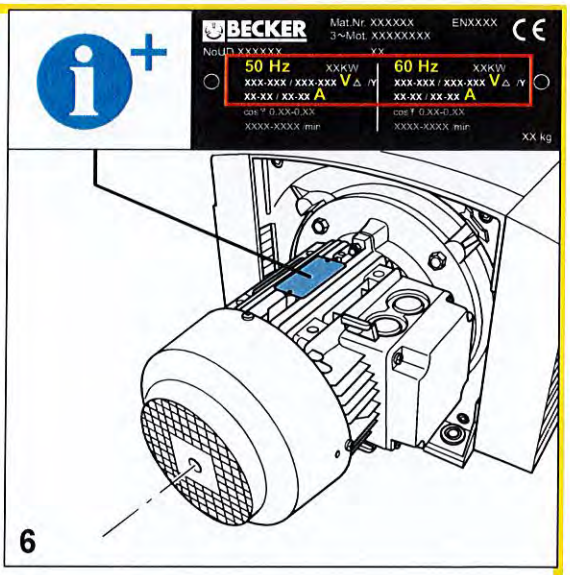
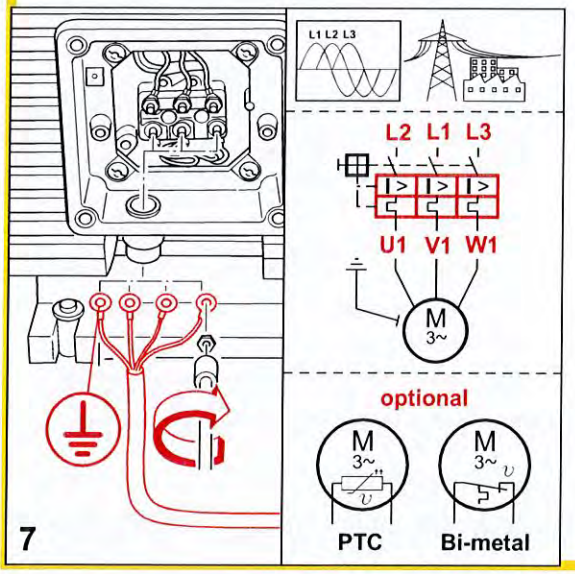
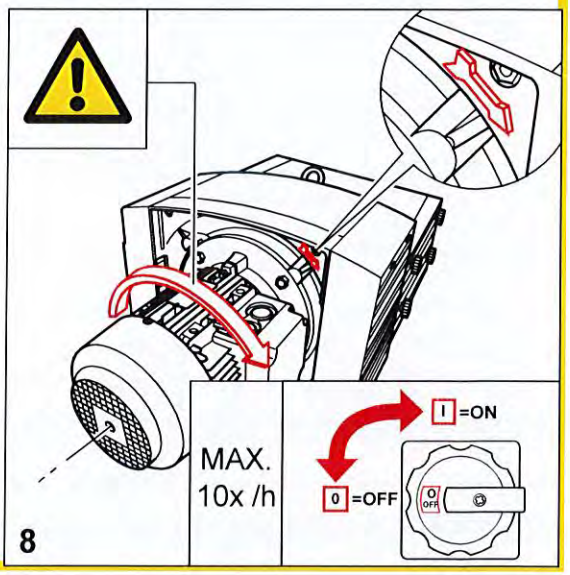
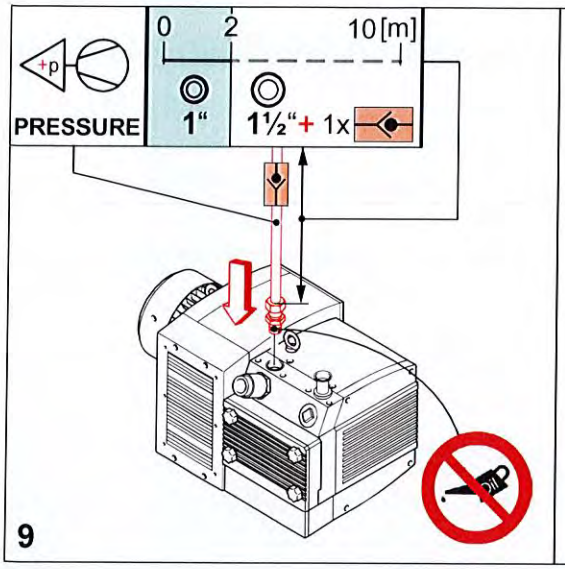

BECKER
50 Hz
60 Hz
6


L1 L2 L3
L2 L1 L3
U1 V1 W1
M
3~
optional
PTC
Bi-metal
7


MAX.
10x /h
I =ON
0 =OFF
8


PRESSURE
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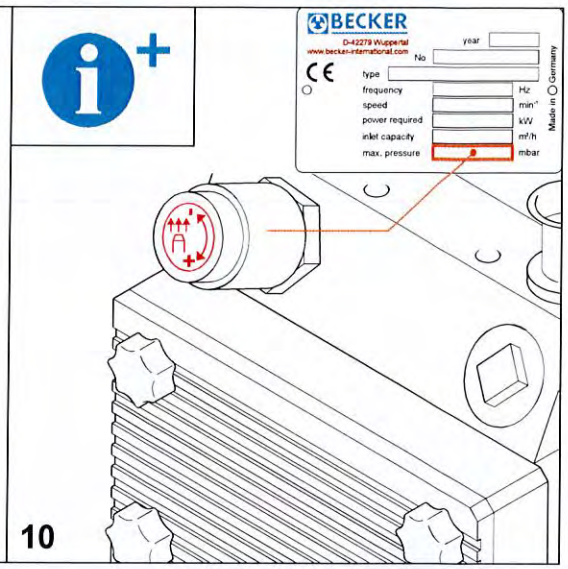
2
10 [m]
1"
1½"+ 1x

9


BECKER
D-42279 Wuppertal
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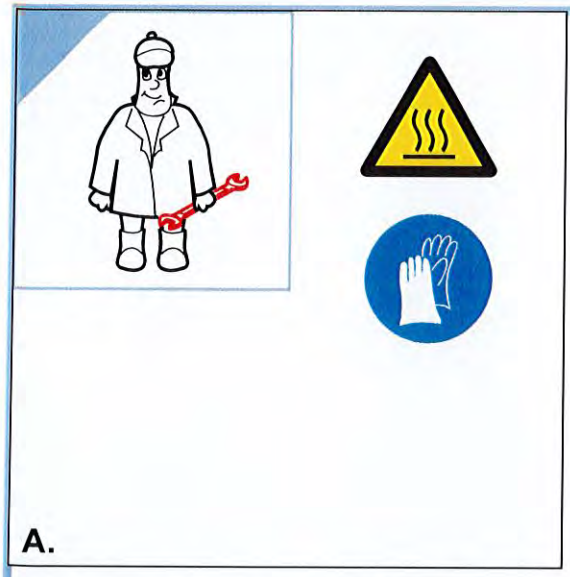
year
No
type
frequency
speed
power required
inlet capacity
max. pressure
Hz
min⁻¹
kW
m³/h
mbar
Made in Germany

10



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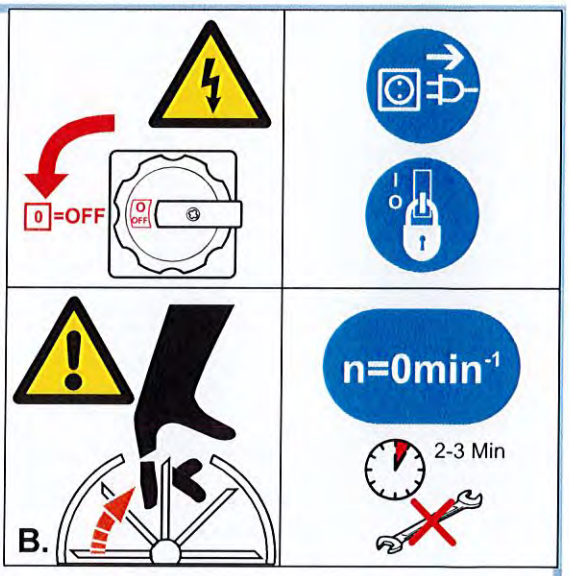
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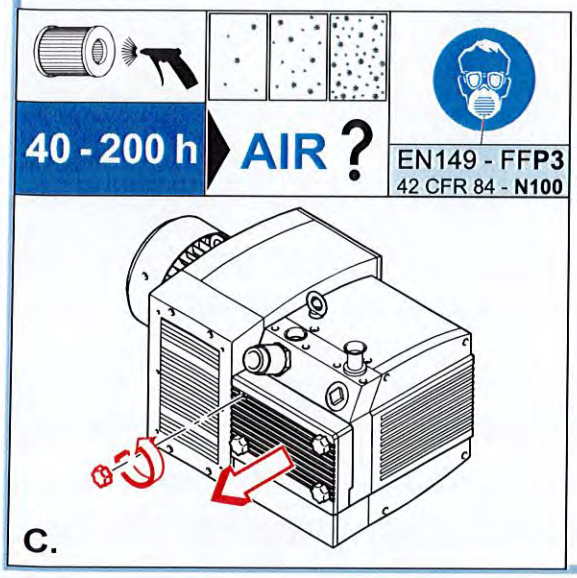
n=0min⁻¹
2-3 Min

B.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AIR ?
EN149 - FFP3
42 CFR 84 - N100

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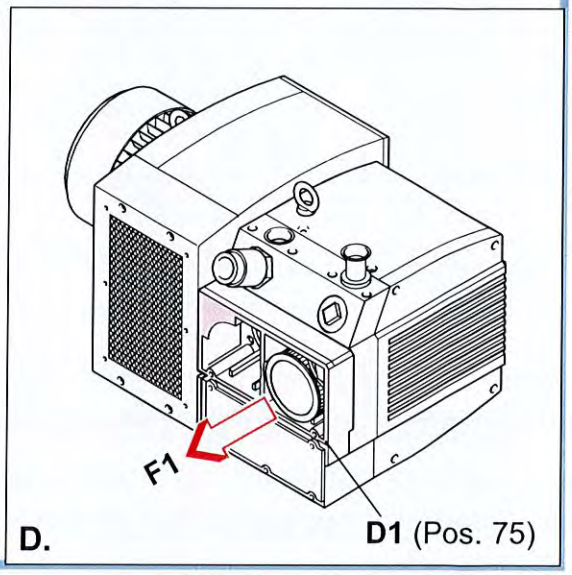
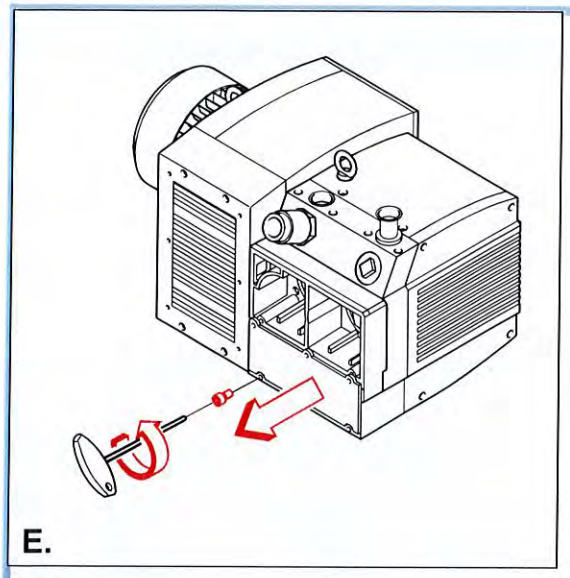

F1
D1 (Pos. 75)

D.



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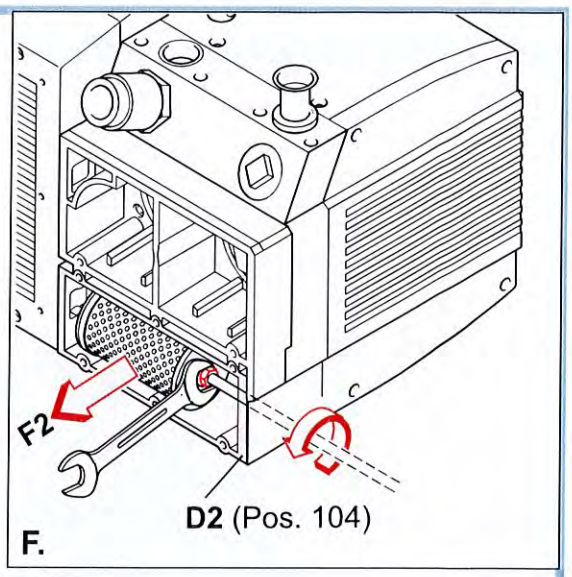

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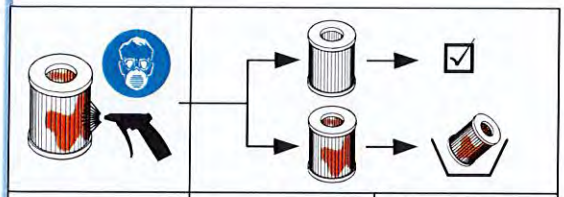
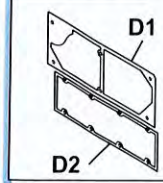
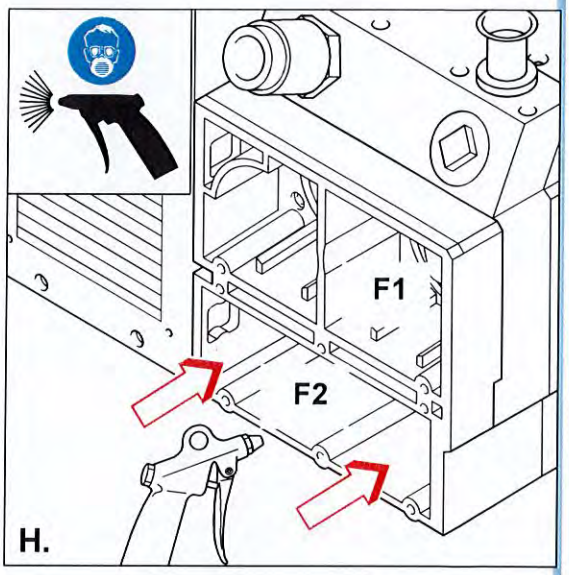


F1 (standard)	F1* (polyester) KDT 3.60/**6**	F2 (standard)
No.: **909507**	No.: **909587**	No.: **909510**



Satz / Kit
Pos.: 20, 24, 62, **75**, 76, 85, **104**, 125, 126, 127, 146, 288

No.: **549000 21100**



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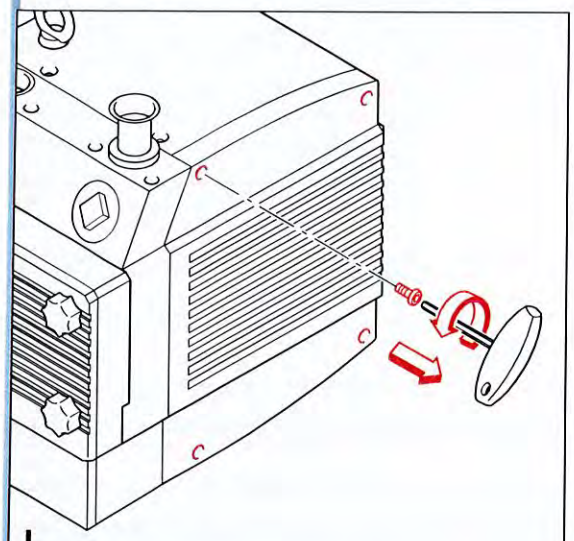

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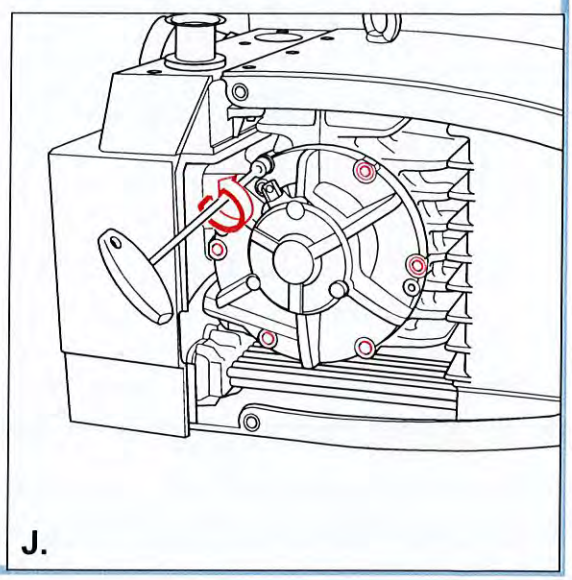

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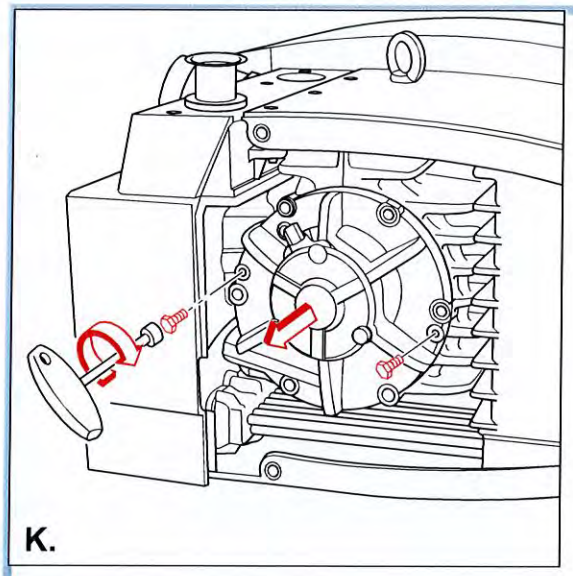

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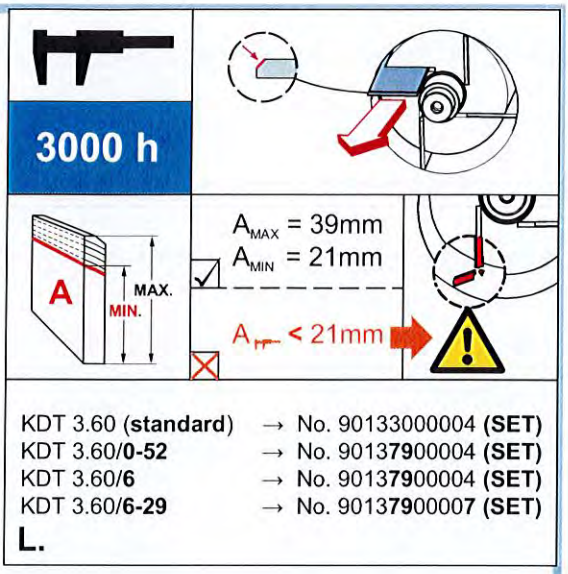
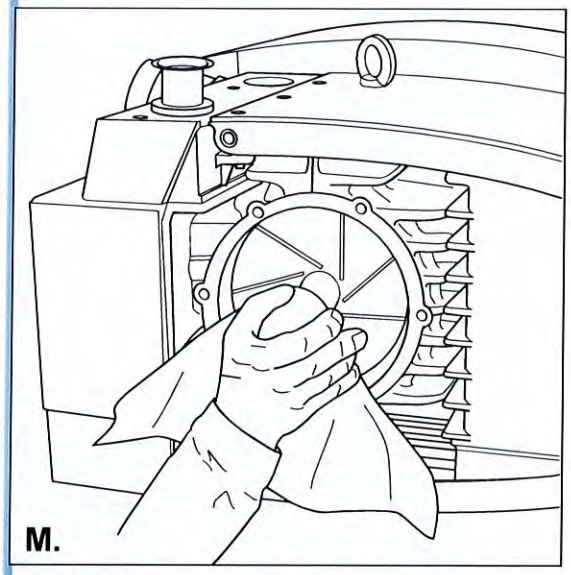


KDT 3.60 (**standard**) → No. 90133000004 **(SET)**
KDT 3.60/**0-52** → No. 90137900004 **(SET)**
KDT 3.60/**6** → No. 90137900004 **(SET)**
KDT 3.60/**6-29** → No. 90137900007 **(SET)**

L.



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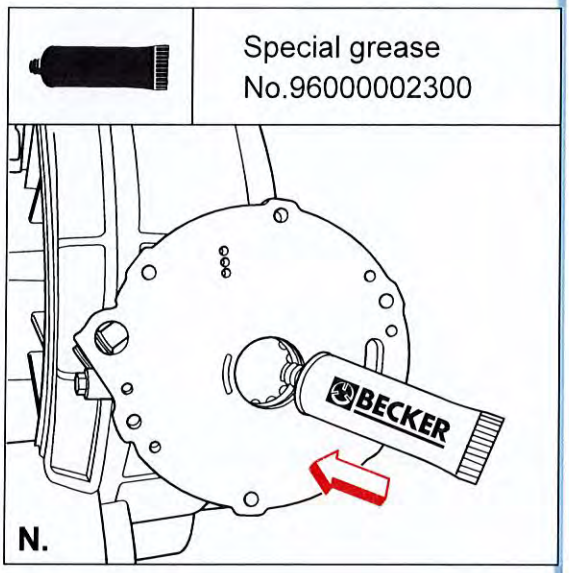

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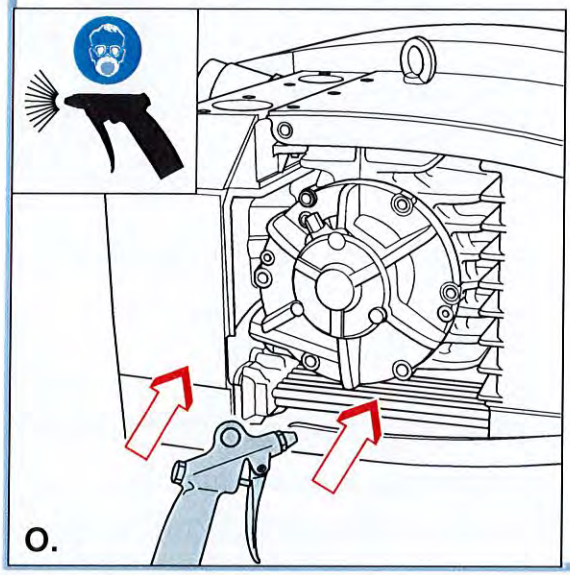

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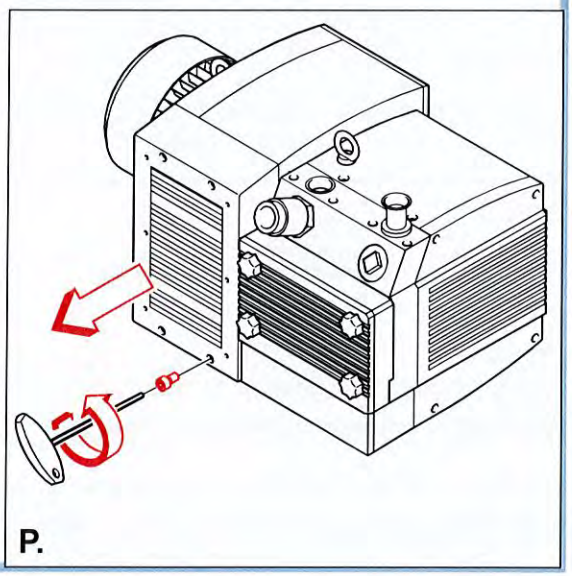

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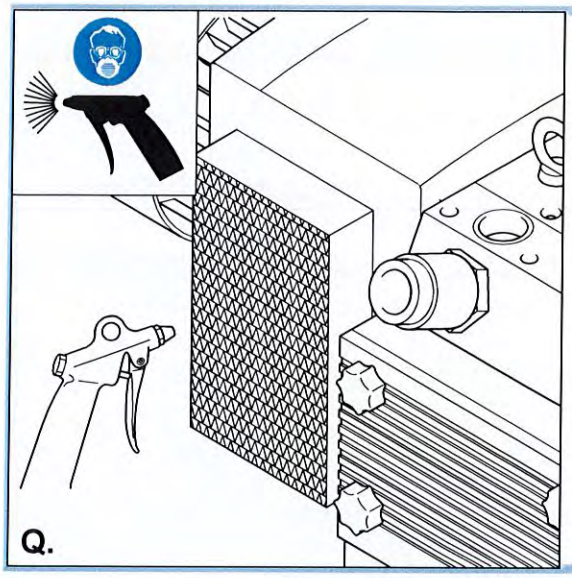

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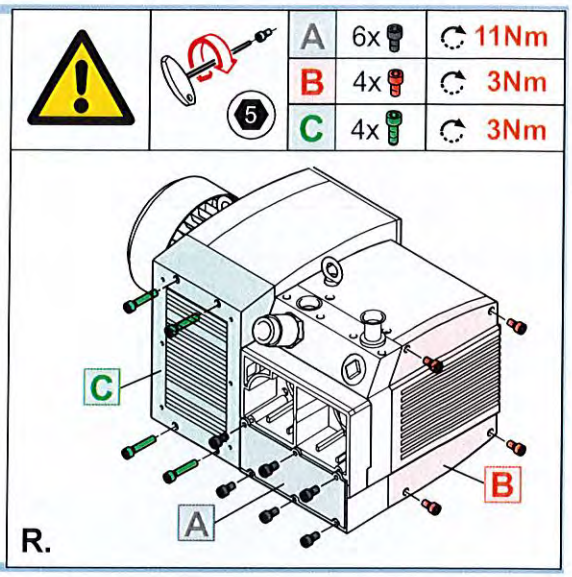

R.

BECKER

Gebr. Becker GmbH
Hölker Feld 29-31
D-42279 Wuppertal
info@becker-international.com

Please read and save these instructions. Read carefully before attempting to assemble, install, operate or maintain the product described. Protect yourself and others by observing all safety information. Failure to comply with instructions could result in personal injury and/or property damage! Retain instructions for future reference.

Dayton® Utility Shutter-Mounted Exhaust Fans

Description

Dayton utility exhaust fans are designed for general purpose exhaust applications and may be used in stores, offices, factories, shops, farm buildings, greenhouses, etc. Efficient, easy-to-install exhaust fans with automatic shutters. Model 1HKL9, 7" Shutter fan fits in half of an 8 x 16" concrete block. Shutter flanges have eight pre-punched 1/4 x 1/2" slotted mounting holes for ease of installation. 7 to 36" diameter deep pitched propeller. Fan guards have charcoal grey metallic polyester finish to resist corrosion. Wire guards comply with OSHA Federal 1/2" max. opening requirement. Shipped completely assembled.

Optional Speed controllers available, see table below.

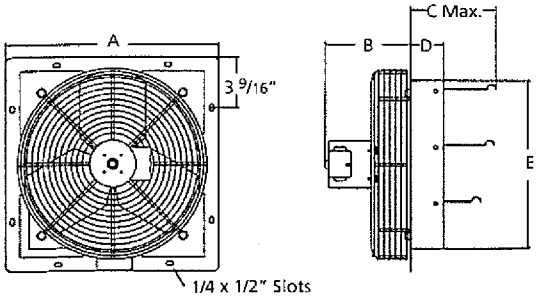

Figure 1 - Dimensions

Unpacking

1. Inspect for any damage that may have occurred during shipment.
2. Shipping damage claim must be filed with carrier.
3. Check all bolts, screws, setscrews, etc. for looseness that may have occurred during transit. Retighten as required.
4. Before installing, rotate the propeller to be sure there are no obstructions which would interfere with proper operation. Adjust as required.

c UL E307468

Dimensions

Model	Prop. Dia.	A Square	B	C	D	E
1HKL9	7"	11 1/8"	4 15/16"	6"	2 3/8"	8"
1HLA1	10	13 1/8	5 9/16	5 1/8	2 3/8	10
1HLA2	12	15 1/8	6	6 1/8	2 3/8	12
1HLA3	16	19 1/8	6 1/2	6 1/8	2 3/8	16
1HLA4	18	21 1/8	8 3/4	6 1/8	2 3/8	18
1HLA5	18	21 1/8	12 1/2	5 3/4	3	18
1HLA6	20	23 1/8	12 1/8	5 3/4	3	20
1HLA7	20	23 1/8	12 1/8	5 3/4	3	20
1HLA8	20	23 1/8	11 9/16	5 3/4	3	20
1HLA9	20	23 1/8	12 1/8	5 3/4	3	20
1HLB1	24	27 1/8	12 5/16	5 3/4	3	24
1HLB2	24	27 1/8	12 5/16	5 3/4	3	24
1HLB3	24	27 1/8	13 5/8	5 3/4	3	24
1HLB4	24	27 1/8	11 13/16	5 3/4	3	24
1HLB5	30	33 1/8	13 1/8	5 3/4	3	30
1HLB6	36	39 1/8	13 1/8	5 3/4	3	36

Performance

Model	Prop. Dia.	CFM @ 0.0" SP	CFM @ 0.125" SP	CFM @ 0.250" SP	Sones@ 0.0" SP @ 5'	Nom. HP	Amps	Nom. RPM	Recommended Speed Control
1HKL9	7"	140	N/A	N/A	4.8	1/30	1.4	1550	1DGV1
1HLA1	10	585	285	N/A	6.6	1/30	1.4	1550	1DGV1
1HLA2	12	800	470	N/A	7.6	1/30	1.4	1550	1DGV1
1HLA3	16	1095	720	N/A	8.0	1/20	1.8	1550	1DGV1
1HLA4	18	1860	850	N/A	8.4	1/15	1.3	1075	1DGV1
1HLA5	18	2590	2190	1705	14.3	1/4	4.5	1725	
1HLA9	20	2830	2255	1235	11.3	1/4	5.0	1725	1DGV2
1HLA8	20	2955	2450	1960	14.4	1/4	4.5	1725	
1HLA7	20	3635	3115	2760	16.9	1/3	4.8	1075	
1HLA6	20	2985	2445	1965	14.3	1/4	4.3	1725	
1HLB3	24	3240	2485	1110	11.7	1/4	4.0	1075	1DGV2
1HLB2	24	3270	2515	1205	10.7	1/4	4.1	1075	
1HLB4	24	3970	3240	1900	12.1	1/3	5.3	1075	
1HLB1	24	3985/3760	3255/2995	1950/1563	11.8/11.3	1/3	5.3	1075	
1HLB5	30	6075	4195	2150	13.5	1/3	4.5	825	
1HLB6	36	8225	6480	2935	14.7	1/2	6.4	825	

Form 5S5617

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Dayton®

ENGLISH

ESPAÑOL

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Dayton® Utility Shutter-Mounted Exhaust Fans

ENGLISH

General Safety Information

⚠WARNING *Do not depend on any switch as sole means of disconnecting power when installing or servicing the fan. If the power disconnect is out-of-sight, lock it in the open position and tag to prevent application of power. Failure to do so may result in fatal electrical shock. Employ proper lock-out procedures during maintenance and installation.*

⚠CAUTION *All electrical connections should be made by a qualified electrician.*

1. Follow all local electrical and safety codes in the United States and Canada, as well as the National Electrical Code (NEC) and the Occupational Safety and Health Act (OSHA) in the United States, and the Canadian Electric Code (CEC) in Canada.
2. Always disconnect power source before working on or near a motor or its connected load.

⚠WARNING *Motor will restart without warning after protector trips.*

⚠CAUTION *In United States to reduce the risk of injury to persons, OSHA complying guards are required when fan is installed within 7 feet of floor or working level.*

⚠CAUTION *In Canada to reduce the risk of injury to persons, CSA complying guards are required when fan is installed below 2.5 meters (8.2 feet) above floor or grade level.*

3. Protect the power cable from coming in contact with sharp objects.
4. Do not kink power cable and never allow the cable to come in contact with oil, grease, hot surfaces, or chemicals.

⚠CAUTION *Do not use in explosive atmospheres.*

5. Make certain that the power source conforms to the requirements of your equipment.
6. The fan frame and motor must be electrically grounded to a suitable electrical ground, such as a grounded water pipe or ground wire system.

Installation

1. The unit should be securely mounted in a rigid framework.

NOTE: Allowing the fan frame to flex or move will result in undue vibrations and possible premature motor, propeller, or shutter failure.

2. Install any auxiliary components.
3. Connect power to the motor, using an approved wiring method.

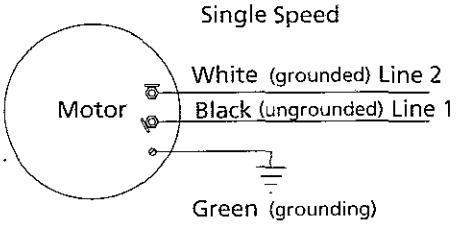

Figure 2 - Wiring Diagram: 115 Volt Connection

⚠CAUTION *Fan frame and motor must be securely and adequately grounded to a suitable electrical ground, such as a ground water pipe or ground wiring system.*

4. Before activating the fan, check to ensure that there are no obstructions (framing, stud, shutter, etc.) which would interfere with proper fan operation by turning the propeller by hand. Also verify that there are no obstructions interfering with the full opening and closing of the shutter.

Operation

1. Keep the area free of objects that could impede air flow on both the intake and exhaust side of fan.
2. For proper exhaust operation, a window, door, or louver should be opened on the opposite side of the area to be ventilated.
3. Turn the fan on, the shutter will open automatically. When the unit is turned OFF, the shutter will close.
4. Speed controllable units are designed to operate at a minimum of fifty percent line voltage.

Maintenance

⚠WARNING ***Do not depend on any switch as sole means of disconnecting power when installing or servicing the fan. If the power disconnect is out-of-sight, lock it in the open position and tag to prevent application of power. Failure to do so may result in fatal electrical shock. Employ proper lock-out procedures when performing maintenance.***

MINOR AND ROUTINE

1. Disconnect power source before servicing.
2. Lubricate the motor sleeve bearings every six months using S.A.E. 20 non-detergent oil as per instructions (see motor label).
3. Periodically clean the propeller, guard, motor, and shutter of any accumulated dirt.

PARTS REPAIR

1. Refer to illustration of parts placement (Figure 3).
2. Disconnect power before servicing.
3. Remove the four screws holding the guard to the venturi panel. Remove the guard/motor/propeller assembly.
4. Loosen the setscrew on propeller hub and remove the propeller.

⚠CAUTION *Do not repair damaged propeller. Replace with a properly balanced unit (see Figure 3 Reference No. 3).*

5. Loosen the nuts holding motor on guard and remove motor.
6. Reassemble the unit in reverse order of disassembly.

⚠CAUTION *Propeller is installed hub first on motor shaft, flush with end, and setscrew located over the flat area.*

For Repair Parts, call 1-800-323-0620

24 hours a day - 365 days a year

Please provide following information:
-Model number
-Serial number (if any)
-Part description and number as shown in par

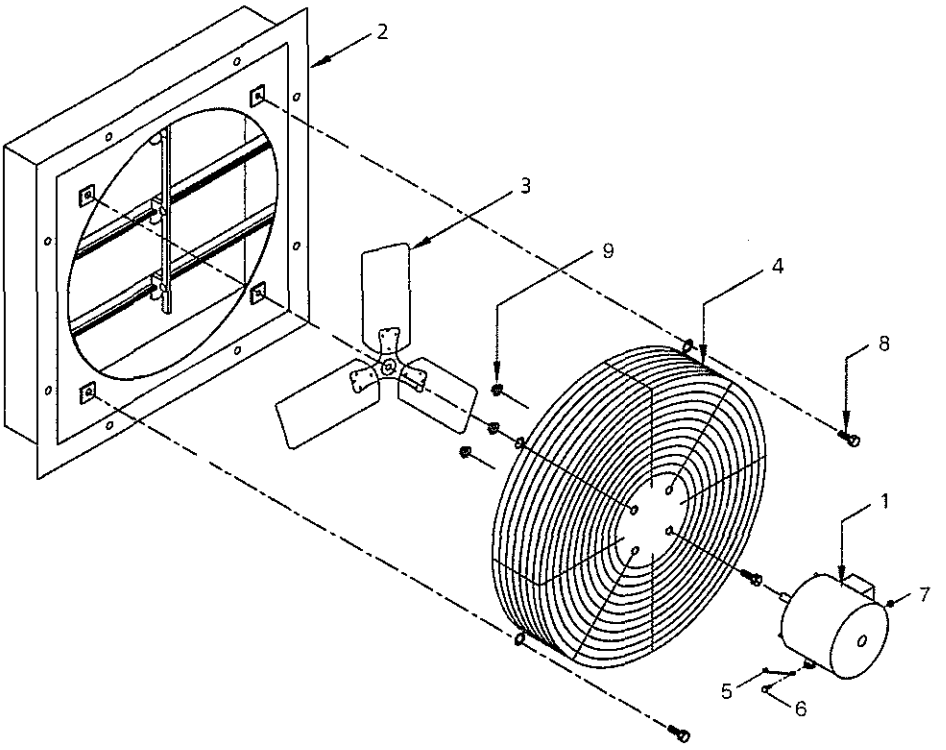

Figure 3 — Repair Parts Illustration

ENGLISH

Repair Parts List

Ref. No.	Description	Part Number for Models: 1HKL9	1HLA1	1HLA2	1HLA3	1HLA4	1HLA5	Qty.
1.	Motor	XXMT71731715	XXMT71731715	XXMT71731715	XXMTHX2185	XXMTHX3835	XXMTKZ6804	1
2	Shutter assembly	502G-08	502G-10	502G-12	502G-16	502G-18	502G-18	1
3	Propeller	XXPR07A	XXPR10A	XXPR12A	XXPR16A	XXPR18B	XXPR18A	1
4	Intake guard	XXWG07A	XXWG10A	XXWG12A	XXWG16A	XXWG18B	XXWG18A	1
5	Yolk Brace	NA	NA	NA	NA	NA	XXSS494PC	1
6	3/8-24 X 1" Screw	*	*	*	*	*	*	1
7	3/8-24 Locknut	*	*	*	*	*	*	1
8	#10-16 x 5/8" SM Screw	*	*	*	*	*	*	4
9	#8-32 Spinlock Nut	*	*	*	*	*	*	4

Ref. No.	Description	Part Number for Models: 1HLA6	1HLA7	1HLA8	1HLA9	1HLB1	Qty.
1	Motor	XXMTKZ6805	XXMTKZ6805	XXMTKZ6804	XXMT71265117	XXMTHX6065	1
2	Shutter assembly	502G-20	502G-20	502G-20	502G-20	502G-24	1
3	Propeller	XXPR20A	XXPR20B	XXPR20A	XXPR20C	XXPR24B	1
4	Intake guard	XXWG20A	XXWG20A	XXWG20A	XXWG20A	XXWG24A	1
5	Yolk Brace	XXSS680PC	XXSS680PC	XXSS680PC	XXSS4680PC	XXSS930PC	1
6	3/8-24 X 1" Screw	*	*	*	*	*	1
7	3/8-24 Locknut	*	*	*	*	*	1
8	#10-16 x 5/8" SM Screw	*	*	*	*	*	4
9	#8-32 Spinlock Nut	*	*	*	*	*	4

Ref. No.	Description	Part Number for Models: 1HLB2	1HLB3	1HLB4	1HLB5	1HLB6	Qty.
1	Motor	XXMTHX6082	XXMTHX6804	XXMTHX6083	XXMTHX7341	XXMTHX7278	1
2	Shutter assembly	502G-24	502G-24	502G-24	556G-30	556G-36	1
3	Propeller	XXPR24A	XXPR24A	XXPR24B	XXPR30A	XXPR36A	1
4	Intake guard	XXWG24A	XXWG24A	XXWG24A	XXWG30A	XXWG36A	1
5	Yolk Brace	XXSS930PC	XXSS930PC	XXSS930PC	XXSS930PC	XXSS1350PC	1
6	3/8-24 X 1" Screw	*	*	*	*	*	1
7	3/8-24 Locknut	*	*	*	*	*	1
8	#10-16 x 5/8" SM Screw	*	*	*	*	*	4
9	#8-32 Spinlock Nut	*	*	*	*	*	4

(*) Standard hardware items, available locally.

Dayton® Utility Shutter-Mounted Exhaust Fans

ENGLISH

Troubleshooting Chart

Symptom	Possible Cause(s)	Corrective Action
Excessive noise	1. Dry motor bearings	1. Relubricate motor bearings as per instructions or replace motor.
	2. Loose propeller	2. Tighten setscrews in hub
	3. Crooked or damaged propeller	3. Replace propeller
Fan inoperative	1. Blown fuse or open circuit breaker	1. Replace fuse or reset circuit breaker
	2. Defective motor	2. Repair or replace motor (see Figure 3)
	3. Speed control off or too low	3. Turn controller on
Insufficient air flow	1. Blocked intake or exhaust opening	1. Clear opening of obstruction or increase size of opening, clean guard/shutter
	2. Low voltage	2. Determine cause and correct
	3. Speed control set too low	3. Increase speed with controller

LIMITED WARRANTY

DAYTON ONE-YEAR LIMITED WARRANTY. *DAYTON® UTILITY SHUTTER-MOUNTED EXHAUST FANS, MODELS COVERED IN THIS MANUAL, ARE WARRANTED BY DAYTON ELECTRIC MFG. CO. (DAYTON) TO THE ORIGINAL USER AGAINST DEFECTS IN WORKMANSHIP OR MATERIALS UNDER NORMAL USE FOR ONE YEAR AFTER DATE OF PURCHASE. ANY PART WHICH IS DETERMINED TO BE DEFECTIVE IN MATERIAL OR WORKMANSHIP AND RETURNED TO AN AUTHORIZED SERVICE LOCATION, AS DAYTON DESIGNATES, SHIPPING COSTS PREPAID, WILL BE, AS THE EXCLUSIVE REMEDY, REPAIRED OR REPLACED AT DAYTON'S OPTION. FOR LIMITED WARRANTY CLAIM PROCEDURES, SEE "PROMPT DISPOSITION" BELOW. THIS LIMITED WARRANTY GIVES PURCHASERS SPECIFIC LEGAL RIGHTS WHICH VARY FROM JURISDICTION TO JURISDICTION.*

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Prompt Disposition. *A good faith effort will be made for prompt correction or other adjustment with respect to any product which proves to be defective within limited warranty. For any product believed to be defective within limited warranty, first write or call dealer from whom the product was purchased. Dealer will give additional directions. If unable to resolve satisfactorily, write to Dayton at address below, giving dealer's name, address, date, and number of dealer's invoice, and describing the nature of the defect. Title and risk of loss pass to buyer on delivery to common carrier. If product was damaged in transit to you, file claim with carrier.*

Manufactured for Dayton Electric Mfg. Co., 5959 W. Howard St., Niles, Illinois 60714-4014 U.S.A.

TF115-001
40° F to 110° F

TF115-023
-30° F to 100° F

TH109-009
40° F to 100° F

TRF115-005
0° F to 120° F

TRF115-007
-30° F to 100° F

T109 & T115 Series

PECO **NEMA 4x** Industrial Controls

Tough industrial application thermostats that are built for long-term, reliable performance while withstanding harsh climate conditions.

One control for heating & cooling,
makes use centralized & easy.

Rugged, weather resistant enclosure,
enabling placement most anywhere.

Tolerates moist conditions,
performs despite water spray, high humidity, airborne contaminates & moderately corrosive conditions.

Large, visible dial,
making set point temperatures clear.

Enclosures comply with N.E.C. Article 547,
giving code compliance peace-of-mind.

Built from corrosion resistant materials,
allowing long life & reliable performance in most demanding climates.

UL listed & CSA certified.

Wide Range of Industrial Functions

Typical applications are anywhere a rugged, weatherproof mechanical thermostat will best control refrigeration, industrial heating/cooling or staged heat/cool/ventilation systems.

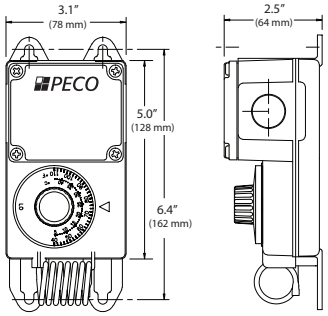
- Walk-in coolers
- Freezers
- Fans
- Dampers
- Factory & industrial buildings
- Greenhouses
- Garages
- Warehouses
- Animal confinement buildings, including those for poultry or livestock.

Ratings

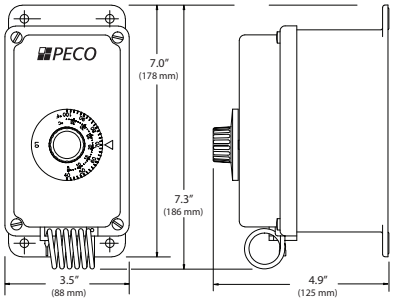
Voltage Rating	FLA	LR	Non-Inductive	Pilot Duty
120 VAC	16.0 A	80.0 A	25.0 A	125 VA
208 VAC	13.2 A	66.0 A	25.0 A	125 VA
240 VAC	12.0 A	60.0 A	25.0 A	125 VA
277 VAC	10.0 A	50.0 A	22.0 A	125 VA

Suitable for 24 VAC operation

TF115 & TRF115



TH109



Models

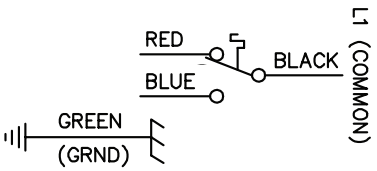
Model	Part No.	Temp. Range	Diff.	Dimensions	Switch Action	Bulb
TF115-001	68471	40° F to 110° F	Fixed 3 F	3.1" W x 6.5" H x 2.5" D	SPDT	Coiled Air - Stainless
TF115-023	70254	-30° F to 100° F	Fixed 6 F	3.1" W x 6.5" H x 2.5" D	SPDT	Coiled Air - Stainless
TRF115-005	68426	0° F to 120° F	Fixed 3 F	3.1" W x 6.5" H x 2.5" D	SPDT	5' Stainless Remote
TRF115-007	69320	-30° F to 100° F	Fixed 6 F	3.1" W x 6.5" H x 2.5" D	SPDT	8' Copper Remote
TH109-009	68427	40° F to 100° F	3°/ Stage	3.5" W x 7.3" H x 4.9" D	2- SPDT	Coiled Air - Stainless

CSA UL LISTED

Technical Data

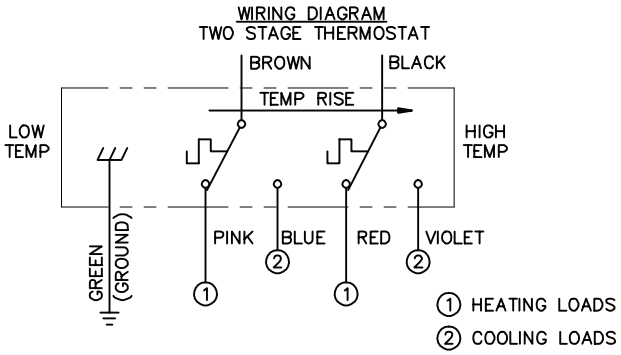
Wiring Connections

TF115-001
TF115-023
TRF115-005
TRF115-007

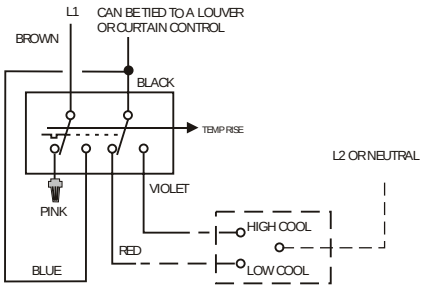


TH109-009

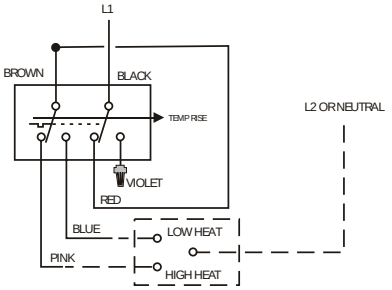
Double pole, double throw contacts operate sequentially with 3° F (1.7 C) nominal separation on temperature rise or fall.



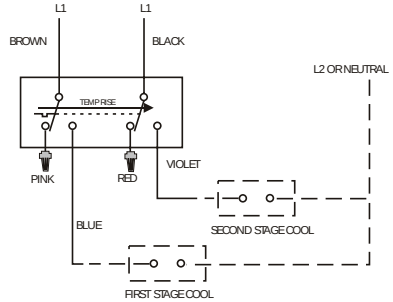
Two Speed Cooling



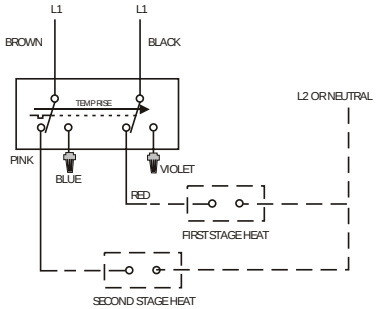
Two Speed Heating



Two Stage Cooling

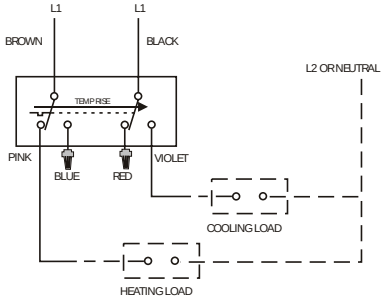


Two Stage Heating



Auto Changeover Control

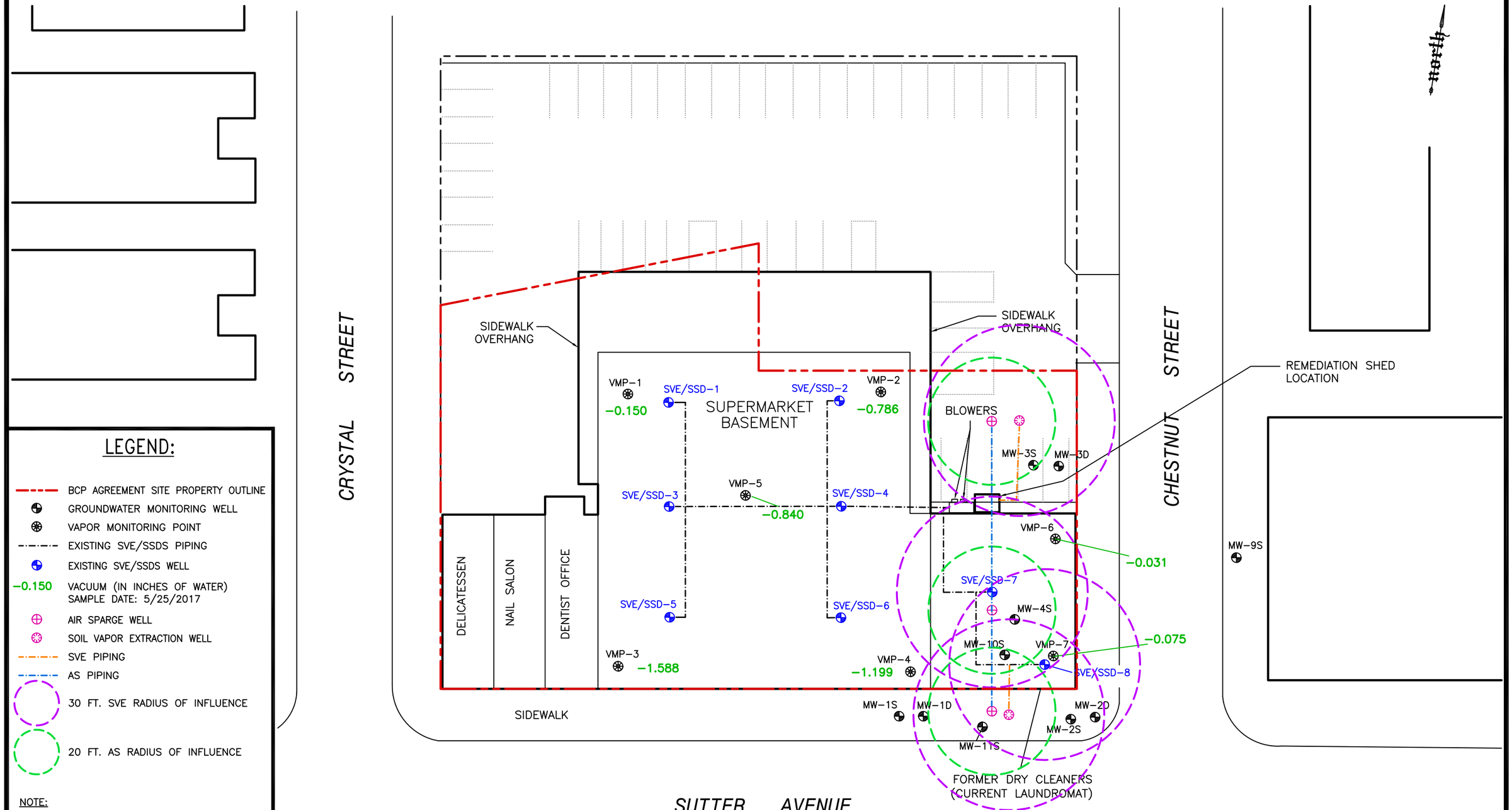
1 Heat/1 Cool with 3˚F dead band



DS-T109-T115 6/10

PECO
Automation & Controls
Division of PECO, Inc.
Portland, OR 97282
800-874-8547 or 503-233-6401
sales@pecomanufacturing.com
www.pecomanufacturing.com

7. System Drawings



LEGEND:

- BCP AGREEMENT SITE PROPERTY OUTLINE
- GROUNDWATER MONITORING WELL
- VAPOR MONITORING POINT
- EXISTING SVE/SSDS PIPING
- EXISTING SVE/SSDS WELL
- -0.150 VACUUM (IN INCHES OF WATER) SAMPLE DATE: 5/25/2017
- AIR SPARGE WELL
- SOIL VAPOR EXTRACTION WELL
- SVE PIPING
- AS PIPING
- 30 FT. SVE RADIUS OF INFLUENCE
- 20 FT. AS RADIUS OF INFLUENCE

NOTE:

COVER/CAP SYSTEM CONSISTS OF PAVED CONCRETE AND ASPHALT AND BUILDING FOUNDATION PRESENT WITHIN THE SITE BOUNDARY.

EnviroTrac
ENVIRONMENTAL SERVICES
5 OLD DOCK ROAD, YAPHANK, NEW YORK 11980
PHONE: (631)924-3001 FAX: (631)924-5001

0 15 30
SCALE IN FEET

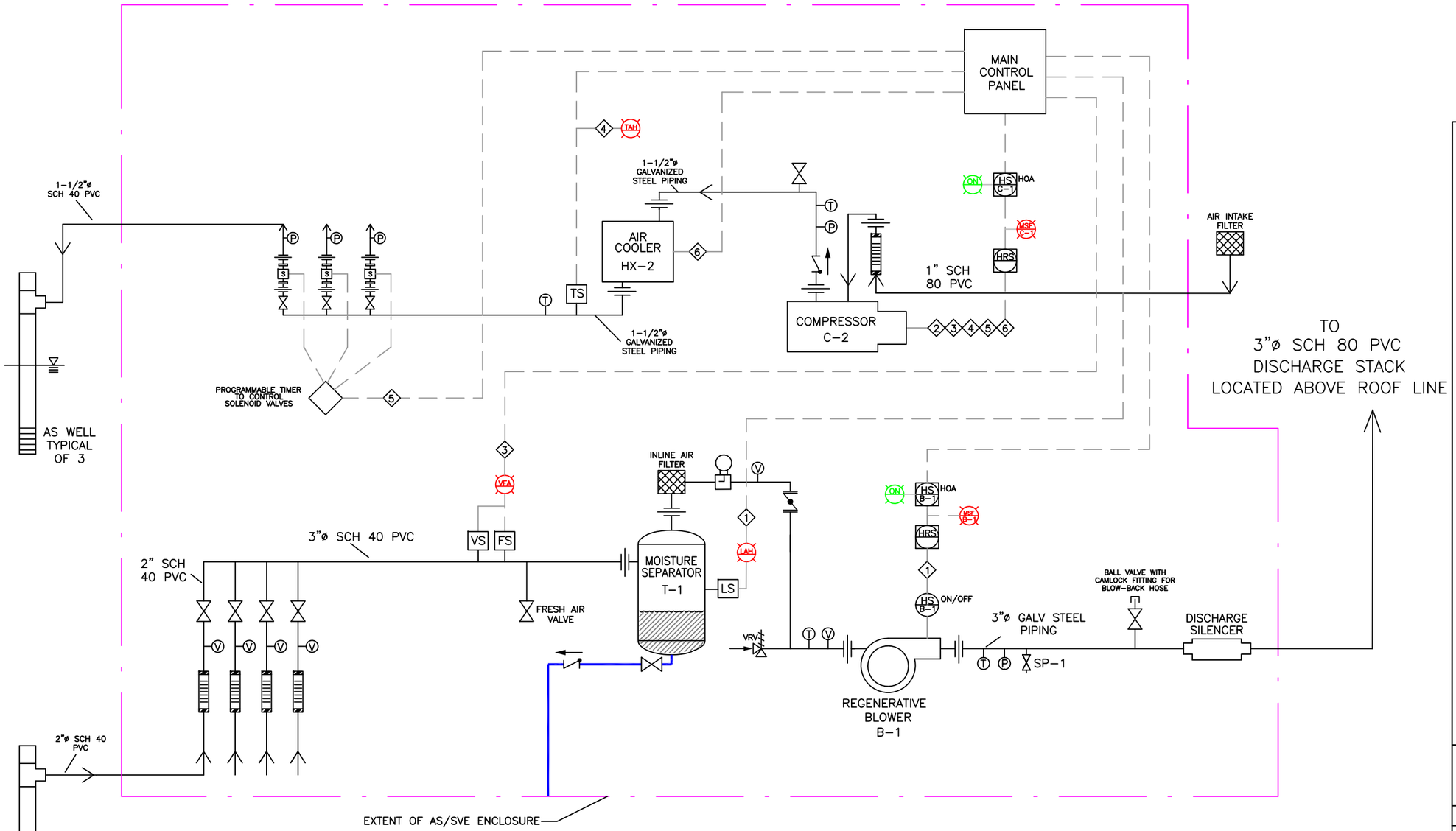
DATE: 10/30/2018

REVISED BY: BS

1199 SUTTER AVENUE
BROOKLYN, NEW YORK

AS-BUILT: ENGINEERING CONTROLS LOCATIONS SVE/AS REMEDIATION SYSTEMS AND COVER/CAP SYSTEM

FIGURE # 12



SYSTEM LEGEND:

- VACUUM GAUGE
- TEMPERATURE GAUGE
- PRESSURE GAUGE
- VENTURI FLOW METER
- REDUCER
- LEVEL SWITCH
- BALL VALVE
- SAMPLE PORT
- VACUUM RELIEF VALVE
- CHECK VALVE
- FLOW/ANEMOMETER PORT
- SIGHT GLASS
- UNION
- HAND SWITCH ON PANEL
- RUN TIME METER
- CONTROL PANEL INDICATOR
- CONTROL PANEL INTERLOCK
- ELECTRIC LINE
- AIR FLOW DIRECTION
- ENCLOSURE LIMITS

INDICATOR LIGHT INDEX:

- LAH — LEVEL ALARM HIGH
- VFA — VACUUM/FLOW ALARM
- TAH — TEMPERATURE ALARM HIGH
- MSF — MOTOR STARTER FAILURE
- ON — MOTOR RUN INDICATOR

INTERLOCK SCHEDULE:

1. HIGH LEVEL IN T-1 – SHUT DOWN B-1.
2. INTERLOCK C-1 TO RUN ONLY WHEN B-1 IS OPERATING.
3. LOW VACUUM OR FLOW ON SVE MANIFOLD – SHUT DOWN C-1.
4. HIGH TEMPERATURE – SHUT DOWN C-1.
5. INTERLOCK C-1 TO ONLY OPERATE ALONG WITH PROGRAMMED SOLENOID VALVE CYCLE TIMES.
6. INTERLOCK HX-1 TO RUN ONLY WHEN C-1 IS OPERATING.

DRAWN/REVISED BY: DK
REVISION DATE: JUL 26, 2018

FIGURE: 2

DRAWING TITLE

AIR SPARGE / SOIL VAPOR EXTRACTION SYSTEM PROCESS AND INSTRUMENTATION DIAGRAM

PREPARED FOR

SUTTER REALTY
1199 SUTTER AVENUE
BROOKLYN, NEW YORK

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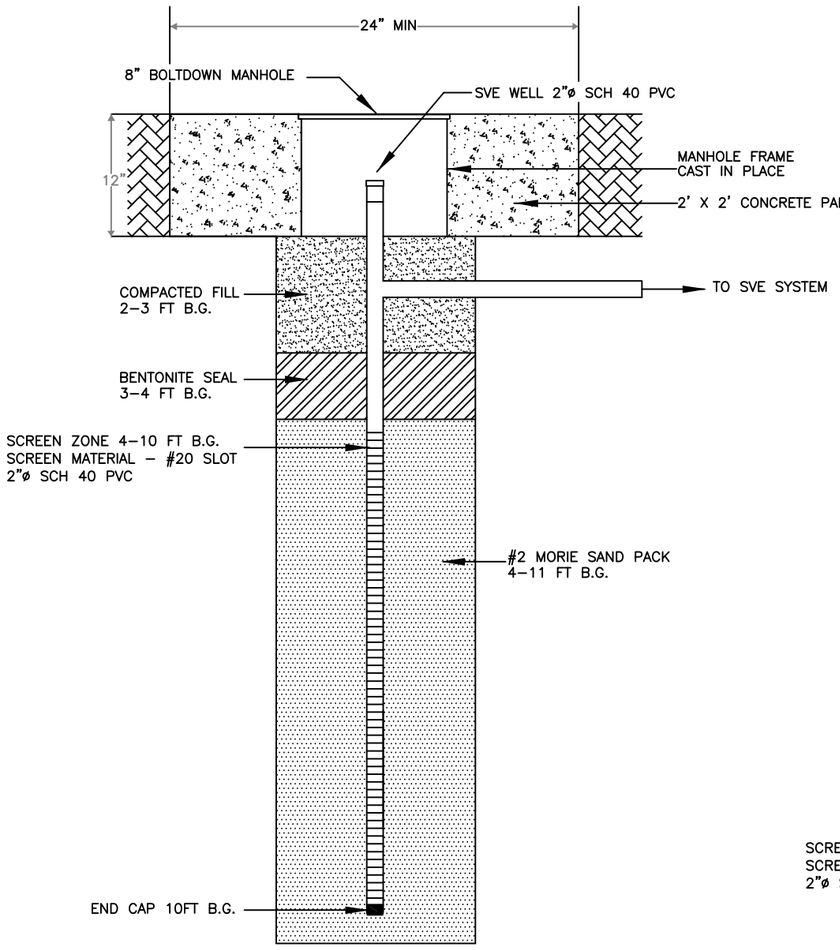
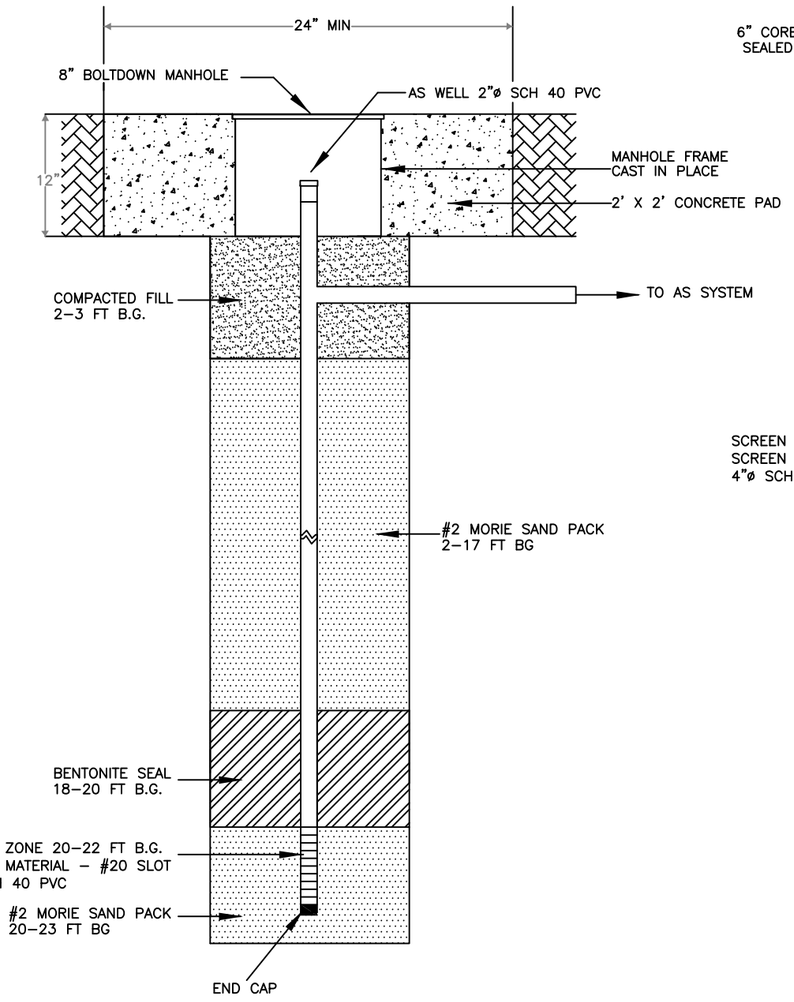
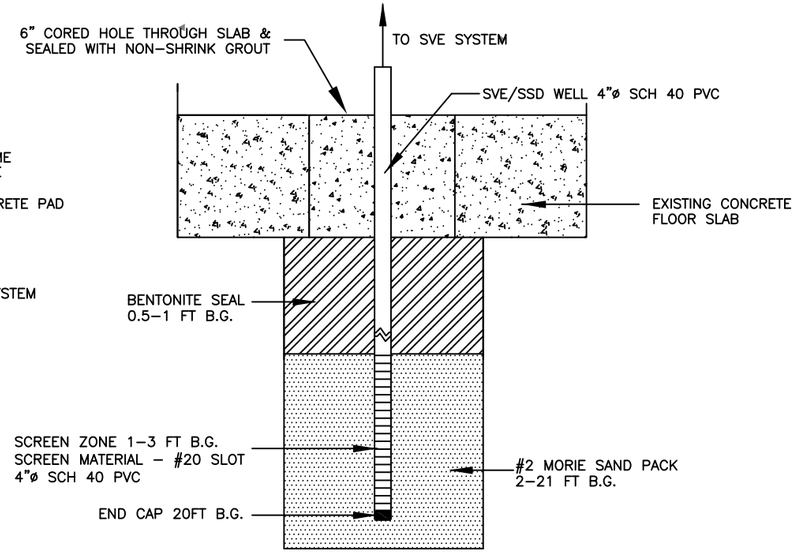
SVE WELL
(TYPICAL OF 2)



AIR SPARGE WELL
(TYPICAL OF 3)



SVE/SSD WELL
(TYPICAL OF 2)



DRAWN/REVISED BY: DK REVISION DATE: JUL 26, 2018	FIGURE: 3

DRAWING TITLE

EXISTING SSD/SVE
WELL & PROPOSED AS & SVE
WELL DETAILS

PREPARED FOR

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APPENDIX I – QUALITY ASSURANCE PROJECT PLAN

AAA SUTTER REALTY, LLC
1199-1221 SUTTER AVE, BROOKLYN, NEW YORK
KINGS COUNTY, NEW YORK

Quality Assurance Project Plan

NYSDEC BCP Number: C224141

Prepared for:
AAA Sutter Realty, LLC
153-157 Seventh Street
Garden City, New York 11530

Prepared by:
EnviroTrac Engineering PE PC
5 Old Dock Road, Yaphank, New York 11980
631-924-3001

NOVEMBER 2018

EnviroTrac
Environmental Services

Table of Contents

FIGURES

1.0 TITLE AND APPROVAL PAGE

Title:	Quality Assurance Project Plan (QAPP) for Site Management Plan (SMP)
Project Name/Property Name:	1199 Sutter Avenue
Property/Site Location:	1199-1221 Sutter Avenue, Brooklyn, New York
Revision Number:	
Revision Date:	
NYSDEC Site Number:	BCP C224141
Preparer's Name and Organizational Affiliation:	EnviroTrac Engineering PE PC 5 Old Dock Road Yaphank, New York 11980 (631) 924-3100
Preparation Date:	November 21, 2018

2.0 PROBLEM DEFINITION/PROJECT DESCRIPTION

2.1 Problem Definition

This Quality Assurance Project Plan (QAPP) has been prepared for Site Management Activities (SMP) activities at the AAA Sutter Realty LLC site located at 1199 Sutter Avenue, Brooklyn, New York. SMP activities at the Site include soil vapor extraction (SVE) system operation and sampling, and groundwater monitoring.

The contaminant(s) of concern identified at the Site are:

- Tetrachloroethylene (PCE)
- Trichloroethylene (TCE)
- Chloroform
- Cis-1,2-Dichloroethene (Cis-1,2-DCE)
- Acetone

The contaminant(s) of concern exceed the applicable standards, criteria and guidance values (SCGs) for:

- Groundwater
- Soil
- Soil Vapor Intrusion

Groundwater: PCE, its daughter compounds (cis-1,2-dichloroethene and trichloroethylene), chloroform, and acetone were found in the groundwater on the property and off-Site to the south of the Site. The latest sampling of groundwater (August 27, 2018) on the property (analyzed for VOCs) found PCE at approximately 225 micrograms per liter (ug/l) in MW-10S, which exceeds the groundwater standard (5 ug/l). PCE and its breakdown products TCE and DCE have been detected up to 140 feet to the south of the Site. PCE was detected in the off-Site groundwater during the August 27, 2018 monitoring event at a maximum concentration of 151 ppb, approximately 13 feet below ground surface on the New York Housing Authority Property, to the south of Sutter Avenue.

Soil: Soil sampling conducted during three (3) subsurface investigations performed in 2009 and 2016 below the rear parking lot and beneath the slab of the former dry cleaner unit, revealed PCE concentrations, which exceeded the NYSDEC Unrestricted Use Soil Cleanup Objectives (UUSCOs). Additional sampling performed during a Site Characterization Investigation in 2011 showed that concentrations of acetone exceeded the NYSDEC UUSCOs at the Site.

Soil Vapor Intrusion: Sub-slab soil vapor samples, soil gas samples, indoor air samples, and outdoor air samples were collected from the Site during the Site Characterization performed in 2011, the RI in 2015, the supplemental investigation to the RI in 2016, and the On-Site Soil Vapor Intrusion Investigation in March, 2017. The indoor air results for the investigations were compared to the NYSDOH Indoor Air Guidance Values. PCE was detected above the NYSDOH Indoor Air Guidance Value in the basement of the former dry cleaner in 2011, but below the NYSDOH Indoor Air Guidance Value in 2017. The results were also compared to the NYSDOH Soil Vapor Intrusion Decision Matrices A, B, and C. The results showed that mitigation was required for the former dry cleaner unit and the adjoining supermarket unit to the west.

2.2 Project Description - Site Location, History and Description

Location: The Site is located at 1199-1221 Sutter Avenue in a mixed residential/commercial area of Brooklyn. The Site is bounded by Sutter Avenue to the south, Chestnut Street to the east, residential to the north and Crystal Street to the west.

Site Features: The Site occupies about half of a city block on the north side of Sutter Avenue. An asphalt parking lot covers the northern portion of the Site and a single-story building is located along the southern portion of the Site. The building is underlain with a basement segmented for each retail/office unit with utilities, storage, and service rooms.

Current Zoning and Land Use: The northern portion of the Site is within an R5 (residential) zoned area. The southern portion of the Site is zoned C1-2 (commercial), as are the properties along the north side of a seven-block stretch of Sutter Avenue.

Past use of the Site: The structures on the Site were constructed in 1957 and were the original development on the property. Spanish American Dry Cleaners occupied the eastern-most unit from September 1988 to May 1995. The former location of the dry cleaner is presently occupied by a self-service laundromat.

Site Geology and Hydrogeology: The property is located within the Pavement and Buildings-Flatbush-Riverhead Series Soil Map Unit, which is described as anthropogenic urban fill overlying glacial out wash deposits and characterized as a sandy loam. The groundwater table ranges from approximately 12 to 13 feet below grade and flows to the south. Groundwater is not utilized as a source of potable water at Site.

A topographic map depicting the Site location is attached as Figure 1.

2.3 Project Quality Objectives

The objectives of the QAPP are to set chemical quality assurance guidelines of reliable data obtained by measurement activities, such that data generated are scientifically valid, defensible, comparable, and of known precision and accuracy.

This QAPP contains a detailed discussion of the chemical quality assurance protocols to be used by field and laboratory personnel.

Analysis of media samples will be conducted by a laboratory certified in New York State to conduct work under the Environmental Laboratory Approval and Analytical Services Programs (ELAP/ASP) producing Category B deliverables.

This QAPP contains a detailed discussion of the quality assurance and quality control (QA/QC) protocols to be utilized by contractor/engineer and laboratory personnel.

3.0 PROJECT TIMELINE

3.1 On and Off-Site Groundwater

Natural attenuation monitoring will be performed at existing groundwater monitoring wells at the Site (MW-1S, MW-2S, MW-10S, and MW-11S) and off-Site (MW-5S and MW-8S), and will be sampled on a quarterly basis for VOCs by US EPA Method 8260C. The location of the monitoring wells is depicted on Figure 2. Groundwater will be sampled using US Environmental Protection Agency (EPA) low-flow purging and sampling procedures. Groundwater samples will be analyzed by an Environmental Laboratory Accreditation Program (ELAP-approved) laboratory for CAT B deliverables.

3.2 Soil Vapor Extraction System

For the on-Site soil, a SVE system was installed at the Site. A SVE system consisting of three (3) extraction wells were installed in the basement of the former dry cleaner (current laundromat, front sidewalk to the south of the building, and in the rear parking lot to the north of the building. The most recent (March, 2017) on-Site sub-slab soil vapor data collected from beneath the former dry cleaner indicated that PCE was detected at a concentration of 831 ug/$m^{3,}$ which is a significant decrease from the previous sampling event conducted in 2011, where PCE was detected at 428,000 ug/$m^{3.}$. The SVE system was designed in conformance with NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation. This will mitigate potential long-term exposure to VOCs found in the sub-slab vapor beneath the building. System operations, maintenance, and monitoring will be performed on a monthly basis.

PCE was also detected at a concentration of 20,100 ug/m^3 in the sub-slab soil vapor beneath the supermarket in 2011. A sub-slab depressurization system (SSDS) was installed at the Site in May, 2018 and mitigates soil vapors beneath this unit.

SVE air emissions will be monitored through the collection of air samples via a Tedlar bag and screened via a properly calibrated photoionization detector (PID). Samples will be submitted to an ELAP-approved laboratory for EPA Method TO-15 analysis on an annual basis.

3.3 Institutional and Engineering Controls

The on-Site remedies require the adoption of institutional and engineering controls to achieve the RAOs. These are specified in the SMP.

4.0 SAMPLING AND ANALYTICAL REQUIREMENTS

4.1 Sampling Methods and Locations

4.1.1 Groundwater Sampling

Groundwater will be monitored over time for indications of natural attenuation. The existing groundwater monitoring wells (MW-1S, MW-2S, MW-5S, MW-8S, MW-10S, and MW-11S) at the Site and off-Site, will be sampled on a quarterly basis for VOCs by US EPA Method 8260C. Groundwater will be sampled using US EPA low-flow purging and sampling procedures. Groundwater samples will be analyzed by an ELAP-approved laboratory for CAT B deliverables. It is anticipated that samples will be collected as described in the following table:

Matrix	Sampling Location	Depth (feet)	Analytical Group	Number of Samples	Sampling SOP Reference	Rationale for Sampling Location
Groundwater	COC Plume on-Site and off-Site to the south	Variable	VOCs	11	See Below	Monitoring for natural attenuation
Groundwater	Trip Blank	---	VOCs	1 per cooler	See Below	Field QC
Groundwater	Blind Duplicate	TBD	VOCs	1	See Below	Field QC
Groundwater	MS/MSD	TBD	VOCs	1	See Below	Laboratory QC

4.1.2 Soil Vapor Sampling

SVE air emissions will be monitored through the collection of air samples via a Tedlar bag and screened via a properly calibrated PID. On an annual basis, samples will be collected into a 6 Liter Summa Canister for laboratory analysis. Samples will be submitted to an ELAP-accredited laboratory for EPA Method TO-15 analysis.

Matrix	Sampling Location	Depth (feet)	Analytical Group	Number of Samples	Sampling SOP Reference	Rationale for Sampling Location
Air (SVE Emissions)	SVE emission sampling port	N/A	VOCs via TO-15	1	See Below	Emissions testing

4.2 Analytical Methods and Requirements

4.2.1 Groundwater and Vapor Samples

The laboratory providing groundwater and emissions analytical services will be ELAP-accredited to conduct the following analyses:

- Non Potable Water
- Potable Water
- Emissions

The proposed analytical methods for groundwater include:

Matrix	Analytical Group	Bottle	Preservative	Analytical Method	Holding Time
Aqueous	VOCs	40 ml. Glass w/Teflon®- lined cap	Cool 4°C, HCL to pH<2	8260C	14 days

The proposed analytical methods for soil vapor and emissions:

Matrix	Analytical Group	Bottle	Preservative	Analytical Method	Holding Time
Air	VOCs	6L Summa Canister	None	TO-15	Summa: 30 days

4.3 Reference Limits and Evaluation

Groundwater VOCs US EPA Method 8260C

					% RECOVERIES			
&Analyte	Units	MDL	PQL	SPK	Low	High	RPD	%DLimit
1,1,1-Trichloroethane	µg/L	0.06	10	50	24	129	0	0
1,1,2,2-Tetrachloroethane	µg/L	0.12	10	50	46	164	0	0
1,1,2-Trichloro-1,2,2-trifluoroethane	µg/L	0.761	10	50	53	122	0	0
1,1,2-Trichloroethane	µg/L	0.104	10	50	62	138	0	0
1,1-Dichloroethane	µg/L	0.07	10	50	52	152	0	0
1,1-Dichloroethene	µg/L	0.155	10	50	62	131	0	0
1,2,4-Trichlorobenzene	µg/L	0.296	10	50	10	175	0	0
1,2-Dibromo-3-chloropropane	µg/L	0.178	10	50	33	137	0	0
1,2-Dibromoethane	µg/L	0.085	10	50	55	129	0	0
1,2-Dichlorobenzene	µg/L	0.114	10	50	60	134	0	0
1,2-Dichloroethane	µg/L	0.087	10	50	48	133	0	0
1,2-Dichloropropane	µg/L	0.095	10	50	40	152	0	0
1,3-Dichlorobenzene	µg/L	0.129	10	50	61	133	0	0
1,4-Dichlorobenzene	µg/L	0.113	10	50	59	134	0	0
2-Butanone	µg/L	0.77	10	50	33	175	0	0
2-Hexanone	µg/L	0.439	10	50	34	175	0	0
4-Methyl-2-pentanone	µg/L	0.164	10	50	44	162	0	0
Acetone	µg/L	0.356	10	50	33	175	0	0
Benzene	µg/L	0.074	10	50	64	139	0	0
Bromodichloromethane	µg/L	0.063	10	50	55	138	0	0
Bromoform	µg/L	0.486	10	50	51	126	0	0
Bromomethane	µg/L	0.216	10	50	67	126	0	0
Carbon disulfide	µg/L	0.543	10	50	19	165	0	0
Carbon tetrachloride	µg/L	0.467	10	50	19	134	0	0
Chlorobenzene	µg/L	0.034	10	50	65	135	0	0
Chloroethane	µg/L	0.196	10	50	66	140	0	0
Chloroform	µg/L	0.111	10	50	56	142	0	0
Chloromethane	µg/L	0.181	10	50	58	142	0	0
cis-1,2-Dichloroethene	µg/L	0.149	10	50	72	132	0	0
cis-1,3-Dichloropropene	µg/L	0.105	10	50	66	126	0	0
Cyclohexane	µg/L	0.087	10	50	33	152	0	0
Dibromochloromethane	µg/L	0.174	10	50	50	133	0	0
Dichlorodifluoromethane	µg/L	0.102	10	50	16	152	0	0
Ethylbenzene	µg/L	0.132	10	50	67	128	0	0
Isopropylbenzene	µg/L	0.108	10	50	58	131	0	0
Methyl Acetate	µg/L	0.24	10	50	45	175	0	0

					% RECOVERIES			
&Analyte	Units	MDL	PQL	SPK	Low	High	RPD	%DLimit
Methyl tert-butyl ether	µg/L	0.031	10	50	64	117	0	0
Methylcyclohexane	µg/L	1.27	10	50	22	171	0	0
Methylene chloride	µg/L	0.169	10	50	47	159	0	0
Styrene	µg/L	0.118	10	50	71	132	0	0
Tetrachloroethylene	µg/L	0.384	10	50	46	124	0	0
Toluene	µg/L	0.077	10	50	69	124	0	0
trans-1,2-Dichloroethene	µg/L	0.075	10	50	64	133	0	0
trans-1,3-Dichloropropene	µg/L	0.144	10	50	61	126	0	0
Trichloroethene	µg/L	0.08	10	50	43	150	0	0
Trichlorofluoromethane	µg/L	0.141	10	50	10	144	0	0
Vinyl chloride	µg/L	0.119	10	50	61	127	0	0
Xylene (total)	µg/L	0.065	10	150	70	133	0	0
1,4-Difluorobenzene	µg/L	0	10	50	50	200	0	0
Bromochloromethane	µg/L	0.074	10	50	50	200	0	0
Chlorobenzene-d5	µg/L	0	10	50	50	200	0	0
1,2-Dichloroethane-d4	µg/L	2.44	10	50	53	183	0	0
4-Bromofluorobenzene	µg/L	1.54	10	50	63	140	0	0
Toluene-d8	µg/L	1.78	10	50	60	135	0	0
1,2,3-Trichlorobenzene	µg/L	0.252	10	50	60	140	0	0
1,2-Dichloroethene (total)	µg/L		10	100	17	147	0	0
1,4-Dioxane	µg/L	28.259	250	1250	60	140	0	0
2-Chloroethylvinyl ether	µg/L	0.133	10	50	60	140	0	0
m,p-Xylene	µg/L	0.151	10	100	72	133	0	0
Naphthalene	µg/L	0.259	10	50	70	118	0	0
o-Xylene	µg/L	0.065	10	50	72	137	0	0
tert-Butyl Alcohol	µg/L	0.319	50	250	12	121	0	0
Total NAPL	µg/L	0	500	0	0	0	0	0

Notes:
Ug/l – micrograms per liter
MDL – Method Detection Limit
PQL – Practical Quantitation Limit
SPK – Spike
RPD – Relative Percent Difference
%D Limit – Percent Detection Limit

%RPD=25%/%R=70-130%

Emission Soil Vapor VOCs US EPA Method TO-15

&Analyte	Units	MDL	PQL
1,1,1-Trichloroethane	ppbv	0.022	0.2
1,1,2,2-Tetrachloroethane	ppbv	0.015	0.2
1,1,2-Trichloro-1,2,2-trifluoroethane	ppbv	0.015	0.2
1,1,2-Trichloroethane	ppbv	0.025	0.2
1,1-Dichloroethane	ppbv	0.017	0.2
1,1-Dichloroethene	ppbv	0.017	0.2
1,2,4-Trichlorobenzene	ppbv	0.017	0.2
1,2,4-Trimethylbenzene	ppbv	0.015	0.2
1,2-Dibromoethane	ppbv	0.017	0.2
1,2-Dichlorobenzene	ppbv	0.012	0.2
1,2-Dichloroethane	ppbv	0.017	0.2
1,2-Dichloroethene (cis)	ppbv	0.012	0.2
1,2-Dichloroethene (trans)	ppbv	0.015	0.2
1,2-Dichloropropane	ppbv	0.031	0.2
1,2-Dichlorotetrafluoroethane	ppbv	0.017	0.2
1,3,5-Trimethylbenzene	ppbv	0	0.2
1,3-Dichlorobenzene	ppbv	0.012	0.2
1,3-Dichloropropene (cis)	ppbv	0.018	0.2
1,3-Dichloropropene (trans)	ppbv	0.031	0.2
1,3-Hexachlorobutadiene	ppbv	0.017	0.2
1,4-Dichlorobenzene	ppbv	0.015	0.2
Acetone	ppbv	0.015	0.2
Benzene	ppbv	0.018	0.2
Bromodichloromethane	ppbv	0.026	0.2
Bromoform	ppbv	0.024	0.2
Bromomethane	ppbv	0.017	0.2
Carbon disulfide	ppbv	0.015	0.2
Carbon tetrachloride	ppbv	0.022	0.2
Chlorobenzene	ppbv	0.015	0.2
Chloroethane	ppbv	0.022	0.2
Chloroform	ppbv	0.024	0.2
Chloromethane	ppbv	0.028	0.2
Dibromochloromethane	ppbv	0.022	0.2
Dichlorodifluoromethane	ppbv	0.017	0.2
Ethylbenzene	ppbv	0.015	0.2
Methyl butyl ketone	ppbv	0.012	0.2
Methyl ethyl ketone	ppbv	0.012	0.2

&Analyte	Units	MDL	PQL
Methyl isobutyl ketone	ppbv	0	0.2
Methyl tert-butyl ether	ppbv	0.015	0.2
Methylene chloride	ppbv	0.03	0.2
Styrene	ppbv	0.018	0.2
Tetrachloroethene	ppbv	0.017	0.2
Toluene	ppbv	0.012	0.2
Trichloroethene	ppbv	0.031	0.2
Trichlorofluoromethane	ppbv	0.018	0.2
Vinyl acetate	ppbv	0.018	0.2
Vinyl chloride	ppbv	0.025	0.2
Xylenes (m&p)	ppbv	0.031	0.2
Xylenes (o)	ppbv	0.017	0.2
1,4-Difluorobenzene	ppbv	0	0.5
Bromochloromethane	ppbv	0	0.5
Chlorobenzene-d5	ppbv	0	0.5
4-Bromofluorobenzene	ppbv	0.995	0.5
1,2-Dichloroethene (total)	ppbv	0.0863	0.5
1,3-Butadiene	ppbv	0	0.5
1,4-Dioxane	ppbv	0.015	0.5
1-Methylnaphthalene	ppbv	0.017	0.5
2,2,4-Trimethylpentane	ppbv	0.015	0.5
2,3-Dimethylpentane	ppbv	0.025	0.2
2-Chlorotoluene	ppbv	0	0.5
2-Methylnaphthalene	ppbv	0.018	0.5
2-Methylpentane	ppbv	0.012	0.2
3-Chloropropene	ppbv	0	0.5
3-Hexanone	ppbv	0.0391	0.5
4-Ethyltoluene	ppbv	0.012	0.5
Acrylonitrile	ppbv	0.079	0.5
Benzyl chloride	ppbv	0.015	0.5
Cyclohexane	ppbv	0.012	0.5
Ethanol	ppbv	0.015	0.5
Ethyl acetate	ppbv	0	0.5
Freon-114	ppbv	0.017	0.5
Indan	ppbv	0	0.5
Indene	ppbv	0.012	0.5
Iodomethane	ppbv	0.0396	0.5
Isopentane	ppbv	0.022	0.2
Isopropanol	ppbv	0.024	0.5
Isopropylbenzene	ppbv	0.012	0.5

&Analyte	Units	MDL	PQL
Methyl methacrylate	ppbv	0.015	0.5
Methyl vinyl ketone	ppbv	0.073	0.5
n-Heptane	ppbv	0.012	0.5
n-Hexane	ppbv	0.012	0.5
n-Propylbenzene	ppbv	0.017	0.5
Naphthalene	ppbv	0.017	0.5
Propylene	ppbv	0.015	0.5
tert-Butyl Alcohol	ppbv	0.018	0.5
Tetrahydrofuran	ppbv	0	0.5
Thiophene	ppbv	0.022	0.5
Vinyl bromide	ppbv	0	0.5
Xylene (total)	ppbv	0.017	0.5

Notes:
ppbv – parts per billion by volume
MDL – Method Detection Limit
PQL – Practical Quantitation Limits

5.0 PROJECT SPECIFIC METHODS AND STANDARD OPERATING PROCEDURES

Quality objectives will be conducted in accordance with the NYSDEC's DER- 10/Technical Guidance for Site Investigation and Remediation. All analyses will be conducted by an analytical laboratory that is NYSDOH ELAP certified for ASP/CLP categories. The Project will require full ASP/CLP laboratory reporting. An independent third-party will conduct data validation and preparation of Data Usability Summary Reports (DUSRs).

5.1 Groundwater Sampling Procedures

The following procedures will be utilized for the collection of groundwater samples using US EPA low-flow purging and sampling procedures.

A. EQUIPMENT AND SUPPLIES

1. Informational materials for sampling event
   a. A copy of the current Health and Safety Plan, QAPP, monitoring well construction data, location map(s), field data from last sampling event, manuals for sampling, and the monitoring instruments' operation, maintenance, and calibration manuals should be brought to the Site;
   b. Tools to open the wells;
   c. Extraction device
      i Adjustable rate, submersible pumps (e.g., centrifugal, bladder, etc.) which are constructed of stainless steel or polytetrafluoroethylene (PTFE, i.e. Teflon®) are preferred. PTFE, however, should not be used when sampling for per- and polyfluoroalkyl substances (PFAS) as it is likely to contain these substances. *Note: If extraction devices constructed of other materials are to be used, adequate information must be provided to show that the substituted materials do not leach contaminants nor cause interferences to the analytical procedures to be used. Acceptance of these materials must be obtained before the sampling event.*
      ii If bladder pumps are selected for the collection of VOCs and dissolved gases, the pump setting should be set so that one pulse will deliver a water volume that is sufficient to fill a 40 mL VOC vial. This is not mandatory, but is considered a "best practice". For the proper operation, the bladder pump will need a minimum amount of water above the pump; consult the manufacturer for the recommended submergence. The pump's recommended submergence value should be determined during the planning stage, since it may influence well construction and placement of dedicated pumps where water-level fluctuations are significant.
      iii Adjustable rate, peristaltic pumps (suction) are to be used with caution when collecting samples for VOCs and dissolved gases (e.g., methane, carbon dioxide, etc.) analyses. If peristaltic pumps are used, the inside diameter of the rotor head tubing needs to match the inside diameter of the tubing installed in the monitoring well.
2. Tubing
   a. PTFE (Teflon®) or PTFE-lined polyethylene tubing are preferred. The use of 1/4 inch or 3/8 inch (inside diameter) tubing is recommended. This will help ensure

that the tubing remains liquid filled when operating at very low pumping rates when using centrifugal and peristaltic pumps.

b. Silastic tubing should be used for the section around the rotor head of a peristaltic pump. It should be less than a foot in length. The inside diameter of the tubing used at the pump rotor head must be the same as the inside diameter of tubing placed in the well. A tubing connector is used to connect the pump rotor head tubing to the well tubing. Alternatively, the two pieces of tubing can be connected to each other by placing the one end of the tubing inside the end of the other tubing. The tubing must not be reused.

3. The water level measuring device or Interface Probe
   a. Electronic ”tape”, pressure transducer, water level sounder/level indicator, etc. should be capable of measuring to 0.01 foot accuracy. Recording pressure transducers, mounted above the pump, are especially helpful in tracking water levels during pumping operations, but their use must include check measurements with a water level “tape” at the start and end of each sampling event.
   b. The interface probe can be used to check on the presence of free phase liquids (LNAPL, or DNAPL) before purging begins (as needed).
4. Flow measurement supplies
   a. Graduated cylinder (size according to flow rate) and stopwatch usually will suffice. Large graduated bucket used to record total water purged from the well.
5. Power source (generator, nitrogen tank, battery, etc.)
   a. When a gasoline generator is used, locate it downwind and at least 30 feet from the well so that the exhaust fumes do not contaminate samples.
6. Indicator field parameter monitoring instruments
   a. Use of a multi-parameter instrument capable of measuring pH, oxidation/reduction potential (ORP), dissolved oxygen (DO), specific conductance, temperature, and coupled with a flow-through-cell is required when measuring all indicator field parameters, except turbidity. Turbidity is collected using a separate instrument. Record equipment/instrument identification (manufacturer, and model number). Transparent, small volume flow-through-cells (e.g., 250 mLs or less) are preferred. This allows observation of air bubbles and sediment buildup in the cell, which can interfere with the operation of the monitoring instrument probes, to be easily detected. A small volume cell facilitates rapid turnover of water in the cell between measurements of the indicator field parameters. It is recommended to use a flow-through-cell and monitoring probes from the same manufacturer and model to avoid incompatibility between the probes and flow-through cell.
   b. Turbidity samples are collected before the flow-through-cell. A “T” connector coupled with a valve is connected between the pump’s tubing and flow-through-cell. When a turbidity measurement is required, the valve is opened to allow the groundwater to flow into a container. The valve is closed and the container sample is then placed in the turbidity meter.
   c. Standards are necessary to perform field calibration of instruments. A minimum of two standards are needed to bracket the instrument measurement range for all parameters except ORP which use a Zobell solution as a standard. For dissolved oxygen, a wet sponge used for the 100% saturation and a zero dissolved oxygen solution are used for the calibration.

d. Barometer (used in the calibration of the Dissolved Oxygen probe) and the conversion formula to convert the barometric pressure into the units of measure used by the Dissolved Oxygen meter are needed.

7. Decontamination supplies
   a. Includes (for example) non-phosphate detergent, distilled/deionized water, isopropyl alcohol, etc.
8. Record keeping supplies
   a. Logbook(s), well purging forms, chain-of-custody forms, field instrument calibration forms, etc.
9. Sample bottles
10. Sample tags or labels
11. PID or FID instrument
    a. This instrument is used to detect VOCs for health and safety purposes, and provide qualitative field evaluations.
12. Miscellaneous Equipment
    a. Equipment to keep the sampling apparatus shaded in the summer (e.g., umbrella) and from freezing in the winter. If the pump's tubing is allowed to heat up in the warm weather, the cold groundwater may degas as it is warmed in the tubing.

B. EQUIPMENT/INSTRUMENT CALIBRATION

1. Prior to the sampling event, perform maintenance checks on the equipment and instruments according to the manufacturer's manual and/or applicable SOP. This will ensure that the equipment/instruments are working properly before they are used in the field.
2. Prior to sampling, the monitoring instruments must be calibrated and the calibration documented. The instruments are calibrated using U.S EPA Region 1 Calibration of Field Instruments (temperature, pH, dissolved oxygen, conductivity/specific conductance, oxidation/reduction [ORP], and turbidity), March 23, 2017, or latest version or from one of the methods listed in 40CFR136, 40CFR141 and SW-846. The instruments shall be calibrated at the beginning of each day. If the field measurement falls outside the calibration range, the instrument must be re-calibrated so that all measurements fall within the calibration range. At the end of each day, a calibration check is performed to verify that instruments remained in calibration throughout the day. This check is performed while the instrument is in measurement mode, not calibration mode. If the field instruments are being used to monitor the natural attenuation parameters, then a calibration check at mid-day is highly recommended to ensure that the instruments did not drift out of calibration. *Note: during the day if the instrument reads zero or a negative number for dissolved oxygen, pH, specific conductance, or turbidity (negative value only), this indicates that the instrument drifted out of calibration or the instrument is malfunctioning. If this situation occurs the data from this instrument will need to be qualified or rejected.*

C. PRELIMINARY SITE ACTIVITIES

1. Check the well for security (damage, evidence of tampering, missing lock, etc.) and record pertinent observations (include photograph as warranted). If needed, lay out a sheet of clean polyethylene for monitoring and sampling equipment, unless equipment is elevated above the ground (e.g., on a table, etc.).
2. Remove well cap and if appropriate measure VOCs at the rim of the well with a PID or FID instrument and record reading in field logbook or on the well purge form. If the well casing does not have an established reference point (usually a V-cut or indelible mark in the well casing), make one. Describe its location and record the date of the mark in the

logbook (consider a photographic record as well). All water level measurements must be recorded relative to this reference point (and the altitude of this point should be determined using techniques that are appropriate to site's DQOs.

3. If water-table or potentiometric surface map(s) are to be constructed for the sampling event, perform synoptic water level measurement round (in the shortest possible time) before any purging and sampling activities begin. If possible, measure water level depth (to 0.01 ft.) and total well depth (to 0.1 ft.) the day before sampling begins, in order to allow for re-settlement of any particulates in the water column. This is especially important for those wells that have not been recently sampled because sediment buildup in the well may require the well to be redeveloped. If measurement of total well depth is not made the day before, it should be measured after sampling of the well is complete. All measurements must be taken from the established referenced point. Care should be taken to minimize water column disturbance.
4. Check newly constructed wells for the presence of LNAPLs or DNAPLs before the initial sampling round. If none are encountered, subsequent check measurements with an interface probe may not be necessary unless analytical data or field analysis signal a worsening situation. This SOP cannot be used in the presence of LNAPLs or DNAPLs. If NAPLs are present, the project team must decide upon an alternate sampling method. All project modifications must be approved and documented prior to implementation.
5. If available, check intake depth and drawdown information from previous sampling event(s) for each well. Duplicate, to the extent practicable, the intake depth and extraction rate (use final pump dial setting information) from previous event(s). If changes are made in the intake depth or extraction rate(s) used during previous sampling event(s), for either portable or dedicated extraction devices, record new values, and explain reasons for the changes in the field logbook.

D. PURGING AND SAMPLING PROCEDURE

1. Purging and sampling wells in order of increasing chemical concentrations (known or anticipated) are preferred. The use of dedicated pumps is recommended to minimize artificial mobilization and entrainment of particulates each time the well is sampled. Note that the use of dedicated sampling equipment can also significantly reduce the time needed to complete each sampling event, will promote consistency in the sampling, and may reduce sampling bias by having the pump's intake at a constant depth.
2. Measure the water level in the well before installing the pump if a non-dedicated pump is being used. The initial water level is recorded on the purge form or in the field logbook.
3. Lower pump, safety cable, tubing and electrical lines slowly (to minimize disturbance) into the well to the appropriate depth (may not be the mid-point of the screen/open interval). The Sampling and Analysis Plan/Quality Assurance Project Plan should specify the sampling depth (used previously), or provide criteria for selection of intake depth for each new well. If possible keep the pump intake at least two feet above the bottom of the well, to minimize mobilization of particulates present in the bottom of the well.
   Pump tubing lengths, above the top of well casing should be kept as short as possible to minimize heating the groundwater in the tubing by exposure to sun light and ambient air temperatures. Heating may cause the groundwater to degas, which is unacceptable for the collection of samples for VOC and dissolved gases analyses.
4. Before starting pump, measure water level. Install recording pressure transducer, if used to track drawdowns, to initialize starting condition.
5. From the time the pump starts purging and until the time the samples are collected, the purged water is discharged into a graduated bucket to determine the total volume of groundwater purged. This information is recorded on the purge form or in the field logbook.

Start the pump at low speed and slowly increase the speed until discharge occurs. Check water level. Check equipment for water leaks, and if present, fix or replace the affected equipment. Try to match pumping rate used during previous sampling event(s). Otherwise, adjust pump speed until there is little or no water level drawdown. If the minimal drawdown that can be achieved exceeds 0.3 feet, but remains stable, continue purging.

6. Monitor and record the water level and pumping rate every five minutes (or as appropriate) during purging. Record any pumping rate adjustments (both time and flow rate). Pumping rates should, as needed, be reduced to the minimum capabilities of the pump to ensure stabilization of the water level. Adjustments are best made in the first 15 minutes of pumping in order to help minimize purging time. During pump start-up, drawdown may exceed the 0.3 feet target and then "recover" somewhat as pump flow adjustments are made. Purge volume calculations should utilize stabilized drawdown value, not the initial drawdown. If the initial water level is above the top of the screen do not allow the water level to fall into the well screen. The final purge volume must be greater than the stabilized drawdown volume plus the pump's tubing volume. If the drawdown has exceeded 0.3 feet and stabilizes, calculate the volume of water between the initial water level and the stabilized water level. Add the volume of the water which occupies the pump's tubing to this calculation. This combined volume of water needs to be purged from the well after the water level has stabilized before samples are collected. Avoid the use of constriction devices on the tubing to decrease the flow rate because the constrictor will cause a pressure difference in the water column. This will cause the groundwater to degas and result in a loss of VOCs and dissolved gasses in the groundwater samples.
   Note: the flow rate used to achieve a stable pumping level should remain constant while monitoring the indicator parameters for stabilization and while collecting the samples.
   Wells with low recharge rates may require the use of special pumps capable of attaining very low pumping rates (e.g., bladder, peristaltic), and/or the use of dedicated equipment.
   For new monitoring wells, or wells where the following situation has not occurred before, if the recovery rate to the well is less than 50 mL/min., or the well is being essentially dewatered during purging, the well should be sampled as soon as the water level has recovered sufficiently to collect the volume needed for all anticipated samples. The project manager or field team leader will need to make the decision when samples should be collected, how the sample is to be collected, and the reasons recorded on the purge form or in the field logbook. A water level measurement needs to be performed and recorded before samples are collected. If the project manager decides to collect the samples using the pump, it is best during this recovery period that the pump intake tubing not be removed, since this will aggravate any turbidity problems. Samples in this specific situation may be collected without stabilization of indicator field parameters. *Note that field conditions and efforts to overcome problematic situations must be recorded in order to support field decisions to deviate from normal procedures described in this SOP. If this type of problematic situation persists in a well, then water sample collection should be changed to a passive or no-purge method, if consistent with the site's DQOs, or have a new well installed.*
7. After the water level has stabilized, connect the "T" connector with a valve and the flow-through-cell to monitor the indicator field parameters. If excessive turbidity is anticipated or encountered with the pump startup, the well may be purged for a while without connecting up the flow-through-cell, in order to minimize particulate buildup in the cell (This is a judgment call made by the sampler). Water level drawdown measurements

should be made as usual. If possible, the pump may be installed the day before purging to allow particulates that were disturbed during pump insertion to settle.
During well purging, monitor indicator field parameters (turbidity, temperature, specific conductance, pH, ORP, DO) at a frequency of five minute intervals or greater. The pump's flow rate must be able to "turn over" at least one flow-through-cell volume between measurements (for a 250 mL flow-through-cell with a flow rate of 50 mLs/min., the monitoring frequency would be every five minutes; for a 500 mL flow-through-cell it would be every ten minutes). If the cell volume cannot be replaced in the five minute interval, then the time between measurements must be increased accordingly. *Note: during the early phase of purging, emphasis should be put on minimizing and stabilizing pumping stress, and recording those adjustments followed by stabilization of indicator parameters.* Purging is considered complete and sampling may begin when all the above indicator field parameters have stabilized. Stabilization is considered to be achieved when three consecutive readings are within the following limits:

Turbidity (10% for values greater than 5 NTU; if three Turbidity values are less than 5 NTU, consider the values as stabilized),
Dissolved Oxygen (10% for values greater than 0.5 mg/L, if three Dissolved Oxygen values are less than 0.5 mg/L, consider the values as stabilized),
Specific Conductance (3%),
Temperature (3%),
pH (± 0.1 unit),
Oxidation/Reduction Potential (±10 millivolts).

All measurements, except turbidity, must be obtained using a flow-through-cell. Samples for turbidity measurements are obtained before water enters the flow-through-cell. Transparent flow-through-cells are preferred, because they allow field personnel to watch for particulate build-up within the cell. This build-up may affect indicator field parameter values measured within the cell. If the cell needs to be cleaned during purging operations, continue pumping and disconnect cell for cleaning, then reconnect after cleaning and continue monitoring activities. Record start and stop times and give a brief description of cleaning activities.
The flow-through-cell must be designed in a way that prevents gas bubble entrapment in the cell. Placing the flow-through-cell at a 45 degree angle with the port facing upward can help remove bubbles from the flow-through-cell. Throughout the measurement process, the flow-through-cell must remain free of any gas bubbles. Otherwise, the monitoring probes may act erratically. When the pump is turned off or cycling on/off (when using a bladder pump), water in the cell must not drain out. Monitoring probes must remain submerged in water at all times.

8. When samples are collected for laboratory analyses, the pump's tubing is disconnected from the "T" connector with a valve and the flow-through-cell. The samples are collected directly from the pump's tubing. Samples must not be collected from the flow-through-cell or from the "T" connector with a valve.
VOC samples are normally collected first and directly into pre-preserved sample containers. Fill all sample containers by allowing the pump discharge to flow gently down the inside of the container with minimal turbulence.
If the pump's flow rate is too high to collect the VOC/dissolved gases samples, collect the other samples first. Lower the pump's flow rate to a reasonable rate and collect the VOC/dissolved gases samples and record the new flow rate.

During purging and sampling, the centrifugal/peristaltic pump tubing must remain filled with water to avoid aeration of the groundwater. It is recommended that 1/4 inch or 3/8 inch (inside diameter) tubing be used to help ensure that the sample tubing remains water filled. If the pump tubing is not completely filled to the sampling point, use the following procedure to collect samples: collect non-VOC/dissolved gases samples first, then increase flow rate slightly until the water completely fills the tubing, collect the VOC/dissolved gases samples, and record new drawdown depth and flow rate.

For bladder pumps that will be used to collect VOC or dissolved gas samples, it is recommended that the pump be set to deliver long pulses of water so that one pulse will fill a 40 mL VOC vial.

Use pre-preserved sample containers or add preservative, as required by analytical methods, to the samples immediately after they are collected. Check the analytical methods preservation.

If determination of filtered metal concentrations is a sampling objective, collect filtered water samples using the same low flow procedures. The use of an in-line filter (transparent housing preferred) is required, and the filter size (0.45 µm is commonly used) should be based on the sampling objective. Pre-rinse the filter with groundwater prior to sample collection. Make sure the filter is free of air bubbles before samples are collected. Preserve the filtered water sample immediately. Note: filtered water samples are not an acceptable substitute for unfiltered samples when the monitoring objective is to obtain chemical concentrations of total mobile contaminants in groundwater for human health or ecological risk calculations.

Label each sample as collected. Samples requiring cooling will be placed into a cooler with ice or refrigerant for delivery to the laboratory. Metal samples after acidification to a pH less than 2 do not need to be cooled.

9. If a recording pressure transducer is used to track drawdown, re-measure water level with tape.

   After collection of samples, the pump tubing may be dedicated to the well for re-sampling (by hanging the tubing inside the well), decontaminated, or properly discarded.

   Before securing the well, measure and record the well depth (to 0.1 ft.), if not measured the day before purging began. Note: measurement of total well depth annually is usually sufficient after the initial low stress sampling event. However, a greater frequency may be needed if the well has a “silting” problem or if confirmation of well identity is needed.

   Secure the well.

10. Decontaminate sampling equipment prior to use in the first well, and then following sampling of each subsequent well. Pumps should not be removed between purging and sampling operations. The pump, tubing, support cable and electrical wires which were in contact with the well should be decontaminated by one of the procedures listed below.

    The use of dedicated pumps and tubing will reduce the amount of time spent on decontamination of the equipment. If dedicated pumps and tubing are used, only the initial sampling event will require decontamination of the pump and tubing. Note if the previous equipment blank data showed that contaminant(s) were present after using the below procedure or the one described in the SAP/QAPP, a more vigorous procedure may be needed.

    <u>Procedure 1</u>

    Decontaminating solutions can be pumped from either buckets or short PVC casing sections through the pump and tubing. The pump may be disassembled and flushed with the decontaminating solutions. It is recommended that detergent and alcohol be used sparingly in the decontamination process and water flushing steps be extended to ensure that any sediment trapped in the pump is removed. The pump exterior and

electrical wires must be rinsed with the decontaminating solutions, as well. The procedure is as follows:

Flush the equipment/pump with potable water.
Flush with non-phosphate detergent solution. If the solution is recycled, the solution must be changed periodically.
Flush with potable or distilled/deionized water to remove all of the detergent solution. If the water is recycled, the water must be changed periodically.
Optional - flush with isopropyl alcohol (pesticide grade; must be free of ketones {e.g., acetone}) or with methanol. This step may be required if the well is highly contaminated or if the equipment blank data from the previous sampling event show that the level of contaminants is significant.
Flush with distilled/deionized water. This step must remove all traces of alcohol (if used) from the equipment. The final water rinse must not be recycled.

Procedure 2
Steam clean the outside of the submersible pump.
Pump hot potable water from the steam cleaner through the inside of the pump. This can be accomplished by placing the pump inside a three or four inch diameter PVC pipe with end cap. Hot water from the steam cleaner jet will be directed inside the PVC pipe and the pump exterior will be cleaned. The hot water from the steam cleaner will then be pumped from the PVC pipe through the pump and collected into another container. Note: additives or solutions should not be added to the steam cleaner.
Pump non-phosphate detergent solution through the inside of the pump. If the solution is recycled, the solution must be changed periodically.
Pump potable water through the inside of the pump to remove all of the detergent solution. If the solution is recycled, the solution must be changed periodically.
Pump distilled/deionized water through the pump. The final water rinse must not be recycled.

11. Quality control samples are required to verify that the sample collection and handling process has not compromised the quality of the groundwater samples. All field quality control samples must be prepared the same as regular investigation samples with regard to sample volume, containers, and preservation. Quality control samples include field duplicates, equipment blanks, matrix spike/matrix spike duplicates, trip blanks (VOCs), and temperature blanks.
12. A field log shall be kept to document all groundwater field monitoring activities, and record the following for each well:

Site name, municipality, state.
Well identifier, latitude-longitude or state grid coordinates.
Measuring point description (e.g., north side of PVC pipe).
Well depth, and measurement technique.
Well screen length.
Pump depth.
Static water level depth, date, time and measurement technique.
Presence and thickness of immiscible liquid (NAPL) layers and detection method.
Pumping rate, drawdown, indicator parameters values, calculated or measured total volume pumped, and clock time of each set of measurements.
Type of tubing used and its length.
Type of pump used.

Clock time of start and end of purging and sampling activity.
Types of sample bottles used and sample identification numbers.
Preservatives used.
Parameters requested for analyses.
Field observations during sampling event.
Name of sample collector(s).
Weather conditions, including approximate ambient air temperature.
QA/QC data for field instruments.
Any problems encountered should be highlighted.

Description of all sampling/monitoring equipment used, including trade names, model number, instrument identification number, diameters, material composition, etc.

13. Data reports are to include laboratory analytical results, QA/QC information, field indicator parameters measured during purging, field instrument calibration information, and whatever other field logbook information is needed to allow for a full evaluation of data usability.
Note: the use of trade, product, or firm names in this sampling procedure is for descriptive purposes only and does not constitute endorsement by the U.S. EPA.

5.2 Emissions Sampling Procedures

Emissions vapor samples will be collected using 6 Liter Summa Canisters according to the US EPA SOP#: 1704, Date: 07/27/95, Revision. #: 0.1.

A. Sampling Using a Mass Flow Controller/Vacuum Pump Arrangement (Anderson Sampler Model 87-100)

1. Prior to sample commencement at the location, the appropriate information is completed on the Canister Sampling Field Data Sheet.

2. A canister, which is evacuated to 0.05 mm Hg and connected in line with the sampler, is opened to the atmosphere containing the VOCs to be sampled.

3. A whole air sample is drawn into the system through a stainless steel inlet tube by a direct drive blower motor assembly.

4. A small portion of this whole air sample is pulled from the inlet tube by a specially modified inert vacuum pump in conjunction with a mass flow controller.

5. The initially evacuated canister is filled by action of the flow controlled pump to a positive pressure not to exceed 25 psig.

6. A digital time-programmer is used to pre-select sample duration and start and stop times.

7. Upon sample completion at the location, the appropriate information is recorded on the Canister Sampling Field Data Sheet.

5.3 Sample Quality Control

To monitor the integrity of field sampling and laboratory procedures, the following quality assurance/quality control (QA/QC) procedures will be adhered to for this effort.

Field QC Samples

Trip Blank: The trip blank accompanies the samples to and from the field, never opened, until all samples are readied for analysis. Its purpose is to assess the potential for in-transit contamination of samples. Trip blanks will be used at a frequency of one per sample delivery group.

Blind Duplicate: A duplicate sample taken in the field from the same location as the original sample to ascertain sampling precision but it is given another name so it is not identified with any field duplicate, again to test precision. Trip blanks will be used at a frequency of one per 20 samples.

Lab QC Samples

Method Blank (MB): A method blank is an analyte-free matrix (water, soil, etc.) subjected to the entire analytical process to demonstrate that the analytical system itself does not introduce contamination. The method blank results should be below the Method Reporting Limit (MRL) or, if required for DoD projects, < ½ MRL for the analytes being tested. A method blank is included with the analysis of every sample preparation batch, every 20 samples, or as stated in the method, whichever is more frequent.

Matrix Spike/Matrix Spike Duplicate (MS/MSD): The matrix spike/matrix duplicate is a known amount of a compound similar chemically to the target analyte is added to samples to ascertain any matrix effects on recoveries and to determine the accuracy and precision of the method in this matrix. MS/MSDs will be used at a frequency of one per 20 samples.

Laboratory Control Sample (LCS): A laboratory control sample is a well-characterized sample of known analytes and concentration. A reference material containing certified amounts of target analytes, may be used as an LCS. An LCS is prepared and analyzed at a minimum frequency of one per 20 samples, with every analytical batch or as stated in the method, whichever is more frequent. The LCS sample is prepared and analyzed in exactly the same manner as the field samples. The percent recovery of the target analytes in the LCS is compared to established control limits and assists in determining whether the methodology is in control and whether the laboratory is capable of making accurate and precise measurements at the required reporting limit. Comparison of batch-to-batch LCS analyses enables the laboratory to evaluate batch-to-batch precision and accuracy.

Surrogates: Surrogates are organic compounds that are similar in chemical composition and behavior to the analytes of interest, but are not normally found in environmental samples. Depending on the analytical method, one or more of these compounds is added to method blanks, calibration and check standards, and samples prior to extraction and analysis. Samples include duplicates, matrix spike samples, duplicate matrix spike samples and laboratory control samples. This is done in order to

monitor the method performance on each sample. The percent recovery is calculated for each surrogate, and the recovery is a measurement of the overall method performance.

Initial (or independent) calibration verification standards (ICVs): Initial (or independent) calibration verification standards are standards that are analyzed after calibration with newly prepared standards but prior to sample analysis, in order to verify the validity and accuracy of the standards used in the calibration. Once it is determined that there is not a reference material defect or systematic error in preparation of the calibration standards, the newly prepared standards are considered valid and may be used for subsequent calibrations and quantitative determinations (as expiration dates and methods allow). The ICV standards are prepared from materials obtained from a source independent from the one used for preparing the calibration standards ("second-source"). ICVs are also analyzed in accordance with method-specific requirements.

Continuing calibration verification standards (CCVs): Continuing calibration verification standards are midrange standards that are analyzed in order to verify that the calibration of the analytical system is still acceptable. The frequency of CCV analysis is either once every ten samples, or as indicated in the method.

6.0 FIELD EQUIPMENT CALIBRATION/CORRECTIVE ACTION

A maintenance, calibration, and operation program will be implemented to ensure that routine calibration and maintenance is performed on all field instruments. Team members are familiar with the field calibration, operation, and maintenance of the field instruments. Manufacturer's instructions pertaining to the use, maintenance and calibration of the field instruments will be followed to ensure proper data collection during the implementation of the SMP. All field instrument calibrations and field checks will be recorded in field log books.

If field instruments should fail, the Project Manager will be contacted immediately. The Project Manager will either provide replacement equipment or have the malfunction repaired immediately.

7.0 ANALYTICAL LABORATORY QA/QC PROCEDURES

All laboratory analyses performed will be in full compliance within applicable State, or Federal Quality Control guidelines. The Quality Assurance (QA) program and Quality Control (QC) procedures will be defined by the Quality Manual and the Laboratory Standard Operating Procedure (SOP) Manual. The QA program will meet or exceed EPA recommended guidelines with quality control samples accounting for at least 20% of the total number of samples analyzed. Data from the analysis of these samples can be used to update control limits, or in the case of projects with defined control limits, the data serves to demonstrate the overall lab performance. Data which exceed control limits are considered suspicious and shall initiate specific actions as defined in the laboratory's Manual and the SOP Manual. The Quality Assurance Office ensures that facilities, equipment, personnel, methods, records, and Quality Control procedures are in conformance with

the laboratory's Standard Operating Procedures (SOPs) as well as with applicable EPA Quality Control guidelines.

Each laboratory project is monitored through application of a QA/QC program, which includes the following elements:

- Centralized Project files;
- Written Standard Operating Procedures;
- Rigorous Chain-of-Custody procedures;
- Documentation of nonconformance events and corrective actions taken;
- Quality Control of data is assessed by analysis of reference samples, spiked samples, duplicates and surrogate spikes;
- Periodic inspections of projects in progress;
- Frequent equipment calibration and maintenance inspections; and
- Archiving of project records under controlled access.

8.0 SAMPLE HANDLING AND CUSTODY REQUIREMENTS

8.1 Sampling Handling Systems

The following list includes a summary of sample handling system:

Sample Collection, Packaging and Shipment

- Sample Collection and Packaging – contractor/engineer
- Coordination of Shipment – contractor/engineer
- Type of Shipment – overnight carrier, laboratory courier

Sample Receipt and Analysis

- Sample Receipt – laboratory
- Sample Custody and Storage – laboratory
- Sample Preparation – laboratory
- Sample Determinative Analysis – laboratory

Sample Archiving

- Field Sample Storage – Samples will be shipped within 24 hours and arrive at the laboratory within 24 hours of sample shipment.

Sample Disposal

- Number of Days from Analysis – 30 days

8.2 Sample Custody Requirements

Chain-of-custody records for all samples will be maintained. A sample will be considered to be "in custody" of any individual if said sample is either in direct view of or otherwise directly controlled by that individual. Storage of samples during custody will be accomplished according to established preservation techniques, in appropriately sealed and numbered containers. Chain-of-custody will be accomplished when the samples are directly transferred from one individual to the next, with the first individual witnessing the signature of the recipient on the chain-of-custody record.

The chain-of-custody records will contain the following information:

- Respective sample numbers of the laboratory and Qualified Environmental Professional, if available.
- Signature of the collector.
- Date and time of collection.
- Sample type (e.g., groundwater, sediment).
- Identification of well or sampling point.
- Number of containers.
- Parameter requested for analysis.
- Signature of person(s) involved in the chain of possession.
- Description of sample bottles and their condition.
- Problems associated with sample collection (i.e., breakage, preservatives missing), if any.

9.0 FIELD AND ANALYTICAL QUALITY CONTROL SUMMARY

The purpose of the QA/QC program is to establish and maintain laboratory practices that will ensure the scientific reliability and comparability of the data generated in support of the project.

Quality assurance (QA) is the system for ensuring that all information, data, and resulting decisions compiled under an investigation are technically sound, statistically valid, and properly documented. Quality control (QC) is the mechanism through which quality assurance achieves its goals. Quality control programs define the frequency and methods of checks, audits, and reviews necessary to identify problems and dictate corrective action, thus high quality data.

The laboratory QA/QC program will outline the purpose, policies, organizations and operations established to support the chemical analyses.

Matrix	Aqueous
Analytical Group	VOCs
Sampling SOP(s)	See Section 5.1
Analytical Method/SOP Reference	SW-846 8260C
Sampler's Name	Contractor/engineer Field Representative
Field Sampling Organization	Contractor/engineer
Analytical Organization	ELAP-accredited laboratory
No. of Sample Locations	6 (plus MS/MSD, Trip Blank, and Duplicate)

Matrix	Air (SVE emissions)
Analytical Group	VOCs
Sampling SOP(s)	See Section 5.2
Analytical Method/SOP Reference	TO-15
Sampler's Name	Contractor/engineer Field Representative
Field Sampling Organization	Contractor/engineer
Analytical Organization	ELAP-accredited laboratory
No. of Sample Locations	1 sample for SVE emissions

10.0 DATA MANAGEMENT AND DOCUMENTATION/PROJECT REPORTS

10.1 Data Management

The Project Manager shall retain copies of all management reports, memoranda, and all correspondence. Other records and documents that will be produced in conjunction with this project include:

- Inspection checklists and reports
- Return-to-compliance forms
- Non-applicability forms
- Enforcement documentation
- Amended QAPP
- Data handling reports
- Progress reports and correspondence to NYSDEC/NYSDOH
- Project reporting (to include discussion of QA issues encountered, and how they were resolved)

The sampler's field records will contain sufficient information such that someone else can reconstruct the sampling situation without reliance on the sampler's memory.
Entries in the field records will include, at a minimum, the following:

- Site name and location
- Project number
- Name and affiliation of Project Manager and sampler involved
- Sampling point name and description
- Type of sample container(s) used
- Preservative(s) used
- Date and time of sample collection
- Sample identification number(s)
- Laboratory's sample identification number(s)
- References such as maps or photographs of the sampling Site, if available
- Field observations

- Pertinent weather factors such as temperature, wind direction and precipitation

To assess the usability of the data obtained during the implementation of the SMP, a Data Usability Summary Report (DUSR) will be prepared by a Third Party Data Validator. The Usability Report will describe the rationale for the data and the presentation of data limitations. For example, if the performance criteria are not usable to address the regulatory requirements or support the project-decision for the Client, then the contractor/engineer Project Manager should address how this problem will be resolved and discuss the alternative approach. Data proven to be usable will be tabulated and compared to SCOs within the final project report.

A copy of all project documents and records will be kept on file at contractor/engineer for a minimum of seven years.

10.2 Project Reports

The format for all data reporting packages will be consistent with the requirements and procedures used for data validation and data assessment described in this QAPP. The NYSDEC has implemented an Environmental Information Management System (EIMS). The EIMS uses the database software application EQuIS™ (EQuIS) from EarthSoft® Inc. (EarthSoft). Data will be submitted to the NYSDEC in accordance with their EIMS.

Three kinds of reports will be prepared: readiness reviews, regular quarterly and annual progress reports, and project final report. Progress reports will note the status of project activities and identify whether any QA problems were encountered (and, if so, how they were handled). Project final report will analyze and interpret data, present observations, draw conclusions, identify data gaps, and describe any limitations in the way the data should be used.

11.0 REFERENCES

US Environmental Protection Agency. (1996, Rev. 2017). Low Stress (low flow) Purging and Sampling Procedures for the Collection of Groundwater Samples from Monitoring Wells

US Environmental Protection Agency. (1995). Standard Operating Procedure # 1704. Summa Canister Sampling

New York State Department of Health. (October 2006, Updated 2006-2017). Guidance for Evaluating Soil Vapor Intrusion in the State of New York.

Bureau of Toxic Substance Assessment New York State Department of Health. Trichloroethene (TCE) in Indoor and Outdoor Air (August 2015 Fact Sheet).

Bureau of Toxic Substance Assessment New York State Department of Health. Tetrachloroethene (PERC) in Indoor and Outdoor Air (September 2013 Fact Sheet).

FIGURES

TOPOGRAPHIC MAP

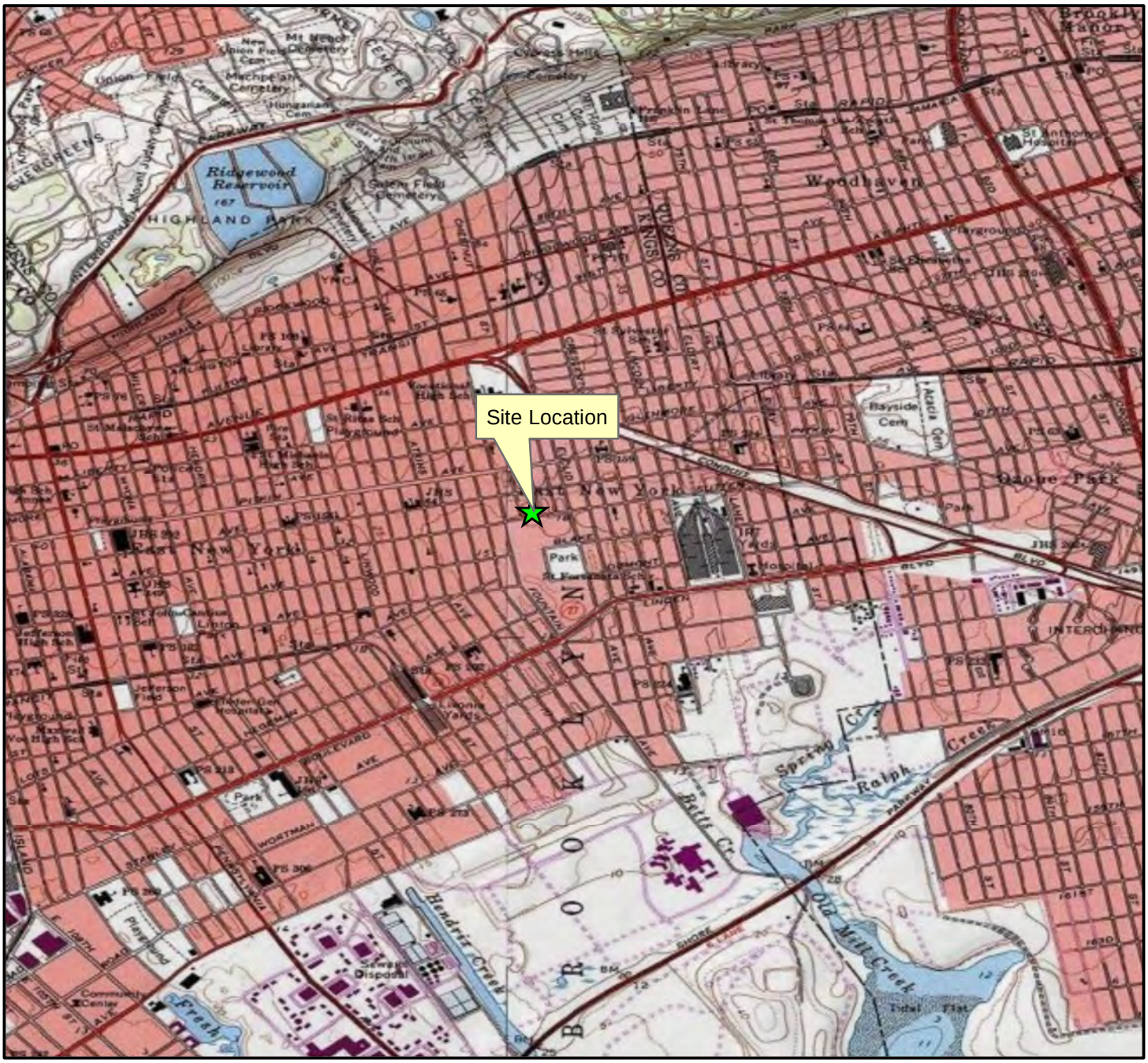

Figure 1
Topographic Map

1199 Sutter Avenue
Brooklyn, NY 11208

USGS Quadrangle:
Brooklyn

Approx. Elevation:
19 feet

N
W E
S

EnviroTrac
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CRYSTAL STREET

CHESTNUT STREET

SUPERMARKET

DELICATESSEN

NAIL SALON

DENTIST OFFICE

SSV-10

SSV-8/OA-2

SSV-6/OA-1

S-4 (2009)

S-1

S-5

B-1

B-12

B-2

S-2

S-3

S-4 (2016)

B-3

MW-3S

MW-3D

B-11

B-10

SSV-4/ASV-4

SSV-2/ASV-2

B-8

SS1/IA-1

SSV-5/ASV-5

SSV-3/ASV-3

B-4

MW-4S

MW-10S

B-7

SSV-9

MW-9S

MW-1S

MW-1D

MW-11S

B-5

MW-2D

B-6

MW-2S

SIDEWALK

FORMER DRY CLEANERS
(CURRENT LAUNDROMAT)

SIDEWALK FLAG
REPAIR AREA

SUTTER AVENUE

SIDEWALK

MW-6D

MW-6S

SSV-11

MW-5S

MW-5D

SSV-7

MW-7S

MW-7D

NYC HOUSING
AUTHORITY PROPERTY

APARTMENT
BUILDING

MW-8S

MW-8D

APARTMENT
BUILDING

LEGEND:

- BCP AGREEMENT SITE PROPERTY OUTLINE
- GROUNDWATER MONITORING WELL
- SOIL BORING
- SOIL & AMBIENT VAPOR SAMPLE
- SSV — SUB-SLAB SAMPLE
- IA/ASV — INDOOR AIR SAMPLE
- OA — OUTDOOR AIR SAMPLE
- INJECTION WELL (INSTALLED 2009)
- INJECTION WELL (INSTALLED 2017)

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0 20 40
SCALE IN FEET

DATE: 10/31/2018

REVISED BY: BS

1199 SUTTER AVENUE
BROOKLYN, NEW YORK

SAMPLE AND INJECTION LOCATIONS 2009 – 2017

FIGURE #
2

STATE OF NEW YORK
DALE C. KONAS
LICENSED PROFESSIONAL ENGINEER
No. 081035

1/8/19

CRYSTAL STREET

SIDEWALK OVERHANG

SIDEWALK OVERHANG

VMP-1 −0.150

SVE/SSD-1

SUPERMARKET BASEMENT

SVE/SSD-2

VMP-2 −0.786

BLOWERS

MW-3S MW-3D

SVE/SSD-3

VMP-5 −0.840

SVE/SSD-4

VMP-6 −0.031

SVE/SSD-7

MW-4S

SVE/SSD-5

SVE/SSD-6

VMP-3 −1.588

MW-10S

VMP-7 −0.075

VMP-4 −1.199

SVE/SSD-8

MW-1S MW-1D

MW-2D MW-2S

MW-11S

FORMER DRY CLEANERS (CURRENT LAUNDROMAT)

DELICATESSEN

NAIL SALON

DENTIST OFFICE

SIDEWALK

SUTTER AVENUE

CHESTNUT STREET

REMEDIATION SHED LOCATION

MW-9S

North

LEGEND:

- BCP AGREEMENT SITE PROPERTY OUTLINE
- GROUNDWATER MONITORING WELL
- VAPOR MONITORING POINT
- EXISTING SVE/SSDS PIPING
- EXISTING SVE/SSDS WELL
- −0.150 VACUUM (IN INCHES OF WATER) SAMPLE DATE: 5/25/2017
- AIR SPARGE WELL
- SOIL VAPOR EXTRACTION WELL
- SVE PIPING
- AS PIPING
- 30 FT. SVE RADIUS OF INFLUENCE
- 20 FT. AS RADIUS OF INFLUENCE

NOTE:

COVER SYSTEM CONSISTS OF PAVED CONCRETE AND ASPHALT AND BUILDING FOUNDATION PRESENT WITHIN THE SITE BOUNDARY.

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0 15 30
SCALE IN FEET

DATE: 10/30/2018

REVISED BY: BS

1199 SUTTER AVENUE
BROOKLYN, NEW YORK

AS-BUILT: ENGINEERING CONTROLS LOCATIONS SVE/AS REMEDIATION SYSTEM/SSDS MITIGATION SYSTEM AND COVER SYSTEM

FIGURE # 3

ATTACHMENT A

RESUMES OF KEY PERSONNEL

CORPORATE RESUME

Tracy Wall
Project Manager

tracyw@envirotrac.com
631.924.3001

Experience Snapshot

Ms. Wall has performed numerous hydrogeologic investigations for several sites in New York, New Jersey, Connecticut and Delaware. Ms. Wall has significant experience in: Phase I and II Environmental Site Assessments (ESAs); soil vapor intrusion investigations; installation, operation, maintenance, and monitoring of remediation and mitigation systems; project management of New York State Department of Environmental Conservation (NYSDEC) and NYCOER BCP and VCP sites, federal Superfund sites, state and petroleum-impacted sites; petroleum and chemical-impacted site evaluations and remediation; underground storage tank (UST) evaluations and removals; commercial, residential, and municipal drinking water sampling; monitoring, and reporting for industrial companies; and technical report writing.

Licenses/Certifications

OSHA 40 Hour Hazardous Waste Operations and Emergency Response Training

OSHA 8 Hour Refresher Hazardous Waste Operations and Emergency Response Training

New York State Asbestos Inspector

American Petroleum Institute (API) Work Safety Training

Strengths

- Phase I & II Environmental Site Assessments (ESAs)
- Project Management of NYSDEC and NYCOER BCP and VCP Projects
- Soil Vapor Intrusion Investigations
- Installation, Operation, Maintenance, and Monitoring of Remediation and Mitigation Systems
- Tank Removals
- Soil and Groundwater Investigations
- Technical Report Writing for State and County Agencies

Education

- B.S., SUNY Stony Brook, 2001
- A.S., Nassau Community College, 1997

Experience highlight 2018

Corporate Resume

Tracy Wall

Project Manager

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About EnviroTrac

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"We Deliver Value, Quality and Innovation Safely to Our Clients"

Professional Affiliations

- Member of Long Island Professional Geologists
- Member of Environmental Professionals Association

Professional History

- 2015—Present, Project Manager, EnviroTrac Ltd.
- 2006—2015, Hydrogeologist, Dermody Consulting
- 2005—2006, Hydrogeologist, Dermody & Menegio Consulting
- 2003—2005, Hydrogeologist, Enviroscience Consultants, Inc.
- 2003, Hydrogeologist, Town of East Hampton
- 2001—2003, Hydrogeologist, P.W. Grosser Consulting, Inc.
- 2001, Environmental Scientist, U.S. Geological Survey

Professional Highlights and Selected Projects

Ms. Wall performed numerous Phase I ESAs in New York, New Jersey, Connecticut and Delaware for property transfers and refinancing. For cases in which Phase I ESA report conclusions recommended additional work be performed to evaluate the potential for contamination at the site, a Phase II ESA investigation was performed, which may have included: air, soil, soil vapor, groundwater, or drinking water sampling; groundwater flow direction detennination; investigation of upgradient potential sources of contamination; and in some cases, remediation of identified contamination.

Ms. Wall performed vapor intrusion investigations in New York to determine whether vapor encroachment would have been an issue at a site. Ms. Wall evaluated the investigation results and successfully determined whether vapor mitigation would have been required.

Ms. Wall performed pilot tests at sites to determine whether hydrogeologic conditions would have been favorable for soil vapor extractions (SVE) and/or air sparge (AS) applications. Ms. Wall played active roles in the installation of SVE and AS remediation system components in Bay Shore and Brooklyn, New York and sub-slab depressurization systems (SSDSs). Ms. Wall performed bi-monthly, monthly, and quarterly operation, maintenance, and monitoring tasks as well as soil, soil vapor, and groundwater sampling for remediation system sites. Ms. Wall performed activities on Long Island, NY and in the five boroughs of New York City.

Corporate Resume

Tracy Wall

Project Manager

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Professional Highlights and Selected Projects

Ms. Wall prepared several work plans for interim remedial measures and final remedial activities, managed remedial activities, prepared site management plans, worked with NYS certified engineers to prepare final engineer reports, and implemented community air monitoring plan (CAMP) air monitoring programs.

Ms. Wall supervised several groundwater and soil investigations for radionuclide and metals contaminated media at Brookhaven National Laboratory located on Long Island, New York.

Ms. Wall performed groundwater sampling for several NYSDEC Regions 1 and 2 projects on Long Island, New York and the five boroughs of New York City. Ms. Wall also performed monthly and quarterly groundwater sampling at petroleum-impacted residential and municipal properties in New York.

Ms. Wall performed evaluations of UST leakage at numerous sites and oversaw the removal of several USTs. Ms. Wall performed evaluations of wastewater and stormwater systems with petroleum and chemical contamination. The evaluations included soil contamination analysis, groundwater well installation, sampling, and interpretation of results. Work plans were prepared and negotiated with the appropriate regulatory agency to determine the scope of work and objectives at each site. UST removals included the preparation of permits and certifications for the appropriate regulatory agencies. Soil and groundwater remediation was performed at numerous sites including excavation of contaminated soil, removal of free-floating petroleum from the water table surface, and installation of remediation or mitigation systems.

Ms. Wall performed drinking water sampling at several commercial and residential properties located in New York and New Jersey, and also for several Long Island schools for numerous suites of compounds.

Ms. Wall was involved in the Preparation of Wild, Scenic and Recreational Rivers Act permits and variances, including variances for lot size. Investigations were conducted in accordance with the health department standard operating procedure for development of sites which were historically used for agricultural purposes. In addition, she managed projects for the identification of threatened and endangered species and historical resources.

Professional Highlights and Selected Projects

Ms. Wall performed monthly and semi-annual wastewater investigations for the Long Island Railroad and commercial properties. In addition, she completed several Industrial User Self Monitoring Reports.

Ms. Wall was responsible for the collection of data and assisting in the preparation of the town of East Hampton, New York Water Resources Management Plan.

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CORPORATE RESUME

Peter C. Breen, PG

Senior Project Manager

pbreen@envirotrac.com
631.924.3001

Experience Snapshot

Mr. Breen has provided professional services to clients for over thirty years, focusing on environmental site investigation and remediation pertaining to soil, soil vapor and groundwater contamination. His expertise includes the development and implementation of technical scopes, budgets and schedules, regulatory interaction and negotiations, performance of technical "cold eyes" project reviews and cause and effect evaluations. He has assisted insurance companies and law firms with claims and litigation pertaining to soil and groundwater contamination involving mining waste and gasoline release sites.

Licenses/Certifications

Professional Geologist, PG-000193, State of New York

Certified Professional Geologist, CPG #11417, American Institute of Professional Geologists

Certified Professional Geologist, GEOG724, State of Alaska

OSHA 40 Hour Hazardous Waste Operations and Emergency Response Training

OSHA 8 Hour Refresher Hazardous Waste Operations and Emergency Response Training

Loss Prevention System (LPS) 8 hour Training, 2004

American Red Cross First Aid/CPR/AED Training

American Red Cross Bloodborne Pathogens Training

Strengths

- Due diligence and remedial investigations
- Insurance claims and litigation support
- Soil vapor intrusion assessments
- Groundwater modeling
- Geophysical evaluations
- Aquifer testing
- Soil and groundwater remediation

Education

- MS Earth Science, Adelphi University
- BS Biology, University of Miami

Experience highlight 2018

Corporate Resume

Peter C. Breen, PG

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Professional Affiliations

- American Institute of Professional Geologists
- National Ground Water Association

Professional History

- 1984—1990, Hydrogeologist/Project Manager, Roux Associates
- 1990—1991, Project Manager, Blasland & Bouck Engineers
- 1991—2003, Senior Project Manager, Environmental Resources Management
- 2003—2008, Principal Professional, Geologic Services Corporation/Kleinfelder
- 2008—Present, Senior Project Manager, EnviroTrac Ltd.

Professional Highlights and Selected Projects

Mr. Breen has extensive experience pertaining to conceptualizing and implementing technical and quality assurance aspects of site cleanups conducted in accordance with the Remediation Standard Regulations (RSRs), section 22a-133k-1 through 22a-133k-3 of the Regulations of Connecticut State Agencies.

Mr. Breen worked on a former manufacturing facility in Cromwell, Connecticut. The remedy for the site included limited hot spot soil remediation and an environmental land use restriction (ELUR) restricting the property to commercial use was filed. Verification reporting is in progress with licensed environmental professional (LEP) oversight.

Mr. Breen worked on a petroleum lubricants manufacturing facility in East Haven, Connecticut. He managed data compilation and quality assurance including evaluation of site testing results to assure usability and compliance with reasonable confidence protocol (RCP) requirements. He developed a conceptual site model for the overburden/bedrock hydrogeologic setting as well as a path forward to achieve compliance with RSRs with LEP oversight. The site testing is ongoing and RSR compliance may include implementing administrative controls and/or conducting soil and groundwater remedial work.

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Professional Highlights and Selected Projects

Mr. Breen assisted council in 2009 regarding a matter involving MTBE Products Liability Litigation related to three cases including:

West Hempstead Water District v. AGIP Inc., et al, 03 CV 10052

West Hempstead Water District v. Merit Oil., et al, 08 CV 4290

Village of Hempstead v. AGIP Inc., et al, 03 CV 10055

The insured party (Defendant) owned, or had previously owned, a portfolio of retail gasoline stations that were identified as potential sources. An excess of thirty-thousand documents were reviewed during a one-year discovery phase. That information included results of an expedited site assessment, aquifer testing, down-hole geophysical testing and stratigraphic analyses, three-dimensional numerical groundwater flow and contaminant transport simulations, a two-phase interim remedial measure (IRM) conducted to capture and remove MTBE from groundwater, and other work conducted by the New York State Department of Environmental Conservation (NYSDEC). Other information included: numerous reports pertaining to the defendant's properties and information associated with a multitude of other facilities (identified as potential sources by the NYSDEC) owned and operated by other named parties, information regarding activities conducted by two water supply districts (Plaintiff's facilities) and hydrogeologic reports and other information developed by others. The cases were settled prior to trial.

Mr. Breen reviewed environmental records pertaining to sixteen MTBE release sites on Long Island, New York on behalf of Defendant (a major oil company). The results of the evaluations were used to develop/update/critique conceptual site models, focusing on assessing spill histories, groundwater plume migration pathways, and plume persistence.

Mr. Breen assessed environmental records pertaining to a portfolio of fourteen retail petroleum sites located in Florida. The work was conducted to support negotiations between the client's insurance firm and successor firm. The client had been the provider of insurance for the sites until the end of 2004, at which time responsibilities for policy management were transferred to the successor firm. During the assessment, petroleum contaminated soil and groundwater was discovered at the sites. The responsibility for the funding of the investigative and remedial work to address these issues were apportioned through negotiations conducted by the two insurance firms.

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About EnviroTrac

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"We Deliver Value, Quality and Innovation Safely to Our Clients"

Professional Highlights and Selected Projects

Mr. Breen was the Technical Director of a groundwater remediation project located on Long Island, New York. The project was conducted with the oversight of the NY SDEC under a negotiated Order on Consent. He assisted the client's (oil company) defense council in a civil action brought forth by local residents. (Madigan et al v. Exxon Mobil Corporation, case number 04-cv—02884 in the U.S. District Court for the Eastern District of New York). The scope of the project included high definition delineation, monitoring and remediating an extensive off-site plume containing MTBE. This was accomplished through testing and sampling of over one-thousand vertically nested monitoring well points installed throughout a residential neighborhood, wetland assessments, indoor air quality evaluations and through the use of a high capacity (500 gpm) groundwater pump and treat system. Supporting technical evaluations were conducted to assess plume migration included gamma logging of boreholes to assess stratigraphic heterogeneities, as well as slug and constant rate pump testing to support remediation goals. The project included assessment and remediation activities at the sources of the off-site plume—two former retail gasoline stations. Remedial efforts at these on-site locations included groundwater pumping and treatment; soil vapor extraction and air sparging (SVE/AS); in-situ chemical oxidation (ISCO) using modified Fenton's Reagent and excavation of residual hotspots during station demolition activities.

Mr. Breen was the Lead Hydrogeologist for a regional-scale groundwater investigation conducted in the vicinity of a salt mining facility located in south central Kansas. The project was conducted in support of litigation, working for Defendant (*Miller v. Cudahy Co., 656 F. Supp. 316 (D. Kan. 1987)*). Aquifer characterization resulted in delineation of saline groundwater and assessment of soil contaminated as a result of historic solution mining activities. The plume was found to extend more than seven miles from the Site over an area of approximately two-thousand-five-hundred acres within a highly prolific alluvial aquifer utilized locally for central pivot crop irrigation and potable water supply. An excess of on-hundred test wells were installed, including three sixteen-inch diameter groundwater extraction wells. Mr. Breen planned, supervised and analyzed the results of three seventy-two-hour high capacity aquifer pumping tests, tested soil and groundwater and conducted other evaluations such as the construction of a numerical groundwater flow model utilizing Modflow to support the litigation strategy and assess remedial alternatives.

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Professional Highlights and Selected Projects

Mr. Breen was the Project Director of a former petroleum terminal site investigation and remediation project in Oceanside, New York, conducted under a stipulation agreement with the NYSDEC. The scope of the project included delineating, monitoring and remediating ground water containing petroleum compounds including BTEX and MTBE. The initial work conducted to support cost recovery efforts by the client included a forensic evaluation of prior site use and spill history. An interim remedial measure (IRM) implemented to reduce on-site chemical constituent concentrations entailed the use of a constructed on-site groundwater pump and treat system consisting of seven recovery wells as well as air stripping technology. Supplemental remediation technologies are in the process of being evaluated to achieve site closure goals. This process will be supported through additional site testing and stratigraphic evaluation.

Mr. Breen managed a Remedial Investigation for a seventy-two-acre research and development site in Linden, New Jersey, conducted under an Administrative Order of Consent with the New Jersey Department of Environmental Protection (NJDEP). The work included a detailed forensic evaluation of historic site activities which resulted in the identification of thirty Areas of Environmental Concern (AOCs) and led to the assessment of associated soil and ground water in overburden and layered siltstone bedrock aquifers. Due to the varied historic activities conducted at the site, a wide range of chemical constituents including inorganics, organics and semi-volatile compounds were found in soil and groundwater. Petroleum-related constituents represented the primary chain of custodies (COCs) in the overburden groundwater while TCE and associated breakdown products were found in the bedrock. Associated work included evaluation of sediment and surface water at on-site wetlands, the development of a baseline ecological evaluation (BEE) and removal of thirteen formerly abandoned in place USTs ranging in capacity from five-hundred-fifty to ten-thousand gallons. The bedrock evaluations employed regional and local fracture trace analysis and an innovative testing approach utilizing downhole closed circuit television, acoustic televiewer, heat pulse flow meter and pumping test applications.

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Professional Highlights and Selected Projects

Mr. Breen served as the senior technical advisor supporting environmental activities pertaining to a large portfolio of retail petroleum site investigation and remediation projects located throughout the Long Island and the New York City metropolitan area. As such, he advised clients and assisted project managers with the construction of site conceptual models; investigated approach, remedial and public affairs strategy development; and served in a peer review capacity. The project sites were situated within urban and suburban settings and were located in ice contact or glacial outwash settings.

Mr. Breen managed site assessment and remediation activities conducted at a large medical products manufacturing facility in Bay Shore, New York. The scope of work included soil and groundwater evaluations consisting of soil boring and well installations, soil and groundwater sampling, as well as developing a historic use model of on-site drains and leaching pools. The chemicals concerned included metals and chlorinated VOCs. Approximately one-thousand-three-hundred tons of metals contaminated soil was excavated and water modeling and site assessment findings. He was successful in negotiating the elimination of significant quantity of groundwater-related site assessment and remediation work that had previously been proposed to the overseeing regulatory agency, and afforded the client considerable cost savings.

Mr. Breen conducted Phase II ESA site investigation and remediation activities at an automotive parts manufacturing plant in Yaphank, New York. A detailed evaluation of historic manufacturing process/waste management was conducted, which revealed the use of improper practices that resulted in the contaminated of soil at waste staging area and on-site sanitary and storm water management facilities. The remediation of soil and leaching pool structures was required based on the presence of VOCs, semi-volatile organic compounds (SVOCs) and inorganic chemical constituents at levels exceeding NYSDEC and state department of health services (SCDOHS) criteria. As a result of cleanup activities conducted, sixty-seven tons of soil contaminated with petroleum related compounds and chlorinated VOCs was excavated from the former drum staging area was hauled from the site for disposal. The remedial activities associated with the onsite leaching pools resulted in forty-five-thousand gallons of liquid and seventy-one tons of solids requiring disposal containing a mixture of sanitary and chemical waste. Following completion of these activities, a notice of no further action (NFA) was obtained from the overseeing regulatory agency.

Corporate Resume

Peter C. Breen, PG

Senior Project Manager

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Professional Highlights and Selected Projects

Mr. Breen assumed management of a former retail gasoline station BCP Volunteer site in the Bronx, New York, at the remedial phase of the project. The former consultant had recommended a Track 1 cleanup and remediation to unrestricted media chemical criteria. Based on the site location, testing results and planned site redevelopment, a Track 4 cleanup was judged to be more appropriate. He successful negotiated the cleanup plan strategy with the NYSDEC and a remedial action plan is currently being developed. It is anticipated that the client will save more than $1 million as a result.

Mr. Breen directed work at a dry cleaner site in Hartsdale, New York, where the current owner enrolled as a volunteer in the NYS Brownfield Cleanup Program. The testing included drilling and sampling of wells and conducting soil vapor intrusion studies. Subsurface chlorinated VOC impacts were addressed through a focused IRM consisting of in-situ chemical reduction (ISCR) technology. All submittals have been provided to NYSDEC/NYSDOH and the certificate of completion is expected.

Mr. Breen managed a RI performed under ECRA and ISRA requirements at a manufacturing facility in Eatontown, New Jersey. The media of investigation included soil, ground water, sediment, surface water and air. The principal contaminants of concern included chlorinated VOCs. As a result of compiling and analyzing the significant repository of environmental documentation and constructing a detailed conceptual site model, he was the first investigator to link the on-site groundwater contaminant plume to a small stream located nearby. Subsequent testing revealed elevated concentrations of vinyl chloride in surface water associated with that stream, persisting at detectable concentrations at locations more than a mile off-site.

Mr. Breen managed an intensive investigation resulting in the characterization and delineation of a TCE plume in groundwater emanating from a former tool and die manufacturing facility in Greenfield, Massachusetts. The work included the establishment of on-site and off-site monitoring well networks, the assessment of surface water resulting from seeps located within the core of the plume as well as the investigation of potential volatilization to nearby residences and commercial structures, and a child daycare facility located within the plume footprint. An additional component of the project related to monitoring and evaluating the performance of an on-site UV peroxidation groundwater treatment facility as well as evaluating the performance of an on-site UV peroxidation groundwater treatment facility.

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Professional Highlights and Selected Projects

Mr. Breen conducted hydrogeological and geophysical evaluations to define the extent of animal hide piles and former on-site chemical disposal lagoons, and assess associated impacts of volatile and inorganic chemical constituents to soil, sediment and groundwater at the two-hundred-forty-five-acre Industri-Plex Superfund site in Woburn, Massachusetts. The geophysical testing included the use of electromagnetics, resistivity and metal detection techniques. The hydrogeological assessments included slug testing and constant rate pump testing techniques.

In Mount Pleasant, Tennessee, Mr. Breen characterized the hydrogeology of a karst limestone watershed setting at a large chemical formulation facility. The site consisted of raw material mining areas and an associated chemical manufacturing plant. Key on-site features that were investigated included a bedrock fault zone, a stream that bisects the site and numerous springs. Work elements included the installation of test wells in unconsolidated and bedrock settings and conducting hydraulic parameter assessments, surface water flow monitoring, hydrologic budget estimations and assessment of ground water/surface water hydraulic relationships.

Mr. Breen managed an ongoing off-site surface water and ground water sampling and SVI testing and mitigation system installations pertaining to a chlorinated solvent release at a former dry cleaner in Nassau County, New York. He advocated for, and successfully adopted groundwater sampling using passive diffusion bags (PDB) for a network of fifty monitoring wells. This approach reduced field labor and eliminated purge water waste management and disposal, resulting in significant cost savings.

Mr. Breen managed a program of SVI testing conducted to evaluate potential intrusion of chlorinated solvent compounds and monitor the progress of an ongoing remedial action in a Nassau County, New York, neighborhood of sixty-five residences from the 2009 to 2012 heating seasons. He directed field activities and served as the primary contact for the NYSDEC and coordinated analytical laboratory and data validator subcontractor services. Work was conducted in accordance with the 2006 NYSDOH Guidance on SVI evaluations and included the collection of twenty-four-hour duration sub-slab, indoor and outdoor air TO-15 samples.

Professional Highlights and Selected Projects

Mr. Breen conducted site testing and other technical evaluations to age-date a spill of heating oil at a residential property in Suffern, New York. This work was performed in collaboration with a group of experts he assembled and directed. The scope of work also included critiquing a prior dating assessment conducted by another consultant that utilized a less rigorous approach.

Mr. Breen evaluated impacts to soil and groundwater at a former landfill in Blooming Grove, New York. Geophysical testing utilizing a variety of techniques was conducted to delineate the lateral and vertical extent of fill material. Monitoring well installations were completed in unconsolidated material and underlying shale bedrock to assess environmental impacts and to support fate and transport assessments; ground water flow pathway identification within the bedrock was assisted through the use of three-dimensional photographic fracture trace analysis. Numerous ephemeral seeps were identified and assessed to determine potential impacts to on-site ponded water and local streams.

In Holbrook, New York, Mr. Breen evaluated impacts to soil and groundwater at a former audio recordings manufacturing site through the implementation of a RI/FS conducted for the EPA. The potential impacts to a nearby municipal water supply well field and a down gradient wetland were assessed utilizing site test data and groundwater flow and transport modeling techniques.

Mr. Breen performed a detailed third party peer review and technical critique of a comprehensive hydrogeological investigation conducted to support the proposed expansion of a major municipal landfill in Middlesex County, New Jersey. The study was conducted on behalf of the utility authority to support the proposed expansion of the landfill. It considered potential effects to nearby wetlands and estuarine environments as the site is located adjacent to a large tidally influenced surface water feature. In addition, the hydraulic effects of an existing containment slurry wall were assessed, under existing conditions and under scenarios representing the expanded landfill.

Mr. Breen was the Environmental Professional and Senior Reviewer for numerous Phase I ESAs prepared in accordance with ASTM Standard Practice E 1527-13 for a variety of clients including but not limited to banks, developers and real estate professionals. He currently serves as EnviroTrac's national account representative for final review and certification of all Phase I ESA related work conducted by the firm for a major bank.

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Mr. Breen managed a program of surface geophysical surveys conducted at twenty-five inactive hazardous waste sites located throughout New York State. He developed technical approach, analyzed data, prepared reports and served as primary contact with the NYSDEC. The methods used included the use of magnetometer, electrical resistivity, electromagnetic (EM) and metal detection techniques. The work assignment also included conducting four Phase II Site Investigations at facilities evaluations conducted through the installation of soil borings and groundwater quality evaluations conducted through the installation of soil borings and groundwater monitoring wells and performance of slug tests.

Mr. Breen conducted ESA evaluations at two large manufacturing facilities in Bethpage and Calverton, New York, as part of site decommissioning activities. The work activities included a comprehensive review of historic manufacturing practices, which resulted in the identification of numerous areas of environmental concern and required subsequent tracing and testing of interior and exterior locations of drains and leaching structures; former ordinance testing locations; and conducting soil and groundwater characterization activities.

Mr. Breen managed a remedial investigation (RI) conducted in support of divesting a two-hundred-seventy-acre research and development site in Florham Park, New Jersey. A significant portion of the site is occupied by wetlands evaluated within the context of a BEE. The impacts found included pesticides and inorganic compounds resulting from historic agricultural land use, and VOCs and SVOCs from activities conducted by the current occupant. Remedial activities included soil mixing and sediment excavation, groundwater pumping and treatment, soil vapor extraction/air sparging (SVE/AS) technologies, and in-situ treatment options.

Mr. Breen worked on a remedy for a site in Waterbury, Connecticut. The solution included establishment of an ELUR and data evaluations to achieve RSR compliance. Direct exposure criteria compliance was supported utilizing ninety-five percent Upper Confidence Level (UCL) analysis of the arithmetic mean. Developed alternate surface water protection criteria (SWPC) using 7Q10 evaluation.

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Mr. Breen managed site investigation and remedial activities at an industrial park located in New York. The site consisted of eight associated properties; activities included evaluation of leaching pools associated with sanitary and storm water systems, and potable water testing. The intent of the work, conducted on behalf of the council in supporting cost recovery efforts, included the identification of responsible parties for historic spills and discharges and preparation of remedial cost estimates. Based on site assessment results, it was determined that sediments and liquids present in numerous leaching pools associated with both systems were impacted with chemical contaminants including volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs) and inorganic compounds at levels requiring remediation in accordance with Suffolk County Department of Health Action Levels.

Mr. Breen developed documentation for acceptance of the site into the CT DEEP's Property Transfer Program (working on behalf of the former owner and with LEP oversight) for an operating fuel oil terminal in Groton Connecticut. The regulatory submittals included Form III and ECAF documents.

Mr. Breen managed data acquisition and quality assurance tasks for the remediation of a former fuel oil terminal in New Haven, Connecticut, in accordance with CT DEEP requirements and with LEP oversight. Site work included identification and remediation of soil hot spots and assessment of historic and ongoing site testing results in accordance with RSRs in preparation for redevelopment.

Mr. Breen developed documentation for acceptance of the site into the Property Transfer Program (working on behalf of the current owner) for a former fuel oil terminal in Greenwich, Connecticut. The regulatory submittals included Form III, ECAF and ELUR documents. The site investigation and remedial action plan (RAP) was completed with LEP oversight. The property was redeveloped for residential use.

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April 2004 - Presented *Evaluating Plume Capture Through Mass Flux Estimates*. LIG Conference SUNY Stony Brook, New York.

March 2006 - Presented *Evaluating the Performance of a Groundwater Recovery System Through a Detailed Site Characterization and Contaminant Mass Flux Estimate.* ExxonMobil Global Remediation Conference, Orlando, Florida.

Spring 2008 - Published *Engineering Social Responsibility: Kleinfelder Adopts Company-Wide Sustainability Principles*. EFCG Sustainability Newsletter, Edition 1.

May 2008 - Environmental Services Sector Representative, *Round Table Discussion*. Queens Sustainability Summit at CUNY School of Law, Flushing, New York.

January 2009 - Panelist, *Environmental Law -Turning Brown Fields Green*. Queens Green Business Summit at Queens College, Flushing, New York.

February 2010 - Panelist, *Green Remediation -Turning Brown Fields Green*. Queens Green Business Summit at Queens College, Flushing, New York.

October 2010 - Panelist, *The Green Movement*. The 41st Annual Conference of the Long Island Business Development Council, Montauk, New York.

ATTACHMENT 1 – LABORATORY CERTIFICATIONS

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2019
Issued April 01, 2018
Revised April 12, 2018

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

DR. MICHAEL E. MILLER
PACE ANALYTICAL SERVICES, LLC - LONG ISLAND NY
575 BROAD HOLLOW ROAD
MELVILLE, NY 11747

NY Lab Id No: 10478

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2003) for the category ENVIRONMENTAL ANALYSES POTABLE WATER
All approved analytes are listed below:

Bacteriology	
Coliform, Total / E. coli (Qualitative)	SM 18-22 9223B (-97, -04) (Colilert)
Heterotrophic Plate Count	SimPlate
Chlorinated Acids	
2,4,5-TP (Silvex)	EPA 515.3
2,4-D	EPA 515.3
Dalapon	EPA 515.3
Dicamba	EPA 515.3
Dinoseb	EPA 515.3
Pentachlorophenol	EPA 515.3
Picloram	EPA 515.3
Disinfection By-products	
Bromide	EPA 300.0 Rev. 2.1
Bromochloroacetic acid	EPA 552.2
Chlorate	EPA 300.1 Rev. 1.0
Dibromoacetic acid	EPA 552.2
Dichloroacetic acid	EPA 552.2
Monobromoacetic acid	EPA 552.2
Monochloroacetic acid	EPA 552.2
Trichloroacetic acid	EPA 552.2
Dissolved Gases	
Ethane	RSK-175
Ethene (Ethylene)	RSK-175
Methane	RSK-175
Fuel Additives	
Methyl tert-butyl ether	EPA 524.2
Naphthalene	EPA 524.2
Metals I	
Arsenic, Total	EPA 200.8 Rev. 5.4
Barium, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Cadmium, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Chromium, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Copper, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Iron, Total	EPA 200.7 Rev. 4.4
Lead, Total	EPA 200.8 Rev. 5.4
Manganese, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Mercury, Total	EPA 245.1 Rev. 3.0
	EPA 200.8 Rev. 5.4
Selenium, Total	EPA 200.8 Rev. 5.4
Silver, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Zinc, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Metals II	
Aluminum, Total	EPA 200.7 Rev. 4.4

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Metals II	
Aluminum, Total	EPA 200.8 Rev. 5.4
Antimony, Total	EPA 200.8 Rev. 5.4
Beryllium, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Molybdenum, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Nickel, Total	EPA 200.8 Rev. 5.4
Thallium, Total	EPA 200.8 Rev. 5.4
Vanadium, Total	EPA 200.7 Rev. 4.4
	EPA 200.8 Rev. 5.4
Metals III	
Boron, Total	EPA 200.7 Rev. 4.4
Calcium, Total	EPA 200.7 Rev. 4.4
Magnesium, Total	EPA 200.7 Rev. 4.4
Potassium, Total	EPA 200.7 Rev. 4.4
Sodium, Total	EPA 200.7 Rev. 4.4
Methylcarbamate Pesticides	
3-Hydroxy Carbofuran	EPA 531.1
Aldicarb	EPA 531.1
Aldicarb Sulfone	EPA 531.1
Aldicarb Sulfoxide	EPA 531.1
Carbaryl	EPA 531.1
Carbofuran	EPA 531.1
Methomyl	EPA 531.1
Oxamyl	EPA 531.1

Microextractibles	
1,2-Dibromo-3-chloropropane	EPA 504.1
1,2-Dibromoethane	EPA 504.1
Miscellaneous	
1,4-Dioxane	EPA 522
Benzo(a)pyrene	EPA 525.2
Bis(2-ethylhexyl) phthalate	EPA 525.2
Di (2-ethylhexyl) adipate	EPA 525.2
Endothall	EPA 548.1
Glyphosate	EPA 547
Hexachlorobenzene	EPA 505
Hexachlorocyclopentadiene	EPA 505
Methyl iodide	EPA 524.2
Odor	SM 18-22 2150B (-97)
Organic Carbon, Dissolved	SM 21-22 5310B (-00)
Organic Carbon, Total	SM 21-22 5310B (-00)
Perchlorate	EPA 314.0
Surfactant (MBAS)	SM 18-22 5540C (-00)
Turbidity	EPA 180.1 Rev. 2.0
UV 254	SM 19-22 5910B (-00)
Non-Metals	
Alkalinity	SM 18-22 2320B (-97)
Calcium Hardness	EPA 200.7 Rev. 4.4
Chloride	EPA 300.0 Rev. 2.1
	SM 21-22 4500-Cl- E (-97)
Color	SM 18-22 2120B (-01)

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Non-Metals	
Corrosivity	SM 18-22 2330
Cyanide	SM 18-22 4500-CN E (-99)
Fluoride, Total	EPA 300.0 Rev. 2.1
Nitrate (as N)	EPA 353.2 Rev. 2.0
Nitrite (as N)	EPA 353.2 Rev. 2.0
Orthophosphate (as P)	SM 18-22 4500-P E (-99)
Silica, Dissolved	EPA 200.7 Rev. 4.4
Solids, Total Dissolved	SM 18-22 2540C (-97)
Specific Conductance	EPA 120.1 Rev. 1982
	SM 18-22 2510B (-97)
Sulfate (as SO4)	EPA 300.0 Rev. 2.1
Organohalide Pesticides	
Alachlor	EPA 505
Aldrin	EPA 505
Atrazine	EPA 525.2
Butachlor	EPA 525.2
Chlordane Total	EPA 505
Dieldrin	EPA 505
Endrin	EPA 505
Heptachlor	EPA 505
Heptachlor epoxide	EPA 505
Lindane	EPA 505
Methoxychlor	EPA 505
Metolachlor	EPA 525.2
Metribuzin	EPA 525.2
Organohalide Pesticides	
Propachlor	EPA 525.2
Simazine	EPA 525.2
Toxaphene	EPA 505
Trifluralin	EPA 525.2
Polychlorinated Biphenyls	
PCB Screen	EPA 505
Trihalomethanes	
Bromodichloromethane	EPA 524.2
Bromoform	EPA 524.2
Chloroform	EPA 524.2
Dibromochloromethane	EPA 524.2
Total Trihalomethanes	EPA 524.2
Volatile Aromatics	
1,2,3-Trichlorobenzene	EPA 524.2
1,2,4-Trichlorobenzene	EPA 524.2
1,2,4-Trimethylbenzene	EPA 524.2
1,2-Dichlorobenzene	EPA 524.2
1,3,5-Trimethylbenzene	EPA 524.2
1,3-Dichlorobenzene	EPA 524.2
1,4-Dichlorobenzene	EPA 524.2
2-Chlorotoluene	EPA 524.2
4-Chlorotoluene	EPA 524.2
Benzene	EPA 524.2
Bromobenzene	EPA 524.2

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Volatile Aromatics	
Chlorobenzene	EPA 524.2
Ethyl benzene	EPA 524.2
Hexachlorobutadiene	EPA 524.2
Isopropylbenzene	EPA 524.2
n-Butylbenzene	EPA 524.2
n-Propylbenzene	EPA 524.2
p-Isopropyltoluene (P-Cymene)	EPA 524.2
sec-Butylbenzene	EPA 524.2
Styrene	EPA 524.2
tert-Butylbenzene	EPA 524.2
Toluene	EPA 524.2
Total Xylenes	EPA 524.2
Volatile Halocarbons	
1,1,1,2-Tetrachloroethane	EPA 524.2
1,1,1-Trichloroethane	EPA 524.2
1,1,2,2-Tetrachloroethane	EPA 524.2
1,1,2-Trichloroethane	EPA 524.2
1,1-Dichloroethane	EPA 524.2
1,1-Dichloroethene	EPA 524.2
1,1-Dichloropropene	EPA 524.2
1,2,3-Trichloropropane	EPA 524.2
1,2-Dichloroethane	EPA 524.2
1,2-Dichloropropane	EPA 524.2
1,3-Dichloropropane	EPA 524.2
2,2-Dichloropropane	EPA 524.2

Volatile Halocarbons	
Bromochloromethane	EPA 524.2
Bromomethane	EPA 524.2
Carbon tetrachloride	EPA 524.2
Chloroethane	EPA 524.2
Chloromethane	EPA 524.2
cis-1,2-Dichloroethene	EPA 524.2
cis-1,3-Dichloropropene	EPA 524.2
Dibromomethane	EPA 524.2
Dichlorodifluoromethane	EPA 524.2
Methylene chloride	EPA 524.2
Tetrachloroethene	EPA 524.2
trans-1,2-Dichloroethene	EPA 524.2
trans-1,3-Dichloropropene	EPA 524.2
Trichloroethene	EPA 524.2
Trichlorofluoromethane	EPA 524.2
Vinyl chloride	EPA 524.2
Sample Preparation Methods	
	SM 18-20 4500-CN C

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WADSWORTH CENTER

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DR. MICHAEL E. MILLER
PACE ANALYTICAL SERVICES, LLC - LONG ISLAND NY
575 BROAD HOLLOW ROAD
MELVILLE, NY 11747

NY Lab Id No: 10478

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All approved analytes are listed below:

Acrylates	
Acrolein (Propenal)	EPA 8260C
	EPA 624.1
Acrylonitrile	EPA 8260C
	EPA 624.1
Ethyl methacrylate	EPA 8260C
Methyl acrylonitrile	EPA 8260C
Methyl methacrylate	EPA 8260C
Amines	
1,2-Diphenylhydrazine	EPA 8270D
1,4-Phenylenediamine	EPA 8270D
1-Naphthylamine	EPA 8270D
2-Naphthylamine	EPA 8270D
2-Nitroaniline	EPA 8270D
3-Nitroaniline	EPA 8270D
4-Chloroaniline	EPA 8270D
4-Nitroaniline	EPA 8270D
5-Nitro-o-toluidine	EPA 8270D
Aniline	EPA 625.1
	EPA 8270D
Carbazole	EPA 625.1
	EPA 8270D
Diphenylamine	EPA 8270D
Methapyrilene	EPA 8270D
Pronamide	EPA 8270D
Propionitrile	EPA 8260C
Amines	
Pyridine	EPA 625.1
	EPA 8270D
Bacteriology	
Coliform, Fecal	SM 9221C E-2006
Coliform, Total	SM 9221B-2006
Enterococci	ASTM D6503-99
	Enterolert
Heterotrophic Plate Count	SimPlate
Benzidines	
3,3'-Dichlorobenzidine	EPA 625.1
	EPA 8270D
3,3'-Dimethylbenzidine	EPA 8270D
Benzidine	EPA 625.1
	EPA 8270D
Chlorinated Hydrocarbon Pesticides	
4,4'-DDD	EPA 8081B
	EPA 608.3
4,4'-DDE	EPA 8081B
	EPA 608.3
4,4'-DDT	EPA 8081B
	EPA 608.3
Aldrin	EPA 8081B
	EPA 608.3
alpha-BHC	EPA 8081B

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Chlorinated Hydrocarbon Pesticides	
alpha-BHC	EPA 608.3
alpha-Chlordane	EPA 8081B
beta-BHC	EPA 8081B
	EPA 608.3
Chlordane Total	EPA 8081B
	EPA 608.3
Chlorobenzilate	EPA 8270D
delta-BHC	EPA 8081B
	EPA 608.3
Diallate	EPA 8270D
Dieldrin	EPA 8081B
	EPA 608.3
Endosulfan I	EPA 8081B
	EPA 608.3
Endosulfan II	EPA 8081B
	EPA 608.3
Endosulfan sulfate	EPA 8081B
	EPA 608.3
Endrin	EPA 8081B
	EPA 608.3
Endrin aldehyde	EPA 8081B
	EPA 608.3
Endrin Ketone	EPA 8081B
gamma-Chlordane	EPA 8081B
Heptachlor	EPA 8081B
	EPA 608.3

Chlorinated Hydrocarbon Pesticides	
Heptachlor epoxide	EPA 8081B
	EPA 608.3
Isodrin	EPA 8081B
	EPA 8270D
Kepone	EPA 8270D
Lindane	EPA 8081B
	EPA 608.3
Methoxychlor	EPA 8081B
	EPA 608.3
Mirex	EPA 8081B
PCNB	EPA 8270D
Toxaphene	EPA 8081B
	EPA 608.3
Chlorinated Hydrocarbons	
1,2,3-Trichlorobenzene	EPA 8260C
1,2,4,5-Tetrachlorobenzene	EPA 8270D
1,2,4-Trichlorobenzene	EPA 625.1
	EPA 8270D
1-Chloronaphthalene	EPA 8270D
2-Chloronaphthalene	EPA 625.1
	EPA 8270D
Hexachlorobenzene	EPA 625.1
	EPA 8270D
Hexachlorobutadiene	EPA 625.1
	EPA 8270D

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Chlorinated Hydrocarbons	
Hexachlorocyclopentadiene	EPA 625.1
	EPA 8270D
Hexachloroethane	EPA 625.1
	EPA 8270D
Hexachloropropene	EPA 8270D
Pentachlorobenzene	EPA 8270D
Chlorophenoxy Acid Pesticides	
2,4,5-T	EPA 8151A
2,4,5-TP (Silvex)	EPA 8151A
2,4-D	EPA 8151A
2,4-DB	EPA 8151A
Dalapon	EPA 8151A
Dicamba	EPA 8151A
Dinoseb	EPA 8151A
	EPA 8270D
Demand	
Biochemical Oxygen Demand	SM 5210B-2011
Carbonaceous BOD	SM 5210B-2011
Chemical Oxygen Demand	EPA 410.4, Rev. 2.0 (1993)
Dissolved Gases	
Ethane	RSK-175
Ethene (Ethylene)	RSK-175
Methane	RSK-175

Fuel Oxygenates	
Di-isopropyl ether	EPA 8260C
Ethanol	EPA 8260C
Methyl tert-butyl ether	EPA 8260C
	EPA 624.1
tert-amyl alcohol	EPA 8260C
tert-amyl methyl ether (TAME)	EPA 8260C
tert-butyl alcohol	EPA 8260C
tert-butyl ethyl ether (ETBE)	EPA 8260C
Haloethers	
2,2'-Oxybis(1-chloropropane)	EPA 625.1
	EPA 8270D
4-Bromophenylphenyl ether	EPA 625.1
	EPA 8270D
4-Chlorophenylphenyl ether	EPA 625.1
	EPA 8270D
Bis(2-chloroethoxy)methane	EPA 625.1
	EPA 8270D
Bis(2-chloroethyl)ether	EPA 625.1
	EPA 8270D
Low Level Halocarbons	
1,2-Dibromo-3-chloropropane, Low Level	EPA 8011
1,2-Dibromoethane, Low Level	EPA 8011
Low Level Polynuclear Aromatics	
Acenaphthene Low Level	EPA 8270D SIM

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Low Level Polynuclear Aromatics	
Acenaphthylene Low Level	EPA 8270D SIM
Anthracene Low Level	EPA 8270D SIM
Benzo(a)anthracene Low Level	EPA 8270D SIM
Benzo(a)pyrene Low Level	EPA 8270D SIM
Benzo(b)fluoranthene Low Level	EPA 8270D SIM
Benzo(g,h,i)perylene Low Level	EPA 8270D SIM
Benzo(k)fluoranthene Low Level	EPA 8270D SIM
Chrysene Low Level	EPA 8270D SIM
Dibenzo(a,h)anthracene Low Level	EPA 8270D SIM
Fluoranthene Low Level	EPA 8270D SIM
Fluorene Low Level	EPA 8270D SIM
Indeno(1,2,3-cd)pyrene Low Level	EPA 8270D SIM
Naphthalene Low Level	EPA 8270D SIM
Phenanthrene Low Level	EPA 8270D SIM
Pyrene Low Level	EPA 8270D SIM
Metals I	
Barium, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010C
	EPA 6020A
	EPA 200.8, Rev. 5.4 (1994)
Cadmium, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010C
	EPA 6020A
	EPA 200.8, Rev. 5.4 (1994)
Calcium, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010C
	EPA 6020A
	EPA 200.8, Rev. 5.4 (1994)
Chromium, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010C
	EPA 6020A
	EPA 200.8, Rev. 5.4 (1994)
Copper, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010C
	EPA 6020A
	EPA 200.8, Rev. 5.4 (1994)
Iron, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010C
Lead, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010C
	EPA 6020A
	EPA 200.8, Rev. 5.4 (1994)
Magnesium, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010C
Manganese, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010C
	EPA 6020A
	EPA 200.8, Rev. 5.4 (1994)
Nickel, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010C
	EPA 6020A
	EPA 200.8, Rev. 5.4 (1994)
Potassium, Total	EPA 200.7, Rev. 4.4 (1994)

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All approved analytes are listed below:

Metals I		**Metals II**	
Potassium, Total	EPA 6010C	Beryllium, Total	EPA 6010C
Silver, Total	EPA 200.7, Rev. 4.4 (1994)		EPA 6020A
	EPA 6010C		EPA 200.8, Rev. 5.4 (1994)
	EPA 6020A	Chromium VI	EPA 7196A
	EPA 200.8, Rev. 5.4 (1994)		SM 3500-Cr B-2011
Sodium, Total	EPA 200.7, Rev. 4.4 (1994)	Mercury, Total	EPA 245.1, Rev. 3.0 (1994)
	EPA 6010C		EPA 7470A
Strontium, Total	EPA 200.7, Rev. 4.4 (1994)	Selenium, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010C		EPA 6010C
	EPA 6020A		EPA 6020A
	EPA 200.8, Rev. 5.4 (1994)		EPA 200.8, Rev. 5.4 (1994)
Metals II		Vanadium, Total	EPA 200.7, Rev. 4.4 (1994)
Aluminum, Total	EPA 200.7, Rev. 4.4 (1994)		EPA 6010C
	EPA 6010C		EPA 6020A
	EPA 6020A		EPA 200.8, Rev. 5.4 (1994)
	EPA 200.8, Rev. 5.4 (1994)	Zinc, Total	EPA 200.7, Rev. 4.4 (1994)
Antimony, Total	EPA 200.7, Rev. 4.4 (1994)		EPA 6010C
	EPA 6010C		EPA 6020A
	EPA 6020A		EPA 200.8, Rev. 5.4 (1994)
	EPA 200.8, Rev. 5.4 (1994)	**Metals III**	
Arsenic, Total	EPA 200.7, Rev. 4.4 (1994)	Cobalt, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010C		EPA 6010C
	EPA 6020A		EPA 6020A
	EPA 200.8, Rev. 5.4 (1994)		EPA 200.8, Rev. 5.4 (1994)
Beryllium, Total	EPA 200.7, Rev. 4.4 (1994)	Gold, Total	EPA 200.7, Rev. 4.4 (1994)

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Metals III	
Molybdenum, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010C
	EPA 6020A
	EPA 200.8, Rev. 5.4 (1994)
Thallium, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010C
	EPA 6020A
	EPA 200.8, Rev. 5.4 (1994)
Tin, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010C
Titanium, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010C
Mineral	
Alkalinity	SM 2320B-2011
Calcium Hardness	EPA 200.7, Rev. 4.4 (1994)
Chloride	EPA 300.0, Rev. 2.1 (1993)
	SM 4500-Cl- E-2011
	EPA 9056A
Fluoride, Total	EPA 300.0, Rev. 2.1 (1993)
	EPA 9056A
Hardness, Total	SM 2340C-2011
	EPA 200.7, Rev. 4.4 (1994)
Sulfate (as SO4)	EPA 300.0, Rev. 2.1 (1993)
	EPA 9056A

Miscellaneous	
Boron, Total	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010C
Bromide	EPA 300.0, Rev. 2.1 (1993)
	EPA 9056A
Color	SM 2120B-2011
Corrosivity	SM 2330
Cyanide, Total	EPA 9014
	SM 4500-CN E-2011
	ASTM D7511-12
Oil and Grease Total Recoverable (HEM)	EPA 1664A
Organic Carbon, Total	SM 5310B-2011
	EPA 9060A
Perchlorate	EPA 314.0
Phenols	EPA 420.1 (Rev. 1978)
	EPA 9065
Silica, Dissolved	EPA 200.7, Rev. 4.4 (1994)
	EPA 6010C
Specific Conductance	EPA 120.1 (Rev. 1982)
	SM 2510B-2011
Sulfide (as S)	SM 4500-S2- F-2011
	EPA 9034
Surfactant (MBAS)	SM 5540C-2011
Total Petroleum Hydrocarbons	EPA 1664A
Turbidity	EPA 180.1, Rev. 2.0 (1993)

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Nitroaromatics and Isophorone	
1,3,5-Trinitrobenzene	EPA 8270D
1,3-Dinitrobenzene	EPA 8270D
1,4-Naphthoquinone	EPA 8270D
2,4-Dinitrotoluene	EPA 625.1
	EPA 8270D
2,6-Dinitrotoluene	EPA 625.1
	EPA 8270D
Isophorone	EPA 625.1
	EPA 8270D
Nitrobenzene	EPA 625.1
	EPA 8270D
Nitrosoamines	
N-Nitrosodiethylamine	EPA 8270D
N-Nitrosodimethylamine	EPA 625.1
	EPA 8270D
N-Nitrosodi-n-butylamine	EPA 8270D
N-Nitrosodi-n-propylamine	EPA 625.1
	EPA 8270D
N-Nitrosodiphenylamine	EPA 625.1
	EPA 8270D
N-nitrosomethylethylamine	EPA 8270D
N-nitrosopiperidine	EPA 8270D
N-Nitrosopyrrolidine	EPA 8270D
Nutrient	
Ammonia (as N)	SM 4500-NH3 H-2011
Nutrient	
Ammonia (as N)	EPA 350.1, Rev. 2.0 (1993)
Kjeldahl Nitrogen, Total	EPA 351.2, Rev. 2.0 (1993)
Nitrate (as N)	EPA 353.2, Rev. 2.0 (1993)
Nitrate-Nitrite (as N)	EPA 353.2, Rev. 2.0 (1993)
Nitrite (as N)	EPA 353.2, Rev. 2.0 (1993)
Orthophosphate (as P)	SM 4500-P E-2011
Phosphorus, Total	SM 4500-P E-2011
Organophosphate Pesticides	
Atrazine	EPA 8270D
Dimethoate	EPA 8270D
Disulfoton	EPA 8270D
Famphur	EPA 8270D
Parathion ethyl	EPA 8270D
Parathion methyl	EPA 8270D
Phorate	EPA 8270D
Sulfotepp	EPA 8270D
Thionazin	EPA 8270D
Petroleum Hydrocarbons	
Diesel Range Organics	EPA 8015D
Gasoline Range Organics	EPA 8015D
Phthalate Esters	
Benzyl butyl phthalate	EPA 625.1
	EPA 8270D
Bis(2-ethylhexyl) phthalate	EPA 625.1

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Phthalate Esters	
Bis(2-ethylhexyl) phthalate	EPA 8270D
Diethyl phthalate	EPA 625.1
	EPA 8270D
Dimethyl phthalate	EPA 625.1
	EPA 8270D
Di-n-butyl phthalate	EPA 625.1
	EPA 8270D
Di-n-octyl phthalate	EPA 625.1
	EPA 8270D
Polychlorinated Biphenyls	
PCB-1016	EPA 8082A
	EPA 608.3
PCB-1221	EPA 8082A
	EPA 608.3
PCB-1232	EPA 8082A
	EPA 608.3
PCB-1242	EPA 8082A
	EPA 608.3
PCB-1248	EPA 8082A
	EPA 608.3
PCB-1254	EPA 8082A
	EPA 608.3
PCB-1260	EPA 8082A
	EPA 608.3
PCB-1262	EPA 8082A

Polychlorinated Biphenyls	
PCB-1268	EPA 8082A
Polynuclear Aromatics	
2-Acetylaminofluorene	EPA 8270D
3-Methylcholanthrene	EPA 8270D
7,12-Dimethylbenzyl (a) anthracene	EPA 8270D
Acenaphthene	EPA 625.1
	EPA 8270D
Acenaphthylene	EPA 625.1
	EPA 8270D
Anthracene	EPA 625.1
	EPA 8270D
Benzo(a)anthracene	EPA 625.1
	EPA 8270D
Benzo(a)pyrene	EPA 625.1
	EPA 8270D
Benzo(b)fluoranthene	EPA 625.1
	EPA 8270D
Benzo(ghi)perylene	EPA 625.1
	EPA 8270D
Benzo(k)fluoranthene	EPA 625.1
	EPA 8270D
Chrysene	EPA 625.1
	EPA 8270D
Dibenzo(a,h)anthracene	EPA 625.1
	EPA 8270D

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Polynuclear Aromatics	
Fluoranthene	EPA 625.1
	EPA 8270D
Fluorene	EPA 625.1
	EPA 8270D
Indeno(1,2,3-cd)pyrene	EPA 625.1
	EPA 8270D
Naphthalene	EPA 625.1
	EPA 8270D
Phenanthrene	EPA 625.1
	EPA 8270D
Pyrene	EPA 625.1
	EPA 8270D
Priority Pollutant Phenols	
2,3,4,6 Tetrachlorophenol	EPA 8270D
2,4,5-Trichlorophenol	EPA 625.1
	EPA 8270D
2,4,6-Trichlorophenol	EPA 625.1
	EPA 8270D
2,4-Dichlorophenol	EPA 625.1
	EPA 8270D
2,4-Dimethylphenol	EPA 625.1
	EPA 8270D
2,4-Dinitrophenol	EPA 625.1
	EPA 8270D
2,6-Dichlorophenol	EPA 8270D

Priority Pollutant Phenols	
2-Chlorophenol	EPA 625.1
	EPA 8270D
2-Methyl-4,6-dinitrophenol	EPA 625.1
	EPA 8270D
2-Methylphenol	EPA 625.1
	EPA 8270D
2-Nitrophenol	EPA 625.1
	EPA 8270D
3-Methylphenol	EPA 8270D
4-Chloro-3-methylphenol	EPA 625.1
	EPA 8270D
4-Methylphenol	EPA 625.1
	EPA 8270D
4-Nitrophenol	EPA 625.1
	EPA 8270D
Cresols, Total	EPA 625.1
	EPA 8270D
Pentachlorophenol	EPA 625.1
	EPA 8270D
Phenol	EPA 625.1
	EPA 8270D
Residue	
Settleable Solids	SM 2540 F-2011
Solids, Total	SM 2540 B-2011
Solids, Total Dissolved	SM 2540 C-2011

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NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2019
Issued April 01, 2018

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

DR. MICHAEL E. MILLER
PACE ANALYTICAL SERVICES, LLC - LONG ISLAND NY
575 BROAD HOLLOW ROAD
MELVILLE, NY 11747

NY Lab Id No: 10478

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2003) for the category ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below:

Residue	
Solids, Total Suspended	SM 2540 D-2011
Solids, Volatile	SM 2540 E-2011
Semi-Volatile Organics	
1,1'-Biphenyl	EPA 8270D
1,2-Dichlorobenzene, Semi-volatile	EPA 8270D
1,3-Dichlorobenzene, Semi-volatile	EPA 8270D
1,4-Dichlorobenzene, Semi-volatile	EPA 8270D
2-Methylnaphthalene	EPA 8270D
2-Picoline	EPA 8270D
4-Amino biphenyl	EPA 8270D
Acetophenone	EPA 625.1
	EPA 8270D
alpha-Terpineol	EPA 625.1
Aramite	EPA 8270D
Benzaldehyde	EPA 8270D
Benzoic Acid	EPA 8270D
Benzyl alcohol	EPA 8270D
Caprolactam	EPA 8270D
Dibenzofuran	EPA 8270D
Ethyl methanesulfonate	EPA 8270D
Isosafrole	EPA 8270D
Methyl methanesulfonate	EPA 8270D
n-Decane	EPA 625.1
n-Octadecane	EPA 625.1
O,O,O-Triethyl phosphorothioate	EPA 8270D
Semi-Volatile Organics	
p-Dimethylaminoazobenzene	EPA 8270D
Phenacetin	EPA 8270D
Safrole	EPA 8270D
Volatile Aromatics	
1,2,4-Trichlorobenzene, Volatile	EPA 8260C
1,2,4-Trimethylbenzene	EPA 8260C
1,2-Dichlorobenzene	EPA 8260C
	EPA 624.1
	EPA 524.2
1,3,5-Trimethylbenzene	EPA 8260C
1,3-Dichlorobenzene	EPA 8260C
	EPA 624.1
1,4-Dichlorobenzene	EPA 8260C
	EPA 624.1
2-Chlorotoluene	EPA 8260C
4-Chlorotoluene	EPA 8260C
Benzene	EPA 8260C
	EPA 624.1
	EPA 524.2
Bromobenzene	EPA 8260C
Chlorobenzene	EPA 8260C
	EPA 624.1
	EPA 524.2
Ethyl benzene	EPA 8260C
	EPA 624.1

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Volatile Aromatics	
Isopropylbenzene	EPA 8260C
m/p-Xylenes	EPA 8260C
	EPA 624.1
Naphthalene, Volatile	EPA 8260C
n-Butylbenzene	EPA 8260C
n-Propylbenzene	EPA 8260C
o-Xylene	EPA 8260C
	EPA 624.1
p-Isopropyltoluene (P-Cymene)	EPA 8260C
sec-Butylbenzene	EPA 8260C
Styrene	EPA 8260C
	EPA 624.1
tert-Butylbenzene	EPA 8260C
Toluene	EPA 8260C
	EPA 624.1
	EPA 524.2
Total Xylenes	EPA 8260C
	EPA 624.1
Volatile Chlorinated Organics	
Benzyl chloride	EPA 8260C
Volatile Halocarbons	
1,1,1,2-Tetrachloroethane	EPA 8260C
1,1,1-Trichloroethane	EPA 8260C
	EPA 624.1
1,1,2,2-Tetrachloroethane	EPA 8260C

Volatile Halocarbons	
1,1,2,2-Tetrachloroethane	EPA 624.1
1,1,2-Trichloro-1,2,2-Trifluoroethane	EPA 8260C
1,1,2-Trichloroethane	EPA 8260C
	EPA 624.1
1,1-Dichloroethane	EPA 8260C
	EPA 624.1
1,1-Dichloroethene	EPA 8260C
	EPA 624.1
1,1-Dichloropropene	EPA 8260C
1,2,3-Trichloropropane	EPA 8260C
1,2-Dibromo-3-chloropropane	EPA 8260C
1,2-Dibromoethane	EPA 8260C
1,2-Dichloroethane	EPA 8260C
	EPA 624.1
	EPA 524.2
1,2-Dichloropropane	EPA 8260C
	EPA 624.1
1,3-Dichloropropane	EPA 8260C
2,2-Dichloropropane	EPA 8260C
2-Chloro-1,3-butadiene (Chloroprene)	EPA 8260C
2-Chloroethylvinyl ether	EPA 8260C
	EPA 624.1
3-Chloropropene (Allyl chloride)	EPA 8260C
Bromochloromethane	EPA 8260C
Bromodichloromethane	EPA 8260C
	EPA 624.1

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Volatile Halocarbons	
Bromoform	EPA 8260C
	EPA 624.1
Bromomethane	EPA 8260C
	EPA 624.1
Carbon tetrachloride	EPA 8260C
	EPA 624.1
Chloroethane	EPA 8260C
	EPA 624.1
Chloroform	EPA 8260C
	EPA 624.1
	EPA 524.2
Chloromethane	EPA 8260C
	EPA 624.1
cis-1,2-Dichloroethene	EPA 8260C
	EPA 624.1
cis-1,3-Dichloropropene	EPA 8260C
	EPA 624.1
Dibromochloromethane	EPA 8260C
	EPA 624.1
Dibromomethane	EPA 8260C
Dichlorodifluoromethane	EPA 8260C
	EPA 624.1
Hexachlorobutadiene, Volatile	EPA 8260C
Methyl iodide	EPA 8260C
Methylene chloride	EPA 8260C
	EPA 624.1

Volatile Halocarbons	
Methylene chloride	EPA 1624B
	EPA 524.2
Tetrachloroethene	EPA 8260C
	EPA 624.1
trans-1,2-Dichloroethene	EPA 8260C
	EPA 624.1
trans-1,3-Dichloropropene	EPA 8260C
	EPA 624.1
trans-1,4-Dichloro-2-butene	EPA 8260C
Trichloroethene	EPA 8260C
	EPA 624.1
Trichlorofluoromethane	EPA 8260C
	EPA 624.1
Vinyl chloride	EPA 8260C
	EPA 624.1

Volatiles Organics	
1,4-Dioxane	EPA 8260C
2-Butanone (Methylethyl ketone)	EPA 8260C
2-Hexanone	EPA 8260C
2-Nitropropane	EPA 8260C
4-Methyl-2-Pentanone	EPA 8260C
	EPA 524.2
Acetone	EPA 8260C
	EPA 624.1
	EPA 1624B

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Volatiles Organics	Sample Preparation Methods
Acetone	EPA 524.2
Acetonitrile	EPA 8260C
Carbon Disulfide	EPA 8260C
Cyclohexane	EPA 8260C
Di-ethyl ether	EPA 8260C
Ethyl Acetate	EPA 1666
	EPA 8260C
Isobutyl alcohol	EPA 8260C
Isopropanol	EPA 8260C
Isopropyl Acetate	EPA 1666
Methyl acetate	EPA 8260C
Methyl cyclohexane	EPA 8260C
n-Amyl Acetate	EPA 1666
o-Toluidine	EPA 8270D
Tetrahydrofuran	EPA 524.2
Vinyl acetate	EPA 8260C
	EPA 624.1

Sample Preparation Methods	
	SM 4500-P B(5)-2011
	EPA 5030C
	SM 4500-CN B-2011 and C-2011
	EPA 9030B
	EPA 3005A
	EPA 3510C
	EPA 3520C

Sample Preparation Methods	
	SM 4500-NH3 B-2011
	EPA 9010C

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Acrylates	
Acrolein (Propenal)	EPA 8260C
Acrylonitrile	EPA 8260C
Ethyl methacrylate	EPA 8260C
Methyl acrylonitrile	EPA 8260C
Methyl methacrylate	EPA 8260C
Amines	
1,2-Diphenylhydrazine	EPA 8270D
1,4-Phenylenediamine	EPA 8270D
1-Naphthylamine	EPA 8270D
2-Naphthylamine	EPA 8270D
2-Nitroaniline	EPA 8270D
3-Nitroaniline	EPA 8270D
4-Chloroaniline	EPA 8270D
4-Nitroaniline	EPA 8270D
5-Nitro-o-toluidine	EPA 8270D
Aniline	EPA 8270D
Carbazole	EPA 8270D
Diphenylamine	EPA 8270D
Methapyrilene	EPA 8270D
Pronamide	EPA 8270D
Benzidines	
3,3'-Dichlorobenzidine	EPA 8270D
3,3'-Dimethylbenzidine	EPA 8270D
Benzidine	EPA 8270D

Characteristic Testing	
Corrosivity	EPA 9040C
	EPA 9045D
	EPA 1110A
Free Liquids	EPA 9095B
Ignitability	EPA 1030
	EPA 1010A
Synthetic Precipitation Leaching Proc.	EPA 1312
TCLP	EPA 1311
Chlorinated Hydrocarbon Pesticides	
4,4'-DDD	EPA 8081B
4,4'-DDE	EPA 8081B
4,4'-DDT	EPA 8081B
Aldrin	EPA 8081B
alpha-BHC	EPA 8081B
alpha-Chlordane	EPA 8081B
Atrazine	EPA 8270D
beta-BHC	EPA 8081B
Chlordane Total	EPA 8081B
Chlorobenzilate	EPA 8270D
delta-BHC	EPA 8081B
Diallate	EPA 8270D
Dieldrin	EPA 8081B
Endosulfan I	EPA 8081B
Endosulfan II	EPA 8081B
Endosulfan sulfate	EPA 8081B

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Chlorinated Hydrocarbon Pesticides	
Endrin	EPA 8081B
Endrin aldehyde	EPA 8081B
Endrin Ketone	EPA 8081B
gamma-Chlordane	EPA 8081B
Heptachlor	EPA 8081B
Heptachlor epoxide	EPA 8081B
Isodrin	EPA 8270D
Lindane	EPA 8081B
Methoxychlor	EPA 8081B
Mirex	EPA 8081B
Pentachloronitrobenzene	EPA 8270D
Toxaphene	EPA 8081B
Chlorinated Hydrocarbons	
1,2,3-Trichlorobenzene	EPA 8260C
1,2,4,5-Tetrachlorobenzene	EPA 8270D
1,2,4-Trichlorobenzene	EPA 8270D
1-Chloronaphthalene	EPA 8270D
2-Chloronaphthalene	EPA 8270D
Hexachlorobenzene	EPA 8270D
Hexachlorobutadiene	EPA 8270D
Hexachlorocyclopentadiene	EPA 8270D
Hexachloroethane	EPA 8270D
Hexachloropropene	EPA 8270D
Pentachlorobenzene	EPA 8270D
Chlorophenoxy Acid Pesticides	
2,4,5-T	EPA 8151A
2,4,5-TP (Silvex)	EPA 8151A
2,4-D	EPA 8151A
2,4-DB	EPA 8151A
Dalapon	EPA 8151A
Dicamba	EPA 8151A
Dinoseb	EPA 8151A
Haloethers	
2,2'-Oxybis(1-chloropropane)	EPA 8270D
4-Bromophenylphenyl ether	EPA 8270D
4-Chlorophenylphenyl ether	EPA 8270D
Bis(2-chloroethoxy)methane	EPA 8270D
Bis(2-chloroethyl)ether	EPA 8270D
Low Level Polynuclear Aromatic Hydrocarbons	
Acenaphthene Low Level	EPA 8270D SIM
Acenaphthylene Low Level	EPA 8270D SIM
Anthracene Low Level	EPA 8270D SIM
Benzo(a)anthracene Low Level	EPA 8270D SIM
Benzo(a)pyrene Low Level	EPA 8270D SIM
Benzo(b)fluoranthene Low Level	EPA 8270D SIM
Benzo(g,h,i)perylene Low Level	EPA 8270D SIM
Benzo(k)fluoranthene Low Level	EPA 8270D SIM
Chrysene Low Level	EPA 8270D SIM
Dibenzo(a,h)anthracene Low Level	EPA 8270D SIM
Fluoranthene Low Level	EPA 8270D SIM

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Low Level Polynuclear Aromatic Hydrocarbons	
Fluorene Low Level	EPA 8270D SIM
Indeno(1,2,3-cd)pyrene Low Level	EPA 8270D SIM
Naphthalene Low Level	EPA 8270D SIM
Phenanthrene Low Level	EPA 8270D SIM
Pyrene Low Level	EPA 8270D SIM
Metals I	
Barium, Total	EPA 6010C
Cadmium, Total	EPA 6010C
Calcium, Total	EPA 6010C
Chromium, Total	EPA 6010C
Copper, Total	EPA 6010C
Iron, Total	EPA 6010C
Lead, Total	EPA 6010C
Magnesium, Total	EPA 6010C
Manganese, Total	EPA 6010C
Nickel, Total	EPA 6010C
Potassium, Total	EPA 6010C
Silver, Total	EPA 6010C
Sodium, Total	EPA 6010C
Strontium, Total	EPA 6010C
Metals II	
Aluminum, Total	EPA 6010C
Antimony, Total	EPA 6010C
Arsenic, Total	EPA 6010C
Beryllium, Total	EPA 6010C
Metals II	
Chromium VI	EPA 7196A
Mercury, Total	EPA 7471B
Selenium, Total	EPA 6010C
Vanadium, Total	EPA 6010C
Zinc, Total	EPA 6010C
Metals III	
Cobalt, Total	EPA 6010C
Molybdenum, Total	EPA 6010C
Thallium, Total	EPA 6010C
Tin, Total	EPA 6010C
Minerals	
Bromide	EPA 9056A
Chloride	EPA 9056A
Fluoride, Total	EPA 9056A
Sulfate (as SO4)	EPA 9056A
Miscellaneous	
Boron, Total	EPA 6010C
Cyanide, Total	EPA 9014
Sulfide (as S)	EPA 9034
Nitroaromatics and Isophorone	
1,3,5-Trinitrobenzene	EPA 8270D
1,3-Dinitrobenzene	EPA 8270D
1,4-Naphthoquinone	EPA 8270D
2,4-Dinitrotoluene	EPA 8270D

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Nitroaromatics and Isophorone	
2,6-Dinitrotoluene	EPA 8270D
Isophorone	EPA 8270D
Nitrobenzene	EPA 8270D
Pyridine	EPA 8270D
Nitrosoamines	
N-Nitrosodiethylamine	EPA 8270D
N-Nitrosodimethylamine	EPA 8270D
N-Nitrosodi-n-butylamine	EPA 8270D
N-Nitrosodi-n-propylamine	EPA 8270D
N-Nitrosodiphenylamine	EPA 8270D
N-nitrosomethylethylamine	EPA 8270D
N-nitrosopiperidine	EPA 8270D
N-Nitrosopyrrolidine	EPA 8270D
Nutrients	
Nitrate (as N)	EPA 9056A
Nitrite (as N)	EPA 9056A
Orthophosphate (as P)	EPA 9056A
Organophosphate Pesticides	
Dimethoate	EPA 8270D
Parathion ethyl	EPA 8270D
Phorate	EPA 8270D
Thionazin	EPA 8270D
Petroleum Hydrocarbons	
Diesel Range Organics	EPA 8015D
Petroleum Hydrocarbons	
Gasoline Range Organics	EPA 8015D
Phthalate Esters	
Benzyl butyl phthalate	EPA 8270D
Bis(2-ethylhexyl) phthalate	EPA 8270D
Diethyl phthalate	EPA 8270D
Dimethyl phthalate	EPA 8270D
Di-n-butyl phthalate	EPA 8270D
Di-n-octyl phthalate	EPA 8270D
Polychlorinated Biphenyls	
PCB-1016	EPA 8082A
PCB-1221	EPA 8082A
PCB-1232	EPA 8082A
PCB-1242	EPA 8082A
PCB-1248	EPA 8082A
PCB-1254	EPA 8082A
PCB-1260	EPA 8082A
PCB-1262	EPA 8082A
PCB-1268	EPA 8082A
PCBs in Oil	EPA 8082A
Polynuclear Aromatic Hydrocarbons	
2-Acetylaminofluorene	EPA 8270D
3-Methylcholanthrene	EPA 8270D
7,12-Dimethylbenzyl (a) anthracene	EPA 8270D
Acenaphthene	EPA 8270D

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Polynuclear Aromatic Hydrocarbons	
Acenaphthylene	EPA 8270D
Anthracene	EPA 8270D
Benzo(a)anthracene	EPA 8270D
Benzo(a)pyrene	EPA 8270D
Benzo(b)fluoranthene	EPA 8270D
Benzo(ghi)perylene	EPA 8270D
Benzo(k)fluoranthene	EPA 8270D
Chrysene	EPA 8270D
Dibenzo(a,h)anthracene	EPA 8270D
Fluoranthene	EPA 8270D
Fluorene	EPA 8270D
Indeno(1,2,3-cd)pyrene	EPA 8270D
Naphthalene	EPA 8270D
Phenanthrene	EPA 8270D
Pyrene	EPA 8270D
Priority Pollutant Phenols	
2,3,4,6 Tetrachlorophenol	EPA 8270D
2,4,5-Trichlorophenol	EPA 8270D
2,4,6-Trichlorophenol	EPA 8270D
2,4-Dichlorophenol	EPA 8270D
2,4-Dimethylphenol	EPA 8270D
2,4-Dinitrophenol	EPA 8270D
2,6-Dichlorophenol	EPA 8270D
2-Chlorophenol	EPA 8270D
2-Methyl-4,6-dinitrophenol	EPA 8270D

Priority Pollutant Phenols	
2-Methylphenol	EPA 8270D
2-Nitrophenol	EPA 8270D
3-Methylphenol	EPA 8270D
4-Chloro-3-methylphenol	EPA 8270D
4-Methylphenol	EPA 8270D
4-Nitrophenol	EPA 8270D
Pentachlorophenol	EPA 8270D
Phenol	EPA 8270D
Semi-Volatile Organics	
1,1'-Biphenyl	EPA 8270D
1,2-Dichlorobenzene, Semi-volatile	EPA 8270D
1,3-Dichlorobenzene, Semi-volatile	EPA 8270D
1,4-Dichlorobenzene, Semi-volatile	EPA 8270D
2-Methylnaphthalene	EPA 8270D
2-Picoline	EPA 8270D
4-Amino biphenyl	EPA 8270D
Acetophenone	EPA 8270D
Aramite	EPA 8270D
Benzaldehyde	EPA 8270D
Benzoic Acid	EPA 8270D
Benzyl alcohol	EPA 8270D
Caprolactam	EPA 8270D
Dibenzofuran	EPA 8270D
Ethyl methanesulfonate	EPA 8270D
Isosafrole	EPA 8270D

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Semi-Volatile Organics	
Methyl methanesulfonate	EPA 8270D
O,O,O-Triethyl phosphorothioate	EPA 8270D
Phenacetin	EPA 8270D
Safrole	EPA 8270D
Volatile Aromatics	
1,2,4-Trichlorobenzene, Volatile	EPA 8260C
1,2,4-Trimethylbenzene	EPA 8260C
1,2-Dichlorobenzene	EPA 8260C
1,3,5-Trimethylbenzene	EPA 8260C
1,3-Dichlorobenzene	EPA 8260C
1,4-Dichlorobenzene	EPA 8260C
2-Chlorotoluene	EPA 8260C
4-Chlorotoluene	EPA 8260C
Benzene	EPA 8260C
Bromobenzene	EPA 8260C
Chlorobenzene	EPA 8260C
Ethyl benzene	EPA 8260C
Isopropylbenzene	EPA 8260C
m/p-Xylenes	EPA 8260C
Naphthalene, Volatile	EPA 8260C
n-Butylbenzene	EPA 8260C
n-Propylbenzene	EPA 8260C
o-Xylene	EPA 8260C
p-Isopropyltoluene (P-Cymene)	EPA 8260C
sec-Butylbenzene	EPA 8260C
Volatile Aromatics	
Styrene	EPA 8260C
tert-Butylbenzene	EPA 8260C
Toluene	EPA 8260C
Total Xylenes	EPA 8260C
Volatile Chlorinated Organics	
Benzyl chloride	EPA 8260C
Volatile Halocarbons	
1,1,1,2-Tetrachloroethane	EPA 8260C
1,1,1-Trichloroethane	EPA 8260C
1,1,2,2-Tetrachloroethane	EPA 8260C
1,1,2-Trichloro-1,2,2-Trifluoroethane	EPA 8260C
1,1,2-Trichloroethane	EPA 8260C
1,1-Dichloroethane	EPA 8260C
1,1-Dichloroethene	EPA 8260C
1,1-Dichloropropene	EPA 8260C
1,2,3-Trichloropropane	EPA 8260C
1,2-Dibromo-3-chloropropane	EPA 8260C
1,2-Dibromoethane	EPA 8260C
1,2-Dichloroethane	EPA 8260C
1,2-Dichloropropane	EPA 8260C
1,3-Dichloropropane	EPA 8260C
2,2-Dichloropropane	EPA 8260C
2-Chloro-1,3-butadiene (Chloroprene)	EPA 8260C
2-Chloroethylvinyl ether	EPA 8260C
3-Chloropropene (Allyl chloride)	EPA 8260C

Serial No.: 57473

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2019
Issued April 01, 2018

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

DR. MICHAEL E. MILLER
PACE ANALYTICAL SERVICES, LLC - LONG ISLAND NY
575 BROAD HOLLOW ROAD
MELVILLE, NY 11747

NY Lab Id No: 10478

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2003) for the category ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved analytes are listed below:

Volatile Halocarbons	
Bromochloromethane	EPA 8260C
Bromodichloromethane	EPA 8260C
Bromoform	EPA 8260C
Bromomethane	EPA 8260C
Carbon tetrachloride	EPA 8260C
Chloroethane	EPA 8260C
Chloroform	EPA 8260C
Chloromethane	EPA 8260C
cis-1,2-Dichloroethene	EPA 8260C
cis-1,3-Dichloropropene	EPA 8260C
Dibromochloromethane	EPA 8260C
Dibromomethane	EPA 8260C
Dichlorodifluoromethane	EPA 8260C
Hexachlorobutadiene, Volatile	EPA 8260C
Methyl iodide	EPA 8260C
Methylene chloride	EPA 8260C
Tetrachloroethene	EPA 8260C
trans-1,2-Dichloroethene	EPA 8260C
trans-1,3-Dichloropropene	EPA 8260C
trans-1,4-Dichloro-2-butene	EPA 8260C
Trichloroethene	EPA 8260C
Trichlorofluoromethane	EPA 8260C
Vinyl chloride	EPA 8260C
Volatile Organics	
1,4-Dioxane	EPA 8260C

Volatile Organics	
2-Butanone (Methylethyl ketone)	EPA 8260C
2-Hexanone	EPA 8260C
2-Nitropropane	EPA 8260C
4-Methyl-2-Pentanone	EPA 8260C
Acetone	EPA 8260C
Acetonitrile	EPA 8260C
Carbon Disulfide	EPA 8260C
Cyclohexane	EPA 8260C
Di-ethyl ether	EPA 8260C
Ethyl Acetate	EPA 8260C
Isobutyl alcohol	EPA 8260C
Isopropanol	EPA 8260C
Methyl acetate	EPA 8260C
Methyl cyclohexane	EPA 8260C
Methyl tert-butyl ether	EPA 8260C
o-Toluidine	EPA 8270D
Propionitrile	EPA 8260C
tert-butyl alcohol	EPA 8260C
Vinyl acetate	EPA 8260C
Sample Preparation Methods	
	EPA 5035A-L
	EPA 5035A-H
	EPA 3580A
	EPA 9030B
	EPA 3005A

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All approved analytes are listed below:

Sample Preparation Methods

EPA 3050B
EPA 3546
EPA 3545A
EPA 3060A
EPA 9010C

Serial No.: 57473

NEW YORK STATE DEPARTMENT OF HEALTH
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is hereby APPROVED as an Environmental Laboratory for the category
ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved subcategories and/or analytes are listed below:

Miscellaneous

Lead in Dust Wipes	EPA 6010C
Lead in Paint	EPA 6010C

Sample Preparation Methods

EPA 3050B

Serial No.: 57474

Pace Analytical Services, LLC
Method Detection Limits and Reporting Limits
by EPA TO15

							LCS		DUP
Analyte	CAS #	MDL (ppbv)	PRL (ppbv)	MW	MDL (ug/m^3)	PRL (ug/m^3)	Lower	Upper	RPD
1,1,1-Trichloroethane	71-55-6	0.0616	0.2	133.4047	0.342	1.11	70	135	25
1,1,2,2-Tetrachloroethane	79-34-5	0.0415	0.1	167.8498	0.290	0.698	70	146	25
1,1,2-Trichloroethane	79-00-5	0.0406	0.1	133.4047	0.225	0.555	70	135	25
1,1,2-Trichlorotrifluoroethane	76-13-1	0.0474	0.2	187.3762	0.369	1.56	63	139	25
1,1-Dichloroethane	75-34-3	0.0516	0.2	98.9596	0.212	0.823	70	134	25
1,1-Dichloroethene	75-35-4	0.0587	0.2	96.9438	0.237	0.806	70	137	25
1,2,4-Trichlorobenzene	120-82-1	0.127	0.5	181.4487	0.958	3.77	60	133	25
1,2,4-Trimethylbenzene	95-63-6	0.0345	0.2	120.1938	0.172	0.999	70	137	25
1,2-Dibromoethane	106-93-4	0.0426	0.2	187.8616	0.333	1.56	70	140	25
1,2-Dichlorobenzene	95-50-1	0.0533	0.2	147.0036	0.326	1.22	70	137	25
1,2-Dichloroethane	107-06-2	0.0481	0.1	98.9596	0.198	0.411	70	136	25
1,2-Dichloropropane	78-87-5	0.0652	0.2	112.9864	0.306	0.939	70	136	25
1,3,5-Trimethylbenzene	108-67-8	0.0824	0.2	120.1938	0.412	0.999	70	133	25
1,3-Butadiene	106-99-0	0.0915	0.2	54.0914	0.206	0.450	64	141	25
1,3-Dichlorobenzene	541-73-1	0.0763	0.2	147.0036	0.466	1.22	70	137	25
1,4-Dichlorobenzene	106-46-7	0.0358	0.2	147.0036	0.219	1.22	70	134	25
2-Butanone (MEK)	78-93-3	0.0676	1	72.1057	0.203	3.00	65	143	25
2-Hexanone	591-78-6	0.147	1	100.1589	0.612	4.16	60	148	25
2-Propanol	67-63-0	0.500	1	60.1	1.25	2.50	65	135	25
4-Ethyltoluene	622-96-8	0.0429	0.2	120.1938	0.214	0.999	70	132	25
4-Methyl-2-pentanone (MIBK)	108-10-1	0.0854	1	100.1602	0.356	4.16	70	135	25
Acetone	67-64-1	0.623	1	58.0798	1.50	2.41	59	132	25
Benzene	71-43-2	0.0465	0.1	78.1134	0.151	0.325	70	134	25
Benzyl Chloride	100-44-7	0.0449	0.2	126.58	0.236	1.05	56	150	25
Bromodichloromethane	75-27-4	0.0522	0.2	163.8289	0.356	1.36	70	142	25
Bromoform	75-25-2	0.0658	0.2	252.7309	0.691	2.10	69	150	25
Bromomethane	74-83-9	0.0526	0.2	94.9387	0.208	0.789	61	141	25
Carbon Disulfide	75-15-0	0.0566	0.2	76.131	0.179	0.633	66	134	25
Carbon tetrachloride	56-23-5	0.0498	0.1	153.823	0.318	0.639	60	145	25
Chlorobenzene	108-90-7	0.0382	0.2	112.5585	0.179	0.936	70	130	25
Chloroethane	75-00-3	0.0762	0.2	64.5145	0.204	0.536	65	143	25

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Chloroform	67-66-3	0.0465	0.1	119.3779	0.231	0.496	70	132	25
Chloromethane	74-87-3	0.0637	0.2	50.4877	0.134	0.420	58	140	25
cis-1,2-Dichloroethene	156-59-2	0.0845	0.2	96.9438	0.341	0.806	70	136	25
cis-1,3-Dichloropropene	10061-01-5	0.0531	0.2	110.9706	0.245	0.923	70	136	25
Cyclohexane	110-82-7	0.0648	0.2	84.1608	0.227	0.700	70	133	25
							LCS		DUP
Analyte	**CAS #**	**MDL (ppbv)**	**PRL (ppbv)**	**MW**	**MDL (ug/m^3)**	**PRL (ug/m^3)**	**Lower**	**Upper**	**RPD**
Dibromochloromethane	124-48-1	0.0511	0.2	208.2799	0.442	1.73	68	149	25
Dichlorodifluoromethane	75-71-8	0.0827	0.2	120.9138	0.416	1.01	69	130	25
Dichlorotetrafluoroethane	76-14-2	0.0622	0.2	170.9216	0.442	1.42	68	130	25
Ethanol	64-17-5	0.243	0.5	46.07	0.465	0.958	65	146	25
Ethyl Acetate	141-78-6	0.0534	0.2	88.106	0.196	0.733	68	136	25
Ethyl Benzene	100-41-4	0.0388	0.2	106.167	0.171	0.883	70	133	25
Hexachlorobutadiene	87-68-3	0.0802	0.2	260.762	0.869	2.17	59	140	25
m&p-Xylene	106-42-3	0.0791	0.4	106.167	0.349	1.77	70	133	25
Methyl Tert Butyl Ether	1634-04-4	0.182	1	88.1492	0.667	3.66	70	132	25
Methylene chloride	75-0902	0.431	1	84.9328	1.52	3.53	67	132	25
Naphthalene	91-20-3	0.112	0.5	128.1732	0.597	2.66	55	136	25
n-Heptane	142-82-5	0.0504	0.2	100.2034	0.210	0.833	64	136	25
n-Hexane	110-54-3	0.0929	0.2	86.1766	0.333	0.716	70	130	25
o-Xylene	95-47-6	0.0840	0.2	106.167	0.371	0.883	70	132	25
Propylene	115-07-1	0.0895	0.2	42.0804	0.157	0.350	37	150	25
Styrene	100-42-5	0.0386	0.2	104.1512	0.167	0.866	70	139	25
Tetrachloroethene	127-18-4	0.0416	0.1	165.834	0.287	0.689	70	133	25
Tetrahydrofuran	109-99-9	0.0913	0.2	72.1066	0.274	0.600	62	141	25
Toluene	108-88-3	0.0416	0.2	92.1402	0.159	0.766	70	130	25
trans-1,2-dichloroethene	156-60-5	0.0731	0.2	96.9438	0.295	0.806	70	132	25
trans-1,3-Dichloropropene	10061-02-6	0.0911	0.2	110.9706	0.420	0.923	70	135	25
Trichloroethene	79-01-6	0.0490	0.1	131.3889	0.268	0.546	70	135	25
Trichlorofluoromethane	75-69-4	0.0732	0.2	137.3684	0.418	1.14	59	140	25
Vinyl Acetate	108-05-4	0.0465	0.2	86.0902	0.166	0.716	57	150	25
Vinyl chloride	75-01-4	0.0486	0.1	62.4987	0.126	0.260	70	141	25

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by EPA TO15

EXTRA ANALYTES (available upon request at an additional cost)

							LCS		DUP
Analyte	CAS #		PRL (ppbv)	MW	MDL (ug/m^3)	PRL (ug/m^3)	Lower	Upper	RPD
1,2,3-Trimethylbenzene	526-73-8	0.0440	0.2	120.19	0.220	0.999	69	150	25
1,4-Dioxane	123-91-1	0.0966	1	88.1051	0.354	3.66	70	145	25
2,2,4-Trimethylpentane	540-84-1	0.0909	0.5	114.22	0.432	2.37	70	140	25
Acrolein	107-02-8	0.110	0.5	56.06	0.256	1.17	65	150	25
Acrylonitrile	107-13-1	0.148	0.5	53.06	0.326	1.10	64	142	25
Allyl Chloride	107-05-1	0.114	0.5	76.525	0.363	1.59	60	147	25
Chlorodifluoromethane	75-45-6	0.0677	0.2	86.47	0.243	0.719	68	142	25
Di-isopropyl Ether	108-20-3	0.0410	1	102.1748	0.174	4.25	70	136	25
Ethyl Tert-Butyl Ether	637-92-3	0.211	1	102.1748	0.896	4.25	70	136	25
Isopentane	78-78-4	0.0704	0.2	72.15	0.211	0.600	44	150	25
Isopropylbenzene	98-82-8	0.0660	0.5	120.194	0.330	2.50	70	133	25
Methyl Methacrylate	80-62-6	0.0877	0.2	100.12	0.365	0.832	47	150	25
Methylcyclohexane	108-87-2	0.0849	0.2	98.186	0.347	0.816	70	137	25
N-Butylbenzene	104-51-8	0.101	0.5	134.2206	0.564	2.79	70	148	25
N-Propylbenzene	103-65-1	0.0402	0.5	120.1938	0.201	2.50	70	145	25
p-Isopropyltoluene	99-87-6	0.0333	0.2	134.22	0.186	1.12	70	143	25
Sec- Butylbenzene	135-98-8	0.0426	0.5	134.2206	0.238	2.79	70	142	25
Tert Amyl Methyl Ether	994-05-8	0.0385	1	102.1748	0.164	4.25	70	135	25
Tert Butyl Alcohol (TBA)	75-65-0	0.116	1	74.12	0.357	3.08	63	143	25
Tert-Butyl Benzene	98-06-6	0.0478	0.2	166.217	0.330	1.38	70	142	25
Vinyl Bromide	593-60-2	0.0517	1	106.95	0.230	4.45	70	140	25
THC as Gas (C4-C12)		11.95	23.9		51.9	104	59	150	25
Xylene (Total)	1330-20-7	0.0840	0.6	106.17	0.371	2.65	70	138	25

Surrogates								
1,4-Dichlorobenzene-d4 (S)	3855-82-1						30	150
Hexane-d14 (S)	21666-38-6						30	150
Toluene-d8 (S)	2037-26-5						30	150

Highlighted cells are calculated results

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APPENDIX J

SITE MANAGEMENT FORMS

Summary of Green Remediation Metrics for Site Management

Site Name: _____ Site Code: _____

Address: _____ City: _____

State: _____ Zip Code: _____ County: _____

Initial Report Period (Start Date of period covered by the Initial Report submittal)

Start Date: _____

Current Reporting Period

Reporting Period From: _____ To: _____

Contact Information

Preparer's Name: _____ Phone No.: _____

Preparer's Affiliation: _____

I. Energy Usage: Quantify the amount of energy used directly on-Site and the portion of that derived from renewable energy sources.

	Current Reporting Period	**Total to Date**
Fuel Type 1 (e.g. natural gas (cf))		
Fuel Type 2 (e.g. fuel oil, propane (gals))		
Electricity (kWh)		
Of that Electric usage, provide quantity:		
Derived from renewable sources (e.g. solar, wind)		
Other energy sources (e.g. geothermal, solar thermal (Btu))		

Provide a description of all energy usage reduction programs for the Site in the space provided on Page 3.

II. Solid Waste Generation: Quantify the management of solid waste generated on-site.

	Current Reporting Period (tons)	**Total to Date (tons)**
Total waste generated on-site		
OM&M generated waste		
Of that total amount, provide quantity:		
Transported off-Site to landfills		
Transported off-Site to other disposal facilities		
Transported off-Site for recycling/reuse		
Reused on-site		

Provide a description of any implemented waste reduction programs for the Site in the space provided on Page 3.

III. Transportation/Shipping: Quantify the distances travelled for delivery of supplies, shipping of laboratory samples, and the removal of waste.

	Current Reporting Period (miles)	**Total to Date (miles)**
Standby Engineer/Contractor		
Laboratory Courier/Delivery Service		
Waste Removal/Hauling		

Provide a description of all mileage reduction programs for the Site in the space provided on Page 3. Include specifically any local vendor/services utilized that are within 50 miles of the site.

IV. Water Usage: Quantify the volume of water used on-Site from various sources.

	Current Reporting Period (gallons)	**Total to Date (gallons)**
Total quantity of water used on-site		
Of that total amount, provide quantity:		
Public potable water supply usage		
Surface water usage		
On-Site groundwater usage		
Collected or diverted storm water usage		

Provide a description of any implemented water consumption reduction programs for the Site in the space provided on Page 3.

V. Land Use and Ecosystems: Quantify the amount of land and/or ecosystems disturbed and the area of land and/or ecosystems restored to a pre-development condition (i.e. Green Infrastructure).

	Current Reporting Period (acres)	**Total to Date (acres)**
Land disturbed		
Land restored		

Provide a description of any implemented land restoration/green infrastructure programs for the Site in the space provided on Page 3.

Description of green remediation programs reported above (Attach additional sheets if needed)
Energy Usage:
Waste Generation:
Transportation/Shipping:

Water usage:
Land Use and Ecosystems:
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 that last day of the period covered by this application.

_____

Date **Contractor**

Operation, Maintenance, and Monitoring Checklist

Procedure	Frequency
Record all gauge readings in system log and field book.	Each Visit
effluent sample port.	Monthly
Empty Moisture Separator.	Monthly
Bleed SVE lines.	Monthly
Clean SVE inline filter elements. Replace element when differential pressure across unit reaches 15 in. H_2O above the initial differential pressure.	Monthly
Change SVE blower bearings.	15,000 hrs

See SVE component sections for more detailed description of maintenance procedures.

Operation & Maintenance Data Sheet for SVE System
AAA Sutter Realty LLC
1199 Sutter Avenue
Brooklyn, New York

EnviroTrac Environmental Services
5 Old Dock Road, Yaphank, NY 11980
(631)924-3001, Fax (631)924-5001

Date: **Arrival Time:**

Weather / Temp: **Departure Time:**

Technician / Operator:

System Status				
	Arrival	Departure		
SVE Blower 1 (ON/OFF)			SVE Blower 1 Run Time (Hrs)	
Sensaphone (ON/OFF)				
Soil Vapor Extraction System				
Total Air Flow Rate (cfm)				
Inline Air Filter (F-1) Inlet Vacuum ("H2O)				
Inlet Vacuum ("H2O)				
Fresh Air Valve Open (%)				
Inlet Temperature (°F)				
Outlet Temperature (°F)				
Outlet Pressure ("H2O)			Moisture Separator Tank Level (gal)	

SVE Manifold Legs - Vacuum/Flow Rate/PID								
SVE/SSD-7 ("H2O)/(cfm)/(ppm)								
SVE/SSD-8 ("H2O)/(cfm)/(ppm)								
SVE-9 ("H2O)/(cfm)/(ppm)								
SVE-10 ("H2O)/(cfm)/(ppm)								

Soil Vapor Monitoring Points - Vacuum Influence/PID			
VMP-1 ("H2O)/(ppm)			
VMP-2 ("H2O)/(ppm)			
VMP-3 ("H2O)/(ppm)			
VMP-4 ("H2O)/(ppm)			
VMP-5 ("H2O)/(ppm)			
VMP-6 ("H2O)/(ppm)			
VMP-7 ("H2O)/(ppm)			

Notes, Comments & Observations:

EnviroTrac Environmental Services

Operation & Maintenance Data Sheet for AS System
AAA Sutter Realty LLC
1199 Sutter Avenue
Brooklyn, New York

EnviroTrac Environmental Services
5 Old Dock Road, Yaphank, NY 11980
(631)924-3001, Fax (631)924-5001

Date: **Arrival Time:**

Weather / Temp: **Departure Time:**

Technician / Operator:

System Status				
	Arrival	Departure		
AS Compressor 1 (ON/OFF)			AS Compressor 1 Run Time (Hrs)	
Sensaphone (ON/OFF)				
Air Sparge System				
Total Air Flow Rate (cfm)				
Inline Air Filter (F-1) Inlet Vacuum ("H2O)				
Inlet Vacuum ("H2O)				
Fresh Air Valve Open (%)				
Inlet Temperature (°F)				
Outlet Temperature (°F)				
Outlet Pressure ("H2O)				

AS Well Legs - Air Flow Rate							
AS-1 (cfm)							
AS-2 (cfm)							
AS-3 (cfm)							

Monitoring Points - Air Flow Rate		
MW-3S		

Notes, Comments & Observations:

Operation & Maintenance Data Sheet for SSD System
AAA Sutter Realty LLC
1199 Sutter Avenue
Brooklyn, New York

EnviroTrac Environmental Services
5 Old Dock Road, Yaphank, NY 11980
(631)924-3001, Fax (631)924-5001

Date: **Arrival Time:**

Weather / Temp: **Departure Time:**

Technician / Operator:

System Status				
	Arrival	Departure		
SVE Blower 1 (ON/OFF)				
Alarm (ON/OFF)				
Sub-Slab Depressurization System				
Total Air Flow Rate (cfm)				
Inline Air Filter (F-1) Inlet Vacuum ("H2O)				
Inlet Vacuum ("H2O)				
Fresh Air Valve Open (%)				
Inlet Temperature (°F)				
Outlet Temperature (°F)				
Outlet Pressure ("H2O)				

SSDS Extraction Points - Vacuum/Flow Rate/PID							
SSD-1 ("H2O)/(cfm)/(ppm)				SSD-5 ("H2O)/(cfm)/(ppm)			
SSD-2 ("H2O)/(cfm)/(ppm)				SSD-6 ("H2O)/(cfm)/(ppm)			
SSD-3 ("H2O)/(cfm)/(ppm)							
SSD-4 ("H2O)/(cfm)/(ppm)							

Soil Vapor Monitoring Points - Vacuum Influence/PID			
VMP-1 ("H2O)/(ppm)			
VMP-2 ("H2O)/(ppm)			
VMP-3 ("H2O)/(ppm)			
VMP-4 ("H2O)/(ppm)			
VMP-5 ("H2O)/(ppm)			
VMP-6 ("H2O)/(ppm)			
VMP-7 ("H2O)/(ppm)			

Notes, Comments & Observations:

Site Inspection Form

AAA Sutter Realty LLC
1199 Sutter Avenue
Brooklyn, New York
NYSDEC BCP Number: C224141

Date: _____

Personnel: _____

Weather: _____

Reporting Period: _____

SVE Piping: _____

SVE Gauges: _____

SVE blowers: _____

AS Piping: _____

AS Gauges: _____

AS Compressor: _____

Monitoring Wells: _____

Miscellaneous Site Conditions: _____

APPENDIX K – FIELD SAMPLING PLAN

Groundwater Sampling

As part of the monitored natural attenuation of the groundwater, groundwater samples will be collected from wells MW-1S, MW-2S, MW-10S, MW-11S (on-Site wells), MW-5S, and MW-8S (off-Site downgradient wells) on a quarterly basis to assess groundwater quality.

Sampling events will be conducted implementing the procedures in the US Environmental Protection Agency (EPA) Region 1 Low Stress (low flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells, dated September, 2017. The goal of this groundwater sampling procedure is to collect water samples that reflect the total mobile organic and inorganic loads (dissolved and colloidal sized fractions) transported through the subsurface under ambient flow conditions, with minimal physical and chemical alterations from sampling operations. This standard operating procedure (SOP) for collecting groundwater samples will help ensure that the project's data quality objectives (DQOs) are met under certain low flow conditions.

The following procedures will be utilized for the collection of groundwater samples using low flow sampling procedures:

Prior to the starting low flow groundwater sampling, water levels will be measured.

Groundwater Elevation Measurements

Groundwater elevation measurements are to be obtained using the following general procedures whenever depth to groundwater or groundwater elevation data is required. This may include activities such as soil borings, groundwater monitoring well installation/development, groundwater monitoring well sampling, and/or synoptic groundwater level measurements. The measurements will be collected concurrent with the groundwater sampling event and the water

levels will be obtained prior to well evacuation and sample collection. The static water level will be measured to the nearest 0.01 foot.

1. Clean all water-level measuring equipment using appropriate decontamination procedures.
2. Remove locking well cap, note weather, time of day, and date, etc. in field notebook, or on an appropriate form.
3. Remove well casing cap.
4. Monitor headspace of well with a PID to determine presence of VOCs, and record in field notebook.
5. Lower water level measuring device into well until the water surface is encountered.
6. Measure distance from water surface to reference measuring point on well casing, and record in field notebook. It will be noted whether the water level measurement is from the top of protective steel casing, top of PVC riser pipe, from ground surface, or some other position on the wellhead.
7. Measure total depth of well and record in field notebook or on log form.
8. Remove all downhole equipment; replace well casing cap and locking steel caps.
9. Calculate elevation of water:

   Egw = E – Dgw

   Where:

   Egw = Elevation of Groundwater;

   E = Elevation at point of measurement; and

   Dgw = Depth to Groundwater.

<u>Low flow groundwater sampling procedures</u>

1. The pump intake should be located within the screen interval and at a depth that will remain under water at all times. It is recommended that the intake depth and pumping rate remain the same for all sampling events. The mid-point or the lowest historical midpoint of the saturated screen length is often used as the location of the pump intake.

2. Stabilization of indicator field parameters is used to indicate that conditions are suitable for sampling to begin. Achievement of turbidity levels of less than 5 NTU, and stable drawdowns of less than 0.3 feet, while desirable, are not mandatory. Sample collection may still take place provided the indicator field parameter criteria in this procedure are met. If after 2 hours of purging indicator field parameters have not stabilized, one of three optional courses of action may be taken:
    a. continue purging until stabilization is achieved,
    b. discontinue purging, do not collect any samples, and record in log book that stabilization could not be achieved (documentation must describe attempts to achieve stabilization),
    c. discontinue purging, collect samples and provide full explanation of attempts to achieve stabilization (note: there is a risk that the analytical data obtained, especially metals and strongly hydrophobic organic analytes, may reflect a sampling bias, and therefore, the data may not meet the data quality objectives of the sampling event).
3. It is recommended that low-flow sampling be conducted when the air temperature is above 32°F (0°C). If the procedure is used below 32°F, special precautions will need to be taken to prevent the groundwater from freezing in the equipment. Because sampling during freezing temperatures may adversely impact the data quality objectives, the need for water sample collection during months when these conditions are likely to occur should be evaluated during Site planning and special sampling measures may need to be developed. Ice formation in the flow-through-cell will cause the monitoring probes to act erratically. A transparent flow-through-cell needs to be used to observe if ice is forming in the cell. If ice starts to form on the other pieces of the sampling equipment, additional problems may occur.

Sampling Equipment

1. Adjustable rate, submersible pumps (e.g., centrifugal, bladder, etc.) which are constructed of stainless steel or polytetrafluoroethylene (PTFE, i.e. Teflon®) are preferred. PTFE, however, should not be used when sampling for per- and polyfluoroalkyl substances (PFAS) as it is likely to contain these substances. Note: If

extraction devices constructed of other materials are to be used, adequate information must be provided to show that the substituted materials do not leach contaminants nor cause interferences to the analytical procedures to be used. Acceptance of these materials must be obtained before the sampling event.

2. If bladder pumps are selected for the collection of VOCs and dissolved gases, the pump setting should be set so that one pulse will deliver a water volume that is sufficient to fill a 40 mL VOC vial. This is not mandatory, but is considered a "best practice". For the proper operation, the bladder pump will need a minimum amount of water above the pump; consult the manufacturer for the recommended submergence. The pump's recommended submergence value should be determined during the planning stage, since it may influence well construction and placement of dedicated pumps where water-levelfluctuations are significant.
3. Adjustable rate, peristaltic pumps (suction) are to be used with caution when collecting samples for VOCs and dissolved gases (e.g., methane, carbon dioxide, etc.) analyses. If peristaltic pumps are used, the inside diameter of the rotor head tubing needs to match the inside diameter of the tubing installed in the monitoring well.
4. Inertial pumping devices (motor driven or manual) are not recommended. These devices frequently cause greater disturbance during purging and sampling, and are less easily controlled than submersible pumps (potentially increasing turbidity and sampling variability, etc.). This can lead to sampling results that are adversely affected by purging and sampling operations, and a higher degree of data variability.
5. PTFE (Teflon®) or PTFE-lined polyethylene tubing are preferred when sampling is to include VOCs, SVOCs, pesticides, PCBs and inorganics.
6. PTFE tubing should not be used when sampling for PFAS. In this case, a suitable alternative such as high-density polyethylene tubing should be used.
7. PVC, polypropylene or polyethylene tubing may be used when collecting samples for metal and other inorganics analyses.

Note: If tubing constructed of other materials is to be used, adequate information must be provided to show that the substituted materials do not leach contaminants nor cause interferences

to the analytical procedures to be used. Acceptance of these materials must be obtained before the sampling event.

8. The use of 1/4 inch or 3/8 inch (inside diameter) tubing is recommended. This will help ensure that the tubing remains liquid filled when operating at very low pumping rates when using centrifugal and peristaltic pumps.
9. Silastic tubing should be used for the section around the rotor head of a peristaltic pump. It should be less than a foot in length. The inside diameter of the tubing used at the pump rotor head must be the same as the inside diameter of tubing placed in the well. A tubing connector is used to connect the pump rotor head tubing to the well tubing. Alternatively, the two pieces of tubing can be connected to each other by placing the one end of the tubing inside the end of the other tubing. The tubing must not be reused.
10. An interface probe should be used to check for the presence of light non-aqueous phase liquid (LNAPL) prior to sampling, and also to determine depth to water measurements.
11. Use of a multi-parameter instrument capable of measuring pH, oxidation/reduction potential (ORP), dissolved oxygen (DO), specific conductance, temperature, and coupled with a flow-through-cell is required when measuring all indicator field parameters, except turbidity. Turbidity is collected using a separate instrument. Record equipment/instrument identification (manufacturer, and model number). Transparent, small volume flow-through-cells (e.g., 250 mLs or less) are preferred. This allows observation of air bubbles and sediment buildup in the cell, which can interfere with the operation of the monitoring instrument probes, to be easily detected. A small volume cell facilitates rapid turnover of water in the cell between measurements of the indicator field parameters. It is recommended to use a flow-through-cell and monitoring probes from the same manufacturer and model to avoid incompatibility between the probes and flow-throughcell.
12. Turbidity samples are collected before the flow-through-cell. A “T” connector coupled with a valve is connected between the pump’s tubing and flow-through-cell. When a turbidity measurement is required, the valve is opened to allow the

groundwater to flow into a container. The valve is closed and the container sample is then placed in the turbidimeter.

13. Standards are necessary to perform field calibration of instruments. A minimum of two standards are needed to bracket the instrument measurement range for all parameters except ORP which use a Zobell solution as a standard.
14. For dissolved oxygen, a wet sponge used for the 100% saturation and a zero dissolved oxygen solution are used for the calibration.
15. Barometer (used in the calibration of the Dissolved Oxygen probe) and the conversion formula to convert the barometric pressure into the units of measure used by the Dissolved Oxygen meter are needed.
16. Non-phosphate detergent, distilled/deionized water, isopropyl alcohol, etc. can be used to decontaminate dedicated equipment.

Sample Quality Control

To monitor the integrity of field sampling and laboratory procedures, the following quality assurance/quality control (QA/QC) procedures will be adhered to for this effort.

Field QC Samples

Trip Blank: The trip blank accompanies the samples to and from the field, never opened, until all samples are readied for analysis. Its purpose is to assess the potential for in-transit contamination of samples. Trip blanks will be used at a frequency of one per sample delivery group.

Blind Duplicate: A duplicate sample taken in the field from the same location as the original sample to ascertain sampling precision but it is given another name so it is not identified with any field duplicate, again to test precision. Trip blanks will be used at a frequency of one per 20 samples.

Lab QC Samples

Method Blank (MB): A method blank is an analyte-free matrix (water, soil, etc.) subjected to the entire analytical process to demonstrate that the analytical system itself does not introduce contamination. The method blank results should be below the Method Reporting Limit (MRL) or, if required for DoD projects, < ½ MRL for the analytes being tested. A method blank is included with the analysis of every sample preparation batch, every 20 samples, or as stated in the method, whichever is more frequent.

Matrix Spike/Matrix Spike Duplicate (MS/MSD): The matrix spike/matrix duplicate is a known amount of a compound similar chemically to the target analyte is added to samples to ascertain any matrix effects on recoveries and to determine the accuracy and precision of the method in this matrix. MS/MSDs will be used at a frequency of one per 20 samples.

Laboratory Control Sample (LCS): A laboratory control sample is a well-characterized sample of known analytes and concentration. A reference material containing certified amounts of target analytes, may be used as an LCS. An LCS is prepared and analyzed at a minimum frequency of one per 20 samples, with every analytical batch or as stated in the method, whichever is more frequent. The LCS sample is prepared and analyzed in exactly the same manner as the field samples. The percent recovery of the target analytes in the LCS is compared to established control limits and assists in determining whether the methodology is in control and whether the laboratory is capable of making accurate and precise measurements at the required reporting limit. Comparison of batch-to-batch LCS analyses enables the laboratory to evaluate batch-to-batch precision and accuracy.

Surrogates: Surrogates are organic compounds that are similar in chemical composition and behavior to the analytes of interest, but are not normally found in environmental samples. Depending on the analytical method, one or more of these compounds is added to method blanks, calibration and check standards, and samples prior to extraction and analysis. Samples include duplicates, matrix spike samples, duplicate matrix spike samples and laboratory control samples. This is done in order to monitor the method performance on each sample. The percent recovery is calculated for each surrogate, and the recovery is a measurement of the overall method performance.

Initial (or independent) calibration verification standards (ICVs): Initial (or independent) calibration verification standards are standards that are analyzed after calibration with newly prepared standards but prior to sample analysis, in order to verify the validity and accuracy of the standards used in the calibration. Once it is determined that there is not a reference material defect or systematic error in preparation of the calibration standards, the newly prepared standards are considered valid and may be used for subsequent calibrations and quantitative determinations (as expiration dates and methods allow). The ICV standards are prepared from materials obtained from a source independent from the one used for preparing the calibration standards ("second-source"). ICVs are also analyzed in accordance with method-specific requirements.

Continuing calibration verification standards (CCVs): Continuing calibration verification standards are midrange standards that are analyzed in order to verify that the calibration of the analytical system is still acceptable. The frequency of CCV analysis is either once every ten samples, or as indicated in the method.

SVE Sampling

For the first month following SVE system start up, PID readings will be collected using Tedlar bags on a weekly basis. Following the initial month of system operation, these readings will be continued on a monthly basis as long as the system is in operation. The monthly Site visits will include SVE system gauge readings and Site cover inspection.

In order to gauge VOC recovery rates associated with the SVE system, samples will be collected from the sampling port located on the discharge piping of the system on a annual basis. Samples will be collected utilizing a Tedlar air bag and will be submitted to an Environmental Laboratory Accreditation Program (ELAP-accredited) laboratory analysis of VOCs via EPA Method TO-15.

APPENDIX L

WASTE MANIFEST AND NYSDEC CONTAIN-IN LETTER

EnviroTrac
Environmental Services

October 3, 2018

Mr. Henry Wilkie
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, New York 12233-7015

Re: **1199 Sutter Avenue**
Brooklyn, NY
BCP Site No. 224141

Dear Mr. Wilkie:

EnviroTrac Ltd. requests permission to properly dispose of six (6) 55-gallon drum of drill cuttings as non-hazardous waste. The drill cuttings were generated during the installation of soil vapor extraction and air sparge wells at the above-referenced site by EnviroTrac Ltd. The primary contaminant detected in the soil and groundwater at the property is tetrachloroethylene. A composite soil sample was collected from the drums and laboratory analyzed for volatile organic compounds by USEPA Method 8260, semi-volatile organic compounds (SVOCs) by USEPA Method 8270, and Toxicity Characteristic Leaching Procedure (TCLP) metals. The laboratory report for the soil sample is provided as Attachment A.

Should you have any questions, please feel free to contact me.

Sincerely,
EnviroTrac Ltd.

Tracy Wall
Project Manager

ATTACHMENT A

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

October 03, 2018

Tracy Wall
Envirotrac Ltd.
5 Old Dock Rd.
Yaphank, NY 11980

RE: Project: SUTTER AVE - 9/18
Pace Project No.: 7065707

Dear Tracy Wall:
Enclosed are the analytical results for sample(s) received by the laboratory on September 21, 2018. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

John D. Stanton
john.stanton@pacelabs.com
(631)694-3040
Project Manager

Enclosures

cc: Ms. Crystal Bakewicz, Envirotrac
Priscilla Dejesus, Envirotrac
Mr. Ed Russo, Envirotrac

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

CERTIFICATIONS

Project: SUTTER AVE - 9/18
Pace Project No.: 7065707

Long Island Certification IDs

575 Broad Hollow Rd, Melville, NY 11747
New York Certification #: 10478 Primary Accrediting Body
New Jersey Certification #: NY158
Pennsylvania Certification #: 68-00350
Connecticut Certification #: PH-0435
Maryland Certification #: 208
Rhode Island Certification #: LAO00340
Massachusetts Certification #: M-NY026
New Hampshire Certification #: 2987

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

SAMPLE ANALYTE COUNT

Project: SUTTER AVE - 9/18
Pace Project No.: 7065707

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
7065707001	**DRUM COMPOISTE 9-18-18**	EPA 6010C	JMW	7	PACE-MV
		EPA 7470A	SK2	1	PACE-MV
		EPA 8270D	MLM	72	PACE-MV
		EPA 8260C	BBL	70	PACE-MV
		ASTM D2216-92M	KM1	1	PACE-MV

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

ANALYTICAL RESULTS

Project: SUTTER AVE - 9/18
Pace Project No.: 7065707

Sample: DRUM COMPOISTE 9-18-18 **Lab ID: 7065707001** Collected: 09/18/18 15:00 Received: 09/21/18 15:55 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.
Comments: • Sample not collected according to EPA Method 5035A low level specifications. Results may be biased low.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, TCLP	Analytical Method: EPA 6010C Preparation Method: EPA 3005A Leachate Method/Date: EPA 1311; 09/24/18 21:28							
Arsenic	**<0.50**	mg/L	0.50	1	09/26/18 09:45	09/26/18 22:11	7440-38-2	
Barium	**<5.0**	mg/L	5.0	1	09/26/18 09:45	09/26/18 22:11	7440-39-3	
Cadmium	**<0.050**	mg/L	0.050	1	09/26/18 09:45	09/26/18 22:11	7440-43-9	
Chromium	**<0.50**	mg/L	0.50	1	09/26/18 09:45	09/26/18 22:11	7440-47-3	
Lead	**<0.50**	mg/L	0.50	1	09/26/18 09:45	09/26/18 22:11	7439-92-1	
Selenium	**<0.050**	mg/L	0.050	1	09/26/18 09:45	09/26/18 22:11	7782-49-2	
Silver	**<0.50**	mg/L	0.50	1	09/26/18 09:45	09/26/18 22:11	7440-22-4	
7470 Mercury, TCLP	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Leachate Method/Date: EPA 1311; 09/24/18 21:28							
Mercury	**<0.00020**	mg/L	0.00020	1	09/26/18 10:25	09/27/18 11:22	7439-97-6	
8270 MSSV	Analytical Method: EPA 8270D Preparation Method: EPA 3545A							
Acenaphthene	**<729**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	83-32-9	
Acenaphthylene	**<729**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	208-96-8	
Anthracene	**<729**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	120-12-7	M6,R1
Benzo(a)anthracene	**2480**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	56-55-3	M6,R1
Benzo(a)pyrene	**2470**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	50-32-8	M6,R1
Benzo(b)fluoranthene	**3370**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	205-99-2	M6,R1
Benzo(g,h,i)perylene	**1910**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	191-24-2	CH,M6
Benzo(k)fluoranthene	**1600**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	207-08-9	M6,R1
4-Bromophenylphenyl ether	**<729**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	101-55-3	
Butylbenzylphthalate	**<729**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	85-68-7	
Carbazole	**<729**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	86-74-8	
4-Chloro-3-methylphenol	**<729**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	59-50-7	
4-Chloroaniline	**<3590**	ug/kg	3590	10	09/26/18 13:13	09/27/18 20:13	106-47-8	
bis(2-Chloroethoxy)methane	**<729**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	111-91-1	
bis(2-Chloroethyl) ether	**<729**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	111-44-4	
2-Chloronaphthalene	**<729**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	91-58-7	
2-Chlorophenol	**<729**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	95-57-8	
4-Chlorophenylphenyl ether	**<729**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	7005-72-3	
Chrysene	**2800**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	218-01-9	M6,R1
Dibenz(a,h)anthracene	**<729**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	53-70-3	M6
Dibenzofuran	**<729**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	132-64-9	
1,2-Dichlorobenzene	**<729**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	95-50-1	
1,3-Dichlorobenzene	**<729**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	541-73-1	
1,4-Dichlorobenzene	**<729**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	106-46-7	
3,3'-Dichlorobenzidine	**<3590**	ug/kg	3590	10	09/26/18 13:13	09/27/18 20:13	91-94-1	
2,4-Dichlorophenol	**<729**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	120-83-2	
Diethylphthalate	**<729**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	84-66-2	
2,4-Dimethylphenol	**<729**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	105-67-9	
Dimethylphthalate	**<729**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	131-11-3	
Di-n-butylphthalate	**<729**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	84-74-2	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

ANALYTICAL RESULTS

Project: SUTTER AVE - 9/18
Pace Project No.: 7065707

Sample: DRUM COMPOISTE 9-18-18 **Lab ID: 7065707001** Collected: 09/18/18 15:00 Received: 09/21/18 15:55 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.
Comments: • Sample not collected according to EPA Method 5035A low level specifications. Results may be biased low.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8270 MSSV	Analytical Method: EPA 8270D		Preparation Method: EPA 3545A					
4,6-Dinitro-2-methylphenol	**<7290**	ug/kg	7290	10	09/26/18 13:13	09/27/18 20:13	534-52-1	
2,4-Dinitrophenol	**<7290**	ug/kg	7290	10	09/26/18 13:13	09/27/18 20:13	51-28-5	M6
2,4-Dinitrotoluene	**<3590**	ug/kg	3590	10	09/26/18 13:13	09/27/18 20:13	121-14-2	
2,6-Dinitrotoluene	**<3590**	ug/kg	3590	10	09/26/18 13:13	09/27/18 20:13	606-20-2	
Di-n-octylphthalate	**<729**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	117-84-0	M6
bis(2-Ethylhexyl)phthalate	**<729**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	117-81-7	
Fluoranthene	**4720**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	206-44-0	M6,R1
Fluorene	**<729**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	86-73-7	R1
Hexachloro-1,3-butadiene	**<729**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	87-68-3	
Hexachlorobenzene	**<729**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	118-74-1	
Hexachlorocyclopentadiene	**<3590**	ug/kg	3590	10	09/26/18 13:13	09/27/18 20:13	77-47-4	CL,M6
Hexachloroethane	**<729**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	67-72-1	
Indeno(1,2,3-cd)pyrene	**1730**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	193-39-5	M6
Isophorone	**<729**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	78-59-1	
2-Methylnaphthalene	**<729**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	91-57-6	
2-Methylphenol(o-Cresol)	**<729**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	95-48-7	
3&4-Methylphenol(m&p Cresol)	**<729**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13		
Naphthalene	**<729**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	91-20-3	
2-Nitroaniline	**<3590**	ug/kg	3590	10	09/26/18 13:13	09/27/18 20:13	88-74-4	
3-Nitroaniline	**<3590**	ug/kg	3590	10	09/26/18 13:13	09/27/18 20:13	99-09-2	
4-Nitroaniline	**<3590**	ug/kg	3590	10	09/26/18 13:13	09/27/18 20:13	100-01-6	
Nitrobenzene	**<729**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	98-95-3	
2-Nitrophenol	**<3590**	ug/kg	3590	10	09/26/18 13:13	09/27/18 20:13	88-75-5	
4-Nitrophenol	**<7290**	ug/kg	7290	10	09/26/18 13:13	09/27/18 20:13	100-02-7	
N-Nitroso-di-n-propylamine	**<729**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	621-64-7	
N-Nitrosodiphenylamine	**<729**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	86-30-6	
2,2'-Oxybis(1-chloropropane)	**<729**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	108-60-1	CL
Pentachlorophenol	**<7290**	ug/kg	7290	10	09/26/18 13:13	09/27/18 20:13	87-86-5	CL,M6
Phenanthrene	**2520**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	85-01-8	M6,R1
Phenol	**<729**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	108-95-2	
Pyrene	**5390**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	129-00-0	M6,R1
1,2,4-Trichlorobenzene	**<729**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	120-82-1	
2,4,5-Trichlorophenol	**<729**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	95-95-4	
2,4,6-Trichlorophenol	**<729**	ug/kg	729	10	09/26/18 13:13	09/27/18 20:13	88-06-2	
Surrogates								
Nitrobenzene-d5 (S)	54	%	23-120	10	09/26/18 13:13	09/27/18 20:13	4165-60-0	
2-Fluorobiphenyl (S)	70	%	30-115	10	09/26/18 13:13	09/27/18 20:13	321-60-8	
p-Terphenyl-d14 (S)	86	%	18-137	10	09/26/18 13:13	09/27/18 20:13	1718-51-0	
Phenol-d5 (S)	55	%	24-113	10	09/26/18 13:13	09/27/18 20:13	4165-62-2	
2-Fluorophenol (S)	53	%	25-121	10	09/26/18 13:13	09/27/18 20:13	367-12-4	
2,4,6-Tribromophenol (S)	55	%	19-122	10	09/26/18 13:13	09/27/18 20:13	118-79-6	
2-Chlorophenol-d4 (S)	58	%	20-130	10	09/26/18 13:13	09/27/18 20:13	93951-73-6	
1,2-Dichlorobenzene-d4 (S)	55	%	20-130	10	09/26/18 13:13	09/27/18 20:13	2199-69-1	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

ANALYTICAL RESULTS

Project: SUTTER AVE - 9/18
Pace Project No.: 7065707

Sample: DRUM COMPOISTE 9-18-18 **Lab ID: 7065707001** Collected: 09/18/18 15:00 Received: 09/21/18 15:55 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.
Comments: • Sample not collected according to EPA Method 5035A low level specifications. Results may be biased low.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260C MSV 5035A-L Low Level	Analytical Method: EPA 8260C		Preparation Method: EPA 5035A-L					
Acetone	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	67-64-1	
Benzene	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	71-43-2	
Bromobenzene	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	108-86-1	
Bromochloromethane	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	74-97-5	
Bromodichloromethane	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	75-27-4	
Bromoform	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	75-25-2	
Bromomethane	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	74-83-9	
2-Butanone (MEK)	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	78-93-3	
n-Butylbenzene	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	104-51-8	
sec-Butylbenzene	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	135-98-8	
tert-Butylbenzene	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	98-06-6	
Carbon tetrachloride	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	56-23-5	
Chlorobenzene	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	108-90-7	
Chlorodifluoromethane	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	75-45-6	N3
Chloroethane	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	75-00-3	
Chloroform	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	67-66-3	
Chloromethane	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	74-87-3	IL
2-Chlorotoluene	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	95-49-8	
4-Chlorotoluene	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	106-43-4	
1,2-Dibromo-3-chloropropane	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	96-12-8	
Dibromochloromethane	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	124-48-1	
1,2-Dibromoethane (EDB)	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	106-93-4	
Dibromomethane	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	74-95-3	
1,2-Dichlorobenzene	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	95-50-1	
1,3-Dichlorobenzene	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	541-73-1	
1,4-Dichlorobenzene	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	106-46-7	
Dichlorodifluoromethane	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	75-71-8	
1,1-Dichloroethane	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	75-34-3	
1,2-Dichloroethane	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	107-06-2	
1,1-Dichloroethene	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	75-35-4	
cis-1,2-Dichloroethene	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	156-59-2	
trans-1,2-Dichloroethene	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	156-60-5	
1,2-Dichloropropane	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	78-87-5	
1,3-Dichloropropane	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	142-28-9	
2,2-Dichloropropane	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	594-20-7	
1,1-Dichloropropene	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	563-58-6	
cis-1,3-Dichloropropene	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	10061-01-5	
trans-1,3-Dichloropropene	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	10061-02-6	
Ethylbenzene	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	100-41-4	
Hexachloro-1,3-butadiene	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	87-68-3	
Isopropylbenzene (Cumene)	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	98-82-8	
p-Isopropyltoluene	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	99-87-6	
Methylene Chloride	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	108-10-1	

Pace Analytical Services, LLC
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(631)694-3040

ANALYTICAL RESULTS

Project: SUTTER AVE - 9/18
Pace Project No.: 7065707

Sample: DRUM COMPOISTE 9-18-18 **Lab ID: 7065707001** Collected: 09/18/18 15:00 Received: 09/21/18 15:55 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.
Comments: • Sample not collected according to EPA Method 5035A low level specifications. Results may be biased low.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260C MSV 5035A-L Low Level	Analytical Method: EPA 8260C	Preparation Method: EPA 5035A-L						
Methyl-tert-butyl ether	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	1634-04-4	
Naphthalene	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	91-20-3	
n-Propylbenzene	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	103-65-1	
Styrene	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	100-42-5	
1,1,1,2-Tetrachloroethane	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	630-20-6	
1,1,2,2-Tetrachloroethane	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	79-34-5	
Tetrachloroethene	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	127-18-4	
1,2,4,5-tetramethylbenzene	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	95-93-2	N3
Toluene	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	108-88-3	
1,2,3-Trichlorobenzene	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	87-61-6	
1,2,4-Trichlorobenzene	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	120-82-1	
1,1,1-Trichloroethane	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	71-55-6	
1,1,2-Trichloroethane	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	79-00-5	
Trichloroethene	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	79-01-6	
Trichlorofluoromethane	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	75-69-4	
1,2,3-Trichloropropane	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	76-13-1	
1,2,4-Trimethylbenzene	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	95-63-6	
1,3,5-Trimethylbenzene	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	108-67-8	
Vinyl chloride	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	75-01-4	
Xylene (Total)	**<4.3**	ug/kg	4.3	1	10/02/18 08:36	10/02/18 11:47	1330-20-7	
m&p-Xylene	**<4.3**	ug/kg	4.3	1	10/02/18 08:36	10/02/18 11:47	179601-23-1	
o-Xylene	**<2.1**	ug/kg	2.1	1	10/02/18 08:36	10/02/18 11:47	95-47-6	
Surrogates								
Toluene-d8 (S)	105	%	43-157	1	10/02/18 08:36	10/02/18 11:47	2037-26-5	
4-Bromofluorobenzene (S)	109	%	34-145	1	10/02/18 08:36	10/02/18 11:47	460-00-4	
1,2-Dichloroethane-d4 (S)	142	%	33-150	1	10/02/18 08:36	10/02/18 11:47	17060-07-0	CH
Percent Moisture	Analytical Method: ASTM D2216-92M							
Percent Moisture	**8.8**	%	0.10	1		09/25/18 16:25		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

QUALITY CONTROL DATA

Project: SUTTER AVE - 9/18
Pace Project No.: 7065707

QC Batch: 84537 Analysis Method: EPA 7470A
QC Batch Method: EPA 7470A Analysis Description: 7470 Mercury TCLP
Associated Lab Samples: 7065707001

METHOD BLANK: 388820 Matrix: Water
Associated Lab Samples: 7065707001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	<0.00020	0.00020	09/27/18 11:15	

METHOD BLANK: 387736 Matrix: Water
Associated Lab Samples: 7065707001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	<0.00020	0.00020	09/27/18 11:18	

LABORATORY CONTROL SAMPLE: 388821

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.001	0.0011	115	80-120	

MATRIX SPIKE SAMPLE: 388822

Parameter	Units	7065551010 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	<0.00020	.001	0.0011	93	75-125	

SAMPLE DUPLICATE: 388823

Parameter	Units	7065551010 Result	Dup Result	RPD	Qualifiers
Mercury	mg/L	<0.00020	<0.00020		

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

QUALITY CONTROL DATA

Project: SUTTER AVE - 9/18
Pace Project No.: 7065707

QC Batch: 84535
QC Batch Method: EPA 3005A
Associated Lab Samples: 7065707001

Analysis Method: EPA 6010C
Analysis Description: 6010 MET TCLP

METHOD BLANK: 388812 Matrix: Water
Associated Lab Samples: 7065707001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/L	<0.50	0.50	09/26/18 21:53	
Barium	mg/L	<5.0	5.0	09/26/18 21:53	
Cadmium	mg/L	<0.050	0.050	09/26/18 21:53	
Chromium	mg/L	<0.50	0.50	09/26/18 21:53	
Lead	mg/L	<0.50	0.50	09/26/18 21:53	
Selenium	mg/L	<0.050	0.050	09/26/18 21:53	
Silver	mg/L	<0.50	0.50	09/26/18 21:53	

LABORATORY CONTROL SAMPLE: 388813

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	.5	0.51	102	80-120	
Barium	mg/L	.5	<5.0	101	80-120	
Cadmium	mg/L	.05	0.053	106	80-120	
Chromium	mg/L	.25	<0.50	108	80-120	
Lead	mg/L	.5	0.51	102	80-120	
Selenium	mg/L	.75	0.75	100	80-120	
Silver	mg/L	.25	<0.50	102	80-120	

MATRIX SPIKE SAMPLE: 388815

Parameter	Units	7065707001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	<0.50	.5	0.51	102	75-125	
Barium	mg/L	<5.0	.5	<5.0	98	75-125	
Cadmium	mg/L	<0.050	.05	0.054	100	75-125	
Chromium	mg/L	<0.50	.25	<0.50	101	75-125	
Lead	mg/L	<0.50	.5	0.70	96	75-125	
Selenium	mg/L	<0.050	.75	0.78	104	75-125	
Silver	mg/L	<0.50	.25	<0.50	117	75-125	

SAMPLE DUPLICATE: 388814

Parameter	Units	7065707001 Result	Dup Result	RPD	Qualifiers
Arsenic	mg/L	<0.50	<0.50		
Barium	mg/L	<5.0	<5.0		
Cadmium	mg/L	<0.050	<0.050		
Chromium	mg/L	<0.50	<0.50		

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

QUALITY CONTROL DATA

Project: SUTTER AVE - 9/18
Pace Project No.: 7065707

SAMPLE DUPLICATE: 388814

Parameter	Units	7065707001 Result	Dup Result	RPD	Qualifiers
Lead	mg/L	<0.50	<0.50		
Selenium	mg/L	<0.050	<0.050		
Silver	mg/L	<0.50	<0.50		

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

QUALITY CONTROL DATA

Project: SUTTER AVE - 9/18
Pace Project No.: 7065707

QC Batch: 85340 Analysis Method: EPA 8260C
QC Batch Method: EPA 5035A-L Analysis Description: 8260 MSV 5035A-L Low Level
Associated Lab Samples: 7065707001

METHOD BLANK: 392285 Matrix: Solid
Associated Lab Samples: 7065707001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	ug/kg	<2.0	2.0	10/02/18 09:18	
1,1,1-Trichloroethane	ug/kg	<2.0	2.0	10/02/18 09:18	
1,1,2,2-Tetrachloroethane	ug/kg	<2.0	2.0	10/02/18 09:18	
1,1,2-Trichloroethane	ug/kg	<2.0	2.0	10/02/18 09:18	
1,1,2-Trichlorotrifluoroethane	ug/kg	<2.0	2.0	10/02/18 09:18	
1,1-Dichloroethane	ug/kg	<2.0	2.0	10/02/18 09:18	
1,1-Dichloroethene	ug/kg	<2.0	2.0	10/02/18 09:18	
1,1-Dichloropropene	ug/kg	<2.0	2.0	10/02/18 09:18	
1,2,3-Trichlorobenzene	ug/kg	<2.0	2.0	10/02/18 09:18	
1,2,3-Trichloropropane	ug/kg	<2.0	2.0	10/02/18 09:18	
1,2,4,5-tetramethylbenzene	ug/kg	<2.0	2.0	10/02/18 09:18	N3
1,2,4-Trichlorobenzene	ug/kg	<2.0	2.0	10/02/18 09:18	
1,2,4-Trimethylbenzene	ug/kg	<2.0	2.0	10/02/18 09:18	
1,2-Dibromo-3-chloropropane	ug/kg	<2.0	2.0	10/02/18 09:18	
1,2-Dibromoethane (EDB)	ug/kg	<2.0	2.0	10/02/18 09:18	
1,2-Dichlorobenzene	ug/kg	<2.0	2.0	10/02/18 09:18	
1,2-Dichloroethane	ug/kg	<2.0	2.0	10/02/18 09:18	
1,2-Dichloropropane	ug/kg	<2.0	2.0	10/02/18 09:18	
1,3,5-Trimethylbenzene	ug/kg	<2.0	2.0	10/02/18 09:18	
1,3-Dichlorobenzene	ug/kg	<2.0	2.0	10/02/18 09:18	
1,3-Dichloropropane	ug/kg	<2.0	2.0	10/02/18 09:18	
1,4-Dichlorobenzene	ug/kg	<2.0	2.0	10/02/18 09:18	
2,2-Dichloropropane	ug/kg	<2.0	2.0	10/02/18 09:18	
2-Butanone (MEK)	ug/kg	<2.0	2.0	10/02/18 09:18	
2-Chlorotoluene	ug/kg	<2.0	2.0	10/02/18 09:18	
4-Chlorotoluene	ug/kg	<2.0	2.0	10/02/18 09:18	
4-Methyl-2-pentanone (MIBK)	ug/kg	<2.0	2.0	10/02/18 09:18	
Acetone	ug/kg	<2.0	2.0	10/02/18 09:18	
Benzene	ug/kg	<2.0	2.0	10/02/18 09:18	
Bromobenzene	ug/kg	<2.0	2.0	10/02/18 09:18	
Bromochloromethane	ug/kg	<2.0	2.0	10/02/18 09:18	
Bromodichloromethane	ug/kg	<2.0	2.0	10/02/18 09:18	
Bromoform	ug/kg	<2.0	2.0	10/02/18 09:18	
Bromomethane	ug/kg	<2.0	2.0	10/02/18 09:18	
Carbon tetrachloride	ug/kg	<2.0	2.0	10/02/18 09:18	
Chlorobenzene	ug/kg	<2.0	2.0	10/02/18 09:18	
Chlorodifluoromethane	ug/kg	<2.0	2.0	10/02/18 09:18	N3
Chloroethane	ug/kg	<2.0	2.0	10/02/18 09:18	
Chloroform	ug/kg	<2.0	2.0	10/02/18 09:18	
Chloromethane	ug/kg	<2.0	2.0	10/02/18 09:18	IL
cis-1,2-Dichloroethene	ug/kg	<2.0	2.0	10/02/18 09:18	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

QUALITY CONTROL DATA

Project: SUTTER AVE - 9/18
Pace Project No.: 7065707

METHOD BLANK: 392285 Matrix: Solid
Associated Lab Samples: 7065707001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
cis-1,3-Dichloropropene	ug/kg	<2.0	2.0	10/02/18 09:18	
Dibromochloromethane	ug/kg	<2.0	2.0	10/02/18 09:18	
Dibromomethane	ug/kg	<2.0	2.0	10/02/18 09:18	
Dichlorodifluoromethane	ug/kg	<2.0	2.0	10/02/18 09:18	
Ethylbenzene	ug/kg	<2.0	2.0	10/02/18 09:18	
Hexachloro-1,3-butadiene	ug/kg	<2.0	2.0	10/02/18 09:18	
Isopropylbenzene (Cumene)	ug/kg	<2.0	2.0	10/02/18 09:18	
m&p-Xylene	ug/kg	<4.0	4.0	10/02/18 09:18	
Methyl-tert-butyl ether	ug/kg	<2.0	2.0	10/02/18 09:18	
Methylene Chloride	ug/kg	<2.0	2.0	10/02/18 09:18	
n-Butylbenzene	ug/kg	<2.0	2.0	10/02/18 09:18	
n-Propylbenzene	ug/kg	<2.0	2.0	10/02/18 09:18	
Naphthalene	ug/kg	<2.0	2.0	10/02/18 09:18	
o-Xylene	ug/kg	<2.0	2.0	10/02/18 09:18	
p-Isopropyltoluene	ug/kg	<2.0	2.0	10/02/18 09:18	
sec-Butylbenzene	ug/kg	<2.0	2.0	10/02/18 09:18	
Styrene	ug/kg	<2.0	2.0	10/02/18 09:18	
tert-Butylbenzene	ug/kg	<2.0	2.0	10/02/18 09:18	
Tetrachloroethene	ug/kg	<2.0	2.0	10/02/18 09:18	
Toluene	ug/kg	<2.0	2.0	10/02/18 09:18	
trans-1,2-Dichloroethene	ug/kg	<2.0	2.0	10/02/18 09:18	
trans-1,3-Dichloropropene	ug/kg	<2.0	2.0	10/02/18 09:18	
Trichloroethene	ug/kg	<2.0	2.0	10/02/18 09:18	
Trichlorofluoromethane	ug/kg	<2.0	2.0	10/02/18 09:18	
Vinyl chloride	ug/kg	<2.0	2.0	10/02/18 09:18	
Xylene (Total)	ug/kg	<4.0	4.0	10/02/18 09:18	
1,2-Dichloroethane-d4 (S)	%	149	33-150	10/02/18 09:18	
4-Bromofluorobenzene (S)	%	117	34-145	10/02/18 09:18	
Toluene-d8 (S)	%	104	43-157	10/02/18 09:18	

LABORATORY CONTROL SAMPLE: 392286

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/kg	50.6	51.1	101	74-140	
1,1,1-Trichloroethane	ug/kg	50.6	54.1	107	59-134	CH
1,1,2,2-Tetrachloroethane	ug/kg	50.6	36.5	72	69-132	
1,1,2-Trichloroethane	ug/kg	50.6	43.6	86	73-135	
1,1,2-Trichlorotrifluoroethane	ug/kg	50.6	40.9	81	45-156	
1,1-Dichloroethane	ug/kg	50.6	40.2	79	53-160	
1,1-Dichloroethene	ug/kg	50.6	38.0	75	47-152	
1,1-Dichloropropene	ug/kg	50.6	49.5	98	56-130	
1,2,3-Trichlorobenzene	ug/kg	50.6	60.2	119	48-144	CH
1,2,3-Trichloropropane	ug/kg	50.6	41.0	81	67-129	
1,2,4,5-tetramethylbenzene	ug/kg	50.6	48.4	96	60-142	N3

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

QUALITY CONTROL DATA

Project: SUTTER AVE - 9/18
Pace Project No.: 7065707

LABORATORY CONTROL SAMPLE: 392286

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2,4-Trichlorobenzene	ug/kg	50.6	56.3	111	52-140	CH
1,2,4-Trimethylbenzene	ug/kg	50.6	39.9	79	59-126	
1,2-Dibromo-3-chloropropane	ug/kg	50.6	47.1	93	57-140	
1,2-Dibromoethane (EDB)	ug/kg	50.6	45.5	90	76-138	
1,2-Dichlorobenzene	ug/kg	50.6	47.1	93	67-125	
1,2-Dichloroethane	ug/kg	50.6	48.0	95	65-143	
1,2-Dichloropropane	ug/kg	50.6	45.5	90	72-131	
1,3,5-Trimethylbenzene	ug/kg	50.6	43.7	86	49-134	
1,3-Dichlorobenzene	ug/kg	50.6	48.8	96	64-124	
1,3-Dichloropropane	ug/kg	50.6	44.1	87	73-130	
1,4-Dichlorobenzene	ug/kg	50.6	48.2	95	61-127	
2,2-Dichloropropane	ug/kg	50.6	46.3	91	55-140	
2-Butanone (MEK)	ug/kg	50.6	49.4	98	52-164	
2-Chlorotoluene	ug/kg	50.6	44.1	87	62-125	
4-Chlorotoluene	ug/kg	50.6	44.3	88	62-125	
4-Methyl-2-pentanone (MIBK)	ug/kg	50.6	46.7	92	63-154	
Acetone	ug/kg	50.6	54.5	108	23-196	
Benzene	ug/kg	50.6	45.2	89	65-129	
Bromobenzene	ug/kg	50.6	45.7	90	63-130	
Bromochloromethane	ug/kg	50.6	41.2	81	78-136	
Bromodichloromethane	ug/kg	50.6	51.2	101	74-141	CH
Bromoform	ug/kg	50.6	57.9	114	59-136	CH
Bromomethane	ug/kg	50.6	49.5	98	32-182	
Carbon tetrachloride	ug/kg	50.6	59.5	117	57-135	CH
Chlorobenzene	ug/kg	50.6	47.7	94	62-136	
Chlorodifluoromethane	ug/kg	50.6	38.3	76	14-161	N3
Chloroethane	ug/kg	50.6	35.5	70	50-159	
Chloroform	ug/kg	50.6	43.9	87	71-135	
Chloromethane	ug/kg	50.6	37.4	74	44-139	IL
cis-1,2-Dichloroethene	ug/kg	50.6	38.8	77	75-130	
cis-1,3-Dichloropropene	ug/kg	50.6	47.9	95	74-140	
Dibromochloromethane	ug/kg	50.6	51.2	101	71-133	CH
Dibromomethane	ug/kg	50.6	49.1	97	75-136	
Dichlorodifluoromethane	ug/kg	50.6	41.5	82	10-155	
Ethylbenzene	ug/kg	50.6	44.5	88	59-135	
Hexachloro-1,3-butadiene	ug/kg	50.6	61.0	121	19-152	CH
Isopropylbenzene (Cumene)	ug/kg	50.6	43.0	85	56-129	
m&p-Xylene	ug/kg	101	89.9	89	69-133	
Methyl-tert-butyl ether	ug/kg	50.6	40.4	80	25-171	
Methylene Chloride	ug/kg	50.6	34.3	68	50-164	
n-Butylbenzene	ug/kg	50.6	47.0	93	54-121	
n-Propylbenzene	ug/kg	50.6	43.8	87	56-125	
Naphthalene	ug/kg	50.6	48.5	96	55-145	
o-Xylene	ug/kg	50.6	45.6	90	71-135	
p-Isopropyltoluene	ug/kg	50.6	48.5	96	54-126	
sec-Butylbenzene	ug/kg	50.6	46.8	93	50-126	
Styrene	ug/kg	50.6	48.0	95	73-133	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

QUALITY CONTROL DATA

Project: SUTTER AVE - 9/18
Pace Project No.: 7065707

LABORATORY CONTROL SAMPLE: 392286

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
tert-Butylbenzene	ug/kg	50.6	45.8	90	56-127	
Tetrachloroethene	ug/kg	50.6	53.1	105	10-176	
Toluene	ug/kg	50.6	44.3	88	66-131	
trans-1,2-Dichloroethene	ug/kg	50.6	38.8	77	53-157	
trans-1,3-Dichloropropene	ug/kg	50.6	49.9	99	66-144	
Trichloroethene	ug/kg	50.6	49.6	98	62-130	
Trichlorofluoromethane	ug/kg	50.6	39.8	79	38-166	
Vinyl chloride	ug/kg	50.6	35.3	70	45-137	
Xylene (Total)	ug/kg	152	136	89	62-135	
1,2-Dichloroethane-d4 (S)	%			135	33-150	CH
4-Bromofluorobenzene (S)	%			117	34-145	
Toluene-d8 (S)	%			112	43-157	

MATRIX SPIKE SAMPLE: 392287

Parameter	Units	7065707001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/kg	<2.1	56.2	58.7	104	74-140	
1,1,1-Trichloroethane	ug/kg	<2.1	56.2	68.6	122	59-134	CH
1,1,2,2-Tetrachloroethane	ug/kg	<2.1	56.2	44.9	80	69-132	
1,1,2-Trichloroethane	ug/kg	<2.1	56.2	47.8	85	73-135	
1,1,2-Trichlorotrifluoroethane	ug/kg	<2.1	56.2	51.5	92	45-156	
1,1-Dichloroethane	ug/kg	<2.1	56.2	49.2	88	53-160	
1,1-Dichloroethene	ug/kg	<2.1	56.2	47.0	84	47-152	
1,1-Dichloropropene	ug/kg	<2.1	56.2	60.1	107	56-130	
1,2,3-Trichlorobenzene	ug/kg	<2.1	56.2	50.5	90	48-144	CH
1,2,3-Trichloropropane	ug/kg	<2.1	56.2	51.2	91	67-129	
1,2,4,5-tetramethylbenzene	ug/kg	<2.1	56.2	51.1	91	60-142	N3
1,2,4-Trichlorobenzene	ug/kg	<2.1	56.2	47.0	84	52-140	CH
1,2,4-Trimethylbenzene	ug/kg	<2.1	56.2	47.6	85	59-126	
1,2-Dibromo-3-chloropropane	ug/kg	<2.1	56.2	53.3	95	57-140	
1,2-Dibromoethane (EDB)	ug/kg	<2.1	56.2	53.2	95	76-138	
1,2-Dichlorobenzene	ug/kg	<2.1	56.2	50.1	89	67-125	
1,2-Dichloroethane	ug/kg	<2.1	56.2	57.2	102	65-143	
1,2-Dichloropropane	ug/kg	<2.1	56.2	53.8	96	72-131	
1,3,5-Trimethylbenzene	ug/kg	<2.1	56.2	52.4	93	49-134	
1,3-Dichlorobenzene	ug/kg	<2.1	56.2	51.6	92	64-124	
1,3-Dichloropropane	ug/kg	<2.1	56.2	51.7	92	73-130	
1,4-Dichlorobenzene	ug/kg	<2.1	56.2	50.8	90	61-127	
2,2-Dichloropropane	ug/kg	<2.1	56.2	57.7	103	55-140	
2-Butanone (MEK)	ug/kg	<2.1	56.2	53.9	96	52-164	
2-Chlorotoluene	ug/kg	<2.1	56.2	53.0	94	62-125	
4-Chlorotoluene	ug/kg	<2.1	56.2	51.0	91	62-125	
4-Methyl-2-pentanone (MIBK)	ug/kg	<2.1	56.2	55.8	99	63-154	
Acetone	ug/kg	<2.1	56.2	67.6	120	23-196	
Benzene	ug/kg	<2.1	56.2	53.6	95	65-129	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

QUALITY CONTROL DATA

Project: SUTTER AVE - 9/18
Pace Project No.: 7065707

MATRIX SPIKE SAMPLE: 392287

Parameter	Units	7065707001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Bromobenzene	ug/kg	<2.1	56.2	53.3	95	63-130	
Bromochloromethane	ug/kg	<2.1	56.2	49.9	89	78-136	
Bromodichloromethane	ug/kg	<2.1	56.2	59.9	107	74-141	CH
Bromoform	ug/kg	<2.1	56.2	67.1	119	59-136	CH
Bromomethane	ug/kg	<2.1	56.2	63.2	112	32-182	
Carbon tetrachloride	ug/kg	<2.1	56.2	75.5	134	57-135	CH
Chlorobenzene	ug/kg	<2.1	56.2	50.9	91	62-136	
Chlorodifluoromethane	ug/kg	<2.1	56.2	51.9	92	14-161	N3
Chloroethane	ug/kg	<2.1	56.2	43.9	78	50-159	
Chloroform	ug/kg	<2.1	56.2	54.0	96	71-135	
Chloromethane	ug/kg	<2.1	56.2	46.0	82	44-139	IL
cis-1,2-Dichloroethene	ug/kg	<2.1	56.2	47.4	84	75-130	
cis-1,3-Dichloropropene	ug/kg	<2.1	56.2	54.0	96	74-140	
Dibromochloromethane	ug/kg	<2.1	56.2	58.7	105	71-133	CH
Dibromomethane	ug/kg	<2.1	56.2	54.9	98	75-136	
Dichlorodifluoromethane	ug/kg	<2.1	56.2	54.7	97	10-155	
Ethylbenzene	ug/kg	<2.1	56.2	52.2	93	59-135	
Hexachloro-1,3-butadiene	ug/kg	<2.1	56.2	49.5	88	19-152	CH
Isopropylbenzene (Cumene)	ug/kg	<2.1	56.2	54.0	96	56-129	
m&p-Xylene	ug/kg	<4.3	112	99.5	89	69-133	
Methyl-tert-butyl ether	ug/kg	<2.1	56.2	49.3	88	25-171	
Methylene Chloride	ug/kg	<2.1	56.2	43.5	74	50-164	
n-Butylbenzene	ug/kg	<2.1	56.2	50.3	90	54-121	
n-Propylbenzene	ug/kg	<2.1	56.2	51.3	91	56-125	
Naphthalene	ug/kg	<2.1	56.2	46.1	82	55-145	
o-Xylene	ug/kg	<2.1	56.2	51.5	92	71-135	
p-Isopropyltoluene	ug/kg	<2.1	56.2	54.8	98	54-126	
sec-Butylbenzene	ug/kg	<2.1	56.2	53.7	96	50-126	
Styrene	ug/kg	<2.1	56.2	50.8	90	73-133	
tert-Butylbenzene	ug/kg	<2.1	56.2	52.2	93	56-127	
Tetrachloroethene	ug/kg	<2.1	56.2	86.0	153	10-176	
Toluene	ug/kg	<2.1	56.2	51.6	92	66-131	
trans-1,2-Dichloroethene	ug/kg	<2.1	56.2	48.4	86	53-157	
trans-1,3-Dichloropropene	ug/kg	<2.1	56.2	56.0	100	66-144	
Trichloroethene	ug/kg	<2.1	56.2	58.8	105	62-130	
Trichlorofluoromethane	ug/kg	<2.1	56.2	56.6	101	38-166	
Vinyl chloride	ug/kg	<2.1	56.2	47.2	84	45-137	
Xylene (Total)	ug/kg	<4.3	169	151	90	62-135	
1,2-Dichloroethane-d4 (S)	%				136	33-150	CH
4-Bromofluorobenzene (S)	%				114	34-145	
Toluene-d8 (S)	%				110	43-157	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

QUALITY CONTROL DATA

Project: SUTTER AVE - 9/18
Pace Project No.: 7065707

SAMPLE DUPLICATE: 392288

Parameter	Units	7066403001 Result	Dup Result	RPD	Qualifiers
1,1,1,2-Tetrachloroethane	ug/kg	0.0	<2.2		
1,1,1-Trichloroethane	ug/kg	0.0	<2.2		
1,1,2,2-Tetrachloroethane	ug/kg	0.0	<2.2		
1,1,2-Trichloroethane	ug/kg	0.0	<2.2		
1,1,2-Trichlorotrifluoroethane	ug/kg	0.0	<2.2		
1,1-Dichloroethane	ug/kg	0.0	<2.2		
1,1-Dichloroethene	ug/kg	0.0	<2.2		
1,1-Dichloropropene	ug/kg	0.0	<2.2		
1,2,3-Trichlorobenzene	ug/kg	0.0	<2.2		
1,2,3-Trichloropropane	ug/kg	0.0	<2.2		
1,2,4,5-tetramethylbenzene	ug/kg	1.3	<2.2		N3
1,2,4-Trichlorobenzene	ug/kg	0.0	<2.2		
1,2,4-Trimethylbenzene	ug/kg	0.0	<2.2		
1,2-Dibromo-3-chloropropane	ug/kg	0.0	<2.2		
1,2-Dibromoethane (EDB)	ug/kg	0.0	<2.2		
1,2-Dichlorobenzene	ug/kg	0.0	<2.2		
1,2-Dichloroethane	ug/kg	0.0	<2.2		
1,2-Dichloropropane	ug/kg	0.0	<2.2		
1,3,5-Trimethylbenzene	ug/kg	0.0	<2.2		
1,3-Dichlorobenzene	ug/kg	0.0	<2.2		
1,3-Dichloropropane	ug/kg	0.0	<2.2		
1,4-Dichlorobenzene	ug/kg	0.0	<2.2		
2,2-Dichloropropane	ug/kg	0.0	<2.2		
2-Butanone (MEK)	ug/kg	0.0	<2.2		
2-Chlorotoluene	ug/kg	0.0	<2.2		
4-Chlorotoluene	ug/kg	0.0	<2.2		
4-Methyl-2-pentanone (MIBK)	ug/kg	0.0	<2.2		
Acetone	ug/kg	14.5	11.4	24	D6
Benzene	ug/kg	0.0	<2.2		
Bromobenzene	ug/kg	0.0	<2.2		
Bromochloromethane	ug/kg	0.0	<2.2		
Bromodichloromethane	ug/kg	0.0	<2.2		
Bromoform	ug/kg	0.0	<2.2		
Bromomethane	ug/kg	0.0	<2.2		
Carbon tetrachloride	ug/kg	0.0	<2.2		
Chlorobenzene	ug/kg	0.0	<2.2		
Chlorodifluoromethane	ug/kg	0.0	<2.2		N3
Chloroethane	ug/kg	0.0	<2.2		
Chloroform	ug/kg	0.0	<2.2		
Chloromethane	ug/kg	0.0	<2.2		IL
cis-1,2-Dichloroethene	ug/kg	0.0	<2.2		
cis-1,3-Dichloropropene	ug/kg	0.0	<2.2		
Dibromochloromethane	ug/kg	0.0	<2.2		
Dibromomethane	ug/kg	0.0	<2.2		
Dichlorodifluoromethane	ug/kg	0.0	<2.2		
Ethylbenzene	ug/kg	0.0	<2.2		
Hexachloro-1,3-butadiene	ug/kg	0.0	<2.2		

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

QUALITY CONTROL DATA

Project: SUTTER AVE - 9/18
Pace Project No.: 7065707

SAMPLE DUPLICATE: 392288

Parameter	Units	7066403001 Result	Dup Result	RPD	Qualifiers
Isopropylbenzene (Cumene)	ug/kg	0.0	<2.2		
m&p-Xylene	ug/kg	0.0	<4.5		
Methyl-tert-butyl ether	ug/kg	0.0	<2.2		
Methylene Chloride	ug/kg	2.0	<2.2	24	D6
n-Butylbenzene	ug/kg	0.0	<2.2		
n-Propylbenzene	ug/kg	0.0	<2.2		
Naphthalene	ug/kg	1.6	<2.2		
o-Xylene	ug/kg	0.0	<2.2		
p-Isopropyltoluene	ug/kg	0.0	<2.2		
sec-Butylbenzene	ug/kg	0.0	<2.2		
Styrene	ug/kg	0.0	<2.2		
tert-Butylbenzene	ug/kg	0.0	<2.2		
Tetrachloroethene	ug/kg	0.0	<2.2		
Toluene	ug/kg	0.0	<2.2		
trans-1,2-Dichloroethene	ug/kg	0.0	<2.2		
trans-1,3-Dichloropropene	ug/kg	0.0	<2.2		
Trichloroethene	ug/kg	0.0	<2.2		
Trichlorofluoromethane	ug/kg	0.0	<2.2		
Vinyl chloride	ug/kg	0.0	<2.2		
Xylene (Total)	ug/kg	0.00000000012	<4.5	6	
1,2-Dichloroethane-d4 (S)	%	28700	140	8	
4-Bromofluorobenzene (S)	%	24100	118	8	
Toluene-d8 (S)	%	22700	110	9	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

QUALITY CONTROL DATA

Project: SUTTER AVE - 9/18
Pace Project No.: 7065707

QC Batch: 84545
QC Batch Method: EPA 3545A
Associated Lab Samples: 7065707001

Analysis Method: EPA 8270D
Analysis Description: 8270 Solid MSSV

METHOD BLANK: 388854
Associated Lab Samples: 7065707001

Matrix: Solid

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,2,4-Trichlorobenzene	ug/kg	<67.0	67.0	09/27/18 14:01	
1,2-Dichlorobenzene	ug/kg	<67.0	67.0	09/27/18 14:01	
1,3-Dichlorobenzene	ug/kg	<67.0	67.0	09/27/18 14:01	
1,4-Dichlorobenzene	ug/kg	<67.0	67.0	09/27/18 14:01	
2,2'-Oxybis(1-chloropropane)	ug/kg	<67.0	67.0	09/27/18 14:01	CL
2,4,5-Trichlorophenol	ug/kg	<67.0	67.0	09/27/18 14:01	
2,4,6-Trichlorophenol	ug/kg	<67.0	67.0	09/27/18 14:01	
2,4-Dichlorophenol	ug/kg	<67.0	67.0	09/27/18 14:01	
2,4-Dimethylphenol	ug/kg	<67.0	67.0	09/27/18 14:01	
2,4-Dinitrophenol	ug/kg	<670	670	09/27/18 14:01	
2,4-Dinitrotoluene	ug/kg	<330	330	09/27/18 14:01	
2,6-Dinitrotoluene	ug/kg	<330	330	09/27/18 14:01	
2-Chloronaphthalene	ug/kg	<67.0	67.0	09/27/18 14:01	
2-Chlorophenol	ug/kg	<67.0	67.0	09/27/18 14:01	
2-Methylnaphthalene	ug/kg	<67.0	67.0	09/27/18 14:01	
2-Methylphenol(o-Cresol)	ug/kg	<67.0	67.0	09/27/18 14:01	
2-Nitroaniline	ug/kg	<330	330	09/27/18 14:01	
2-Nitrophenol	ug/kg	<330	330	09/27/18 14:01	
3&4-Methylphenol(m&p Cresol)	ug/kg	<67.0	67.0	09/27/18 14:01	
3,3'-Dichlorobenzidine	ug/kg	<330	330	09/27/18 14:01	
3-Nitroaniline	ug/kg	<330	330	09/27/18 14:01	
4,6-Dinitro-2-methylphenol	ug/kg	<670	670	09/27/18 14:01	
4-Bromophenylphenyl ether	ug/kg	<67.0	67.0	09/27/18 14:01	
4-Chloro-3-methylphenol	ug/kg	<67.0	67.0	09/27/18 14:01	
4-Chloroaniline	ug/kg	<330	330	09/27/18 14:01	
4-Chlorophenylphenyl ether	ug/kg	<67.0	67.0	09/27/18 14:01	
4-Nitroaniline	ug/kg	<330	330	09/27/18 14:01	
4-Nitrophenol	ug/kg	<670	670	09/27/18 14:01	
Acenaphthene	ug/kg	<67.0	67.0	09/27/18 14:01	
Acenaphthylene	ug/kg	<67.0	67.0	09/27/18 14:01	
Anthracene	ug/kg	<67.0	67.0	09/27/18 14:01	
Benzo(a)anthracene	ug/kg	<67.0	67.0	09/27/18 14:01	
Benzo(a)pyrene	ug/kg	<67.0	67.0	09/27/18 14:01	
Benzo(b)fluoranthene	ug/kg	<67.0	67.0	09/27/18 14:01	
Benzo(g,h,i)perylene	ug/kg	<67.0	67.0	09/27/18 14:01	
Benzo(k)fluoranthene	ug/kg	<67.0	67.0	09/27/18 14:01	
bis(2-Chloroethoxy)methane	ug/kg	<67.0	67.0	09/27/18 14:01	
bis(2-Chloroethyl) ether	ug/kg	<67.0	67.0	09/27/18 14:01	
bis(2-Ethylhexyl)phthalate	ug/kg	<67.0	67.0	09/27/18 14:01	
Butylbenzylphthalate	ug/kg	<67.0	67.0	09/27/18 14:01	
Carbazole	ug/kg	<67.0	67.0	09/27/18 14:01	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

QUALITY CONTROL DATA

Project: SUTTER AVE - 9/18
Pace Project No.: 7065707

METHOD BLANK: 388854 Matrix: Solid
Associated Lab Samples: 7065707001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chrysene	ug/kg	<67.0	67.0	09/27/18 14:01	
Di-n-butylphthalate	ug/kg	<67.0	67.0	09/27/18 14:01	
Di-n-octylphthalate	ug/kg	<67.0	67.0	09/27/18 14:01	
Dibenz(a,h)anthracene	ug/kg	<67.0	67.0	09/27/18 14:01	
Dibenzofuran	ug/kg	<67.0	67.0	09/27/18 14:01	
Diethylphthalate	ug/kg	<67.0	67.0	09/27/18 14:01	
Dimethylphthalate	ug/kg	<67.0	67.0	09/27/18 14:01	
Fluoranthene	ug/kg	<67.0	67.0	09/27/18 14:01	
Fluorene	ug/kg	<67.0	67.0	09/27/18 14:01	
Hexachloro-1,3-butadiene	ug/kg	<67.0	67.0	09/27/18 14:01	
Hexachlorobenzene	ug/kg	<67.0	67.0	09/27/18 14:01	
Hexachlorocyclopentadiene	ug/kg	<330	330	09/27/18 14:01	CL
Hexachloroethane	ug/kg	<67.0	67.0	09/27/18 14:01	
Indeno(1,2,3-cd)pyrene	ug/kg	<67.0	67.0	09/27/18 14:01	
Isophorone	ug/kg	<67.0	67.0	09/27/18 14:01	
N-Nitroso-di-n-propylamine	ug/kg	<67.0	67.0	09/27/18 14:01	
N-Nitrosodiphenylamine	ug/kg	<67.0	67.0	09/27/18 14:01	
Naphthalene	ug/kg	<67.0	67.0	09/27/18 14:01	
Nitrobenzene	ug/kg	<67.0	67.0	09/27/18 14:01	
Pentachlorophenol	ug/kg	<670	670	09/27/18 14:01	CL
Phenanthrene	ug/kg	<67.0	67.0	09/27/18 14:01	
Phenol	ug/kg	<67.0	67.0	09/27/18 14:01	
Pyrene	ug/kg	<67.0	67.0	09/27/18 14:01	
1,2-Dichlorobenzene-d4 (S)	%	65	20-130	09/27/18 14:01	
2,4,6-Tribromophenol (S)	%	71	19-122	09/27/18 14:01	
2-Chlorophenol-d4 (S)	%	63	20-130	09/27/18 14:01	
2-Fluorobiphenyl (S)	%	77	30-115	09/27/18 14:01	
2-Fluorophenol (S)	%	61	25-121	09/27/18 14:01	
Nitrobenzene-d5 (S)	%	65	23-120	09/27/18 14:01	
p-Terphenyl-d14 (S)	%	85	18-137	09/27/18 14:01	
Phenol-d5 (S)	%	61	24-113	09/27/18 14:01	

LABORATORY CONTROL SAMPLE: 388855

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2,4-Trichlorobenzene	ug/kg	1670	1300	78	35-110	
1,2-Dichlorobenzene	ug/kg	1670	1140	69	36-107	
1,3-Dichlorobenzene	ug/kg	1670	1070	64	34-104	
1,4-Dichlorobenzene	ug/kg	1670	1090	66	35-108	
2,2'-Oxybis(1-chloropropane)	ug/kg	1670	773	46	33-116	CL
2,4,5-Trichlorophenol	ug/kg	1670	1170	70	45-111	
2,4,6-Trichlorophenol	ug/kg	1670	1270	76	45-110	
2,4-Dichlorophenol	ug/kg	1670	1490	90	41-117	
2,4-Dimethylphenol	ug/kg	1670	1370	82	24-96	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

QUALITY CONTROL DATA

Project: SUTTER AVE - 9/18
Pace Project No.: 7065707

LABORATORY CONTROL SAMPLE: 388855

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
2,4-Dinitrophenol	ug/kg	1670	<670	29	10-80	
2,4-Dinitrotoluene	ug/kg	1670	1320	79	49-112	
2,6-Dinitrotoluene	ug/kg	1670	1330	80	50-109	
2-Chloronaphthalene	ug/kg	1670	1350	81	35-107	
2-Chlorophenol	ug/kg	1670	1180	71	36-109	
2-Methylnaphthalene	ug/kg	1670	1360	82	31-135	
2-Methylphenol(o-Cresol)	ug/kg	1670	1210	72	36-104	
2-Nitroaniline	ug/kg	1670	895	54	42-118	
2-Nitrophenol	ug/kg	1670	1300	78	36-117	
3&4-Methylphenol(m&p Cresol)	ug/kg	1670	1090	66	37-137	
3,3'-Dichlorobenzidine	ug/kg	1670	1450	87	41-116	
3-Nitroaniline	ug/kg	1670	1160	69	40-95	
4,6-Dinitro-2-methylphenol	ug/kg	1670	939	56	16-104	
4-Bromophenylphenyl ether	ug/kg	1670	1420	85	50-116	
4-Chloro-3-methylphenol	ug/kg	1670	1440	87	45-118	
4-Chloroaniline	ug/kg	1670	1140	68	29-88	
4-Chlorophenylphenyl ether	ug/kg	1670	1260	75	48-111	
4-Nitroaniline	ug/kg	1670	1300	78	46-110	
4-Nitrophenol	ug/kg	1670	1280	77	26-118	
Acenaphthene	ug/kg	1670	1290	77	45-109	
Acenaphthylene	ug/kg	1670	1300	78	43-107	
Anthracene	ug/kg	1670	1350	81	50-117	
Benzo(a)anthracene	ug/kg	1670	1340	80	52-116	
Benzo(a)pyrene	ug/kg	1670	1440	87	56-119	
Benzo(b)fluoranthene	ug/kg	1670	1340	81	45-122	
Benzo(g,h,i)perylene	ug/kg	1670	1720	103	30-107	CH
Benzo(k)fluoranthene	ug/kg	1670	1430	86	54-124	
bis(2-Chloroethoxy)methane	ug/kg	1670	978	59	29-112	
bis(2-Chloroethyl) ether	ug/kg	1670	1030	62	32-116	
bis(2-Ethylhexyl)phthalate	ug/kg	1670	1390	83	60-127	
Butylbenzylphthalate	ug/kg	1670	1330	80	54-130	
Carbazole	ug/kg	1670	1520	91	40-120	
Chrysene	ug/kg	1670	1290	78	48-121	
Di-n-butylphthalate	ug/kg	1670	1450	87	53-124	
Di-n-octylphthalate	ug/kg	1670	1440	86	46-141	
Dibenz(a,h)anthracene	ug/kg	1670	1550	93	52-109	
Dibenzofuran	ug/kg	1670	1260	75	48-112	
Diethylphthalate	ug/kg	1670	1290	78	51-114	
Dimethylphthalate	ug/kg	1670	1280	77	49-112	
Fluoranthene	ug/kg	1670	1380	83	45-126	
Fluorene	ug/kg	1670	1270	76	47-108	
Hexachloro-1,3-butadiene	ug/kg	1670	1420	85	36-118	
Hexachlorobenzene	ug/kg	1670	1430	86	51-110	
Hexachlorocyclopentadiene	ug/kg	1670	568	34	10-97	CL
Hexachloroethane	ug/kg	1670	1090	65	34-105	
Indeno(1,2,3-cd)pyrene	ug/kg	1670	1600	96	50-108	
Isophorone	ug/kg	1670	1250	75	14-129	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

QUALITY CONTROL DATA

Project: SUTTER AVE - 9/18
Pace Project No.: 7065707

LABORATORY CONTROL SAMPLE: 388855

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
N-Nitroso-di-n-propylamine	ug/kg	1670	1220	73	33-109	
N-Nitrosodiphenylamine	ug/kg	1670	1370	82	39-90	
Naphthalene	ug/kg	1670	1290	78	18-142	
Nitrobenzene	ug/kg	1670	1190	71	36-119	
Pentachlorophenol	ug/kg	1670	<670	33	22-115	CL
Phenanthrene	ug/kg	1670	1430	86	47-124	
Phenol	ug/kg	1670	1110	67	38-104	
Pyrene	ug/kg	1670	1340	81	49-132	
1,2-Dichlorobenzene-d4 (S)	%			63	20-130	
2,4,6-Tribromophenol (S)	%			75	19-122	
2-Chlorophenol-d4 (S)	%			72	20-130	
2-Fluorobiphenyl (S)	%			76	30-115	
2-Fluorophenol (S)	%			68	25-121	
Nitrobenzene-d5 (S)	%			64	23-120	
p-Terphenyl-d14 (S)	%			86	18-137	
Phenol-d5 (S)	%			70	24-113	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 388856 388857

Parameter	Units	7065707001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
1,2,4-Trichlorobenzene	ug/kg	<729	1810	1820	1330	1200	73	66	35-110	11	
1,2-Dichlorobenzene	ug/kg	<729	1810	1820	1140	997	63	55	36-107	14	
1,3-Dichlorobenzene	ug/kg	<729	1810	1820	1170	1030	65	56	34-104	13	
1,4-Dichlorobenzene	ug/kg	<729	1810	1820	1090	982	60	54	35-108	10	
2,2'-Oxybis(1-chloropropane)	ug/kg	<729	1810	1820	916	796	51	44	33-116	14	CL
2,4,5-Trichlorophenol	ug/kg	<729	1810	1820	1520	1240	84	68	45-111	20	
2,4,6-Trichlorophenol	ug/kg	<729	1810	1820	1420	1270	78	70	45-110	11	
2,4-Dichlorophenol	ug/kg	<729	1810	1820	1350	1240	74	68	41-117	8	
2,4-Dimethylphenol	ug/kg	<729	1810	1820	1090	921	60	51	24-96	17	
2,4-Dinitrophenol	ug/kg	<7290	1810	1820	<7290	<7330	0	0	10-80		M6
2,4-Dinitrotoluene	ug/kg	<3590	1810	1820	<3590	<3610	88	80	49-112		
2,6-Dinitrotoluene	ug/kg	<3590	1810	1820	<3590	<3610	87	81	50-109		
2-Chloronaphthalene	ug/kg	<729	1810	1820	1520	1410	84	77	35-107	8	
2-Chlorophenol	ug/kg	<729	1810	1820	1240	1080	69	59	36-109	15	
2-Methylnaphthalene	ug/kg	<729	1810	1820	1460	1260	81	69	31-135	15	
2-Methylphenol(o-Cresol)	ug/kg	<729	1810	1820	1270	1080	70	59	36-104	16	
2-Nitroaniline	ug/kg	<3590	1810	1820	<3590	<3610	74	62	42-118		
2-Nitrophenol	ug/kg	<3590	1810	1820	<3590	<3610	73	53	36-117		
3&4-Methylphenol(m&p Cresol)	ug/kg	<729	1810	1820	1240	1070	68	59	37-137	14	
3,3'-Dichlorobenzidine	ug/kg	<3590	1810	1820	<3590	<3610	71	78	41-116		
3-Nitroaniline	ug/kg	<3590	1810	1820	<3590	<3610	93	79	40-95		
4,6-Dinitro-2-methylphenol	ug/kg	<7290	1810	1820	<7290	<7330	62	59	16-104		
4-Bromophenylphenyl ether	ug/kg	<729	1810	1820	1520	1490	84	82	50-116	2	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

QUALITY CONTROL DATA

Project: SUTTER AVE - 9/18
Pace Project No.: 7065707

MATRIX SPIKE & MATRIX SPIKE DUPLICATE:		388856			388857						
Parameter	Units	7065707001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
4-Chloro-3-methylphenol	ug/kg	<729	1810	1820	1480	1310	81	72	45-118	12	
4-Chloroaniline	ug/kg	<3590	1810	1820	<3590	<3610	62	61	29-88		
4-Chlorophenylphenyl ether	ug/kg	<729	1810	1820	1550	1200	85	66	48-111	26	
4-Nitroaniline	ug/kg	<3590	1810	1820	<3590	<3610	91	89	46-110		
4-Nitrophenol	ug/kg	<7290	1810	1820	<7290	<7330	75	68	26-118		
Acenaphthene	ug/kg	<729	1810	1820	1900	1540	105	85	45-109	21	
Acenaphthylene	ug/kg	<729	1810	1820	1780	1640	98	90	43-107	8	
Anthracene	ug/kg	<729	1810	1820	2790	2010	154	110	50-117	32	M6,R1
Benzo(a)anthracene	ug/kg	2480	1810	1820	7430	5040	273	141	52-116	38	M6,R1
Benzo(a)pyrene	ug/kg	2470	1810	1820	7440	4990	274	138	56-119	40	M6,R1
Benzo(b)fluoranthene	ug/kg	3370	1810	1820	9110	6210	317	156	45-122	38	M6,R1
Benzo(g,h,i)perylene	ug/kg	1910	1810	1820	4650	3700	151	98	30-107	23	CH,M6
Benzo(k)fluoranthene	ug/kg	1600	1810	1820	5690	3510	225	105	54-124	47	M6,R1
bis(2-Chloroethoxy)methane	ug/kg	<729	1810	1820	1110	987	61	54	29-112	12	
bis(2-Chloroethyl) ether	ug/kg	<729	1810	1820	1220	1100	67	60	32-116	11	
bis(2-Ethylhexyl)phthalate	ug/kg	<729	1810	1820	2170	1940	119	106	60-127	11	
Butylbenzylphthalate	ug/kg	<729	1810	1820	1650	1590	91	87	54-130	4	
Carbazole	ug/kg	<729	1810	1820	1960	1680	108	92	40-120	16	
Chrysene	ug/kg	2800	1810	1820	7970	5620	285	154	48-121	35	M6,R1
Di-n-butylphthalate	ug/kg	<729	1810	1820	1510	1470	83	81	53-124	2	
Di-n-octylphthalate	ug/kg	<729	1810	1820	2580	2010	142	110	46-141	25	M6
Dibenz(a,h)anthracene	ug/kg	<729	1810	1820	2280	1960	126	108	52-109	15	M6
Dibenzofuran	ug/kg	<729	1810	1820	1720	1480	95	81	48-112	15	
Diethylphthalate	ug/kg	<729	1810	1820	1730	1320	95	72	51-114	27	
Dimethylphthalate	ug/kg	<729	1810	1820	1470	1380	81	76	49-112	6	
Fluoranthene	ug/kg	4720	1810	1820	11800	8500	391	207	45-126	33	M6,R1
Fluorene	ug/kg	<729	1810	1820	1930	1410	106	77	47-108	31	R1
Hexachloro-1,3-butadiene	ug/kg	<729	1810	1820	1460	1220	80	67	36-118	18	
Hexachlorobenzene	ug/kg	<729	1810	1820	1460	1290	80	71	51-110	12	
Hexachlorocyclopentadiene	ug/kg	<3590	1810	1820	<3590	<3610	0	0	10-97		CL,M6
Hexachloroethane	ug/kg	<729	1810	1820	957	800	53	44	34-105	18	
Indeno(1,2,3-cd)pyrene	ug/kg	1730	1810	1820	5080	4060	185	128	50-108	22	M6
Isophorone	ug/kg	<729	1810	1820	1280	1070	70	59	14-129	17	
N-Nitroso-di-n-propylamine	ug/kg	<729	1810	1820	1240	1190	68	65	33-109	4	
N-Nitrosodiphenylamine	ug/kg	<729	1810	1820	1530	1550	84	85	39-90	1	
Naphthalene	ug/kg	<729	1810	1820	1520	1250	84	69	18-142	19	
Nitrobenzene	ug/kg	<729	1810	1820	1180	1150	65	63	36-119	3	
Pentachlorophenol	ug/kg	<7290	1810	1820	<7290	<7330	7	5	22-115		CL,M6
Phenanthrene	ug/kg	2520	1810	1820	7750	4150	288	89	47-124	61	M6,R1
Phenol	ug/kg	<729	1810	1820	1200	959	66	53	38-104	22	
Pyrene	ug/kg	5390	1810	1820	13800	8950	464	196	49-132	43	M6,R1
1,2-Dichlorobenzene-d4 (S)	%						62	56	20-130		
2,4,6-Tribromophenol (S)	%						70	67	19-122		
2-Chlorophenol-d4 (S)	%						70	63	20-130		
2-Fluorobiphenyl (S)	%						81	68	30-115		
2-Fluorophenol (S)	%						65	60	25-121		

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

QUALITY CONTROL DATA

Project: SUTTER AVE - 9/18
Pace Project No.: 7065707

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 388856 388857

Parameter	Units	7065707001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Nitrobenzene-d5 (S)	%						68	61	23-120		
p-Terphenyl-d14 (S)	%						100	99	18-137		
Phenol-d5 (S)	%						70	58	24-113		

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

QUALITY CONTROL DATA

Project: SUTTER AVE - 9/18
Pace Project No.: 7065707

QC Batch: 84410
QC Batch Method: ASTM D2216-92M
Associated Lab Samples: 7065707001

Analysis Method: ASTM D2216-92M
Analysis Description: Dry Weight/Percent Moisture

SAMPLE DUPLICATE: 388191

Parameter	Units	7065735002 Result	Dup Result	RPD	Qualifiers
Percent Moisture	%	6.9	8.4	19	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

QUALIFIERS

Project: SUTTER AVE - 9/18
Pace Project No.: 7065707

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PACE-MV	Pace Analytical Services - Melville

ANALYTE QUALIFIERS

CH	The continuing calibration for this compound is outside of Pace Analytical acceptance limits. The results may be biased high.
CL	The continuing calibration for this compound is outside of Pace Analytical acceptance limits. The results may be biased low.
D6	The precision between the sample and sample duplicate exceeded laboratory control limits.
IL	This analyte exceeded secondary source verification criteria low for the initial calibration. The reported results should be considered an estimated value.
M6	Matrix spike and Matrix spike duplicate recovery not evaluated against control limits due to sample dilution.
N3	Accreditation is not offered by the relevant laboratory accrediting body for this parameter.
R1	RPD value was outside control limits.

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: SUTTER AVE - 9/18
Pace Project No.: 7065707

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
7065707001	**DRUM COMPOISTE 9-18-18**	EPA 3005A	84535	EPA 6010C	84560
7065707001	**DRUM COMPOISTE 9-18-18**	EPA 7470A	84537	EPA 7470A	84564
7065707001	**DRUM COMPOISTE 9-18-18**	EPA 3545A	84545	EPA 8270D	84635
7065707001	**DRUM COMPOISTE 9-18-18**	EPA 5035A-L	85340	EPA 8260C	85341
7065707001	**DRUM COMPOISTE 9-18-18**	ASTM D2216-92M	84410		

Pace Analytical®
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be comp

WO#: 7065707

7065707

Section A Required Client Information:	Section B Required Project Information:	Section C Invoice Information:
Company: EnviroTrac Ltd.	Report To:	Attention:
Address: 5 Old Dock Rd Yaphank, NY 11980	Copy To:	Company Name:
Email To: tracyw@envirotrac.com	Purchase Order No.:	Address:
Phone: 631-924-3001 Fax:	Project Name: Sutter Ave (P) 9/24/18	Pace Quote Reference:
Requested Due Date/TAT:	Project Number: ~~10549~~	Pace Project Manager:
		Pace Profile #: 6399 #7

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER _____

Site Location STATE: NY

Section D Required Client Information

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Matrix Codes MATRIX / CODE

Drinking Water	DW
Water	WT
Waste Water	WW
Product	P
Soil/Solid	SL
Oil	OL
Wipe	WP
Air	AR
Tissue	TS
Other	OT

Requested Analysis Filtered (Y/N)

ITEM #	Section D Required Client Information / SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	VOCs 8260	SVOCs 8270	TCLP Metals	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	Drum Composite 9-18-18	S	C	9/18/18	1500	9/18/18	1500		2	2													001
2																							
3																							
4																							
5																							
6																							
7																							
8																							
9																							
10																							
11																							
12																							

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
	Michael Myers ETNY	9/18/18	1730	ETNY Frig	9/18/18	1730	4.1 ✓ ✓ ✓
		9/20/18		Tim Dalca	9/20/18	15:30	2.4 ✓ ✓ ✓
		9/21/18	11:15		9/21		

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Mich Byrnes

SIGNATURE of SAMPLER: Michael Myers

DATE Signed (MM/DD/YY): 9/20/18

Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

Sample Condition Upon Receipt

Pace Analytical

Client Name: ENVIro

Pr WO#:7065707

PM: JDS Due Date: 10/03/18

CLIENT: ENVIROTRAC

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☒ Pace ☐ Other

Tracking #:

Custody Seal on Cooler/Box Present: ☒ Yes ☐ No Seals intact: ☒ Yes ☐ No

Temperature Blank Present: ☐ Yes ☐ No

Packing Material: ☐ Bubble Wrap ☒ Bubble Bags ☐ Ziploc ☐ None ☐ Other

Type of Ice: Wet Blue None

Thermometer Used: TH091 Correction Factor: 0.0

☐ Samples on ice, cooling process has begun

Cooler Temperature (°C): 4.5 & 4.8 Cooler Temperature Corrected (°C): 4.5 & 4.8

Date/Time 5035A kits placed in freezer

Temp should be above freezing to 6.0°C

USDA Regulated Soil (☐ N/A, water sample) Date and Initials of person examining contents: TD 9/24/18

Did samples originate in a quarantine zone within the United States: AL, AR, CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX, or VA (check map)? ☐ YES ☐ NO

Did samples orignate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☒ No

If Yes to either question, fill out a Regulated Soil Checklist (F-LI-C-010) and include with SCUR/COC paperwork.

				COMMENTS:
Chain of Custody Present:	☑Yes	☐No		1.
Chain of Custody Filled Out:	☑Yes	☐No		2.
Chain of Custody Relinquished:	☑Yes	☐No		3.
Sampler Name & Signature on COC:	☑Yes	☐No	☐N/A	4.
Samples Arrived within Hold Time:	☑Yes	☐No		5.
Short Hold Time Analysis (<72hr):	☐Yes	☑No		6.
Rush Turn Around Time Requested:	☐Yes	☑No		7.
Sufficient Volume: (Triple volume provided for MS/MSD)	☑Yes	☐No		8.
Correct Containers Used:	☑Yes	☐No		9.
-Pace Containers Used:	☑Yes	☐No		
Containers Intact:	☑Yes	☐No		10.
Filtered volume received for Dissolved tests	☐Yes	☐No	☑N/A	11. Note if sediment is visible in the dissolved container.
Sample Labels match COC: -Includes date/time/ID/Analysis Matrix SL WT OIL	☑Yes	☐No		12.
All containers needing preservation have been checked	☐Yes	☐No	☑N/A	13. ☐ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
pH paper Lot #				Sample #
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl, NaOH>9 Sulfide, NaOH>12 Cyanide) Exceptions: VOA, Coliform, TOC/DOC, Oil and Grease, DRO/8015 (water). Per Method, VOA pH is checked after analysis	☐Yes	☐No	☑N/A	Initial when completed: / Lot # of added preservative: / Date/Time preservative added:
Samples checked for dechlorination:	☐Yes	☐No	☑N/A	14.
KI starch test strips Lot #				Positive for Res. Chlorine? Y N
Residual chlorine strips Lot #				
Headspace in VOA Vials (>6mm):	☐Yes	☐No	☑N/A	15.
Trip Blank Present:	☐Yes	☐No	☑N/A	16.
Trip Blank Custody Seals Present	☐Yes	☐No	☑N/A	
Pace Trip Blank Lot # (if applicable):				

Client Notification/ Resolution: Field Data Required? Y / N

Person Contacted: Date/Time:

Comments/ Resolution:

* PM (Project Manager) review is documented electronically in LIMS.

F-LI-C-002-rev.02

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Materials Management, Bureau of Hazardous Waste and Radiation Management
625 Broadway, 9th Floor, Albany, New York 12233-7256
P: (518) 402-8651 | F: (518) 402-9024
www.dec.ny.gov

October 4, 2018

Ms. Tracy Wall
Project Manager
EnviroTrac Ltd.
5 Old Dock Road
Yaphank NY 11980

Re: 1199 Sutter Avenue
Brooklyn, NY
BCP Site No. C224141

Dear Ms. Wall:

We have completed our review of the soil sampling data (Lab Sample ID: 7065707001) submitted with your October 3, 2018 request for a "contained-in" determination for the referenced project. Concentrations detected for individual VOCs were all significantly less than their current "contained-in" soil action levels, and Land Disposal Restriction concentrations. No hazardous constituents exhibited a hazardous waste characteristic by exceeding their TCLP regulatory level.

Concentrations for trichloroethene and tetrachloroethene were below the soil "contained-in" action level and the Land Disposal Restriction concentration. Therefore, six (6) 55-gallon drums, containing soil cuttings generated during the installation of soil vapor extraction and air sparge wells at the above-referenced site, do not have to be managed as hazardous waste and can be transported off-site to permitted solid waste landfill with liner and leachate collection system, for disposal. Please provide the Department the name and address of the facility that will receive it, for disposal.

Should you have any questions regarding the content of this letter, please do not hesitate to contact me at (518) 402-9611 or email me at henry.wilkie@dec.ny.gov.

Sincerely,

Henry Wilkie
Environmental Engineer 1
RCRA Permitting Section

ec: M. Maccabe, DER

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF MATERIALS MANAGEMENT

PART 364
WASTE TRANSPORTER PERMIT NO. 1A-727

Pursuant to Article 27 ,Titles 3 and 15 of the Environmental Conservation Law and 6 NYCRR 364

PERMIT ISSUED TO:

AARCO ENVIRONMENTAL SERVICES CORPORATION
50 GEAR AVENUE
LINDENHURST, NY 11757

PERMIT TYPE:

☐ NEW
■ RENEWAL
☐ MODIFICATION

CONTACT NAME:	RICK SPADALIK / TARA BOGGS	EFFECTIVE DATE:	07/09/2018
COUNTY:	SUFFOLK	EXPIRATION DATE:	07/08/2019
TELEPHONE NO:	(631)586-5900	US EPA ID NUMBER:	NYR000107326

AUTHORIZED WASTE TYPES BY DESTINATION FACILITY:

The Permittee is Authorized to Transport the Following Waste Type(s) to the Destination Facility listed :

Destination Facility	Location	Waste Type(s)	Note
110 Sand Company Clean Fill Disposal Site	Melville , NY	Non-Hazardous Industrial/Commercial	non-friable asbestos
Advanced Waste and Water Technology	Farmingdale , NY	Non-Hazardous Industrial/Commercial	
AES ENVIRONMENTAL	CALVERT CITY , KY	Petroleum Contaminated Soil Hazardous Industrial/Commercial	
BAYSHORE SOIL MANAGEMENT, LLC	KEASBEY , NJ	Non-Hazardous Industrial/Commercial Petroleum Contaminated Soil	
Brookhaven Waste Management Facility	Yaphank , NY	Non-Hazardous Industrial/Commercial Petroleum Contaminated Soil Non-Residential Raw Sewage or Sewage-Contaminated Wastes Sludge from Sewage or Water Supply Treatment Plant	
CLEAN EARTH OF CARTERET	CARTERET , NJ	Non-Hazardous Industrial/Commercial Petroleum Contaminated Soil	
CLEAN EARTH OF NORTH JERSEY	KEARNY , NJ	Non-Hazardous Industrial/Commercial Petroleum Contaminated Soil Hazardous Industrial/Commercial	
Clean Water of New York	Staten Island , NY	Non-Hazardous Industrial/Commercial Petroleum Contaminated Soil Waste Oil	
Clear Flo Technologies Inc	Lindenhurst , NY	Non-Hazardous Industrial/Commercial Septage only (residential)	

*** AUTHORIZED WASTE TYPES BY DESTINATION FACILITY LISTING (continued on next page) ***

NOTE: By acceptance of this permit, the permittee agrees that the permit is contingent upon strict compliance with the Environmental Conservation Law, all applicable regulations, and the General Conditions printed on the back of this page.

ADDRESS:

New York State Department of Environmental Conservation
Division of Materials Management - Waste Transporter Program
625 Broadway, 9th Floor
Albany, NY 12233-7251

AUTHORIZED SIGNATURE: _____ Date: 06/25/18

NOTICE

This renewed permit is not valid until the effective date listed on the permit.

WASTE TRANSPORTER PERMIT

GENERAL CONDITIONS

The permittee must:

1. Carry a copy of this waste transporter permit in each vehicle to transport waste. Failure to produce a copy of the permit upon request is a violation of the permit.

2. Display the full name of the transporter on both sides of each vehicle and display the waste transporter permit number on both sides and rear of each vehicle containing waste. The displayed name and permit number must be in characters at least three inches high and of a color that contrasts sharply with the background.

3. Transport waste only in authorized vehicles. An authorized vehicle is one that is listed on this permit.

4. Submit to the Department a modification application for additions/deletions to the authorized fleet of vehicles. The permittee must wait for a modified permit before operating the vehicles identified in the modification application.

5. Submit to the Department a modification application to add a new waste category or a new destination facility, or to change the current waste or destination facility category. The permittee must wait for a modified permit before transporting new waste types or transporting to new destination facilities.

6. Submit to the Department a modification application for change of address or company name.

7. Comply with requirements for placarding and packaging as set forth in New York State Transportation Law as well as any applicable federal rules and regulations.

8. Contain all wastes in the vehicle so there is no leaking, blowing, or other discharge of waste.

9. Use vehicles to transport only materials not intended for human or animal consumption unless the vehicle is properly cleaned.

10. Comply with requirements for manifesting hazardous waste, regulated medical waste, or low-level radioactive waste as set forth in the New York State Environmental Conservation Law and the implementing regulations. Transporters who provide a pre-printed manifest to a generator/shipper/ offeror of regulated waste shall ensure that all information is correct and clearly legible on all copies of the manifest.

11. Deliver waste only to transfer, storage, treatment and disposal facilities authorized to accept such waste. Permittee must demonstrate that facilities are so authorized if requested to do so.

12. Maintain liability insurance as required by New York State Environmental Conservation Law.

13. Maintain records of the amount of each waste type transported to each destination facility on a calendar-year basis. The transporter is obligated to provide a report of this information to the Department at the time of permit renewal, or to any law enforcement officer, if requested to do so.

14. Pay regulatory fees on an annual basis. Non-payment may be cause for revocation or suspension of permit.

15. This permit is not transferrable. A change of ownership will invalidate this permit.

16. This permit does not relieve the permittee from the obligation to obtain any other approvals or permits, or from complying with any other applicable federal, state, or local requirement.

17. **Renewal applications must be submitted no less than 30 days prior to the expiration date of the permit to:**

New York State Department of Environmental Conservation
Division of Materials Management, Waste Transporter Program
625 Broadway, 9th Floor
Albany, NY 12233-7251

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF MATERIALS MANAGEMENT

PART 364
WASTE TRANSPORTER PERMIT NO. 1A-727

Pursuant to Article 27 ,Titles 3 and 15 of the Environmental Conservation Law and 6 NYCRR 364

PERMIT ISSUED TO:

AARCO ENVIRONMENTAL SERVICES CORPORATION
50 GEAR AVENUE
LINDENHURST, NY 11757

PERMIT TYPE:

☐ NEW
■ RENEWAL
☐ MODIFICATION

CONTACT NAME:	RICK SPADALIK / TARA BOGGS	EFFECTIVE DATE:	07/09/2018
COUNTY:	SUFFOLK	EXPIRATION DATE:	07/08/2019
TELEPHONE NO:	(631)586-5900	US EPA ID NUMBER:	NYR000107326

AUTHORIZED WASTE TYPES BY DESTINATION FACILITY: (Continued)
The Permittee is Authorized to Transport the Following Waste Type(s) to the Destination Facility listed :

Destination Facility	Location	Waste Type(s)	Note
Clear Flo Technologies Inc	Lindenhurst , NY	Non-Residential Raw Sewage or Sewage-Contaminated Wastes	
CONESTOGA LANDFILL	MORGANTOWN , PA	Non-Hazardous Industrial/Commercial Petroleum Contaminated Soil	
CUMBERLAND COUNTY LANDFILL	NEWBURG , PA	Sludge from Sewage or Water Supply Treatment Plant	
CWM CHEMICAL SERVICES	MODEL CITY , NY	Non-Hazardous Industrial/Commercial Petroleum Contaminated Soil Hazardous Industrial/Commercial	
CYCLE CHEM (NJ)	ELIZABETH , NJ	Non-Hazardous Industrial/Commercial Asbestos Petroleum Contaminated Soil Hazardous Industrial/Commercial Waste Oil	
Dale Transfer Corp	West Babylon , NY	Non-Hazardous Industrial/Commercial Gas Well Drill Cuttings Oil and Gas Production Waste Petroleum Contaminated Soil Grease Trap Waste Non-Residential Raw Sewage or Sewage-Contaminated Wastes Sludge from Sewage or Water Supply Treatment Plant	
FCC ENVIRONMENTAL	WILMINGTON , DE	Non-Hazardous Industrial/Commercial	
General Environmental Services, Inc.	Wyandanch , NY	Non-Hazardous Industrial/Commercial Petroleum Contaminated Soil Grease Trap Waste Waste Oil	
GREENTREE LANDFILL	KERSEY , PA	Sludge from Sewage or Water Supply Treatment Plant	
GROWS LANDFILL NORTH (PA DEP 101680)	MORRISVILLE , PA	Non-Hazardous Industrial/Commercial Petroleum Contaminated Soil	
High Acres Western Expansion Landfill	Fairport , NY	Non-Hazardous Industrial/Commercial	
Huntington Resource Recovery Facility	East Northport , NY	Non-Hazardous Industrial/Commercial Petroleum Contaminated Soil Hazardous Industrial/Commercial	
ISP ENVIRONMENTAL SERVICES, INC.	LINDEN , NJ	Non-Hazardous Industrial/Commercial	

*** AUTHORIZED WASTE TYPES BY DESTINATION FACILITY LISTING (continued on next page) ***

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AUTHORIZED WASTE TYPES BY DESTINATION FACILITY: (Continued)
The Permittee is Authorized to Transport the Following Waste Type(s) to the Destination Facility listed :

Destination Facility	Location	Waste Type(s)	Note
Jamaica Recycling (Liberty)	Jamaica , NY	Petroleum Contaminated Soil	
KEYSTONE SANITARY LANDFILL	DUNMORE , PA	Non-Hazardous Industrial/Commercial Petroleum Contaminated Soil Non-Residential Raw Sewage or Sewage-Contaminated Wastes Sludge from Sewage or Water Supply Treatment Plant	
LORCO PETROLEUM SERVICES	ELIZABETH , NJ	Non-Hazardous Industrial/Commercial Petroleum Contaminated Soil	
New York Oil Recovery Inc	Brooklyn , NY	Non-Hazardous Industrial/Commercial Waste Oil	
NLR, INC.	EAST WINDSOR , CT	Non-Hazardous Industrial/Commercial Hazardous Industrial/Commercial	
NORTHLAND ENVIRONMENTAL, LLC	PROVIDENCE , RI	Non-Hazardous Industrial/Commercial Asbestos Petroleum Contaminated Soil Grease Trap Waste Hazardous Industrial/Commercial	
Paradise Heating Oil Inc	Ossining , NY	Non-Hazardous Industrial/Commercial	
PIONEER CROSSING LANDFILL	BIRDSBORO , PA	Non-Hazardous Industrial/Commercial Petroleum Contaminated Soil	
Posillico Materials	Farmingdale , NY	Petroleum Contaminated Soil	
PURE SOIL TECHNOLOGIES	JACKSON , NJ	Petroleum Contaminated Soil	
REPUBLIC ENVIRONMENTAL SYSTEMS	HATFIELD , PA	Non-Hazardous Industrial/Commercial Asbestos Petroleum Contaminated Soil Grease Trap Waste Hazardous Industrial/Commercial	
ROSS INCINERATION SERVICES, INC.	GRAFTON , OH	Petroleum Contaminated Soil Hazardous Industrial/Commercial	
SOIL SAFE, INC.	LOGAN TOWNSHIP , NJ	Petroleum Contaminated Soil	
SOIL SAFE-METRO 12	CARTERET , NJ	Non-Hazardous Industrial/Commercial Petroleum Contaminated Soil	
TRADEBE TREATMENT & RECYCLING NORTHEAST, LLC	MERIDEN , CT	Non-Hazardous Industrial/Commercial	

*** AUTHORIZED WASTE TYPES BY DESTINATION FACILITY LISTING (continued on next page) ***

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AUTHORIZED WASTE TYPES BY DESTINATION FACILITY: (Continued)
The Permittee is Authorized to Transport the Following Waste Type(s) to the Destination Facility listed :

Destination Facility	Location	Waste Type(s)	Note
TRADEBE TREATMENT & RECYCLING NORTHEAST, LLC	MERIDEN , CT	Petroleum Contaminated Soil Hazardous Industrial/Commercial	
TRADEBE TREATMENT & RECYCLING OF BRIDGEPORT, LLC	BRIDGEPORT , CT	Non-Hazardous Industrial/Commercial Asbestos Petroleum Contaminated Soil Hazardous Industrial/Commercial Waste Oil	
TRIUMVIRATE ENVIRONMENTAL	ASTORIA , NY	Non-Hazardous Industrial/Commercial Petroleum Contaminated Soil Hazardous Industrial/Commercial	
Tully Environmental Inc d/b/a Clearbrook	Deer Park , NY	Non-Hazardous Industrial/Commercial Petroleum Contaminated Soil Grease Trap Waste Non-Residential Raw Sewage or Sewage-Contaminated Wastes Sludge from Sewage or Water Supply Treatment Plant	
Tully Environmental Inc Flushing	Flushing , NY	Non-Hazardous Industrial/Commercial	
TULLYTOWN RESOURCE RECOVERY FACILITY (PA DEP 101494)	TULLYTOWN , PA	Non-Hazardous Industrial/Commercial Petroleum Contaminated Soil	
VEOLIA ES TECHNICAL SOLUTIONS	FLANDERS , NJ	Non-Hazardous Industrial/Commercial Asbestos Petroleum Contaminated Soil Hazardous Industrial/Commercial Waste Oil	

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
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TELEPHONE NO:	(631)586-5900	US EPA ID NUMBER:	NYR000107326

AUTHORIZED VEHICLES:
The Permittee is Authorized to Operate the Following Vehicles to Transport Waste:

(Vehicles enclosed in <>'s are authorized to haul Residential Raw Sewage and/or Septage only)

24 (Twenty Four) Permitted Vehicle(s)

MI RB02607
NY 20672MK
NY 21297MG
NY 21642ME
NY 23663MD
NY 27400ME
NY 31314KA
NY 36973MA
NY 36974MA
NY 37370PC
NY 38684MH
NY 58128ME
NY 58347MD
NY 60354PC
NY 64931JY
NY 66588PC
NY 70961MJ
NY 75021MK
NY 79870JR
NY 88085MD
NY 88961MG
NY 93243ME
NY 98195MC
NY GCX6154
End of List

Please print or type
(Form designed for use on elite (12-pitch) typewriter.)

#2873

NON-HAZARDOUS MANIFEST

1. Generator's US EPA ID No.	Manifest Doc. No.	2. Page 1 of
. . . . .	65344	

GENERATOR

3. Generator's Name and Mailing Address: A.A.A. Sutter Realty LLC — 1199 Sutter Avenue Brooklyn NY

4. Generator's Phone (631) 905-4259

5. Transporter 1 Company Name	6. US EPA ID Number	A. Transporter's Phone
AARCO ENVIRONMENTAL SERVICES CORP.	N.Y.R.0.0.0.1.0.7.3.2.6	631-586-5900
7. Transporter 2 Company Name	8. US EPA ID Number	B. Transporter's Phone
	. . . . .	

9. Designated Facility Name and Site Address	10. US EPA ID Number	C. Facility's Phone
DALE TRANSFER CORP. 129 DALE STREET West BABYLON, NY 11704	. . . . . M/A. . .	631-393-2882

11. Waste Shipping Name and Description	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol
a. NON-HAZARDOUS WASTE SOLID DRILL Cuttings	5	DM	275	(P)
b.				
c.				
d.				

D. Additional Descriptions for Materials Listed Above

E. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information
EMERGENCY PHONE # 631-586-5900
PROFILE # 2018-287

16. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Printed/Typed Name	Signature	Month	Day	Year
AGENT FOR AAA SUTTER REALTY	Julio Galarza	10	18	18

TRANSPORTER

17. Transporter 1 Acknowledgment of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year
Julio Galarza	Julio Galarza	10	18	18

18. Transporter 2 Acknowledgment of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year
		.	.	.

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of waste materials covered by this manifest except as noted in item 19.

Printed/Typed Name	Signature	Month	Day	Year
Anthony Miranda	Anthony Miranda	11	28	18

ORIGINAL – RETURN TO GENERATOR

November 28, 2018

Mr. Henry Wilkie
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, New York 12233-7015

Re: **1199 Sutter Avenue**
Brooklyn, NY
BCP Site No. 224141

Dear Mr. Wilkie:

EnviroTrac Ltd. requests permission to properly dispose of four (4) 55-gallon drums of soil as non-hazardous waste. The soil was generated during the trenching and installation of soil vapor extraction system (SVE) and air sparge (AS) piping for the remediation system at the above-referenced site by EnviroTrac Ltd. The primary contaminant detected in the soil and groundwater at the property is tetrachloroethylene. A composite soil sample was collected from the drums and laboratory analyzed for volatile organic compounds by USEPA Method 8260, semi-volatile organic compounds (SVOCs) by USEPA Method 8270, and Toxicity Characteristic Leaching Procedure (TCLP) metals. The laboratory report for the soil sample is provided as Attachment A.

Should you have any questions, please feel free to contact me.

Sincerely,
EnviroTrac Ltd.

Tracy Wall
Project Manager

ATTACHMENT A

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

November 27, 2018

Mr. Ed Russo
Envirotrac
5 Old Dock Road
Yaphank, NY 11980

RE: Project: 1199 SUTTER AVE
Pace Project No.: 7071350

Dear Mr. Russo:
Enclosed are the analytical results for sample(s) received by the laboratory on November 16, 2018. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

John D. Stanton
john.stanton@pacelabs.com
(631)694-3040
Project Manager

Enclosures

cc: Ms. Crystal Bakewicz, Envirotrac
Mr. Joe Rennie, Envirotrac
Mr. Dan Ruffini, Envirotrac

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

CERTIFICATIONS

Project: 1199 SUTTER AVE
Pace Project No.: 7071350

Long Island Certification IDs

575 Broad Hollow Rd, Melville, NY 11747
New York Certification #: 10478 Primary Accrediting Body
New Jersey Certification #: NY158
Pennsylvania Certification #: 68-00350
Connecticut Certification #: PH-0435
Maryland Certification #: 208
Rhode Island Certification #: LAO00340
Massachusetts Certification #: M-NY026
New Hampshire Certification #: 2987

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

ANALYTICAL RESULTS

Project: 1199 SUTTER AVE
Pace Project No.: 7071350

Sample: COMPOSITE DRUM SAMPLE **Lab ID: 7071350001** Collected: 11/16/18 11:15 Received: 11/16/18 16:50 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8270 MSSV	Analytical Method: EPA 8270D Preparation Method: EPA 3545A							
Acenaphthene	**<742**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	83-32-9	
Acenaphthylene	**<742**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	208-96-8	
Anthracene	**<742**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	120-12-7	
Benzaldehyde	**<742**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	100-52-7	CL,IC
Benzo(a)anthracene	**3900**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	56-55-3	
Benzo(a)pyrene	**3600**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	50-32-8	
Benzo(b)fluoranthene	**4350**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	205-99-2	
Benzo(g,h,i)perylene	**2820**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	191-24-2	
Benzo(k)fluoranthene	**2170**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	207-08-9	
4-Bromophenylphenyl ether	**<742**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	101-55-3	
Butylbenzylphthalate	**<742**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	85-68-7	
Carbazole	**<742**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	86-74-8	
4-Chloro-3-methylphenol	**<742**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	59-50-7	
4-Chloroaniline	**<3650**	ug/kg	3650	10	11/20/18 10:42	11/26/18 19:10	106-47-8	L2
bis(2-Chloroethoxy)methane	**<742**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	111-91-1	
bis(2-Chloroethyl) ether	**<742**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	111-44-4	
2-Chloronaphthalene	**<742**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	91-58-7	
2-Chlorophenol	**<742**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	95-57-8	
4-Chlorophenylphenyl ether	**<742**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	7005-72-3	
Chrysene	**3880**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	218-01-9	
Dibenz(a,h)anthracene	**766**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	53-70-3	
Dibenzofuran	**<742**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	132-64-9	
1,2-Dichlorobenzene	**<742**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	95-50-1	
1,3-Dichlorobenzene	**<742**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	541-73-1	
1,4-Dichlorobenzene	**<742**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	106-46-7	
3,3'-Dichlorobenzidine	**<3650**	ug/kg	3650	10	11/20/18 10:42	11/26/18 19:10	91-94-1	
2,4-Dichlorophenol	**<742**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	120-83-2	
Diethylphthalate	**<742**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	84-66-2	
2,4-Dimethylphenol	**<742**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	105-67-9	
Dimethylphthalate	**<742**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	131-11-3	
Di-n-butylphthalate	**<742**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	84-74-2	
4,6-Dinitro-2-methylphenol	**<7420**	ug/kg	7420	10	11/20/18 10:42	11/26/18 19:10	534-52-1	
2,4-Dinitrophenol	**<7420**	ug/kg	7420	10	11/20/18 10:42	11/26/18 19:10	51-28-5	
2,4-Dinitrotoluene	**<3650**	ug/kg	3650	10	11/20/18 10:42	11/26/18 19:10	121-14-2	
2,6-Dinitrotoluene	**<3650**	ug/kg	3650	10	11/20/18 10:42	11/26/18 19:10	606-20-2	
Di-n-octylphthalate	**<742**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	117-84-0	
bis(2-Ethylhexyl)phthalate	**<742**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	117-81-7	
Fluoranthene	**6460**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	206-44-0	
Fluorene	**<742**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	86-73-7	
Hexachloro-1,3-butadiene	**<742**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	87-68-3	
Hexachlorobenzene	**<742**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	118-74-1	
Hexachlorocyclopentadiene	**<3650**	ug/kg	3650	10	11/20/18 10:42	11/26/18 19:10	77-47-4	CL,IC,L1
Hexachloroethane	**<742**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	67-72-1	
Indeno(1,2,3-cd)pyrene	**2880**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	193-39-5	
Isophorone	**<742**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	78-59-1	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

ANALYTICAL RESULTS

Project: 1199 SUTTER AVE
Pace Project No.: 7071350

Sample: COMPOSITE DRUM SAMPLE **Lab ID: 7071350001** Collected: 11/16/18 11:15 Received: 11/16/18 16:50 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8270 MSSV	Analytical Method: EPA 8270D Preparation Method: EPA 3545A							
2-Methylnaphthalene	**<742**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	91-57-6	
2-Methylphenol(o-Cresol)	**<742**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	95-48-7	
3&4-Methylphenol(m&p Cresol)	**<742**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10		
Naphthalene	**<742**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	91-20-3	
2-Nitroaniline	**<3650**	ug/kg	3650	10	11/20/18 10:42	11/26/18 19:10	88-74-4	
3-Nitroaniline	**<3650**	ug/kg	3650	10	11/20/18 10:42	11/26/18 19:10	99-09-2	
4-Nitroaniline	**<3650**	ug/kg	3650	10	11/20/18 10:42	11/26/18 19:10	100-01-6	
Nitrobenzene	**<742**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	98-95-3	
2-Nitrophenol	**<3650**	ug/kg	3650	10	11/20/18 10:42	11/26/18 19:10	88-75-5	
4-Nitrophenol	**<7420**	ug/kg	7420	10	11/20/18 10:42	11/26/18 19:10	100-02-7	
N-Nitroso-di-n-propylamine	**<742**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	621-64-7	
N-Nitrosodiphenylamine	**<742**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	86-30-6	
2,2'-Oxybis(1-chloropropane)	**<742**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	108-60-1	
Pentachlorophenol	**<7420**	ug/kg	7420	10	11/20/18 10:42	11/26/18 19:10	87-86-5	
Phenanthrene	**2060**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	85-01-8	
Phenol	**<742**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	108-95-2	
Pyrene	**5710**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	129-00-0	
1,2,4,5-Tetrachlorobenzene	**<742**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	95-94-3	
1,2,4-Trichlorobenzene	**<742**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	120-82-1	
2,4,5-Trichlorophenol	**<742**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	95-95-4	
2,4,6-Trichlorophenol	**<742**	ug/kg	742	10	11/20/18 10:42	11/26/18 19:10	88-06-2	
Surrogates								
Nitrobenzene-d5 (S)	75	%	23-120	10	11/20/18 10:42	11/26/18 19:10	4165-60-0	
2-Fluorobiphenyl (S)	82	%	30-115	10	11/20/18 10:42	11/26/18 19:10	321-60-8	
p-Terphenyl-d14 (S)	100	%	18-137	10	11/20/18 10:42	11/26/18 19:10	1718-51-0	
Phenol-d5 (S)	75	%	24-113	10	11/20/18 10:42	11/26/18 19:10	4165-62-2	
2-Fluorophenol (S)	69	%	25-121	10	11/20/18 10:42	11/26/18 19:10	367-12-4	
2,4,6-Tribromophenol (S)	67	%	19-122	10	11/20/18 10:42	11/26/18 19:10	118-79-6	
2-Chlorophenol-d4 (S)	70	%	20-130	10	11/20/18 10:42	11/26/18 19:10	93951-73-6	
1,2-Dichlorobenzene-d4 (S)	66	%	20-130	10	11/20/18 10:42	11/26/18 19:10	2199-69-1	
8260C MSV 5035A-L Low Level	Analytical Method: EPA 8260C Preparation Method: EPA 5035A-L							
Acetone	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	67-64-1	
Benzene	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	71-43-2	
Bromobenzene	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	108-86-1	
Bromochloromethane	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	74-97-5	
Bromodichloromethane	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	75-27-4	
Bromoform	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	75-25-2	
Bromomethane	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	74-83-9	
2-Butanone (MEK)	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	78-93-3	
n-Butylbenzene	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	104-51-8	
sec-Butylbenzene	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	135-98-8	
tert-Butylbenzene	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	98-06-6	
Carbon tetrachloride	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	56-23-5	
Chlorobenzene	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	108-90-7	

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

ANALYTICAL RESULTS

Project: 1199 SUTTER AVE
Pace Project No.: 7071350

Sample: COMPOSITE DRUM SAMPLE **Lab ID: 7071350001** Collected: 11/16/18 11:15 Received: 11/16/18 16:50 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260C MSV 5035A-L Low Level	Analytical Method: EPA 8260C Preparation Method: EPA 5035A-L							
Chlorodifluoromethane	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	75-45-6	N3
Chloroethane	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	75-00-3	
Chloroform	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	67-66-3	
Chloromethane	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	74-87-3	
2-Chlorotoluene	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	95-49-8	CL
4-Chlorotoluene	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	106-43-4	CL
1,2-Dibromo-3-chloropropane	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	96-12-8	CL
Dibromochloromethane	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	124-48-1	
1,2-Dibromoethane (EDB)	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	106-93-4	
Dibromomethane	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	74-95-3	
1,2-Dichlorobenzene	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	95-50-1	
1,3-Dichlorobenzene	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	541-73-1	
1,4-Dichlorobenzene	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	106-46-7	
Dichlorodifluoromethane	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	75-71-8	
1,1-Dichloroethane	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	75-34-3	
1,2-Dichloroethane	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	107-06-2	
1,1-Dichloroethene	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	75-35-4	
cis-1,2-Dichloroethene	**6.3**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	156-59-2	
trans-1,2-Dichloroethene	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	156-60-5	
1,2-Dichloropropane	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	78-87-5	
1,3-Dichloropropane	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	142-28-9	
2,2-Dichloropropane	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	594-20-7	
1,1-Dichloropropene	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	563-58-6	
cis-1,3-Dichloropropene	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	10061-01-5	
trans-1,3-Dichloropropene	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	10061-02-6	
Ethylbenzene	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	100-41-4	
Hexachloro-1,3-butadiene	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	87-68-3	
Isopropylbenzene (Cumene)	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	98-82-8	
p-Isopropyltoluene	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	99-87-6	
Methylene Chloride	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	108-10-1	
Methyl-tert-butyl ether	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	1634-04-4	
Naphthalene	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	91-20-3	
n-Propylbenzene	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	103-65-1	CL
Styrene	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	100-42-5	
1,1,1,2-Tetrachloroethane	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	630-20-6	
1,1,2,2-Tetrachloroethane	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	79-34-5	CL
Tetrachloroethene	**163**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	127-18-4	CH
1,2,4,5-tetramethylbenzene	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	95-93-2	N3
Toluene	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	108-88-3	
1,2,3-Trichlorobenzene	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	87-61-6	
1,2,4-Trichlorobenzene	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	120-82-1	
1,1,1-Trichloroethane	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	71-55-6	
1,1,2-Trichloroethane	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	79-00-5	
Trichloroethene	**6.3**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	79-01-6	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

ANALYTICAL RESULTS

Project: 1199 SUTTER AVE
Pace Project No.: 7071350

Sample: COMPOSITE DRUM SAMPLE **Lab ID: 7071350001** Collected: 11/16/18 11:15 Received: 11/16/18 16:50 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260C MSV 5035A-L Low Level	Analytical Method: EPA 8260C Preparation Method: EPA 5035A-L							
Trichlorofluoromethane	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	75-69-4	
1,2,3-Trichloropropane	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	96-18-4	CL
1,1,2-Trichlorotrifluoroethane	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	76-13-1	
1,2,4-Trimethylbenzene	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	95-63-6	
1,3,5-Trimethylbenzene	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	108-67-8	
Vinyl chloride	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	75-01-4	
Xylene (Total)	**<4.9**	ug/kg	4.9	1	11/18/18 10:54	11/18/18 19:32	1330-20-7	
m&p-Xylene	**<4.9**	ug/kg	4.9	1	11/18/18 10:54	11/18/18 19:32	179601-23-1	
o-Xylene	**<2.4**	ug/kg	2.4	1	11/18/18 10:54	11/18/18 19:32	95-47-6	
Surrogates								
Toluene-d8 (S)	101	%	43-157	1	11/18/18 10:54	11/18/18 19:32	2037-26-5	
4-Bromofluorobenzene (S)	95	%	34-145	1	11/18/18 10:54	11/18/18 19:32	460-00-4	
1,2-Dichloroethane-d4 (S)	103	%	33-150	1	11/18/18 10:54	11/18/18 19:32	17060-07-0	
TIC MSV Soil	Analytical Method: EPA 8260							
TIC Search	**No TIC's Found**			1		11/20/18 21:35		
Percent Moisture	Analytical Method: ASTM D2216-92M							
Percent Moisture	**9.7**	%	0.10	1		11/27/18 10:25		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

ANALYTICAL RESULTS

Project: 1199 SUTTER AVE
Pace Project No.: 7071350

Sample: COMPOSITE DRUM SAMPLE **Lab ID: 7071350002** Collected: 11/16/18 11:15 Received: 11/16/18 16:50 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, TCLP	Analytical Method: EPA 6010C Preparation Method: EPA 3005A Leachate Method/Date: EPA 1311; 11/16/18 20:51							
Arsenic	**<0.50**	mg/L	0.50	1	11/20/18 09:02	11/27/18 14:44	7440-38-2	
Barium	**<5.0**	mg/L	5.0	1	11/20/18 09:02	11/27/18 14:44	7440-39-3	
Cadmium	**<0.050**	mg/L	0.050	1	11/20/18 09:02	11/27/18 14:44	7440-43-9	
Chromium	**<0.50**	mg/L	0.50	1	11/20/18 09:02	11/27/18 14:44	7440-47-3	
Lead	**3.5**	mg/L	0.50	1	11/20/18 09:02	11/27/18 14:44	7439-92-1	
Selenium	**<0.050**	mg/L	0.050	1	11/20/18 09:02	11/27/18 14:44	7782-49-2	
Silver	**<0.50**	mg/L	0.50	1	11/20/18 09:02	11/27/18 14:44	7440-22-4	
7470 Mercury, TCLP	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Leachate Method/Date: EPA 1311; 11/16/18 20:51							
Mercury	**<0.00020**	mg/L	0.00020	1	11/20/18 11:04	11/21/18 12:05	7439-97-6	
Percent Moisture	Analytical Method: ASTM D2216-92M							
Percent Moisture	**10.2**	%	0.10	1		11/27/18 10:25		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

QUALITY CONTROL DATA

Project: 1199 SUTTER AVE
Pace Project No.: 7071350

QC Batch: 92006 Analysis Method: EPA 7470A
QC Batch Method: EPA 7470A Analysis Description: 7470 Mercury TCLP
Associated Lab Samples: 7071350002

METHOD BLANK: 424277 Matrix: Water
Associated Lab Samples: 7071350002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	<0.00020	0.00020	11/21/18 11:58	

METHOD BLANK: 422764 Matrix: Water
Associated Lab Samples: 7071350002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	<0.00020	0.00020	11/21/18 12:01	

LABORATORY CONTROL SAMPLE: 424278

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	.001	0.0011	114	80-120	

MATRIX SPIKE SAMPLE: 424279

Parameter	Units	7071350002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	<0.00020	.001	0.0011	102	75-125	

SAMPLE DUPLICATE: 424280

Parameter	Units	7071350002 Result	Dup Result	RPD	Qualifiers
Mercury	mg/L	<0.00020	<0.00020		

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

QUALITY CONTROL DATA

Project: 1199 SUTTER AVE
Pace Project No.: 7071350

QC Batch: 92002
QC Batch Method: EPA 3005A
Analysis Method: EPA 6010C
Analysis Description: 6010 MET TCLP
Associated Lab Samples: 7071350002

METHOD BLANK: 424258
Matrix: Water
Associated Lab Samples: 7071350002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/L	<0.50	0.50	11/27/18 14:40	
Barium	mg/L	<5.0	5.0	11/27/18 14:40	
Cadmium	mg/L	<0.050	0.050	11/27/18 14:40	
Chromium	mg/L	<0.50	0.50	11/27/18 14:40	
Lead	mg/L	<0.50	0.50	11/27/18 14:40	
Selenium	mg/L	<0.050	0.050	11/27/18 14:40	
Silver	mg/L	<0.50	0.50	11/27/18 14:40	

LABORATORY CONTROL SAMPLE: 424259

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	.5	<0.50	98	80-120	
Barium	mg/L	.5	<5.0	102	80-120	
Cadmium	mg/L	.05	0.051	102	80-120	
Chromium	mg/L	.25	<0.50	98	80-120	
Lead	mg/L	.5	0.50	100	80-120	
Selenium	mg/L	.75	0.76	101	80-120	
Silver	mg/L	.25	<0.50	100	80-120	

MATRIX SPIKE SAMPLE: 424261

Parameter	Units	7071350002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	<0.50	.5	<0.50	99	75-125	
Barium	mg/L	<5.0	.5	<5.0	104	75-125	
Cadmium	mg/L	<0.050	.05	0.057	100	75-125	
Chromium	mg/L	<0.50	.25	<0.50	94	75-125	
Lead	mg/L	3.5	.5	4.0	94	75-125	
Selenium	mg/L	<0.050	.75	0.79	105	75-125	
Silver	mg/L	<0.50	.25	<0.50	102	75-125	

SAMPLE DUPLICATE: 424260

Parameter	Units	7071350002 Result	Dup Result	RPD	Qualifiers
Arsenic	mg/L	<0.50	<0.50		
Barium	mg/L	<5.0	<5.0		
Cadmium	mg/L	<0.050	<0.050		
Chromium	mg/L	<0.50	<0.50		

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

QUALITY CONTROL DATA

Project: 1199 SUTTER AVE
Pace Project No.: 7071350

SAMPLE DUPLICATE: 424260

Parameter	Units	7071350002 Result	Dup Result	RPD	Qualifiers
Lead	mg/L	3.5	3.5	1	
Selenium	mg/L	<0.050	<0.050		
Silver	mg/L	<0.50	<0.50		

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

QUALITY CONTROL DATA

Project: 1199 SUTTER AVE
Pace Project No.: 7071350

QC Batch: 91882
QC Batch Method: EPA 5035A-L
Analysis Method: EPA 8260C
Analysis Description: 8260 MSV 5035A-L Low Level
Associated Lab Samples: 7071350001

METHOD BLANK: 423936
Matrix: Solid
Associated Lab Samples: 7071350001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	ug/kg	<2.0	2.0	11/18/18 14:50	
1,1,1-Trichloroethane	ug/kg	<2.0	2.0	11/18/18 14:50	
1,1,2,2-Tetrachloroethane	ug/kg	<2.0	2.0	11/18/18 14:50	CL
1,1,2-Trichloroethane	ug/kg	<2.0	2.0	11/18/18 14:50	
1,1,2-Trichlorotrifluoroethane	ug/kg	<2.0	2.0	11/18/18 14:50	
1,1-Dichloroethane	ug/kg	<2.0	2.0	11/18/18 14:50	
1,1-Dichloroethene	ug/kg	<2.0	2.0	11/18/18 14:50	
1,1-Dichloropropene	ug/kg	<2.0	2.0	11/18/18 14:50	
1,2,3-Trichlorobenzene	ug/kg	<2.0	2.0	11/18/18 14:50	
1,2,3-Trichloropropane	ug/kg	<2.0	2.0	11/18/18 14:50	CL
1,2,4,5-tetramethylbenzene	ug/kg	<2.0	2.0	11/18/18 14:50	N3
1,2,4-Trichlorobenzene	ug/kg	<2.0	2.0	11/18/18 14:50	
1,2,4-Trimethylbenzene	ug/kg	<2.0	2.0	11/18/18 14:50	
1,2-Dibromo-3-chloropropane	ug/kg	<2.0	2.0	11/18/18 14:50	CL
1,2-Dibromoethane (EDB)	ug/kg	<2.0	2.0	11/18/18 14:50	
1,2-Dichlorobenzene	ug/kg	<2.0	2.0	11/18/18 14:50	
1,2-Dichloroethane	ug/kg	<2.0	2.0	11/18/18 14:50	
1,2-Dichloropropane	ug/kg	<2.0	2.0	11/18/18 14:50	
1,3,5-Trimethylbenzene	ug/kg	<2.0	2.0	11/18/18 14:50	
1,3-Dichlorobenzene	ug/kg	<2.0	2.0	11/18/18 14:50	
1,3-Dichloropropane	ug/kg	<2.0	2.0	11/18/18 14:50	
1,4-Dichlorobenzene	ug/kg	<2.0	2.0	11/18/18 14:50	
2,2-Dichloropropane	ug/kg	<2.0	2.0	11/18/18 14:50	
2-Butanone (MEK)	ug/kg	<2.0	2.0	11/18/18 14:50	
2-Chlorotoluene	ug/kg	<2.0	2.0	11/18/18 14:50	CL
4-Chlorotoluene	ug/kg	<2.0	2.0	11/18/18 14:50	CL
4-Methyl-2-pentanone (MIBK)	ug/kg	<2.0	2.0	11/18/18 14:50	
Acetone	ug/kg	<2.0	2.0	11/18/18 14:50	
Benzene	ug/kg	<2.0	2.0	11/18/18 14:50	
Bromobenzene	ug/kg	<2.0	2.0	11/18/18 14:50	
Bromochloromethane	ug/kg	<2.0	2.0	11/18/18 14:50	
Bromodichloromethane	ug/kg	<2.0	2.0	11/18/18 14:50	
Bromoform	ug/kg	<2.0	2.0	11/18/18 14:50	
Bromomethane	ug/kg	<2.0	2.0	11/18/18 14:50	
Carbon tetrachloride	ug/kg	<2.0	2.0	11/18/18 14:50	
Chlorobenzene	ug/kg	<2.0	2.0	11/18/18 14:50	
Chlorodifluoromethane	ug/kg	<2.0	2.0	11/18/18 14:50	N3
Chloroethane	ug/kg	<2.0	2.0	11/18/18 14:50	
Chloroform	ug/kg	<2.0	2.0	11/18/18 14:50	
Chloromethane	ug/kg	<2.0	2.0	11/18/18 14:50	
cis-1,2-Dichloroethene	ug/kg	<2.0	2.0	11/18/18 14:50	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

QUALITY CONTROL DATA

Project: 1199 SUTTER AVE
Pace Project No.: 7071350

METHOD BLANK: 423936 Matrix: Solid
Associated Lab Samples: 7071350001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
cis-1,3-Dichloropropene	ug/kg	<2.0	2.0	11/18/18 14:50	
Dibromochloromethane	ug/kg	<2.0	2.0	11/18/18 14:50	
Dibromomethane	ug/kg	<2.0	2.0	11/18/18 14:50	
Dichlorodifluoromethane	ug/kg	<2.0	2.0	11/18/18 14:50	
Ethylbenzene	ug/kg	<2.0	2.0	11/18/18 14:50	
Hexachloro-1,3-butadiene	ug/kg	<2.0	2.0	11/18/18 14:50	
Isopropylbenzene (Cumene)	ug/kg	<2.0	2.0	11/18/18 14:50	
m&p-Xylene	ug/kg	<3.9	3.9	11/18/18 14:50	
Methyl-tert-butyl ether	ug/kg	<2.0	2.0	11/18/18 14:50	
Methylene Chloride	ug/kg	<2.0	2.0	11/18/18 14:50	
n-Butylbenzene	ug/kg	<2.0	2.0	11/18/18 14:50	
n-Propylbenzene	ug/kg	<2.0	2.0	11/18/18 14:50	CL
Naphthalene	ug/kg	<2.0	2.0	11/18/18 14:50	
o-Xylene	ug/kg	<2.0	2.0	11/18/18 14:50	
p-Isopropyltoluene	ug/kg	<2.0	2.0	11/18/18 14:50	
sec-Butylbenzene	ug/kg	<2.0	2.0	11/18/18 14:50	
Styrene	ug/kg	<2.0	2.0	11/18/18 14:50	
tert-Butylbenzene	ug/kg	<2.0	2.0	11/18/18 14:50	
Tetrachloroethene	ug/kg	<2.0	2.0	11/18/18 14:50	
Toluene	ug/kg	<2.0	2.0	11/18/18 14:50	
trans-1,2-Dichloroethene	ug/kg	<2.0	2.0	11/18/18 14:50	
trans-1,3-Dichloropropene	ug/kg	<2.0	2.0	11/18/18 14:50	
Trichloroethene	ug/kg	<2.0	2.0	11/18/18 14:50	
Trichlorofluoromethane	ug/kg	<2.0	2.0	11/18/18 14:50	
Vinyl chloride	ug/kg	<2.0	2.0	11/18/18 14:50	
Xylene (Total)	ug/kg	<3.9	3.9	11/18/18 14:50	
1,2-Dichloroethane-d4 (S)	%	94	33-150	11/18/18 14:50	
4-Bromofluorobenzene (S)	%	105	34-145	11/18/18 14:50	
Toluene-d8 (S)	%	96	43-157	11/18/18 14:50	

LABORATORY CONTROL SAMPLE: 423937

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/kg	50.2	64.8	129	74-140	
1,1,1-Trichloroethane	ug/kg	50.2	61.0	122	59-134	
1,1,2,2-Tetrachloroethane	ug/kg	50.2	38.5	77	69-132	CL
1,1,2-Trichloroethane	ug/kg	50.2	52.0	104	73-135	
1,1,2-Trichlorotrifluoroethane	ug/kg	50.2	51.1	102	45-156	
1,1-Dichloroethane	ug/kg	50.2	53.7	107	53-160	
1,1-Dichloroethene	ug/kg	50.2	50.6	101	47-152	
1,1-Dichloropropene	ug/kg	50.2	55.7	111	56-130	
1,2,3-Trichlorobenzene	ug/kg	50.2	54.5	109	48-144	
1,2,3-Trichloropropane	ug/kg	50.2	42.7	85	67-129	CL
1,2,4,5-tetramethylbenzene	ug/kg	50.2	47.5	95	60-142	N3

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

QUALITY CONTROL DATA

Project: 1199 SUTTER AVE
Pace Project No.: 7071350

LABORATORY CONTROL SAMPLE: 423937

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2,4-Trichlorobenzene	ug/kg	50.2	55.2	110	52-140	
1,2,4-Trimethylbenzene	ug/kg	50.2	44.9	89	59-126	
1,2-Dibromo-3-chloropropane	ug/kg	50.2	37.7	75	57-140	CL
1,2-Dibromoethane (EDB)	ug/kg	50.2	56.9	113	76-138	
1,2-Dichlorobenzene	ug/kg	50.2	51.0	102	67-125	
1,2-Dichloroethane	ug/kg	50.2	55.4	110	65-143	
1,2-Dichloropropane	ug/kg	50.2	56.0	111	72-131	
1,3,5-Trimethylbenzene	ug/kg	50.2	45.9	91	49-134	
1,3-Dichlorobenzene	ug/kg	50.2	52.3	104	64-124	
1,3-Dichloropropane	ug/kg	50.2	54.1	108	73-130	
1,4-Dichlorobenzene	ug/kg	50.2	51.4	102	61-127	
2,2-Dichloropropane	ug/kg	50.2	56.7	113	55-140	
2-Butanone (MEK)	ug/kg	50.2	50.0	100	52-164	
2-Chlorotoluene	ug/kg	50.2	43.8	87	62-125	CL
4-Chlorotoluene	ug/kg	50.2	44.1	88	62-125	CL
4-Methyl-2-pentanone (MIBK)	ug/kg	50.2	52.1	104	63-154	
Acetone	ug/kg	50.2	43.0	86	23-196	
Benzene	ug/kg	50.2	56.6	113	65-129	
Bromobenzene	ug/kg	50.2	52.0	104	63-130	
Bromochloromethane	ug/kg	50.2	58.8	117	78-136	
Bromodichloromethane	ug/kg	50.2	59.8	119	74-141	
Bromoform	ug/kg	50.2	61.0	121	59-136	
Bromomethane	ug/kg	50.2	54.7	109	32-182	
Carbon tetrachloride	ug/kg	50.2	62.5	125	57-135	
Chlorobenzene	ug/kg	50.2	60.8	121	62-136	
Chlorodifluoromethane	ug/kg	50.2	45.2	90	14-161	N3
Chloroethane	ug/kg	50.2	51.8	103	50-159	
Chloroform	ug/kg	50.2	55.2	110	71-135	
Chloromethane	ug/kg	50.2	44.2	88	44-139	
cis-1,2-Dichloroethene	ug/kg	50.2	54.8	109	75-130	
cis-1,3-Dichloropropene	ug/kg	50.2	57.5	115	74-140	
Dibromochloromethane	ug/kg	50.2	57.6	115	71-133	
Dibromomethane	ug/kg	50.2	54.2	108	75-136	
Dichlorodifluoromethane	ug/kg	50.2	55.5	111	10-155	
Ethylbenzene	ug/kg	50.2	59.1	118	59-135	
Hexachloro-1,3-butadiene	ug/kg	50.2	61.5	123	19-152	
Isopropylbenzene (Cumene)	ug/kg	50.2	45.4	90	56-129	
m&p-Xylene	ug/kg	100	120	120	69-133	
Methyl-tert-butyl ether	ug/kg	50.2	54.4	108	25-171	
Methylene Chloride	ug/kg	50.2	49.2	98	50-164	
n-Butylbenzene	ug/kg	50.2	44.8	89	54-121	
n-Propylbenzene	ug/kg	50.2	43.0	86	56-125	CL
Naphthalene	ug/kg	50.2	44.0	88	55-145	
o-Xylene	ug/kg	50.2	59.0	118	71-135	
p-Isopropyltoluene	ug/kg	50.2	47.9	95	54-126	
sec-Butylbenzene	ug/kg	50.2	46.2	92	50-126	
Styrene	ug/kg	50.2	58.2	116	73-133	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

QUALITY CONTROL DATA

Project: 1199 SUTTER AVE
Pace Project No.: 7071350

LABORATORY CONTROL SAMPLE: 423937

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
tert-Butylbenzene	ug/kg	50.2	48.1	96	56-127	
Tetrachloroethene	ug/kg	50.2	72.0	143	10-176	CH
Toluene	ug/kg	50.2	57.0	114	66-131	
trans-1,2-Dichloroethene	ug/kg	50.2	55.6	111	53-157	
trans-1,3-Dichloropropene	ug/kg	50.2	57.5	115	66-144	
Trichloroethene	ug/kg	50.2	57.0	114	62-130	
Trichlorofluoromethane	ug/kg	50.2	53.4	106	38-166	
Vinyl chloride	ug/kg	50.2	45.4	90	45-137	
Xylene (Total)	ug/kg	151	179	119	62-135	
1,2-Dichloroethane-d4 (S)	%			93	33-150	
4-Bromofluorobenzene (S)	%			99	34-145	
Toluene-d8 (S)	%			95	43-157	

MATRIX SPIKE SAMPLE: 423939

Parameter	Units	7070900005 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/kg	<2.0	47	61.2	130	74-140	
1,1,1-Trichloroethane	ug/kg	<2.0	47	61.4	130	59-134	
1,1,2,2-Tetrachloroethane	ug/kg	<2.0	47	40.7	87	69-132	CL
1,1,2-Trichloroethane	ug/kg	<2.0	47	51.8	110	73-135	
1,1,2-Trichlorotrifluoroethane	ug/kg	<2.0	47	53.6	114	45-156	
1,1-Dichloroethane	ug/kg	<2.0	47	57.8	123	53-160	
1,1-Dichloroethene	ug/kg	<2.0	47	53.4	114	47-152	
1,1-Dichloropropene	ug/kg	<2.0	47	56.3	120	56-130	
1,2,3-Trichlorobenzene	ug/kg	<2.0	47	44.6	95	48-144	
1,2,3-Trichloropropane	ug/kg	<2.0	47	44.6	95	67-129	CL
1,2,4,5-tetramethylbenzene	ug/kg	<2.0	47	44.7	95	60-142	N3
1,2,4-Trichlorobenzene	ug/kg	<2.0	47	44.9	95	52-140	
1,2,4-Trimethylbenzene	ug/kg	<2.0	47	42.2	90	59-126	
1,2-Dibromo-3-chloropropane	ug/kg	<2.0	47	40.8	87	57-140	CL
1,2-Dibromoethane (EDB)	ug/kg	<2.0	47	56.0	119	76-138	
1,2-Dichlorobenzene	ug/kg	<2.0	47	47.4	101	67-125	
1,2-Dichloroethane	ug/kg	<2.0	47	59.7	127	65-143	
1,2-Dichloropropane	ug/kg	<2.0	47	54.7	116	72-131	
1,3,5-Trimethylbenzene	ug/kg	<2.0	47	42.1	89	49-134	
1,3-Dichlorobenzene	ug/kg	<2.0	47	47.1	100	64-124	
1,3-Dichloropropane	ug/kg	<2.0	47	53.6	114	73-130	
1,4-Dichlorobenzene	ug/kg	<2.0	47	47.5	101	61-127	
2,2-Dichloropropane	ug/kg	<2.0	47	58.5	124	55-140	
2-Butanone (MEK)	ug/kg	<2.0	47	47.9	102	52-164	
2-Chlorotoluene	ug/kg	<2.0	47	42.2	90	62-125	CL
4-Chlorotoluene	ug/kg	<2.0	47	41.1	87	62-125	CL
4-Methyl-2-pentanone (MIBK)	ug/kg	<2.0	47	53.4	114	63-154	
Acetone	ug/kg	<2.0	47	53.0	113	23-196	
Benzene	ug/kg	<2.0	47	57.1	121	65-129	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

QUALITY CONTROL DATA

Project: 1199 SUTTER AVE
Pace Project No.: 7071350

MATRIX SPIKE SAMPLE: 423939

Parameter	Units	7070900005 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Bromobenzene	ug/kg	<2.0	47	50.9	108	63-130	
Bromochloromethane	ug/kg	<2.0	47	59.1	126	78-136	
Bromodichloromethane	ug/kg	<2.0	47	58.4	124	74-141	
Bromoform	ug/kg	<2.0	47	60.5	129	59-136	
Bromomethane	ug/kg	<2.0	47	57.8	123	32-182	
Carbon tetrachloride	ug/kg	<2.0	47	60.8	129	57-135	
Chlorobenzene	ug/kg	<2.0	47	55.9	119	62-136	
Chlorodifluoromethane	ug/kg	<2.0	47	54.9	117	14-161	N3
Chloroethane	ug/kg	<2.0	47	55.6	118	50-159	
Chloroform	ug/kg	<2.0	47	59.2	126	71-135	
Chloromethane	ug/kg	<2.0	47	51.2	109	44-139	
cis-1,2-Dichloroethene	ug/kg	<2.0	47	56.7	121	75-130	
cis-1,3-Dichloropropene	ug/kg	<2.0	47	56.2	120	74-140	
Dibromochloromethane	ug/kg	<2.0	47	56.3	120	71-133	
Dibromomethane	ug/kg	<2.0	47	54.9	117	75-136	
Dichlorodifluoromethane	ug/kg	<2.0	47	60.6	129	10-155	
Ethylbenzene	ug/kg	<2.0	47	55.1	117	59-135	
Hexachloro-1,3-butadiene	ug/kg	<2.0	47	41.0	87	19-152	
Isopropylbenzene (Cumene)	ug/kg	<2.0	47	43.7	93	56-129	
m&p-Xylene	ug/kg	<3.9	94.1	110	117	69-133	
Methyl-tert-butyl ether	ug/kg	<2.0	47	61.1	130	25-171	
Methylene Chloride	ug/kg	<2.0	47	53.7	114	50-164	
n-Butylbenzene	ug/kg	<2.0	47	39.5	84	54-121	
n-Propylbenzene	ug/kg	<2.0	47	40.7	86	56-125	CL
Naphthalene	ug/kg	<2.0	47	42.4	90	55-145	
o-Xylene	ug/kg	<2.0	47	55.5	118	71-135	
p-Isopropyltoluene	ug/kg	<2.0	47	43.3	92	54-126	
sec-Butylbenzene	ug/kg	<2.0	47	42.1	90	50-126	
Styrene	ug/kg	<2.0	47	53.6	114	73-133	
tert-Butylbenzene	ug/kg	<2.0	47	44.7	95	56-127	
Tetrachloroethene	ug/kg	<2.0	47	64.0	136	10-176	CH
Toluene	ug/kg	<2.0	47	56.9	121	66-131	
trans-1,2-Dichloroethene	ug/kg	<2.0	47	58.1	123	53-157	
trans-1,3-Dichloropropene	ug/kg	<2.0	47	55.8	119	66-144	
Trichloroethene	ug/kg	<2.0	47	53.6	114	62-130	
Trichlorofluoromethane	ug/kg	<2.0	47	56.5	120	38-166	
Vinyl chloride	ug/kg	<2.0	47	49.6	105	45-137	
Xylene (Total)	ug/kg	<3.9	141	166	118	62-135	
1,2-Dichloroethane-d4 (S)	%				92	33-150	
4-Bromofluorobenzene (S)	%				100	34-145	
Toluene-d8 (S)	%				95	43-157	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

QUALITY CONTROL DATA

Project: 1199 SUTTER AVE
Pace Project No.: 7071350

SAMPLE DUPLICATE: 423938

Parameter	Units	7070900002 Result	Dup Result	RPD	Qualifiers
1,1,1,2-Tetrachloroethane	ug/kg	<2.2	<2.0		
1,1,1-Trichloroethane	ug/kg	<2.2	<2.0		
1,1,2,2-Tetrachloroethane	ug/kg	<2.2	<2.0		CL
1,1,2-Trichloroethane	ug/kg	<2.2	<2.0		
1,1,2-Trichlorotrifluoroethane	ug/kg	<2.2	<2.0		
1,1-Dichloroethane	ug/kg	<2.2	<2.0		
1,1-Dichloroethene	ug/kg	<2.2	<2.0		
1,1-Dichloropropene	ug/kg	<2.2	<2.0		
1,2,3-Trichlorobenzene	ug/kg	<2.2	<2.0		
1,2,3-Trichloropropane	ug/kg	<2.2	<2.0		CL
1,2,4,5-tetramethylbenzene	ug/kg	<2.2	<2.0		N3
1,2,4-Trichlorobenzene	ug/kg	<2.2	<2.0		
1,2,4-Trimethylbenzene	ug/kg	<2.2	<2.0		
1,2-Dibromo-3-chloropropane	ug/kg	<2.2	<2.0		CL
1,2-Dibromoethane (EDB)	ug/kg	<2.2	<2.0		
1,2-Dichlorobenzene	ug/kg	<2.2	<2.0		
1,2-Dichloroethane	ug/kg	<2.2	<2.0		
1,2-Dichloropropane	ug/kg	<2.2	<2.0		
1,3,5-Trimethylbenzene	ug/kg	<2.2	<2.0		
1,3-Dichlorobenzene	ug/kg	<2.2	<2.0		
1,3-Dichloropropane	ug/kg	<2.2	<2.0		
1,4-Dichlorobenzene	ug/kg	<2.2	<2.0		
2,2-Dichloropropane	ug/kg	<2.2	<2.0		
2-Butanone (MEK)	ug/kg	<2.2	<2.0		
2-Chlorotoluene	ug/kg	<2.2	<2.0		CL
4-Chlorotoluene	ug/kg	<2.2	<2.0		CL
4-Methyl-2-pentanone (MIBK)	ug/kg	<2.2	<2.0		
Acetone	ug/kg	<2.2	<2.0		
Benzene	ug/kg	<2.2	<2.0		
Bromobenzene	ug/kg	<2.2	<2.0		
Bromochloromethane	ug/kg	<2.2	<2.0		
Bromodichloromethane	ug/kg	<2.2	<2.0		
Bromoform	ug/kg	<2.2	<2.0		
Bromomethane	ug/kg	<2.2	<2.0		
Carbon tetrachloride	ug/kg	<2.2	<2.0		
Chlorobenzene	ug/kg	<2.2	<2.0		
Chlorodifluoromethane	ug/kg	<2.2	<2.0		N3
Chloroethane	ug/kg	<2.2	<2.0		
Chloroform	ug/kg	<2.2	<2.0		
Chloromethane	ug/kg	<2.2	<2.0		
cis-1,2-Dichloroethene	ug/kg	<2.2	<2.0		
cis-1,3-Dichloropropene	ug/kg	<2.2	<2.0		
Dibromochloromethane	ug/kg	<2.2	<2.0		
Dibromomethane	ug/kg	<2.2	<2.0		
Dichlorodifluoromethane	ug/kg	<2.2	<2.0		
Ethylbenzene	ug/kg	<2.2	<2.0		
Hexachloro-1,3-butadiene	ug/kg	<2.2	<2.0		

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

QUALITY CONTROL DATA

Project: 1199 SUTTER AVE
Pace Project No.: 7071350

SAMPLE DUPLICATE: 423938

Parameter	Units	7070900002 Result	Dup Result	RPD	Qualifiers
Isopropylbenzene (Cumene)	ug/kg	<2.2	<2.0		
m&p-Xylene	ug/kg	<4.5	<3.9		
Methyl-tert-butyl ether	ug/kg	<2.2	<2.0		
Methylene Chloride	ug/kg	<2.2	<2.0		
n-Butylbenzene	ug/kg	<2.2	<2.0		
n-Propylbenzene	ug/kg	<2.2	<2.0		CL
Naphthalene	ug/kg	<2.2	<2.0		
o-Xylene	ug/kg	<2.2	<2.0		
p-Isopropyltoluene	ug/kg	<2.2	<2.0		
sec-Butylbenzene	ug/kg	<2.2	<2.0		
Styrene	ug/kg	<2.2	<2.0		
tert-Butylbenzene	ug/kg	<2.2	<2.0		
Tetrachloroethene	ug/kg	<2.2	<2.0		
Toluene	ug/kg	<2.2	<2.0		
trans-1,2-Dichloroethene	ug/kg	<2.2	<2.0		
trans-1,3-Dichloropropene	ug/kg	<2.2	<2.0		
Trichloroethene	ug/kg	<2.2	<2.0		
Trichlorofluoromethane	ug/kg	<2.2	<2.0		
Vinyl chloride	ug/kg	<2.2	<2.0		
Xylene (Total)	ug/kg	<4.5	<3.9		
1,2-Dichloroethane-d4 (S)	%	109	100	21	
4-Bromofluorobenzene (S)	%	99	102	10	
Toluene-d8 (S)	%	95	97	11	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
575 Broad Hollow Road
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(631)694-3040

QUALITY CONTROL DATA

Project: 1199 SUTTER AVE
Pace Project No.: 7071350

QC Batch: 91923
QC Batch Method: EPA 3545A
Associated Lab Samples: 7071350001

Analysis Method: EPA 8270D
Analysis Description: 8270 Solid MSSV

METHOD BLANK: 424086
Matrix: Solid
Associated Lab Samples: 7071350001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,2,4,5-Tetrachlorobenzene	ug/kg	<67.0	67.0	11/26/18 13:22	
1,2,4-Trichlorobenzene	ug/kg	<67.0	67.0	11/26/18 13:22	
1,2-Dichlorobenzene	ug/kg	<67.0	67.0	11/26/18 13:22	
1,3-Dichlorobenzene	ug/kg	<67.0	67.0	11/26/18 13:22	
1,4-Dichlorobenzene	ug/kg	<67.0	67.0	11/26/18 13:22	
2,2'-Oxybis(1-chloropropane)	ug/kg	<67.0	67.0	11/26/18 13:22	
2,4,5-Trichlorophenol	ug/kg	<67.0	67.0	11/26/18 13:22	
2,4,6-Trichlorophenol	ug/kg	<67.0	67.0	11/26/18 13:22	
2,4-Dichlorophenol	ug/kg	<67.0	67.0	11/26/18 13:22	
2,4-Dimethylphenol	ug/kg	<67.0	67.0	11/26/18 13:22	
2,4-Dinitrophenol	ug/kg	<670	670	11/26/18 13:22	
2,4-Dinitrotoluene	ug/kg	<330	330	11/26/18 13:22	
2,6-Dinitrotoluene	ug/kg	<330	330	11/26/18 13:22	
2-Chloronaphthalene	ug/kg	<67.0	67.0	11/26/18 13:22	
2-Chlorophenol	ug/kg	<67.0	67.0	11/26/18 13:22	
2-Methylnaphthalene	ug/kg	<67.0	67.0	11/26/18 13:22	
2-Methylphenol(o-Cresol)	ug/kg	<67.0	67.0	11/26/18 13:22	
2-Nitroaniline	ug/kg	<330	330	11/26/18 13:22	
2-Nitrophenol	ug/kg	<330	330	11/26/18 13:22	
3&4-Methylphenol(m&p Cresol)	ug/kg	<67.0	67.0	11/26/18 13:22	
3,3'-Dichlorobenzidine	ug/kg	<330	330	11/26/18 13:22	
3-Nitroaniline	ug/kg	<330	330	11/26/18 13:22	
4,6-Dinitro-2-methylphenol	ug/kg	<670	670	11/26/18 13:22	
4-Bromophenylphenyl ether	ug/kg	<67.0	67.0	11/26/18 13:22	
4-Chloro-3-methylphenol	ug/kg	<67.0	67.0	11/26/18 13:22	
4-Chloroaniline	ug/kg	<330	330	11/26/18 13:22	
4-Chlorophenylphenyl ether	ug/kg	<67.0	67.0	11/26/18 13:22	
4-Nitroaniline	ug/kg	<330	330	11/26/18 13:22	
4-Nitrophenol	ug/kg	<670	670	11/26/18 13:22	
Acenaphthene	ug/kg	<67.0	67.0	11/26/18 13:22	
Acenaphthylene	ug/kg	<67.0	67.0	11/26/18 13:22	
Anthracene	ug/kg	<67.0	67.0	11/26/18 13:22	
Benzaldehyde	ug/kg	<67.0	67.0	11/26/18 13:22	CL,IC
Benzo(a)anthracene	ug/kg	<67.0	67.0	11/26/18 13:22	
Benzo(a)pyrene	ug/kg	<67.0	67.0	11/26/18 13:22	
Benzo(b)fluoranthene	ug/kg	<67.0	67.0	11/26/18 13:22	
Benzo(g,h,i)perylene	ug/kg	<67.0	67.0	11/26/18 13:22	
Benzo(k)fluoranthene	ug/kg	<67.0	67.0	11/26/18 13:22	
bis(2-Chloroethoxy)methane	ug/kg	<67.0	67.0	11/26/18 13:22	
bis(2-Chloroethyl) ether	ug/kg	<67.0	67.0	11/26/18 13:22	
bis(2-Ethylhexyl)phthalate	ug/kg	<67.0	67.0	11/26/18 13:22	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

QUALITY CONTROL DATA

Project: 1199 SUTTER AVE
Pace Project No.: 7071350

METHOD BLANK: 424086 Matrix: Solid
Associated Lab Samples: 7071350001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Butylbenzylphthalate	ug/kg	<67.0	67.0	11/26/18 13:22	
Carbazole	ug/kg	<67.0	67.0	11/26/18 13:22	
Chrysene	ug/kg	<67.0	67.0	11/26/18 13:22	
Di-n-butylphthalate	ug/kg	<67.0	67.0	11/26/18 13:22	
Di-n-octylphthalate	ug/kg	<67.0	67.0	11/26/18 13:22	
Dibenz(a,h)anthracene	ug/kg	<67.0	67.0	11/26/18 13:22	
Dibenzofuran	ug/kg	<67.0	67.0	11/26/18 13:22	
Diethylphthalate	ug/kg	<67.0	67.0	11/26/18 13:22	
Dimethylphthalate	ug/kg	<67.0	67.0	11/26/18 13:22	
Fluoranthene	ug/kg	<67.0	67.0	11/26/18 13:22	
Fluorene	ug/kg	<67.0	67.0	11/26/18 13:22	
Hexachloro-1,3-butadiene	ug/kg	<67.0	67.0	11/26/18 13:22	
Hexachlorobenzene	ug/kg	<67.0	67.0	11/26/18 13:22	
Hexachlorocyclopentadiene	ug/kg	<330	330	11/26/18 13:22	CL,IC
Hexachloroethane	ug/kg	<67.0	67.0	11/26/18 13:22	
Indeno(1,2,3-cd)pyrene	ug/kg	<67.0	67.0	11/26/18 13:22	
Isophorone	ug/kg	<67.0	67.0	11/26/18 13:22	
N-Nitroso-di-n-propylamine	ug/kg	<67.0	67.0	11/26/18 13:22	
N-Nitrosodiphenylamine	ug/kg	<67.0	67.0	11/26/18 13:22	
Naphthalene	ug/kg	<67.0	67.0	11/26/18 13:22	
Nitrobenzene	ug/kg	<67.0	67.0	11/26/18 13:22	
Pentachlorophenol	ug/kg	<670	670	11/26/18 13:22	
Phenanthrene	ug/kg	<67.0	67.0	11/26/18 13:22	
Phenol	ug/kg	<67.0	67.0	11/26/18 13:22	
Pyrene	ug/kg	<67.0	67.0	11/26/18 13:22	
1,2-Dichlorobenzene-d4 (S)	%	67	20-130	11/26/18 13:22	
2,4,6-Tribromophenol (S)	%	60	19-122	11/26/18 13:22	
2-Chlorophenol-d4 (S)	%	70	20-130	11/26/18 13:22	
2-Fluorobiphenyl (S)	%	71	30-115	11/26/18 13:22	
2-Fluorophenol (S)	%	68	25-121	11/26/18 13:22	
Nitrobenzene-d5 (S)	%	71	23-120	11/26/18 13:22	
p-Terphenyl-d14 (S)	%	87	18-137	11/26/18 13:22	
Phenol-d5 (S)	%	73	24-113	11/26/18 13:22	

LABORATORY CONTROL SAMPLE: 424087

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2,4,5-Tetrachlorobenzene	ug/kg	1670	1300	78	37-133	
1,2,4-Trichlorobenzene	ug/kg	1670	1190	71	35-110	
1,2-Dichlorobenzene	ug/kg	1670	1240	74	36-107	
1,3-Dichlorobenzene	ug/kg	1670	1180	71	34-104	
1,4-Dichlorobenzene	ug/kg	1670	1200	72	35-108	
2,2'-Oxybis(1-chloropropane)	ug/kg	1670	1230	74	33-116	
2,4,5-Trichlorophenol	ug/kg	1670	1460	87	45-111	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

QUALITY CONTROL DATA

Project: 1199 SUTTER AVE
Pace Project No.: 7071350

LABORATORY CONTROL SAMPLE: 424087

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
2,4,6-Trichlorophenol	ug/kg	1670	1420	85	45-110	
2,4-Dichlorophenol	ug/kg	1670	1290	77	41-117	
2,4-Dimethylphenol	ug/kg	1670	1030	62	24-96	
2,4-Dinitrophenol	ug/kg	1670	1140	69	10-80	
2,4-Dinitrotoluene	ug/kg	1670	1390	83	49-112	
2,6-Dinitrotoluene	ug/kg	1670	1360	81	50-109	
2-Chloronaphthalene	ug/kg	1670	1230	74	35-107	
2-Chlorophenol	ug/kg	1670	1320	79	36-109	
2-Methylnaphthalene	ug/kg	1670	1230	74	31-135	
2-Methylphenol(o-Cresol)	ug/kg	1670	1250	75	36-104	
2-Nitroaniline	ug/kg	1670	1330	80	42-118	
2-Nitrophenol	ug/kg	1670	1210	72	36-117	
3&4-Methylphenol(m&p Cresol)	ug/kg	1670	1220	73	37-137	
3,3'-Dichlorobenzidine	ug/kg	1670	875	53	41-116	
3-Nitroaniline	ug/kg	1670	916	55	40-95	
4,6-Dinitro-2-methylphenol	ug/kg	1670	1240	74	16-104	
4-Bromophenylphenyl ether	ug/kg	1670	1370	82	50-116	
4-Chloro-3-methylphenol	ug/kg	1670	1330	80	45-118	
4-Chloroaniline	ug/kg	1670	<330	19	29-88	L2
4-Chlorophenylphenyl ether	ug/kg	1670	1340	80	48-111	
4-Nitroaniline	ug/kg	1670	1090	65	46-110	
4-Nitrophenol	ug/kg	1670	1480	89	26-118	
Acenaphthene	ug/kg	1670	1320	79	45-109	
Acenaphthylene	ug/kg	1670	1350	81	43-107	
Anthracene	ug/kg	1670	1430	86	50-117	
Benzaldehyde	ug/kg	1670	1900	114	40-140	CL,IC,IH
Benzo(a)anthracene	ug/kg	1670	1490	90	52-116	
Benzo(a)pyrene	ug/kg	1670	1650	99	56-119	
Benzo(b)fluoranthene	ug/kg	1670	1640	99	45-122	
Benzo(g,h,i)perylene	ug/kg	1670	1640	98	30-107	
Benzo(k)fluoranthene	ug/kg	1670	1710	103	54-124	
bis(2-Chloroethoxy)methane	ug/kg	1670	1230	74	29-112	
bis(2-Chloroethyl) ether	ug/kg	1670	1180	71	32-116	
bis(2-Ethylhexyl)phthalate	ug/kg	1670	1480	89	60-127	
Butylbenzylphthalate	ug/kg	1670	1470	88	54-130	
Carbazole	ug/kg	1670	1450	87	40-120	
Chrysene	ug/kg	1670	1600	96	48-121	
Di-n-butylphthalate	ug/kg	1670	1610	97	53-124	
Di-n-octylphthalate	ug/kg	1670	1690	102	46-141	
Dibenz(a,h)anthracene	ug/kg	1670	1670	100	52-109	
Dibenzofuran	ug/kg	1670	1380	83	48-112	
Diethylphthalate	ug/kg	1670	1350	81	51-114	
Dimethylphthalate	ug/kg	1670	1340	81	49-112	
Fluoranthene	ug/kg	1670	1560	94	45-126	
Fluorene	ug/kg	1670	1340	81	47-108	
Hexachloro-1,3-butadiene	ug/kg	1670	1190	71	36-118	
Hexachlorobenzene	ug/kg	1670	1370	82	51-110	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

QUALITY CONTROL DATA

Project: 1199 SUTTER AVE
Pace Project No.: 7071350

LABORATORY CONTROL SAMPLE: 424087

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Hexachlorocyclopentadiene	ug/kg	1670	3330	200	10-97	CL,IC,IH,L1
Hexachloroethane	ug/kg	1670	1170	70	34-105	
Indeno(1,2,3-cd)pyrene	ug/kg	1670	1690	101	50-108	
Isophorone	ug/kg	1670	1200	72	14-129	
N-Nitroso-di-n-propylamine	ug/kg	1670	1250	75	33-109	
N-Nitrosodiphenylamine	ug/kg	1670	1350	81	39-90	
Naphthalene	ug/kg	1670	1240	74	18-142	
Nitrobenzene	ug/kg	1670	1170	70	36-119	
Pentachlorophenol	ug/kg	1670	1260	75	22-115	
Phenanthrene	ug/kg	1670	1430	86	47-124	
Phenol	ug/kg	1670	1220	73	38-104	
Pyrene	ug/kg	1670	1530	92	49-132	
1,2-Dichlorobenzene-d4 (S)	%			71	20-130	
2,4,6-Tribromophenol (S)	%			88	19-122	
2-Chlorophenol-d4 (S)	%			80	20-130	
2-Fluorobiphenyl (S)	%			82	30-115	
2-Fluorophenol (S)	%			81	25-121	
Nitrobenzene-d5 (S)	%			70	23-120	
p-Terphenyl-d14 (S)	%			94	18-137	
Phenol-d5 (S)	%			81	24-113	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 424172 424173

Parameter	Units	7071129001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
1,2,4,5-Tetrachlorobenzene	ug/kg	<817	2040	2040	1760	1520	86	74	37-133	15	
1,2,4-Trichlorobenzene	ug/kg	<817	2040	2040	1620	1560	79	76	35-110	4	
1,2-Dichlorobenzene	ug/kg	<817	2040	2040	1310	1240	64	61	36-107	6	
1,3-Dichlorobenzene	ug/kg	<817	2040	2040	1190	1180	58	58	34-104	0	
1,4-Dichlorobenzene	ug/kg	<817	2040	2040	1250	1240	61	60	35-108	1	
2,2'-Oxybis(1-chloropropane)	ug/kg	<817	2040	2040	1450	1320	71	65	33-116	9	
2,4,5-Trichlorophenol	ug/kg	<817	2040	2040	1960	1620	96	79	45-111	19	
2,4,6-Trichlorophenol	ug/kg	<817	2040	2040	1580	1350	77	66	45-110	15	
2,4-Dichlorophenol	ug/kg	<817	2040	2040	1840	1660	90	81	41-117	10	
2,4-Dimethylphenol	ug/kg	<817	2040	2040	1960	1660	96	81	24-96	16	
2,4-Dinitrophenol	ug/kg	<8170	2040	2040	<8220	<8220	243	240	10-80		M6
2,4-Dinitrotoluene	ug/kg	<4020	2040	2040	<4050	<4050	107	84	49-112		
2,6-Dinitrotoluene	ug/kg	<4020	2040	2040	<4050	<4050	99	84	50-109		
2-Chloronaphthalene	ug/kg	<817	2040	2040	1630	1430	80	70	35-107	13	
2-Chlorophenol	ug/kg	<817	2040	2040	1520	1330	74	65	36-109	13	
2-Methylnaphthalene	ug/kg	2320	2040	2040	5390	5480	150	154	31-135	2	M6
2-Methylphenol(o-Cresol)	ug/kg	<817	2040	2040	1590	1340	78	66	36-104	17	
2-Nitroaniline	ug/kg	<4020	2040	2040	<4050	<4050	85	68	42-118		
2-Nitrophenol	ug/kg	<4020	2040	2040	<4050	<4050	77	68	36-117		

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

QUALITY CONTROL DATA

Project: 1199 SUTTER AVE
Pace Project No.: 7071350

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 424172 424173

Parameter	Units	7071129001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
3&4-Methylphenol(m&p Cresol)	ug/kg	<817	2040	2040	1710	1440	84	71	37-137	17	
3,3'-Dichlorobenzidine	ug/kg	<4020	2040	2040	<4050	<4050	58	54	41-116		
3-Nitroaniline	ug/kg	<4020	2040	2040	<4050	<4050	98	70	40-95		M6
4,6-Dinitro-2-methylphenol	ug/kg	<8170	2040	2040	<8220	<8220	128	122	16-104		M6
4-Bromophenylphenyl ether	ug/kg	<817	2040	2040	2180	1870	106	92	50-116	15	
4-Chloro-3-methylphenol	ug/kg	<817	2040	2040	2140	1860	105	91	45-118	14	
4-Chloroaniline	ug/kg	<4020	2040	2040	<4050	<4050	43	41	29-88		
4-Chlorophenylphenyl ether	ug/kg	<817	2040	2040	2000	1730	98	85	48-111	14	
4-Nitroaniline	ug/kg	<4020	2040	2040	<4050	<4050	95	72	46-110		
4-Nitrophenol	ug/kg	<8170	2040	2040	<8220	<8220	94	90	26-118		
Acenaphthene	ug/kg	<817	2040	2040	2620	2310	128	113	45-109	13	M6
Acenaphthylene	ug/kg	1650	2040	2040	4580	3850	143	107	43-107	17	M6
Anthracene	ug/kg	<817	2040	2040	3610	3230	177	158	50-117	11	M6
Benzaldehyde	ug/kg	<817	2040	2040	2300	2090	112	102	40-140	9	CL,IC,IH
Benzo(a)anthracene	ug/kg	6830	2040	2040	12900	11600	299	235	52-116	11	M6
Benzo(a)pyrene	ug/kg	6490	2040	2040	12500	10700	295	204	56-119	16	M6
Benzo(b)fluoranthene	ug/kg	6850	2040	2040	12700	11300	286	217	45-122	12	M6
Benzo(g,h,i)perylene	ug/kg	4500	2040	2040	9840	8120	261	177	30-107	19	M6
Benzo(k)fluoranthene	ug/kg	4000	2040	2040	7740	6620	183	128	54-124	16	M6
bis(2-Chloroethoxy)methane	ug/kg	<817	2040	2040	1660	1480	81	73	29-112	12	
bis(2-Chloroethyl) ether	ug/kg	<817	2040	2040	1160	1070	57	52	32-116	8	
bis(2-Ethylhexyl)phthalate	ug/kg	<817	2040	2040	2300	2010	112	98	60-127	13	
Butylbenzylphthalate	ug/kg	<817	2040	2040	2150	1820	105	89	54-130	17	
Carbazole	ug/kg	<817	2040	2040	2300	1990	112	97	40-120	14	
Chrysene	ug/kg	7040	2040	2040	13400	11800	312	233	48-121	13	M6
Di-n-butylphthalate	ug/kg	<817	2040	2040	2430	2090	119	102	53-124	15	
Di-n-octylphthalate	ug/kg	<817	2040	2040	2160	2040	105	100	46-141	6	
Dibenz(a,h)anthracene	ug/kg	1270	2040	2040	4300	3730	148	120	52-109	14	M6
Dibenzofuran	ug/kg	<817	2040	2040	2580	2140	126	105	48-112	18	M6
Diethylphthalate	ug/kg	<817	2040	2040	2000	1630	98	80	51-114	20	
Dimethylphthalate	ug/kg	<817	2040	2040	1980	1690	97	83	49-112	15	
Fluoranthene	ug/kg	8820	2040	2040	16700	15800	384	344	45-126	5	M6
Fluorene	ug/kg	<817	2040	2040	2910	2580	142	126	47-108	12	M6
Hexachloro-1,3-butadiene	ug/kg	<817	2040	2040	1550	1470	76	72	36-118	5	
Hexachlorobenzene	ug/kg	<817	2040	2040	2180	1970	107	96	51-110	10	
Hexachlorocyclopentadiene	ug/kg	<4020	2040	2040	<4050	<4050	51	40	10-97		CL,IC,IH
Hexachloroethane	ug/kg	<817	2040	2040	1410	1440	69	70	34-105	2	
Indeno(1,2,3-cd)pyrene	ug/kg	4630	2040	2040	9610	8020	243	166	50-108	18	M6
Isophorone	ug/kg	<817	2040	2040	1760	1570	86	77	14-129	12	
N-Nitroso-di-n-propylamine	ug/kg	<817	2040	2040	1510	1320	74	64	33-109	14	
N-Nitrosodiphenylamine	ug/kg	<817	2040	2040	3220	2970	158	145	39-90	8	M6
Naphthalene	ug/kg	<817	2040	2040	1960	1780	96	87	18-142	10	
Nitrobenzene	ug/kg	<817	2040	2040	1560	1430	77	70	36-119	9	
Pentachlorophenol	ug/kg	<8170	2040	2040	<8220	<8220	167	162	22-115		M6
Phenanthrene	ug/kg	1560	2040	2040	4620	4310	150	135	47-124	7	M6

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

QUALITY CONTROL DATA

Project: 1199 SUTTER AVE
Pace Project No.: 7071350

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 424172 424173

Parameter	Units	7071129001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Phenol	ug/kg	<817	2040	2040	1370	1150	67	56	38-104	18	
Pyrene	ug/kg	9910	2040	2040	18100	16800	399	336	49-132	7	M6
1,2-Dichlorobenzene-d4 (S)	%						55	54	20-130		
2,4,6-Tribromophenol (S)	%						83	67	19-122		
2-Chlorophenol-d4 (S)	%						75	65	20-130		
2-Fluorobiphenyl (S)	%						88	76	30-115		
2-Fluorophenol (S)	%						74	67	25-121		
Nitrobenzene-d5 (S)	%						77	68	23-120		
p-Terphenyl-d14 (S)	%						116	96	18-137		
Phenol-d5 (S)	%						80	64	24-113		

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

QUALITY CONTROL DATA

Project: 1199 SUTTER AVE
Pace Project No.: 7071350

QC Batch: 92504
QC Batch Method: ASTM D2216-92M
Analysis Method: ASTM D2216-92M
Analysis Description: Dry Weight/Percent Moisture
Associated Lab Samples: 7071350001, 7071350002

SAMPLE DUPLICATE: 426914

Parameter	Units	7070835001 Result	Dup Result	RPD	Qualifiers
Percent Moisture	%	72.5	72.6	0	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

QUALIFIERS

Project: 1199 SUTTER AVE
Pace Project No.: 7071350

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

SAMPLE QUALIFIERS

Sample: 7071350001

[1] Sample not collected according to EPA Method 5035A low level specifications. Results may be biased low.

ANALYTE QUALIFIERS

CH	The continuing calibration for this compound is outside of Pace Analytical acceptance limits. The results may be biased high.
CL	The continuing calibration for this compound is outside of Pace Analytical acceptance limits. The results may be biased low.
IC	The initial calibration for this compound was outside of method control limits. The result is estimated.
IH	This analyte exceeded secondary source verification criteria high for the initial calibration. The reported results should be considered an estimated value.
L1	Analyte recovery in the laboratory control sample (LCS) was above QC limits. Results for this analyte in associated samples may be biased high.
L2	Analyte recovery in the laboratory control sample (LCS) was below QC limits. Results for this analyte in associated samples may be biased low.
M6	Matrix spike and Matrix spike duplicate recovery not evaluated against control limits due to sample dilution.
N3	Accreditation is not offered by the relevant laboratory accrediting body for this parameter.

Pace Analytical Services, LLC
575 Broad Hollow Road
Melville, NY 11747
(631)694-3040

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 1199 SUTTER AVE
Pace Project No.: 7071350

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
7071350002	**COMPOSITE DRUM SAMPLE**	EPA 3005A	92002	EPA 6010C	92034
7071350002	**COMPOSITE DRUM SAMPLE**	EPA 7470A	92006	EPA 7470A	92037
7071350001	**COMPOSITE DRUM SAMPLE**	EPA 3545A	91923	EPA 8270D	92293
7071350001	**COMPOSITE DRUM SAMPLE**	EPA 5035A-L	91882	EPA 8260C	92016
7071350001	**COMPOSITE DRUM SAMPLE**	EPA 8260			
7071350001	**COMPOSITE DRUM SAMPLE**	ASTM D2216-92M	92504		
7071350002	**COMPOSITE DRUM SAMPLE**	ASTM D2216-92M	92504		

1-8oz 1-4oz Composite soil sample from drums

Sutter Ave 01.991 373.00 Task 02.0000

extra jars

Pace Analytical®
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Docum

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accu

WO#:7071350

7071350

Section A Required Client Information:	Section B Required Project Information:	Section C Invoice Information:
Company: EnviroTrac Ltd.	Report To: Tracy Wall	Attention:
Address: 5 Old Dock Road, Yaphank, NY 11980	Copy To:	Company Name:
		Address:
Email To: tracyw@envirotrac.com	Purchase Order No.:	Pace Quote Reference:
Phone: 631-924-3001 Fax: 631-924-5001	Project Name: 1199 Sutter Avenue	Pace Project Manager:
Requested Due Date/TAT: Standard	Project Number: 01.991373.00, Task 02.0000	Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER _____

Site Location STATE: NY

Requested Analysis Filtered (Y/N)

ITEM #	Section D Required Client Information — SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE	Matrix Codes (MATRIX / CODE): Drinking Water DW, Water WT, Waste Water WW, Product P, Soil/Solid SL, Oil OL, Wipe WP, Air AR, Tissue TS, Other OT	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Y/N	Analysis Test: VOCs 8260	SVOCs 8270	TCLP Metals	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	composite drum sample		S	C	11-14-18	8:14	11-14-18	8:15		2	2								X	X	X		001/002
2																								
3																								
4																								
5																								
6																								
7																								
8																								
9																								
10																								
11																								
12																								

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
	EnviroTrac Ltd.	11/14/18			11/16/18	1510	
		11/16/18	1650		11/16/18	16:50	2.4 — — —

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Josh Levy

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 11/16/18

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

Pace Analytical
Lang Island Laboratory

Sample Condition Upon Receipt

WO#:7071350

PM: JDS Due Date: 11/20/18
CLIENT: SPDWY ENVIRO

Client Name: Enviroflac **Projec**

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other

Tracking #:

Custody Seal on Cooler/Box Present: ☐ Yes ☐ No **Seals intact:** ☐ Yes ☐ No

Temperature Blank Present: ☐ Yes ☐ No

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☐ Ziploc ☐ None ☐ Other

Type of Ice: Wet Blue None

Thermometer Used: TH091 **Correction Factor:** 0.0

☐ Samples on ice, cooling process has begun

Cooler Temperature (°C): 2.4 **Cooler Temperature Corrected (°C):** 2.4

Date/Time 5035A kits placed in freezer

Temp should be above freezing to 6.0°C

USDA Regulated Soil (☐ N/A, water sample)

Date and Initials of person examining contents: 11/16/18

Did samples originate in a quarantine zone within the United States: AL, AR, CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX, or VA (check map)? ☐ YES ☐ NO

Did samples orignate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

If Yes to either question, fill out a Regulated Soil Checklist (F-LI-C-010) and include with SCUR/COC paperwork.

				COMMENTS:
Chain of Custody Present:	☐Yes	☐No		1.
Chain of Custody Filled Out:	☐Yes	☐No		2.
Chain of Custody Relinquished:	☐Yes	☐No		3.
Sampler Name & Signature on COC:	☐Yes	☐No	☐N/A	4.
Samples Arrived within Hold Time:	☐Yes	☐No		5.
Short Hold Time Analysis (<72hr):	☐Yes	☐No		6.
Rush Turn Around Time Requested:	☐Yes	☐No		7.
Sufficient Volume: (Triple volume provided for MS/MSD	☐Yes	☐No		8.
Correct Containers Used:	☐Yes	☐No		9.
-Pace Containers Used:	☐Yes	☐No		
Containers Intact:	☐Yes	☐No		10.
Filtered volume received for Dissolved tests	☐Yes	☐No	☐N/A	11. Note if sediment is visible in the dissolved container.
Sample Labels match COC:	☐Yes	☐No		12.
-Includes date/time/ID/Analysis Matrix SL WT OIL				
All containers needing preservation have been checked	☐Yes	☐No	☐N/A	13. ☐ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
pH paper Lot #				Sample #
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl, NaOH>9 Sulfide, NAOH>12 Cyanide) Exceptions: VOA, Coliform, TOC/DOC, Oil and Grease, DRO/8015 (water). Per Method, VOA pH is checked after analysis	☐Yes	☐No	☐N/A	Initial when completed: / Lot # of added preservative: / Date/Time preservative added:
Samples checked for dechlorination:	☐Yes	☐No	☐N/A	14.
KI starch test strips Lot #				Positive for Res. Chlorine? Y N
Residual chlorine strips Lot #				
Headspace in VOA Vials (>6mm):	☐Yes	☐No	☐N/A	15.
Trip Blank Present:	☐Yes	☐No	☐N/A	16.
Trip Blank Custody Seals Present	☐Yes	☐No	☐N/A	
Pace Trip Blank Lot # (if applicable):				

Client Notification/ Resolution: Field Data Required? Y / N

Person Contacted: Date/Time:

Comments/ Resolution:

*** PM (Project Manager) review is documented electronically in LIMS.**

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Materials Management, Bureau of Hazardous Waste and Radiation Management
625 Broadway, 9th Floor, Albany, New York 12233-7256
P: (518) 402-8651 | F: (518) 402-9024
www.dec.ny.gov

November 29, 2018

Ms. Tracy Wall
Project Manager
EnviroTrac Ltd.
5 Old Dock Road
Yaphank NY 11980

Re: 1199 Sutter Avenue
Brooklyn, NY
BCP Site No. C224141

Dear Ms. Wall:

We have completed our review of the soil sampling data (Lab Sample ID: 7071350001) submitted with your November 28, 2018 request for a "contained-in" determination for the referenced project. Concentrations detected for individual VOCs, SVOCs were all significantly less than their current "contained-in" soil action levels, and Land Disposal Restriction concentrations. No hazardous constituents exhibited a hazardous waste characteristic by exceeding their TCLP regulatory level.

Concentrations for trichloroethene and tetrachloroethene were below the soil "contained-in" action level and the Land Disposal Restriction concentration. Therefore, four (4) 55-gallon drums, containing soil during the trenching and installation of soil vapor extraction system (SVE) and air sparge (AS) piping for the remediation system at the above-referenced site, do not have to be managed as hazardous waste and can be transported off-site to permitted solid waste landfill with liner and leachate collection system, for disposal. Please provide the Department the name and address of the facility that will receive it, for disposal.

Should you have any questions regarding the content of this letter, please do not hesitate to contact me at (518) 402-9611 or email me at henry.wilkie@dec.ny.gov.

Sincerely,

Henry Wilkie
Assistant Environmental Engineer
RCRA Permitting Section

ec: M. Maccabe, DER

APPENDIX M

REMEDIAL SYSTEM OPTIMIZATION TABLE OF CONTENTS

REMEDIAL SYSTEM OPTIMIZATION FOR AAA Sutter Realty LLC, 1199 Sutter Avenue, Brooklyn, New York

TABLE OF CONTENTS

APPENDIX K

PERMITS AND/OR PERMIT EQUIVALENT

NYC Department of Transportation

Office of Permit Management

STREET OPENING PERMIT

PERMIT#: B01-2018260-B18

ISSUED DATE:	9/17/2018	**PERMIT VALID FROM:**	9/17/2018	**TO:**	10/1/2018
BOROUGH:	BROOKLYN	**PERMIT TYPE:**	0126 - TEST PITS, CORES OR BORING		
FEES (NON-REFUNDABLE):		**ROADWAY TYPE:**			
ADMINISTRATION FEE	$135.00	**SIDEWALK TYPE:**	CONCRETE		
TOTAL :	$135.00 PAID				

PERMISSION HEREBY GRANTED TO:

NAME:	ASSOCIATED ENVIRONMENTAL SERVICES, LTD.	**LICENSE #:**	None
CONTACT NAME:	SCHRETZMAYER JOHN	**CONTRACT #:**	None
PHONE:	6312344280	**SPONSORING AGENCY:**	None
ADDRESS:	25 - CENTRAL AVENUE HAUPPAUGE NY 11788		

TO OPEN THE SIDEWALK AT:

HOUSE#:	1199		
ON STREET:	SUTTER AVENUE		
FROM STREET:	CHESTNUT STREET		
TO STREET:	CRYSTAL STREET		
LOCATION DETAILS:			
FOR PURPOSE OF:	WELL INSTALLATION BEING DONE FOR THE NYSDEC AT 1199 SUTTER AVE BETWEEB CHESNUT ST AND CRYSTAL ST.		
RELATED AGENCY #:			
FOR MAX. LENGTH OF:	15 FT		
INSPECT DIST:	3	**COMM. BOARD:**	05
RECORDED:	None	**SEQUENCE #:**	0001
TRACKING #:	2018091401071170		

Note: If House Number is not provided Permittee shall use "Location Details" box to indicate a specific location of the work area within a block (for all non-Contract work, i.e. Contract #: None).

PERMITTEE SHALL COMPLY WITH ALL APPLICABLE LAWS, RULES AND SPECIFICATIONS OF THE NEW YORK CITY DEPARTMENT OF TRANSPORTATION AND WITH THE TERMS AND CONDITIONS OF THE PERMIT. FAILURE TO COMPLY MAY RESULT IN REVOCATION OF THE PERMIT BY THE COMMISSIONER.

TAMPERING WITH OR KNOWINGLY MAKING A FALSE ENTRY IN OR FALSELY ALTERING THIS PERMIT MAY RESULT IN A RESTRICTION IN OBTAINING FUTURE NYCDOT PERMITS.

NYS LAW

NYC Department of Transportation

Office of Permit Management

STREET OPENING PERMIT

PERMIT#: B01-2018260-B18

CALL NEW YORK 811, INC. AT 1-800-272-4480 OR 811 BEFORE STREET OPENING EXCAVATIONS. NEW YORK STATE INDUSTRIAL CODE RULE 753 MANDATES 2-10 BUSINESS DAYS NOTICE PRIOR TO DIGGING.

PERMITTEE SHALL COMPLY WITH ALL OF THE FOLLOWING STIPULATIONS

SPECIFIC STIPULATION	DP
013	MAINTAIN A MINIMUM 5 FOOT CLEAR PEDESTRIAN WALK ON THE SIDEWALK
038	ALL TEMPORARY TRAFFIC CONTROL DEVICES, INCLUDING BUT NOT LIMITED TO SIGNS, CHANNELIZING DEVICES, FENCING AND MARKINGS SHALL BE PROVIDED, INSTALLED, MAINTAINED AND REMOVED BY THE PERMITTEE IN ACCORDANCE WITH THE MOST RECENT VERSION OF PART 6 OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS (MUTCD). OBTAIN THE MUTCD AT HTTP://MUTCD.FHWA.DOT.GOV .
082	WORK 7AM - 4PM, MONDAY THROUGH FRIDAY
091	THIS PERMIT ACTIVITY MAY NOT START UNTIL THE PERMITTEE COORDINATES ALL WORK WITH ANY ONGOING CONSTRUCTION AND WITH THE PROJECT/RESIDENT ENGINEER FOR ANY ONGOING CAPITAL PROJECTS.
103	PARKING OF NON-COMMERCIAL VEHICLES ON THE STREET (ROADWAY AND SIDEWALK) WITHIN WORK ZONES IS PROHIBITED.
NOISE1	BY SUBMITTING THIS APPLICATION AND/OR RENEWAL REQUEST, THE PERMITTEE CERTIFIES ITS COMPLIANCE WITH ALL APPLICABLE CITYWIDE CONSTRUCTION NOISE MITIGATION REQUIREMENTS INCLUDING, BUT NOT LIMITED TO THE DEVELOPMENT OF A COMPLIANT NOISE MITIGATION OR ALTERNATIVE NOISE MITIGATION PLAN. PLEASE CONTACT THE NYC DEPARTMENT OF ENVIRONMENTAL PROTECTION (WWW.NYC.GOV/HTML/DEP/HTML/NOISE/CONSTRUCTION-NOISE.SHTML) FOR FURTHER INFORMATION.
SCHOOL	NO WORK TO BE PERFORMED WITHIN BLOCK FRONTING SCHOOL INCLUDING INTERSECTIONS FOR ONE HOUR PRIOR TO SCHOOL START TIME THROUGH ONE HOUR AFTER END OF SCHOOL TIME. PERMITTEE MUST NOTIFY SCHOOL PRINCIPAL IN WRITING 48 HOURS PRIOR TO BEGINNING ANY WORK. THIS STIP VOIDS ANY/ ALL OTHER CONFLICTING STIPS ON THIS PERMIT UNLESS ACCOMPANIED WITH VARIANCE STIP VAR001.
TMC001	CONTRACTORS WHO AT ANY TIME DURING THEIR PERMITTED WORK ENCOUNTER TRAFFIC SURVEILLANCE CAMERAS, DETECTION EQUIP OR ANY TYPE OF COMMUNICATION EQUIPMENT (WIRELESS OR HARD-WIRED) ON ANY NYCDOT FACILITY, THAT IS NOT INCLUDED ON THE DESIGN/BUILD DWGS, SHALL IMMEDIATELY NOTIFY NYCDOT TRAFFIC MANAGEMENT AT TMC@DOT.NYC.GOV & 718-433-3390/40 AND AWAIT DIRECTION PRIOR TO CONTINUING WORK
WAGE01	NYC ADMINISTRATIVE CODE, 19-142, WORKERS ON EXCAVATIONS: A PERSON TO WHOM A PERMIT MAY BE ISSUED, TO USE OR OPEN A STREET, SHALL BE REQUIRED, BEFORE SUCH PERMIT MAY BE ISSUED, TO AGREE THAT NONE BUT COMPETENT WORKERS, SKILLED IN THE WORK REQUIRED OF THEM, SHALL BE EMPLOYED THEREON, (CONT. ON STIP WAGE02)
WAGE02	...AND THAT THE PREVAILING SCALE OF UNION WAGES SHALL BE THE PREVAILING WAGE FOR SIMILAR TITLES AS ESTABLISHED BY THE FISCAL OFFICER PURSUANT TO SEC. TWO HUNDRED TWENTY OF THE LABOR LAW, PAID TO THOSE SO EMPLOYED.

NYC Department of Transportation

Office of Permit Management

SIDEWALK CONSTRUCTION PERMIT

PERMIT#: B04-2018299-A06

ISSUED DATE:	10/26/2018	**PERMIT VALID FROM:**	10/29/2018	**TO:**	11/9/2018
BOROUGH:	BROOKLYN	**PERMIT TYPE:**	0401 - REPAIR SIDEWALK		
FEES (NON-REFUNDABLE):		**ROADWAY TYPE:**			
ADMINISTR ATION FEE $70.00		**SIDEWALK TYPE:**	CONCRETE		
TOTAL : $70.00 PAID					

PERMISSION HEREBY GRANTED TO:

NAME:	ENVIROTRAC LTD.	**LICENSE #:**	None
CONTACT NAME:	BYRNES JOSEPH	**CONTRACT #:**	None
PHONE:	6319243001	**SPONSORING AGENCY:**	None
ADDRESS:	5 - OLD DOCK ROAD YAPHANK NY 11980		

TO OPEN THE SIDEWALK AT:

HOUSE#:	1199
ON STREET:	SUTTER AVENUE
FROM STREET:	CHESTNUT STREET
TO STREET:	CRYSTAL STREET
LOCATION DETAILS:	Repair of two sidewalk flags in front of the laundromat for the building 1199-1221 Sutter Avenue, Brooklyn, NY, on the north side of the street.
FOR PURPOSE OF:	Repair two sidewalk flags on the north side of Sutter Avenue between Chestnut Street and Crystal Street. These flags were removed during the installation of two wells and subsurface piping through the building to be used for a remediation system.
RELATED AGENCY #:	
FOR MAX. LENGTH OF:	12 FT
INSPECT DIST:	3
RECORDED:	None
TRACKING #:	2018102600338313

COMM. BOARD: 05

SEQUENCE #: 0001

Note: If House Number is not provided Permittee shall use "Location Details" box to indicate a specific location of the work area within a block (for all non-Contract work, i.e. Contract #: None).

PERMITTEE SHALL COMPLY WITH ALL APPLICABLE LAWS, RULES AND SPECIFICATIONS OF THE NEW YORK CITY DEPARTMENT OF TRANSPORTATION AND WITH THE TERMS AND CONDITIONS OF THE PERMIT. FAILURE TO COMPLY MAY RESULT IN REVOCATION OF THE PERMIT BY THE COMMISSIONER.

TAMPERING WITH OR KNOWINGLY MAKING A FALSE ENTRY IN OR FALSELY ALTERING THIS PERMIT MAY RESULT IN A RESTRICTION IN OBTAINING FUTURE NYCDOT PERMITS.

NYC Department of Transportation

Office of Permit Management

SIDEWALK CONSTRUCTION PERMIT

PERMIT#: B04-2018299-A06

NYS LAW

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PERMITTEE SHALL COMPLY WITH ALL OF THE FOLLOWING STIPULATIONS

SPECIFIC STIPULATION	DP
013	MAINTAIN A MINIMUM 5 FOOT CLEAR PEDESTRIAN WALK ON THE SIDEWALK
038	ALL TEMPORARY TRAFFIC CONTROL DEVICES, INCLUDING BUT NOT LIMITED TO SIGNS, CHANNELIZING DEVICES, FENCING AND MARKINGS SHALL BE PROVIDED, INSTALLED, MAINTAINED AND REMOVED BY THE PERMITTEE IN ACCORDANCE WITH THE MOST RECENT VERSION OF PART 6 OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS (MUTCD). OBTAIN THE MUTCD AT HTTP://MUTCD.FHWA.DOT.GOV .
066	DO NOT PLACE MATERIALS, TRAILERS,CRANES, CONTAINERS, OR EQUIPMENT IN FRONT OF DRIVEWAYS, BUS STOPS, WITHIN FIFTEEN FEET OF A FIRE HYDRANT, IN AUTHORIZED PARKING ZONES OR BLOCKING ACCESS TO DEP WATER TESTING BOXES. IF WORK IS DIRECTLY IN ABOVE AREAS, MAY BE IN VICINITY DURING STIPULATED WORK HOURS BUT NOT WHEN SITE IS UNATTENDED.
082	WORK 7AM - 4PM, MONDAY THROUGH FRIDAY
091	THIS PERMIT ACTIVITY MAY NOT START UNTIL THE PERMITTEE COORDINATES ALL WORK WITH ANY ONGOING CONSTRUCTION AND WITH THE PROJECT/RESIDENT ENGINEER FOR ANY ONGOING CAPITAL PROJECTS.
103	PARKING OF NON-COMMERCIAL VEHICLES ON THE STREET (ROADWAY AND SIDEWALK) WITHIN WORK ZONES IS PROHIBITED.
NOISE1	BY SUBMITTING THIS APPLICATION AND/OR RENEWAL REQUEST, THE PERMITTEE CERTIFIES ITS COMPLIANCE WITH ALL APPLICABLE CITYWIDE CONSTRUCTION NOISE MITIGATION REQUIREMENTS INCLUDING, BUT NOT LIMITED TO THE DEVELOPMENT OF A COMPLIANT NOISE MITIGATION OR ALTERNATIVE NOISE MITIGATION PLAN. PLEASE CONTACT THE NYC DEPARTMENT OF ENVIRONMENTAL PROTECTION (WWW.NYC.GOV/HTML/DEP/HTML/NOISE/CONSTRUCTION-NOISE.SHTML) FOR FURTHER INFORMATION.
OCMC76	CONTRACTOR MAY NOT REMOVE OR RELOCATE ANY PARKING METERS OR BLOCK PUBLIC ACCESS TO MUNI-METERS WITHOUT FIRST OBTAINING APPROVAL FROM NYCDOT PARKING METER DIVISION AT 646-892-1224/1208.
SCHOOL	NO WORK TO BE PERFORMED WITHIN BLOCK FRONTING SCHOOL INCLUDING INTERSECTIONS FOR ONE HOUR PRIOR TO SCHOOL START TIME THROUGH ONE HOUR AFTER END OF SCHOOL TIME. PERMITTEE MUST NOTIFY SCHOOL PRINCIPAL IN WRITING 48 HOURS PRIOR TO BEGINNING ANY WORK. THIS STIP VOIDS ANY/ ALL OTHER CONFLICTING STIPS ON THIS PERMIT UNLESS ACCOMPANIED WITH VARIANCE STIP VAR001.
TMC001	CONTRACTORS WHO AT ANY TIME DURING THEIR PERMITTED WORK ENCOUNTER TRAFFIC SURVEILLANCE CAMERAS, DETECTION EQUIP OR ANY TYPE OF COMMUNICATION EQUIPMENT (WIRELESS OR HARD-WIRED) ON ANY NYCDOT FACILITY, THAT IS NOT INCLUDED ON THE DESIGN/BUILD DWGS, SHALL IMMEDIATELY NOTIFY NYCDOT TRAFFIC MANAGEMENT AT TMC@DOT.NYC.GOV & 718-433-3390/40 AND AWAIT DIRECTION PRIOR TO CONTINUING WORK