

22-60 46TH STREET

QUEENS, NEW YORK

SITE MANAGEMENT PLAN

NYSDEC Site Number: C241244

AKRF Project Number: 190275

Prepared for:

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Prepared by:



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Revisions to Final Approved Site Management Plan:

Revision No.	Date Submitted	Summary of Revision	NYSDEC Approval Date

DECEMBER 2022

CERTIFICATION STATEMENT

I, Rebecca Kinal, P.E., certify that I am currently a NYS registered professional engineer as defined in 6 NYCRR Part 375 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).



NYS Professional Engineer #082046-1

12/22/2022

Date



Signature

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LIST OF ACRONYMS

Acronym	Definition
1,1-DCE	1,1-dichloroethene
1,1,1-TCA	1,1,1-trichloroethane
ACM	Asbestos Containing Material
AG	Air Guide
AGC	Annual Guideline Concentrations
AGV	Air Guidance Value
ASTM	American Society for Testing and Materials
AWQSGV	Ambient Water Quality Standards and Guidance Values
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
bgs	Below Ground Surface
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
CAMP	Community Air Monitoring Plan
CFM	Cubic Feet per Minute
CFR	Code of Federal Regulations
CMWP	Corrective Measures Work Plan
COC	Certificate of Completion
CP	Commissioner's Policy
CPP	Citizen Participation Plan
CVOC	Chlorinated Volatile Organic Compound
DAR	Division of Air Resources
DD	Decision Document
DER	Division of Environmental Remediation
DUSR	Data Usability Summary Report
EC	Engineering Control
ECL	Environmental Conservation Law
EE	Environmental Easement
ELAP	New York State Environmental Laboratory Approval Program
EM	Electromagnetic
EPA	United States Environmental Protection Agency
ESA	Environmental Site Assessment
FER	Final Engineering Report
FMP	Foundation Management Plan
GAC	Granular Activated Carbon
GPA	Gas Permeable Aggregate
GPR	Ground Penetrating Radar
HASP	Health and Safety Plan
IC	Institutional Control
ISCO	In-Situ Chemical Oxidation

Acronym	Definition
LBP	Lead-Based Paint
MCL	Maximum Contaminant Level
MEK	Methyl Ethyl Ketone
mg/kg	Milligrams per Kilogram
MP	Monitoring Point
MS/MSD	Matrix Spike/Matrix Spike Duplicate
MW	Monitoring Well
NYCDOHMH	New York City Department of Health and Mental Hygiene
NYCRR	New York Codes, Rules and Regulations
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
O&M	Operation and Maintenance
OSHA	United States Occupational Safety and Health Administration
OSVI	Off-Site Soil Vapor Intrusion
OSVIR	Off-Site Soil Vapor Intrusion Report
OSVIWP	Off-Site Soil Vapor Intrusion Work Plan
P&ID	Process and Instrumentation Diagram
P.E./PE	Professional Engineer
PAH	Polycyclic Aromatic Hydrocarbon
PBS	Petroleum Bulk Storage
PCB	Polychlorinated Biphenyl
PCE	Tetrachloroethylene
PFAS	Per- and Polyfluoroalkyl Substances
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctanesulfonic Acid
PID	Photoionization Detector
ppb	Parts per Billion
ppm	Parts per Million
PRR	Periodic Review Report
PVC	Polyvinyl Chloride
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
QEP	Qualified Environmental Professional
RAO	Remedial Action Objective
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act
REC	Recognized Environmental Condition
RI	Remedial Investigation
RIR	Remedial Investigation Report
RIWP	Remedial Investigation Work Plan

Acronym	Definition
RMR	Remedy Modification Request
RP	Remedial Party
RRSCO	Restricted Residential Soil Cleanup Objective
RSO	Remedial Site Optimization
SB	Soil Boring
SCFM	Standard Cubic Feet per Minute
SCG	Standard, Criteria, And Guidance
SCO	Soil Cleanup Objective
SGC	Short-term Guideline Concentrations
SIM	Selected Ion Monitoring
SMP	Site Management Plan
SSDS	Sub-Slab Depressurization System
SV	Soil Vapor
SVE	Soil Vapor Extraction
SVI	Soil Vapor Intrusion
SVOC	Semivolatile Organic Compound
TAL	Target Analyte List
TCE	Trichloroethylene
TOGS	Technical Operational and Guidance Series
UST	Underground Storage Tank
UUSCO	Unrestricted Use Soil Cleanup Objective
VFD	Variable-frequency Drive
VMP	Vapor Monitoring Point
VOC	Volatile Organic Compound
µg/L	Micrograms per Liter
µg/m ³	Micrograms per Cubic Meter

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):

In-Text Table I
Site Management Plan Summary

Site Identification:	Site No. C241244 22-60 46 th Street Queens, New York
Institutional Controls:	1. The property may be used for restricted residential, commercial, and industrial use only, as set forth in the Environmental Easement.
	2. All Engineering Controls (ECs) must be operated and maintained as specified in the SMP.
	3. All ECs 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 New York State Department of Health (NYSDOH) or the New York City Department of Health and Mental Hygiene (NYCDOHMH) 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 this SMP.
	6. Data and information pertinent to Site management must be reported at the frequency and in a manner as defined in this SMP.
	7. All future activities that will disturb remaining contaminated material must be conducted in accordance with this SMP.
	8. Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in this SMP.
	9. Operation, maintenance, monitoring, inspection, and reporting of the 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 in the Environmental Easement.
	11. The potential for vapor intrusion must be evaluated for any new buildings developed in the area within the IC boundaries and any potential impacts that are identified must be monitored or mitigated.
	12. Vegetable gardens and farming on the Site are prohibited.
Engineering Controls:	1. Active Sub-Slab Depressurization System (SSDS)
	2. Soil Vapor Extraction (SVE) System (SVES)
Inspections:	
1. Site Inspection	Annually
2. Active SVE System	Monthly (first year), annually (after first year)
3. Active SSDS	Quarterly (first year), annually (after first year)

Site Identification:	Site No. C241244 22-60 46 th Street Queens, New York	
Monitoring:		
1. Groundwater Monitoring Wells	Quarterly for first year, then annually	
2. SVE Extracted Vapor Sampling	6 months and 12 months after start-up, annually and as necessary thereafter	
3. SVE System Monitoring	Monthly (first year), quarterly (after first year)	
4. SSDS Monitoring	Quarterly (first year), annually (after first year)	
Maintenance:		
1. SVE System	Quarterly/As Needed	
2. Active SSDS	As Needed	
Reporting:		
1. Periodic Review Report	First PRR 16 months after receipt of the Certificate of Completion (COC). Annually thereafter.	

Further descriptions of these requirements are provided in detail in the latter sections of this SMP.

1.0 INTRODUCTION

This Site Management Plan (SMP) is a required element of the remedial program for the 22-60 46th Street Site located in the Astoria section of Queens, New York (hereinafter referred to as the “Site”), also identified as Tax Block 769, Lots 25 and 42¹ on the New York City Tax Map. The Site is enrolled in the New York State (NYS) Brownfield Cleanup Program (BCP), Site No. C241244, which is administered by NYS Department of Environmental Conservation (NYSDEC). A Site Location map is provided as Figure 1.

MD45 Developers LLC entered into a Brownfield Cleanup Agreement (BCA) (Index No. C241244-09-20) with NYSDEC on September 17, 2020, as a Participant, to remediate the Site. The Site was remediated to Track 2 Restricted Residential Soil Cleanup Objectives (RRSCOs) in accordance with the NYSDEC-approved Remedial Action Work Plan (RAWP), Remedy Modification Request (RMR), Final Engineering Report (FER), and Decision Document (DD), as described in this SMP.

1.1 General

The Applicant entered into a BCA to investigate and remediate the approximately 0.689-acre Site. A Site Location Map is provided as Figure 1 and a Site Plan showing the Site boundaries is provided as Figure 2. The boundaries of the Site are more fully described in the metes and bounds that is part of the Environmental Easement (EE) provided in Appendix A.

1.2 Purpose

After completion of the remedial work described in the Remedial Action Work Plan (RAWP) and the Remedy Modification Request (RMR), some contamination was left at the 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, thereby ensuring protection of public health and the environment. An EE will be granted to NYSDEC and recorded with the Office of the City Register of the City of New York and will require 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 EE is extinguished in accordance with ECL Article 71, Title 36. This plan has been approved by NYSDEC, and compliance with this plan is required by the grantor of the EE and the grantor’s successors and assigns. This SMP may be revised only with the approval of NYSDEC.

It is important to note that:

1. This SMP details the site-specific implementation procedures that are required by the EE. Failure to properly implement the SMP is a violation of the EE, which is grounds for revocation of the Certificate of Completion (COC); and
2. Failure to comply with this SMP is also a violation of Environmental Conservation Law, 6 New York Codes, Rules, and Regulations (NYCRR) Part 375 and the BCA (Index No. C241244-09-20; Site No. C241244) for the Site, and thereby subject to applicable penalties.

¹ It should be noted that the BCP Site encompasses the same area indicated in the BCP Application and as set forth in the Brownfield Cleanup Agreement (BCA), however, the lot merger application, which was tentatively approved on April 30, 2020, was never finalized and has been withdrawn. Accordingly, the BCP Site constitutes Queens Borough Tax Block 769, Lots 25 and 42. An amendment to the BCA was executed on November 9, 2021 to reflect the proper tax lots that comprise the BCP Site.

All reports associated with the Site can be viewed by contacting 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 Tables II and III of this SMP.

This SMP was prepared by AKRF, Inc. (AKRF) on behalf of the Participant in accordance with the requirements of NYSDEC's DER-10 ("Technical Guidance for Site Investigation and Remediation"), dated May 2010, and the guidelines provided by NYSDEC. This SMP addresses the means for implementing the ICs and ECs that are required by the EE for the Site.

1.3 Revisions

Revisions to this SMP will be proposed in writing to 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 a shut-down of a remedial system, post-remedial removal of contaminated sediment or soil, or other significant change(s) to the Site conditions. In accordance with the EE for the Site, 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.

1.4 Notifications

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

- 60-day advanced notice of any proposed changes in Site use that are required under the terms of the BCA, 6 NYCRR Part 375 and/or Environmental Conservation Law (ECL);
- 7-day advanced notice of any field activity associated with the remedial program other than routine inspection, maintenance, and monitoring;
- 15-day advanced notice of any proposed ground-intrusive activity pursuant to the Foundation Management Plan (FMP). If the ground-intrusive activity qualifies as a change of use as defined in 6 NYCRR Part 375, the above mentioned 60-day advance notice is also required.
- Notice within 48-hours of any damage or defect to the foundation, structures or ECs 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;
- Notice within 48 hours of any non-routine maintenance activities.
- 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 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 ongoing responsive action submitted to 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, 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 15 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 NYSDEC.

Table II includes contact information for these notifications. 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 Table III and Appendix B.

In-Text Table II
Notifications*

Company/Regulator	Contact Name	Contact Title	Contact Number
NYSDEC	Meghan Medwid	Project Manager	518-402-8610
	Jane H. O'Connell	Chief, Superfund and Brownfield Cleanup Section	718-482-4599
	Kelly Lewandowski	Chief, Site Control	518-402-9553
NYSDOH	Sally Rushford	Project Manager	(518) 402-5465

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

In-Text Table III
Site Contact List

Company	Individual Name	Title	Contact Number
AKRF	Deborah Shapiro, QEP	Principal	646-388-9544 (office)
	Rebecca Kinal, P.E.	Remedial Engineer	914-922-2362 (office)
	Adrianna Bosco	Project Manager	646-388-9576 (office)
	Ashutosh Sharma	Deputy Project Manager	646-388-9865 (office)
MD45 Developers LLC	Emanuel Kokinakis	Participant's Representative	718-932-6342 (office)

2.0 SITE BACKGROUND

2.1 Site Location and Description

The Site is located in Astoria, Queens County, New York and is identified as Tax Block 769, Lots 25 and 42 on the New York City Tax Map. The Site location is shown on Figure 1. The Site is an approximately 0.689-acre parcel bounded to the north by a parking garage, followed by a multi-story residential building; to the east by 46th Street, followed by private residences; to the south by private residences and commercial uses; and to the west by 45th Street, followed by a shopping center and warehouses. The surrounding area comprises predominantly residential with some commercial and industrial uses. A Site plan is provided as Figure 2. The boundaries of the Site are more fully described in the EE, provided as Appendix A. The owner of the Site at the time of issuance of this SMP is MD45 Developers LLC.

2.2 Site History

A full Site history, including historical Sanborn maps and a summary of previous investigations conducted at the Site, was provided in the RAWP. Historic records indicated that the Site was used for manufacturing and commercial purposes since approximately 1967. Based on the historical Sanborn Fire Insurance Maps and City Directories, Lot 25 was undeveloped until approximately 1967, when it was developed with a warehouse utilized by an electronics manufacturer through approximately 2006. Lot 25 was additionally identified as part of the west-adjacent knitting mill (Lot 42) between approximately 1981 and 1993. Lot 42 was undeveloped until approximately 1967, when it was developed with a knitting mill through approximately 1993, and unspecified manufacturing between 1994 and 2006. All on-site buildings were demolished in January 2022.

2.3 Physical Setting

2.3.1 Land Use

To support the proposed redevelopment, the Site was rezoned in February 2020 from M1-1 (manufacturing) to R6A (residential) and C2-3 (commercial). The Site is currently being redeveloped with two 8-story, mixed-use buildings. When completed, the buildings will contain approximately 96 residential units, including 30 permanently affordable units. The first floor will contain approximately 3,721-square feet of commercial space, approximately 11,740-square feet of community facility space, and residential amenities. Floors two through eight will contain residential units. Additionally, the first and second floors between the two buildings will include an exterior courtyard. The two proposed buildings will occupy the entirety of the Site.

2.3.2 Geology

Prior to redevelopment, the stratigraphy of the Site generally consisted of fill material extending from surface grade to approximately 5 to 15 feet below grade comprising sand, silt, and gravel with varying amounts of concrete and brick. The historic fill was underlain by apparent native sand, gravel, and silt to boring termination depths (up to 50 feet below grade). The Site lies at an elevation of approximately 53.7 to 54.4 feet above the North American Vertical Datum of 1988 (NAVD88).

2.3.3 Hydrogeology

During the RI, groundwater beneath the Site ranged from elevation 19.79 to elevation 21.07 (NAVD88), or 32.92 to 33.73 feet below grade, across the Site. Groundwater was

determined to flow in a northeasterly direction. A groundwater contour map is shown on Figure 3. Groundwater elevation data is provided in Attached Table 1.

2.4 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. Copies of all reports and documents referenced were placed in the Site document repositories.

Phase I ESA, 22-60 46th Street, Queens, New York 11105, Environmental Studies Corporation, Inc., May 2018

Environmental Studies Corporation, Inc. (ESC) prepared a Phase I Environmental Site Assessment (ESA) in May 2018 for Lot 25 only. The Phase I ESA was performed in conformance with the scope and limitations of the American Society for Testing & Materials (ASTM) Standard E1527-13. The assessment identified the following Recognized Environmental Conditions (RECs) in connection with the Site:

The potential for contamination from past electronics manufacturing and knitting mill operations in the Site building;

- The potential for a vapor encroachment condition from past on-site manufacturing operations, and from potential off-site sources of contamination in the immediate vicinity of the Site; and
- The possible presence of asbestos-containing materials (ACM) and lead-based paint (LBP) in the Site building (business environmental risk outside of ASTM E1527-13).

Phase I ESA, 22-61 45th Street, Queens, New York 11105, CA RICH Consultants, Inc., June 2018

CA RICH Consultants, Inc. (CA RICH) of Plainview, New York completed a Phase I ESA in June 2018 for Lot 42 only. The Phase I ESA was conducted in substantive conformance with the suggested informational requirements, scope and limitations of ASTM E1527-13, Standard Practice for Environmental Site Assessments. CA RICH did not identify any RECs; however, two business environmental risks were identified, as summarized below:

- Based upon the age of the structure, constructed circa 1955, asbestos is likely present in some of the building materials. If the building is to be renovated or demolished, it is recommended that an ACM survey be performed and appropriate measures taken to protect the health and safety of building occupants or workers during activities that may disturb the ACM; and
- Based upon the age of the structure, constructed circa 1955, LBP is likely present in some of the building materials, especially in the lower layers of paint. If the building is to be renovated or demolished, it is recommended that an LBP survey be performed. At the time of the inspection, no peeling paint was observed.

Phase II ESA, Environmental Studies Corporation, Inc., May 2019

Based on the results of the Phase I ESAs, ESC conducted a Phase II ESA at the Site in May 2019 in accordance with ASTM E1903-97, "Standard Guide for ESAs: Phase II ESA Process."

The scope of work included the following:

- Completion of a geophysical investigation, which included an electromagnetic (EM) survey and GPR survey;
- Advancement of 8 soil borings with the collection and laboratory analysis of 16 soil samples;

- Installation of 2 temporary groundwater monitoring wells with the collection and laboratory analysis of 2 groundwater samples; and
- Installation of 6 temporary soil vapor probes with the collection and laboratory analysis of 6 soil vapor samples.

Two soil samples were collected from each soil boring location. One soil sample was collected from the upper 2 feet beneath the existing pavement and a deeper soil sample was collected from 15 to 17 feet below surface. Two 1-inch-diameter temporary monitoring wells were installed in the eastern and western portions of the Site. Soil and groundwater samples were analyzed for volatile organic compounds (VOCs) by EPA Method 8260, semivolatile organic compounds (SVOCs) by EPA Method 8270, pesticides/polychlorinated biphenyls (PCBs) by EPA Methods 8081/8082, and target analyte list (TAL) Metals.

Six temporary soil vapor probes were installed between approximately 15 and 17 feet below grade. Soil vapor samples were collected via dedicated polyethylene tubing with SUMMA[®] canisters, and analyzed for VOCs using EPA TO-15 method parameters.

Soil Quality Conditions

Historic fill comprising sand and gravel with varying amounts of brick, concrete, and stone fragments was found throughout the Site to approximately 4 to 6 feet below grade. The fill material was underlain by native materials consisting of sand and silt, with fine gravel. No petroleum-like odors, staining, or elevated PID readings were detected.

The soil samples were compared to the NYSDEC Soil Cleanup Objectives (SCOs) 6 New York Codes, Rules, and Regulations (NYCRR) Subpart 375-6.8 (a): Unrestricted Use SCOs (UUSCOs) and Restricted-Residential Use SCOs (RRSCOs). Soil laboratory analytical results are summarized below:

- No VOCs were identified above laboratory detection limitations or the SCOs in the soil samples collected. Tetrachloroethylene (PCE) was detected at low levels in 7 of the 16 soil samples, below the SCOs.
- One SVOC, indeno[123-cd]pyrene, was detected above the UUSCO and RRSCO in one sample.
- No pesticides or PCBs were identified above laboratory detection limitations or the SCOs.
- Total TAL metals exceeding the UUSCOs included copper [maximum concentration (max.) of 174 milligrams per kilogram (mg/kg)], lead (max. of 315 mg/kg), mercury (max. of 0.4 mg/kg), nickel (max. of 43 mg/kg), and zinc (max. of 772 mg/kg). Copper was additionally detected above the RRSCO in one sample.

Groundwater Quality Conditions

Groundwater was encountered at approximately 45 feet below grade in the two temporary groundwater monitoring wells installed as part of ESC's May 2019 Phase II ESA. No visual or olfactory evidence of contamination was detected in the purge water from either well.

No VOCs, SVOCs, pesticides, or metals were detected above the NYSDEC Ambient Water Quality Standards and Guidance Values (AWQSGVs). One PCB, Aroclor 1260, was detected at a concentration of 0.164 micrograms per liter (µg/L), above the AWQSGV of 0.09 µg/L.

Soil Vapor Quality Conditions

Various petroleum- and solvent-related VOCs were detected in the soil vapor samples at concentrations ranging from 1.1 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) to 4,900 $\mu\text{g}/\text{m}^3$. PCE was detected in all six samples at concentrations ranging from 37 to 4,900 $\mu\text{g}/\text{m}^3$. The greatest concentration (4,900 $\mu\text{g}/\text{m}^3$) was detected in the central portion of the Site on Lot 25. A breakdown product of PCE, trichloroethylene (TCE), was detected in one soil vapor sample collected from the southwestern corner of the Site at a concentration of 1.1 $\mu\text{g}/\text{m}^3$.

Supplemental Subsurface (Phase II) Investigation, AKRF, Inc., August 2019

AKRF conducted a Subsurface (Phase II) Investigation at the Site in August 2019 to supplement the soil and soil vapor data obtained during the May 2019 Phase II ESA. The scope of work for the investigation included the advancement of 12 soil borings with the collection and laboratory analysis of 18 soil samples, and the installation of 1 sub-slab vapor point with the collection and laboratory analysis of 1 sub-slab soil vapor sample. On August 5, 2019, four soil borings were advanced with the collection and laboratory analysis of four soil samples, collected from the interval of greatest contamination or, in the absence of contamination, the upper 2 feet beneath existing pavement. On August 29, 2019, 8 soil borings were advanced with the collection and laboratory analysis of 14 soil samples. Soil samples were collected from the upper 2 feet beneath existing pavement, and a second sample was collected from the interval of greatest contamination or within the historic fill layer. The soil samples were analyzed for VOCs by EPA Method 8260, polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270, and Resource Conservation and Recovery Act (RCRA) 8 metals by EPA Methods 6020 and 7041 in accordance with Category B deliverables. For QA/QC purposes, one field blank, one trip blank, one blind duplicate, and one matrix spike/matrix spike duplicate (MS/MSD) sample were collected and submitted with the soil samples.

The investigation also included the installation of one temporary sub-slab vapor point (SV-07) installed to a depth of approximately 18 inches below the existing building slab on Lot 42. One soil vapor sample was collected over a two-hour period and analyzed for VOCs by EPA method TO-15.

Soil Quality Conditions

The soil samples were compared to the NYSDEC Part 375 UUSCOs and RRSCOs. Soil laboratory analytical results are summarized below:

- No VOCs were identified above the SCOs in the soil samples collected. PCE was detected at low levels in 15 of the 18 soil samples, below the UUSCOs and RRSCOs.
- The SVOCs benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, and/or indeno[123-cd]pyrene were detected at concentrations above the RRSCOs in up to seven samples. All concentrations ranged from 0.6 mg/kg to 3 mg/kg.
- Total metals exceeding the UUSCOs included barium (max. of 684 mg/kg), lead (max. of 583 mg/kg), and mercury (max. of 0.56 mg/kg). Barium and lead were additionally detected at concentrations above the RRSCOs in up to four samples.

Sub-Slab Soil Vapor Quality Conditions

The sub-slab soil vapor sample results were similar to the May 2019 Phase II, with comparable detections of petroleum- and chlorinated-related VOCs reported. Chlorinated VOCs, including carbon tetrachloride, PCE, and TCE, were detected in SV-07 at concentrations up to 4,400 $\mu\text{g}/\text{m}^3$.

The concentrations of SVOCs and metals above RRSCOs were believed to be related to the presence of historic fill at the Site. The elevated concentrations of chlorinated solvents in soil vapor were believed to be related to the Site's historical manufacturing usage.

BCP Application, 22-60 46th Street, Queens York, AKRF, Inc., May 2020

AKRF prepared a BCP Application for the Site in May 2020, which discussed soil, groundwater, and soil vapor contamination associated with the Site's former uses. The Site was entered into the BCP in September 2020 (BCA Index No. C241244-09-20).

Citizen Participation Plan (CPP), 22-60 46th Street, Queens York, AKRF Inc., October 2020

AKRF prepared a CPP for the Site in October 2020, which provided details on major issues of public concern related to the Site and surrounding areas. The CPP provided this information to the public and encouraged citizen involvement in decisions being made about the Site regarding their health.

Remedial Investigation Work Plan (RIWP), 22-60 46th Street, Queens York, AKRF Inc., November 2020 and RIWP Addendum dated May 2021

AKRF prepared and submitted a RIWP for the Site concurrently with the BCP Application. The RIWP was finalized and approved by NYSDEC in November 2020. The RIWP described the procedures to be used to define the nature and extent of contamination at the Site. A remedial investigation was completed at the Site in December 2020 and the draft remedial investigation report (RIR) was submitted in February 2021. In April 2021, NYSDEC requested the collection of additional soil and groundwater samples as part of the RI to further investigate the source of tetrachloroethylene (PCE) in soil vapor identified. A RIWP Addendum describing the procedures to be used to attempt to identify the potential on-site source of PCE was prepared and submitted to NYSDEC for review and approval.

Remedial Investigation Report (RIR), 22-60 46th Street, Queens York, AKRF Inc., October 2021

The RI was conducted between December 7 and 22, 2020 and between May 5 and 21, 2021, and included the following scope of work:

- The performance of a geophysical survey across accessible portions of the Site and utility mark-outs.
- The advancement of 15 soil borings with continuous soil sampling and laboratory analysis of 44 soil samples.
- The installation of 11 permanent, 2-inch-diameter groundwater monitoring wells with the collection and laboratory analysis of 11 groundwater samples.
- The installation of 7 temporary sub-slab soil vapor probes and the collection and laboratory analysis of 7 sub-slab soil vapor samples and 3 indoor air samples (co-located with 3 temporary sub-slab soil vapor samples).
- The performance of two groundwater monitoring well elevation and location surveys of the newly installed monitoring wells.
- Summary of Hydrogeological Findings
- The following geologic and hydrogeologic conditions were noted during the RI:
- Based on December 2020 and May 2021 surveys of the Site by Fehringer Surveying, PC, the Site lies at an elevation of 53.70 to 54.38 feet above the North American Vertical Datum of 1988 (NAVD88).

- The stratigraphy of the Site generally consisted of fill material extending from surface grade to approximately 5 to 15 feet below grade comprising sand, silt, and gravel with varying amounts of concrete and brick. The historic fill was underlain by apparent native sand, gravel, and silt to boring termination depths (up to 50 feet below grade). Bedrock was not encountered during the RI.
- Groundwater beneath the Site ranges from elevation 19.79 to elevation 21.07 (NAVD88), or 32.92 to 33.73 feet below grade across the Site.
- Based on the well elevation survey, groundwater flows in a generally northerly direction beneath the Site.

Summary of Environmental Findings

Soil

Forty-four soil samples were collected for laboratory analysis of volatile organic compounds (VOCs) by United States Environmental Protection Agency (EPA) Method 8260, semivolatile organic compounds (SVOCs) by EPA Method 8270, pesticides by EPA Method 8081B, polychlorinated biphenyls (PCBs) by EPA Method 8082, target analyte list (TAL) metals by EPA Method 6000/7000 series, hexavalent chromium by EPA Method 7196A, NYSDEC list of 21 per- and polyfluoroalkyl substances (PFAS) by EPA Modified Method 537, and/or 1,4-dioxane by EPA Method 8270D Selective Ion Monitoring (SIM). Soil sample analytical results were compared to the 6 New York Codes, Rules, and Regulations (NYCRR) Unrestricted Use Soil Cleanup Objectives (UUSCOs) and Restricted Residential Soil Cleanup Objectives (RRSCOs), the applicable Soil Cleanup Objectives (SCOs) for the proposed future use of the Site.

No VOCs were detected above UUSCOs and/or RRSCOs. Acetone was detected in nine samples at concentrations up to 0.028 milligrams per kilogram (mg/kg) in sample RI-SB-01_33-35_20201208, below the UUSCO of 0.05 mg/kg and RRSCO of 100 mg/kg. Tetrachloroethylene (PCE) was detected in 35 samples at concentrations up to 0.055 mg/kg. Four SVOCs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and indeno(1,2,3-c,d)pyrene] were detected at concentrations up to 1.5 mg/kg in one sample, above their respective UUSCOs and RRSCOs. Total PCBs were not detected above laboratory reporting limits in any soil samples. Two pesticides (P,P'-DDE and P,P'-DDT) were detected at concentrations above their respective UUSCOs, but below their respective RRSCOs in one or more soil samples. Three metals (lead, mercury, and zinc) were detected at concentrations ranging from 0.29 mg/kg to 385 mg/kg, above their respective UUSCOs, but below their respective RRSCOs, in one or more soil samples. Lead was additionally detected above its RRSCO of 400 mg/kg in one sample and at a concentration of 605 mg/kg.

Perfluorooctanesulfonic acid (PFOS) was detected at concentrations below both the NYSDEC Unrestricted Use Guidance Value of 0.88 parts per billion (ppb) and the Restricted Residential Use Guidance Value of 44 ppb. Perfluorooctanoic acid (PFOA) was detected at a concentration of 0.89 ppb in one sample above the Unrestricted Use Guidance Value of 0.66 ppb, but below the Restricted Residential Use Guidance Value of 33 ppb. Total PFAS concentrations ranged from 0.016 ppb to 1.443 µg/kg.

Groundwater

Five groundwater samples were collected for laboratory analysis of VOCs by EPA Method 8260, SVOCs by EPA Method 8270, pesticides by EPA Method 8081B and 8151A, PCBs

by EPA Method 8082, total (unfiltered) and dissolved (filtered) TAL metals by EPA Method 6000/7000 series, PFAS by EPA Modified Method 537, and 1,4-dioxane by EPA Method 8270 SIM. Six additional groundwater samples were collected for laboratory analysis of chlorinated VOCs (CVOCs) by EPA Method 8260. Groundwater sample analytical results for VOCs, SVOCs, pesticides, PCBs, and TAL metals were conservatively compared to the NYSDEC Ambient Water Quality Standards and Guidance Values (AWQSGVs). Groundwater analytical results for the 21 compound list of PFAS were compared to the NYSDEC January 2021 guidance value of 10 parts per trillion (ppt). These standards are for drinking water, although groundwater in this portion of Queens is not used as a potable source. Although there is currently no established guidance value or standard for 1,4-dioxane in groundwater, concentrations of 1,4-dioxane were compared to the August 2020 New York State (NYS) Maximum Contaminant Level (MCL) screening level.

Two VOCs (chloroform and PCE) were detected in the groundwater samples at concentrations above their respective AWQSGVs. SVOCs were not detected above laboratory reporting limits in any of the groundwater samples. The pesticide dieldrin was detected above the AWQSGV of 0.004 micrograms per liter ($\mu\text{g/L}$) in one groundwater sample at a concentration of 0.014 $\mu\text{g/L}$. Pesticides were not detected above laboratory reporting limits in the remaining four groundwater samples. PCBs were not detected above laboratory reporting limits in any of the groundwater samples. Iron, magnesium, and sodium were detected above their respective AWQSGVs in each of the five unfiltered groundwater samples, and magnesium and sodium were detected above the AWQSGVs in each of the five filtered groundwater samples.

PFOS was detected above the NYSDEC January 2021 guidance value of 10 ppt in three of the five groundwater samples at concentrations up to 15.7 ppt. PFOA was detected in each of the five groundwater samples (plus the blind duplicate) at concentrations up to 34.1 ppt, above the guidance value of 10 ppt. No individual PFAS compounds were detected at concentrations above 100 ppt. Total PFAS concentrations were below 500 ppt in each groundwater sample. 1,4-Dioxane was not detected above laboratory reporting limits in the groundwater samples.

Soil Vapor and Indoor Air

Seven sub-slab soil vapor samples, three with co-located indoor air samples, were collected from the seven temporary sub-slab soil vapor points located across the Site, as well as one ambient air sample. Although there are currently no regulatory or published guidance values for VOCs in soil vapor, soil vapor data was used to assess the potential for exposure to receptors and to help define the nature and extent of contamination at the Site.

The sub-slab soil vapor samples were analyzed for VOCs by EPA Method TO-15. Thirty-six of the 71 VOCs analyzed for were detected in the soil vapor samples. Solvent-related VOCs [including 1,1,1-trichloroethane [1,1,1-TCA), carbon tetrachloride, chlorodifluoromethane, chloromethane, dichlorodifluoromethane, PCE, tetrahydrofuran, trans-1,2-dichloroethene, and trichloroethylene (TCE)] were detected in the sub-slab soil vapor samples at individual concentrations up to 1,200 micrograms per cubic meter ($\mu\text{g/m}^3$) from a diluted analysis (PCE in sample RI-SV-07_20201209). Other VOCs, including compounds typically associated with petroleum [such as 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 1,3-butadiene, 1,3-dichlorobenzene, 2,2,4-trimethylpentane, 2-hexanone, 4-ethyltoluene, butane, cymene, isopropanol, isopropylbenzene, methyl ethyl ketone (MEK), n-butylbenzene, n-heptane, n-hexane, n-propylbenzene, trimethylbenzene,

and benzene, toluene, ethylbenzene, and m,p and o-xylenes (collectively referred to as BTEX)], were detected in the sub-slab soil vapor samples at individual concentrations up to 320 $\mu\text{g}/\text{m}^3$ from a diluted analysis (toluene in sample RI-SV-06_20201209).

The indoor air samples were analyzed for VOCs by EPA Method TO-15. Twenty-eight of the 71 VOCs analyzed for were detected in one or more samples. Nineteen VOCs were detected in the ambient air sample (RI-AA-01_20201209). Solvent-related VOCs (including 1,1,2-trichloro-1,2,2-trifluoroethane, acetone, carbon disulfide, carbon tetrachloride, chlorodifluoromethane, chloromethane, dichlorodifluoromethane, and PCE) were detected in the indoor air samples at individual concentrations up to 15 $\mu\text{g}/\text{m}^3$ (acetone in sample RI-IA-02_20201222). Other VOCs, including compounds typically associated with petroleum (such as 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 1,3-butadiene, 2,2,4-trimethylpentane, 4-ethyltoluene, cyclohexane, isopropanol, isopropylbenzene, MEK, n-butylbenzene, n-heptane, n-hexane, n-propylbenzene, and BTEX), were detected in the indoor air samples at individual concentrations up to 100 $\mu\text{g}/\text{m}^3$ (m,p-xylenes in sample RI-IA-03_20201209).

Sub-slab soil vapor and co-located indoor air sample analytical results were compared to the Soil Vapor/Indoor Air Matrices included in the Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York, dated October 2006, updated May 2017. The New York State Department of Health (NYSDOH) developed decision matrices for eight compounds [1,1,1-TCA, 1,1-dichloroethene (1,1-DCE), carbon tetrachloride, cis-1,2-dichloroethylene (cis-1,2-DCE), methylene chloride, PCE, TCE, and vinyl chloride]. Based on an evaluation of the co-located soil vapor and indoor air samples using the applicable matrix for each of these compounds, the recommendation is “no further action.” PCE was detected at a concentration of 1,200 $\mu\text{g}/\text{m}^3$ in sample RI-SV-07_20201209, above the NYSDOH threshold for mitigation of 1,000 $\mu\text{g}/\text{m}^3$, regardless of the indoor air concentration.

Remedial Action Work Plan (RAWP), 22-60 46th Street, Queens, NY, AKRF Inc., January 2022

AKRF prepared a RAWP in January 2022, which outlined the remedial activities and cleanup objectives for the Site. The RAWP proposed excavation and removal of soil/fill to a maximum depth of 15 feet below grade to achieve a Track 2 Cleanup; excavation and removal of three known and any unknown underground storage tanks (USTs) and associated piping encountered during the excavation in accordance with applicable federal, state, and local laws and regulations, as defined by 6 NYCRR Part 375-6.8; and performance of an off-site soil vapor intrusion (SVI) investigation to determine off-site impacts and potential remedial requirements. The remedy also included the installation of ICs/ECs including the installation of an active sub-slab depressurization system (SSDS), a soil vapor extraction (SVE) system, and a groundwater treatment program into the proposed building design as part of construction.

Off-Site Soil Vapor Intrusion (OSVI) Work Plan (OSVIWP), 22-60 46th Street, Queens, AKRF Inc., February 2022

AKRF prepared an OSVIWP in February 2022, which described the procedures to be used to collect soil vapor and indoor air data at neighboring, off-site properties. The data compiled from the OSVI was used to prepare an Off-Site Soil Vapor Intrusion Report (OSVIR).

Remedy Modification Request, 22-60 46th Street, Queens, AKRF Inc., May 2022

AKRF prepared a Remedy Modification Request (RMR) in May 2022 based on the findings of treatability study and an in-situ chemical oxidation (ISCO) pilot test completed at the Site to evaluate the effectiveness of reducing chlorinated VOCs (CVOCs) [primarily tetrachloroethylene

(PCE)] in groundwater, and the findings of a pilot test conducted as part of the SVE system design. Based on the findings, AKRF, on behalf of the Applicant, formally requested the following modifications to the remedy:

- Full-scale treatment of the previously-identified, approximately 20,000-square foot area is no longer necessary and should be modified and limited to completion of one round of ISCO around RI-MW-06 (in addition to already completed ISCO treatment at MW-07).
- As the source of on-site contamination appeared to be soil vapor (as opposed to groundwater as previously indicated in the RAWP and Decision Document), and the elevated concentrations of PCE in soil vapor that would remain post-remedial excavation appear to be limited to the western-central, and southwestern portions of the Site, it is recommended that the Full Scale SVE system be installed biased towards these areas, as opposed to only around the Site perimeter. With these adjustments, the Full Scale SVE system would treat the elevated concentrations of PCE in soil vapor, while still preventing the off-site migration of contaminated soil vapor (if any).

Off-Site Soil Vapor Intrusion Report (OSVIR), 22-60 46th Street, Queens, AKRF Inc., July 2022

AKRF conducted an off-site SVI and the findings were reported in the OSVIR dated July 2022. The field work associated with the OSVI investigation was completed between February 14 and February 16, 2022, and March 16 and March 18, 2022. The OSVI investigation included: the installation of four temporary sub-slab soil vapor sampling points and four temporary soil vapor sampling points; and the collection of sub-slab soil vapor, soil vapor, indoor air, and ambient (outdoor) air samples for field screening and laboratory analysis.

Based on the findings of the OSVI investigation, AKRF concluded the following:

- Laboratory analytical results for the sub-slab soil vapor and indoor air samples identified up to 38 VOCs, including chlorinated solvents and petroleum related compounds in the samples collected from off-site properties. Of the compounds with established NYSDOH Sub-Slab Soil Vapor/Indoor Air matrices values, matrices for PCE, methylene chloride and carbon tetrachloride were relevant. When comparing the sub-slab soil vapor and indoor air concentrations to the applicable matrix for PCE and carbon tetrachloride the results were “no further action”. When comparing the sub-slab soil vapor and indoor air concentrations to the applicable matrix for methylene chloride the results were “identify source(s) and resample or mitigate” for two properties (22-68 46th Street and 45-03 23rd Avenue). Methylene chloride was detected at a concentration of 2.47 $\mu\text{g}/\text{m}^3$ in the sub-slab soil vapor sample and at a concentration of 74.3 $\mu\text{g}/\text{m}^3$ in the co-located indoor air sample collected from the 22-68 46th Street property; and at a concentration of 7.2 $\mu\text{g}/\text{m}^3$ in the sub-slab soil vapor sample and at a concentration of 12 $\mu\text{g}/\text{m}^3$ in the co-located indoor air sample collected from the 45-03 23rd Avenue property. Methylene chloride concentrations in the indoor air samples were orders of magnitude higher than the sub-slab soil vapor sample concentrations. Methylene chloride is used in a variety of commercially available products (paint strippers and adhesives) and was also detected in the ambient air samples. Based on the findings, elevated concentrations of methylene chloride in indoor air are likely related to building conditions and are not attributed to any sub-slab soil vapor source or a vapor intrusion condition.
- Eighteen VOCs, including solvents and petroleum-related compounds were detected in one or more of the soil vapor samples collected from the 45th Street sidewalk at concentrations ranging from 3.86 $\mu\text{g}/\text{m}^3$ to 1,570 $\mu\text{g}/\text{m}^3$ (PCE at SV-45TH-02_20220316). PCE was detected in samples SV-45TH-01_20220316 and SV-45TH-02_20220316 at a concentration of 854 $\mu\text{g}/\text{m}^3$ and 1,570 $\mu\text{g}/\text{m}^3$, respectively. TCE was detected in samples SV-45TH-01_20220316 and SV-

45TH-02_20220316 at a concentration of 16.9 $\mu\text{g}/\text{m}^3$ and 10.5 $\mu\text{g}/\text{m}^3$, respectively. The compound 1,1,1-trichloroethane (TCA) was detected in samples SV-45TH-01_20220316 and SV-45TH-02_20220316 at a concentration of 34.1 $\mu\text{g}/\text{m}^3$ and 11.7 $\mu\text{g}/\text{m}^3$, respectively.

- Fifteen VOCs, including solvents and petroleum-related compounds were detected in one or more of the soil vapor samples collected from the 46th Street sidewalk at concentrations ranging from 4.61 $\mu\text{g}/\text{m}^3$ to 2,410 $\mu\text{g}/\text{m}^3$ (trichlorofluoromethane at SV-45TH-02_20220316). PCE was detected in samples SV-46TH-01_20220316 and SV-46TH-02_20220316 at a concentration of 277 $\mu\text{g}/\text{m}^3$ and 86.1 $\mu\text{g}/\text{m}^3$, respectively. TCA was detected in samples SV-46TH-01_20220316 and SV-46TH-02_20220316 at a concentration of 420 $\mu\text{g}/\text{m}^3$ and 64.9 $\mu\text{g}/\text{m}^3$, respectively.

2.5 Remedial Action Objectives

The BCP Remedial Action Objectives (RAOs) established for the Site through the remedy selection process stated in 6 NYCRR Part 375, as listed in the DD dated January 2022, 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 groundwater aquifer to pre-disposal/pre-release conditions, to the extent practicable.
- Remove the source of groundwater contamination.

Soil

RAOs for Public Health Protection

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

RAOs for Environmental Protection

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

Soil Vapor

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

2.6 Summary of Remedial Actions

Remedial actions were performed at the Site in accordance with the NYSDEC-approved January 2022 RAWP, January 2022 DD, May 2022 RMR, and all applicable federal, state, and local rules and regulations. Remedial activities during the BCP remedy phase began at the Site in March 2022 and were completed in September 2022.

The following is a summary of the Remedial Actions performed at the Site under the BCP:

2.6.1 Soil Excavation and Off-Site Disposal

On-site soils that exceeded the RRSCOs, as defined by 6 NYCRR Part 375-6.8, were excavated and transported off-site for proper disposal at approved facilities (refer to Figure 4). A total of 27,940.25 tons of soil were excavated and disposed off-site. During all excavation and ground intrusive activities, AKRF conducted real-time air monitoring for particulates and VOCs, in accordance with a NYSDEC-approved Community Air Monitoring Plan (CAMP), including a Special Requirements CAMP when within 20 feet of any potential exposures.

Post-excavation soil endpoint samples were collected across the Site in accordance with the RAWP to evaluate performance of the remedy and the sample results met the Track 2 RRSCOs. The endpoint sample analytical results are included in Attached Tables 2 through 7. Endpoint sampling locations are shown on Figure 4.

2.6.2 Underground Storage Tank (UST) Removal

During soil excavation activities, four USTs including two 1,080-gallon No. 2 fuel oil USTs, one 2,000-gallon #2 fuel oil UST, and one 6,800-gallon No. 4 fuel oil UST were encountered and removed from the Site. The USTs were properly cleaned, removed, and disposed of off-site by Boro Waste Oil LLC of Staten Island, New York (a licensed tank remediation contractor). The USTs were registered in July 2022 and subsequently closed with the NYSDEC PBS Database under Facility ID 2-613355. The PBS registration is provided as Appendix C.

2.6.3 In-Situ Chemical Oxidation (ISCO)

As part of the remedial action, in-situ chemical oxidation (ISCO) was completed at two targeted locations with the highest concentrations of PCE identified in groundwater. AKRF retained In-Situ Oxidative Technologies, Inc. (ISOTEC) to conduct an ISCO bench-scale treatability study to identify reagent type and dosage to treat low concentrations of PCE identified in groundwater. Following the Bench Scale study, ISOTEC designed and completed an ISCO treatment targeting an approximately 1,200-square foot area each around monitoring well RI-MW-06 and RI-MW-07 where the highest concentrations of PCE were identified during the remedial investigation.

2.6.4 Import

2.5.4.1 Stone/Gravel Import

A total of 2,116.13 tons of dense grade aggregate (DGA) were imported to backfill behind subgrade. In addition, 1,084.15 tons of gas permeable aggregate stone (GPA) were imported as part of the SSDS and installed below the concrete slab. Import approvals are provided in Appendix D.

2.6.5 Active Sub-Slab Depressurization System (SSDS)

Installation of a vapor barrier/waterproofing membrane and an active SSDS was completed in September 2022 as a mitigation measure against potential soil vapors accumulating within the building. The SSDS layout plan is shown on Figure 5. A vapor barrier, a construction element, was installed beneath the foundation slab (75-mil Aussie Skin[®] 550G) and behind subgrade walls (60-mil Aussie Mate[®] 580-AL).

2.6.6 Soil Vapor Extraction (SVE) System

An SVE system was installed to treat residual elevated concentrations of PCE in soil vapor and prevent the off-site migration of contaminated soil vapor (if any). The SVE plan is shown on Figure 6. As-Built of the SVE system are enclosed as Appendix G.

2.7 Remaining Contamination

2.7.1 Soil

Soil quality was characterized during previous investigations prior to entering the BCP, and during the RI investigation conducted as part of the BCP. All soil exceeding the Track 2 RRSCOs within the upper 15 feet was excavated and removed from the Site in accordance with the RAWP and the DD. Soil endpoint samples were collected from the base of the excavation and the results are provided in Attached Tables 2 through 7. All endpoint sample results were below the RRSCOs.

2.7.2 Groundwater

Groundwater quality was characterized during previous investigations prior to entering the BCP and during the RI conducted as part of the BCP. The groundwater beneath the Site was found to have concentrations of CVOCs (specifically PCE) above the AWQSGVs and groundwater treatment was included as a component of the Decision Document. A groundwater treatment program was completed at the Site to treat elevated concentrations of PCE (see Figure 7); however, low-level concentrations exceeding the AWQSGVs still remain. The pre-remediation and post-remediation concentrations of CVOCs are provided in Attached Tables 8 and 9, respectively. Residual groundwater PCE concentrations are shown on Figure 7.

Groundwater use at the Site is also subject to the ICs documented within the Environmental Easement and is restricted for use as a source of potable or process water without necessary water quality treatment as determined by NYSDOH.

2.7.3 Sub-Slab Soil Vapor

Based on the findings of the RI and additional soil vapor testing completed as part of pilot testing, contaminated soil vapor remains at the Site. The contaminated soil vapor will be treated by the SVE system and the vapor mitigation system, which consists of a vapor barrier membrane and the active SSDS installed below the entire building footprint (see Figures 5 and 6 for details) will prevent vapor intrusion into the new building.

2.8 Management of Remaining Contamination

The remaining contamination was addressed using the NYSDEC-approved Track 2 Restricted Residential Use cleanup remedy, as described in the RAWP, DD, and RMR which included the utilization of ICs and ECs to isolate the remaining contamination, prevent exposure, and be protective of human health and the environment. The IC is in the form of an EE for the Site that requires periodic certification, allows the use and development of the Site for restricted residential use, restricts the use of groundwater as a source of potable or process water without necessary water quality treatment as determined by NYSDOH, and requires compliance with this Department-approved SMP.

The following Section 3.0 (Institutional and Engineering Control Plan) includes descriptions and plans for the ECs, and the requirements for monitoring, inspection, operation and maintenance, and reporting to confirm that remediation goal continue to be met.

3.0 INSTITUTIONAL AND ENGINEERING CONTROL PLAN

3.1 General

Since remaining contaminated soil vapor and groundwater exists at the Site, and SSDS and SVE were installed, ICs and 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 component of the SMP and is subject to revision by NYSDEC.

This plan provides:

- A description of all ICs/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 EE;
- 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 ICs/ECs, such as the implementation of the Foundation Management Plan (FMP) (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 ICs/ECs required by the Site remedy, as determined by NYSDEC.

3.2 Institutional Controls

A series of ICs is required by the RAWP 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 uses only. Adherence to these ICs on the Site is required by the EE and will be implemented under this SMP. ICs identified in the EE may not be discontinued without an amendment to or extinguishment of the EE. The IC boundaries are shown on Figure 2.

The ICs are as follows:

- The Site may be used only for restricted residential, commercial or institutional uses;
- All ECs must be operated and maintained as specified in this SMP;
- All ECs on the Site must be inspected and certified at a frequency and in a manner defined in this SMP;
- The use of groundwater underlying the Site is prohibited without necessary water quality treatment as determined by NYSDOH or the New York City Department of Health and Mental Hygiene (NYCDOHMH) 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 NYSDEC;
- Any soil vapor or groundwater public health monitoring must be performed as defined in this SMP;
- Data and information pertinent to Site management must be reported at the frequency and in a manner as defined in this SMP;
- All future activities that will disturb remaining contaminated material must be conducted in accordance with this SMP;

- Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in this SMP;
- Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical component of the remedy shall be performed as defined in this SMP;
- 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 the EE;
- The potential for vapor intrusion must be evaluated for any buildings developed in the area within the IC boundaries noted on Figure 2, and any potential impacts that are identified must be monitored or mitigated; and
- In-ground vegetable gardens and farming on the Site are prohibited.

3.3 Engineering Controls

3.3.1 SSDS

An active SSDS will be operated to mitigate the potential for soil vapor intrusion into the proposed new buildings. The SSDS will induce a negative pressure (i.e., vacuum) beneath the proposed building slab. The underground elements of the SSDS installed under the new building slab include the following components:

- Five SSDS branches consisting of 0.02-inch slotted and solid, 4-inch diameter Schedule 40 polyvinyl chloride (PVC) pipe lengths were installed beneath the building slab with riser legs penetrating the building slab and stubbed out approximately XX inches above the top of slab;
- Communication and pipe sleeves through concrete foundation elements;
- A minimum 6-inch thick gas-permeable aggregate stratum underlain by 6-mil poly sheeting beneath the entire SSDS treatment area;
- Six vacuum monitoring points (VMPs) installed beneath the building slab; and
- A vapor barrier (AVM Aussie Skin 550G) beneath the full extent of the building slab.

During construction of the new building superstructure, the following aboveground elements will be installed to complete the SSDS installation:

- A pipe manifold, which combines the PVC riser legs into a single 6-inch cast iron riser pipe, will extend to the roof of the building following building completion;
- A roof-mounted blower with a shut-off alarm connected to a local alarm panel;
- One 6-inch diameter galvanized steel rooftop exhaust stack fitted with a rain cap, terminating at least 7 feet above the finished roof;
- Accessories, including: cleanouts, sample ports, vacuum indicators/pressure gauges, flow meters, butterfly valves, and differential pressure switches; and
- A control panel equipped with a telemetry system to notify select personnel of alarm conditions.

The SSDS complies with the requirements stated in Section 9.0 of the RAWP. The location and components of the SSDS are shown on Figure 5. As-built drawings for the underground components of the SSDS are included in Appendix G.

Procedures for operating and maintaining the SSDS are documented in the Operation and Maintenance Plan (See Section 5.0 of this SMP) and procedures for monitoring the SSDS are included in the Monitoring Plan (see Section 4.0 of this SMP). The Monitoring Plan also addresses severe condition inspections in the event that a severe condition occurs, which may affect controls at the Site.

3.3.2 SVE System

The treatment of residual contaminated soil vapor at the Site will be performed through operation of an SVE system. The SVE system, in combination with the SSDS, also prevents any soil vapor intrusion and off-site migration of contaminated soil vapor. The SVE system installed at the Site is comprised of:

- Six 4-inch diameter PVC SVE wells, which target the vadose zone treatment interval.
- One 15-horsepower SVE blower operating at approximately 50 inH₂O and 500 standard cubic feet per minute (SCFM);
- One 120-gallon moisture separator tank with high-level alarm, transfer pump, and 55-gallon auxiliary drum with high-level alarm;
- One inline particulate filter;
- One dilution line with particulate filter;
- Two Tetrasolv VR-200 vapor-phase granulated activated carbon (GAC) vessels (piped in series, with influent, intermediate, and effluent sample ports).
- System alarms including one high temperature sensor, and one low vacuum sensor;
- Individual SVE line, and dilution line accessories, including vacuum gauges, pitot tube/differential pressure gauge assemblies for air flow rate measurements, throttling valves, and sampling ports (seven each);
- Additional accessories including pre- and post-blower vacuum/pressure, and temperature gauges, and pre- and post-particulate filter vacuum gauges (one each);
- One control panel equipped with a telemetry system to notify select personnel of alarm conditions;
- One equipment shed (cargo box with electricity and ventilation) located on the southwestern portion of the Site; and
- One 6-inch diameter galvanized steel effluent stack.

The SVE system is designed to operate on a continual basis, 24 hours a day, 7 days a week, and 365 days a year except for periodic shut-downs for maintenance. The SVE system will operate until monitoring (as outlined in Section 4.0 of this SMP) and appropriate consultation with NYSDEC and NYSDOH confirm that the SVE wells and/or carbon treatment are no longer required to treat contaminated soil vapor left in place at the Site. The locations of the SVE wells and SVE system components are shown on Figure 6.

Procedures for operating and maintaining the SVE system are documented in the Operation and Maintenance Plan (Section 5.0 of this SMP). The Operation and Maintenance Plan also addresses severe condition inspections in the event that a severe condition, which may affect controls at the Site, occurs.

3.3.3 Contingent Groundwater Treatment

In the event that the SVE system is shut down and the CVOC concentrations in on-site groundwater monitoring wells are above the AWQSGVs, contingent groundwater treatment will be performed within the remaining wells around RI-MW-07 (RI-MW-07A, RI-MW-07E, and RI-MW-07W). To reduce CVOC concentrations, slow-release permanganate candles will be installed in the monitoring wells and/or an ISCO injection event will be conducted.

Prior to shutting down the SVE system, groundwater samples will be collected from the monitoring wells around RI-MW-07 and submitted to the laboratory for analysis of CVOCs by EPA Method 8260. If the CVOC concentrations are above the AWQSGVs, a description of the in-situ groundwater treatment program or candle installation and monitoring protocols will be submitted to NYSDEC for review and approval prior to implementation.

3.3.4 Criteria for Completion of Remediation/Termination of Remedial Systems

Generally, remedial processes are considered complete when effectiveness 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 6.6 of NYSDEC DER-10. Unless waived by the NYSDEC, confirmation samples of applicable environmental media are required before terminating any remedial actions at the site. Confirmation samples require Category B deliverables and a Data Usability Summary Report (DUSR).

As discussed below, the NYSDEC may approve termination of a groundwater monitoring program, operation of the SVE System, and/or operation of the SSDS. When a remedial party receives such an approval, the remedial party will decommission all related monitoring points, SVE wells, and/or groundwater monitoring wells, as appropriate. Decommissioning of groundwater monitoring wells will be in accordance with the NYSDEC CP-43 policy.

The remedial party will also conduct any needed Site restoration activities, such as asphalt patching and decommissioning treatment system equipment. In addition, the remedial party will conduct any necessary restoration of vegetation coverage, trees and wetlands, and will comply with NYSDEC and United States Army Corps of Engineers regulations and guidance. Also, the remedial party will ensure that no ongoing erosion is occurring on the Site.

Active SSDS

The operation of the active SSDS will not be discontinued unless prior written approval is granted by the NYSDEC in consultation with NYSDOH, as they are anticipated to be permanent ECs. In the event that monitoring data collected under the Monitoring Plan (Section 4.0 of this SMP) indicates that the SSDS or one or more of its components is no longer required, a proposal to discontinue or reduce controls associated with the SSDS and/or the applicable components will be submitted by to the NYSDEC and NYSDOH for review and approval.

SVE System

The SVE system will not be discontinued unless prior written approval is granted by the NYSDEC in consultation with NYSDOH. In the event that monitoring data collected under

the Monitoring Plan (Section 4.0 of this SMP) and/or the Operations and Maintenance Plan (Section 5.0 of this SMP) indicate that the SVE system operation is no longer warranted, a proposal to discontinue the connection and operation of the SVE system will be submitted by the property owner. Conditions that warrant discontinuing the SVE system include contaminant concentrations in soil vapor from the SVE system that: (1) reach levels that are consistently below NYSDOH Matrices Values, (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 soil vapor collected from sampling ports installed on the SVE manifold legs. The SVE system will remain in place and operational until permission to discontinue or reduce controls associated with its use is granted in writing by the NYSDEC.

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 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 H.

4.2 Purpose and Schedule

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

- Sampling and analysis of all appropriate media (e.g., groundwater, soil vapor, and indoor air and sub-slab soil vapor);
- Assessing compliance with applicable NYSDEC standards, criteria and guidance (SCGs), particularly NYSDEC AWQSGVs and NYSDOH Matrices Values;
- Assessing achievement of the remedial performance criteria;
- Evaluating Site information periodically to confirm that the remedy continues to be effective in protecting public health and the environment; and
- Preparing the necessary reports for the various monitoring activities.

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;
- Reporting requirements;
- Quality Assurance/Quality Control (QA/QC) requirements;
- Inspection and maintenance requirements for SVE and SSDS components; and
- Annual inspection and periodic certification.

Reporting requirements are provided in Section 7.0 of this SMP. Monitoring of the performance of the remedy and overall reduction in contamination on-site will be conducted for the periods specified for each matrix listed in Table IV. The frequency thereafter will be determined in consultation with NYSDEC and based on reports submitted showing contaminant trends. Trends in contaminant levels in soil vapor in the affected areas will be evaluated to determine if the remedy continues to be effective in achieving remedial goals. Monitoring programs are summarized in In-Text Table IV and outlined in detail in sections below.

Table IV
Monitoring/Inspection Schedule

Monitoring Program	Frequency*	Location	Matrix	Analysis
SSDS Routine Component Inspection and Maintenance	Quarterly for the first 12 months after COC, annually afterwards	SSDS riser pipes, manifold, vapor monitoring points, and system components on the roof	System Integrity and Air Flow	Visual Inspection of Conditions and System Readings
Soil Vapor Extraction System	Monthly until December 2023, quarterly afterwards	Aboveground piping and SVE equipment shed	SVE System Mechanics	Visual Inspection
SVE Extracted Vapor Sampling	6 months and 12 months after start-up, annually, and as necessary thereafter	SVE Equipment Shed	Composited SVE system influent, intermediate and effluent collected at carbon vessels	CVOCs by TO-15
Groundwater Monitoring	Four quarterly events following the approval of the SMP	Existing monitoring wells installed at the Site	Groundwater	CVOCs by EPA 8260
Site-Wide Inspection	Annually	Site-Wide	Visual Inspection	N/A

Notes:

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

CVOCs – Chlorinated Volatile Organic Compounds

4.3 Site-Wide Inspection

Site-wide inspections will be performed at a minimum of once per year. These periodic inspections must be conducted when the ground surface is visible (i.e., no snow cover). Site-wide inspections will be performed by a qualified environmental professional (QEP) as defined in 6 NYCRR Part 375, a PE who is licensed and registered in New York State, or a qualified person who directly reports to a PE who is licensed and registered in New York State. Modification to the frequency or duration of the inspections will require approval from the NYSDEC project manager. 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 P – 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;
- Whether stormwater management systems, such as basins and outfalls, are working as designed;
- 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 (PRR). 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.

Reporting requirements are outlined in Section 7 of this SMP.

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 project manager 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 ICs/ECs implemented at the Site by a QEP, as defined in 6 NYCRR Part 375. Written confirmation must be provided to the NYSDEC project manager within 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

4.4 SSDS Monitoring

Monitoring of the active SSDS will be performed on a routine basis, as identified in the Monitoring/Inspection Schedule included as Table V. The monitoring of remedial systems must be conducted by a Qualified Environmental Professional (QEP) as defined in 6 NYCRR Part 375, a P.E. who is licensed and registered in NYS, or a qualified person who directly reports to a P.E. who is licensed and registered in New York State (NYS). Modifications to the frequency or related monitoring requirements will require approval from the NYSDEC Project Manager. An inspection of the complete system and monitoring of system operational parameters will be conducted on a quarterly basis for the first year and then annually thereafter. Unscheduled inspections and/or monitoring may take place when a suspected failure of the SSDS has been reported or a significant event as defined in Section 5.4.5 has occurred that is deemed likely to affect the operation of the system. SSDS components to be monitored are included in Table V, below.

The inspection/monitoring frequency may be modified based on field screening with the approval of NYSDEC. This SMP will be modified to reflect changes in monitoring and sampling plans approved by NYSDEC.

SSDS components to be monitored are summarized below.

Table V
SSDS Monitoring Requirements and Schedule

SSDS Component	Monitoring Parameter	Operating Range	Monitoring Schedule
Vapor Monitoring Points	Induced Vacuum Reading	a minimum of 0.005 inches of H ₂ O	Quarterly (first year), annually (after first year)
Riser Legs	Flow Rate	40 to 100 CFM	
Riser Legs	Induced Vacuum Reading	0.5 to 5 inches of H ₂ O	
Aboveground System Components	Visual-Intactness	NA	

4.5 Groundwater Monitoring

A network of monitoring wells was installed as part of the RI to monitor groundwater conditions at the Site. In addition, two off-site monitoring wells were installed during the remedial action to monitor down-gradient groundwater conditions. The network of on-Site and off-Site wells was installed based on the following criteria:

- Contaminant source area location including soil vapor and groundwater analytical results documented over the course of the RI;
- A generally northeasterly groundwater flow direction; and
- The presence of physical constraints that influenced groundwater flow, including subsurface utilities, building structural elements, and variable fill conditions.

A figure showing the monitoring well locations is provided as Figure 7. The monitoring wells are located within the building footprint and on adjacent sidewalks. PCE was detected in groundwater samples at concentrations above the AWQSGVs in multiple samples collected during the RI and the remedial action.

Four quarterly groundwater sampling events will be completed following approval of this SMP. A groundwater monitoring program schedule is provided below:

Table VI
Groundwater Monitoring Schedule

Well ID	Well Location	Monitoring Frequency	Analytical Parameter(s)
RI-MW-03	On-Site	Quarterly	CVOCs
RI-MW-05A	On-Site	Quarterly	CVOCs
RI-MW-06A	On-Site	Quarterly	CVOCs
RI-MW-07A	On-Site	Quarterly	CVOCs
RI-MW-08A	On-Site	Quarterly	CVOCs
RI-MW-09A	On-Site	Quarterly	CVOCs
RI-MW-10	On-Site	Quarterly	CVOCs

The sampling will be performed to assess CVOC concentrations on a quarterly basis, as outlined in the table above. The sampling event described above will be reported in a quarterly monitoring report per the requirements of Section 7.0 of this SMP. The sampling will be conducted in accordance with the Health and Safety Plan (HASP) and Community Air Monitoring Plan (CAMP) (Appendix F) and the Quality Assurance Project Plan (QAPP) (Appendix H).

4.6 Soil Vapor Extraction System Monitoring and Sampling

Six SVE wells were installed in the vadose zone to address the soil vapor contamination and to prevent the off-site migration of contaminant soil vapor (if any). After the initial month of operation, the SVE system will be inspected at a minimum of once a month for a period of 12 months, and quarterly thereafter to ensure proper operation. Monthly/quarterly checks will consist of individual SVE line gauge readings, blower and carbon inspections, and alarm checks. In addition, extracted vapor samples will be collected at system start-up and during the quarterly inspections, as described in Section 4.7.1, to monitor contaminant removal rates and ensure proper treatment of SVE System effluent. The SVE system monitoring requirements and schedule is summarized in Table VII below.

Table VII
SVE System Monitoring Requirements and Schedule

SVE System Component	Monitoring Parameter	Operating Range	Monitoring Schedule
Soil Vapor Monitoring Points	Induced Vacuum Reading	≥ 0.01 inH ₂ O	Monthly (first year), quarterly (after first year)
Individual SVE Lines	Flow Rate and Applied Vacuum	Varies - see Log Sheets	Monthly (first year), quarterly (after first year)
SVE Blower Inlet Parameters	Temperature and Pressure	Varies - see Log Sheets	Monthly (first year), quarterly (after first year)
Aboveground System Components	Visual Intactness	NA	Monthly (first year), quarterly (after first year)
Carbon System Vapor	VOCs	NA	Semi-Annually

The SVE system will continue to be maintained and operational until permission to discontinue operation is granted in writing by NYSDEC and NYSDOH. A proposal to discontinue the SVE system may be submitted by the Owner based on SVE system operation history, and effluent vapor sample data.

4.6.1 Confirmatory Soil Vapor Sampling

Confirmatory extracted vapor sampling will be conducted following startup to reassess VOC emissions calculations, and to provide baseline VOC concentrations at the onset of SVE system operation. Influent, intermediate, and effluent vapor samples will be collected using 1-Liter Tedlar[®] bags in accordance with the QAPP and analyzed for CVOCs by EPA Method TO-15 by a NYSDOH-ELAP-certified laboratory.

All effluent vapor VOC concentrations will be compared to the NYSDEC Division of Air Resources (DAR-1) publication Air Guide-1 (AG-1): Annual Guideline Concentrations (AGC)/Short-term Guideline Concentrations (SGC) Tables, updated October 18, 2010. The analysis will be performed using NYSDEC DAR-1 Air Guide-1 Policy (Policy DAR-1: Guidelines for the Control of Toxic Ambient Air Contaminants, November 12, 1997), which simulates the atmospheric processes that disperse pollutants from an emissions source to predict concentrations at selected downwind receptor locations. The procedures in the DAR-1 policy are used to model conservative, worst-case annual and short-term concentrations based on the laboratory analytical results and exhaust stack parameters to compare against the NYSDOH AGCs and SGCs.

4.6.2 Sampling Protocol

All sampling activities will be recorded by taking applicable notes in a field book and by collecting the readings listed on the sampling logs presented in Appendix I. Pertinent observations or Site conditions at the time of the sampling (e.g., monitoring point integrity, etc.) will also be noted on the sampling logs. One sampling log will be filled out for each monitoring point and will serve as the inspection form associated with the monitoring point network.

4.7 Monitoring Quality Assurance/Quality Control

All sampling and analyses will be performed in accordance with the requirements of the Quality QAPP prepared for the Site (Appendix H). Main Components of the QAPP include:

- QA/QC Objectives for Data Measurement;
- Sampling Program:
 - Samples will be collected into laboratory-supplied containers.
 - Sample holding times will be in accordance with the NYSDEC Analytical Services Protocol (ASP) requirements.
 - Field QC samples (e.g., trip blanks, coded field duplicates, and matrix spike/matrix spike duplicates) will be collected as necessary.
- Sample Tracking and Custody;
- Calibration Procedures:
 - All field analytical equipment will be calibrated immediately prior to each day's use and will follow all calibration procedures and schedules as specified in EPA SW-846 and subsequent updates that apply to the instruments used for the analytical methods.
- Analytical Procedures;
- Preparation of a DUSR, which will present the results of data validation, including a summary assessment of laboratory data packages, sample preservation and chain of custody procedures, and a summary assessment of precision, accuracy, representativeness, comparability, and completeness for each analytical method.
- Internal QC and Checks;
- QA Performance and System Audits;
- Preventative Maintenance Procedures and Schedules; and
- Corrective Action Measures.

5.0 OPERATION AND MAINTENANCE PLAN

5.1 General

This Operation and Maintenance (O&M) Plan describes the measures necessary to operate, monitor and maintain the mechanical components of the remedy selected for the Site, which include an SSDS and SVE System. This Operation and Maintenance Plan:

- Includes the steps necessary to allow individuals unfamiliar with the Site to operate and maintain the active SSDS and the SVE system;
- Includes an operation and maintenance contingency plan; and,
- Will be updated periodically to reflect changes in Site conditions or the manner in which the active SSDS and SVE are operated and maintained.

A copy of this Operation and Maintenance Plan, along with the complete SMP, will be kept at the Site. This Operation and Maintenance Plan is not to be used as a stand-alone document, but as a component document of the SMP.

5.2 Scope

Once completed, the SSDS and SVE system are designed to operate continuously, 24 hours a day, 7 days a week, 365 days a year, without any required adjustments or repairs beyond the routine maintenance items discussed in Sections 5.4.4 and 5.5.4, respectively. Manufacturers' specifications for each of the SSDS and SVE components (included in Appendices J and K, respectively) should be consulted prior to any repairs or adjustments that may become necessary. Regular system inspections, operation parameter documentation, and performance assessment guidelines are detailed in Sections 5.4 and 5.5 of this SMP.

5.3 Remedial Systems Performance Criteria

An SSDS has been installed at the Site to prevent the potential for vapor intrusion into the building and will operate continuously in conjunction with the SVE wells to treat residual petroleum-contaminated soil left in place at the Site. The SVE wells began operating at the Site on September 30, 2022. Details pertaining to the performance monitoring of these ECs are outlined below.

5.4 SSDS Operation and Maintenance

An active SSDS will be operated to mitigate the potential for soil vapor intrusion into the new building by applying negative pressure beneath the concrete slab, minimizing the potential for vapor intrusion. The major components of the SSDS include:

- Five slotted 4-inch PVC horizontal SSDS pipes embedded in a gas permeable aggregate layer (3/4-inch stone) above the soil vapor extraction area; and, six sub-slab vacuum monitoring points throughout the Site building;
- A system manifold connecting the five SSDS branches to an 8-inch diameter cast iron vertical riser leading to the building roof. Magnehelic gauges and flow sensors are installed on the pipe manifold to monitor system performance.
- One appropriately-sized 1.5 HP blower connected to the vertical riser at the building roof to vent soil vapor with a variable-frequency drive (VFD) to throttle blower operation to acceptable conditions;

- A control panel equipped with a remote alarm system to notify on-site personnel of alarm conditions; and
- An exhaust stack consisting of an 8-inch galvanized steel pipe terminating a minimum of 7 feet from any air intakes/vents or off-Site buildings.

As-built drawings for the underground components of the SSDS are included in Appendix G. This SMP will be updated after building construction to include as-built drawings of the aboveground SSDS elements in Appendix G and SSDS component manuals in Appendix J.

Once completed, the SSDS is designed to operate continuously, 24 hours a day, 7 days a week, 365 days a year, without any required adjustments or repairs beyond routine maintenance items discussed in Section 4.2.4.1. Manufacturers' specifications for each of the SSDS components and the troubleshooting guide (included in Appendix J) should be consulted prior to any repairs or adjustments that may become necessary. Regular system inspections, operation parameter documentation, and performance assessment guidelines are detailed in Sections 4.2.3 and 4.2.4 of this SMP.

5.4.1 SSDS Start-Up and Testing

The system will be started up and tested following the completion of the building construction. Testing will also be conducted after any future event that requires system shut-down/restart.

The SSDS start-up inspection will include the following:

- Confirmation of acceptable air flow rate from each SSDS riser by a visual inspection of flow sensors affixed to each of the manifold legs and use of an appropriate manometer or portable vacuum gauging device;
- Confirmation of acceptable vacuum readings from each SSDS riser by a visual inspection of magnehelic gauges affixed to manifold legs; and
- Confirmation of acceptable induced vacuum (a minimum of 0.005 inches of H₂O) beneath the entire basement slab from monitoring points MP-1 through MP-6 through the manual access of each point and use of an appropriate manometer or portable vacuum gauging device.

Adjustments to the blower and individual SSDS lines may be necessary at start-up and after any alterations to the overall system. SSDS equipment, including individual valves on SSDS lines will be throttled to rebalance the system, adjusting air flow rates, and vacuum/pressure readings to acceptable values. A copy of the SSDS inspection log is provided in Appendix L. The log will be updated after initial system start-up and balancing to determine acceptable operating ranges for air flow and vacuum.

At a minimum, the findings and conclusions following system start-up/restart activities will be reported in the subsequent quarterly media monitoring report. In addition, depending on the nature of the adjustment to the system, the process and instrumentation diagram (P&ID) and/or Site figures may need to be updated to reflect the work completed. Such revisions shall be completed and submitted to NYSDEC with the media monitoring report.

All further modifications, adjustments, or additions to the SSDS should be completed in accordance with the equipment specifications provided by the manufacturer. Manufacturers' specifications for all system components as part of the manuals provided in Appendix J.

5.4.2 SSDS Operation: Routine Operation

After start-up, the SSDS is designed to operate continuously without any required adjustments or repairs, beyond routine maintenance items discussed in Section 5.5.3. No adjustments to the operating schedule or other intentional interruptions to operation (other than those required for routine maintenance) shall be permitted without written approval by NYSDEC and NYSDOH.

As described in Section 5.2.6, the system includes a differential pressure switch that will trigger an alarm in the event of blower malfunction (or other condition resulting in low vacuum in the SSDS riser) so that appropriate corrective actions can be taken.

If shutdown of the SSDS is considered, a proposal to discontinue the SSDS will be submitted by the property owner for NYSDEC and NYSDOH approval. The SSDS will remain in place and operational until permission to discontinue use is granted in writing by NYSDEC and NYSDOH.

5.4.3 SSDS Operation: Routine Inspections

The effectiveness of the SSDS components will be confirmed via quarterly system inspections to be conducted by personnel under the supervision of a qualified environmental professional as described in Section 4.4. Monitoring of the SSDS will consist of a visual inspection of the complete system including checking to confirm that the SSDS blower is operating properly, observing all associated air flow and vacuum gauges and alarms to confirm they are within acceptable ranges, identification and repair of any system malfunctions or problems (i.e., leaks, cracks, collection of condensation, etc.), and taking vacuum readings at the six vacuum monitoring points. A copy of the SSDS Routine Inspection Log is provided in Appendix L. The log will be updated after initial system start-up and balancing to determine acceptable operating ranges for air flow and vacuum.

Individual flow rate and vacuum readings will be recorded for the five SSDS pipe branches and sub-slab vacuum will be confirmed in the six vacuum monitoring points. This operational data will be used as needed to adjust controls for individual branches and any faulty gauges will be repaired or replaced as needed. SSDS inspections will be conducted on a quarterly basis for the first year of operation, and annually thereafter.

Care shall be taken during inspections to identify and repair any system malfunctions or problems (i.e., leaks, cracks, collection of condensation, etc.). Manufacturer's specifications and the troubleshooting guide, included as Appendix J, should be consulted prior to any repairs or adjustments that may become necessary.

5.4.4 SSDS Operation: Routine Equipment Maintenance

A schedule for SSDS routine equipment maintenance work is provided in Table VIII:

Table VIII
SSDS Inspection/Maintenance Schedule

Operations Monitoring Tasks	Frequency	Maintenance Task
SSDS Routine Inspection	Quarterly (first year), annually (after first year), and as necessary	Repairs to system components as needed based on inspections

Routine Maintenance

The routine SSDS inspections will include:

- Confirmation that the blower is operating and air is discharging through the exhaust piping at the roof;
- Confirmation that the pressure gauges and air flow sensors on each SSDS riser leg are clean and readings within normal ranges;
- Confirmation that the vacuum gauge at the blower inlet is clean and reading within the acceptable range; and
- Confirmation that the exterior of the SSDS control panel is clean.

Maintenance to system components (e.g., cleaning/replacement of gauges, adjustments to system balancing) will be scheduled as needed based on findings from the inspection. Some routine maintenance will require intentional interruptions to SSDS operation. Both unexpected and deliberate alterations to and/or shutdowns of the system will be recorded in the field book and documented on SSDS Inspection Log, provided in Appendix L. A cumulative shutdown log, provided in Appendix M, will be maintained separately to track any atypical system activity, including, but not limited to alarm conditions and responses, and to track scheduled shutdowns for system maintenance.

Detailed SSDS Inspection and System Component Maintenance

The detailed operations check will be performed to identify/rectify operations-based maintenance items, such as malfunctioning SSDS risers, piping runs, and/or other system components. Typical detailed maintenance items that should be addressed during these inspections include:

- Confirm/assess blower performance and integrity;
- Assess blowers and determine need for replacement;
- Confirm/assess the operating condition of vacuum monitoring points MP-1 through MP-6; and

Confirm/assess the structural integrity of concrete floor slabs overlying constructed SSDS manifold and piping runs

The roof-mounted SSDS fan consists of a blower and motor pair. Each piece of equipment requires routine maintenance that is dictated either by runtimes or operating conditions, as defined by manufacturer's specifications. The pertinent material cut sheets and manuals are provided as Appendix J. A binder containing complete paper copies of manufacturer's specifications for all system components will be maintained on-Site.

Reporting

Barring any unusual findings, the system inspections and maintenance described above will be reported per the requirements of Section 7.0 of this SMP. In the event that an unexpected condition, such as a critical malfunction or extreme weather conditions that may hinder system operation is noted, the NYSDEC will be alerted promptly.

5.4.5 System Operation: Non-Routine Equipment Maintenance

In most instances, non-routine maintenance will be required due to operating conditions that are monitored by the SSDS alarm system. The primary objective of the alarm system

is to notify personnel when operating conditions are likely to reduce or otherwise compromise SSDS efficiency.

An alarm condition may be indicative of damage to, blockage of, and/or deterioration of, the SSDS piping or blower. Damage to the individual SSDS lines may be noticeable only by interpreting unusually high or low vacuum readings or air flow rates, which will be noted in the routine system inspections and remedied upon identification.

5.4.6 Monitoring Devices and Alarms

The SSDS will have a warning alarm system that notifies on-site maintenance personnel if the system is not operating properly (e.g., vacuum blower failure or a low vacuum condition). The alarm will provide both an audible and visual notification for a low vacuum condition from the differential pressure switch. The audible alarm will be an 85 to 95 decibel horn or buzzer with a manual acknowledge off switches.

In the event of an alarm, the on-site maintenance personnel shall investigate the problem by performing a detailed operations check and conducting applicable maintenance and repairs, as specified in this Operation and Maintenance Plan. Testing will be conducted as described in Section 5.2.1. when the system is restarted after an alarm condition. Operational problems will be noted in the quarterly monitoring report and PRR prepared for that reporting period.

5.5 SVE System Operation and Maintenance

An SVE system was installed to remediate residual contaminated soil vapor in the vadose zone beneath the building, and to help prevent the off-Site migration of PCE and any breakdown products in soil vapor. The VOC-contaminated air extracted from the SVE wells will be treated using grounded activated carbon and discharged to the atmosphere in accordance with 6 NYCRR Part 212.

The Site-specific design for the SVE system was developed based on the findings from preliminary SVE pilot testing conducted at the Site. The SVE system collects and treats contaminated vapor, and subsequently discharges the vapor through a dedicated exhaust stack. The major components of the SVE system include:

- Six 4-inch diameter PVC SVE wells, which target the vadose zone treatment interval.
- One 15 HP blower to extract soil vapor, with a variable-frequency drive (VFD) to throttle blower operation to acceptable conditions.
- A control panel equipped with a telemetry system to notify select personnel of alarm conditions.
- Two carbon treatment units connected in series to treat contaminated soil vapor.
- A control panel equipped with a telemetry system to notify select personnel of alarm conditions.
- Effluent stack consisting of an 8-inch steel riser pipe extending from the SVE shed.

5.5.1 SVE System Start-Up and Testing

Initial startup of the SVE system occurred on September 30, 2022. If, in the course of the SVE system lifetime, significant changes are made to the system and the system must be restarted, some or all of the following initial startup testing protocols shall be implemented and documented in addition to ongoing routine maintenance and monitoring activities.

Since initial startup of the SVE system was completed successfully, these procedures need not be followed after routine system restarts, such as those needed after alarm resets or following routine system maintenance.

Table IX
SVE System Startup Protocols

	Following SVE pit/pipe addition, repair, or replacement	Following SVE blower repair or replacement	Following carbon vessel repair or replacement
SVE line pressure testing	Yes	No	No
SVE blower inspection	Yes	Yes	Yes

Note: Pressure testing and blower inspection procedures are described in full in the QAPP, provided as Appendix H.

As described in the QAPP, SVE blower inspections shall comprise confirmation of:

- VFD operation reading;
- Pre-particulate filter blower vacuum and air flow rate readings;
- Carbon influent, intermediate, and effluent pressure, temperature, and PID readings; and
- Vacuum and air flow rates at each SVE well during active operation in that zone.

Appropriate values for these confirmation readings are outlined in SVE Inspection Log, provided in Appendix N.

Further adjustments to the blower and individual SVE lines may be necessary after any alterations to the overall system. SVE equipment, including individual valves on SVE lines will be throttled to rebalance the system, adjusting air flow rates and vacuum/pressure readings to acceptable values.

At a minimum, the findings and conclusions following system restart activities will be reported in the subsequent quarterly media monitoring report. In addition, depending on the nature of the adjustment to the system, the P&ID and/or Site figures may need to be updated to reflect the work completed. Such revisions shall be completed and submitted to NYSDEC with the quarterly media monitoring report.

All further modifications, adjustments or additions to the SVE system should be completed in accordance with the equipment specifications provided by the manufacturer. This SMP will be maintained on-Site and includes manufacturers' specifications for all system components in Appendix K.

5.5.2 SVE System Operation: Routine Operation Procedures

The SVE system is designed to operate continuously without any required adjustments or repairs, beyond routine maintenance items discussed in Sections 5.5.3 and 5.5.4. No adjustments to the operating schedule or other intentional interruptions to operation (other than those required for routine maintenance) shall be permitted without written approval by NYSDEC and NYSDOH.

The operation of the SVE system components will be confirmed by monthly system inspections (for first year, quarterly afterwards) by an environmental professional. The

check will consist of confirming the blower is operating properly with individual flow rate and vacuum readings for each of the SVE wells within designated ranges, and confirming instantaneous PID readings at the influent, intermediate, and effluent sample ports on the carbon treatment units. The check will also note any unusual conditions (e.g., unusual odors, spills, leaks, blower noise, etc.). A copy of the SVE Inspection Log is provided in Appendix N.

Care shall be taken during inspections to identify and repair any system malfunctions or problems (i.e., leaks, cracks, collection of condensation, etc.). Manufacturer's specifications and the troubleshooting guide, included as Appendix K, should be consulted prior to any repairs or adjustments that may become necessary.

If, in consultation with NYSDEC and NYSDOH, shutdown of the SVE system and/or carbon treatment system is considered, a proposal to discontinue the SVE and/or carbon treatment system will be submitted by the property owner for NYSDEC and NYSDOH approval. The SVE and/or carbon treatment system will remain in place and operational until permission to discontinue use is granted in writing by NYSDEC and NYSDOH.

5.5.3 SVE System Operation: Routine Equipment Maintenance

A tentative schedule for SVE system routine equipment maintenance work is provided in the following table:

Table X
SVE System Inspection/Maintenance Schedule

Operations Monitoring Tasks	Frequency
SVE System Inspection	Monthly (first year), quarterly afterwards and as necessary
System Component Maintenance	Semi-annual and as necessary
Wellhead and External System Component Maintenance	Annually and as necessary

Typical routine maintenance items that should be addressed during monthly inspections are listed in the SVE Inspection Log provided in Appendix N and include:

- Confirmation that the blower is operating and air is discharging through the exhaust piping to the roof;
- Confirmation that the pressure and air flow rate gauges on each manifold leg are clean and within normal ranges;
- Confirmation that the blower effluent PID readings and temperatures are within acceptable ranges; and
- Confirmation that the exterior of the SVE control panel is clean.

Some routine maintenance will require intentional interruptions to SVE system operation. Both unexpected and deliberate alterations to and/or shutdowns of the system will be recorded in the field book and documented on the SVE Inspection Log provided in Appendix N. A shutdown log, provided as Appendix O, will be maintained separately to track any atypical system activity, including, but not limited to, alarm conditions and responses, and scheduled shutdowns for system maintenance.

5.5.4 Routine SVE System Component Maintenance

The SVE system consists of one blower and motor pair. Each piece of equipment requires routine maintenance that is dictated either by runtimes or operating conditions, as defined by manufacturer's specifications. However, most maintenance items are required on a quarterly basis, assuming continuous operation. Maintenance frequency will be adjusted as necessary following the transition to monthly pulsed operation. The pertinent material cut sheets and manuals are provided as Appendix K. A binder containing complete manufacturer's specifications for all system components is maintained on-Site.

5.5.5 SVE Wellhead and External System Component Maintenance

Individual wellheads and manholes will be inspected, at a minimum, on an annual basis. All SVE wells are accessible via flush-mount well covers. In the event of a damaged or out-of-service SVE well, the well will be properly decommissioned. Repairs and/or replacement of SVE wells will be performed based on assessments of structural integrity and overall performance.

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

Wellhead and external system component inspections should be conducted as detailed in the QAPP, provided in Appendix H.

5.5.6 SVE System Operation: Non-Routine Equipment Maintenance

In most instances, non-routine maintenance will be required due to operating conditions that are governed by the SVE alarm system and system telemetry. The primary objective of system telemetry is to notify personnel when operating conditions are likely to reduce or otherwise compromise SVE efficiency, which could lead to the potential uncontrolled migration of volatile soil vapor.

The system telemetry will also notify the current owner's environmental professional when operating conditions may be indicative of damage to the SVE equipment. SVE alarm conditions are detailed in In-Text Table XI. Potential damage to the SVE pipes or carbon units should trigger one of the alarm conditions. Damage to the individual SVE lines may be noticeable only by interpreting unusually high or low vacuum readings or air flow rates, which will be noted in the system inspections and remedied upon identification.

The SVE was also designed with particulate and moisture separators on the blower skid to prevent solids from reaching the blowers. The particulate and moisture separators are shown in the P&ID provided as part of the manual in Appendix K. Procedures for maintaining the particulate separators and all SVE components are provided in the operation and maintenance manuals provided in Appendix K and QAPP provided in Appendix H.

In-Text Table XI
SVE System Alarm Conditions

Alarm Condition	Response Measure
Moisture Separator High Level	Drain/containerize moisture, identify and address/eliminate cause of moisture influx
Blower Inlet Low Vacuum	Identify and address/eliminate cause of low pressure condition
Blower Outlet High Temperature	Identify and address/eliminate cause of high temperature condition

5.6 SVE System Sampling Event Protocol

5.6.1 Effluent Vapor Sampling Protocol

Though theoretical calculations have been made to approximate the anticipated carbon usage rate, carbon replacement frequency will be based on field screening using a PID and laboratory analytical results. Individual lines are not anticipated to be sampled in the routine sampling events; however, there are sampling ports for each line prior to manifolding to facilitate field screening or sampling as necessary at the discretion of the remedial engineer, in consultation with NYSDEC and NYSDOH.

The influent, intermediate, and effluent vapor from the set of SVE system carbon vessels will be field-screened monthly (when the system is cycled on) for the first year and quarterly afterwards, and sampled as described below to provide an estimate of carbon usage. Confirmatory SVE system sampling will be conducted following startup to more accurately assess the VOC concentrations in extracted soil vapor from the entire Site, and the condition and lifespan of the carbon units. Samples of the SVE system air will be collected as part of initial startup and again 6 months and 12 months following start-up. Subsequent SVE system vapor sampling will be performed annually, and as needed to evaluate system operating conditions and support the calculations of contaminant mass removal.

The vapor samples will be collected using a peristaltic pump to fill a one-liter Tedlar bag, in accordance with the sampling procedure detailed in the QAPP provided as Appendix H. All samples for laboratory analysis will be submitted to a NYSDOH ELAP-certified laboratory for analysis of CVOCs by EPA Method TO-15.

All sampling activities will be recorded in a field book and in the SVE Vapor Sampling Log presented in Appendix N. Field observations (e.g., visual observations and PID reading of effluent, etc.) will be noted on the sampling log, which will be subject to the reporting requirements and system checks as discussed in Sections 5.5 and 5.7. Complete effluent vapor sampling procedures are detailed in the QAPP, provided as Appendix H.

5.6.2 Spent Carbon Sampling Protocol

All spent carbon will be disposed of or recycled off-Site in accordance with all applicable local, state, and federal regulations. Based on requirements of the disposal/recycling facility and waste disposal contractor, a carbon sample may need to be collected for facility acceptance purposes. If so, a representative sample of the spent carbon will be collected and submitted for laboratory analysis based on the requirements of the receiving facility, as detailed in the QAPP provided as Appendix H. Spent carbon will be handled as a listed hazardous waste unless a contained-in request is approved by NYSDEC.

All sampling activities will be recorded in a field book. Field observations (e.g., visual observations and PID reading of carbon, etc.) will be noted on the sampling log, which will be subject to the reporting requirements and system checks as discussed in Sections 5.5 and 5.7.

5.6.3 Condensate Water Sampling

All condensate water collected from the SVE water knock-out vessel will be transferred to 55-gallon drums and be disposed of off-Site in accordance with all applicable local, state and federal regulations on an as-needed basis. A representative condensate water sample will be collected from each 55-gallon drum to be disposed of and submitted for laboratory analysis as detailed in the QAPP, provided as Appendix H. Condensate water will be handled as a listed hazardous waste unless a contained-in request is approved by NYSDEC. Documentation associated with condensate water disposal will be subject to the reporting requirements and system checks as discussed in Section 5.5 and 5.7.

5.7 SSDS and SVE System Maintenance and Performance Monitoring Reporting Requirements

Barring any unusual findings, the system inspections and maintenance described above will be reported per the requirements of Section 7.0 of this SMP. In the event that an unexpected condition, such as a critical malfunction or extreme weather conditions that may hinder system operation is noted, the NYSDEC will be alerted promptly.

Any unexpected or critical issues identified during the monitoring tasks will be reported via email or phone notification to the NYSDEC Project Manager. Maintenance reports and any other information generated during regular operations at the Site will be kept on-file on-Site. All reports, forms, and other relevant information generated will be available upon request to the NYSDEC and submitted as part of the Periodic Review Report, as specified in the Section 6.0 of this SMP.

5.7.1 Routine Maintenance Forms

Checklists or forms (see Appendix P) will be completed during each maintenance event. Checklists/forms will include, but not be limited to the following information:

- Date;
- Name, company, and position of person(s) conducting maintenance activities;
- Maintenance activities conducted;
- Any modifications to the system;
- 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).

5.7.2 Non-Routine Maintenance Forms

During each non-routine maintenance event, a form will be completed which will include, but not be limited to, the following information:

- Date;
- Name, company, and position of person(s) conducting non-routine maintenance/repair activities;

- Presence of leaks;
- Date of leak repair;
- Other repairs or adjustments made to the system;
- 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).

5.8 Contingency Plan

Emergencies may include injury to personnel, fire or explosion, environmental release, or serious weather conditions.

The appropriate action for on-site emergencies are detailed in the attached Health and Safety Plan (HASP) and Community Air Monitoring Plan (CAMP), provided as Appendix F.

5.9 Emergency Telephone Numbers

In the event of any environmentally related situation or unplanned occurrence requiring assistance, the Owner or Owner's representative(s) should contact the appropriate party from the contact list below. For emergencies, appropriate emergency response personnel should be contacted. Prompt contact should also be made to AKRF's Project Principal or Project Manager or the current property manager/owner's representative for the Site. Emergency contact lists must be maintained in an easily accessible location at the Site. Table XII includes contact information for the emergency response personnel.

Table XII
Emergency Contact Numbers

Medical, Fire, and Police:	911
One Call Center:	(800) 272-4480 (3 day notice required for utility mark out)
Poison Control Center:	(800) 222-1222
Pollution Toxic Chemical Oil Spills:	(800) 424-8802
NYSDEC Spills Hotline	(800) 457-7362

5.10 Map and Directions to Nearest Health Facility

- Site Location: 22-60 46th Street
- Nearest Hospital Name: Mount Sinai Queens
- Hospital Location: 3019 Crescent Street at 30th Road, Astoria, NY 11102
- Hospital Telephone: (718) 932-1000
- Directions to Hospital:
 1. Turn LEFT out of the Site from 45th Street, heading southwest toward 23rd Avenue.
 2. Turn RIGHT onto Astoria Boulevard North.
 3. Stay RIGHT to continue onto Hoyt Avenue North.
 4. Turn LEFT onto Crescent Street.

5. The emergency room will be on the LEFT at the corner of Crescent Street and 30th Road.
6. A map showing the route from the Site to the Hospital is included under the HASP (Appendix F).

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 ECs to severe storms/weather events and associated flooding.

- Flood Plain: The Site is not located within a flood plain.
- Site Drainage and Storm Water Management: Stormwater at the Site and the surrounding area flows to the New York City combined sewer system.
- Erosion: As the only areas of the Site not covered with concrete slabs are surrounded by buildings, erosion is not anticipated to be an issue of concern.
- High Wind: All permanent building components are secured against high winds. In the event that high winds are forecasted for the Site, proper precautions will be taken to secure or shelter any Site components that are not protected against high winds.
- Electricity: Electricity to the buildings is supplied via newly installed underground vaults and conduits and is not expected to be affected by severe weather events.
- Spill/Contaminant Release: Storage of large amounts of fuel oil, or other chemicals at the Site is not expected. Nominal amounts of cleaning chemicals are likely to be stored throughout the Site but are not expected to be affected by severe weather conditions.

6.2 Soil Vapor Intrusion Evaluation

In the event that the existing building is modified, requiring subsurface disturbance, or additional buildings are constructed, a soil vapor intrusion evaluation will be conducted in coordination with NYSDEC and NYSDOH.

6.3 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 PRR.

6.3.1 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.

6.3.2 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.

6.3.3 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 to conduct inspections 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.

6.4 Remedial System Optimization

A Remedial Site Optimization (RSO) study will be conducted any time that 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 DD;
- 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; or
- A new and applicable remedial technology becomes available.

A 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.

7.0 REPORTING REQUIREMENTS

Inspection logs and maintenance reports and any other information generated during regular operations at the Site will be kept on file on-site. All reports, forms, and other relevant information generated will be available upon request to NYSDEC and submitted as part of the PRR, as specified in Section 4.0 of this SMP. All site management inspection, non-routine maintenance, and monitoring events will be conducted by a qualified environmental professional as defined in 6 NYCRR Part 375, a P.E. who is licensed and registered in New York State, or a qualified person who directly reports to a P.E. who is licensed and registered in New York State. Routine maintenance, such as changing out/cleaning of gauges, may be conducted by the on-site building maintenance personnel as appropriate.

7.1 Site Management Reports

All Site management inspections and maintenance and monitoring events will be recorded on the appropriate Site management form provided in Appendix P. The form is subject to NYSDEC revision.

All applicable inspection forms and other records, including media sampling data generated for the Site during the reporting period, will be provided in electronic format to NYSDEC in accordance with the requirements of Table XIII and summarized in the PRR.

Table XIII
Schedule of Monitoring/Inspection Reports

Task/Report	Reporting Frequency*
Monitoring/Inspection Letter Report with Figures and Attachments (Treatment System Inspections and Associated Sampling Events)	Quarterly
Periodic Review Report (Inclusive of All Inspections and Sampling Events)	Annually. First inspection no more than 16 months after COC, then at least annually thereafter, and PRR due 1 month later.

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

All 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 and/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., groundwater, sub-slab vapor, indoor air, outdoor air, etc.);
- Copies of all field forms completed (e.g., 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 be provided in the quarterly reports and 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 system;
- 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 be provided in the quarterly reports and 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 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 (PRR)

The first PRR will be submitted to the NYSDEC 16 months after the COC is issued. After submittal of the initial PRR, the next PRR shall be submitted to the NYSDEC annually or at another frequency as may be required NYSDEC. In the event that the Site is subdivided into separate parcels with different ownership, a single PRR will be prepared that addresses the Site described in the EE (Appendix A). The PRR 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 PRR. 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;

- Identification of any wastes generated during the reporting period, along with waste characterization data, manifests, and disposal documentation;
- 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, soil vapor, etc.), which include a listing of all compounds analyzed, along with the applicable standards, with all exceedances highlighted. These tables and figures will include a presentation of past data as part of an evaluation of contaminant concentration trends, including but not limited to:
- Trend monitoring graphs that present groundwater contaminant levels from before the start of the remedy implementation to the most current sampling data;
- Trend monitoring graphs depicting SVE system influent analytical data on a per event and cumulative basis;
- O&M data summary tables;
- A current plume map for sites with remaining groundwater contamination;
- A groundwater elevation contour map for each gauging event; and
- 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 and DD;
- The operation and effectiveness of the ECs, including identification of any needed repairs or modifications;
- Any new conclusions or observations regarding Site contamination based on inspections or data generated;
- Recommendations regarding any necessary changes to the remedy and/or Monitoring and Sampling Plan; and
- An evaluation of trends in contaminant levels in the affected media to determine if the remedy continues to be effective in achieving remedial goals as specified by the RAWP, and Decision Document; and
- The overall performance and effectiveness of the remedy.

In addition, a performance summary for all treatment systems at the site during the calendar year, including information such as:

- The contaminant mass removed during the certification period and during the life of the treatment system;
- 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. Recommendations must address how receptors would be impacted. Recommendations can include:

Proposals to address efficiency such as: instituting remote operation, system changes to decrease maintenance and downtime, and system changes to decrease energy use; and

Proposals to modify or shut down a treatment system due to remediation completion, system performance or changed conditions. System shutdowns are addressed in Section 6.4 of DER-10.

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 PRR, 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;

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;

No new information has come to my attention, including groundwater monitoring data from wells located at the Site boundary, if any, to indicate that the assumptions made in the qualitative exposure assessment of off-site contamination are no longer valid; and

The assumptions made in the qualitative exposure assessment remain valid, 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, [name], of [business address], am certifying as [Owner/Remedial Party or Owner’s/Remedial Party’s Designated Site Representative].”

"I certify that the New York State Education Department has granted a Certificate of Authorization to provide Professional Engineering services to the firm that prepared this Periodic Review Report."

The signed certifications will be included in the PRR.

The PRR will be submitted, in electronic format, to the NYSDEC project manager in which the Site is located and the NYSDOH project manager. The PRR may need to be submitted in hard-copy format, if 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 IC or EC, a Corrective Measures Work Plan (CMWP) will be submitted to 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 CMWP until it has been approved by NYSDEC.

7.4 Remedial Site Optimization Report

In the event that an RSO is to be performed (see Section 6.4), upon completion of a RSO, a RSO report must be submitted to the NYSDEC for approval. 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 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. An FER 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

- 6 NYCRR 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).
- Phase I ESA, 22-60 46th Street, Queens, New York 11105, Environmental Studies Corporation, Inc., May 2018
- Phase I ESA, 22-61 45th Street, Queens, New York 11105, CA RICH Consultants, Inc., June 2018
- Phase II ESA, Environmental Studies Corporation, Inc., May 2019
- Supplemental Subsurface (Phase II) Investigation, AKRF, Inc., August 2019
- BCP Application, 22-60 46th Street, Queens York, AKRF, Inc., May 2020
- Citizen Participation Plan, 22-60 46th Street, Queens York, AKRF Inc., October 2020
- Remedial Investigation Work Plan, 22-60 46th Street, Queens York, AKRF Inc., November 2020 and RIWP Addendum dated May 2021
- Remedial Investigation Report, 22-60 46th Street, Queens York, AKRF Inc., October 2021
- Remedial Action Work Plan, 22-60 46th Street, Queens, NY, AKRF Inc., January 2022
- Off-Site Soil Vapor Intrusion Work Plan, 22-60 46th Street, Queens, AKRF Inc., February 2022
- Remedy Modification Request, 22-60 46th Street, Queens, AKRF Inc., May 2022
- Off-Site Soil Vapor Intrusion Report, 22-60 46th Street, Queens, AKRF Inc., July 2022

TABLES

Table 1
22-60 46th Street
Queens, New York
Groundwater Elevation Data

Well ID	Top of Casing Elevation (feet)	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet)
RI-MW-01	44.5	24.32	20.18
RI-MW-03	43.3	23.05	20.21
RI-MW-04	44.5	24.17	20.33
RI-MW-05A	42.4	22.56	19.84
RI-MW-06A	44.04	23.32	20.72
RI-MW-07A	43.63	23.01	20.62
RI-MW-08A	47.3	26.45	20.85
RI-MW-09A	44.45	23.67	20.78
RI-MW-10	45.36	24.31	21.05

Notes:

All elevations are referenced to the North American Vertical Datum of 1988 (NAVD88).

TOC = Top of Casing

Table 2
22-60 46th Street
Queens, New York
Post-Excavation Soil Endpoint Sample Analytical Results
Volatile Organic Compounds (VOCs)

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			EP-01_20220425 460-256954-1 4/25/2022 mg/kg 1	EP-X_20220425 460-256954-2 4/25/2022 mg/kg 1	EP-02_20220425 460-256954-3 4/25/2022 mg/kg 1	EP-03_20220425 460-256954-4 4/25/2022 mg/kg 1	EP-04_20220425 460-256954-5 4/25/2022 mg/kg 1
Compound	NYSDEC UUSCO	NYSDEC RRSCO	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
1,1,1-Trichloroethane	0.68	100	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
1,1,2,2-Tetrachloroethane	NS	NS	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	NS	NS	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
1,1,2-Trichloroethane	NS	NS	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
1,1-Dichloroethane	0.27	26	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
1,1-Dichloroethene	0.33	100	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
1,2,3-Trichlorobenzene	NS	NS	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
1,2,4-Trichlorobenzene	NS	NS	0.001 UJ	0.0011 UJ	0.0011 U	0.00089 U	0.0012 U
1,2,4-Trimethylbenzene	3.6	52	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
1,2-Dibromo-3-Chloropropane	NS	NS	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
1,2-Dibromoethane (Ethylene Dibromide)	NS	NS	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
1,2-Dichlorobenzene	1.1	100	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
1,2-Dichloroethane	0.02	3.1	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
1,2-Dichloropropane	NS	NS	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
1,3,5-Trimethylbenzene (Mesitylene)	8.4	52	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
1,3-Dichlorobenzene	2.4	49	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
1,4-Dichlorobenzene	1.8	13	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
2-Hexanone	NS	NS	0.0051 UJ	0.0057 UJ	0.0053 U	0.0044 U	0.0058 U
Acetone	0.05	100	0.02 J	0.0068 U	0.0072	0.0095	0.007 U
Benzene	0.06	4.8	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
Bromochloromethane	NS	NS	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
Bromodichloromethane	NS	NS	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
Bromoform	NS	NS	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
Bromomethane	NS	NS	0.0021 U	0.0023 U	0.0021 U	0.0018 U	0.0023 U
Carbon Disulfide	NS	NS	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
Carbon Tetrachloride	0.76	2.4	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
Chlorobenzene	1.1	100	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
Chloroethane	NS	NS	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
Chloroform	0.37	49	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
Chloromethane	NS	NS	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
Cis-1,2-Dichloroethylene	0.25	100	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
Cis-1,3-Dichloropropene	NS	NS	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
Cyclohexane	NS	NS	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
Dibromochloromethane	NS	NS	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
Dichlorodifluoromethane	NS	NS	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
Ethylbenzene	1	41	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
Isopropylbenzene (Cumene)	NS	NS	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
M,P-Xylenes	NS	NS	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
Methyl Acetate	NS	NS	0.0051 U	0.0057 U	0.0053 U	0.0044 U	0.0058 U
Methyl Ethyl Ketone (2-Butanone)	0.12	100	0.0051 U	0.0057 U	0.0053 U	0.0044 U	0.0058 U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	NS	NS	0.0051 U	0.0057 U	0.0053 U	0.0044 U	0.0058 U
Methylcyclohexane	NS	NS	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
Methylene Chloride	0.05	100	0.0021 U	0.0023 U	0.0021 U	0.0018 U	0.0023 U
N-Butylbenzene	12	100	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
N-Propylbenzene	3.9	100	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
O-Xylene (1,2-Dimethylbenzene)	NS	NS	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
Sec-Butylbenzene	11	100	0.001 UJ	0.0011 UJ	0.0011 U	0.00089 U	0.0012 U
Styrene	NS	NS	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
T-Butylbenzene	5.9	100	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
Tert-Butyl Methyl Ether	0.93	100	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
Tetrachloroethylene (PCE)	1.3	19	0.001 U	0.0011 U	0.0084	0.00089 U	0.0012 U
Toluene	0.7	100	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
Trans-1,2-Dichloroethene	0.19	100	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
Trans-1,3-Dichloropropene	NS	NS	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
Trichloroethylene (TCE)	0.47	21	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
Trichlorofluoromethane	NS	NS	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
Vinyl Chloride	0.02	0.9	0.001 U	0.0011 U	0.0011 U	0.00089 U	0.0012 U
Xylenes, Total	0.26	100	0.0021 U	0.0023 U	0.0021 U	0.0018 U	0.0023 U

Table 2
22-60 46th Street
Queens, New York
Post-Excavation Soil Endpoint Sample Analytical Results
Volatile Organic Compounds (VOCs)

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			EP-05_20220425 460-256954-6 4/25/2022 mg/kg 1	EP-06_20220425 460-256954-7 4/25/2022 mg/kg 1	EP-07_20220425 460-256954-8 4/25/2022 mg/kg 1	EP-08_20220425 460-256954-9 4/25/2022 mg/kg 1	EP-09_20220425 460-256954-11 4/25/2022 mg/kg 1
Compound	NYSDEC UUSCO	NYSDEC RRSCO	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
1,1,1-Trichloroethane	0.68	100	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
1,1,2,2-Tetrachloroethane	NS	NS	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	NS	NS	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
1,1,2-Trichloroethane	NS	NS	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
1,1-Dichloroethane	0.27	26	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
1,1-Dichloroethene	0.33	100	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
1,2,3-Trichlorobenzene	NS	NS	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
1,2,4-Trichlorobenzene	NS	NS	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
1,2,4-Trimethylbenzene	3.6	52	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
1,2-Dibromo-3-Chloropropane	NS	NS	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
1,2-Dibromoethane (Ethylene Dibromide)	NS	NS	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
1,2-Dichlorobenzene	1.1	100	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
1,2-Dichloroethane	0.02	3.1	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
1,2-Dichloropropane	NS	NS	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
1,3,5-Trimethylbenzene (Mesitylene)	8.4	52	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
1,3-Dichlorobenzene	2.4	49	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
1,4-Dichlorobenzene	1.8	13	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
2-Hexanone	NS	NS	0.0057 U	0.0058 U	0.0052 U	0.0051 U	0.0064 U
Acetone	0.05	100	0.025	0.016	0.0069	0.018	0.018
Benzene	0.06	4.8	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
Bromochloromethane	NS	NS	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
Bromodichloromethane	NS	NS	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
Bromoform	NS	NS	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
Bromomethane	NS	NS	0.0023 U	0.0023 U	0.0021 U	0.002 U	0.0026 U
Carbon Disulfide	NS	NS	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
Carbon Tetrachloride	0.76	2.4	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
Chlorobenzene	1.1	100	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
Chloroethane	NS	NS	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
Chloroform	0.37	49	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
Chloromethane	NS	NS	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
Cis-1,2-Dichloroethylene	0.25	100	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
Cis-1,3-Dichloropropene	NS	NS	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
Cyclohexane	NS	NS	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
Dibromochloromethane	NS	NS	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
Dichlorodifluoromethane	NS	NS	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
Ethylbenzene	1	41	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
Isopropylbenzene (Cumene)	NS	NS	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
M,P-Xylenes	NS	NS	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
Methyl Acetate	NS	NS	0.0057 U	0.0058 U	0.0052 U	0.0051 U	0.0064 U
Methyl Ethyl Ketone (2-Butanone)	0.12	100	0.0057 U	0.0058 U	0.0052 U	0.0051 U	0.0064 U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	NS	NS	0.0057 U	0.0058 U	0.0052 U	0.0051 U	0.0064 U
Methylcyclohexane	NS	NS	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
Methylene Chloride	0.05	100	0.0023 U	0.0023 U	0.0021 U	0.002 U	0.0026 U
N-Butylbenzene	12	100	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
N-Propylbenzene	3.9	100	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
O-Xylene (1,2-Dimethylbenzene)	NS	NS	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
Sec-Butylbenzene	11	100	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
Styrene	NS	NS	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
T-Butylbenzene	5.9	100	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
Tert-Butyl Methyl Ether	0.93	100	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
Tetrachloroethylene (PCE)	1.3	19	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
Toluene	0.7	100	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
Trans-1,2-Dichloroethene	0.19	100	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
Trans-1,3-Dichloropropene	NS	NS	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
Trichloroethylene (TCE)	0.47	21	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
Trichlorofluoromethane	NS	NS	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
Vinyl Chloride	0.02	0.9	0.0011 U	0.0012 U	0.001 U	0.001 U	0.0013 U
Xylenes, Total	0.26	100	0.0023 U	0.0023 U	0.0021 U	0.002 U	0.0026 U

Table 2
22-60 46th Street
Queens, New York
Post-Excavation Soil Endpoint Sample Analytical Results
Volatile Organic Compounds (VOCs)

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			EP-10_20220509 460-257822-1 5/09/2022 mg/kg 1	EP-X02_20220509 460-257822-2 5/09/2022 mg/kg 1	EP-11_20220509 460-257822-3 5/09/2022 mg/kg 1	EP-12_20220509 460-257822-4 5/09/2022 mg/kg 1	EP-13_20220509 460-257822-5 5/09/2022 mg/kg 1
Compound	NYSDEC UUSCO	NYSDEC RRSCO	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
1,1,1-Trichloroethane	0.68	100	0.0011 U	0.0011 U	0.00098 U	0.00099 U	0.001 U
1,1,2,2-Tetrachloroethane	NS	NS	0.0011 U	0.0011 U	0.00098 U	0.00099 U	0.001 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	NS	NS	0.0011 U	0.0011 U	0.00098 U	0.00099 U	0.001 U
1,1,2-Trichloroethane	NS	NS	0.0011 U	0.0011 U	0.00098 U	0.00099 U	0.001 U
1,1-Dichloroethane	0.27	26	0.0011 U	0.0011 U	0.00098 U	0.00099 U	0.001 U
1,1-Dichloroethene	0.33	100	0.0011 U	0.0011 U	0.00098 U	0.00099 U	0.001 U
1,2,3-Trichlorobenzene	NS	NS	0.0011 U	0.0011 U	0.00098 U	0.00099 U	0.001 U
1,2,4-Trichlorobenzene	NS	NS	0.0011 U	0.0011 U	0.00098 U	0.00099 U	0.001 U
1,2,4-Trimethylbenzene	3.6	52	0.0011 UJ	0.0011 UJ	0.00098 U	0.00099 U	0.001 U
1,2-Dibromo-3-Chloropropane	NS	NS	0.0011 U	0.0011 U	0.00098 U	0.00099 U	0.001 U
1,2-Dibromoethane (Ethylene Dibromide)	NS	NS	0.0011 U	0.0011 U	0.00098 U	0.00099 U	0.001 U
1,2-Dichlorobenzene	1.1	100	0.0011 U	0.0011 U	0.00098 U	0.00099 U	0.001 U
1,2-Dichloroethane	0.02	3.1	0.0011 U	0.0011 U	0.00098 U	0.00099 U	0.001 U
1,2-Dichloropropane	NS	NS	0.0011 U	0.0011 U	0.00098 U	0.00099 U	0.001 U
1,3,5-Trimethylbenzene (Mesitylene)	8.4	52	0.0011 UJ	0.0011 UJ	0.00098 U	0.00099 U	0.001 U
1,3-Dichlorobenzene	2.4	49	0.0011 U	0.0011 U	0.00098 U	0.00099 U	0.001 U
1,4-Dichlorobenzene	1.8	13	0.0011 U	0.0011 U	0.00098 U	0.00099 U	0.001 U
2-Hexanone	NS	NS	0.0054 UJ	0.0053 UJ	0.0049 U	0.005 U	0.005 U
Acetone	0.05	100	0.0078	0.0063 U	0.0059 U	0.006 U	0.006 U
Benzene	0.06	4.8	0.0011 U	0.0011 U	0.00098 U	0.00099 U	0.001 U
Bromochloromethane	NS	NS	0.0011 U	0.0011 U	0.00098 U	0.00099 U	0.001 U
Bromodichloromethane	NS	NS	0.0011 U	0.0011 U	0.00098 U	0.00099 U	0.001 U
Bromoform	NS	NS	0.0011 U	0.0011 U	0.00098 U	0.00099 U	0.001 U
Bromomethane	NS	NS	0.0022 U	0.0021 U	0.002 U	0.002 U	0.002 U
Carbon Disulfide	NS	NS	0.0011 U	0.0011 U	0.00098 U	0.00099 U	0.001 U
Carbon Tetrachloride	0.76	2.4	0.0011 U	0.0011 U	0.00098 U	0.00099 U	0.001 U
Chlorobenzene	1.1	100	0.0011 U	0.0011 U	0.00098 U	0.00099 U	0.001 U
Chloroethane	NS	NS	0.0011 U	0.0011 U	0.00098 U	0.00099 U	0.001 U
Chloroform	0.37	49	0.0011 U	0.0011 U	0.00098 U	0.00099 U	0.001 U
Chloromethane	NS	NS	0.0011 U	0.0011 U	0.00098 U	0.00099 U	0.001 U
Cis-1,2-Dichloroethylene	0.25	100	0.0011 U	0.0011 U	0.00098 U	0.00099 U	0.001 U
Cis-1,3-Dichloropropene	NS	NS	0.0011 U	0.0011 U	0.00098 U	0.00099 U	0.001 U
Cyclohexane	NS	NS	0.0011 U	0.0011 U	0.00098 U	0.00099 U	0.001 U
Dibromochloromethane	NS	NS	0.0011 U	0.0011 U	0.00098 U	0.00099 U	0.001 U
Dichlorodifluoromethane	NS	NS	0.0011 U	0.0011 U	0.00098 U	0.00099 U	0.001 U
Ethylbenzene	1	41	0.0011 U	0.0011 U	0.00098 U	0.00099 U	0.001 U
Isopropylbenzene (Cumene)	NS	NS	0.0011 UJ	0.0011 UJ	0.00098 U	0.00099 U	0.001 U
M,P-Xylenes	NS	NS	0.0011 UJ	0.0011 UJ	0.00098 U	0.00099 U	0.001 U
Methyl Acetate	NS	NS	0.0054 U	0.0053 U	0.0049 U	0.005 U	0.005 U
Methyl Ethyl Ketone (2-Butanone)	0.12	100	0.0054 U	0.0053 U	0.0049 U	0.005 U	0.005 U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	NS	NS	0.0054 U	0.0053 U	0.0049 U	0.005 U	0.005 U
Methylcyclohexane	NS	NS	0.0011 U	0.0011 U	0.00098 U	0.00099 U	0.001 U
Methylene Chloride	0.05	100	0.0022 U	0.0021 U	0.002 U	0.002 U	0.002 U
N-Butylbenzene	12	100	0.0011 UJ	0.0011 UJ	0.00098 U	0.00099 U	0.001 U
N-Propylbenzene	3.9	100	0.0011 UJ	0.0011 UJ	0.00098 U	0.00099 U	0.001 U
O-Xylene (1,2-Dimethylbenzene)	NS	NS	0.0011 U	0.0011 U	0.00098 U	0.00099 U	0.001 U
Sec-Butylbenzene	11	100	0.0011 UJ	0.0011 UJ	0.00098 U	0.00099 U	0.001 U
Styrene	NS	NS	0.0011 UJ	0.0011 UJ	0.00098 U	0.00099 U	0.001 U
T-Butylbenzene	5.9	100	0.0011 U	0.0011 U	0.00098 U	0.00099 U	0.001 U
Tert-Butyl Methyl Ether	0.93	100	0.0011 U	0.0011 U	0.00098 U	0.00099 U	0.001 U
Tetrachloroethylene (PCE)	1.3	19	0.00043 J	0.00033 J	0.0011	0.00056 J	0.00069 J
Toluene	0.7	100	0.0011 U	0.0011 U	0.00098 U	0.00099 U	0.001 U
Trans-1,2-Dichloroethene	0.19	100	0.0011 U	0.0011 U	0.00098 U	0.00099 U	0.001 U
Trans-1,3-Dichloropropene	NS	NS	0.0011 U	0.0011 U	0.00098 U	0.00099 U	0.001 U
Trichloroethylene (TCE)	0.47	21	0.0011 U	0.0011 U	0.00098 U	0.00099 U	0.001 U
Trichlorofluoromethane	NS	NS	0.0011 U	0.0011 U	0.00098 U	0.00099 U	0.001 U
Vinyl Chloride	0.02	0.9	0.0011 U	0.0011 U	0.00098 U	0.00099 U	0.001 U
Xylenes, Total	0.26	100	0.0022 UJ	0.0021 UJ	0.002 U	0.002 U	0.002 U

Table 2
22-60 46th Street
Queens, New York
Post-Excavation Soil Endpoint Sample Analytical Results
Volatile Organic Compounds (VOCs)

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			EP-14_20220509 460-257822-6 5/09/2022 mg/kg 1	EP-15_20220509 460-257822-7 5/09/2022 mg/kg 1	EP-16_20220509 460-257822-8 5/09/2022 mg/kg 1	EP-17_20220509 460-257822-9 5/09/2022 mg/kg 1	EP-18_20220509 460-257822-10 5/09/2022 mg/kg 1
Compound	NYSDEC UUSCO	NYSDEC RRSCO	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
1,1,1-Trichloroethane	0.68	100	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
1,1,2,2-Tetrachloroethane	NS	NS	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	NS	NS	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
1,1,2-Trichloroethane	NS	NS	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
1,1-Dichloroethane	0.27	26	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
1,1-Dichloroethene	0.33	100	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
1,2,3-Trichlorobenzene	NS	NS	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
1,2,4-Trichlorobenzene	NS	NS	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
1,2,4-Trimethylbenzene	3.6	52	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
1,2-Dibromo-3-Chloropropane	NS	NS	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
1,2-Dibromoethane (Ethylene Dibromide)	NS	NS	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
1,2-Dichlorobenzene	1.1	100	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
1,2-Dichloroethane	0.02	3.1	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
1,2-Dichloropropane	NS	NS	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
1,3,5-Trimethylbenzene (Mesitylene)	8.4	52	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
1,3-Dichlorobenzene	2.4	49	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
1,4-Dichlorobenzene	1.8	13	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
2-Hexanone	NS	NS	0.0048 U	0.0048 U	0.0046 U	0.0047 U	0.0051 U
Acetone	0.05	100	0.0058 U	0.0058 U	0.0056 U	0.0057 U	0.0061 U
Benzene	0.06	4.8	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
Bromochloromethane	NS	NS	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
Bromodichloromethane	NS	NS	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
Bromoform	NS	NS	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
Bromomethane	NS	NS	0.0019 U	0.0019 U	0.0019 U	0.0019 U	0.002 U
Carbon Disulfide	NS	NS	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
Carbon Tetrachloride	0.76	2.4	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
Chlorobenzene	1.1	100	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
Chloroethane	NS	NS	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
Chloroform	0.37	49	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
Chloromethane	NS	NS	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
Cis-1,2-Dichloroethylene	0.25	100	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
Cis-1,3-Dichloropropene	NS	NS	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
Cyclohexane	NS	NS	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
Dibromochloromethane	NS	NS	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
Dichlorodifluoromethane	NS	NS	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
Ethylbenzene	1	41	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
Isopropylbenzene (Cumene)	NS	NS	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
M,P-Xylenes	NS	NS	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
Methyl Acetate	NS	NS	0.0048 U	0.0048 U	0.0046 U	0.0047 U	0.0051 U
Methyl Ethyl Ketone (2-Butanone)	0.12	100	0.0048 U	0.0048 U	0.0046 U	0.0047 U	0.0051 U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	NS	NS	0.0048 U	0.0048 U	0.0046 U	0.0047 U	0.0051 U
Methylcyclohexane	NS	NS	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
Methylene Chloride	0.05	100	0.0019 U	0.0019 U	0.0019 U	0.0019 U	0.002 U
N-Butylbenzene	12	100	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
N-Propylbenzene	3.9	100	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
O-Xylene (1,2-Dimethylbenzene)	NS	NS	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
Sec-Butylbenzene	11	100	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
Styrene	NS	NS	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
T-Butylbenzene	5.9	100	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
Tert-Butyl Methyl Ether	0.93	100	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
Tetrachloroethylene (PCE)	1.3	19	0.00075 J	0.00096 U	0.002	0.0018	0.012
Toluene	0.7	100	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
Trans-1,2-Dichloroethene	0.19	100	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
Trans-1,3-Dichloropropene	NS	NS	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
Trichloroethylene (TCE)	0.47	21	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
Trichlorofluoromethane	NS	NS	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
Vinyl Chloride	0.02	0.9	0.00096 U	0.00096 U	0.00093 U	0.00095 U	0.001 U
Xylenes, Total	0.26	100	0.0019 U	0.0019 U	0.0019 U	0.0019 U	0.002 U

Table 2
22-60 46th Street
Queens, New York
Post-Excavation Soil Endpoint Sample Analytical Results
Volatile Organic Compounds (VOCs)

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			EP-19_20220509 460-257822-11 5/09/2022 mg/kg 1	EP-20_20220509 460-257822-12 5/09/2022 mg/kg 1	EP-21_20220509 460-257822-15 5/09/2022 mg/kg 1	EP-22_20220509 460-257822-16 5/09/2022 mg/kg 1	EP-23_20220509 460-257822-17 5/09/2022 mg/kg 1
Compound	NYSDEC UUSCO	NYSDEC RRSCO	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
1,1,1-Trichloroethane	0.68	100	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
1,1,2,2-Tetrachloroethane	NS	NS	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	NS	NS	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
1,1,2-Trichloroethane	NS	NS	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
1,1-Dichloroethane	0.27	26	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
1,1-Dichloroethene	0.33	100	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
1,2,3-Trichlorobenzene	NS	NS	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
1,2,4-Trichlorobenzene	NS	NS	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
1,2,4-Trimethylbenzene	3.6	52	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
1,2-Dibromo-3-Chloropropane	NS	NS	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
1,2-Dibromoethane (Ethylene Dibromide)	NS	NS	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
1,2-Dichlorobenzene	1.1	100	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
1,2-Dichloroethane	0.02	3.1	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
1,2-Dichloropropane	NS	NS	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
1,3,5-Trimethylbenzene (Mesitylene)	8.4	52	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
1,3-Dichlorobenzene	2.4	49	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
1,4-Dichlorobenzene	1.8	13	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
2-Hexanone	NS	NS	0.0047 U	0.0051 U	0.0056 U	0.0064 U	0.0046 U
Acetone	0.05	100	0.0056 U	0.0061 U	0.0067 U	0.0077 U	0.0055 U
Benzene	0.06	4.8	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
Bromochloromethane	NS	NS	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
Bromodichloromethane	NS	NS	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
Bromoform	NS	NS	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
Bromomethane	NS	NS	0.0019 U	0.002 U	0.0022 U	0.0026 U	0.0018 U
Carbon Disulfide	NS	NS	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
Carbon Tetrachloride	0.76	2.4	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
Chlorobenzene	1.1	100	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
Chloroethane	NS	NS	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
Chloroform	0.37	49	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
Chloromethane	NS	NS	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
Cis-1,2-Dichloroethylene	0.25	100	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
Cis-1,3-Dichloropropene	NS	NS	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
Cyclohexane	NS	NS	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
Dibromochloromethane	NS	NS	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
Dichlorodifluoromethane	NS	NS	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
Ethylbenzene	1	41	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
Isopropylbenzene (Cumene)	NS	NS	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
M,P-Xylenes	NS	NS	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
Methyl Acetate	NS	NS	0.0047 U	0.0051 U	0.0056 U	0.0064 U	0.0046 U
Methyl Ethyl Ketone (2-Butanone)	0.12	100	0.0047 U	0.0051 U	0.0056 U	0.0064 U	0.0046 U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	NS	NS	0.0047 U	0.0051 U	0.0056 U	0.0064 U	0.0046 U
Methylcyclohexane	NS	NS	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
Methylene Chloride	0.05	100	0.0019 U	0.002 U	0.0022 U	0.0026 U	0.0018 U
N-Butylbenzene	12	100	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
N-Propylbenzene	3.9	100	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
O-Xylene (1,2-Dimethylbenzene)	NS	NS	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
Sec-Butylbenzene	11	100	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
Styrene	NS	NS	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
T-Butylbenzene	5.9	100	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
Tert-Butyl Methyl Ether	0.93	100	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
Tetrachloroethylene (PCE)	1.3	19	0.0038	0.0028	0.0019	0.0027	0.0042
Toluene	0.7	100	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
Trans-1,2-Dichloroethene	0.19	100	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
Trans-1,3-Dichloropropene	NS	NS	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
Trichloroethylene (TCE)	0.47	21	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
Trichlorofluoromethane	NS	NS	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
Vinyl Chloride	0.02	0.9	0.00094 U	0.001 U	0.0011 U	0.0013 U	0.00091 U
Xylenes, Total	0.26	100	0.0019 U	0.002 U	0.0022 U	0.0026 U	0.0018 U

Table 2
22-60 46th Street
Queens, New York
Post-Excavation Soil Endpoint Sample Analytical Results
Volatile Organic Compounds (VOCs)

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			EP-24_20220509 460-257822-18 5/09/2022 mg/kg 1	EP-25_20220509 460-257822-19 5/09/2022 mg/kg 1	EP-26_20220513 460-258122-1 5/13/2022 mg/kg 1	EP-X03_20220513 460-258122-2 5/13/2022 mg/kg 1	EP-27_20220513 460-258122-8 5/13/2022 mg/kg 1
Compound	NYSDEC UUSCO	NYSDEC RRSCO	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
1,1,1-Trichloroethane	0.68	100	0.0011 U	0.00094 U	0.0014 UJ	0.0012 UJ	0.0012 U
1,1,2,2-Tetrachloroethane	NS	NS	0.0011 U	0.00094 U	0.0014 U	0.0012 U	0.0012 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	NS	NS	0.0011 U	0.00094 U	0.0014 U	0.0012 U	0.0012 U
1,1,2-Trichloroethane	NS	NS	0.0011 U	0.00094 U	0.0014 U	0.0012 U	0.0012 U
1,1-Dichloroethane	0.27	26	0.0011 U	0.00094 U	0.0014 UJ	0.0012 UJ	0.0012 UJ
1,1-Dichloroethene	0.33	100	0.0011 U	0.00094 U	0.0014 U	0.0012 U	0.0012 U
1,2,3-Trichlorobenzene	NS	NS	0.0011 U	0.00094 U	0.0014 U	0.0012 U	0.0012 U
1,2,4-Trichlorobenzene	NS	NS	0.0011 U	0.00094 U	0.0014 UJ	0.0012 UJ	0.0012 U
1,2,4-Trimethylbenzene	3.6	52	0.0011 U	0.00094 U	0.0014 U	0.0012 U	0.0012 U
1,2-Dibromo-3-Chloropropane	NS	NS	0.0011 U	0.00094 U	0.0014 U	0.0012 U	0.0012 U
1,2-Dibromoethane (Ethylene Dibromide)	NS	NS	0.0011 U	0.00094 U	0.0014 U	0.0012 U	0.0012 U
1,2-Dichlorobenzene	1.1	100	0.0011 U	0.00094 U	0.0014 U	0.0012 U	0.0012 U
1,2-Dichloroethane	0.02	3.1	0.0011 U	0.00094 U	0.0014 UJ	0.0012 UJ	0.0012 UJ
1,2-Dichloropropane	NS	NS	0.0011 U	0.00094 U	0.0014 U	0.0012 U	0.0012 U
1,3,5-Trimethylbenzene (Mesitylene)	8.4	52	0.0011 U	0.00094 U	0.0014 U	0.0012 U	0.0012 U
1,3-Dichlorobenzene	2.4	49	0.0011 U	0.00094 U	0.0014 U	0.0012 U	0.0012 U
1,4-Dichlorobenzene	1.8	13	0.0011 U	0.00094 U	0.0014 U	0.0012 U	0.0012 U
2-Hexanone	NS	NS	0.0056 U	0.0047 U	0.0071 U	0.0062 U	0.0062 U
Acetone	0.05	100	0.0067 U	0.0056 U	0.0086 U	0.0074 U	0.0074 U
Benzene	0.06	4.8	0.0011 U	0.00094 U	0.0014 U	0.0012 U	0.0012 U
Bromochloromethane	NS	NS	0.0011 U	0.00094 U	0.0014 U	0.0012 U	0.0012 U
Bromodichloromethane	NS	NS	0.0011 U	0.00094 U	0.0014 UJ	0.0012 UJ	0.0012 U
Bromoform	NS	NS	0.0011 U	0.00094 U	0.0014 UJ	0.0012 UJ	0.0012 U
Bromomethane	NS	NS	0.0022 U	0.0019 U	0.0029 U	0.0025 U	0.0025 U
Carbon Disulfide	NS	NS	0.0011 U	0.00094 U	0.0014 U	0.0012 U	0.0012 U
Carbon Tetrachloride	0.76	2.4	0.0011 U	0.00094 U	0.0014 UJ	0.0012 UJ	0.0012 U
Chlorobenzene	1.1	100	0.0011 U	0.00094 U	0.0014 U	0.0012 U	0.0012 U
Chloroethane	NS	NS	0.0011 U	0.00094 U	0.0014 U	0.0012 U	0.0012 U
Chloroform	0.37	49	0.0011 U	0.00094 U	0.0014 U	0.0012 U	0.0012 U
Chloromethane	NS	NS	0.0011 U	0.00094 U	0.0014 U	0.0012 U	0.0012 U
Cis-1,2-Dichloroethylene	0.25	100	0.0011 U	0.00094 U	0.0014 U	0.0012 U	0.0012 U
Cis-1,3-Dichloropropene	NS	NS	0.0011 U	0.00094 U	0.0014 U	0.0012 U	0.0012 U
Cyclohexane	NS	NS	0.0011 U	0.00094 U	0.0014 U	0.0012 U	0.0012 U
Dibromochloromethane	NS	NS	0.0011 U	0.00094 U	0.0014 U	0.0012 U	0.0012 U
Dichlorodifluoromethane	NS	NS	0.0011 U	0.00094 U	0.0014 U	0.0012 U	0.0012 U
Ethylbenzene	1	41	0.0011 U	0.00094 U	0.0014 U	0.0012 U	0.0012 U
Isopropylbenzene (Cumene)	NS	NS	0.0011 U	0.00094 U	0.0014 U	0.0012 U	0.0012 U
M,P-Xylenes	NS	NS	0.0011 U	0.00094 U	0.0014 U	0.0012 U	0.0012 U
Methyl Acetate	NS	NS	0.0056 U	0.0047 U	0.0071 U	0.0062 U	0.0062 U
Methyl Ethyl Ketone (2-Butanone)	0.12	100	0.0056 U	0.0047 U	0.0071 U	0.0062 U	0.0062 U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	NS	NS	0.0056 U	0.0047 U	0.0071 U	0.0062 U	0.0062 U
Methylcyclohexane	NS	NS	0.0011 U	0.00094 U	0.0014 U	0.0012 U	0.0012 U
Methylene Chloride	0.05	100	0.0022 U	0.0019 U	0.0029 U	0.0025 U	0.0025 U
N-Butylbenzene	12	100	0.0011 U	0.00094 U	0.0014 UJ	0.0012 UJ	0.0012 U
N-Propylbenzene	3.9	100	0.0011 U	0.00094 U	0.0014 U	0.0012 U	0.0012 U
O-Xylene (1,2-Dimethylbenzene)	NS	NS	0.0011 U	0.00094 U	0.0014 U	0.0012 U	0.0012 U
Sec-Butylbenzene	11	100	0.0011 U	0.00094 U	0.0014 U	0.0012 U	0.0012 U
Styrene	NS	NS	0.0011 U	0.00094 U	0.0014 UJ	0.0012 UJ	0.0012 U
T-Butylbenzene	5.9	100	0.0011 U	0.00094 U	0.0014 U	0.0012 U	0.0012 U
Tert-Butyl Methyl Ether	0.93	100	0.0011 U	0.00094 U	0.0014 UJ	0.0012 UJ	0.0012 U
Tetrachloroethylene (PCE)	1.3	19	0.0029 U	0.0023 U	0.0091 JL	0.0027 JL	0.015
Toluene	0.7	100	0.0011 U	0.00094 U	0.0014 U	0.0012 U	0.0012 U
Trans-1,2-Dichloroethene	0.19	100	0.0011 U	0.00094 U	0.0014 U	0.0012 U	0.0012 U
Trans-1,3-Dichloropropene	NS	NS	0.0011 U	0.00094 U	0.0014 U	0.0012 U	0.0012 U
Trichloroethylene (TCE)	0.47	21	0.0011 U	0.00094 U	0.0014 U	0.0012 U	0.0012 U
Trichlorofluoromethane	NS	NS	0.0011 U	0.00094 U	0.0014 U	0.0012 U	0.0012 U
Vinyl Chloride	0.02	0.9	0.0011 U	0.00094 U	0.0014 U	0.0012 U	0.0012 UJ
Xylenes, Total	0.26	100	0.0022 U	0.0019 U	0.0029 U	0.0025 U	0.0025 U

Table 2
22-60 46th Street
Queens, New York
Post-Excavation Soil Endpoint Sample Analytical Results
Volatile Organic Compounds (VOCs)

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			EP-28_20220513 460-258122-9 5/13/2022 mg/kg 1	EP-29_20220701 460-261267-1 7/01/2022 mg/kg 1	EP-X04_20220701 460-261267-2 7/01/2022 mg/kg 1	EP-30_20220701 460-261267-3 7/01/2022 mg/kg 1	EP-31_20220727 460-262709-1 7/27/2022 mg/kg 1
Compound	NYSDEC UUSCO	NYSDEC RRSCO	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
1,1,1-Trichloroethane	0.68	100	0.0014 U	0.00099 U	0.0011 U	0.00098 U	0.0011 U
1,1,2,2-Tetrachloroethane	NS	NS	0.0014 U	0.00099 U	0.0011 U	0.00098 U	0.0011 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	NS	NS	0.0014 U	0.00099 U	0.0011 U	0.00098 U	0.0011 U
1,1,2-Trichloroethane	NS	NS	0.0014 U	0.00099 U	0.0011 U	0.00098 U	0.0011 U
1,1-Dichloroethane	0.27	26	0.0014 UJ	0.00099 U	0.0011 U	0.00098 U	0.0011 U
1,1-Dichloroethene	0.33	100	0.0014 U	0.00099 U	0.0011 U	0.00098 U	0.0011 U
1,2,3-Trichlorobenzene	NS	NS	0.0014 U	0.00099 U	0.0011 U	0.00098 U	0.0011 U
1,2,4-Trichlorobenzene	NS	NS	0.0014 U	0.00099 UJ	0.0011 UJ	0.00098 U	0.0011 U
1,2,4-Trimethylbenzene	3.6	52	0.0014 U	0.00099 U	0.0011 U	0.00098 U	0.0011 U
1,2-Dibromo-3-Chloropropane	NS	NS	0.0014 U	0.00099 U	0.0011 U	0.00098 U	0.0011 U
1,2-Dibromoethane (Ethylene Dibromide)	NS	NS	0.0014 U	0.00099 U	0.0011 U	0.00098 U	0.0011 U
1,2-Dichlorobenzene	1.1	100	0.0014 U	0.00099 U	0.0011 U	0.00098 U	0.0011 U
1,2-Dichloroethane	0.02	3.1	0.0014 UJ	0.00099 U	0.0011 U	0.00098 U	0.0011 U
1,2-Dichloropropane	NS	NS	0.0014 U	0.00099 U	0.0011 U	0.00098 U	0.0011 U
1,3,5-Trimethylbenzene (Mesitylene)	8.4	52	0.0014 U	0.00099 U	0.0011 U	0.00098 U	0.0011 U
1,3-Dichlorobenzene	2.4	49	0.0014 U	0.00099 U	0.0011 U	0.00098 U	0.0011 U
1,4-Dichlorobenzene	1.8	13	0.0014 U	0.00099 U	0.0011 U	0.00098 U	0.0011 U
2-Hexanone	NS	NS	0.0072 U	0.005 U	0.0054 U	0.0049 U	0.0054 U
Acetone	0.05	100	0.0087 U	0.006 U	0.0064 U	0.0059 U	0.014
Benzene	0.06	4.8	0.0014 U	0.00099 U	0.0011 U	0.00098 U	0.0011 U
Bromochloromethane	NS	NS	0.0014 U	0.00099 UJ	0.0011 UJ	0.00098 UJ	0.0011 U
Bromodichloromethane	NS	NS	0.0014 U	0.00099 U	0.0011 U	0.00098 U	0.0011 U
Bromoform	NS	NS	0.0014 U	0.00099 UJ	0.0011 UJ	0.00098 U	0.0011 U
Bromomethane	NS	NS	0.0029 U	0.002 UJ	0.0021 UJ	0.002 UJ	0.0022 U
Carbon Disulfide	NS	NS	0.0014 U	0.00099 U	0.0011 U	0.00098 U	0.0011 U
Carbon Tetrachloride	0.76	2.4	0.0014 U	0.00099 U	0.0011 U	0.00098 U	0.0011 U
Chlorobenzene	1.1	100	0.0014 U	0.00099 U	0.0011 U	0.00098 U	0.0011 U
Chloroethane	NS	NS	0.0014 U	0.00099 U	0.0011 U	0.00098 U	0.0011 U
Chloroform	0.37	49	0.0014 U	0.00099 U	0.0011 U	0.00098 U	0.0011 U
Chloromethane	NS	NS	0.0014 U	0.00099 U	0.0011 U	0.00098 U	0.0011 U
Cis-1,2-Dichloroethylene	0.25	100	0.0014 U	0.00099 U	0.0011 U	0.00098 U	0.0011 U
Cis-1,3-Dichloropropene	NS	NS	0.0014 U	0.00099 U	0.0011 U	0.00098 U	0.0011 U
Cyclohexane	NS	NS	0.0014 U	0.00099 U	0.0011 U	0.00098 U	0.0011 U
Dibromochloromethane	NS	NS	0.0014 U	0.00099 U	0.0011 U	0.00098 U	0.0011 U
Dichlorodifluoromethane	NS	NS	0.0014 U	0.00099 U	0.0011 U	0.00098 U	0.0011 U
Ethylbenzene	1	41	0.0014 U	0.00099 U	0.0011 U	0.00098 U	0.0011 U
Isopropylbenzene (Cumene)	NS	NS	0.0014 U	0.00099 U	0.0011 U	0.00098 U	0.0011 U
M,P-Xylenes	NS	NS	0.0014 U	0.00099 U	0.0011 U	0.00098 U	0.0011 U
Methyl Acetate	NS	NS	0.0072 U	0.005 U	0.0054 U	0.0049 U	0.0054 U
Methyl Ethyl Ketone (2-Butanone)	0.12	100	0.0072 U	0.005 UJ	0.0054 UJ	0.0049 U	0.0054 U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	NS	NS	0.0072 U	0.005 U	0.0054 U	0.0049 U	0.0054 U
Methylcyclohexane	NS	NS	0.0014 U	0.00099 U	0.0011 U	0.00098 U	0.0011 U
Methylene Chloride	0.05	100	0.0029 U	0.002 U	0.0023 U	0.002 U	0.0022 U
N-Butylbenzene	12	100	0.0014 U	0.00099 U	0.0011 U	0.00098 U	0.0011 U
N-Propylbenzene	3.9	100	0.0014 U	0.00099 U	0.0011 U	0.00098 U	0.0011 U
O-Xylene (1,2-Dimethylbenzene)	NS	NS	0.0014 U	0.00099 U	0.0011 U	0.00098 U	0.0011 U
Sec-Butylbenzene	11	100	0.0014 U	0.00099 U	0.0011 U	0.00098 U	0.0011 U
Styrene	NS	NS	0.0014 U	0.00099 U	0.0011 U	0.00098 U	0.0011 U
T-Butylbenzene	5.9	100	0.0014 U	0.00099 U	0.0011 U	0.00098 U	0.0011 U
Tert-Butyl Methyl Ether	0.93	100	0.0014 U	0.00099 U	0.0011 U	0.00098 U	0.0011 U
Tetrachloroethylene (PCE)	1.3	19	0.0027	0.00042 J	0.0017 JK	0.0005 J	0.0011 U
Toluene	0.7	100	0.0014 U	0.00099 U	0.0011 U	0.00098 U	0.0011 U
Trans-1,2-Dichloroethene	0.19	100	0.0014 U	0.00099 U	0.0011 U	0.00098 U	0.0011 U
Trans-1,3-Dichloropropene	NS	NS	0.0014 U	0.00099 U	0.0011 U	0.00098 U	0.0011 U
Trichloroethylene (TCE)	0.47	21	0.0014 U	0.00099 U	0.0011 U	0.00098 U	0.0011 U
Trichlorofluoromethane	NS	NS	0.0014 U	0.00099 U	0.0011 U	0.00098 U	0.0011 U
Vinyl Chloride	0.02	0.9	0.0014 UJ	0.00099 U	0.0011 U	0.00098 U	0.0011 U
Xylenes, Total	0.26	100	0.0029 U	0.002 U	0.0021 U	0.002 U	0.0022 U

Table 2
22-60 46th Street
Queens, New York
Post-Excavation Soil Endpoint Sample Analytical Results
Volatile Organic Compounds (VOCs)

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			EP-X05_20220727 460-262709-2 7/27/2022 mg/kg 1	EP-32_20220727 460-262709-3 7/27/2022 mg/kg 1	EP-33_20220811 460-263713-1 8/11/2022 mg/kg 1	EP-X06_20220811 460-263713-2 8/11/2022 mg/kg 1	EP-34_20220811 460-263713-3 8/11/2022 mg/kg 1
Compound	NYSDEC UUSCO	NYSDEC RRSCO	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
1,1,1-Trichloroethane	0.68	100	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
1,1,2,2-Tetrachloroethane	NS	NS	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	NS	NS	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
1,1,2-Trichloroethane	NS	NS	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
1,1-Dichloroethane	0.27	26	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
1,1-Dichloroethene	0.33	100	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
1,2,3-Trichlorobenzene	NS	NS	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
1,2,4-Trichlorobenzene	NS	NS	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
1,2,4-Trimethylbenzene	3.6	52	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
1,2-Dibromo-3-Chloropropane	NS	NS	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
1,2-Dibromoethane (Ethylene Dibromide)	NS	NS	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
1,2-Dichlorobenzene	1.1	100	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
1,2-Dichloroethane	0.02	3.1	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
1,2-Dichloropropane	NS	NS	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
1,3,5-Trimethylbenzene (Mesitylene)	8.4	52	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
1,3-Dichlorobenzene	2.4	49	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
1,4-Dichlorobenzene	1.8	13	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
2-Hexanone	NS	NS	0.0067 U	0.0051 U	0.0049 U	0.0047 U	0.0057 U
Acetone	0.05	100	0.022	0.0061 U	0.0059 U	0.0057 U	0.0068 U
Benzene	0.06	4.8	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
Bromochloromethane	NS	NS	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
Bromodichloromethane	NS	NS	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
Bromoform	NS	NS	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
Bromomethane	NS	NS	0.0027 U	0.002 U	0.002 U	0.0019 U	0.0023 U
Carbon Disulfide	NS	NS	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
Carbon Tetrachloride	0.76	2.4	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
Chlorobenzene	1.1	100	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
Chloroethane	NS	NS	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
Chloroform	0.37	49	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
Chloromethane	NS	NS	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
Cis-1,2-Dichloroethylene	0.25	100	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
Cis-1,3-Dichloropropene	NS	NS	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
Cyclohexane	NS	NS	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
Dibromochloromethane	NS	NS	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
Dichlorodifluoromethane	NS	NS	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
Ethylbenzene	1	41	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
Isopropylbenzene (Cumene)	NS	NS	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
M,P-Xylenes	NS	NS	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
Methyl Acetate	NS	NS	0.0067 U	0.0051 U	0.0049 U	0.0047 U	0.0057 U
Methyl Ethyl Ketone (2-Butanone)	0.12	100	0.0067 U	0.0051 U	0.0049 U	0.0047 U	0.0057 U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	NS	NS	0.0067 U	0.0051 U	0.0049 U	0.0047 U	0.0057 U
Methylcyclohexane	NS	NS	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
Methylene Chloride	0.05	100	0.0027 U	0.002 U	0.002 U	0.0019 U	0.0023 U
N-Butylbenzene	12	100	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
N-Propylbenzene	3.9	100	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
O-Xylene (1,2-Dimethylbenzene)	NS	NS	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
Sec-Butylbenzene	11	100	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
Styrene	NS	NS	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
T-Butylbenzene	5.9	100	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
Tert-Butyl Methyl Ether	0.93	100	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
Tetrachloroethylene (PCE)	1.3	19	0.0013 U	0.00092 J	0.00099 U	0.00094 U	0.00056 J
Toluene	0.7	100	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
Trans-1,2-Dichloroethene	0.19	100	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
Trans-1,3-Dichloropropene	NS	NS	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
Trichloroethylene (TCE)	0.47	21	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
Trichlorofluoromethane	NS	NS	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
Vinyl Chloride	0.02	0.9	0.0013 U	0.001 U	0.00099 U	0.00094 U	0.0011 U
Xylenes, Total	0.26	100	0.0027 U	0.002 U	0.002 U	0.0019 U	0.0023 U

Table 2
22-60 46th Street
Queens, New York
Post-Excavation Soil Endpoint Sample Analytical Results
Volatile Organic Compounds (VOCs)

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			EP-35_20220830 460-264635-1 8/30/2022 mg/kg 1	EP-X07_20220830 460-264635-2 8/30/2022 mg/kg 1	EP-36_20220830 460-264635-3 8/30/2022 mg/kg 1	FB-01_20220425 460-256948-7 4/25/2022 µg/L 1	FB-01_20220425 460-256954-10 4/25/2022 µg/L 1
Compound	NYSDEC UUSCO	NYSDEC RRSCO	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
1,1,1-Trichloroethane	0.68	100	0.0012 U	0.001 U	0.001 U	1 U	1 U
1,1,2,2-Tetrachloroethane	NS	NS	0.0012 U	0.001 U	0.001 U	1 U	1 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	NS	NS	0.0012 U	0.001 U	0.001 U	1 U	1 U
1,1,2-Trichloroethane	NS	NS	0.0012 U	0.001 U	0.001 U	1 U	1 U
1,1-Dichloroethane	0.27	26	0.0012 U	0.001 U	0.001 U	1 U	1 U
1,1-Dichloroethene	0.33	100	0.0012 U	0.001 U	0.001 U	1 U	1 U
1,2,3-Trichlorobenzene	NS	NS	0.0012 U	0.001 U	0.001 U	1 U	1 U
1,2,4-Trichlorobenzene	NS	NS	0.0012 U	0.001 U	0.001 U	1 U	1 U
1,2,4-Trimethylbenzene	3.6	52	0.0012 U	0.001 U	0.001 U	NR	1 U
1,2-Dibromo-3-Chloropropane	NS	NS	0.0012 U	0.001 U	0.001 U	1 U	1 U
1,2-Dibromoethane (Ethylene Dibromide)	NS	NS	0.0012 U	0.001 U	0.001 U	1 U	1 U
1,2-Dichlorobenzene	1.1	100	0.0012 U	0.001 U	0.001 U	1 U	1 U
1,2-Dichloroethane	0.02	3.1	0.0012 U	0.001 U	0.001 U	1 U	1 U
1,2-Dichloropropane	NS	NS	0.0012 U	0.001 U	0.001 U	1 U	1 U
1,3,5-Trimethylbenzene (Mesitylene)	8.4	52	0.0012 U	0.001 U	0.001 U	NR	1 U
1,3-Dichlorobenzene	2.4	49	0.0012 U	0.001 U	0.001 U	1 U	1 U
1,4-Dichlorobenzene	1.8	13	0.0012 U	0.001 U	0.001 U	1 U	1 U
2-Hexanone	NS	NS	0.006 U	0.0052 U	0.0052 U	5 U	5 U
Acetone	0.05	100	0.0072 U	0.0063 U	0.0062 U	5 U	5 U
Benzene	0.06	4.8	0.0012 U	0.001 U	0.001 U	1 U	1 U
Bromochloromethane	NS	NS	0.0012 U	0.001 U	0.001 U	1 U	1 U
Bromodichloromethane	NS	NS	0.0012 U	0.001 U	0.001 U	1 U	1 U
Bromoform	NS	NS	0.0012 U	0.001 U	0.001 U	1 U	1 U
Bromomethane	NS	NS	0.0024 U	0.0021 U	0.0021 U	1 U	1 U
Carbon Disulfide	NS	NS	0.0012 U	0.001 U	0.001 U	1 U	1 U
Carbon Tetrachloride	0.76	2.4	0.0012 U	0.001 U	0.001 U	1 U	1 U
Chlorobenzene	1.1	100	0.0012 U	0.001 U	0.001 U	1 U	1 U
Chloroethane	NS	NS	0.0012 U	0.001 U	0.001 U	1 U	1 U
Chloroform	0.37	49	0.0012 U	0.001 U	0.001 U	1 U	1 U
Chloromethane	NS	NS	0.0012 U	0.001 U	0.001 U	1 U	1 U
Cis-1,2-Dichloroethylene	0.25	100	0.0012 U	0.001 U	0.001 U	1 U	1 U
Cis-1,3-Dichloropropene	NS	NS	0.0012 U	0.001 U	0.001 U	1 U	1 U
Cyclohexane	NS	NS	0.0012 U	0.001 U	0.001 U	1 U	1 U
Dibromochloromethane	NS	NS	0.0012 U	0.001 U	0.001 U	1 U	1 U
Dichlorodifluoromethane	NS	NS	0.0012 U	0.001 U	0.001 U	1 U	1 U
Ethylbenzene	1	41	0.0012 U	0.001 U	0.001 U	1 U	1 U
Isopropylbenzene (Cumene)	NS	NS	0.0012 U	0.001 U	0.001 U	1 U	1 U
M,P-Xylenes	NS	NS	0.0012 U	0.001 U	0.001 U	1 U	1 U
Methyl Acetate	NS	NS	0.006 U	0.0052 U	0.0052 U	5 U	5 U
Methyl Ethyl Ketone (2-Butanone)	0.12	100	0.006 U	0.0052 U	0.0052 U	5 U	5 U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	NS	NS	0.006 U	0.0052 U	0.0052 U	5 U	5 U
Methylcyclohexane	NS	NS	0.0012 U	0.001 U	0.001 U	1 U	1 U
Methylene Chloride	0.05	100	0.0024 U	0.0021 U	0.0021 U	1 U	1 U
N-Butylbenzene	12	100	0.0012 U	0.001 U	0.001 U	NR	1 U
N-Propylbenzene	3.9	100	0.0012 U	0.001 U	0.001 U	NR	1 U
O-Xylene (1,2-Dimethylbenzene)	NS	NS	0.0012 U	0.001 U	0.001 U	1 U	1 U
Sec-Butylbenzene	11	100	0.0012 U	0.001 U	0.001 U	NR	1 U
Styrene	NS	NS	0.0012 U	0.001 U	0.001 U	1 U	1 U
T-Butylbenzene	5.9	100	0.0012 U	0.001 U	0.001 U	NR	1 U
Tert-Butyl Methyl Ether	0.93	100	0.0012 U	0.001 U	0.001 U	1 U	1 U
Tetrachloroethylene (PCE)	1.3	19	0.0012 U	0.0009 U	0.001 U	1 U	1 U
Toluene	0.7	100	0.0012 U	0.001 U	0.001 U	1 U	1 U
Trans-1,2-Dichloroethene	0.19	100	0.0012 U	0.001 U	0.001 U	1 U	1 U
Trans-1,3-Dichloropropene	NS	NS	0.0012 U	0.001 U	0.001 U	1 U	1 U
Trichloroethylene (TCE)	0.47	21	0.0012 U	0.001 U	0.001 U	1 U	1 U
Trichlorofluoromethane	NS	NS	0.0012 U	0.001 U	0.001 U	1 U	1 U
Vinyl Chloride	0.02	0.9	0.0012 U	0.001 U	0.001 U	1 U	1 U
Xylenes, Total	0.26	100	0.0024 U	0.0021 U	0.0021 U	2 U	2 U

Table 2
22-60 46th Street
Queens, New York
Post-Excavation Soil Endpoint Sample Analytical Results
Volatile Organic Compounds (VOCs)

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			FB-01_20220509 460-257822-13 5/09/2022 µg/L 1	FB-01_20220513 460-258122-10 5/13/2022 µg/L 1	FB-01_20220701 460-261267-4 7/01/2022 µg/L 1	FB-01_20220727 460-262709-4 7/27/2022 µg/L 1	FB-01_20220811 460-263713-4 8/11/2022 µg/L 1
Compound	NYSDEC UUSCO	NYSDEC RRSCO	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
1,1,1-Trichloroethane	0.68	100	1 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	NS	NS	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	NS	NS	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	NS	NS	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	0.27	26	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	0.33	100	1 U	1 U	1 U	1 U	1 U
1,2,3-Trichlorobenzene	NS	NS	1 UJ	1 UJ	1 U	1 U	1 U
1,2,4-Trichlorobenzene	NS	NS	1 U	1 U	1 U	1 U	1 U
1,2,4-Trimethylbenzene	3.6	52	1 U	1 U	1 U	1 U	1 U
1,2-Dibromo-3-Chloropropane	NS	NS	1 U	1 U	1 U	1 U	1 UT
1,2-Dibromoethane (Ethylene Dibromide)	NS	NS	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	1.1	100	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	0.02	3.1	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	NS	NS	1 U	1 U	1 U	1 U	1 U
1,3,5-Trimethylbenzene (Mesitylene)	8.4	52	1 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	2.4	49	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1.8	13	1 U	1 U	1 U	1 U	1 U
2-Hexanone	NS	NS	5 U	5 U	5 U	5 U	5 U
Acetone	0.05	100	20 JK	5 U	5 U	5 U	5 U
Benzene	0.06	4.8	1 U	1 U	1 U	1 U	1 U
Bromochloromethane	NS	NS	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	NS	NS	1 U	1 U	1 U	1 U	1 U
Bromoform	NS	NS	1 U	1 U	1 U	1 U	1 U
Bromomethane	NS	NS	1 U	1 U	1 UJ	1 U	1 U
Carbon Disulfide	NS	NS	1 U	1 U	1 U	1 U	1 U
Carbon Tetrachloride	0.76	2.4	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	1.1	100	1 U	1 U	1 U	1 U	1 U
Chloroethane	NS	NS	1 U	1 U	1 U	1 U	1 U
Chloroform	0.37	49	1 U	1 U	1 U	1 U	1 U
Chloromethane	NS	NS	1 U	1 U	1 U	1 U	1 U
Cis-1,2-Dichloroethylene	0.25	100	1 U	1 U	1 U	1 U	1 U
Cis-1,3-Dichloropropene	NS	NS	1 U	1 U	1 U	1 U	1 U
Cyclohexane	NS	NS	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	NS	NS	1 U	1 U	1 U	1 U	1 U
Dichlorodifluoromethane	NS	NS	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	1	41	1 U	1 U	1 U	1 U	1 U
Isopropylbenzene (Cumene)	NS	NS	1 U	1 U	1 U	1 U	1 U
M,P-Xylenes	NS	NS	1 U	1 U	1 U	1 U	1 U
Methyl Acetate	NS	NS	5 U	5 U	5 U	5 U	5 U
Methyl Ethyl Ketone (2-Butanone)	0.12	100	5 U	5 U	5 U	5 U	5 U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	NS	NS	5 U	5 U	5 U	5 U	5 U
Methylcyclohexane	NS	NS	1 U	1 U	1 U	1 U	1 U
Methylene Chloride	0.05	100	0.38 JK	1 U	1 U	1 U	0.8 J
N-Butylbenzene	12	100	1 U	1 U	1 U	1 U	1 U
N-Propylbenzene	3.9	100	1 U	1 U	1 U	1 U	1 U
O-Xylene (1,2-Dimethylbenzene)	NS	NS	1 U	1 U	1 U	1 U	1 U
Sec-Butylbenzene	11	100	1 U	1 U	1 U	1 U	1 U
Styrene	NS	NS	1 U	1 U	1 U	1 U	1 U
T-Butylbenzene	5.9	100	1 U	1 U	1 U	1 U	1 U
Tert-Butyl Methyl Ether	0.93	100	1 U	1 UJ	1 U	1 U	1 U
Tetrachloroethylene (PCE)	1.3	19	1 U	1 U	1 U	1 U	1 U
Toluene	0.7	100	1 U	1 U	1 U	1 U	1 U
Trans-1,2-Dichloroethene	0.19	100	1 U	1 U	1 U	1 U	1 U
Trans-1,3-Dichloropropene	NS	NS	1 U	1 U	1 U	1 U	1 U
Trichloroethylene (TCE)	0.47	21	1 U	1 U	1 U	1 U	1 U
Trichlorofluoromethane	NS	NS	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	0.02	0.9	1 U	1 U	1 U	1 U	1 U
Xylenes, Total	0.26	100	2 U	1 U	2 U	2 U	2 U

Table 2
22-60 46th Street
Queens, New York
Post-Excavation Soil Endpoint Sample Analytical Results
Volatile Organic Compounds (VOCs)

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			FB-01_20220830 460-264635-4 8/30/2022 µg/L 1	TB-01_20220425 460-256948-8 4/25/2022 µg/L 1	TB-01_20220425 460-256954-12 4/25/2022 µg/L 1	TB-01_20220509 460-257822-14 5/09/2022 µg/L 1	TB-01_20220513 460-258122-16 5/13/2022 µg/L 1
Compound	NYSDEC UUSCO	NYSDEC RRSCO	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
1,1,1-Trichloroethane	0.68	100	1 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	NS	NS	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	NS	NS	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	NS	NS	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	0.27	26	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	0.33	100	1 U	1 U	1 U	1 U	1 U
1,2,3-Trichlorobenzene	NS	NS	1 U	1 U	1 U	1 UJ	1 UJ
1,2,4-Trichlorobenzene	NS	NS	1 U	1 U	1 U	1 U	1 U
1,2,4-Trimethylbenzene	3.6	52	1 U	NR	1 U	1 U	1 U
1,2-Dibromo-3-Chloropropane	NS	NS	1 U	1 U	1 U	1 U	1 U
1,2-Dibromoethane (Ethylene Dibromide)	NS	NS	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	1.1	100	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	0.02	3.1	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	NS	NS	1 U	1 U	1 U	1 U	1 U
1,3,5-Trimethylbenzene (Mesitylene)	8.4	52	1 U	NR	1 U	1 U	1 U
1,3-Dichlorobenzene	2.4	49	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1.8	13	1 U	1 U	1 U	1 U	1 U
2-Hexanone	NS	NS	5 U	5 U	5 U	5 U	5 U
Acetone	0.05	100	5 U	5 U	5 U	5 U	5 U
Benzene	0.06	4.8	1 U	1 U	1 U	1 U	1 U
Bromochloromethane	NS	NS	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	NS	NS	1 U	1 U	1 U	1 U	1 U
Bromoform	NS	NS	1 U	1 U	1 U	1 U	1 U
Bromomethane	NS	NS	1 U	1 U	1 U	1 U	1 U
Carbon Disulfide	NS	NS	1 U	1 U	1 U	1 U	1 U
Carbon Tetrachloride	0.76	2.4	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	1.1	100	1 U	1 U	1 U	1 U	1 U
Chloroethane	NS	NS	1 U	1 U	1 U	1 U	1 U
Chloroform	0.37	49	1 U	1 U	1 U	1 U	1 U
Chloromethane	NS	NS	1 U	1 U	1 U	1 U	1 U
Cis-1,2-Dichloroethylene	0.25	100	1 U	1 U	1 U	1 U	1 U
Cis-1,3-Dichloropropene	NS	NS	1 U	1 U	1 U	1 U	1 U
Cyclohexane	NS	NS	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	NS	NS	1 U	1 U	1 U	1 U	1 U
Dichlorodifluoromethane	NS	NS	1 U	1 U	1 UJ	1 U	1 U
Ethylbenzene	1	41	1 U	1 U	1 U	1 U	1 U
Isopropylbenzene (Cumene)	NS	NS	1 U	1 U	1 U	1 U	1 U
M,P-Xylenes	NS	NS	1 U	1 U	1 U	1 U	1 U
Methyl Acetate	NS	NS	5 U	5 U	5 U	5 U	5 U
Methyl Ethyl Ketone (2-Butanone)	0.12	100	5 U	5 U	5 U	5 U	5 U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	NS	NS	5 U	5 U	5 U	5 U	5 U
Methylcyclohexane	NS	NS	1 U	1 U	1 U	1 U	1 U
Methylene Chloride	0.05	100	1 U	1 U	1 U	1 U	1 U
N-Butylbenzene	12	100	1 U	NR	1 U	1 U	1 U
N-Propylbenzene	3.9	100	1 U	NR	1 U	1 U	1 U
O-Xylene (1,2-Dimethylbenzene)	NS	NS	1 U	1 U	1 U	1 U	1 U
Sec-Butylbenzene	11	100	1 U	NR	1 U	1 U	1 U
Styrene	NS	NS	1 U	1 U	1 U	1 U	1 U
T-Butylbenzene	5.9	100	1 U	NR	1 U	1 U	1 U
Tert-Butyl Methyl Ether	0.93	100	1 U	1 U	1 U	1 U	1 UJ
Tetrachloroethylene (PCE)	1.3	19	1 U	1 U	1 U	1 U	1 U
Toluene	0.7	100	1 U	1 U	1 U	1 U	1 U
Trans-1,2-Dichloroethene	0.19	100	1 UJ	1 U	1 U	1 U	1 U
Trans-1,3-Dichloropropene	NS	NS	1 U	1 U	1 U	1 U	1 U
Trichloroethylene (TCE)	0.47	21	1 U	1 U	1 U	1 U	1 U
Trichlorofluoromethane	NS	NS	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	0.02	0.9	1 U	1 U	1 U	1 U	1 U
Xylenes, Total	0.26	100	2 U	2 U	2 U	2 U	1 U

Table 2
22-60 46th Street
Queens, New York
Post-Excavation Soil Endpoint Sample Analytical Results
Volatile Organic Compounds (VOCs)

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			TB-01_20220701 460-261267-5 7/01/2022 µg/L 1	TB-01_20220727 460-262709-5 7/27/2022 µg/L 1	TB-01_20220811 460-263713-5 8/11/2022 µg/L 1	TB-01_20220830 460-264635-5 8/30/2022 µg/L 1
Compound	NYSDEC UUSCO	NYSDEC RRSCO	CONC Q	CONC Q	CONC Q	CONC Q
1,1,1-Trichloroethane	0.68	100	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	NS	NS	1 U	1 U	1 U	1 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	NS	NS	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	NS	NS	1 U	1 U	1 U	1 U
1,1-Dichloroethane	0.27	26	1 U	1 U	1 U	1 U
1,1-Dichloroethene	0.33	100	1 U	1 U	1 U	1 U
1,2,3-Trichlorobenzene	NS	NS	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	NS	NS	1 U	1 U	1 U	1 U
1,2,4-Trimethylbenzene	3.6	52	1 U	1 U	1 U	1 U
1,2-Dibromo-3-Chloropropane	NS	NS	1 U	1 U	1 U	1 U
1,2-Dibromoethane (Ethylene Dibromide)	NS	NS	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	1.1	100	1 U	1 U	1 U	1 U
1,2-Dichloroethane	0.02	3.1	1 U	1 U	1 U	1 U
1,2-Dichloropropane	NS	NS	1 U	1 U	1 U	1 U
1,3,5-Trimethylbenzene (Mesitylene)	8.4	52	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	2.4	49	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1.8	13	1 U	1 U	1 U	1 U
2-Hexanone	NS	NS	5 U	5 U	5 U	5 U
Acetone	0.05	100	5 U	5 U	5 U	5 U
Benzene	0.06	4.8	1 U	1 U	1 U	1 U
Bromochloromethane	NS	NS	1 U	1 U	1 U	1 U
Bromodichloromethane	NS	NS	1 U	1 U	1 U	1 U
Bromoform	NS	NS	1 U	1 U	1 U	1 U
Bromomethane	NS	NS	1 U	1 U	1 U	1 U
Carbon Disulfide	NS	NS	1 U	1 U	1 U	1 U
Carbon Tetrachloride	0.76	2.4	1 U	1 U	1 U	1 U
Chlorobenzene	1.1	100	1 U	1 U	1 U	1 U
Chloroethane	NS	NS	1 U	1 U	1 U	1 U
Chloroform	0.37	49	1 U	1 U	1 U	1 U
Chloromethane	NS	NS	1 U	1 U	1 U	1 U
Cis-1,2-Dichloroethylene	0.25	100	1 U	1 U	1 U	1 U
Cis-1,3-Dichloropropene	NS	NS	1 U	1 U	1 U	1 U
Cyclohexane	NS	NS	1 U	1 U	1 U	1 U
Dibromochloromethane	NS	NS	1 U	1 U	1 U	1 U
Dichlorodifluoromethane	NS	NS	1 U	1 U	1 U	1 U
Ethylbenzene	1	41	1 U	1 U	1 U	1 U
Isopropylbenzene (Cumene)	NS	NS	1 U	1 U	1 U	1 U
M,P-Xylenes	NS	NS	1 U	1 U	1 U	1 U
Methyl Acetate	NS	NS	5 U	5 U	5 U	5 U
Methyl Ethyl Ketone (2-Butanone)	0.12	100	5 U	5 U	5 U	5 U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	NS	NS	5 U	5 U	5 U	5 U
Methylcyclohexane	NS	NS	1 U	1 U	1 U	1 U
Methylene Chloride	0.05	100	1 U	1 U	0.8 J	1 U
N-Butylbenzene	12	100	1 U	1 U	1 U	1 U
N-Propylbenzene	3.9	100	1 U	1 U	1 U	1 U
O-Xylene (1,2-Dimethylbenzene)	NS	NS	1 U	1 U	1 U	1 U
Sec-Butylbenzene	11	100	1 U	1 U	1 U	1 U
Styrene	NS	NS	1 U	1 U	1 U	1 U
T-Butylbenzene	5.9	100	1 U	1 U	1 U	1 U
Tert-Butyl Methyl Ether	0.93	100	1 U	1 U	1 U	1 U
Tetrachloroethylene (PCE)	1.3	19	1 U	1 U	1 U	1 U
Toluene	0.7	100	1 U	1 U	0.55 J	1 U
Trans-1,2-Dichloroethene	0.19	100	1 U	1 U	1 U	1 U
Trans-1,3-Dichloropropene	NS	NS	1 U	1 U	1 U	1 U
Trichloroethylene (TCE)	0.47	21	1 U	1 U	1 U	1 U
Trichlorofluoromethane	NS	NS	1 U	1 U	1 U	1 U
Vinyl Chloride	0.02	0.9	1 U	1 U	1 U	1 U
Xylenes, Total	0.26	100	2 U	2 U	2 U	2 U

Table 3
22-60 46th Street
Queens, New York
 Post-Excavation Soil Endpoint Sample Analytical Results
 Semivolatile Organic Compounds (SVOCs)

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			EP-01_20220425 460-256954-1 4/25/2022 mg/kg 1	EP-X_20220425 460-256954-2 4/25/2022 mg/kg 1	EP-02_20220425 460-256954-3 4/25/2022 mg/kg 1	EP-03_20220425 460-256954-4 4/25/2022 mg/kg 1	EP-04_20220425 460-256954-5 4/25/2022 mg/kg 1	EP-05_20220425 460-256954-6 4/25/2022 mg/kg 1	EP-06_20220425 460-256954-7 4/25/2022 mg/kg 1
Compound	NYSDEC UUSCO	NYSDEC RRSOC	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
1,2,4,5-Tetrachlorobenzene	NS	NS	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U
1,4-Dioxane (P-Dioxane)	0.1	13	0.035 UJ	0.035 UJ	0.036 UJ	0.036 UJ	0.035 UJ	0.037 UJ	0.035 UJ
2,3,4,6-Tetrachlorophenol	NS	NS	0.35 U	0.35 U	0.36 U	0.36 U	0.35 U	0.37 U	0.35 U
2,4,5-Trichlorophenol	NS	NS	0.35 U	0.35 U	0.36 U	0.36 U	0.35 U	0.37 U	0.35 U
2,4,6-Trichlorophenol	NS	NS	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.15 U	0.14 U
2,4-Dichlorophenol	NS	NS	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.15 U	0.14 U
2,4-Dimethylphenol	NS	NS	0.35 U	0.35 U	0.36 U	0.36 U	0.35 U	0.37 U	0.35 U
2,4-Dinitrophenol	NS	NS	0.29 U	0.29 U	0.29 U	0.29 U	0.28 U	0.3 U	0.28 U
2,4-Dinitrotoluene	NS	NS	0.072 U	0.072 U	0.072 U	0.073 U	0.071 U	0.074 U	0.07 U
2,6-Dinitrotoluene	NS	NS	0.072 U	0.072 U	0.072 U	0.073 U	0.071 U	0.074 U	0.07 U
2-Chloronaphthalene	NS	NS	0.35 U	0.35 U	0.36 U	0.36 U	0.35 U	0.37 U	0.35 U
2-Chlorophenol	NS	NS	0.35 U	0.35 U	0.36 U	0.36 U	0.35 U	0.37 U	0.35 U
2-Methylnaphthalene	NS	NS	0.35 U	0.35 U	0.36 U	0.36 U	0.35 U	0.37 U	0.35 U
2-Methylphenol (O-Cresol)	0.33	100	0.35 U	0.35 U	0.36 U	0.36 U	0.35 U	0.37 U	0.35 U
2-Nitroaniline	NS	NS	0.35 U	0.35 U	0.36 U	0.36 U	0.35 U	0.37 U	0.35 U
2-Nitrophenol	NS	NS	0.35 U	0.35 U	0.36 U	0.36 U	0.35 U	0.37 U	0.35 U
3- And 4- Methylphenol (Total)	NS	NS	0.35 U	0.35 U	0.36 U	0.36 U	0.35 U	0.37 U	0.35 U
3,3'-Dichlorobenzidine	NS	NS	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.15 U	0.14 U
3-Nitroaniline	NS	NS	0.35 U	0.35 U	0.36 U	0.36 U	0.35 U	0.37 U	0.35 U
4,6-Dinitro-2-Methylphenol	NS	NS	0.29 U	0.29 U	0.29 U	0.29 U	0.28 U	0.3 U	0.28 U
4-Bromophenyl Phenyl Ether	NS	NS	0.35 U	0.35 U	0.36 U	0.36 U	0.35 U	0.37 U	0.35 U
4-Chloro-3-Methylphenol	NS	NS	0.35 U	0.35 U	0.36 U	0.36 U	0.35 U	0.37 U	0.35 U
4-Chloroaniline	NS	NS	0.35 U	0.35 U	0.36 U	0.36 U	0.35 U	0.37 U	0.35 U
4-Chlorophenyl Phenyl Ether	NS	NS	0.35 U	0.35 U	0.36 U	0.36 U	0.35 U	0.37 U	0.35 U
4-Methylphenol (P-Cresol)	0.33	100	0.35 U	0.35 U	0.36 U	0.36 U	0.35 U	0.37 U	0.35 U
4-Nitroaniline	NS	NS	0.35 U	0.35 U	0.36 U	0.36 U	0.35 U	0.37 U	0.35 U
4-Nitrophenol	NS	NS	0.72 U	0.72 U	0.72 U	0.73 U	0.71 U	0.74 U	0.7 U
Acenaphthene	20	100	0.35 U	0.35 U	0.36 U	0.36 U	0.35 U	0.37 U	0.35 U
Acenaphthylene	100	100	0.35 U	0.35 U	0.36 U	0.36 U	0.35 U	0.37 U	0.35 U
Acetophenone	NS	NS	0.35 U	0.35 U	0.36 U	0.36 U	0.35 U	0.37 U	0.35 U
Anthracene	100	100	0.35 U	0.35 U	0.36 U	0.36 U	0.35 U	0.37 U	0.35 U
Atrazine	NS	NS	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.15 U	0.14 U
Benzaldehyde	NS	NS	0.35 UJ	0.35 UJ	0.36 UJ	0.36 UJ	0.35 UJ	0.37 UJ	0.35 UJ
Benzo(a)Anthracene	1	1	0.035 U	0.035 U	0.036 U	0.036 U	0.035 U	0.037 U	0.035 U
Benzo(a)Pyrene	1	1	0.035 U	0.035 U	0.036 U	0.036 U	0.035 U	0.037 U	0.035 U
Benzo(b)Fluoranthene	1	1	0.035 U	0.035 U	0.036 U	0.036 U	0.035 U	0.037 U	0.035 U
Benzo(g,h,i)Perylene	100	100	0.35 U	0.35 U	0.36 U	0.027 J	0.35 U	0.37 U	0.35 U
Benzo(k)Fluoranthene	0.8	3.9	0.035 U	0.035 U	0.036 U	0.017 J	0.035 U	0.037 U	0.035 U
Benzyl Butyl Phthalate	NS	NS	0.35 U	0.35 U	0.36 U	0.36 U	0.35 U	0.37 U	0.35 U
Biphenyl (Diphenyl)	NS	NS	0.35 U	0.35 U	0.36 U	0.36 U	0.35 U	0.37 U	0.35 U
Bis(2-Chloroethoxy) Methane	NS	NS	0.35 U	0.35 U	0.36 U	0.36 U	0.35 U	0.37 U	0.35 U
Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether)	NS	NS	0.035 U	0.035 U	0.036 U	0.036 U	0.035 U	0.037 U	0.035 U
Bis(2-Chloroisopropyl) Ether	NS	NS	0.35 UJ	0.35 UJ	0.36 UJ	0.36 UJ	0.35 UJ	0.37 UJ	0.35 UJ
Bis(2-Ethylhexyl) Phthalate	NS	NS	0.35 U	0.35 U	0.36 U	0.36 U	0.35 U	0.37 U	0.35 U
Caprolactam	NS	NS	0.35 U	0.35 U	0.36 U	0.36 U	0.35 U	0.37 U	0.35 U
Carbazole	NS	NS	0.35 U	0.35 U	0.36 U	0.36 U	0.35 U	0.37 U	0.35 U
Chrysene	1	3.9	0.35 U	0.35 U	0.36 U	0.037 J	0.35 U	0.37 U	0.35 U
Dibenz(a,h)Anthracene	0.33	0.33	0.035 U	0.035 U	0.036 U	0.036 U	0.035 U	0.037 U	0.035 U
Dibenzofuran	7	59	0.35 U	0.35 U	0.36 U	0.36 U	0.35 U	0.37 U	0.35 U
Diethyl Phthalate	NS	NS	0.35 U	0.35 U	0.36 U	0.36 U	0.35 U	0.37 U	0.35 U
Dimethyl Phthalate	NS	NS	0.35 U	0.35 U	0.36 U	0.36 U	0.35 U	0.37 U	0.35 U
Di-N-Butyl Phthalate	NS	NS	0.35 U	0.35 U	0.36 U	0.36 U	0.35 U	0.37 U	0.35 U
Di-N-Octylphthalate	NS	NS	0.35 U	0.35 U	0.36 U	0.36 U	0.35 U	0.37 U	0.35 U
Fluoranthene	100	100	0.35 U	0.35 U	0.36 U	0.069 J	0.35 U	0.37 U	0.35 U
Fluorene	30	100	0.35 U	0.35 U	0.36 U	0.36 U	0.35 U	0.37 U	0.35 U
Hexachlorobenzene	0.33	1.2	0.035 U	0.035 U	0.036 U	0.036 U	0.035 U	0.037 U	0.035 U
Hexachlorobutadiene	NS	NS	0.072 U	0.072 U	0.072 U	0.073 U	0.071 U	0.074 U	0.07 U
Hexachlorocyclopentadiene	NS	NS	0.35 U	0.35 U	0.36 U	0.36 U	0.35 U	0.37 U	0.35 U
Hexachloroethane	NS	NS	0.035 U	0.035 U	0.036 U	0.036 U	0.035 U	0.037 U	0.035 U
Indeno(1,2,3-c,d)Pyrene	0.5	0.5	0.035 UJ	0.035 UJ	0.036 UJ	0.03 J	0.035 UJ	0.037 UJ	0.035 UJ
Isophorone	NS	NS	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.15 U	0.14 U
Naphthalene	12	100	0.35 U	0.35 U	0.36 U	0.36 U	0.35 U	0.37 U	0.35 U
Nitrobenzene	NS	NS	0.035 U	0.035 U	0.036 U	0.036 U	0.035 U	0.037 U	0.035 U
N-Nitrosodi-N-Propylamine	NS	NS	0.035 U	0.035 U	0.036 U	0.036 U	0.035 U	0.037 U	0.035 U
N-Nitrosodiphenylamine	NS	NS	0.35 U	0.35 U	0.36 U	0.36 U	0.35 U	0.37 U	0.35 U
Pentachlorophenol	0.8	6.7	0.29 U	0.29 U	0.29 U	0.29 U	0.28 U	0.3 U	0.28 U
Phenanthrene	100	100	0.35 U	0.35 U	0.011 J	0.031 J	0.35 U	0.37 U	0.35 U
Phenol	0.33	100	0.35 U	0.35 U	0.36 U	0.36 U	0.35 U	0.37 U	0.35 U
Pyrene	100	100	0.35 U	0.35 U	0.36 U	0.066 J	0.35 U	0.37 U	0.35 U

Table 3
22-60 46th Street
Queens, New York
Post-Excavation Soil Endpoint Sample Analytical Results
Semivolatile Organic Compounds (SVOCs)

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			EP-07_20220425 460-256954-3 4/25/2022 mg/kg 1	EP-08_20220425 460-256954-9 4/25/2022 mg/kg 1	EP-09_20220425 460-256954-11 4/25/2022 mg/kg 1	EP-10_20220509 460-257822-1 5/09/2022 mg/kg 1	EP-X02_20220509 460-257822-2 5/09/2022 mg/kg 1	EP-10A_B_20220513 460-258122-3 5/13/2022 mg/kg 1	EP-10A_E_20220513 460-258122-5 5/13/2022 mg/kg 1
Compound	NYSDEC UUSCO	NYSDEC RRSOC	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
1,2,4,5-Tetrachlorobenzene	NS	NS	0.36 U	0.36 U	0.41 U	0.38 U	0.38 U	0.36 U	0.36 U
1,4-Dioxane (P-Dioxane)	0.1	13	0.036 UJ	0.036 UJ	0.041 UJ	0.038 U	0.038 U	0.036 U	0.036 U
2,3,4,6-Tetrachlorophenol	NS	NS	0.36 U	0.36 U	0.41 U	0.38 U	0.38 U	0.36 U	0.36 U
2,4,5-Trichlorophenol	NS	NS	0.36 U	0.36 U	0.41 U	0.38 U	0.38 U	0.36 U	0.36 U
2,4,6-Trichlorophenol	NS	NS	0.14 U	0.14 U	0.17 U	0.15 U	0.15 U	0.15 U	0.15 U
2,4-Dichlorophenol	NS	NS	0.14 U	0.14 U	0.17 U	0.15 U	0.15 U	0.15 U	0.15 U
2,4-Dimethylphenol	NS	NS	0.36 U	0.36 U	0.41 U	0.38 U	0.38 U	0.36 U	0.36 U
2,4-Dinitrophenol	NS	NS	0.29 U	0.29 U	0.33 U	0.31 UJ	0.29 U	0.29 U	0.29 U
2,4-Dinitrotoluene	NS	NS	0.073 U	0.072 U	0.083 U	0.077 U	0.078 U	0.073 UJ	0.073 UJ
2,6-Dinitrotoluene	NS	NS	0.073 U	0.072 U	0.083 U	0.077 U	0.078 U	0.073 U	0.073 U
2-Chloronaphthalene	NS	NS	0.36 U	0.36 U	0.41 U	0.38 U	0.38 U	0.36 U	0.36 U
2-Chlorophenol	NS	NS	0.36 U	0.36 U	0.41 U	0.38 U	0.38 U	0.36 U	0.36 U
2-Methylnaphthalene	NS	NS	0.36 U	0.36 U	0.41 U	0.38 U	0.38 U	0.017 J	0.36 U
2-Methylphenol (O-Cresol)	0.33	100	0.36 U	0.36 U	0.41 U	0.38 U	0.38 U	0.36 U	0.36 U
2-Nitroaniline	NS	NS	0.36 U	0.36 U	0.41 U	0.38 U	0.38 U	0.36 U	0.36 U
2-Nitrophenol	NS	NS	0.36 U	0.36 U	0.41 U	0.38 U	0.38 U	0.36 U	0.36 U
3- And 4- Methylphenol (Total)	NS	NS	0.36 U	0.36 U	0.41 U	0.38 U	0.38 U	0.36 U	0.36 U
3,3'-Dichlorobenzidine	NS	NS	0.14 U	0.14 U	0.17 U	0.15 U	0.15 U	0.15 U	0.15 U
3-Nitroaniline	NS	NS	0.36 U	0.36 U	0.41 U	0.38 U	0.38 U	0.36 U	0.36 U
4,6-Dinitro-2-Methylphenol	NS	NS	0.29 U	0.29 U	0.33 U	0.31 UJ	0.29 UJ	0.29 UJ	0.29 UJ
4-Bromophenyl Phenyl Ether	NS	NS	0.36 U	0.36 U	0.41 U	0.38 U	0.38 U	0.36 U	0.36 U
4-Chloro-3-Methylphenol	NS	NS	0.36 U	0.36 U	0.41 U	0.38 U	0.38 U	0.36 U	0.36 U
4-Chloroaniline	NS	NS	0.36 U	0.36 U	0.41 U	0.38 U	0.38 U	0.36 U	0.36 U
4-Chlorophenyl Phenyl Ether	NS	NS	0.36 U	0.36 U	0.41 U	0.38 U	0.38 U	0.36 U	0.36 U
4-Methylphenol (P-Cresol)	0.33	100	0.36 U	0.36 U	0.41 U	0.38 U	0.38 U	0.36 U	0.36 U
4-Nitroaniline	NS	NS	0.36 U	0.36 U	0.41 U	0.38 U	0.38 U	0.36 U	0.36 U
4-Nitrophenol	NS	NS	0.73 U	0.72 U	0.83 U	0.77 U	0.78 U	0.73 U	0.73 U
Acenaphthene	20	100	0.36 U	0.36 U	0.41 U	0.38 U	0.38 U	0.02 J	0.36 U
Acenaphthylene	100	100	0.36 U	0.36 U	0.41 U	0.025 JL	0.38 UJ	0.013 J	0.36 U
Acetophenone	NS	NS	0.36 U	0.36 U	0.41 U	0.38 U	0.38 U	0.36 U	0.36 U
Anthracene	100	100	0.36 U	0.36 U	0.41 U	0.047 J	0.02 J	0.017 J	0.36 U
Atrazine	NS	NS	0.14 U	0.14 U	0.17 U	0.15 U	0.15 U	0.15 U	0.15 U
Benzaldehyde	NS	NS	0.36 UJ	0.36 UJ	0.41 UJ	0.38 UJ	0.38 UJ	0.36 UJ	0.36 UJ
Benzo(a)Anthracene	1	1	0.036 U	0.036 U	0.041 U	0.044	0.035 J	0.027 J	0.015 J
Benzo(a)Pyrene	1	1	0.036 U	0.036 U	0.041 U	0.064	0.038	0.023 J	0.036 U
Benzo(b)Fluoranthene	1	1	0.036 U	0.036 U	0.041 U	0.047	0.044	0.022 J	0.011 J
Benzo(g,h,i)Perylene	100	100	0.36 U	0.36 U	0.41 U	0.85 JL	0.58 JL	0.36 U	0.36 U
Benzo(k)Fluoranthene	0.8	3.9	0.036 U	0.036 U	0.041 U	0.022 J	0.018 J	0.011 J	0.036 U
Benzyl Butyl Phthalate	NS	NS	0.36 U	0.36 U	0.41 U	0.38 U	0.38 U	0.36 U	0.36 U
Biphenyl (Diphenyl)	NS	NS	0.36 U	0.36 U	0.41 U	0.38 U	0.38 U	0.36 U	0.36 U
Bis(2-Chloroethoxy) Methane	NS	NS	0.36 U	0.36 U	0.41 U	0.38 U	0.38 U	0.36 U	0.36 U
Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether)	NS	NS	0.036 U	0.036 U	0.041 U	0.038 U	0.038 U	0.036 U	0.036 U
Bis(2-Chloroisopropyl) Ether	NS	NS	0.36 UJ	0.36 UJ	0.41 UJ	0.38 UJ	0.38 UJ	0.36 UJ	0.36 UJ
Bis(2-Ethylhexyl) Phthalate	NS	NS	0.36 U	0.36 U	0.41 U	0.38 U	0.38 U	0.36 U	0.36 U
Caprolactam	NS	NS	0.36 U	0.36 U	0.41 U	0.38 U	0.38 U	0.36 U	0.36 U
Carbazole	NS	NS	0.36 U	0.36 U	0.41 U	0.38 U	0.38 U	0.36 U	0.36 U
Chrysene	1	3.9	0.36 U	0.36 U	0.41 U	0.036 J	0.03 J	0.025 J	0.019 J
Dibenz(a,h)Anthracene	0.33	0.33	0.036 U	0.036 U	0.041 U	0.12 JL	0.35 JL	0.036 U	0.036 U
Dibenzofuran	7	59	0.36 U	0.36 U	0.41 U	0.38 U	0.38 U	0.36 U	0.36 U
Diethyl Phthalate	NS	NS	0.36 U	0.36 U	0.036 J	0.38 U	0.38 U	0.36 U	0.36 U
Dimethyl Phthalate	NS	NS	0.36 U	0.36 U	0.41 U	0.38 U	0.38 U	0.36 U	0.36 U
Di-N-Butyl Phthalate	NS	NS	0.36 U	0.36 U	0.41 U	0.38 U	0.38 U	0.36 U	0.36 U
Di-N-Octylphthalate	NS	NS	0.36 U	0.36 U	0.41 U	0.38 U	0.38 U	0.36 U	0.36 U
Fluoranthene	100	100	0.36 U	0.36 U	0.41 U	0.076 J	0.062 J	0.046 J	0.015 J
Fluorene	30	100	0.36 U	0.36 U	0.41 U	0.38 U	0.38 U	0.015 J	0.36 U
Hexachlorobenzene	0.33	1.2	0.036 U	0.036 U	0.041 U	0.038 U	0.038 U	0.036 U	0.036 U
Hexachlorobutadiene	NS	NS	0.073 U	0.072 U	0.083 U	0.077 U	0.078 U	0.073 U	0.073 U
Hexachlorocyclopentadiene	NS	NS	0.36 U	0.36 U	0.41 U	0.38 UJ	0.38 UJ	0.36 U	0.36 U
Hexachloroethane	NS	NS	0.036 U	0.036 U	0.041 U	0.038 U	0.038 U	0.036 U	0.036 U
Indeno(1,2,3-c,d)Pyrene	0.5	0.5	0.036 UJ	0.036 UJ	0.041 UJ	0.8 JL	0.62 JL	0.014 J	0.036 UJ
Isophorone	NS	NS	0.14 U	0.14 U	0.17 U	0.15 U	0.15 U	0.15 U	0.15 U
Naphthalene	12	100	0.36 U	0.36 U	0.41 U	0.0091 J	0.38 U	0.047 J	0.36 U
Nitrobenzene	NS	NS	0.036 U	0.036 U	0.041 U	0.038 U	0.038 U	0.036 U	0.036 U
N-Nitrosodi-N-Propylamine	NS	NS	0.036 U	0.036 U	0.041 U	0.038 U	0.038 U	0.036 U	0.036 U
N-Nitrosodiphenylamine	NS	NS	0.36 U	0.36 U	0.41 U	0.38 U	0.38 U	0.36 U	0.36 U
Pentachlorophenol	0.8	6.7	0.29 U	0.29 U	0.33 U	0.3 U	0.31 U	0.29 U	0.29 U
Phenanthrene	100	100	0.36 U	0.36 U	0.41 U	0.06 J	0.036 J	0.071 J	0.012 J
Phenol	0.33	100	0.36 U	0.36 U	0.41 U	0.38 U	0.38 U	0.36 U	0.36 U
Pyrene	100	100	0.36 U	0.36 U	0.41 U	0.061 JL	0.047 JL	0.059 J	0.015 J

Table 3
22-60 46th Street
Queens, New York
Post-Excavation Soil Endpoint Sample Analytical Results
Semivolatile Organic Compounds (SVOCs)

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			EP-10A_N_20220513 460-258122-4 5/13/2022 mg/kg 1	EP-10A_S_20220513 460-258122-7 5/13/2022 mg/kg 1	EP-10A_W_20220513 460-258122-6 5/13/2022 mg/kg 1	EP-11_20220509 460-257822-3 5/09/2022 mg/kg 1	EP-12_20220509 460-257822-4 5/09/2022 mg/kg 1	EP-13_20220509 460-257822-5 5/09/2022 mg/kg 1	EP-14_20220509 460-257822-6 5/09/2022 mg/kg 1
Compound	NYSDEC UUSCO	NYSDEC RRSCO	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
1,2,4,5-Tetrachlorobenzene	NS	NS	0.36 U	0.36 U	0.36 U	0.39 U	0.36 U	0.38 U	0.37 U
1,4-Dioxane (P-Dioxane)	0.1	13	0.036 U	0.036 U	0.036 U	0.039 U	0.037 U	0.038 U	0.037 U
2,3,4,6-Tetrachlorophenol	NS	NS	0.36 U	0.36 U	0.36 U	0.39 U	0.37 U	0.38 U	0.37 U
2,4,5-Trichlorophenol	NS	NS	0.36 U	0.36 U	0.36 U	0.39 U	0.37 U	0.38 U	0.37 U
2,4,6-Trichlorophenol	NS	NS	0.15 U	0.14 U	0.14 U	0.16 U	0.15 U	0.15 U	0.15 U
2,4-Dichlorophenol	NS	NS	0.15 U	0.14 U	0.14 U	0.16 U	0.15 U	0.15 U	0.15 UJ
2,4-Dimethylphenol	NS	NS	0.36 U	0.36 U	0.36 U	0.39 U	0.37 U	0.38 U	0.37 U
2,4-Dinitrophenol	NS	NS	0.29 U	0.29 U	0.29 U	0.31 U	0.3 U	0.3 U	0.3 UJ
2,4-Dinitrotoluene	NS	NS	0.073 UJ	0.072 UJ	0.072 UJ	0.079 U	0.075 U	0.077 U	0.074 U
2,6-Dinitrotoluene	NS	NS	0.073 U	0.072 U	0.072 U	0.079 U	0.075 U	0.077 U	0.074 U
2-Chloronaphthalene	NS	NS	0.36 U	0.36 U	0.36 U	0.39 U	0.37 U	0.38 U	0.37 U
2-Chlorophenol	NS	NS	0.36 U	0.36 U	0.36 U	0.39 U	0.37 U	0.38 U	0.37 UJ
2-Methylnaphthalene	NS	NS	0.36 U	0.36 U	0.36 U	0.39 U	0.37 U	0.38 U	0.37 U
2-Methylphenol (O-Cresol)	0.33	100	0.36 U	0.36 U	0.36 U	0.39 U	0.37 U	0.38 U	0.37 U
2-Nitroaniline	NS	NS	0.36 U	0.36 U	0.36 U	0.39 U	0.37 U	0.38 U	0.37 U
2-Nitrophenol	NS	NS	0.36 U	0.36 U	0.36 U	0.39 U	0.37 U	0.38 U	0.37 UJ
3- And 4- Methylphenol (Total)	NS	NS	0.36 U	0.36 U	0.36 U	0.39 U	0.37 U	0.38 U	0.37 U
3,3'-Dichlorobenzidine	NS	NS	0.15 U	0.14 U	0.14 U	0.16 U	0.15 U	0.15 U	0.15 U
3-Nitroaniline	NS	NS	0.36 U	0.36 U	0.36 U	0.39 U	0.37 U	0.38 U	0.37 U
4,6-Dinitro-2-Methylphenol	NS	NS	0.29 UJ	0.29 UJ	0.29 UJ	0.31 U	0.3 U	0.3 U	0.3 UJ
4-Bromophenyl Phenyl Ether	NS	NS	0.36 U	0.36 U	0.36 U	0.39 U	0.37 U	0.38 U	0.37 U
4-Chloro-3-Methylphenol	NS	NS	0.36 U	0.36 U	0.36 U	0.39 U	0.37 U	0.38 U	0.37 U
4-Chloroaniline	NS	NS	0.36 U	0.36 U	0.36 U	0.39 U	0.37 U	0.38 U	0.37 U
4-Chlorophenyl Phenyl Ether	NS	NS	0.36 U	0.36 U	0.36 U	0.39 U	0.37 U	0.38 U	0.37 U
4-Methylphenol (P-Cresol)	0.33	100	0.36 U	0.36 U	0.36 U	0.39 U	0.37 U	0.38 U	0.37 U
4-Nitroaniline	NS	NS	0.36 U	0.36 U	0.36 U	0.39 U	0.37 U	0.38 U	0.37 U
4-Nitrophenol	NS	NS	0.73 U	0.72 U	0.72 U	0.79 U	0.75 U	0.77 U	0.74 U
Acenaphthene	20	100	0.36 U	0.36 U	0.36 U	0.39 U	0.37 U	0.38 U	0.045 J
Acenaphthylene	100	100	0.36 U	0.36 U	0.36 U	0.39 U	0.37 U	0.38 U	0.012 J
Acetophenone	NS	NS	0.36 U	0.36 U	0.36 U	0.39 U	0.37 U	0.38 U	0.37 U
Anthracene	100	100	0.36 U	0.36 U	0.36 U	0.023 J	0.013 J	0.025 J	0.095 J
Atrazine	NS	NS	0.15 U	0.14 U	0.14 U	0.16 U	0.15 U	0.15 U	0.15 UJ
Benzaldehyde	NS	NS	0.36 UJ	0.36 UJ	0.36 UJ	0.39 UJ	0.37 UJ	0.38 UJ	0.37 UJ
Benzo(a)Anthracene	1	1	0.017 J	0.038	0.023 J	0.06	0.031 J	0.051	0.19
Benzo(a)Pyrene	1	1	0.014 J	0.025 J	0.019 J	0.048	0.02 J	0.038	0.15
Benzo(b)Fluoranthene	1	1	0.021 J	0.038	0.023 J	0.069	0.032 J	0.057	0.21
Benzo(g,h,i)Perylene	100	100	0.011 J	0.017 J	0.014 J	0.097 J	0.022 J	0.015 J	0.1 J
Benzo(k)Fluoranthene	0.8	3.9	0.011 J	0.014 J	0.012 J	0.031 J	0.016 J	0.023 J	0.086
Benzyl Butyl Phthalate	NS	NS	0.36 U	0.36 U	0.36 U	0.39 U	0.37 U	0.38 U	0.37 UJ
Biphenyl (Diphenyl)	NS	NS	0.36 U	0.36 U	0.36 U	0.39 U	0.37 U	0.38 U	0.37 U
Bis(2-Chloroethoxy) Methane	NS	NS	0.36 U	0.36 U	0.36 U	0.39 U	0.37 U	0.38 U	0.37 U
Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether)	NS	NS	0.036 U	0.036 U	0.036 U	0.039 U	0.037 U	0.038 U	0.037 U
Bis(2-Chloroisopropyl) Ether	NS	NS	0.36 UJ	0.36 UJ	0.36 UJ	0.39 UJ	0.37 UJ	0.38 UJ	0.37 U
Bis(2-Ethylhexyl) Phthalate	NS	NS	0.36 U	0.36 U	0.36 U	0.39 U	0.37 U	0.38 U	0.37 UJ
Caprolactam	NS	NS	0.36 U	0.36 U	0.36 U	0.39 U	0.37 U	0.38 U	0.37 UJ
Carbazole	NS	NS	0.36 U	0.36 U	0.36 U	0.39 U	0.37 U	0.38 U	0.021 J
Chrysene	1	3.9	0.019 J	0.037 J	0.021 J	0.056 J	0.026 J	0.049 J	0.15 J
Dibenz(a,h)Anthracene	0.33	0.33	0.036 U	0.036 U	0.036 U	0.044	0.023 J	0.038 U	0.037 U
Dibenzofuran	7	59	0.36 U	0.36 U	0.36 U	0.39 U	0.37 U	0.38 U	0.016 J
Diethyl Phthalate	NS	NS	0.36 U	0.36 U	0.36 U	0.39 U	0.37 U	0.38 U	0.37 U
Dimethyl Phthalate	NS	NS	0.36 U	0.36 U	0.36 U	0.39 U	0.37 U	0.38 U	0.37 U
Di-N-Butyl Phthalate	NS	NS	0.36 U	0.36 U	0.36 U	0.39 U	0.37 U	0.38 U	0.37 U
Di-N-Octylphthalate	NS	NS	0.36 U	0.36 U	0.36 U	0.39 U	0.37 U	0.38 U	0.37 UJ
Fluoranthene	100	100	0.027 J	0.066 J	0.041 J	0.12 J	0.048 J	0.097 J	0.44
Fluorene	30	100	0.36 U	0.36 U	0.36 U	0.39 U	0.37 U	0.38 U	0.024 J
Hexachlorobenzene	0.33	1.2	0.036 U	0.036 U	0.036 U	0.039 U	0.037 U	0.038 U	0.037 U
Hexachlorobutadiene	NS	NS	0.073 U	0.072 U	0.072 U	0.079 U	0.075 U	0.077 U	0.074 U
Hexachlorocyclopentadiene	NS	NS	0.36 U	0.36 U	0.36 U	0.39 U	0.37 U	0.38 U	0.37 U
Hexachloroethane	NS	NS	0.036 U	0.036 U	0.036 U	0.039 U	0.037 U	0.038 U	0.037 U
Indeno(1,2,3-c,d)Pyrene	0.5	0.5	0.036 UJ	0.02 J	0.036 UJ	0.11	0.042	0.044	0.15
Isophorone	NS	NS	0.15 U	0.14 U	0.14 U	0.16 U	0.15 U	0.15 U	0.15 U
Naphthalene	12	100	0.36 U	0.36 U	0.36 U	0.39 U	0.37 U	0.38 U	0.37 U
Nitrobenzene	NS	NS	0.036 U	0.036 U	0.036 U	0.039 U	0.037 U	0.038 U	0.037 U
N-Nitrosodi-N-Propylamine	NS	NS	0.036 U	0.036 U	0.036 U	0.039 U	0.037 U	0.038 U	0.037 U
N-Nitrosodiphenylamine	NS	NS	0.36 U	0.36 U	0.36 U	0.39 U	0.37 U	0.38 U	0.37 UJ
Pentachlorophenol	0.8	6.7	0.29 U	0.29 U	0.29 U	0.31 U	0.3 U	0.3 U	0.3 U
Phenanthrene	100	100	0.013 J	0.044 J	0.027 J	0.059 J	0.022 J	0.064 J	0.35 J
Phenol	0.33	100	0.36 U	0.36 U	0.36 U	0.39 U	0.37 U	0.38 U	0.37 U
Pyrene	100	100	0.027 J	0.066 J	0.039 J	0.09 J	0.041 J	0.084 J	0.35 J

Table 3
22-60 46th Street
Queens, New York
Post-Excavation Soil Endpoint Sample Analytical Results
Semivolatile Organic Compounds (SVOCs)

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			EP-15_20220509 460-257822-7 5/09/2022 mg/kg 1	EP-16_20220509 460-257822-8 5/09/2022 mg/kg 1	EP-17_20220509 460-257822-9 5/09/2022 mg/kg 1	EP-18_20220509 460-257822-10 5/09/2022 mg/kg 1	EP-19_20220509 460-257822-11 5/09/2022 mg/kg 1	EP-20_20220509 460-257822-12 5/09/2022 mg/kg 1	EP-21_20220509 460-257822-15 5/09/2022 mg/kg 1
Compound	NYSDEC UUSCO	NYSDEC RRSOC	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
1,2,4,5-Tetrachlorobenzene	NS	NS	0.37 U	0.36 U	0.35 U	0.36 U	0.37 U	0.36 U	0.38 U
1,4-Dioxane (P-Dioxane)	0.1	13	0.037 U	0.036 U	0.035 U	0.036 U	0.036 U	0.037 U	0.038 U
2,3,4,6-Tetrachlorophenol	NS	NS	0.37 U	0.36 U	0.35 U	0.36 U	0.36 U	0.37 U	0.38 U
2,4,5-Trichlorophenol	NS	NS	0.37 U	0.36 U	0.35 U	0.36 U	0.36 U	0.37 U	0.38 U
2,4,6-Trichlorophenol	NS	NS	0.15 U	0.15 U	0.14 U	0.15 U	0.14 U	0.15 U	0.15 U
2,4-Dichlorophenol	NS	NS	0.15 U	0.15 U	0.14 U	0.15 U	0.14 U	0.15 U	0.15 UJ
2,4-Dimethylphenol	NS	NS	0.37 U	0.36 U	0.35 U	0.36 U	0.36 U	0.37 U	0.38 U
2,4-Dinitrophenol	NS	NS	0.3 U	0.29 U	0.28 U	0.29 UJ	0.29 UJ	0.31 UJ	0.31 UJ
2,4-Dinitrotoluene	NS	NS	0.075 U	0.073 U	0.071 U	0.074 U	0.072 U	0.075 U	0.077 U
2,6-Dinitrotoluene	NS	NS	0.075 U	0.073 U	0.071 U	0.074 U	0.072 U	0.075 U	0.077 U
2-Chloronaphthalene	NS	NS	0.37 U	0.36 U	0.35 U	0.36 U	0.36 U	0.37 U	0.38 U
2-Chlorophenol	NS	NS	0.37 U	0.36 U	0.35 U	0.36 U	0.36 U	0.37 U	0.38 U
2-Methylnaphthalene	NS	NS	0.37 U	0.36 U	0.35 U	0.36 U	0.36 U	0.37 U	0.38 UJ
2-Methylphenol (O-Cresol)	0.33	100	0.37 U	0.36 U	0.35 U	0.36 U	0.36 U	0.37 U	0.38 U
2-Nitroaniline	NS	NS	0.37 U	0.36 U	0.35 U	0.36 U	0.36 U	0.37 U	0.38 U
2-Nitrophenol	NS	NS	0.37 U	0.36 U	0.35 U	0.36 U	0.36 U	0.37 U	0.38 UJ
3- And 4- Methylphenol (Total)	NS	NS	0.37 U	0.36 U	0.35 U	0.36 U	0.36 U	0.37 U	0.38 U
3,3'-Dichlorobenzidine	NS	NS	0.15 U	0.15 U	0.14 U	0.15 U	0.14 U	0.15 U	0.15 U
3-Nitroaniline	NS	NS	0.37 U	0.36 U	0.35 U	0.36 U	0.36 U	0.37 U	0.38 U
4,6-Dinitro-2-Methylphenol	NS	NS	0.3 U	0.29 U	0.28 U	0.29 UJ	0.29 UJ	0.31 UJ	0.31 UJ
4-Bromophenyl Phenyl Ether	NS	NS	0.37 U	0.36 U	0.35 U	0.36 U	0.36 U	0.37 U	0.38 U
4-Chloro-3-Methylphenol	NS	NS	0.37 U	0.36 U	0.35 U	0.36 U	0.36 U	0.37 U	0.38 U
4-Chloroaniline	NS	NS	0.37 U	0.36 U	0.35 U	0.36 U	0.36 U	0.37 U	0.38 U
4-Chlorophenyl Phenyl Ether	NS	NS	0.37 U	0.36 U	0.35 U	0.36 U	0.36 U	0.37 U	0.38 U
4-Methylphenol (P-Cresol)	0.33	100	0.37 U	0.36 U	0.35 U	0.36 U	0.36 U	0.37 U	0.38 U
4-Nitroaniline	NS	NS	0.37 U	0.36 U	0.35 U	0.36 U	0.36 U	0.37 U	0.38 U
4-Nitrophenol	NS	NS	0.75 U	0.73 U	0.71 U	0.74 U	0.72 U	0.75 U	0.77 U
Acenaphthene	20	100	0.37 U	0.36 U	0.35 U	0.36 U	0.36 U	0.37 U	0.38 U
Acenaphthylene	100	100	0.37 U	0.36 U	0.35 U	0.36 U	0.36 U	0.37 U	0.38 U
Acetophenone	NS	NS	0.37 U	0.36 U	0.35 U	0.36 U	0.36 U	0.37 U	0.38 U
Anthracene	100	100	0.37 U	0.022 J	0.35 U	0.024 J	0.36 U	0.017 J	0.056 J
Atrazine	NS	NS	0.15 U	0.15 U	0.14 U	0.15 U	0.14 U	0.15 U	0.15 UJ
Benzaldehyde	NS	NS	0.37 UJ	0.36 UJ	0.35 UJ	0.36 UJ	0.36 UJ	0.37 UJ	0.38 UJ
Benzo(a)Anthracene	1	1	0.037 U	0.053	0.013 J	0.069	0.025 J	0.047	0.16
Benzo(a)Pyrene	1	1	0.037 U	0.04	0.035 U	0.055	0.019 J	0.035 J	0.13
Benzo(b)Fluoranthene	1	1	0.037 U	0.052	0.035 U	0.071	0.025 J	0.044	0.17
Benzo(g,h,i)Perylene	100	100	0.37 U	0.011 J	0.35 U	0.036 J	0.013 J	0.023 J	0.078 J
Benzo(k)Fluoranthene	0.8	3.9	0.037 U	0.021 J	0.035 U	0.03 J	0.014 J	0.02 J	0.065
Benzyl Butyl Phthalate	NS	NS	0.37 U	0.36 U	0.35 U	0.36 U	0.36 U	0.37 U	0.38 UJ
Biphenyl (Diphenyl)	NS	NS	0.37 U	0.36 U	0.35 U	0.36 U	0.36 U	0.37 U	0.38 U
Bis(2-Chloroethoxy) Methane	NS	NS	0.37 U	0.36 U	0.35 U	0.36 U	0.36 U	0.37 U	0.38 U
Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether)	NS	NS	0.037 U	0.036 U	0.035 U	0.036 U	0.036 U	0.037 U	0.038 U
Bis(2-Chloroisopropyl) Ether	NS	NS	0.37 UJ	0.36 UJ	0.35 UJ	0.36 UJ	0.36 UJ	0.37 UJ	0.38 U
Bis(2-Ethylhexyl) Phthalate	NS	NS	0.37 U	0.36 U	0.35 U	0.36 U	0.36 U	0.032 J	0.38 UJ
Caprolactam	NS	NS	0.37 U	0.36 U	0.35 U	0.36 UJ	0.36 UJ	0.37 UJ	0.38 UJ
Carbazole	NS	NS	0.37 U	0.36 U	0.35 U	0.36 U	0.36 U	0.37 U	0.028 J
Chrysene	1	3.9	0.37 U	0.042 J	0.0064 J	0.064 J	0.021 J	0.042 J	0.17 J
Dibenz(a,h)Anthracene	0.33	0.33	0.037 U	0.036 U	0.035 U	0.036 U	0.036 U	0.037 U	0.03 J
Dibenzofuran	7	59	0.37 U	0.36 U	0.35 U	0.36 U	0.36 U	0.37 U	0.38 U
Diethyl Phthalate	NS	NS	0.37 U	0.36 U	0.35 U	0.36 U	0.36 U	0.37 U	0.38 U
Dimethyl Phthalate	NS	NS	0.37 U	0.36 U	0.35 U	0.36 U	0.36 U	0.37 U	0.38 U
Di-N-Butyl Phthalate	NS	NS	0.37 U	0.36 U	0.35 U	0.36 U	0.36 U	0.37 U	0.38 U
Di-N-Octylphthalate	NS	NS	0.37 U	0.36 U	0.35 U	0.36 U	0.36 U	0.37 U	0.38 UJ
Fluoranthene	100	100	0.37 U	0.1 J	0.015 J	0.12 J	0.033 J	0.083 J	0.3 J
Fluorene	30	100	0.37 U	0.36 U	0.35 U	0.36 U	0.36 U	0.011 J	0.011 J
Hexachlorobenzene	0.33	1.2	0.037 U	0.036 U	0.035 U	0.036 U	0.036 U	0.037 U	0.038 U
Hexachlorobutadiene	NS	NS	0.075 U	0.073 U	0.071 U	0.074 U	0.072 U	0.075 U	0.077 U
Hexachlorocyclopentadiene	NS	NS	0.37 U	0.36 U	0.35 U	0.36 U	0.36 U	0.37 U	0.38 UJ
Hexachloroethane	NS	NS	0.037 U	0.036 U	0.035 U	0.036 U	0.036 U	0.037 U	0.038 U
Indeno(1,2,3-c,d)Pyrene	0.5	0.5	0.027 J	0.047	0.035 U	0.039	0.015 J	0.026 J	0.15
Isophorone	NS	NS	0.15 U	0.15 U	0.14 U	0.15 U	0.14 U	0.15 U	0.15 U
Naphthalene	12	100	0.37 U	0.36 U	0.35 U	0.36 U	0.36 U	0.37 U	0.019 J
Nitrobenzene	NS	NS	0.037 U	0.036 U	0.035 U	0.036 U	0.036 U	0.037 U	0.038 U
N-Nitrosodi-N-Propylamine	NS	NS	0.037 U	0.036 U	0.035 U	0.036 U	0.036 U	0.037 U	0.038 U
N-Nitrosodiphenylamine	NS	NS	0.37 U	0.36 U	0.35 U	0.36 U	0.36 U	0.37 U	0.38 UJ
Pentachlorophenol	0.8	6.7	0.3 U	0.29 U	0.28 U	0.29 U	0.29 U	0.3 U	0.31 U
Phenanthrene	100	100	0.37 U	0.057 J	0.01 J	0.087 J	0.023 J	0.073 J	0.21 J
Phenol	0.33	100	0.37 U	0.36 U	0.35 U	0.36 U	0.36 U	0.37 U	0.38 U
Pyrene	100	100	0.37 U	0.084 J	0.012 J	0.13 J	0.04 J	0.089 J	0.31 J

Table 3
22-60 46th Street
Queens, New York
Post-Excavation Soil Endpoint Sample Analytical Results
Semivolatile Organic Compounds (SVOCs)

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			EP-22_20220509 460-257822-16 5/09/2022 mg/kg 1	EP22A_B_20220513 460-258122-11 5/13/2022 mg/kg 1	EP22A_E_20220513 460-258122-14 5/13/2022 mg/kg 1	EP22A_N_20220513 460-258122-12 5/13/2022 mg/kg 1	EP22A_S_20220513 460-258122-15 5/13/2022 mg/kg 1	EP22A_W_20220513 460-258122-13 5/13/2022 mg/kg 1	EP-23_20220509 460-257822-17 5/09/2022 mg/kg 1
Compound	NYSDEC UUSCO	NYSDEC RRSCO	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
1,2,4,5-Tetrachlorobenzene	NS	NS	0.43 U	0.35 U	0.35 U	0.37 U	0.35 U	0.4 U	0.38 U
1,4-Dioxane (P-Dioxane)	0.1	13	0.043 U	0.035 U	0.035 U	0.037 U	0.037 U	0.04 U	0.038 U
2,3,4,6-Tetrachlorophenol	NS	NS	0.43 U	0.35 U	0.35 U	0.37 U	0.37 U	0.4 U	0.38 U
2,4,5-Trichlorophenol	NS	NS	0.43 U	0.35 U	0.35 U	0.37 U	0.37 U	0.4 U	0.38 U
2,4,6-Trichlorophenol	NS	NS	0.17 U	0.14 U	0.14 U	0.15 U	0.15 U	0.16 U	0.15 U
2,4-Dichlorophenol	NS	NS	0.17 UJ	0.14 U	0.14 U	0.15 U	0.15 U	0.16 U	0.15 UJ
2,4-Dimethylphenol	NS	NS	0.43 U	0.35 U	0.35 U	0.37 U	0.37 U	0.4 U	0.38 U
2,4-Dinitrophenol	NS	NS	0.35 UJ	0.28 U	0.28 U	0.3 U	0.3 U	0.32 U	0.3 UJ
2,4-Dinitrotoluene	NS	NS	0.087 U	0.072 UJ	0.07 UJ	0.075 UJ	0.075 UJ	0.081 UJ	0.077 U
2,6-Dinitrotoluene	NS	NS	0.087 U	0.072 U	0.07 U	0.075 U	0.075 U	0.081 U	0.077 U
2-Chloronaphthalene	NS	NS	0.43 U	0.35 U	0.35 U	0.37 U	0.37 U	0.4 U	0.38 U
2-Chlorophenol	NS	NS	0.43 U	0.35 U	0.35 U	0.37 U	0.37 U	0.4 U	0.38 U
2-Methylnaphthalene	NS	NS	0.12 J	0.35 U	0.35 U	0.37 U	0.37 U	0.4 U	0.38 U
2-Methylphenol (O-Cresol)	0.33	100	0.43 U	0.35 U	0.35 U	0.37 U	0.37 U	0.4 U	0.38 U
2-Nitroaniline	NS	NS	0.43 U	0.35 U	0.35 U	0.37 U	0.37 U	0.4 U	0.38 U
2-Nitrophenol	NS	NS	0.43 UJ	0.35 U	0.35 U	0.37 U	0.37 U	0.4 U	0.38 UJ
3- And 4- Methylphenol (Total)	NS	NS	0.43 U	0.35 U	0.35 U	0.37 U	0.37 U	0.4 U	0.38 U
3,3'-Dichlorobenzidine	NS	NS	0.17 U	0.14 U	0.14 U	0.15 U	0.15 U	0.16 U	0.15 U
3-Nitroaniline	NS	NS	0.43 U	0.35 U	0.35 U	0.37 U	0.37 U	0.4 U	0.38 U
4,6-Dinitro-2-Methylphenol	NS	NS	0.35 UJ	0.28 UJ	0.28 UJ	0.3 UJ	0.3 UJ	0.32 UJ	0.3 UJ
4-Bromophenyl Phenyl Ether	NS	NS	0.43 U	0.35 U	0.35 U	0.37 U	0.37 U	0.4 U	0.38 U
4-Chloro-3-Methylphenol	NS	NS	0.43 U	0.35 U	0.35 U	0.37 U	0.37 U	0.4 U	0.38 U
4-Chloroaniline	NS	NS	0.43 U	0.35 U	0.35 U	0.37 U	0.37 U	0.4 U	0.38 U
4-Chlorophenyl Phenyl Ether	NS	NS	0.43 U	0.35 U	0.35 U	0.37 U	0.37 U	0.4 U	0.38 U
4-Methylphenol (P-Cresol)	0.33	100	0.43 U	0.35 U	0.35 U	0.37 U	0.37 U	0.4 U	0.38 U
4-Nitroaniline	NS	NS	0.43 U	0.35 U	0.35 U	0.37 U	0.37 U	0.4 U	0.38 U
4-Nitrophenol	NS	NS	0.87 U	0.72 U	0.7 U	0.75 U	0.75 U	0.81 U	0.77 U
Acenaphthene	20	100	0.46	0.35 U	0.35 U	0.37 U	0.37 U	0.4 U	0.38 U
Acenaphthylene	100	100	0.043 J	0.35 U	0.35 U	0.37 U	0.37 U	0.4 U	0.38 U
Acetophenone	NS	NS	0.43 U	0.35 U	0.35 U	0.37 U	0.37 U	0.4 U	0.38 U
Anthracene	100	100	1.4	0.35 U	0.35 U	0.37 U	0.015 J	0.018 J	0.022 J
Atrazine	NS	NS	0.17 UJ	0.14 U	0.14 U	0.15 U	0.15 U	0.16 U	0.15 UJ
Benzaldehyde	NS	NS	0.43 UJ	0.35 UJ	0.35 UJ	0.37 UJ	0.37 UJ	0.4 UJ	0.38 UJ
Benzo(a)Anthracene	1	1	2.1	0.028 J	0.024 J	0.029 J	0.06	0.05	0.097
Benzo(a)Pyrene	1	1	1.8	0.023 J	0.023 J	0.023 J	0.048	0.04	0.08
Benzo(b)Fluoranthene	1	1	2.4	0.027 J	0.025 J	0.028 J	0.058	0.052	0.12
Benzo(g,h,i)Perylene	100	100	0.98	0.014 J	0.013 J	0.014 J	0.034 J	0.025 J	0.047 J
Benzo(k)Fluoranthene	0.8	3.9	0.84	0.015 J	0.012 J	0.014 J	0.025 J	0.026 J	0.036 J
Benzyl Butyl Phthalate	NS	NS	0.43 UJ	0.35 U	0.35 U	0.37 U	0.37 U	0.4 U	0.38 UJ
Biphenyl (Diphenyl)	NS	NS	0.059 J	0.35 U	0.35 U	0.37 U	0.37 U	0.4 U	0.38 U
Bis(2-Chloroethoxy) Methane	NS	NS	0.43 U	0.35 U	0.35 U	0.37 U	0.37 U	0.4 U	0.38 U
Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether)	NS	NS	0.043 U	0.035 U	0.035 U	0.037 U	0.037 U	0.04 U	0.038 U
Bis(2-Chloroisopropyl) Ether	NS	NS	0.43 U	0.35 UJ	0.35 UJ	0.37 UJ	0.37 UJ	0.4 UJ	0.38 U
Bis(2-Ethylhexyl) Phthalate	NS	NS	0.43 UJ	0.35 U	0.35 U	0.37 U	0.37 U	0.4 U	0.024 J
Caprolactam	NS	NS	0.43 UJ	0.35 U	0.35 U	0.37 U	0.37 U	0.4 U	0.38 UJ
Carbazole	NS	NS	0.48	0.35 U	0.35 U	0.37 U	0.37 U	0.4 U	0.38 U
Chrysene	1	3.9	1.7	0.026 J	0.022 J	0.027 J	0.06 J	0.053 J	0.08 J
Dibenz(a,h)Anthracene	0.33	0.33	0.22	0.035 U	0.035 U	0.037 U	0.037 U	0.04 U	0.029 J
Dibenzofuran	7	59	0.43	0.35 U	0.35 U	0.37 U	0.37 U	0.4 U	0.38 U
Diethyl Phthalate	NS	NS	0.43 U	0.35 U	0.35 U	0.37 U	0.37 U	0.4 U	0.38 U
Dimethyl Phthalate	NS	NS	0.43 U	0.35 U	0.35 U	0.37 U	0.37 U	0.4 U	0.38 U
Di-N-Butyl Phthalate	NS	NS	0.019 J	0.35 U	0.35 U	0.37 U	0.37 U	0.4 U	0.38 U
Di-N-Octylphthalate	NS	NS	0.43 UJ	0.35 U	0.35 U	0.37 U	0.37 U	0.4 U	0.38 UJ
Fluoranthene	100	100	6.5	0.039 J	0.038 J	0.042 J	0.12 J	0.12 J	0.17 J
Fluorene	30	100	0.63	0.35 U	0.35 U	0.37 U	0.37 U	0.4 U	0.38 U
Hexachlorobenzene	0.33	1.2	0.043 U	0.035 U	0.035 U	0.037 U	0.037 U	0.04 U	0.038 U
Hexachlorobutadiene	NS	NS	0.087 U	0.072 U	0.07 U	0.075 U	0.075 U	0.081 U	0.077 U
Hexachlorocyclopentadiene	NS	NS	0.43 UJ	0.35 U	0.35 U	0.37 U	0.37 U	0.4 U	0.38 UJ
Hexachloroethane	NS	NS	0.043 U	0.035 U	0.035 U	0.037 U	0.037 U	0.04 U	0.038 U
Indeno(1,2,3-c,d)Pyrene	0.5	0.5	1.3	0.015 J	0.035 UJ	0.015 J	0.036 J	0.027 J	0.082
Isophorone	NS	NS	0.17 U	0.14 U	0.14 U	0.15 U	0.15 U	0.16 U	0.15 U
Naphthalene	12	100	0.17 J	0.0087 J	0.35 U	0.01 J	0.37 U	0.013 J	0.38 U
Nitrobenzene	NS	NS	0.043 U	0.035 U	0.035 U	0.037 U	0.037 U	0.04 U	0.038 U
N-Nitrosodi-N-Propylamine	NS	NS	0.043 U	0.035 U	0.035 U	0.037 U	0.037 U	0.04 U	0.038 U
N-Nitrosodiphenylamine	NS	NS	0.43 UJ	0.35 U	0.35 U	0.37 U	0.37 U	0.4 U	0.38 UJ
Pentachlorophenol	0.8	6.7	0.35 UJ	0.28 U	0.28 U	0.3 U	0.3 U	0.32 U	0.3 U
Phenanthrene	100	100	6.8	0.022 J	0.026 J	0.031 J	0.063 J	0.067 J	0.086 J
Phenol	0.33	100	0.43 U	0.35 U	0.35 U	0.37 U	0.37 U	0.4 U	0.38 U
Pyrene	100	100	4.6 J	0.039 J	0.04 J	0.045 J	0.12 J	0.095 J	0.15 J

Table 3
22-60 46th Street
Queens, New York
Post-Excavation Soil Endpoint Sample Analytical Results
Semivolatile Organic Compounds (SVOCs)

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			EP-24_20220509 460-257822-18 5/09/2022 mg/kg 1	EP-25_20220509 460-257822-19 5/09/2022 mg/kg 1	EP-26_20220513 460-258122-1 5/13/2022 mg/kg 1	EP-X03_20220513 460-258122-2 5/13/2022 mg/kg 1	EP-27_20220513 460-258122-8 5/13/2022 mg/kg 1	EP-28_20220513 460-258122-9 5/13/2022 mg/kg 1	EP-29_20220701 460-261267-1 7/01/2022 mg/kg 1
Compound	NYSDEC UUSCO	NYSDEC RRSOC	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
1,2,4,5-Tetrachlorobenzene	NS	NS	0.38 U	0.38 U	0.39 U	0.39 U	0.36 U	0.41 U	0.35 U
1,4-Dioxane (P-Dioxane)	0.1	13	0.038 U	0.038 U	0.039 U	0.037 U	0.036 U	0.041 U	0.035 U
2,3,4,6-Tetrachlorophenol	NS	NS	0.38 U	0.38 U	0.39 U	0.37 U	0.36 U	0.41 U	0.35 U
2,4,5-Trichlorophenol	NS	NS	0.38 U	0.38 U	0.39 U	0.37 U	0.36 U	0.41 U	0.35 U
2,4,6-Trichlorophenol	NS	NS	0.15 U	0.15 U	0.16 U	0.15 U	0.14 U	0.16 U	0.14 U
2,4-Dichlorophenol	NS	NS	0.15 UJ	0.15 UJ	0.16 U	0.15 U	0.14 U	0.16 U	0.14 U
2,4-Dimethylphenol	NS	NS	0.38 U	0.38 U	0.39 U	0.37 U	0.36 U	0.41 U	0.35 U
2,4-Dinitrophenol	NS	NS	0.31 UJ	0.3 UJ	0.32 U	0.3 U	0.29 U	0.33 U	0.28 U
2,4-Dinitrotoluene	NS	NS	0.077 U	0.076 U	0.08 UJ	0.075 UJ	0.073 UJ	0.083 UJ	0.071 UJ
2,6-Dinitrotoluene	NS	NS	0.077 U	0.076 U	0.08 U	0.075 U	0.073 U	0.083 U	0.071 U
2-Chloronaphthalene	NS	NS	0.38 U	0.38 U	0.39 U	0.37 U	0.36 U	0.41 U	0.35 U
2-Chlorophenol	NS	NS	0.38 U	0.38 U	0.39 U	0.37 U	0.36 U	0.41 U	0.35 U
2-Methylnaphthalene	NS	NS	0.38 U	0.38 U	0.39 U	0.37 U	0.36 U	0.41 U	0.35 U
2-Methylphenol (O-Cresol)	0.33	100	0.38 U	0.38 U	0.39 U	0.37 U	0.36 U	0.41 U	0.35 U
2-Nitroaniline	NS	NS	0.38 U	0.38 U	0.39 U	0.37 U	0.36 U	0.41 U	0.35 UJ
2-Nitrophenol	NS	NS	0.38 UJ	0.38 UJ	0.39 U	0.37 U	0.36 U	0.41 U	0.35 UJ
3- And 4- Methylphenol (Total)	NS	NS	0.38 U	0.38 U	0.39 U	0.37 U	0.36 U	0.41 U	0.35 U
3,3'-Dichlorobenzidine	NS	NS	0.15 U	0.15 U	0.16 U	0.15 U	0.14 U	0.16 U	0.14 U
3-Nitroaniline	NS	NS	0.38 U	0.38 U	0.39 U	0.37 U	0.36 U	0.41 U	0.35 U
4,6-Dinitro-2-Methylphenol	NS	NS	0.31 UJ	0.3 UJ	0.32 UJ	0.3 UJ	0.29 UJ	0.33 UJ	0.28 UJ
4-Bromophenyl Phenyl Ether	NS	NS	0.38 U	0.38 U	0.39 U	0.37 U	0.36 U	0.41 U	0.35 U
4-Chloro-3-Methylphenol	NS	NS	0.38 U	0.38 U	0.39 U	0.37 U	0.36 U	0.41 U	0.35 U
4-Chloroaniline	NS	NS	0.38 U	0.38 U	0.39 U	0.37 U	0.36 U	0.41 U	0.35 U
4-Chlorophenyl Phenyl Ether	NS	NS	0.38 U	0.38 U	0.39 U	0.37 U	0.36 U	0.41 U	0.35 U
4-Methylphenol (P-Cresol)	0.33	100	0.38 U	0.38 U	0.39 U	0.37 U	0.36 U	0.41 U	0.35 U
4-Nitroaniline	NS	NS	0.38 U	0.38 U	0.39 U	0.37 U	0.36 U	0.41 U	0.35 U
4-Nitrophenol	NS	NS	0.77 U	0.76 U	0.8 U	0.75 U	0.73 U	0.83 U	0.71 UJ
Acenaphthene	20	100	0.38 U	0.38 U	0.39 U	0.37 U	0.36 U	0.41 U	0.35 U
Acenaphthylene	100	100	0.38 U	0.38 U	0.39 U	0.37 U	0.36 U	0.41 U	0.35 U
Acetophenone	NS	NS	0.38 U	0.38 U	0.39 U	0.37 U	0.36 U	0.41 U	0.35 U
Anthracene	100	100	0.023 J	0.019 J	0.39 U	0.37 U	0.36 U	0.019 J	0.35 U
Atrazine	NS	NS	0.15 UJ	0.15 UJ	0.16 U	0.15 U	0.14 U	0.16 U	0.14 U
Benzaldehyde	NS	NS	0.38 UJ	0.38 UJ	0.39 UJ	0.37 UJ	0.36 UJ	0.41 UJ	0.35 UJ
Benzo(a)Anthracene	1	1	0.065	0.067	0.016 J	0.016 J	0.025 J	0.055	0.024 J
Benzo(a)Pyrene	1	1	0.048	0.049	0.013 J	0.012 J	0.022 J	0.043	0.016 J
Benzo(b)Fluoranthene	1	1	0.076	0.065	0.016 J	0.011 J	0.025 J	0.059	0.021 J
Benzo(g,h,i)Perylene	100	100	0.023 J	0.025 J	0.39 U	0.37 U	0.014 J	0.024 J	0.35 U
Benzo(k)Fluoranthene	0.8	3.9	0.029 J	0.033 J	0.039 U	0.037 U	0.012 J	0.021 J	0.0097 J
Benzyl Butyl Phthalate	NS	NS	0.38 UJ	0.38 UJ	0.39 U	0.37 U	0.36 U	0.41 U	0.35 U
Biphenyl (Diphenyl)	NS	NS	0.38 U	0.38 U	0.39 U	0.37 U	0.36 U	0.41 U	0.35 U
Bis(2-Chloroethoxy) Methane	NS	NS	0.38 U	0.38 U	0.39 U	0.37 U	0.36 U	0.41 U	0.35 U
Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether)	NS	NS	0.038 U	0.038 U	0.039 U	0.037 U	0.036 U	0.041 U	0.035 U
Bis(2-Chloroisopropyl) Ether	NS	NS	0.38 U	0.38 U	0.39 UJ	0.37 UJ	0.36 UJ	0.41 UJ	0.35 UJ
Bis(2-Ethylhexyl) Phthalate	NS	NS	0.38 UJ	0.38 UJ	0.39 U	0.37 U	0.36 U	0.41 U	0.35 U
Caprolactam	NS	NS	0.38 UJ	0.38 UJ	0.39 U	0.37 U	0.36 U	0.41 U	0.35 U
Carbazole	NS	NS	0.38 U	0.38 U	0.39 U	0.37 U	0.36 U	0.41 U	0.35 U
Chrysene	1	3.9	0.053 J	0.052 J	0.0097 J	0.014 J	0.024 J	0.052 J	0.02 J
Dibenz(a,h)Anthracene	0.33	0.33	0.038 U	0.023 J	0.039 U	0.037 U	0.036 U	0.041 U	0.035 U
Dibenzofuran	7	59	0.38 U	0.38 U	0.39 U	0.37 U	0.36 U	0.41 U	0.35 U
Diethyl Phthalate	NS	NS	0.38 U	0.38 U	0.39 U	0.37 U	0.36 U	0.41 U	0.35 U
Dimethyl Phthalate	NS	NS	0.38 U	0.38 U	0.39 U	0.37 U	0.36 U	0.41 U	0.35 U
Di-N-Butyl Phthalate	NS	NS	0.38 U	0.38 U	0.39 U	0.37 U	0.36 U	0.41 U	0.35 U
Di-N-Octylphthalate	NS	NS	0.38 UJ	0.38 UJ	0.39 U	0.37 U	0.36 U	0.41 U	0.35 UJ
Fluoranthene	100	100	0.12 J	0.12 J	0.019 J	0.023 J	0.038 J	0.11 J	0.041 J
Fluorene	30	100	0.38 U	0.38 U	0.39 U	0.37 U	0.36 U	0.41 U	0.35 U
Hexachlorobenzene	0.33	1.2	0.038 U	0.038 U	0.039 U	0.037 U	0.036 U	0.041 U	0.035 U
Hexachlorobutadiene	NS	NS	0.077 U	0.076 U	0.08 U	0.075 U	0.073 U	0.083 U	0.071 U
Hexachlorocyclopentadiene	NS	NS	0.38 UJ	0.38 UJ	0.39 U	0.37 U	0.36 U	0.41 U	0.35 U
Hexachloroethane	NS	NS	0.038 U	0.038 U	0.039 U	0.037 U	0.036 U	0.041 U	0.035 U
Indeno(1,2,3-c,d)Pyrene	0.5	0.5	0.062	0.067	0.039 UJ	0.037 UJ	0.016 J	0.032 J	0.035 U
Isophorone	NS	NS	0.15 U	0.15 U	0.16 U	0.15 U	0.14 U	0.16 U	0.14 U
Naphthalene	12	100	0.0078 J	0.38 U	0.39 U	0.37 U	0.0095 J	0.018 J	0.35 U
Nitrobenzene	NS	NS	0.038 U	0.038 U	0.039 U	0.037 U	0.036 U	0.041 U	0.035 U
N-Nitrosodi-N-Propylamine	NS	NS	0.038 U	0.038 U	0.039 U	0.037 U	0.036 U	0.041 U	0.035 U
N-Nitrosodiphenylamine	NS	NS	0.38 UJ	0.38 UJ	0.39 U	0.37 U	0.36 U	0.41 U	0.35 U
Pentachlorophenol	0.8	6.7	0.31 U	0.3 U	0.32 U	0.3 U	0.29 U	0.33 U	0.28 U
Phenanthrene	100	100	0.089 J	0.072 J	0.011 J	0.022 J	0.025 J	0.077 J	0.035 J
Phenol	0.33	100	0.38 U	0.38 U	0.39 U	0.37 U	0.36 U	0.41 U	0.35 UJ
Pyrene	100	100	0.099 J	0.1 J	0.02 J	0.022 J	0.041 J	0.094 J	0.039 J

Table 3
22-60 46th Street
Queens, New York
Post-Excavation Soil Endpoint Sample Analytical Results
Semivolatile Organic Compounds (SVOCs)

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			EP-X04_20220701 460-261267-2 7/01/2022 mg/kg 1	EP-30_20220701 460-261267-3 7/01/2022 mg/kg 1	EP-31_20220727 460-262709-1 7/27/2022 mg/kg 1	EP-X05_20220727 460-262709-2 7/27/2022 mg/kg 1	EP-32_20220727 460-262709-3 7/27/2022 mg/kg 1	EP-33_20220811 460-263713-1 8/11/2022 mg/kg 1	EP-X06_20220811 460-263713-2 8/11/2022 mg/kg 1
Compound	NYSDEC UUSCO	NYSDEC RRSOC	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
1,2,4,5-Tetrachlorobenzene	NS	NS	0.35 U	0.35 U	0.35 U	0.35 U	0.37 U	0.37 U	0.38 U
1,4-Dioxane (P-Dioxane)	0.1	13	0.035 U	0.036 U	0.035 U	0.036 U	0.037 U	0.037 U	0.038 U
2,3,4,6-Tetrachlorophenol	NS	NS	0.35 U	0.36 U	0.35 U	0.36 U	0.37 U	0.37 U	0.38 U
2,4,5-Trichlorophenol	NS	NS	0.35 U	0.36 U	0.35 U	0.36 U	0.37 U	0.37 U	0.38 U
2,4,6-Trichlorophenol	NS	NS	0.14 U	0.15 U	0.14 U	0.14 U	0.15 U	0.15 U	0.15 U
2,4-Dichlorophenol	NS	NS	0.14 U	0.15 U	0.14 U	0.14 U	0.15 U	0.15 U	0.15 U
2,4-Dimethylphenol	NS	NS	0.35 U	0.36 U	0.35 U	0.36 U	0.37 U	0.37 U	0.38 U
2,4-Dinitrophenol	NS	NS	0.28 U	0.29 U	0.28 U	0.29 U	0.3 U	0.31 U	0.31 U
2,4-Dinitrotoluene	NS	NS	0.072 UJ	0.074 UJ	0.072 U	0.072 U	0.074 U	0.076 U	0.077 U
2,6-Dinitrotoluene	NS	NS	0.072 U	0.074 U	0.072 U	0.072 U	0.074 U	0.076 U	0.077 U
2-Chloronaphthalene	NS	NS	0.35 U	0.36 U	0.35 U	0.36 U	0.37 U	0.37 U	0.38 U
2-Chlorophenol	NS	NS	0.35 U	0.36 U	0.35 U	0.36 U	0.37 U	0.37 U	0.38 U
2-Methylnaphthalene	NS	NS	0.35 U	0.36 U	0.35 U	0.36 U	0.37 U	0.37 U	0.38 U
2-Methylphenol (O-Cresol)	0.33	100	0.35 U	0.36 U	0.35 U	0.36 U	0.37 U	0.37 U	0.38 U
2-Nitroaniline	NS	NS	0.35 UJ	0.36 UJ	0.35 U	0.36 U	0.37 U	0.37 U	0.38 U
2-Nitrophenol	NS	NS	0.35 UJ	0.36 UJ	0.35 U	0.36 U	0.37 U	0.37 U	0.38 U
3- And 4- Methylphenol (Total)	NS	NS	0.35 U	0.36 U	0.35 U	0.36 U	0.37 U	0.37 U	0.38 U
3,3'-Dichlorobenzidine	NS	NS	0.14 U	0.15 U	0.14 U	0.14 U	0.15 U	0.15 U	0.15 U
3-Nitroaniline	NS	NS	0.35 U	0.36 U	0.35 U	0.36 U	0.37 U	0.37 U	0.38 U
4,6-Dinitro-2-Methylphenol	NS	NS	0.28 UJ	0.29 UJ	0.28 U	0.29 U	0.3 U	0.31 U	0.31 U
4-Bromophenyl Phenyl Ether	NS	NS	0.35 U	0.36 U	0.35 U	0.36 U	0.37 U	0.37 U	0.38 U
4-Chloro-3-Methylphenol	NS	NS	0.35 U	0.36 U	0.35 U	0.36 U	0.37 U	0.37 U	0.38 U
4-Chloroaniline	NS	NS	0.35 U	0.36 U	0.35 U	0.36 U	0.37 U	0.37 U	0.38 U
4-Chlorophenyl Phenyl Ether	NS	NS	0.35 U	0.36 U	0.35 U	0.36 U	0.37 U	0.37 U	0.38 U
4-Methylphenol (P-Cresol)	0.33	100	0.35 U	0.36 U	0.35 U	0.36 U	0.37 U	0.37 U	0.38 U
4-Nitroaniline	NS	NS	0.35 U	0.36 U	0.35 U	0.36 U	0.37 U	0.37 U	0.38 U
4-Nitrophenol	NS	NS	0.72 UJ	0.74 UJ	0.72 U	0.72 U	0.74 U	0.76 U	0.77 U
Acenaphthene	20	100	0.35 U	0.36 U	0.35 U	0.36 U	0.37 U	0.37 U	0.013 J
Acenaphthylene	100	100	0.35 U	0.36 U	0.35 U	0.36 U	0.37 U	0.37 U	0.38 U
Acetophenone	NS	NS	0.35 U	0.36 U	0.35 U	0.36 U	0.37 U	0.37 U	0.38 U
Anthracene	100	100	0.35 U	0.36 U	0.35 U	0.36 U	0.37 U	0.37 U	0.035 J
Atrazine	NS	NS	0.14 U	0.15 U	0.14 UT	0.14 UT	0.15 UT	0.15 UT	0.15 UT
Benzaldehyde	NS	NS	0.35 UJ	0.36 UJ	0.35 U	0.36 U	0.37 U	0.37 U	0.38 U
Benzo(a)Anthracene	1	1	0.035 U	0.023 J	0.035 U	0.021 J	0.054	0.014 J	0.024 J
Benzo(a)Pyrene	1	1	0.035 U	0.014 J	0.035 U	0.036 U	0.043	0.037 U	0.012 J
Benzo(b)Fluoranthene	1	1	0.035 U	0.016 J	0.035 U	0.014 J	0.053	0.037 U	0.016 J
Benzo(g,h,i)Perylene	100	100	0.35 U	0.36 U	0.35 U	0.36 U	0.021 J	0.37 U	0.38 U
Benzo(k)Fluoranthene	0.8	3.9	0.035 U	0.036 U	0.035 U	0.036 U	0.022 J	0.037 U	0.038 U
Benzyl Butyl Phthalate	NS	NS	0.35 U	0.36 U	0.35 U	0.36 U	0.37 U	0.37 U	0.38 U
Biphenyl (Diphenyl)	NS	NS	0.35 U	0.36 U	0.35 U	0.36 U	0.37 U	0.37 U	0.38 U
Bis(2-Chloroethoxy) Methane	NS	NS	0.35 U	0.36 U	0.35 U	0.36 U	0.37 U	0.37 U	0.38 U
Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether)	NS	NS	0.035 U	0.036 U	0.035 U	0.036 U	0.037 U	0.037 U	0.038 U
Bis(2-Chloroisopropyl) Ether	NS	NS	0.35 UJ	0.36 UJ	0.35 U	0.36 U	0.37 U	0.37 U	0.38 U
Bis(2-Ethylhexyl) Phthalate	NS	NS	0.35 U	0.36 U	0.35 U	0.36 U	0.37 U	0.14 J	0.24 J
Caprolactam	NS	NS	0.35 U	0.36 U	0.35 UT	0.36 UT	0.37 UT	0.37 UT	0.38 UT
Carbazole	NS	NS	0.35 U	0.36 U	0.35 U	0.36 U	0.37 U	0.37 U	0.38 U
Chrysene	1	3.9	0.0072 J	0.014 J	0.35 U	0.014 J	0.06 J	0.0076 J	0.014 J
Dibenz(a,h)Anthracene	0.33	0.33	0.035 U	0.036 U	0.035 U	0.036 U	0.037 U	0.037 U	0.038 U
Dibenzofuran	7	59	0.35 U	0.36 U	0.35 U	0.36 U	0.37 U	0.37 U	0.013 J
Diethyl Phthalate	NS	NS	0.35 U	0.36 U	0.35 U	0.36 U	0.37 U	0.37 U	0.38 U
Dimethyl Phthalate	NS	NS	0.35 U	0.36 U	0.35 U	0.36 U	0.37 U	0.37 U	0.38 U
Di-N-Butyl Phthalate	NS	NS	0.35 U	0.36 U	0.35 U	0.36 U	0.37 U	0.37 U	0.38 U
Di-N-Octylphthalate	NS	NS	0.35 UJ	0.36 UJ	0.35 U	0.36 U	0.37 U	0.37 U	0.38 U
Fluoranthene	100	100	0.35 U	0.03 J	0.35 U	0.021 J	0.12 J	0.014 J	0.046 J
Fluorene	30	100	0.35 U	0.36 U	0.35 U	0.011 J	0.37 U	0.039 J	0.039 J
Hexachlorobenzene	0.33	1.2	0.035 U	0.036 U	0.035 U	0.036 U	0.037 U	0.037 U	0.038 U
Hexachlorobutadiene	NS	NS	0.072 U	0.074 U	0.072 U	0.072 U	0.074 U	0.076 U	0.077 U
Hexachlorocyclopentadiene	NS	NS	0.35 U	0.36 U	0.35 U	0.36 U	0.37 U	0.37 U	0.38 U
Hexachloroethane	NS	NS	0.035 U	0.036 U	0.035 U	0.036 U	0.037 U	0.037 U	0.038 U
Indeno(1,2,3-c,d)Pyrene	0.5	0.5	0.035 U	0.036 U	0.035 U	0.036 U	0.06	0.037 U	0.049
Isophorone	NS	NS	0.14 U	0.15 U	0.14 U	0.14 U	0.15 U	0.15 U	0.15 U
Naphthalene	12	100	0.35 U	0.36 U	0.35 U	0.36 U	0.37 U	0.37 U	0.014 J
Nitrobenzene	NS	NS	0.035 U	0.036 U	0.035 U	0.036 U	0.037 U	0.037 U	0.038 U
N-Nitrosodi-N-Propylamine	NS	NS	0.035 U	0.036 U	0.035 U	0.036 U	0.037 U	0.037 U	0.038 U
N-Nitrosodiphenylamine	NS	NS	0.35 U	0.36 U	0.35 U	0.36 U	0.37 U	0.37 U	0.38 U
Pentachlorophenol	0.8	6.7	0.28 U	0.29 U	0.28 U	0.29 U	0.3 U	0.31 U	0.31 U
Phenanthrene	100	100	0.35 U	0.027 J	0.35 U	0.36 U	0.13 J	0.016 J	0.074 J
Phenol	0.33	100	0.35 UJ	0.36 UJ	0.35 U	0.36 U	0.37 U	0.37 U	0.38 U
Pyrene	100	100	0.011 J	0.028 J	0.35 U	0.018 J	0.11 J	0.013 J	0.037 J

Table 3
22-60 46th Street
Queens, New York
Post-Excavation Soil Endpoint Sample Analytical Results
Semivolatile Organic Compounds (SVOCs)

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			EP-34_20220811 460-263713-3 8/11/2022 mg/kg 1	EP-35_20220830 460-264635-1 8/30/2022 mg/kg 1	EP-X07_20220830 460-264635-2 8/30/2022 mg/kg 1	EP-36_20220830 460-264635-3 8/30/2022 mg/kg 1	FB-01_20220425 460-256948-7 4/25/2022 µg/L 1	FB-01_20220425 460-256954-10 4/25/2022 µg/L 1	FB-01_20220509 460-257822-13 5/09/2022 µg/L 1
Compound	NYSDEC UUSCO	NYSDEC RRSOC	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
1,2,4,5-Tetrachlorobenzene	NS	NS	0.37 U	0.34 U	0.36 U	0.35 U	10 U	10 U	10 U
1,4-Dioxane (P-Dioxane)	0.1	13	0.037 U	0.034 U	0.036 U	0.035 U	10 U	0.2 U	0.2 U
2,3,4,6-Tetrachlorophenol	NS	NS	0.37 U	0.34 U	0.36 U	0.35 U	10 U	10 U	10 U
2,4,5-Trichlorophenol	NS	NS	0.37 U	0.34 U	0.36 U	0.35 U	10 U	10 U	10 U
2,4,6-Trichlorophenol	NS	NS	0.15 U	0.14 U	0.14 U	0.14 U	10 U	10 U	10 U
2,4-Dichlorophenol	NS	NS	0.15 U	0.14 U	0.14 U	0.14 U	10 U	10 U	10 U
2,4-Dimethylphenol	NS	NS	0.37 U	0.34 U	0.36 U	0.35 U	10 U	10 U	10 U
2,4-Dinitrophenol	NS	NS	0.29 U	0.28 U	0.29 U	0.28 U	20 UJ	20 UJ	20 U
2,4-Dinitrotoluene	NS	NS	0.074 U	0.069 U	0.073 U	0.071 U	2 U	2 U	2 U
2,6-Dinitrotoluene	NS	NS	0.074 U	0.069 U	0.073 U	0.071 U	2 U	2 U	2 U
2-Chloronaphthalene	NS	NS	0.37 U	0.34 U	0.36 U	0.35 U	10 U	10 U	10 U
2-Chlorophenol	NS	NS	0.37 U	0.34 U	0.36 U	0.35 U	10 U	10 U	10 U
2-Methylnaphthalene	NS	NS	0.093 J	0.34 U	0.011 J	0.35 U	10 U	10 U	10 U
2-Methylphenol (O-Cresol)	0.33	100	0.37 U	0.34 U	0.36 U	0.35 U	10 U	10 U	10 U
2-Nitroaniline	NS	NS	0.37 U	0.34 U	0.36 U	0.35 U	10 U	10 U	10 U
2-Nitrophenol	NS	NS	0.37 U	0.34 U	0.36 U	0.35 U	10 U	10 U	10 U
3- And 4- Methylphenol (Total)	NS	NS	0.37 U	0.34 U	0.36 U	0.35 U	NR	10 U	10 U
3,3'-Dichlorobenzidine	NS	NS	0.15 U	0.14 U	0.14 U	0.14 U	10 U	10 U	10 U
3-Nitroaniline	NS	NS	0.37 U	0.34 U	0.36 U	0.35 U	10 U	10 U	10 U
4,6-Dinitro-2-Methylphenol	NS	NS	0.29 U	0.28 U	0.29 U	0.28 U	20 U	20 U	20 U
4-Bromophenyl Phenyl Ether	NS	NS	0.37 U	0.34 U	0.36 U	0.35 U	10 U	10 U	10 U
4-Chloro-3-Methylphenol	NS	NS	0.37 U	0.34 U	0.36 U	0.35 U	10 U	10 U	10 U
4-Chloroaniline	NS	NS	0.37 U	0.34 U	0.36 U	0.35 U	10 U	10 U	10 U
4-Chlorophenyl Phenyl Ether	NS	NS	0.37 U	0.34 U	0.36 U	0.35 U	10 U	10 U	10 U
4-Methylphenol (P-Cresol)	0.33	100	0.37 U	0.34 U	0.36 U	0.35 U	10 U	10 U	10 U
4-Nitroaniline	NS	NS	0.37 U	0.34 U	0.36 U	0.35 U	10 U	10 U	10 U
4-Nitrophenol	NS	NS	0.74 U	0.69 U	0.73 U	0.71 U	20 UJ	20 UJ	20 U
Acenaphthene	20	100	0.051 J	0.035 J	0.074 J	0.017 J	10 U	10 U	10 U
Acenaphthylene	100	100	0.011 J	0.34 U	0.36 U	0.35 U	10 U	10 U	10 U
Acetophenone	NS	NS	0.37 U	0.34 U	0.36 U	0.35 U	10 U	10 U	10 U
Anthracene	100	100	0.074 J	0.078 J	0.2 J	0.035 J	10 U	10 U	10 U
Atrazine	NS	NS	0.15 UT	0.14 U	0.14 U	0.14 U	2 U	2 U	2 UJ
Benzaldehyde	NS	NS	0.37 U	0.34 U	0.36 U	0.35 U	10 UJ	10 UJ	10 UJ
Benzo(a)Anthracene	1	1	0.063	0.19	0.65	0.09	1 U	1 U	1 U
Benzo(a)Pyrene	1	1	0.044	0.16	0.57	0.073	1 U	1 U	1 U
Benzo(b)Fluoranthene	1	1	0.067	0.22	0.78	0.1	2 U	2 U	2 U
Benzo(g,h,i)Perylene	100	100	0.024 J	0.11 J	0.42	0.046 J	10 U	10 U	10 U
Benzo(k)Fluoranthene	0.8	3.9	0.027 J	0.1	0.35	0.041	1 U	1 UJ	1 U
Benzyl Butyl Phthalate	NS	NS	0.37 U	0.029 J	0.062 J	0.35 U	10 UJ	10 UJ	10 U
Biphenyl (Diphenyl)	NS	NS	0.028 J	0.34 U	0.36 U	0.35 U	10 U	10 U	10 U
Bis(2-Chloroethoxy) Methane	NS	NS	0.37 U	0.34 U	0.36 U	0.35 U	10 U	10 U	10 U
Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether)	NS	NS	0.037 U	0.034 U	0.036 U	0.035 U	1 U	1 U	1 U
Bis(2-Chloroisopropyl) Ether	NS	NS	0.37 U	0.34 U	0.36 U	0.35 U	10 U	10 U	10 U
Bis(2-Ethylhexyl) Phthalate	NS	NS	0.47	0.019 J	0.042 J	0.35 U	2 UJ	2 UJ	2 UJ
Caprolactam	NS	NS	0.37 UT	0.34 U	0.36 U	0.35 U	10 U	10 U	10 U
Carbazole	NS	NS	0.021 J	0.03 J	0.13 J	0.023 J	10 U	10 U	10 U
Chrysene	1	3.9	0.063 J	0.18 J	0.64	0.083 J	2 U	2 U	2 U
Dibenz(a,h)Anthracene	0.33	0.33	0.037 U	0.016 J	0.06	0.035 U	1 U	1 U	1 U
Dibenzofuran	7	59	0.047 J	0.016 J	0.039 J	0.35 U	10 U	10 U	10 U
Diethyl Phthalate	NS	NS	0.37 U	0.34 U	0.36 U	0.35 U	10 U	10 U	10 U
Dimethyl Phthalate	NS	NS	0.37 U	0.34 U	0.36 U	0.35 U	10 U	10 U	10 U
Di-N-Butyl Phthalate	NS	NS	0.37 U	0.34 U	0.36 U	0.35 U	10 U	10 U	10 U
Di-N-Octylphthalate	NS	NS	0.37 U	0.34 U	0.36 U	0.35 U	10 UJ	10 UJ	10 U
Fluoranthene	100	100	0.14 J	0.38	1.4	0.19 J	10 U	10 U	10 U
Fluorene	30	100	0.082 J	0.025 J	0.056 J	0.014 J	10 U	10 U	10 U
Hexachlorobenzene	0.33	1.2	0.037 U	0.034 U	0.036 U	0.035 U	1 UJ	1 UJ	1 U
Hexachlorobutadiene	NS	NS	0.074 U	0.069 U	0.073 U	0.071 U	1 U	1 U	1 U
Hexachlorocyclopentadiene	NS	NS	0.37 U	0.34 U	0.36 U	0.35 U	10 U	10 U	10 U
Hexachloroethane	NS	NS	0.037 U	0.034 U	0.036 U	0.035 U	2 U	2 U	2 U
Indeno(1,2,3-c,d)Pyrene	0.5	0.5	0.071	0.17	0.54	0.094	2 U	2 U	2 U
Isophorone	NS	NS	0.15 U	0.14 U	0.14 U	0.14 U	10 U	10 U	10 U
Naphthalene	12	100	0.23 J	0.015 J	0.019 J	0.0068 J	2 U	2 U	2 U
Nitrobenzene	NS	NS	0.037 U	0.034 U	0.036 U	0.035 U	1 U	1 U	1 U
N-Nitrosodi-N-Propylamine	NS	NS	0.037 U	0.034 U	0.036 U	0.035 U	1 U	1 U	1 U
N-Nitrosodiphenylamine	NS	NS	0.37 U	0.34 U	0.36 U	0.35 U	10 U	10 U	10 U
Pentachlorophenol	0.8	6.7	0.29 U	0.28 U	0.29 U	0.28 U	20 UJ	20 UJ	20 U
Phenanthrene	100	100	0.14 J	0.27 J	0.92	0.15 J	10 U	10 U	10 U
Phenol	0.33	100	0.37 U	0.34 U	0.36 U	0.35 U	10 U	10 U	10 U
Pyrene	100	100	0.12 J	0.33 J	1.2	0.15 J	10 U	10 U	10 U

Table 3
22-60 46th Street
Queens, New York
Post-Excavation Soil Endpoint Sample Analytical Results
Semivolatile Organic Compounds (SVOCs)

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			FB-01_20220513 460-258122-10 5/13/2022 µg/L 1	FB-01_20220701 460-261267-4 7/01/2022 µg/L 1	FB-01_20220727 460-262709-4 7/27/2022 µg/L 1	FB-01_20220811 460-263713-4 8/11/2022 µg/L 1	FB-01_20220830 460-264635-4 8/30/2022 µg/L 1
Compound	NYSDEC UUSCO	NYSDEC RRSO	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
1,2,4,5-Tetrachlorobenzene	NS	NS	10 U	10 U	10 U	10 U	10 U
1,4-Dioxane (P-Dioxane)	0.1	13	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2,3,4,6-Tetrachlorophenol	NS	NS	10 U	10 U	10 U	10 U	10 U
2,4,5-Trichlorophenol	NS	NS	10 U	10 U	10 U	10 U	10 U
2,4,6-Trichlorophenol	NS	NS	10 U	10 U	10 U	10 U	10 U
2,4-Dichlorophenol	NS	NS	10 U	10 U	10 U	10 U	10 U
2,4-Dimethylphenol	NS	NS	10 U	10 U	10 U	10 U	10 U
2,4-Dinitrophenol	NS	NS	20 UJ	20 UJ	40 U	40 U	40 U
2,4-Dinitrotoluene	NS	NS	2 U	2 U	10 U	10 U	10 U
2,6-Dinitrotoluene	NS	NS	2 UJ	2 U	2 U	2 U	2 U
2-Chloronaphthalene	NS	NS	10 U	10 U	10 U	10 U	10 U
2-Chlorophenol	NS	NS	10 U	10 U	10 U	10 U	10 U
2-Methylnaphthalene	NS	NS	10 U	10 U	10 U	10 U	10 U
2-Methylphenol (O-Cresol)	0.33	100	10 U	10 U	10 U	10 U	10 U
2-Nitroaniline	NS	NS	10 U	10 U	10 U	10 U	10 U
2-Nitrophenol	NS	NS	10 UJ	10 UJ	10 U	10 U	10 U
3- And 4- Methylphenol (Total)	NS	NS	10 U	10 U	10 U	10 U	10 U
3,3'-Dichlorobenzidine	NS	NS	10 U	10 U	10 U	10 U	10 U
3-Nitroaniline	NS	NS	10 U	10 U	10 U	10 U	10 U
4,6-Dinitro-2-Methylphenol	NS	NS	20 UJ	20 UJ	20 U	20 U	20 U
4-Bromophenyl Phenyl Ether	NS	NS	10 U	10 U	10 U	10 U	10 U
4-Chloro-3-Methylphenol	NS	NS	10 U	10 U	10 U	10 U	10 U
4-Chloroaniline	NS	NS	10 U	10 U	10 U	10 U	10 U
4-Chlorophenyl Phenyl Ether	NS	NS	10 U	10 U	10 U	10 U	10 U
4-Methylphenol (P-Cresol)	0.33	100	10 U	10 U	10 U	10 U	10 U
4-Nitroaniline	NS	NS	10 U	10 U	10 U	10 U	10 U
4-Nitrophenol	NS	NS	20 U	20 U	20 U	20 U	20 U
Acenaphthene	20	100	10 U	10 U	10 U	10 U	10 U
Acenaphthylene	100	100	10 U	10 U	10 U	10 U	10 U
Acetophenone	NS	NS	10 U	10 U	10 U	10 U	10 U
Anthracene	100	100	10 U	10 U	10 U	10 U	10 U
Atrazine	NS	NS	2 U	2 U	2 UT	2 UT	2 UT
Benzaldehyde	NS	NS	10 UJ	10 UJ	10 U	10 U	10 UT
Benzo(a)Anthracene	1	1	1 U	1 U	1 U	1 U	1 U
Benzo(a)Pyrene	1	1	1 U	1 U	1 U	1 U	1 U
Benzo(b)Fluoranthene	1	1	2 U	2 U	2 U	2 U	2 U
Benzo(g,h,i)Perylene	100	100	10 U	10 UJ	10 U	10 U	10 U
Benzo(k)Fluoranthene	0.8	3.9	1 U	1 U	1 U	1 U	1 U
Benzyl Butyl Phthalate	NS	NS	10 U	10 U	10 U	10 U	10 U
Biphenyl (Diphenyl)	NS	NS	10 U	10 U	10 U	10 U	10 U
Bis(2-Chloroethoxy) Methane	NS	NS	10 U	10 U	10 U	10 U	10 U
Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether	NS	NS	1 U	1 U	1 U	1 U	1 U
Bis(2-Chloroisopropyl) Ether	NS	NS	10 UJ	10 U	10 U	10 U	10 U
Bis(2-Ethylhexyl) Phthalate	NS	NS	2 U	2 U	2 U	2 U	2 U
Caprolactam	NS	NS	10 U	10 U	10 U	10 U	10 U
Carbazole	NS	NS	10 U	10 U	10 U	10 U	10 U
Chrysene	1	3.9	2 U	2 U	2 U	2 U	2 U
Dibenz(a,h)Anthracene	0.33	0.33	1 U	1 UJ	1 U	1 U	1 U
Dibenzofuran	7	59	10 U	10 U	10 U	10 U	10 U
Diethyl Phthalate	NS	NS	10 U	10 U	10 U	10 U	10 U
Dimethyl Phthalate	NS	NS	10 U	10 U	10 U	10 U	10 U
Di-N-Butyl Phthalate	NS	NS	10 U	10 U	10 U	10 U	10 U
Di-N-Octylphthalate	NS	NS	10 U	10 U	10 U	10 U	10 U
Fluoranthene	100	100	10 U	10 U	10 U	10 U	10 U
Fluorene	30	100	10 U	10 U	10 U	10 U	10 U
Hexachlorobenzene	0.33	1.2	1 U	1 U	1 U	1 U	1 U
Hexachlorobutadiene	NS	NS	1 U	1 UJ	1 U	1 U	1 U
Hexachlorocyclopentadiene	NS	NS	10 UJ	10 UJ	10 U	10 U	10 U
Hexachloroethane	NS	NS	2 U	2 U	2 U	2 U	2 U
Indeno(1,2,3-c,d)Pyrene	0.5	0.5	2 U	2 UJ	2 U	2 U	2 U
Isophorone	NS	NS	10 U	10 U	10 U	10 U	10 U
Naphthalene	12	100	2 U	2 U	2 U	2 U	2 U
Nitrobenzene	NS	NS	1 U	1 U	1 U	1 U	1 U
N-Nitrosodi-N-Propylamine	NS	NS	1 U	1 U	1 U	1 U	1 U
N-Nitrosodiphenylamine	NS	NS	10 U	10 U	10 U	10 U	10 U
Pentachlorophenol	0.8	6.7	20 U	20 U	20 U	20 U	20 U
Phenanthrene	100	100	10 U	10 U	10 U	10 U	10 U
Phenol	0.33	100	10 U	10 U	10 U	10 U	10 U
Pyrene	100	100	10 U	10 U	10 U	10 U	10 U

Table 4
22-60 46th Street
Queens, New York
Post-Excavation Soil Endpoint Sample Analytical Results
Metals

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			EP-01_20220425 460-256954-1 4/25/2022 mg/kg 1	EP-X_20220425 460-256954-2 4/25/2022 mg/kg 1	EP-02_20220425 460-256954-3 4/25/2022 mg/kg 1	EP-03_20220425 460-256954-4 4/25/2022 mg/kg 1	EP-04_20220425 460-256954-5 4/25/2022 mg/kg 1
Compound	NYSDEC UUSCO	NYSDEC RRSCO	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
Aluminum	NS	NS	8,370	8,200	6,600	8,270	6,860
Antimony	NS	NS	0.84 UJ	0.83 UJ	0.88 U	0.86 U	0.86 U
Arsenic	13	16	2.2	1.7	2	3.5	1.2
Barium	350	400	29.9 J	26.8 J	27.3	35	24.6
Beryllium	7.2	72	0.39	0.36	0.31 J	0.36	0.3 J
Cadmium	2.5	4.3	0.84 U	0.83 U	0.88 U	0.1 J	0.86 U
Calcium	NS	NS	1,120	842	700	1,940	607
Chromium, Total	NS	NS	14.1	13.8	13.3	12.6	11.2
Cobalt	NS	NS	5.1	5.5	4.3	5.4	4.7
Copper	50	270	14.4	16.6	10.7	13.4	12.2
Iron	NS	NS	13,200	12,900	10,500	14,200	9,690
Lead	63	400	13.6	9.1	6.8	25.6	4.5
Magnesium	NS	NS	2,960	3,050	2,120	2,670	2,360
Manganese	1,600	2,000	244 J	285 J	200	225	243
Mercury	0.18	0.81	0.091	0.045	0.019	0.08	0.017
Nickel	30	310	12.4	13.3	9.7	9.9	10.2
Potassium	NS	NS	971	806	682	602	716
Selenium	3.9	180	0.13 J	0.12 J	0.14 J	0.24 J	1.1 U
Silver	2	180	0.34 U	0.33 U	0.35 U	0.34 U	0.34 U
Sodium	NS	NS	86.7	80.4 J	101	64.2 J	60.5 J
Thallium	NS	NS	0.074 J	0.072 J	0.052 J	0.068 J	0.058 J
Vanadium	NS	NS	20.2	19.4	15.8	19.7	16.9
Zinc	109	10,000	35.2	35.4	21.9	38.2	25.3

Table 4
22-60 46th Street
Queens, New York
Post-Excavation Soil Endpoint Sample Analytical Results
Metals

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			EP-05_20220425 460-256954-6 4/25/2022 mg/kg 1	EP-06_20220425 460-256954-7 4/25/2022 mg/kg 1	EP-07_20220425 460-256954-8 4/25/2022 mg/kg 1	EP-08_20220425 460-256954-9 4/25/2022 mg/kg 1	EP-09_20220425 460-256954-11 4/25/2022 mg/kg 1
Compound	NYSDEC UUSCO	NYSDEC RRSCO	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
Aluminum	NS	NS	6,390	4,430	7,720	7,890	7,270
Antimony	NS	NS	0.83 U	0.77 U	0.86 U	0.8 U	0.97 U
Arsenic	13	16	1.5	0.71 J	1.5	1.4	1.7
Barium	350	400	22.4	22.7	36.5	36.2	37.6
Beryllium	7.2	72	0.29 J	0.24 J	0.26 J	0.29 J	0.39
Cadmium	2.5	4.3	0.83 U	0.77 U	0.86 U	0.8 U	0.97 U
Calcium	NS	NS	755	451	799	622	959
Chromium, Total	NS	NS	10.6	7.9	13.1	13	11.9
Cobalt	NS	NS	4.4	3	3.9	4.6	4.8
Copper	50	270	10.3	5.1	11.3	13	12.6
Iron	NS	NS	9,870	6,610	9,210	10,900	11,600
Lead	63	400	3.6	3.1	4.9	3.4	6.3
Magnesium	NS	NS	2,350	1,910	2,940	2,830	2,630
Manganese	1,600	2,000	234	183	124	239	281
Mercury	0.18	0.81	0.015 J	0.0085 J	0.023	0.015 J	0.02
Nickel	30	310	11	7.4	11.3	14.3	11.3
Potassium	NS	NS	618	509	792	791	796
Selenium	3.9	180	1 U	0.96 U	0.11 J	0.12 J	0.15 J
Silver	2	180	0.33 U	0.31 U	0.34 U	0.32 U	0.39 U
Sodium	NS	NS	52.2 J	42.1 J	55.4 J	55.4 J	98.9
Thallium	NS	NS	0.05 J	0.047 J	0.063 J	0.054 J	0.064 J
Vanadium	NS	NS	14.3	9.5	15.7	18.3	18.1
Zinc	109	10,000	20.7	14.9	26.3	23.7	33.1

Table 4
22-60 46th Street
Queens, New York
Post-Excavation Soil Endpoint Sample Analytical Results
Metals

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			EP-10_20220509 460-257822-1 5/09/2022 mg/kg 1	EP-X02_20220509 460-257822-2 5/09/2022 mg/kg 1	EP-11_20220509 460-257822-3 5/09/2022 mg/kg 1	EP-12_20220509 460-257822-4 5/09/2022 mg/kg 1	EP-13_20220509 460-257822-5 5/09/2022 mg/kg 1
Compound	NYSDEC UUSCO	NYSDEC RRSCO	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
Aluminum	NS	NS	8,380	5,740	8,410	8,060	8,570
Antimony	NS	NS	1.1 UJ	1.1 UJ	1.1 U	1.1 U	1.1 U
Arsenic	13	16	2.6	1.8	3	2.7	3.1
Barium	350	400	49.2 J	28.6 J	40.6	39.8	50.5
Beryllium	7.2	72	0.4 J	0.27 J	0.4 J	0.39 J	0.41 J
Cadmium	2.5	4.3	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
Calcium	NS	NS	1,710	2,600	2,270	1,590	1,300
Chromium, Total	NS	NS	14.9	11.3	15.3	14.2	15.1
Cobalt	NS	NS	6.2	4.3	6.1	5.7	6
Copper	50	270	14.5	10.7	15.7	14.1	17.2
Iron	NS	NS	13,300	10,100	14,100	13,100	14,400
Lead	63	400	21.2 JL	16.2 JL	28.4	22.4	24.5
Magnesium	NS	NS	3,280	2,770	3,330	2,910	2,770
Manganese	1,600	2,000	257	180	287	231	383
Mercury	0.18	0.81	0.049 J	0.028 J	0.074	0.048	0.045
Nickel	30	310	14	10.3	14.2	13.6	14.1
Potassium	NS	NS	952 J	685 J	804	833	806
Selenium	3.9	180	1.4 U	1.4 U	0.16 J	0.14 J	0.16 J
Silver	2	180	0.46 U	0.45 U	0.44 U	0.44 U	0.45 U
Sodium	NS	NS	78.8 J	64.6 J	71.3 J	61.9 J	67.9 J
Thallium	NS	NS	0.093 J	0.064 J	0.081 J	0.086 J	0.1 J
Vanadium	NS	NS	20.6	16.1	20.9	19.8	25.7
Zinc	109	10,000	43.5 J	28 J	42.8	37.1	64

Table 4
22-60 46th Street
Queens, New York
Post-Excavation Soil Endpoint Sample Analytical Results
Metals

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			EP-14_20220509 460-257822-6 5/09/2022 mg/kg 1	EP-15_20220509 460-257822-7 5/09/2022 mg/kg 1	EP-16_20220509 460-257822-8 5/09/2022 mg/kg 1	EP-17_20220509 460-257822-9 5/09/2022 mg/kg 1	EP-18_20220509 460-257822-10 5/09/2022 mg/kg 1
Compound	NYSDEC UUSCO	NYSDEC RRSCO	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
Aluminum	NS	NS	9,230	7,580	7,490	9,380	8,580
Antimony	NS	NS	1 U	1.1 U	1 U	1 U	1.1 U
Arsenic	13	16	4	1.8	2	2.7	2.7
Barium	350	400	53.3	43.7	44.6	61.8	54.4
Beryllium	7.2	72	0.42	0.36 J	0.33 J	0.4 J	0.45
Cadmium	2.5	4.3	0.12 J	1.1 U	1 U	1 U	1.1 U
Calcium	NS	NS	1,390	1,010	1,260	2,730	1,750
Chromium, Total	NS	NS	15.5	16.5	13.8	22.9	18.1
Cobalt	NS	NS	5.6	6.3	5.2	8.5	6.1
Copper	50	270	21.5	16.7	14.6	30.3	20.5
Iron	NS	NS	14,500	12,200	11,600	17,200	15,700
Lead	63	400	53.6	4.7	18.9	11.5	33.9
Magnesium	NS	NS	2,280	2,260	2,440	5,130	2,910
Manganese	1,600	2,000	280	288	267	300	270
Mercury	0.18	0.81	0.045	0.018 U	0.049	0.026	0.068
Nickel	30	310	12.3	13.5	11.1	18.1	13
Potassium	NS	NS	710	691	836	2,170	1,020
Selenium	3.9	180	0.24 J	1.4 U	1.3 U	1.3 U	0.16 J
Silver	2	180	0.41 U	0.44 U	0.42 U	0.41 U	0.43 U
Sodium	NS	NS	67.7 J	86.2 J	85.1 J	213	101 J
Thallium	NS	NS	0.095 J	0.063 J	0.075 J	0.14 J	0.091 J
Vanadium	NS	NS	21.8	22.7	21.4	34.2	26
Zinc	109	10,000	52.7	27.8	31.5	34.6	42.7

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AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			EP-19_20220509 460-257822-11 5/09/2022 mg/kg 1	EP-20_20220509 460-257822-12 5/09/2022 mg/kg 1	EP-21_20220509 460-257822-15 5/09/2022 mg/kg 1	EP-22_20220509 460-257822-16 5/09/2022 mg/kg 1	EP-23_20220509 460-257822-17 5/09/2022 mg/kg 1
Compound	NYSDEC UUSCO	NYSDEC RRSCO	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
Aluminum	NS	NS	8,420	8,060	7,980	10,700	8,030
Antimony	NS	NS	1.1 U	0.25 J	1.1 U	1.2 U	1.1 U
Arsenic	13	16	2.1	2.1	2.6	4.6	3.8
Barium	350	400	64.9	52.7	42.2	69.3	84.5
Beryllium	7.2	72	0.42	0.39 J	0.36 J	0.46 J	0.33 J
Cadmium	2.5	4.3	1.1 U	1 U	1.1 U	0.25 J	1.1 U
Calcium	NS	NS	1,390	4,220	1,550	3,330	1,880
Chromium, Total	NS	NS	15.6	16.4	14.1	17.8	14.6
Cobalt	NS	NS	6.3	5.8	5.7	6.2	5.7
Copper	50	270	20.5	17.5	17.8	26.4	20
Iron	NS	NS	12,900	13,200	12,700	15,800	15,100
Lead	63	400	18.2	17.7	26.5	89.4	82.1
Magnesium	NS	NS	3,110	4,200	2,780	3,660	2,410
Manganese	1,600	2,000	304	305	229	289	254
Mercury	0.18	0.81	0.043	0.054	0.064	0.23	0.077
Nickel	30	310	14.4	12.9	14.4	14	11.6
Potassium	NS	NS	994	1,030	785	868	777
Selenium	3.9	180	1.3 U	1.3 U	0.14 J	0.38 J	0.18 J
Silver	2	180	0.42 U	0.42 U	0.43 U	0.49 U	0.43 U
Sodium	NS	NS	82.6 J	92.8 J	126	143	101 J
Thallium	NS	NS	0.092 J	0.084 J	0.085 J	0.12 J	0.084 J
Vanadium	NS	NS	22.4	23.5	26.1	26.3	21
Zinc	109	10,000	37.3	35.1	68.6	98	52.5

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Metals

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			EP-24_20220509 460-257822-18 5/09/2022 mg/kg 1	EP-25_20220509 460-257822-19 5/09/2022 mg/kg 1	EP-26_20220513 460-258122-1 5/13/2022 mg/kg 1	EP-X03_20220513 460-258122-2 5/13/2022 mg/kg 1	EP-27_20220513 460-258122-8 5/13/2022 mg/kg 1
Compound	NYSDEC UUSCO	NYSDEC RRSCO	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
Aluminum	NS	NS	8,910	9,210	10,600	9,400	8,490
Antimony	NS	NS	1.1 U	1.1 U	1.2 UJ	1 UJ	1 U
Arsenic	13	16	3	2.9	3.1 J	2 J	2.9
Barium	350	400	51.3	54.9	55.4 J	48.4 J	52.3
Beryllium	7.2	72	0.35 J	0.4 J	0.45 J	0.41 J	0.39 J
Cadmium	2.5	4.3	1.1 U	1.1 U	1.2 U	1 U	1 U
Calcium	NS	NS	1,420	1,780	1,580 J	1,060 J	2,140
Chromium, Total	NS	NS	14.4	16.2	17.2	14.9	15.4
Cobalt	NS	NS	5.8	5.8	6.6	6.2	7.3
Copper	50	270	14.6	18.8	19.4 J	18 J	18.3
Iron	NS	NS	13,100	14,600	15,100 J	13,600 J	13,200
Lead	63	400	37.4	27	27.9 J	14.6 J	17.9
Magnesium	NS	NS	2,790	2,910	3,240	3,220	3,470
Manganese	1,600	2,000	192	258	307	319	285
Mercury	0.18	0.81	0.051	0.092	0.036	0.044	0.043
Nickel	30	310	15.1	13.6	14.1	16	17
Potassium	NS	NS	831	921	884	813	961
Selenium	3.9	180	1.4 U	0.14 J	0.21 J	0.15 J	1.3 U
Silver	2	180	0.44 U	0.44 U	0.48 U	0.42 U	0.4 U
Sodium	NS	NS	98.9 J	110 J	121	91.7 J	114
Thallium	NS	NS	0.086 J	0.089 J	0.11 J	0.1 J	0.08 J
Vanadium	NS	NS	33.6	25.6	24.1 JK	21.6 JK	22.8
Zinc	109	10,000	53.3	48.6	43.7 J	32.6 J	37.2

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AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			EP-28_20220513 460-258122-9 5/13/2022 mg/kg 1	EP-29_20220701 460-261267-1 7/01/2022 mg/kg 1	EP-X04_20220701 460-261267-2 7/01/2022 mg/kg 1	EP-30_20220701 460-261267-3 7/01/2022 mg/kg 1	EP-31_20220727 460-262709-1 7/27/2022 mg/kg 1
Compound	NYSDEC UUSCO	NYSDEC RRSCO	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
Aluminum	NS	NS	6,850	7,610	7,240	8,690	6,090
Antimony	NS	NS	1.2 U	1 UJ	1 UJ	1 U	0.81 U
Arsenic	13	16	2	1.5	1.7	2.2	3.6
Barium	350	400	38.7	48.4	44.2	43	25.1
Beryllium	7.2	72	0.36 J	0.32 J	0.32 J	0.36 J	0.38
Cadmium	2.5	4.3	1.2 U	1 U	1 U	1 U	0.81 U
Calcium	NS	NS	1,220	2,480 J	1,560 J	3,160	546
Chromium, Total	NS	NS	13.7	14.4	14.2	14.8	11.9
Cobalt	NS	NS	5.5	6 JK	5.3 JK	6.1	5.2
Copper	50	270	15.6	19.5 J	16.9 J	18.1	13.2
Iron	NS	NS	12,900	12,500	11,700	14,000	12,800
Lead	63	400	12.9	11.9	12.7 J	17.1	4.8
Magnesium	NS	NS	2,790	3,550 J	2,860	3,880	1,820
Manganese	1,600	2,000	240	296	279	236	132
Mercury	0.18	0.81	0.035	0.014 J	0.021	0.02	0.018 U
Nickel	30	310	12.3	13 JK	12.6 JK	12.7	9.9
Potassium	NS	NS	777	1,030	867	830	548
Selenium	3.9	180	1.5 U	1.3 U	1.3 U	1.3 U	1 U
Silver	2	180	0.48 U	0.4 U	0.42 U	0.4 U	0.32 U
Sodium	NS	NS	120	106 J	55.4 J	134	65.8 J
Thallium	NS	NS	0.061 J	0.06 J	0.053 J	0.056 J	0.051 J
Vanadium	NS	NS	19.1	21.3 JK	19.1 JK	26	17.3
Zinc	109	10,000	30.1	31.3 JK	32.7 JK	44.2	25.3

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Metals

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			EP-X05_20220727 460-262709-2 7/27/2022 mg/kg 1	EP-32_20220727 460-262709-3 7/27/2022 mg/kg 1	EP-33_20220811 460-263713-1 8/11/2022 mg/kg 1	EP-X06_20220811 460-263713-2 8/11/2022 mg/kg 1	EP-34_20220811 460-263713-3 8/11/2022 mg/kg 1
Compound	NYSDEC UUSCO	NYSDEC RRSCO	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
Aluminum	NS	NS	6,870	6,520	9,900	11,200	9,750
Antimony	NS	NS	1 U	1 U	0.91 U	1.1 U	1.1 U
Arsenic	13	16	3.9	2	1.8	1.9	2.7
Barium	350	400	27.5	37.5	57.6	63	49.1
Beryllium	7.2	72	0.4	0.29 J	0.5	0.5	0.42 J
Cadmium	2.5	4.3	1 U	1 U	0.16 J	1.1 U	1.1 U
Calcium	NS	NS	520	1,360	2,040	1,970	1,520
Chromium, Total	NS	NS	12.7	13	23	24.6	18.5
Cobalt	NS	NS	5.9	4.8	7.4	9.1	6.7
Copper	50	270	14.5	13.7	18.7	20.2	18.3
Iron	NS	NS	13,700	10,500	18,100	19,000	14,600
Lead	63	400	5.7	14.9	6.9	7.3	20.2
Magnesium	NS	NS	1,900	2,450	4,420	5,200	3,240
Manganese	1,600	2,000	153	212	496	475	331
Mercury	0.18	0.81	0.018 U	0.016 J	0.019 U	0.019 U	0.066
Nickel	30	310	10.9	11.3	16.7	18.3	14.1
Potassium	NS	NS	661	783	1,500	1,710	986
Selenium	3.9	180	1.3 U	1.3 U	1.1 U	1.4 U	0.17 J
Silver	2	180	0.4 U	0.41 U	0.37 U	0.46 U	0.43 U
Sodium	NS	NS	76.1 J	69.2 J	171	133	119
Thallium	NS	NS	0.058 J	0.064 J	0.11 J	0.11 J	0.074 J
Vanadium	NS	NS	18.1	21	32.4	33.2	26.8
Zinc	109	10,000	28.3	30.5	40.6	45.7	42.1

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Post-Excavation Soil Endpoint Sample Analytical Results
Metals

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			EP-35_20220830 460-264635-1 8/30/2022 mg/kg 1	EP-X07_20220830 460-264635-2 8/30/2022 mg/kg 1	EP-36_20220830 460-264635-3 8/30/2022 mg/kg 1	FB-01_20220425 460-256954-10 4/25/2022 µg/L 1	FB-01_20220509 460-257822-13 5/09/2022 µg/L 1
Compound	NYSDEC UUSCO	NYSDEC RRSCO	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
Aluminum	NS	NS	8,610	8,490	7,560	40 U	40 U
Antimony	NS	NS	1 U	0.45 J	1 U	2 U	2 U
Arsenic	13	16	2.8	4.1	1.7	2 U	2 U
Barium	350	400	58.9	172	44.5	4 U	4 U
Beryllium	7.2	72	0.38 J	0.39 J	0.34 J	0.8 U	0.8 U
Cadmium	2.5	4.3	0.19 J	0.59 J	0.13 J	2 U	2 U
Calcium	NS	NS	3,910	5,070	5,620	500 U	100 J
Chromium, Total	NS	NS	17.4	17.3	15.2	4 U	4 U
Cobalt	NS	NS	6.6	5.5	6.1	4 U	4 U
Copper	50	270	23.3	32.4	21.2	4 U	4 U
Iron	NS	NS	13,200	13,300	11,800	120 U	120 U
Lead	63	400	72.8	240	24.6	1.2 U	1.2 U
Magnesium	NS	NS	3,560	3,460	3,990	200 U	200 U
Manganese	1,600	2,000	242	615	304	8 U	8 U
Mercury	0.18	0.81	0.075	0.12	0.025	0.2 U	0.2 U
Nickel	30	310	12.7	13.5	15.6	4 U	4 U
Potassium	NS	NS	880	917	1,020	200 U	200 U
Selenium	3.9	180	0.23 J	0.36 J	1.3 U	2.5 U	2.5 U
Silver	2	180	0.41 U	0.42 U	0.42 U	2 U	2 U
Sodium	NS	NS	141	153	122	500 U	245 J
Thallium	NS	NS	0.08 J	0.11 J	0.069 J	0.8 U	0.8 U
Vanadium	NS	NS	23	23.4	21.7	4 U	4 U
Zinc	109	10,000	64.3	169	39	16 U	16 U

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Metals

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			FB-01_20220513 460-258122-10 5/13/2022 µg/L 1	FB-01_20220701 460-261267-4 7/01/2022 µg/L 1	FB-01_20220727 460-262709-4 7/27/2022 µg/L 1	FB-01_20220811 460-263713-4 8/11/2022 µg/L 1	FB-01_20220830 460-264635-4 8/30/2022 µg/L 1
Compound	NYSDEC UUSCO	NYSDEC RRSCO	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
Aluminum	NS	NS	40 U	40 U	40 U	40 U	40 U
Antimony	NS	NS	2 U	2 U	2 U	2 U	2 U
Arsenic	13	16	2 U	2 U	2 U	2 U	2 U
Barium	350	400	4 U	4 U	4 U	4 U	4 U
Beryllium	7.2	72	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Cadmium	2.5	4.3	2 U	2 U	2 U	2 U	2 U
Calcium	NS	NS	169 J	500 U	500 U	500 U	500 U
Chromium, Total	NS	NS	4 U	4 U	4 U	4 U	4 U
Cobalt	NS	NS	4 U	4 U	4 U	4 U	4 U
Copper	50	270	4 U	4 U	4 U	4 U	4 U
Iron	NS	NS	120 U	120 U	120 U	120 U	120 U
Lead	63	400	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
Magnesium	NS	NS	200 U	200 U	200 U	200 U	200 U
Manganese	1,600	2,000	8 U	8 U	8 U	8 U	8 U
Mercury	0.18	0.81	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	30	310	4 U	4 U	4 U	4 U	4 U
Potassium	NS	NS	200 U	200 U	200 U	200 U	200 U
Selenium	3.9	180	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Silver	2	180	2 U	2 U	2 U	2 U	2 U
Sodium	NS	NS	366 J	500 U	500 U	500 U	500 U
Thallium	NS	NS	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Vanadium	NS	NS	4 U	4 U	4 U	4 U	4 U
Zinc	109	10,000	16 U	16 U	16 U	16 U	16 U

Table 5
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Post-Excavation Soil Endpoint Sample Analytical Results
Polychlorinated Biphenyls (PCBs)

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			EP-01_20220425 460-256954-1 4/25/2022 mg/kg 1	EP-X_20220425 460-256954-2 4/25/2022 mg/kg 1	EP-02_20220425 460-256954-3 4/25/2022 mg/kg 1	EP-03_20220425 460-256954-4 4/25/2022 mg/kg 1	EP-04_20220425 460-256954-5 4/25/2022 mg/kg 1
Compound	NYSDEC UUSCO	NYSDEC RRSCO	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
PCB-1016 (Aroclor 1016)	NS	NS	0.072 U	0.072 U	0.072 U	0.073 U	0.071 U
PCB-1221 (Aroclor 1221)	NS	NS	0.072 U	0.072 U	0.072 U	0.073 U	0.071 U
PCB-1232 (Aroclor 1232)	NS	NS	0.072 U	0.072 U	0.072 U	0.073 U	0.071 U
PCB-1242 (Aroclor 1242)	NS	NS	0.072 U	0.072 U	0.072 U	0.073 U	0.071 U
PCB-1248 (Aroclor 1248)	NS	NS	0.072 U	0.072 U	0.072 U	0.073 U	0.071 U
PCB-1254 (Aroclor 1254)	NS	NS	0.072 U	0.072 U	0.072 U	0.073 U	0.071 U
PCB-1260 (Aroclor 1260)	NS	NS	0.072 U	0.072 U	0.072 U	0.073 U	0.071 U
PCB-1262 (Aroclor 1262)	NS	NS	0.072 U	0.072 U	0.072 U	0.073 U	0.071 U
PCB-1268 (Aroclor 1268)	NS	NS	0.072 U	0.072 U	0.072 U	0.073 U	0.071 U
Total PCBs	0.1	1	0.072 U	0.072 U	0.072 U	0.073 U	0.071 U

Table 5
22-60 46th Street
Queens, New York
 Post-Excavation Soil Endpoint Sample Analytical Results
Polychlorinated Biphenyls (PCBs)

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			EP-05_20220425 460-256954-6 4/25/2022 mg/kg 1	EP-06_20220425 460-256954-7 4/25/2022 mg/kg 1	EP-07_20220425 460-256954-8 4/25/2022 mg/kg 1	EP-08_20220425 460-256954-9 4/25/2022 mg/kg 1	EP-09_20220425 460-256954-11 4/25/2022 mg/kg 1
Compound	NYSDEC UUSCO	NYSDEC RRSCO	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
PCB-1016 (Aroclor 1016)	NS	NS	0.075 U	0.07 U	0.073 U	0.073 U	0.083 U
PCB-1221 (Aroclor 1221)	NS	NS	0.075 U	0.07 U	0.073 U	0.073 U	0.083 U
PCB-1232 (Aroclor 1232)	NS	NS	0.075 U	0.07 U	0.073 U	0.073 U	0.083 U
PCB-1242 (Aroclor 1242)	NS	NS	0.075 U	0.07 U	0.073 U	0.073 U	0.083 U
PCB-1248 (Aroclor 1248)	NS	NS	0.075 U	0.07 U	0.073 U	0.073 U	0.083 U
PCB-1254 (Aroclor 1254)	NS	NS	0.075 U	0.07 U	0.073 U	0.073 U	0.083 U
PCB-1260 (Aroclor 1260)	NS	NS	0.075 U	0.07 U	0.073 U	0.073 U	0.083 U
PCB-1262 (Aroclor 1262)	NS	NS	0.075 U	0.07 U	0.073 U	0.073 U	0.083 U
PCB-1268 (Aroclor 1268)	NS	NS	0.075 U	0.07 U	0.073 U	0.073 U	0.083 U
Total PCBs	0.1	1	0.075 U	0.07 U	0.073 U	0.073 U	0.083 U

Table 5
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 Post-Excavation Soil Endpoint Sample Analytical Results
Polychlorinated Biphenyls (PCBs)

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			EP-10_20220509 460-257822-1 5/09/2022 mg/kg 1	EP-X02_20220509 460-257822-2 5/09/2022 mg/kg 1	EP-11_20220509 460-257822-3 5/09/2022 mg/kg 1	EP-12_20220509 460-257822-4 5/09/2022 mg/kg 1	EP-13_20220509 460-257822-5 5/09/2022 mg/kg 1
Compound	NYSDEC UUSCO	NYSDEC RRSCO	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
PCB-1016 (Aroclor 1016)	NS	NS	0.077 U	0.077 U	0.079 U	0.075 U	0.077 U
PCB-1221 (Aroclor 1221)	NS	NS	0.077 U	0.077 U	0.079 U	0.075 U	0.077 U
PCB-1232 (Aroclor 1232)	NS	NS	0.077 U	0.077 U	0.079 U	0.075 U	0.077 U
PCB-1242 (Aroclor 1242)	NS	NS	0.077 U	0.077 U	0.079 U	0.075 U	0.077 U
PCB-1248 (Aroclor 1248)	NS	NS	0.077 U	0.077 U	0.079 U	0.075 U	0.077 U
PCB-1254 (Aroclor 1254)	NS	NS	0.077 U	0.077 U	0.079 U	0.075 U	0.077 U
PCB-1260 (Aroclor 1260)	NS	NS	0.077 U	0.077 U	0.079 U	0.075 U	0.077 U
PCB-1262 (Aroclor 1262)	NS	NS	0.077 U	0.077 U	0.079 U	0.075 U	0.077 U
PCB-1268 (Aroclor 1268)	NS	NS	0.077 U	0.077 U	0.079 U	0.075 U	0.077 U
Total PCBs	0.1	1	0.077 U	0.077 U	0.079 U	0.075 U	0.077 U

Table 5
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 Post-Excavation Soil Endpoint Sample Analytical Results
Polychlorinated Biphenyls (PCBs)

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			EP-14_20220509 460-257822-6 5/09/2022 mg/kg 1	EP-15_20220509 460-257822-7 5/09/2022 mg/kg 1	EP-16_20220509 460-257822-8 5/09/2022 mg/kg 1	EP-17_20220509 460-257822-9 5/09/2022 mg/kg 1	EP-18_20220509 460-257822-10 5/09/2022 mg/kg 1
Compound	NYSDEC UUSCO	NYSDEC RRSCO	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
PCB-1016 (Aroclor 1016)	NS	NS	0.075 U	0.075 U	0.073 U	0.071 U	0.074 U
PCB-1221 (Aroclor 1221)	NS	NS	0.075 U	0.075 U	0.073 U	0.071 U	0.074 U
PCB-1232 (Aroclor 1232)	NS	NS	0.075 U	0.075 U	0.073 U	0.071 U	0.074 U
PCB-1242 (Aroclor 1242)	NS	NS	0.075 U	0.075 U	0.073 U	0.071 U	0.074 U
PCB-1248 (Aroclor 1248)	NS	NS	0.075 U	0.075 U	0.073 U	0.071 U	0.074 U
PCB-1254 (Aroclor 1254)	NS	NS	0.075 U	0.075 U	0.073 U	0.071 U	0.074 U
PCB-1260 (Aroclor 1260)	NS	NS	0.075 U	0.075 U	0.073 U	0.071 U	0.074 U
PCB-1262 (Aroclor 1262)	NS	NS	0.075 U	0.075 U	0.073 U	0.071 U	0.074 U
PCB-1268 (Aroclor 1268)	NS	NS	0.075 U	0.075 U	0.073 U	0.071 U	0.074 U
Total PCBs	0.1	1	0.075 U	0.075 U	0.073 U	0.071 U	0.074 U

Table 5
22-60 46th Street
Queens, New York
Post-Excavation Soil Endpoint Sample Analytical Results
Polychlorinated Biphenyls (PCBs)

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			EP-19_20220509 460-257822-11 5/09/2022 mg/kg 1	EP-20_20220509 460-257822-12 5/09/2022 mg/kg 1	EP-21_20220509 460-257822-15 5/09/2022 mg/kg 1	EP-22_20220509 460-257822-16 5/09/2022 mg/kg 1	EP-23_20220509 460-257822-17 5/09/2022 mg/kg 1
Compound	NYSDEC UUSCO	NYSDEC RRSCO	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
PCB-1016 (Aroclor 1016)	NS	NS	0.072 U	0.075 U	0.077 U	0.087 U	0.076 U
PCB-1221 (Aroclor 1221)	NS	NS	0.072 U	0.075 U	0.077 U	0.087 U	0.076 U
PCB-1232 (Aroclor 1232)	NS	NS	0.072 U	0.075 U	0.077 U	0.087 U	0.076 U
PCB-1242 (Aroclor 1242)	NS	NS	0.072 U	0.075 U	0.077 U	0.087 U	0.076 U
PCB-1248 (Aroclor 1248)	NS	NS	0.072 U	0.075 U	0.077 U	0.087 U	0.076 U
PCB-1254 (Aroclor 1254)	NS	NS	0.072 U	0.075 U	0.077 U	0.087 U	0.076 U
PCB-1260 (Aroclor 1260)	NS	NS	0.072 U	0.075 U	0.077 U	0.087 U	0.076 U
PCB-1262 (Aroclor 1262)	NS	NS	0.072 U	0.075 U	0.077 U	0.087 U	0.076 U
PCB-1268 (Aroclor 1268)	NS	NS	0.072 U	0.075 U	0.077 U	0.087 U	0.076 U
Total PCBs	0.1	1	0.072 U	0.075 U	0.077 U	0.087 U	0.076 U

Table 5
22-60 46th Street
Queens, New York
 Post-Excavation Soil Endpoint Sample Analytical Results
Polychlorinated Biphenyls (PCBs)

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			EP-24_20220509 460-257822-18 5/09/2022 mg/kg 1	EP-25_20220509 460-257822-19 5/09/2022 mg/kg 1	EP-26_20220513 460-258122-1 5/13/2022 mg/kg 1	EP-X03_20220513 460-258122-2 5/13/2022 mg/kg 1	EP-27_20220513 460-258122-8 5/13/2022 mg/kg 1
Compound	NYSDEC UUSCO	NYSDEC RRSCO	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
PCB-1016 (Aroclor 1016)	NS	NS	0.077 U	0.076 U	0.079 U	0.075 U	0.073 U
PCB-1221 (Aroclor 1221)	NS	NS	0.077 U	0.076 U	0.079 U	0.075 U	0.073 U
PCB-1232 (Aroclor 1232)	NS	NS	0.077 U	0.076 U	0.079 U	0.075 U	0.073 U
PCB-1242 (Aroclor 1242)	NS	NS	0.077 U	0.076 U	0.079 U	0.075 U	0.073 U
PCB-1248 (Aroclor 1248)	NS	NS	0.077 U	0.076 U	0.079 U	0.075 U	0.073 U
PCB-1254 (Aroclor 1254)	NS	NS	0.077 U	0.076 U	0.079 U	0.075 U	0.073 U
PCB-1260 (Aroclor 1260)	NS	NS	0.077 U	0.076 U	0.079 U	0.075 U	0.073 U
PCB-1262 (Aroclor 1262)	NS	NS	0.077 U	0.076 U	0.079 U	0.075 U	0.073 U
PCB-1268 (Aroclor 1268)	NS	NS	0.077 U	0.076 U	0.079 U	0.075 U	0.073 U
Total PCBs	0.1	1	0.077 U	0.076 U	0.079 U	0.075 U	0.073 U

Table 5
22-60 46th Street
Queens, New York
 Post-Excavation Soil Endpoint Sample Analytical Results
Polychlorinated Biphenyls (PCBs)

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			EP-28_20220513 460-258122-9 5/13/2022 mg/kg 1	EP-29_20220701 460-261267-1 7/01/2022 mg/kg 1	EP-X04_20220701 460-261267-2 7/01/2022 mg/kg 1	EP-30_20220701 460-261267-3 7/01/2022 mg/kg 1	EP-31_20220727 460-262709-1 7/27/2022 mg/kg 1
Compound	NYSDEC UUSCO	NYSDEC RRSCO	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
PCB-1016 (Aroclor 1016)	NS	NS	0.083 U	0.072 U	0.072 U	0.074 U	0.072 U
PCB-1221 (Aroclor 1221)	NS	NS	0.083 U	0.072 U	0.072 U	0.074 U	0.072 U
PCB-1232 (Aroclor 1232)	NS	NS	0.083 U	0.072 U	0.072 U	0.074 U	0.072 U
PCB-1242 (Aroclor 1242)	NS	NS	0.083 U	0.072 U	0.072 U	0.074 U	0.072 U
PCB-1248 (Aroclor 1248)	NS	NS	0.083 U	0.072 U	0.072 U	0.074 U	0.072 U
PCB-1254 (Aroclor 1254)	NS	NS	0.083 U	0.072 U	0.072 U	0.074 U	0.072 U
PCB-1260 (Aroclor 1260)	NS	NS	0.083 U	0.072 U	0.072 U	0.074 U	0.072 U
PCB-1262 (Aroclor 1262)	NS	NS	0.083 U	0.072 U	0.072 U	0.074 U	0.072 U
PCB-1268 (Aroclor 1268)	NS	NS	0.083 U	0.072 U	0.072 U	0.074 U	0.072 U
Total PCBs	0.1	1	0.083 U	0.072 U	0.072 U	0.074 U	0.072 U

Table 5
22-60 46th Street
Queens, New York
Post-Excavation Soil Endpoint Sample Analytical Results
Polychlorinated Biphenyls (PCBs)

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			EP-X05_20220727 460-262709-2 7/27/2022 mg/kg 1	EP-32_20220727 460-262709-3 7/27/2022 mg/kg 1	EP-33_20220811 460-263713-1 8/11/2022 mg/kg 1	EP-X06_20220811 460-263713-2 8/11/2022 mg/kg 1	EP-34_20220811 460-263713-3 8/11/2022 mg/kg 1
Compound	NYSDEC UUSCO	NYSDEC RRSCO	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
PCB-1016 (Aroclor 1016)	NS	NS	0.072 U	0.074 U	0.076 U	0.077 U	0.074 U
PCB-1221 (Aroclor 1221)	NS	NS	0.072 U	0.074 U	0.076 U	0.077 U	0.074 U
PCB-1232 (Aroclor 1232)	NS	NS	0.072 U	0.074 U	0.076 U	0.077 U	0.074 U
PCB-1242 (Aroclor 1242)	NS	NS	0.072 U	0.074 U	0.076 U	0.077 U	0.074 U
PCB-1248 (Aroclor 1248)	NS	NS	0.072 U	0.074 U	0.076 U	0.077 U	0.074 U
PCB-1254 (Aroclor 1254)	NS	NS	0.072 U	0.074 U	0.076 U	0.077 U	0.074 U
PCB-1260 (Aroclor 1260)	NS	NS	0.072 U	0.074 U	0.076 U	0.077 U	0.074 U
PCB-1262 (Aroclor 1262)	NS	NS	0.072 U	0.074 U	0.076 U	0.077 U	0.074 U
PCB-1268 (Aroclor 1268)	NS	NS	0.072 U	0.074 U	0.076 U	0.077 U	0.074 U
Total PCBs	0.1	1	0.072 U	0.074 U	0.076 U	0.077 U	0.074 U

Table 5
22-60 46th Street
Queens, New York
 Post-Excavation Soil Endpoint Sample Analytical Results
Polychlorinated Biphenyls (PCBs)

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			EP-35_20220830 460-264635-1 8/30/2022 mg/kg 1	EP-X07_20220830 460-264635-2 8/30/2022 mg/kg 1	EP-36_20220830 460-264635-3 8/30/2022 mg/kg 1	FB-01_20220425 460-256954-10 4/25/2022 µg/L 1	FB-01_20220509 460-257822-13 5/09/2022 µg/L 1
Compound	NYSDEC UUSCO	NYSDEC RRSCO	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
PCB-1016 (Aroclor 1016)	NS	NS	0.069 U	0.073 U	0.071 U	0.4 U	0.4 U
PCB-1221 (Aroclor 1221)	NS	NS	0.069 U	0.073 U	0.071 U	0.4 U	0.4 U
PCB-1232 (Aroclor 1232)	NS	NS	0.069 U	0.073 U	0.071 U	0.4 U	0.4 U
PCB-1242 (Aroclor 1242)	NS	NS	0.069 U	0.073 U	0.071 U	0.4 U	0.4 U
PCB-1248 (Aroclor 1248)	NS	NS	0.069 U	0.073 U	0.071 U	0.4 U	0.4 U
PCB-1254 (Aroclor 1254)	NS	NS	0.069 U	0.073 U	0.071 U	0.4 U	0.4 U
PCB-1260 (Aroclor 1260)	NS	NS	0.069 U	0.073 U	0.071 U	0.4 U	0.4 U
PCB-1262 (Aroclor 1262)	NS	NS	0.069 U	0.073 U	0.071 U	0.4 U	0.4 U
PCB-1268 (Aroclor 1268)	NS	NS	0.069 U	0.073 U	0.071 U	0.4 U	0.4 U
Total PCBs	0.1	1	0.069 U	0.073 U	0.071 U	0.4 U	0.4 U

Table 5
22-60 46th Street
Queens, New York
Post-Excavation Soil Endpoint Sample Analytical Results
Polychlorinated Biphenyls (PCBs)

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			FB-01_20220513 460-258122-10 5/13/2022 µg/L 1	FB-01_20220701 460-261267-4 7/01/2022 µg/L 1	FB-01_20220727 460-262709-4 7/27/2022 µg/L 1	FB-01_20220811 460-263713-4 8/11/2022 µg/L 1	FB-01_20220830 460-264635-4 8/30/2022 µg/L 1
Compound	NYSDEC UUSCO	NYSDEC RRSCO	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
PCB-1016 (Aroclor 1016)	NS	NS	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
PCB-1221 (Aroclor 1221)	NS	NS	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
PCB-1232 (Aroclor 1232)	NS	NS	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
PCB-1242 (Aroclor 1242)	NS	NS	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
PCB-1248 (Aroclor 1248)	NS	NS	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
PCB-1254 (Aroclor 1254)	NS	NS	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
PCB-1260 (Aroclor 1260)	NS	NS	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
PCB-1262 (Aroclor 1262)	NS	NS	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
PCB-1268 (Aroclor 1268)	NS	NS	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
Total PCBs	0.1	1	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U

Table 6
22-60 46th Street
Queens, New York
Post-Excavation Soil Endpoint Sample Analytical Results
Pesticides

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			EP-01_20220425 460-256954-1 4/25/2022 mg/kg 1	EP-X_20220425 460-256954-2 4/25/2022 mg/kg 1	EP-02_20220425 460-256954-3 4/25/2022 mg/kg 1	EP-03_20220425 460-256954-4 4/25/2022 mg/kg 1	EP-04_20220425 460-256954-5 4/25/2022 mg/kg 1
Compound	NYSDEC UUSCO	NYSDEC RRSCO	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
Aldrin	0.005	0.097	0.0072 U	0.0072 U	0.0072 U	0.0073 U	0.0071 U
Alpha Bhc (Alpha Hexachlorocyclohexane)	0.02	0.48	0.0021 U	0.0021 U	0.0022 U	0.0022 U	0.0021 U
Alpha Endosulfan	NS	NS	0.0072 U	0.0072 U	0.0072 U	0.0073 U	0.0071 U
Beta Bhc (Beta Hexachlorocyclohexane)	0.036	0.36	0.0021 U	0.0021 U	0.0022 U	0.0022 U	0.0021 U
Beta Endosulfan	NS	NS	0.0072 U	0.0072 U	0.0072 U	0.0073 U	0.0071 U
cis-Chlordane	0.094	4.2	0.0072 U	0.0072 U	0.0072 U	0.0073 U	0.0071 U
Delta BHC (Delta Hexachlorocyclohexane)	0.04	100	0.0021 U	0.0021 U	0.0022 U	0.0022 U	0.0021 U
Dieldrin	0.005	0.2	0.0021 U	0.0021 U	0.0022 U	0.0022 U	0.0021 U
Endosulfan Sulfate	NS	NS	0.0072 U	0.0072 U	0.0072 U	0.0073 U	0.0071 U
Endosulfans ABS	2.4	24	0 U	0 U	0 U	0 U	0 U
Endrin	0.014	11	0.0072 U	0.0072 U	0.0072 U	0.0073 U	0.0071 U
Endrin Aldehyde	NS	NS	0.0072 U	0.0072 U	0.0072 U	0.0073 U	0.0071 U
Endrin Ketone	NS	NS	0.0072 U	0.0072 U	0.0072 U	0.0073 U	0.0071 U
Gamma Bhc (Lindane)	0.1	1.3	0.0021 U	0.0021 U	0.0022 U	0.0022 U	0.0021 U
Heptachlor	0.042	2.1	0.0072 U	0.0072 U	0.0072 U	0.0073 U	0.0071 U
Heptachlor Epoxide	NS	NS	0.0072 U	0.0072 U	0.0072 U	0.0073 U	0.0071 U
Methoxychlor	NS	NS	0.0072 U	0.0072 U	0.0072 U	0.0073 U	0.0071 U
P,P'-DDD	0.0033	13	0.0072 U	0.0072 U	0.0072 U	0.0073 U	0.0071 U
P,P'-DDE	0.0033	8.9	0.0072 U	0.0072 U	0.0072 U	0.0073 U	0.0071 U
P,P'-DDT	0.0033	7.9	0.0072 U	0.0072 U	0.0072 U	0.0073 U	0.0071 U
Toxaphene	NS	NS	0.072 U	0.072 U	0.072 U	0.073 U	0.071 U

Table 6
22-60 46th Street
Queens, New York
Post-Excavation Soil Endpoint Sample Analytical Results
Pesticides

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			EP-05_20220425 460-256954-6 4/25/2022 mg/kg 1	EP-06_20220425 460-256954-7 4/25/2022 mg/kg 1	EP-07_20220425 460-256954-8 4/25/2022 mg/kg 1	EP-08_20220425 460-256954-9 4/25/2022 mg/kg 1	EP-09_20220425 460-256954-11 4/25/2022 mg/kg 1
Compound	NYSDEC UUSCO	NYSDEC RRSCO	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
Aldrin	0.005	0.097	0.0075 U	0.007 U	0.0073 U	0.0073 U	0.0083 U
Alpha Bhc (Alpha Hexachlorocyclohexane)	0.02	0.48	0.0022 U	0.0021 U	0.0022 U	0.0022 U	0.0025 U
Alpha Endosulfan	NS	NS	0.0075 U	0.007 U	0.0073 U	0.0073 U	0.0083 U
Beta Bhc (Beta Hexachlorocyclohexane)	0.036	0.36	0.0022 U	0.0021 U	0.0022 U	0.0022 U	0.0025 U
Beta Endosulfan	NS	NS	0.0075 U	0.007 U	0.0073 U	0.0073 U	0.0083 U
cis-Chlordane	0.094	4.2	0.0075 U	0.007 U	0.0073 U	0.0073 U	0.0083 U
Delta BHC (Delta Hexachlorocyclohexane)	0.04	100	0.0022 U	0.0021 U	0.0022 U	0.0022 U	0.0025 U
Dieldrin	0.005	0.2	0.0022 U	0.0021 U	0.0022 U	0.0022 U	0.0025 U
Endosulfan Sulfate	NS	NS	0.0075 U	0.007 U	0.0073 U	0.0073 U	0.0083 U
Endosulfans ABS	2.4	24	0 U	0 U	0 U	0 U	0 U
Endrin	0.014	11	0.0075 U	0.007 U	0.0073 U	0.0073 U	0.0083 U
Endrin Aldehyde	NS	NS	0.0075 U	0.007 U	0.0073 U	0.0073 U	0.0083 U
Endrin Ketone	NS	NS	0.0075 U	0.007 U	0.0073 U	0.0073 U	0.0083 U
Gamma Bhc (Lindane)	0.1	1.3	0.0022 U	0.0021 U	0.0022 U	0.0022 U	0.0025 U
Heptachlor	0.042	2.1	0.0075 U	0.007 U	0.0073 U	0.0073 U	0.0083 U
Heptachlor Epoxide	NS	NS	0.0075 U	0.007 U	0.0073 U	0.0073 U	0.0083 U
Methoxychlor	NS	NS	0.0075 U	0.007 U	0.0073 U	0.0073 U	0.0083 U
P,P'-DDD	0.0033	13	0.0075 U	0.007 U	0.0073 U	0.0073 U	0.0083 U
P,P'-DDE	0.0033	8.9	0.0075 U	0.007 U	0.0073 U	0.0073 U	0.0083 U
P,P'-DDT	0.0033	7.9	0.0075 U	0.007 U	0.0073 U	0.0073 U	0.0083 U
Toxaphene	NS	NS	0.075 U	0.07 U	0.073 U	0.073 U	0.083 U

Table 6
22-60 46th Street
Queens, New York
Post-Excavation Soil Endpoint Sample Analytical Results
Pesticides

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			EP-10_20220509 460-257822-1 5/09/2022 mg/kg 1	EP-X02_20220509 460-257822-2 5/09/2022 mg/kg 1	EP-11_20220509 460-257822-3 5/09/2022 mg/kg 1	EP-12_20220509 460-257822-4 5/09/2022 mg/kg 1	EP-13_20220509 460-257822-5 5/09/2022 mg/kg 1
Compound	NYSDEC UUSCO	NYSDEC RRSCO	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
Aldrin	0.005	0.097	0.0077 U	0.0077 U	0.0079 U	0.0075 U	0.0077 U
Alpha Bhc (Alpha Hexachlorocyclohexane)	0.02	0.48	0.0023 U	0.0023 U	0.0024 U	0.0022 U	0.0023 U
Alpha Endosulfan	NS	NS	0.0077 U	0.0077 U	0.0079 U	0.0075 U	0.0077 U
Beta Bhc (Beta Hexachlorocyclohexane)	0.036	0.36	0.0023 U	0.0023 U	0.0024 U	0.0022 U	0.0023 U
Beta Endosulfan	NS	NS	0.0077 U	0.0077 U	0.0079 U	0.0075 U	0.0077 U
cis-Chlordane	0.094	4.2	0.0077 U	0.0077 U	0.0079 U	0.0075 U	0.0077 U
Delta BHC (Delta Hexachlorocyclohexane)	0.04	100	0.0023 U	0.0023 U	0.0024 U	0.0022 U	0.0023 U
Dieldrin	0.005	0.2	0.0023 U	0.0023 U	0.0024 U	0.0022 U	0.0023 U
Endosulfan Sulfate	NS	NS	0.0077 U	0.0077 U	0.0079 U	0.0075 U	0.0077 U
Endosulfans ABS	2.4	24	0 U	0 U	0 U	0 U	0 U
Endrin	0.014	11	0.0077 U	0.0077 U	0.0079 U	0.0075 U	0.0077 U
Endrin Aldehyde	NS	NS	0.0077 U	0.0077 U	0.0079 U	0.0075 U	0.0077 U
Endrin Ketone	NS	NS	0.0077 U	0.0077 U	0.0079 U	0.0075 U	0.0077 U
Gamma Bhc (Lindane)	0.1	1.3	0.0023 U	0.0023 U	0.0024 U	0.0022 U	0.0023 U
Heptachlor	0.042	2.1	0.0077 U	0.0077 U	0.0079 U	0.0075 U	0.0077 U
Heptachlor Epoxide	NS	NS	0.0077 U	0.0077 U	0.0079 U	0.0075 U	0.0077 U
Methoxychlor	NS	NS	0.0077 U	0.0077 U	0.0079 U	0.0075 U	0.0077 U
P,P'-DDD	0.0033	13	0.0077 U	0.0077 U	0.0079 U	0.0075 U	0.0077 U
P,P'-DDE	0.0033	8.9	0.0077 U	0.0077 U	0.0079 U	0.0075 U	0.0077 U
P,P'-DDT	0.0033	7.9	0.0077 U	0.0077 U	0.0079 U	0.0075 U	0.0077 U
Toxaphene	NS	NS	0.077 U	0.077 U	0.079 U	0.075 U	0.077 U

Table 6
22-60 46th Street
Queens, New York
Post-Excavation Soil Endpoint Sample Analytical Results
Pesticides

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			EP-14_20220509 460-257822-6 5/09/2022 mg/kg 1	EP-15_20220509 460-257822-7 5/09/2022 mg/kg 1	EP-16_20220509 460-257822-8 5/09/2022 mg/kg 1	EP-17_20220509 460-257822-9 5/09/2022 mg/kg 1	EP-18_20220509 460-257822-10 5/09/2022 mg/kg 1
Compound	NYSDEC UUSCO	NYSDEC RRSCO	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
Aldrin	0.005	0.097	0.0075 U	0.0075 U	0.0073 U	0.0071 U	0.0074 U
Alpha Bhc (Alpha Hexachlorocyclohexane)	0.02	0.48	0.0022 U	0.0022 U	0.0022 U	0.0021 U	0.0022 U
Alpha Endosulfan	NS	NS	0.0075 U	0.0075 U	0.0073 U	0.0071 U	0.0074 U
Beta Bhc (Beta Hexachlorocyclohexane)	0.036	0.36	0.0022 U	0.0022 U	0.0022 U	0.0021 U	0.0022 U
Beta Endosulfan	NS	NS	0.0075 U	0.0075 U	0.0073 U	0.0071 U	0.0074 U
cis-Chlordane	0.094	4.2	0.0075 U	0.0075 U	0.0073 U	0.0071 U	0.0074 U
Delta BHC (Delta Hexachlorocyclohexane)	0.04	100	0.0022 U	0.0022 U	0.0022 U	0.0021 U	0.0022 U
Dieldrin	0.005	0.2	0.0022 U	0.0022 U	0.0022 U	0.0021 U	0.0022 U
Endosulfan Sulfate	NS	NS	0.0075 U	0.0075 U	0.0073 U	0.0071 U	0.0074 U
Endosulfans ABS	2.4	24	0 U	0 U	0 U	0 U	0 U
Endrin	0.014	11	0.0075 U	0.0075 U	0.0073 U	0.0071 U	0.0074 U
Endrin Aldehyde	NS	NS	0.0075 U	0.0075 U	0.0073 U	0.0071 U	0.0074 U
Endrin Ketone	NS	NS	0.0075 U	0.0075 U	0.0073 U	0.0071 U	0.0074 U
Gamma Bhc (Lindane)	0.1	1.3	0.0022 U	0.0022 U	0.0022 U	0.0021 U	0.0022 U
Heptachlor	0.042	2.1	0.0075 U	0.0075 U	0.0073 U	0.0071 U	0.0074 U
Heptachlor Epoxide	NS	NS	0.0075 U	0.0075 U	0.0073 U	0.0071 U	0.0074 U
Methoxychlor	NS	NS	0.0075 U	0.0075 U	0.0073 U	0.0071 U	0.0074 U
P,P'-DDD	0.0033	13	0.0075 U	0.0075 U	0.0073 U	0.0071 U	0.0074 U
P,P'-DDE	0.0033	8.9	0.0075 U	0.0075 U	0.0073 U	0.0071 U	0.0074 U
P,P'-DDT	0.0033	7.9	0.0075 U	0.0075 U	0.0073 U	0.0071 U	0.0074 U
Toxaphene	NS	NS	0.075 U	0.075 U	0.073 U	0.071 U	0.074 U

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Pesticides

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			EP-19_20220509 460-257822-11 5/09/2022 mg/kg 1	EP-20_20220509 460-257822-12 5/09/2022 mg/kg 1	EP-21_20220509 460-257822-15 5/09/2022 mg/kg 1	EP-22_20220509 460-257822-16 5/09/2022 mg/kg 1	EP-23_20220509 460-257822-17 5/09/2022 mg/kg 1
Compound	NYSDEC UUSCO	NYSDEC RRSCO	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
Aldrin	0.005	0.097	0.0072 U	0.0075 U	0.0077 U	0.0087 U	0.0076 U
Alpha Bhc (Alpha Hexachlorocyclohexane)	0.02	0.48	0.0022 U	0.0022 U	0.0023 U	0.0026 U	0.0023 U
Alpha Endosulfan	NS	NS	0.0072 U	0.0075 U	0.0077 U	0.0087 U	0.0076 U
Beta Bhc (Beta Hexachlorocyclohexane)	0.036	0.36	0.0022 U	0.0022 U	0.0023 U	0.0026 U	0.0023 U
Beta Endosulfan	NS	NS	0.0072 U	0.0075 U	0.0077 U	0.0087 U	0.0076 U
cis-Chlordane	0.094	4.2	0.0072 U	0.0075 U	0.0077 U	0.0087 U	0.0076 U
Delta BHC (Delta Hexachlorocyclohexane)	0.04	100	0.0022 U	0.0022 U	0.0023 U	0.0026 U	0.0023 U
Dieldrin	0.005	0.2	0.0022 U	0.0022 U	0.0023 U	0.0026 U	0.0023 U
Endosulfan Sulfate	NS	NS	0.0072 U	0.0075 U	0.0077 U	0.0087 U	0.0076 U
Endosulfans ABS	2.4	24	0 U	0 U	0 U	0 U	0 U
Endrin	0.014	11	0.0072 U	0.0075 U	0.0077 U	0.0087 U	0.0076 U
Endrin Aldehyde	NS	NS	0.0072 U	0.0075 U	0.0077 U	0.0087 U	0.0076 U
Endrin Ketone	NS	NS	0.0072 U	0.0075 U	0.0077 U	0.0087 U	0.0076 U
Gamma Bhc (Lindane)	0.1	1.3	0.0022 U	0.0022 U	0.0023 U	0.0026 U	0.0023 U
Heptachlor	0.042	2.1	0.0072 U	0.0075 U	0.0077 U	0.0087 U	0.0076 U
Heptachlor Epoxide	NS	NS	0.0072 U	0.0075 U	0.0077 U	0.0087 U	0.0076 U
Methoxychlor	NS	NS	0.0072 U	0.0075 U	0.0077 U	0.0087 U	0.0076 U
P,P'-DDD	0.0033	13	0.0072 U	0.0075 U	0.0077 U	0.0087 U	0.0076 U
P,P'-DDE	0.0033	8.9	0.0072 U	0.0075 U	0.0077 U	0.0087 U	0.0076 U
P,P'-DDT	0.0033	7.9	0.0072 U	0.0075 U	0.0077 U	0.0087 U	0.0076 U
Toxaphene	NS	NS	0.072 U	0.075 U	0.077 U	0.087 U	0.076 U

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Pesticides

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			EP-24_20220509 460-257822-18 5/09/2022 mg/kg 1	EP-25_20220509 460-257822-19 5/09/2022 mg/kg 1	EP-26_20220513 460-258122-1 5/13/2022 mg/kg 1	EP-X03_20220513 460-258122-2 5/13/2022 mg/kg 1	EP-27_20220513 460-258122-8 5/13/2022 mg/kg 1
Compound	NYSDEC UUSCO	NYSDEC RRSCO	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
Aldrin	0.005	0.097	0.0077 U	0.0076 U	0.0079 U	0.0075 U	0.0073 U
Alpha Bhc (Alpha Hexachlorocyclohexane)	0.02	0.48	0.0023 U	0.0023 U	0.0024 U	0.0022 U	0.0022 U
Alpha Endosulfan	NS	NS	0.0077 U	0.0076 U	0.0079 U	0.0075 U	0.0073 U
Beta Bhc (Beta Hexachlorocyclohexane)	0.036	0.36	0.0023 U	0.0023 U	0.0024 U	0.0022 U	0.0022 U
Beta Endosulfan	NS	NS	0.0077 U	0.0076 U	0.0079 U	0.0075 U	0.0073 U
cis-Chlordane	0.094	4.2	0.0077 U	0.0076 U	0.0079 U	0.0075 U	0.0073 U
Delta BHC (Delta Hexachlorocyclohexane)	0.04	100	0.0023 U	0.0023 U	0.0024 U	0.0022 U	0.0022 U
Dieldrin	0.005	0.2	0.0023 U	0.0023 U	0.0024 U	0.0022 U	0.0022 U
Endosulfan Sulfate	NS	NS	0.0077 U	0.0076 U	0.0079 U	0.0075 U	0.0073 U
Endosulfans ABS	2.4	24	0 U	0 U	0 U	0 U	0 U
Endrin	0.014	11	0.0077 U	0.0076 U	0.0079 U	0.0075 U	0.0073 U
Endrin Aldehyde	NS	NS	0.0077 U	0.0076 U	0.0079 U	0.0075 U	0.0073 U
Endrin Ketone	NS	NS	0.0077 U	0.0076 U	0.0079 U	0.0075 U	0.0073 U
Gamma Bhc (Lindane)	0.1	1.3	0.0023 U	0.0023 U	0.0024 U	0.0022 U	0.0022 U
Heptachlor	0.042	2.1	0.0077 U	0.0076 U	0.0079 U	0.0075 U	0.0073 U
Heptachlor Epoxide	NS	NS	0.0077 U	0.0076 U	0.0079 U	0.0075 U	0.0073 U
Methoxychlor	NS	NS	0.0077 U	0.0076 U	0.0079 U	0.0075 U	0.0073 U
P,P'-DDD	0.0033	13	0.0077 U	0.0076 U	0.0079 U	0.0075 U	0.0073 U
P,P'-DDE	0.0033	8.9	0.0077 U	0.0076 U	0.0079 U	0.0075 U	0.0073 U
P,P'-DDT	0.0033	7.9	0.0077 U	0.0076 U	0.0079 U	0.0075 U	0.0073 U
Toxaphene	NS	NS	0.077 U	0.076 U	0.079 U	0.075 U	0.073 U

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Pesticides

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			EP-28_20220513 460-258122-9 5/13/2022 mg/kg 1	EP-29_20220701 460-261267-1 7/01/2022 mg/kg 1	EP-X04_20220701 460-261267-2 7/01/2022 mg/kg 1	EP-30_20220701 460-261267-3 7/01/2022 mg/kg 1	EP-31_20220727 460-262709-1 7/27/2022 mg/kg 1
Compound	NYSDEC UUSCO	NYSDEC RRSCO	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
Aldrin	0.005	0.097	0.0083 U	0.0072 U	0.0072 U	0.0074 U	0.0072 U
Alpha Bhc (Alpha Hexachlorocyclohexane)	0.02	0.48	0.0025 U	0.0021 U	0.0021 U	0.0022 U	0.0021 U
Alpha Endosulfan	NS	NS	0.0083 U	0.0072 U	0.0072 U	0.0074 U	0.0072 U
Beta Bhc (Beta Hexachlorocyclohexane)	0.036	0.36	0.0025 U	0.0021 U	0.0021 U	0.0022 U	0.0021 U
Beta Endosulfan	NS	NS	0.0083 U	0.0072 U	0.0072 U	0.0074 U	0.0072 U
cis-Chlordane	0.094	4.2	0.0083 U	0.0072 U	0.0072 U	0.0074 U	0.0072 U
Delta BHC (Delta Hexachlorocyclohexane)	0.04	100	0.0025 U	0.0021 U	0.0021 U	0.0022 U	0.0021 U
Dieldrin	0.005	0.2	0.0025 U	0.0021 U	0.0021 U	0.0022 U	0.0021 U
Endosulfan Sulfate	NS	NS	0.0083 U	0.0072 U	0.0072 U	0.0074 U	0.0072 U
Endosulfans ABS	2.4	24	0 U	0 U	0 U	0 U	0 U
Endrin	0.014	11	0.0083 U	0.0072 U	0.0072 U	0.0074 U	0.0072 U
Endrin Aldehyde	NS	NS	0.0083 U	0.0072 U	0.0072 U	0.0074 U	0.0072 U
Endrin Ketone	NS	NS	0.0083 U	0.0072 U	0.0072 U	0.0074 U	0.0072 U
Gamma Bhc (Lindane)	0.1	1.3	0.0025 U	0.0021 U	0.0021 U	0.0022 U	0.0021 U
Heptachlor	0.042	2.1	0.0083 U	0.0072 U	0.0072 U	0.0074 U	0.0072 U
Heptachlor Epoxide	NS	NS	0.0083 U	0.0072 U	0.0072 U	0.0074 U	0.0072 U
Methoxychlor	NS	NS	0.0083 U	0.0072 U	0.0072 U	0.0074 U	0.0072 U
P,P'-DDD	0.0033	13	0.0083 U	0.0072 U	0.0072 U	0.0074 U	0.0072 U
P,P'-DDE	0.0033	8.9	0.0083 U	0.0072 U	0.0072 U	0.0074 U	0.0072 U
P,P'-DDT	0.0033	7.9	0.0083 U	0.0072 U	0.0072 U	0.0074 U	0.0072 U
Toxaphene	NS	NS	0.083 U	0.072 U	0.072 U	0.074 U	0.072 U

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Pesticides

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			EP-X05_20220727 460-262709-2 7/27/2022 mg/kg 1	EP-32_20220727 460-262709-3 7/27/2022 mg/kg 1	EP-33_20220811 460-263713-1 8/11/2022 mg/kg 1	EP-X06_20220811 460-263713-2 8/11/2022 mg/kg 1	EP-34_20220811 460-263713-3 8/11/2022 mg/kg 1
Compound	NYSDEC UUSCO	NYSDEC RRSCO	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
Aldrin	0.005	0.097	0.0072 U	0.0074 U	0.0076 U	0.0077 U	0.0074 U
Alpha Bhc (Alpha Hexachlorocyclohexane)	0.02	0.48	0.0022 U	0.0022 U	0.0023 U	0.0023 U	0.0022 U
Alpha Endosulfan	NS	NS	0.0072 U	0.0074 U	0.0076 U	0.0077 U	0.0074 U
Beta Bhc (Beta Hexachlorocyclohexane)	0.036	0.36	0.0022 U	0.0022 U	0.0023 U	0.0023 U	0.0022 U
Beta Endosulfan	NS	NS	0.0072 U	0.0074 U	0.0076 U	0.0077 U	0.0074 U
cis-Chlordane	0.094	4.2	0.0072 U	0.0074 U	0.0076 U	0.0077 U	0.0074 U
Delta BHC (Delta Hexachlorocyclohexane)	0.04	100	0.0022 U	0.0022 U	0.0023 U	0.0023 U	0.0022 U
Dieldrin	0.005	0.2	0.0022 U	0.0022 U	0.0023 U	0.0023 U	0.0022 U
Endosulfan Sulfate	NS	NS	0.0072 U	0.0074 U	0.0076 U	0.0077 U	0.0074 U
Endosulfans ABS	2.4	24	0 U	0 U	0 U	0 U	0 U
Endrin	0.014	11	0.0072 U	0.0074 U	0.0076 U	0.0077 U	0.0074 U
Endrin Aldehyde	NS	NS	0.0072 U	0.0074 U	0.0076 U	0.0077 U	0.0074 U
Endrin Ketone	NS	NS	0.0072 U	0.0074 U	0.0076 U	0.0077 U	0.0074 U
Gamma Bhc (Lindane)	0.1	1.3	0.0022 U	0.0022 U	0.0023 U	0.0023 U	0.0022 U
Heptachlor	0.042	2.1	0.0072 U	0.0074 U	0.0076 U	0.0077 U	0.0074 U
Heptachlor Epoxide	NS	NS	0.0072 U	0.0074 U	0.0076 U	0.0077 U	0.0074 U
Methoxychlor	NS	NS	0.0072 U	0.0074 U	0.0076 U	0.0077 U	0.0074 U
P,P'-DDD	0.0033	13	0.0072 U	0.0074 U	0.0076 U	0.0077 U	0.0074 U
P,P'-DDE	0.0033	8.9	0.0072 U	0.0074 U	0.0076 U	0.0077 U	0.0074 U
P,P'-DDT	0.0033	7.9	0.0072 U	0.0074 U	0.0076 U	0.0077 U	0.0074 U
Toxaphene	NS	NS	0.072 U	0.074 U	0.076 U	0.077 U	0.074 U

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Pesticides

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			EP-35_20220830 460-264635-1 8/30/2022 mg/kg 1	EP-X07_20220830 460-264635-2 8/30/2022 mg/kg 1	EP-36_20220830 460-264635-3 8/30/2022 mg/kg 1	FB-01_20220425 460-256954-10 4/25/2022 µg/L 1	FB-01_20220509 460-257822-13 5/09/2022 µg/L 1
Compound	NYSDEC UUSCO	NYSDEC RRSCO	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
Aldrin	0.005	0.097	0.0069 U	0.0073 U	0.0071 U	0.02 U	0.02 U
Alpha Bhc (Alpha Hexachlorocyclohexane)	0.02	0.48	0.0021 U	0.0022 U	0.0021 U	0.02 U	0.02 U
Alpha Endosulfan	NS	NS	0.0069 U	0.0073 U	0.0071 U	0.02 U	0.02 U
Beta Bhc (Beta Hexachlorocyclohexane)	0.036	0.36	0.0021 U	0.0022 U	0.0021 U	0.02 U	0.02 U
Beta Endosulfan	NS	NS	0.0069 U	0.0073 U	0.0071 U	0.02 U	0.02 U
cis-Chlordane	0.094	4.2	0.0069 U	0.0073 U	0.0071 U	0.02 U	0.02 U
Delta BHC (Delta Hexachlorocyclohexane)	0.04	100	0.0021 U	0.0022 U	0.0021 U	0.02 U	0.02 U
Dieldrin	0.005	0.2	0.0021 U	0.0022 U	0.0021 U	0.02 U	0.02 U
Endosulfan Sulfate	NS	NS	0.0069 U	0.0073 U	0.0071 U	0.02 U	0.02 U
Endosulfans ABS	2.4	24	0 U	0 U	0 U	0 U	0 U
Endrin	0.014	11	0.0069 U	0.0073 U	0.0071 U	0.02 U	0.02 U
Endrin Aldehyde	NS	NS	0.0069 U	0.0073 U	0.0071 U	0.02 U	0.02 U
Endrin Ketone	NS	NS	0.0069 U	0.0073 U	0.0071 U	0.02 U	0.02 U
Gamma Bhc (Lindane)	0.1	1.3	0.0021 U	0.0022 U	0.0021 U	0.02 U	0.02 U
Heptachlor	0.042	2.1	0.0069 U	0.0073 U	0.0071 U	0.02 U	0.02 U
Heptachlor Epoxide	NS	NS	0.0069 U	0.0073 U	0.0071 U	0.02 U	0.02 U
Methoxychlor	NS	NS	0.0069 U	0.0073 U	0.0071 U	0.02 U	0.02 U
P,P'-DDD	0.0033	13	0.0069 U	0.0073 U	0.0071 U	0.02 U	0.02 U
P,P'-DDE	0.0033	8.9	0.0069 U	0.0073 U	0.0071 U	0.02 U	0.02 U
P,P'-DDT	0.0033	7.9	0.0069 U	0.0073 U	0.0071 U	0.02 U	0.02 U
Toxaphene	NS	NS	0.069 U	0.073 U	0.071 U	0.5 U	0.5 U

Table 6
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Pesticides

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor			FB-01_20220513 460-258122-10 5/13/2022 µg/L 1	FB-01_20220701 460-261267-4 7/01/2022 µg/L 1	FB-01_20220727 460-262709-4 7/27/2022 µg/L 1	FB-01_20220811 460-263713-4 8/11/2022 µg/L 1	FB-01_20220830 460-264635-4 8/30/2022 µg/L 1
Compound	NYSDEC UUSCO	NYSDEC RRSCO	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
Aldrin	0.005	0.097	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Alpha Bhc (Alpha Hexachlorocyclohexane)	0.02	0.48	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Alpha Endosulfan	NS	NS	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Beta Bhc (Beta Hexachlorocyclohexane)	0.036	0.36	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Beta Endosulfan	NS	NS	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
cis-Chlordane	0.094	4.2	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Delta BHC (Delta Hexachlorocyclohexane)	0.04	100	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Dieldrin	0.005	0.2	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Endosulfan Sulfate	NS	NS	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Endosulfans ABS	2.4	24	0 U	0 U	0 U	0 U	0 U
Endrin	0.014	11	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Endrin Aldehyde	NS	NS	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Endrin Ketone	NS	NS	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Gamma Bhc (Lindane)	0.1	1.3	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Heptachlor	0.042	2.1	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Heptachlor Epoxide	NS	NS	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Methoxychlor	NS	NS	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
P,P'-DDD	0.0033	13	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
P,P'-DDE	0.0033	8.9	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
P,P'-DDT	0.0033	7.9	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Toxaphene	NS	NS	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Table 7
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Post-Excavation Soil Endpoint Sample Analytical Results
Per- and Polyfluoroalkyl Substances (PFAS)

AKRF Sample ID Laboratory Sample ID Date Sampled Dilution Factor Unit			EP-01_20220425 460-256994-1 4/25/2022 1 ppb	EP-X_20220425 460-256994-2 4/25/2022 1 ppb	EP-02_20220425 460-256994-3 4/25/2022 1 ppb	EP-03_20220425 460-256994-4 4/25/2022 1 ppb	EP-04_20220425 460-256994-5 4/25/2022 1 ppb
Compound	NYSDEC UUGV	NYSDEC RRGV	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
6:2 Fluorotelomer sulfonate	NS	NS	0.21 U	0.21 U	0.25 U	0.22 U	0.21 U
8:2 Fluorotelomer sulfonate	NS	NS	0.21 U	0.21 U	0.25 U	0.22 U	0.21 U
N-ethyl perfluorooctanesulfonamidoacetic acid	NS	NS	0.21 R	0.21 R	0.25 U	0.22 U	0.21 R
N-methyl perfluorooctanesulfonamidoacetic acid	NS	NS	0.21 R	0.21 R	0.25 U	0.22 U	0.21 R
Perfluorobutanesulfonic acid	NS	NS	0.42 U	0.43 U	0.49 U	0.44 U	0.43 U
Perfluorobutanoic acid	NS	NS	0.21 U	0.21 U	0.25 U	0.22 U	0.21 U
Perfluorodecanesulfonic acid	NS	NS	0.21 U	0.21 U	0.25 U	0.22 U	0.21 U
Perfluorodecanoic acid	NS	NS	0.21 U	0.21 U	0.25 U	0.22 U	0.21 U
Perfluorododecanoic acid	NS	NS	0.21 U	0.21 U	0.25 U	0.22 U	0.21 U
Perfluoroheptanesulfonic acid	NS	NS	0.21 U	0.21 U	0.25 U	0.22 U	0.21 U
Perfluoroheptanoic acid	NS	NS	0.21 U	0.21 U	0.25 U	0.22 U	0.21 U
Perfluorohexanesulfonic acid	NS	NS	0.21 U	0.21 U	0.25 U	0.22 U	0.21 U
Perfluorohexanoic acid	NS	NS	0.21 U	0.21 U	0.25 U	0.032 J	0.21 U
Perfluorononanoic acid	NS	NS	0.21 U	0.21 U	0.25 U	0.22 U	0.21 U
Perfluorooctanesulfonic acid	0.88	44	0.21 U	0.21 U	0.25 U	0.14 J	0.21 U
Perfluorooctanoic acid	0.66	33	0.031 J	0.023 J	0.031 J	0.078 J	0.21 U
Perfluoropentanoic acid	NS	NS	0.21 U	0.21 U	0.25 U	0.22 U	0.21 U
Perfluorotetradecanoic acid	NS	NS	0.21 U	0.21 U	0.25 U	0.22 U	0.21 U
Perfluorotridecanoic acid	NS	NS	0.21 U	0.21 U	0.25 U	0.22 U	0.21 U
Perfluoroundecanoic acid	NS	NS	0.21 U	0.21 U	0.25 U	0.22 U	0.21 U
Perfluorooctanesulfonamide	NS	NS	0.21 U	0.21 U	0.25 U	0.22 U	0.21 U

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Post-Excavation Soil Endpoint Sample Analytical Results
Per- and Polyfluoroalkyl Substances (PFAS)

AKRF Sample ID Laboratory Sample ID Date Sampled Dilution Factor Unit			EP-05_20220425 460-256994-6 4/25/2022 1 ppb	EP-06_20220425 460-256994-7 4/25/2022 1 ppb	EP-07_20220425 460-256994-8 4/25/2022 1 ppb	EP-08_20220425 460-256994-9 4/25/2022 1 ppb	EP-09_20220425 460-256994-11 4/25/2022 1 ppb
Compound	NYSDEC UUGV	NYSDEC RRGV	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
6:2 Fluorotelomer sulfonate	NS	NS	0.21 U	0.22 U	0.22 U	0.22 U	0.21 U
8:2 Fluorotelomer sulfonate	NS	NS	0.21 U	0.22 U	0.22 U	0.22 U	0.21 U
N-ethyl perfluorooctanesulfonamidoacetic acid	NS	NS	0.21 R	0.22 U	0.22 R	0.22 R	0.21 R
N-methyl perfluorooctanesulfonamidoacetic acid	NS	NS	0.21 R	0.22 U	0.22 R	0.22 R	0.21 R
Perfluorobutanesulfonic acid	NS	NS	0.42 U	0.43 U	0.44 U	0.43 U	0.42 U
Perfluorobutanoic acid	NS	NS	0.21 U	0.22 U	0.22 UJ	0.027 J	0.21 U
Perfluorodecanesulfonic acid	NS	NS	0.21 U	0.22 U	0.22 U	0.22 U	0.21 U
Perfluorodecanoic acid	NS	NS	0.21 U	0.22 U	0.22 UJ	0.22 U	0.21 U
Perfluorododecanoic acid	NS	NS	0.21 U	0.22 U	0.22 U	0.22 U	0.21 U
Perfluoroheptanesulfonic acid	NS	NS	0.21 U	0.22 U	0.22 U	0.22 U	0.21 U
Perfluoroheptanoic acid	NS	NS	0.21 U	0.22 U	0.22 U	0.22 U	0.21 U
Perfluorohexanesulfonic acid	NS	NS	0.21 U	0.22 U	0.22 U	0.22 U	0.21 U
Perfluorohexanoic acid	NS	NS	0.21 U	0.22 U	0.22 U	0.22 U	0.21 U
Perfluorononanoic acid	NS	NS	0.21 U	0.22 U	0.22 UJ	0.22 U	0.21 U
Perfluorooctanesulfonic acid	0.88	44	0.21 U	0.22 U	0.22 U	0.22 U	0.21 U
Perfluorooctanoic acid	0.66	33	0.21 U	0.044 J	0.22 UJ	0.22 U	0.027 J
Perfluoropentanoic acid	NS	NS	0.21 U	0.22 U	0.22 U	0.22 U	0.21 U
Perfluorotetradecanoic acid	NS	NS	0.21 U	0.22 U	0.22 U	0.22 U	0.21 U
Perfluorotridecanoic acid	NS	NS	0.21 U	0.22 U	0.22 U	0.22 U	0.21 U
Perfluoroundecanoic acid	NS	NS	0.21 U	0.22 U	0.22 U	0.22 U	0.21 U
Perfluorooctanesulfonamide	NS	NS	0.21 U	0.22 U	0.22 U	0.22 U	0.21 U

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Post-Excavation Soil Endpoint Sample Analytical Results
Per- and Polyfluoroalkyl Substances (PFAS)

AKRF Sample ID Laboratory Sample ID Date Sampled Dilution Factor Unit			EP-10_20220509 460-257853-1 5/09/2022 1 ppb	EP-X02_20220509 460-257853-2 5/09/2022 1 ppb	EP-11_20220509 460-257853-3 5/09/2022 1 ppb	EP-12_20220509 460-257853-4 5/09/2022 1 ppb	EP-13_20220509 460-257853-5 5/09/2022 1 ppb
Compound	NYSDEC UUGV	NYSDEC RRGV	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
6:2 Fluorotelomer sulfonate	NS	NS	0.23 U	0.23 U	0.23 U	0.22 U	0.23 U
8:2 Fluorotelomer sulfonate	NS	NS	0.23 U	0.23 U	0.23 U	0.22 U	0.23 U
N-ethyl perfluorooctanesulfonamidoacetic acid	NS	NS	0.23 U	0.23 U	0.23 U	0.22 U	0.23 U
N-methyl perfluorooctanesulfonamidoacetic acid	NS	NS	0.038 J	0.23 U	0.23 U	0.22 U	0.23 U
Perfluorobutanesulfonic acid	NS	NS	0.45 U	0.46 U	0.46 U	0.44 U	0.45 U
Perfluorobutanoic acid	NS	NS	0.23 U	0.23 U	0.23 U	0.22 U	0.23 U
Perfluorodecanesulfonic acid	NS	NS	0.23 U	0.23 U	0.23 U	0.22 U	0.23 U
Perfluorodecanoic acid	NS	NS	0.23 U	0.23 U	0.23 U	0.22 U	0.23 U
Perfluorododecanoic acid	NS	NS	0.23 U	0.23 U	0.23 U	0.22 U	0.23 U
Perfluoroheptanesulfonic acid	NS	NS	0.23 U	0.23 U	0.23 U	0.22 U	0.23 U
Perfluoroheptanoic acid	NS	NS	0.23 U	0.23 U	0.23 U	0.22 U	0.23 U
Perfluorohexanesulfonic acid	NS	NS	0.23 U	0.23 U	0.23 U	0.22 U	0.23 U
Perfluorohexanoic acid	NS	NS	0.23 U	0.23 U	0.23 U	0.22 U	0.23 U
Perfluorononanoic acid	NS	NS	0.23 U	0.23 U	0.23 U	0.22 U	0.23 U
Perfluorooctanesulfonic acid	0.88	44	0.089 J	0.14 J	0.12 J	0.061 J	0.075 J
Perfluorooctanoic acid	0.66	33	0.033 J	0.038 J	0.042 J	0.22 U	0.23 U
Perfluoropentanoic acid	NS	NS	0.23 U	0.23 U	0.23 U	0.22 U	0.23 U
Perfluorotetradecanoic acid	NS	NS	0.23 U	0.23 U	0.23 U	0.22 U	0.23 U
Perfluorotridecanoic acid	NS	NS	0.23 U	0.23 U	0.23 U	0.22 U	0.23 U
Perfluoroundecanoic acid	NS	NS	0.23 U	0.23 U	0.23 U	0.22 U	0.23 U
Perfluorooctanesulfonamide	NS	NS	0.23 U	0.23 U	0.23 UJ	0.22 U	0.23 U

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Per- and Polyfluoroalkyl Substances (PFAS)

AKRF Sample ID Laboratory Sample ID Date Sampled Dilution Factor Unit			EP-14_20220509 460-257853-6 5/09/2022 1 ppb	EP-15_20220509 460-257853-7 5/09/2022 1 ppb	EP-16_20220509 460-257853-8 5/09/2022 1 ppb	EP-17_20220509 460-257853-9 5/09/2022 1 ppb	EP-18_20220509 460-257853-10 5/09/2022 1 ppb
Compound	NYSDEC UUGV	NYSDEC RRGV	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
6:2 Fluorotelomer sulfonate	NS	NS	0.23 U	0.22 U	0.22 U	0.21 U	0.22 U
8:2 Fluorotelomer sulfonate	NS	NS	0.23 U	0.22 U	0.22 U	0.21 U	0.22 U
N-ethyl perfluorooctanesulfonamidoacetic acid	NS	NS	0.23 U	0.22 U	0.22 U	0.037 J	0.22 U
N-methyl perfluorooctanesulfonamidoacetic acid	NS	NS	0.23 U	0.22 U	0.22 U	0.21 U	0.22 U
Perfluorobutanesulfonic acid	NS	NS	0.45 U	0.44 U	0.44 U	0.43 U	0.43 U
Perfluorobutanoic acid	NS	NS	0.23 U	0.22 U	0.22 U	0.21 U	0.22 U
Perfluorodecanesulfonic acid	NS	NS	0.23 U	0.22 U	0.22 U	0.21 U	0.22 U
Perfluorodecanoic acid	NS	NS	0.23 U	0.22 U	0.22 U	0.21 U	0.22 U
Perfluorododecanoic acid	NS	NS	0.23 U	0.22 U	0.22 U	0.21 U	0.22 U
Perfluoroheptanesulfonic acid	NS	NS	0.23 U	0.22 U	0.22 U	0.21 U	0.22 U
Perfluoroheptanoic acid	NS	NS	0.23 U	0.22 U	0.22 U	0.21 U	0.22 U
Perfluorohexanesulfonic acid	NS	NS	0.23 U	0.22 U	0.22 U	0.21 U	0.22 U
Perfluorohexanoic acid	NS	NS	0.23 U	0.22 U	0.22 U	0.21 U	0.22 U
Perfluorononanoic acid	NS	NS	0.23 U	0.22 U	0.22 U	0.21 U	0.22 U
Perfluorooctanesulfonic acid	0.88	44	0.1 J	0.22 U	0.22 U	0.041 J	0.22 U
Perfluorooctanoic acid	0.66	33	0.056 J	0.22 U	0.22 U	0.21 U	0.031 J
Perfluoropentanoic acid	NS	NS	0.23 U	0.22 U	0.22 U	0.21 U	0.22 U
Perfluorotetradecanoic acid	NS	NS	0.23 U	0.22 U	0.22 U	0.21 U	0.22 U
Perfluorotridecanoic acid	NS	NS	0.23 U	0.22 U	0.22 U	0.21 U	0.22 U
Perfluoroundecanoic acid	NS	NS	0.23 U	0.22 U	0.22 U	0.21 U	0.22 U
Perfluorooctanesulfonamide	NS	NS	0.23 U	0.22 U	0.22 U	0.21 U	0.22 U

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Per- and Polyfluoroalkyl Substances (PFAS)

AKRF Sample ID Laboratory Sample ID Date Sampled Dilution Factor Unit			EP-19_20220509 460-257853-11 5/09/2022 1 ppb	EP-20_20220509 460-257853-12 5/09/2022 1 ppb	EP-21_20220509 460-257853-14 5/09/2022 1 ppb	EP-22_20220509 460-257853-15 5/09/2022 1 ppb	EP-23_20220509 460-257853-16 5/09/2022 1 ppb
Compound	NYSDEC UUGV	NYSDEC RRGV	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
6:2 Fluorotelomer sulfonate	NS	NS	0.21 U	0.22 U	0.23 U	0.25 U	0.23 U
8:2 Fluorotelomer sulfonate	NS	NS	0.21 U	0.22 U	0.23 U	0.25 U	0.23 U
N-ethyl perfluorooctanesulfonamidoacetic acid	NS	NS	0.21 U	0.22 U	0.23 U	0.25 U	0.23 U
N-methyl perfluorooctanesulfonamidoacetic acid	NS	NS	0.21 U	0.22 U	0.23 U	0.25 U	0.23 U
Perfluorobutanesulfonic acid	NS	NS	0.43 U	0.45 U	0.45 U	0.49 U	0.45 U
Perfluorobutanoic acid	NS	NS	0.21 U	0.22 U	0.23 U	0.25 U	0.23 U
Perfluorodecanesulfonic acid	NS	NS	0.21 U	0.22 U	0.23 U	0.25 U	0.23 U
Perfluorodecanoic acid	NS	NS	0.21 U	0.22 U	0.23 U	0.25 U	0.23 U
Perfluorododecanoic acid	NS	NS	0.21 U	0.22 U	0.23 U	0.25 U	0.23 U
Perfluoroheptanesulfonic acid	NS	NS	0.21 U	0.22 U	0.23 U	0.25 U	0.23 U
Perfluoroheptanoic acid	NS	NS	0.21 U	0.22 U	0.23 U	0.25 U	0.23 U
Perfluorohexanesulfonic acid	NS	NS	0.21 U	0.22 U	0.23 U	0.25 U	0.23 U
Perfluorohexanoic acid	NS	NS	0.21 U	0.22 U	0.23 U	0.25 U	0.23 U
Perfluorononanoic acid	NS	NS	0.21 U	0.22 U	0.23 U	0.25 U	0.23 U
Perfluorooctanesulfonic acid	0.88	44	0.21 U	0.041 J	0.06 J	0.25 U	0.17 J
Perfluorooctanoic acid	0.66	33	0.21 U	0.031 J	0.03 J	0.25 U	0.07 J
Perfluoropentanoic acid	NS	NS	0.21 U	0.22 U	0.23 U	0.25 U	0.23 U
Perfluorotetradecanoic acid	NS	NS	0.21 U	0.22 U	0.23 U	0.25 U	0.23 U
Perfluorotridecanoic acid	NS	NS	0.21 U	0.22 U	0.23 U	0.25 U	0.23 U
Perfluoroundecanoic acid	NS	NS	0.21 U	0.22 U	0.23 U	0.25 U	0.23 U
Perfluorooctanesulfonamide	NS	NS	0.21 U	0.22 UJ	0.23 U	0.25 U	0.23 U

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Per- and Polyfluoroalkyl Substances (PFAS)

AKRF Sample ID Laboratory Sample ID Date Sampled Dilution Factor Unit			EP-24_20220509 460-257853-17 5/09/2022 1 ppb	EP-25_20220509 460-257853-18 5/09/2022 1 ppb	EP-26_20220513 460-258154-1 5/13/2022 1 ppb	EP-X03_20220513 460-258154-2 5/13/2022 1 ppb	EP-27_20220513 460-258154-8 5/13/2022 1 ppb
Compound	NYSDEC UUGV	NYSDEC RRGV	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
6:2 Fluorotelomer sulfonate	NS	NS	0.23 U	0.22 U	0.22 U	0.22 U	0.22 U
8:2 Fluorotelomer sulfonate	NS	NS	0.23 U	0.22 U	0.22 U	0.22 U	0.22 U
N-ethyl perfluorooctanesulfonamidoacetic acid	NS	NS	0.23 U	0.22 U	0.22 U	0.22 U	0.22 U
N-methyl perfluorooctanesulfonamidoacetic acid	NS	NS	0.23 U	0.22 U	0.22 U	0.22 U	0.22 U
Perfluorobutanesulfonic acid	NS	NS	0.46 U	0.45 U	0.45 U	0.45 U	0.43 U
Perfluorobutanoic acid	NS	NS	0.23 U	0.22 U	0.22 U	0.22 U	0.22 U
Perfluorodecanesulfonic acid	NS	NS	0.23 U	0.22 U	0.22 U	0.22 U	0.22 U
Perfluorodecanoic acid	NS	NS	0.23 U	0.22 U	0.22 U	0.22 U	0.22 U
Perfluorododecanoic acid	NS	NS	0.23 U	0.22 U	0.22 U	0.22 U	0.22 U
Perfluoroheptanesulfonic acid	NS	NS	0.23 U	0.22 U	0.22 U	0.22 U	0.22 U
Perfluoroheptanoic acid	NS	NS	0.23 U	0.22 U	0.22 U	0.22 U	0.22 U
Perfluorohexanesulfonic acid	NS	NS	0.23 U	0.22 U	0.22 U	0.22 U	0.22 U
Perfluorohexanoic acid	NS	NS	0.23 U	0.22 U	0.22 U	0.22 U	0.22 U
Perfluorononanoic acid	NS	NS	0.23 U	0.22 U	0.22 U	0.22 U	0.22 U
Perfluorooctanesulfonic acid	0.88	44	0.048 J	0.066 J	0.22 U	0.22 U	0.22 U
Perfluorooctanoic acid	0.66	33	0.041 J	0.22 U	0.037 J	0.046 J	0.063 J
Perfluoropentanoic acid	NS	NS	0.23 U	0.22 U	0.22 U	0.22 U	0.22 U
Perfluorotetradecanoic acid	NS	NS	0.23 U	0.22 U	0.22 U	0.22 U	0.22 U
Perfluorotridecanoic acid	NS	NS	0.23 U	0.22 U	0.22 U	0.22 U	0.22 U
Perfluoroundecanoic acid	NS	NS	0.23 U	0.22 U	0.22 U	0.22 U	0.22 U
Perfluorooctanesulfonamide	NS	NS	0.23 U	0.22 R	0.22 U	0.22 U	0.22 U

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Per- and Polyfluoroalkyl Substances (PFAS)

AKRF Sample ID Laboratory Sample ID Date Sampled Dilution Factor Unit			EP-28_20220513 460-258154-9 5/13/2022 1 ppb	EP-29_20220701 460-261278-1 7/01/2022 1 ppb	EP-X04_20220701 460-261278-2 7/01/2022 1 ppb	EP-30_20220701 460-261278-3 7/01/2022 1 ppb	EP-31_20220727 460-262712-1 7/27/2022 1 ppb
Compound	NYSDEC UUGV	NYSDEC RRGV	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
6:2 Fluorotelomer sulfonate	NS	NS	0.22 U	2.06 U	2.18 U	2.15 U	2.12 U
8:2 Fluorotelomer sulfonate	NS	NS	0.22 U	2.06 U	2.18 U	2.15 U	2.12 U
N-ethyl perfluorooctanesulfonamidoacetic acid	NS	NS	0.22 U	2.06 U	2.18 U	2.15 U	2.12 U
N-methyl perfluorooctanesulfonamidoacetic acid	NS	NS	0.22 R	2.06 U	2.18 U	2.15 U	2.12 U
Perfluorobutanesulfonic acid	NS	NS	0.44 U	0.21 U	0.22 U	0.22 U	0.21 U
Perfluorobutanoic acid	NS	NS	0.22 U	0.51 U	0.54 U	0.54 U	0.53 U
Perfluorodecanesulfonic acid	NS	NS	0.22 U	0.21 U	0.22 U	0.22 U	0.21 U
Perfluorodecanoic acid	NS	NS	0.22 U	0.21 U	0.22 U	0.22 U	0.21 U
Perfluorododecanoic acid	NS	NS	0.22 U	0.21 U	0.22 U	0.22 U	0.21 U
Perfluoroheptanesulfonic acid	NS	NS	0.22 U	0.21 U	0.22 U	0.22 U	0.21 U
Perfluoroheptanoic acid	NS	NS	0.22 U	0.21 U	0.22 U	0.22 U	0.21 U
Perfluorohexanesulfonic acid	NS	NS	0.22 U	0.21 U	0.22 U	0.22 U	0.21 U
Perfluorohexanoic acid	NS	NS	0.22 U	0.21 U	0.22 U	0.22 U	0.21 U
Perfluorononanoic acid	NS	NS	0.22 U	0.21 U	0.22 U	0.22 U	0.21 U
Perfluorooctanesulfonic acid	0.88	44	0.22 U	0.21 U	0.22 U	0.22 U	0.21 U
Perfluorooctanoic acid	0.66	33	0.042 J	0.21 U	0.22 U	0.22 U	0.21 U
Perfluoropentanoic acid	NS	NS	0.22 U	0.21 U	0.22 U	0.22 U	0.21 U
Perfluorotetradecanoic acid	NS	NS	0.22 U	0.21 U	0.22 U	0.22 U	0.21 U
Perfluorotridecanoic acid	NS	NS	0.22 U	0.21 U	0.22 U	0.22 U	0.21 U
Perfluoroundecanoic acid	NS	NS	0.22 U	0.21 U	0.22 U	0.22 U	0.21 U
Perfluorooctanesulfonamide	NS	NS	0.22 U	0.21 U	0.22 U	0.22 U	0.21 U

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Per- and Polyfluoroalkyl Substances (PFAS)

AKRF Sample ID Laboratory Sample ID Date Sampled Dilution Factor Unit			EP-X05_20220727 460-262712-2 7/27/2022 1 ppb	EP-32_20220727 460-262712-3 7/27/2022 1 ppb	EP-33_20220811 460-263714-1 8/11/2022 1 ppb	EP-X06_20220811 460-263714-2 8/11/2022 1 ppb	EP-34_20220811 460-263714-3 8/11/2022 1 ppb
Compound	NYSDEC UUGV	NYSDEC RRGV	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
6:2 Fluorotelomer sulfonate	NS	NS	2.13 U	2.1 U	2.17 U	2.21 U	2.15 U
8:2 Fluorotelomer sulfonate	NS	NS	2.13 U	2.1 U	2.17 U	2.21 U	2.15 U
N-ethyl perfluorooctanesulfonamidoacetic acid	NS	NS	2.13 U	2.1 U	2.17 U	2.21 U	2.15 U
N-methyl perfluorooctanesulfonamidoacetic acid	NS	NS	2.13 U	2.1 U	2.17 U	2.21 U	2.15 U
Perfluorobutanesulfonic acid	NS	NS	0.21 U	0.21 U	0.22 U	0.22 U	0.21 U
Perfluorobutanoic acid	NS	NS	0.53 U	0.52 U	0.54 U	0.55 U	0.54 U
Perfluorodecanesulfonic acid	NS	NS	0.21 U	0.21 U	0.22 U	0.22 U	0.21 U
Perfluorodecanoic acid	NS	NS	0.21 U	0.21 U	0.22 U	0.22 U	0.21 U
Perfluorododecanoic acid	NS	NS	0.21 U	0.21 U	0.22 U	0.22 U	0.21 U
Perfluoroheptanesulfonic acid	NS	NS	0.21 U	0.21 U	0.22 U	0.22 U	0.21 U
Perfluoroheptanoic acid	NS	NS	0.21 U	0.21 U	0.22 U	0.22 U	0.21 U
Perfluorohexanesulfonic acid	NS	NS	0.21 U	0.21 U	0.22 U	0.22 U	0.21 U
Perfluorohexanoic acid	NS	NS	0.21 U	0.21 U	0.22 U	0.22 U	0.21 U
Perfluorononanoic acid	NS	NS	0.21 U	0.21 U	0.22 U	0.22 U	0.21 U
Perfluorooctanesulfonic acid	0.88	44	0.21 U	0.21 U	0.22 U	0.22 U	0.21 U
Perfluorooctanoic acid	0.66	33	0.21 U	0.21 U	0.22 U	0.22 U	0.21 U
Perfluoropentanoic acid	NS	NS	0.21 U	0.21 U	0.22 U	0.22 U	0.21 U
Perfluorotetradecanoic acid	NS	NS	0.21 U	0.21 U	0.22 U	0.22 U	0.21 U
Perfluorotridecanoic acid	NS	NS	0.21 U	0.21 U	0.22 U	0.22 U	0.21 U
Perfluoroundecanoic acid	NS	NS	0.21 U	0.21 U	0.22 U	0.22 U	0.21 U
Perfluorooctanesulfonamide	NS	NS	0.21 U	0.21 U	0.22 U	0.22 U	0.21 U

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Per- and Polyfluoroalkyl Substances (PFAS)

AKRF Sample ID Laboratory Sample ID Date Sampled Dilution Factor Unit			EP-35_20220830 460-264649-1 8/30/2022 1 ppb	EP-X07_20220830 460-264649-2 8/30/2022 1 ppb	EP-36_20220830 460-264649-3 8/30/2022 1 ppb	FB-01_20220425 460-256994-10 4/25/2022 1 ppt	FB-01_20220509 460-257853-13 5/09/2022 1 ppt
Compound	NYSDEC UUGV	NYSDEC RRGV	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
6:2 Fluorotelomer sulfonate	NS	NS	2.11 U	2.08 U	2.1 U	4.38 U	4.24 U
8:2 Fluorotelomer sulfonate	NS	NS	2.11 U	2.08 U	2.1 U	2.63 U	2.54 U
N-ethyl perfluorooctanesulfonamidoacetic acid	NS	NS	0.1 J	2.08 U	2.1 U	2.63 U	2.54 U
N-methyl perfluorooctanesulfonamidoacetic acid	NS	NS	2.11 U	2.08 U	2.1 U	1.75 U	1.7 U
Perfluorobutanesulfonic acid	NS	NS	0.21 U	0.21 U	0.21 U	1.75 U	1.7 U
Perfluorobutanoic acid	NS	NS	0.53 U	0.52 U	0.53 U	4.38 U	4.24 U
Perfluorodecanesulfonic acid	NS	NS	0.21 U	0.21 U	0.21 U	1.75 U	1.7 U
Perfluorodecanoic acid	NS	NS	0.033 J	0.21 U	0.21 U	1.75 U	1.7 U
Perfluorododecanoic acid	NS	NS	0.21 U	0.21 U	0.21 U	1.75 U	1.7 U
Perfluoroheptanesulfonic acid	NS	NS	0.21 U	0.21 U	0.21 U	1.75 U	1.7 U
Perfluoroheptanoic acid	NS	NS	0.21 U	0.21 U	0.21 U	1.75 U	1.7 U
Perfluorohexanesulfonic acid	NS	NS	0.21 U	0.21 U	0.21 U	1.75 U	1.7 U
Perfluorohexanoic acid	NS	NS	0.21 U	0.21 U	0.21 U	1.75 U	1.7 U
Perfluorononanoic acid	NS	NS	0.21 U	0.21 U	0.21 U	1.75 U	1.7 U
Perfluorooctanesulfonic acid	0.88	44	0.21	0.14 J	0.21 U	1.75 U	1.7 U
Perfluorooctanoic acid	0.66	33	0.075 J	0.21 U	0.21 U	1.75 U	1.7 U
Perfluoropentanoic acid	NS	NS	0.21 U	0.21 U	0.21 U	1.75 U	1.7 U
Perfluorotetradecanoic acid	NS	NS	0.21 U	0.21 U	0.21 U	1.75 U	1.7 U
Perfluorotridecanoic acid	NS	NS	0.21 U	0.21 U	0.21 U	1.75 U	1.7 U
Perfluoroundecanoic acid	NS	NS	0.21 U	0.21 U	0.21 U	1.75 U	1.7 U
Perfluorooctanesulfonamide	NS	NS	0.21 U	0.21 U	0.21 U	1.75 U	1.7 U

Table 7
22-60 46th Street
Queens, New York
Post-Excavation Soil Endpoint Sample Analytical Results
Per- and Polyfluoroalkyl Substances (PFAS)

AKRF Sample ID Laboratory Sample ID Date Sampled Dilution Factor Unit			FB-01_20220513 460-258154-10 5/13/2022 1 ppt	FB-01_20220701 460-261278-4 7/01/2022 1 ppt	FB-01_20220727 460-262712-4 7/27/2022 1 ppt	FB-01_20220811 460-263714-4 8/11/2022 1 ppt	FB-01_20220830 460-264649-4 8/30/2022 1 ppt
Compound	NYSDEC UUGV	NYSDEC RRGV	CONC Q	CONC Q	CONC Q	CONC Q	CONC Q
6:2 Fluorotelomer sulfonate	NS	NS	4.16 U	4.49 U	4.26 U	4.19 U	4.42 U
8:2 Fluorotelomer sulfonate	NS	NS	2.5 U	1.8 U	1.7 U	1.68 U	1.77 U
N-ethyl perfluorooctanesulfonamidoacetic acid	NS	NS	2.5 U	4.49 U	4.26 U	4.19 U	4.42 U
N-methyl perfluorooctanesulfonamidoacetic acid	NS	NS	1.66 U	4.49 U	4.26 U	4.19 U	4.42 U
Perfluorobutanesulfonic acid	NS	NS	1.66 U	1.8 U	1.7 U	1.68 U	1.77 U
Perfluorobutanoic acid	NS	NS	4.16 U	4.49 U	4.26 U	4.19 U	4.42 U
Perfluorodecanesulfonic acid	NS	NS	1.66 U	1.8 U	1.7 U	1.68 U	1.77 U
Perfluorodecanoic acid	NS	NS	1.66 U	1.8 U	1.7 U	1.68 U	1.77 U
Perfluorododecanoic acid	NS	NS	1.66 U	1.8 U	1.7 U	1.68 U	1.77 U
Perfluoroheptanesulfonic acid	NS	NS	1.66 U	1.8 U	1.7 U	1.68 U	1.77 U
Perfluoroheptanoic acid	NS	NS	1.66 U	1.8 U	1.7 U	1.68 U	1.77 U
Perfluorohexanesulfonic acid	NS	NS	1.66 U	1.8 U	1.7 U	1.68 U	1.77 U
Perfluorohexanoic acid	NS	NS	1.66 U	1.8 U	1.7 U	1.68 U	1.77 U
Perfluorononanoic acid	NS	NS	1.66 U	1.8 U	1.7 U	0.97 J	1.77 U
Perfluorooctanesulfonic acid	0.88	44	0.42 J	1.8 U	1.7 U	1.68 U	1.77 U
Perfluorooctanoic acid	0.66	33	1.66 U	1.8 U	1.7 U	1.68 U	1.77 U
Perfluoropentanoic acid	NS	NS	1.66 U	1.8 U	1.7 U	1.68 U	1.77 U
Perfluorotetradecanoic acid	NS	NS	1.66 U	1.8 U	1.7 U	1.68 U	1.77 U
Perfluorotridecanoic acid	NS	NS	1.66 U	1.8 U	1.7 U	1.68 U	1.77 U
Perfluoroundecanoic acid	NS	NS	1.66 U	1.8 U	1.7 U	1.68 U	1.77 U
Perfluorooctanesulfonamide	NS	NS	1.66 U	1.8 U	1.7 U	1.68 U	1.77 U

Tables 2-7
22-60 46th Street
Queens, New York
Post-Excavation Soil Endpoint Sample Analytical Results
Notes

DEFINITIONS

J : The concentration given is an estimated value.

K : Reported concentration value is proportional to dilution factor and may be exaggerated.

L : Sample result is estimated and biased low.

NS : No standard.

T : Indicates that a quality control parameter has exceeded laboratory limits.

U : The analyte was not detected at the indicated concentration.

mg/kg : milligrams per kilogram

ppb : parts per billion

ppt : parts per trillion

µg/L : micrograms per liter

STANDARDS

Part 375 Soil Cleanup Objectives : Soil Cleanup Objectives listed in New York State Department of Environmental Conservation (NYSDEC) "Part 375" Regulations [6 New York Codes, Rules and Regulations (NYCRR) Part 375].

Exceedances of Part 375 Unrestricted Use Soil Cleanup Objectives (UUSCOs) are highlighted in bold font.

Exceedances of Part 375 Restricted Residential Soil Cleanup Objectives (RRSCOs) are highlighted in gray shading.

NYSDEC Part 375 PFAS Guidance Values : New York State Department of Environmental Conservation (NYSDEC) Sampling, Analysis and Assessment Of Per- and Polyfluoroalkyl Substances (PFAS) Under NYSDCE's Part 375 Remedial Programs Issued January 2021.

Exceedances of NYSDCE PFAS Unrestricted Use Guidance Values (UUGVs) are highlighted in bold font.

Exceedances of NYSDCE PFAS Restricted Residential Guidance Values (RRGVs) are highlighted in gray shading.

DUPLICATES

EP-X_20220425 is a blind duplicate of sample EP-01_20220425

EP-X02_20220509 is a blind duplicate of sample EP-10_20220509

EP-X03_20220513 is a blind duplicate of sample EP-26_20220513

EP-X04_20220701 is a blind duplicate of sample EP-29_20220701

EP-X05_20220727 is a blind duplicate of sample EP-31_20220727

EP-X06_20220811 is a blind duplicate of sample EP-33_20220811

EP-X07_20220830 is a blind duplicate of sample EP-35_20220830

Table 8
22-60 46th Street
Queens, NY
Baseline and Pre-Remedial Groundwater Results
Chlorinated Volatile Organic Compounds

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor		ISCO-MW-01_20220228 460-253384-6 2/28/2022 11:55:00 AM ug/L 1	ISCO-MW-02_20220228 460-253384-7 2/28/2022 12:15:00 PM ug/L 1	RI-MW-01_20201222 460-225478-7 12/22/2020 12:30:00 PM ug/L 1	RI-MW-02_20201222 460-225478-5 12/22/2020 2:45:00 PM ug/L 1
Compound	AWQSGV				
1,1,1-Trichloroethane	5	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	5	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1	1 U	1 U	1 U	1 U
1,1-Dichloroethane	5	1 U	1 U	1 U	1 U
1,1-Dichloroethene	5	1 U	1 U	1 U	1 U
1,2-Dichloroethane	0.6	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1	1 U	1 U	1 U	1 U
Bromodichloromethane	50	1 UJ	1 UJ	1 U	1 U
Carbon Tetrachloride	5	1 UJ	1 UJ	1 U	1 U
Chlorobenzene	5	1 U	1 U	1 U	1 U
Chloroethane	5	1 U	1 U	1 U	1 U
Chloroform	7	0.88 J	0.7 J	1.1	1.8
Chloromethane	5	1 U	1 U	1 U	1 U
Cis-1,2-Dichloroethylene	5	1 U	1 U	1 U	1 U
Cis-1,3-Dichloropropene	NS	1 U	1 U	1 U	1 U
Dibromochloromethane	50	1 UJ	1 UJ	1 U	1 U
Methylene Chloride	5	1 U	1 U	1 U	1 U
Tetrachloroethylene (PCE)	5	3.7	4.1	2.1	2
Trans-1,2-Dichloroethene	5	1 U	1 U	1 U	1 U
Trans-1,3-Dichloropropene	NS	1 U	1 U	1 U	1 U
Trichloroethylene (TCE)	5	1 U	1 U	1 U	1 U
Vinyl Chloride	2	1 U	1 U	1 U	1 U

Table 8
22-60 46th Street
Queens, NY
Baseline and Pre-Remedial Groundwater Results
Chlorinated Volatile Organic Compounds

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor		RI-MW-03_20201222 460-225478-4 12/22/2020 2:10:00 PM ug/L 1	RI-MW-04_20201222 460-225478-6 12/22/2020 10:30:00 AM ug/L 1	RI-MW-05_20201222 460-225478-8 12/22/2020 11:00:00 AM ug/L 1	RI-MW-0X_20201222 460-225478-9 12/23/2020 12:25:00 PM ug/L 1
Compound	AWQSGV				
1,1,1-Trichloroethane	5	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	5	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1	1 U	1 U	1 U	1 U
1,1-Dichloroethane	5	1 U	1 U	1 U	1 U
1,1-Dichloroethene	5	1 U	1 U	1 U	1 U
1,2-Dichloroethane	0.6	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1	1 U	1 U	1 U	1 U
Bromodichloromethane	50	1 U	1 U	1 U	1 U
Carbon Tetrachloride	5	1 U	1 U	1 U	1 U
Chlorobenzene	5	1 U	1 U	1 U	1 U
Chloroethane	5	1 U	1 U	1 U	1 U
Chloroform	7	6.2	9	1 U	1 U
Chloromethane	5	1 U	1 U	1 U	1 U
Cis-1,2-Dichloroethylene	5	1 U	1 U	1 U	1 U
Cis-1,3-Dichloropropene	NS	1 U	1 U	1 U	1 U
Dibromochloromethane	50	1 U	1 U	1 U	1 U
Methylene Chloride	5	1 U	1 U	1 U	1 U
Tetrachloroethylene (PCE)	5	1.6	5.3	14	14
Trans-1,2-Dichloroethene	5	1 U	1 U	1 U	1 U
Trans-1,3-Dichloropropene	NS	1 U	1 U	1 U	1 U
Trichloroethylene (TCE)	5	1 U	0.42 J	1 U	1 U
Vinyl Chloride	2	1 U	1 U	1 U	1 U

Table 8
22-60 46th Street
Queens, NY
Baseline and Pre-Remedial Groundwater Results
Chlorinated Volatile Organic Compounds

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor		RI-MW-06_20210521 460-235169-1 5/21/2021 9:50:00 AM ug/L 1	RI-MW-0X_20210521 460-235169-8 5/21/2021 10:15:00 AM ug/L 1	RI-MW-06A_20220531 460-259088-1 5/31/2022 8:25:00 AM ug/L 1	RI-MW-X_20220531 460-259088-2 5/31/2022 8:45:00 AM ug/L 1
Compound	AWQSGV				
1,1,1-Trichloroethane	5	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	5	1 UJ	1 UJ	1 U	1 U
1,1,2-Trichloroethane	1	1 U	1 U	1 U	1 U
1,1-Dichloroethane	5	1 U	1 U	1 U	1 U
1,1-Dichloroethene	5	1 U	1 U	1 U	1 U
1,2-Dichloroethane	0.6	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1	1 U	1 U	1 U	1 U
Bromodichloromethane	50	1 U	1 U	0.64 J	0.58 J
Carbon Tetrachloride	5	1 U	1 U	1 U	1 U
Chlorobenzene	5	1 U	1 U	1 U	1 U
Chloroethane	5	1 U	1 U	1 U	1 U
Chloroform	7	1 U	1 U	13	14
Chloromethane	5	1 U	1 U	1 UJ	1 UJ
Cis-1,2-Dichloroethylene	5	1 U	1 U	1 U	1 U
Cis-1,3-Dichloropropene	NS	1 U	1 U	1 U	1 U
Dibromochloromethane	50	1 U	1 U	1 U	1 U
Methylene Chloride	5	1 U	1 U	1 U	1 U
Tetrachloroethylene (PCE)	5	24	20	15	19
Trans-1,2-Dichloroethene	5	1 U	1 U	1 U	1 U
Trans-1,3-Dichloropropene	NS	1 U	1 U	1 U	1 U
Trichloroethylene (TCE)	5	1 U	1 U	0.41 J	0.33 J
Vinyl Chloride	2	1 U	1 U	1 UJ	1 UJ

Table 8
22-60 46th Street
Queens, NY
Baseline and Pre-Remedial Groundwater Results
Chlorinated Volatile Organic Compounds

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor		RI-MW-07_20210521 460-235169-3 5/21/2021 1:15:00 PM ug/L 1	RI-MW-07_20220228 460-253384-1 2/28/2022 10:50:00 AM ug/L 1	RI-MW-07-E_20220228 460-253384-3 2/28/2022 10:10:00 AM ug/L 1	RI-MW-07-N_20220228 460-253384-2 2/28/2022 9:10:00 AM ug/L 1
Compound	AWQSGV				
1,1,1-Trichloroethane	5	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	5	1 UJ	1 U	1 U	1 U
1,1,2-Trichloroethane	1	1 U	1 U	1 U	1 U
1,1-Dichloroethane	5	1 U	1 U	1 U	1 U
1,1-Dichloroethene	5	1 U	1 U	1 U	1 U
1,2-Dichloroethane	0.6	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1	1 U	1 U	1 U	1 U
Bromodichloromethane	50	1 U	1 UJ	1 UJ	1 UJ
Carbon Tetrachloride	5	1 U	1 UJ	1 UJ	1 UJ
Chlorobenzene	5	1 U	1 U	1 U	1 U
Chloroethane	5	1 U	1 U	1 U	1 U
Chloroform	7	1.8	0.5 J	0.59 J	0.56 J
Chloromethane	5	1 U	1 U	1 U	1 U
Cis-1,2-Dichloroethylene	5	1 U	1 U	1 U	1 U
Cis-1,3-Dichloropropene	NS	1 U	1 U	1 U	1 U
Dibromochloromethane	50	1 U	1 UJ	1 UJ	1 UJ
Methylene Chloride	5	1 U	1 U	1 U	1 U
Tetrachloroethylene (PCE)	5	28	21	13	10
Trans-1,2-Dichloroethene	5	1 U	1 U	1 U	1 U
Trans-1,3-Dichloropropene	NS	1 U	1 U	1 U	1 U
Trichloroethylene (TCE)	5	1 U	1 U	1 U	1 U
Vinyl Chloride	2	1 U	1 U	1 U	1 U

Table 8
22-60 46th Street
Queens, NY
Baseline and Pre-Remedial Groundwater Results
Chlorinated Volatile Organic Compounds

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor		RI-MW-07-S_20220228 460-253384-4 2/28/2022 8:55:00 AM ug/L 1	RI-MW-07-W_20220228 460-253384-5 2/28/2022 10:00:00 AM ug/L 1	RI-MW-X_20220228 460-253384-8 2/28/2022 9:00:00 AM ug/L 1	RI-MW-08_20210521 460-235169-9 5/21/2021 4:15:00 PM ug/L 1
Compound	AWQSGV				
1,1,1-Trichloroethane	5	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	5	1 U	1 U	1 U	1 UJ
1,1,2-Trichloroethane	1	1 U	1 U	1 U	1 U
1,1-Dichloroethane	5	1 U	1 U	1 U	1 U
1,1-Dichloroethene	5	1 U	1 U	1 U	1 U
1,2-Dichloroethane	0.6	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1	1 U	1 U	1 U	1 U
Bromodichloromethane	50	1 UJ	1 UJ	1 UJ	1 U
Carbon Tetrachloride	5	1 UJ	1 UJ	1 UJ	1 U
Chlorobenzene	5	1 U	1 U	1 U	1 U
Chloroethane	5	1 U	1 U	1 U	1 U
Chloroform	7	7.9	0.7 J	0.53 J	1.2
Chloromethane	5	1 U	1 U	1 U	1 U
Cis-1,2-Dichloroethylene	5	1 U	1 U	1 U	1 U
Cis-1,3-Dichloropropene	NS	1 U	1 U	1 U	1 U
Dibromochloromethane	50	1 UJ	1 UJ	1 UJ	1 U
Methylene Chloride	5	1 U	1 U	1 U	1 U
Tetrachloroethylene (PCE)	5	5.6	14	10	12
Trans-1,2-Dichloroethene	5	1 U	1 U	1 U	1 U
Trans-1,3-Dichloropropene	NS	1 U	1 U	1 U	1 U
Trichloroethylene (TCE)	5	1 U	1 U	1 U	1 U
Vinyl Chloride	2	1 U	1 U	1 U	1 U

Table 8
22-60 46th Street
Queens, NY
Baseline and Pre-Remedial Groundwater Results
Chlorinated Volatile Organic Compounds

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor		RI-MW-09_20210521 460-235169-4 5/21/2021 11:35:00 AM ug/L 1	RI-MW-10_20210521 460-235169-5 5/21/2021 10:00:00 AM ug/L 1	RI-MW-11_20210521 460-235169-2 5/21/2021 2:30:00 PM ug/L 1	FB-01_20220531 460-259088-4 5/31/2022 8:35:00 AM ug/L 1
Compound	AWQSGV				
1,1,1-Trichloroethane	5	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	5	1 UJ	1 UJ	1 UJ	1 U
1,1,2-Trichloroethane	1	1 U	1 U	1 U	1 U
1,1-Dichloroethane	5	1 U	1 U	1 U	1 U
1,1-Dichloroethene	5	1 U	1 U	1 U	1 U
1,2-Dichloroethane	0.6	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1	1 U	1 U	1 U	1 U
Bromodichloromethane	50	1 U	1 U	1 U	1 U
Carbon Tetrachloride	5	1 U	1 U	1 U	1 U
Chlorobenzene	5	1 U	1 U	1 U	1 U
Chloroethane	5	1 U	1 U	1	1 U
Chloroform	7	3.1	1.3	1.2	1 U
Chloromethane	5	1 U	1 U	1 U	1 U
Cis-1,2-Dichloroethylene	5	1 U	1 U	1 U	1 U
Cis-1,3-Dichloropropene	NS	1 U	1 U	1 U	1 U
Dibromochloromethane	50	1 U	1 U	1 U	1 U
Methylene Chloride	5	1 U	1 U	1 U	1 U
Tetrachloroethylene (PCE)	5	16	2.2	4.2	1 U
Trans-1,2-Dichloroethene	5	1 U	1 U	1 U	1 U
Trans-1,3-Dichloropropene	NS	1 U	1 U	1 U	1 U
Trichloroethylene (TCE)	5	1 U	1 U	1 U	1 U
Vinyl Chloride	2	1 U	1 U	1 U	1 UJ

Table 8
22-60 46th Street
Queens, NY
Baseline and Pre-Remedial Groundwater Results
Chlorinated Volatile Organic Compounds

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor		RI-FB-W-01_20201222 460-225478-2 12/22/2020 11:00:00 AM ug/L 1	RI-FB-W-01_20210521 460-235169-7 5/21/2021 3:40:00 PM ug/L 1	RI-TB-W-01_20210521 460-235169-6 5/21/2021 ug/L 1	TB-01_20220531 460-259088-3 5/31/2022 8:45:00 AM ug/L 1
Compound	AWQSGV				
1,1,1-Trichloroethane	5	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	5	1 U	1 UJ	1 UJ	1 U
1,1,2-Trichloroethane	1	1 U	1 U	1 U	1 U
1,1-Dichloroethane	5	1 U	1 U	1 U	1 U
1,1-Dichloroethene	5	1 U	1 U	1 U	1 U
1,2-Dichloroethane	0.6	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1	1 U	1 U	1 U	1 U
Bromodichloromethane	50	1 U	1 U	1 U	1 U
Carbon Tetrachloride	5	1 U	1 U	1 U	1 U
Chlorobenzene	5	1 U	1 U	1 U	1 U
Chloroethane	5	1 U	1 U	1 U	1 U
Chloroform	7	1 U	1 U	1 U	1 U
Chloromethane	5	1 U	1 U	1 U	1 U
Cis-1,2-Dichloroethylene	5	1 U	1 U	1 U	1 U
Cis-1,3-Dichloropropene	NS	1 U	1 U	1 U	1 U
Dibromochloromethane	50	1 U	1 U	1 U	1 U
Methylene Chloride	5	1 U	1 U	1 U	1 U
Tetrachloroethylene (PCE)	5	1 U	1 U	1 U	1 U
Trans-1,2-Dichloroethene	5	1 U	1 U	1 U	1 U
Trans-1,3-Dichloropropene	NS	1 U	1 U	1 U	1 U
Trichloroethylene (TCE)	5	1 U	1 U	1 U	1 U
Vinyl Chloride	2	1 U	1 U	1 U	1 UJ

Table 8
22-60 46th Street
Queens, NY
Baseline and Pre-Remedial Groundwater Sample Results
Notes

DEFINITIONS

J : The concentration given is an estimated value.

NS : No standard.

U : The analyte was not detected at the indicated concentration.

µg/L : micrograms per liter

STANDARDS

NYSDEC New York State Department of Environmental Conservation (NYSDEC) Technical and Operational
Class GA : Guidance Series (1.1.1): Class GA Ambient Water Quality Standards and Guidance Values
AWQSGVs (AWQSGVs).

Exceedances of NYSDEC Class GA AWQSGVs are highlighted in bold font.

DUPLICATES

RI-MW-0X_20201222 is a duplicate of RI-MW-05_20201222

RI-MW-0X_20210521 is a blind duplicate of RI-MW-06_20210521

RI-MW-X_20220531 is a blind duplicate of RI-MW-06A_20220531

RI-MW-X_20220228 is a blind duplicate of RI-MW-07-W_20220228

Table 9
22-60 46th Street
Queens, NY
Post-Remedial Groundwater Sample Results
Chlorinated Volatile Organic Compounds

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor		RI-MW-05A_20220715 460-262024-2 7/15/2022 µg/L 1	RI-MW-06A_20220714 460-261934-1 7/14/2022 µg/L 1	RI-MW-X_20220714 460-261934-2 7/14/2022 µg/L 1	RI-MW-07_20220406 460-255745-7 4/06/2022 µg/L 1
Compound	AWQSGV				
1,1,1-Trichloroethane	5	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	5	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1	1 U	1 U	1 U	1 U
1,1-Dichloroethane	5	1 U	1 U	1 U	1 U
1,1-Dichloroethene	5	1 U	1 U	1 U	1 U
1,2-Dichloroethane	0.6	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1	1 U	1 U	1 U	1 U
Bromodichloromethane	50	1 U	0.57 J	0.65 J	1 U
Carbon Tetrachloride	5	1 U	1 U	1 U	1 U
Chlorobenzene	5	1 U	1 U	1 U	1 U
Chloroethane	5	1 U	1 U	1 U	1 U
Chloroform	7	7	8	8.2	0.7 J
Chloromethane	5	1 U	1 U	1 U	1 U
Cis-1,2-Dichloroethylene	5	1 U	1 U	1 U	1 U
Cis-1,3-Dichloropropene	NS	1 U	1 U	1 U	1 U
Dibromochloromethane	50	1 U	1 U	1 U	1 U
Methylene Chloride	5	1 U	1 U	1 U	1 U
Tetrachloroethylene (PCE)	5	18	5.7	6.3	23
Trans-1,2-Dichloroethene	5	1 U	1 U	1 U	1 U
Trans-1,3-Dichloropropene	NS	1 U	1 U	1 U	1 U
Trichloroethylene (TCE)	5	1 U	1 U	1 U	1 U
Vinyl Chloride	2	1 U	1 U	1 U	1 U

Table 9
22-60 46th Street
Queens, NY
Post-Remedial Groundwater Sample Results
Chlorinated Volatile Organic Compounds

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor		RI-MW-07A_20220715 460-262024-3 7/15/2022 µg/L 1	RI-MW-08A_20220715 460-262024-1 7/15/2022 µg/L 1	RI-MW-09A_20220715 460-262024-4 7/15/2022 µg/L 1	FB-01_20220406 460-255745-1 4/06/2022 µg/L 1
Compound	AWQSGV				
1,1,1-Trichloroethane	5	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	5	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1	1 U	1 U	1 U	1 U
1,1-Dichloroethane	5	1 U	1 U	1 U	1 U
1,1-Dichloroethene	5	1 U	1 U	1 U	1 U
1,2-Dichloroethane	0.6	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1	1 U	1 U	1 U	1 U
Bromodichloromethane	50	1 U	1 U	1 U	1 U
Carbon Tetrachloride	5	1 U	1 U	1 U	1 U
Chlorobenzene	5	1 U	1 U	1 U	1 U
Chloroethane	5	1 U	1 U	1 U	1 U
Chloroform	7	0.71 J	0.65 J	1.1	1 U
Chloromethane	5	1 U	1 U	1 U	1 U
Cis-1,2-Dichloroethylene	5	1 U	1 U	1 U	1 U
Cis-1,3-Dichloropropene	NS	1 U	1 U	1 U	1 U
Dibromochloromethane	50	1 U	1 U	1 U	1 U
Methylene Chloride	5	1 U	1 U	1 U	0.5 J
Tetrachloroethylene (PCE)	5	25	8.4	7.4	1 U
Trans-1,2-Dichloroethene	5	1 U	1 U	1 U	1 U
Trans-1,3-Dichloropropene	NS	1 U	1 U	1 U	1 U
Trichloroethylene (TCE)	5	1 U	1 U	1 U	1 U
Vinyl Chloride	2	1 U	1 U	1 U	1 U

Table 9
22-60 46th Street
Queens, NY
Post-Remedial Groundwater Sample Results
Chlorinated Volatile Organic Compounds

AKRF Sample ID Laboratory Sample ID Date Sampled Unit Dilution Factor		FB-01_20220714 460-261934-3 7/14/2022 µg/L 1	TB-01_20220406 460-255745-3 4/06/2022 µg/L 1	TB-01_20220714 460-261934-4 7/14/2022 µg/L 1
Compound	AWQSGV			
1,1,1-Trichloroethane	5	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	5	1 U	1 U	1 U
1,1,2-Trichloroethane	1	1 U	1 U	1 U
1,1-Dichloroethane	5	1 U	1 U	1 U
1,1-Dichloroethene	5	1 U	1 U	1 U
1,2-Dichloroethane	0.6	1 U	1 U	1 U
1,2-Dichloropropane	1	1 U	1 U	1 U
Bromodichloromethane	50	1 U	1 U	1 U
Carbon Tetrachloride	5	1 U	1 U	1 U
Chlorobenzene	5	1 U	1 U	1 U
Chloroethane	5	1 U	1 U	1 U
Chloroform	7	1 U	1 U	1 U
Chloromethane	5	1 U	1 U	0.4 J
Cis-1,2-Dichloroethylene	5	1 U	1 U	1 U
Cis-1,3-Dichloropropene	NS	1 U	1 U	1 U
Dibromochloromethane	50	1 U	1 U	1 U
Methylene Chloride	5	0.5 J	1 U	1 U
Tetrachloroethylene (PCE)	5	1 U	1 U	1 U
Trans-1,2-Dichloroethene	5	1 U	1 U	1 U
Trans-1,3-Dichloropropene	NS	1 U	1 U	1 U
Trichloroethylene (TCE)	5	1 U	1 U	1 U
Vinyl Chloride	2	1 U	1 U	1 U

Table 9
22-60 46th Street
Queens, NY
Post-Remedial Groundwater Sample Results
Notes

DEFINITIONS

J : The concentration given is an estimated value.

NS : No standard.

U : The analyte was not detected at the indicated concentration.

µg/L : micrograms per liter

STANDARDS

NYSDEC New York State Department of Environmental Conservation (NYSDEC) Technical and Operational
Class GA : Guidance Series (1.1.1): Class GA Ambient Water Quality Standards and Guidance Values
AWQSGVs (AWQSGVs).

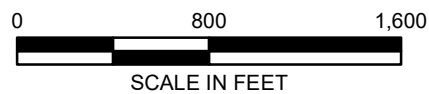
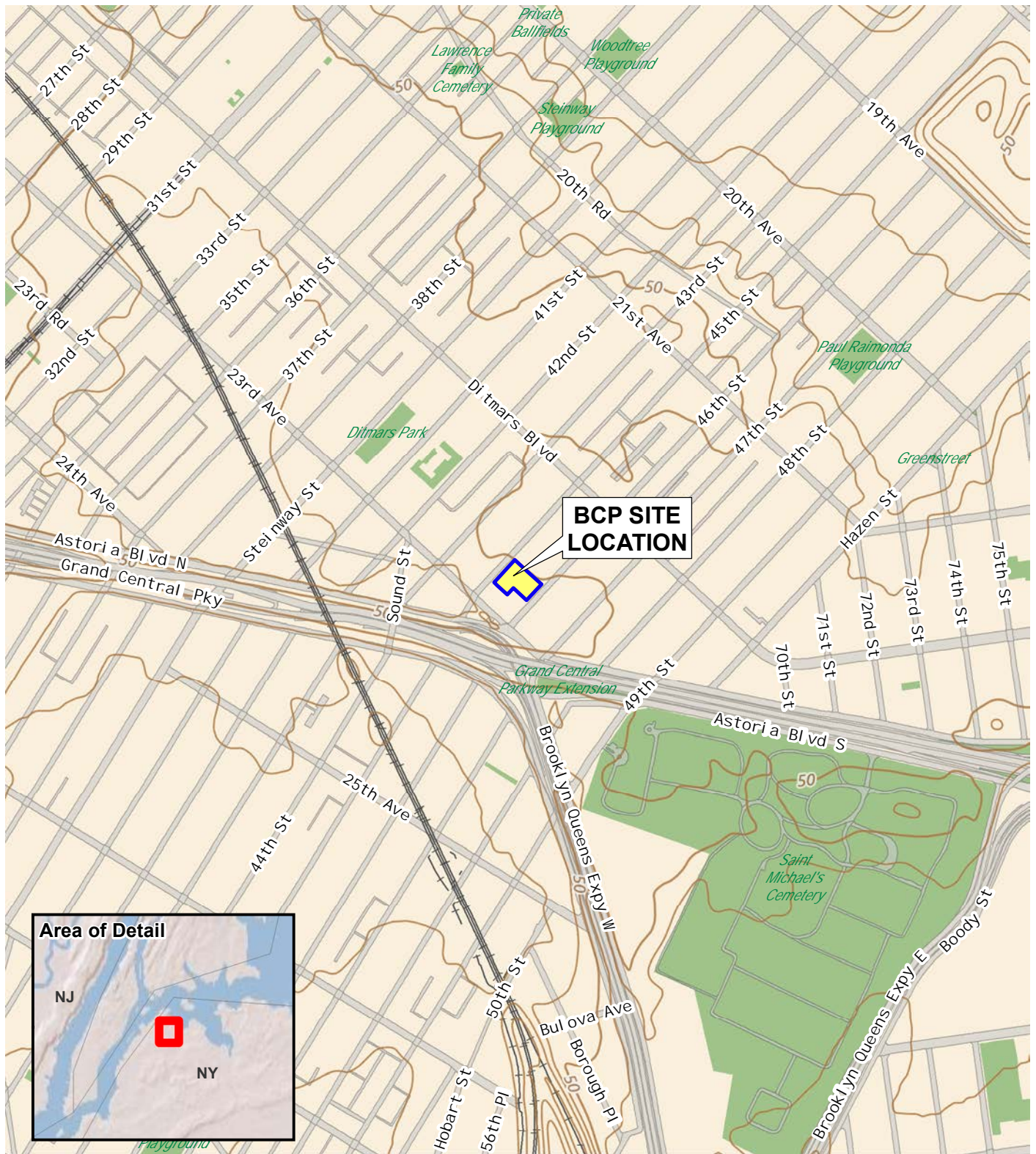
Exceedances of NYSDEC Class GA AWQSGVs are highlighted in bold font.

DUPLICATES

RI-MW-X_20220714 is a duplicate of RI-MW-06A_20220714

FIGURES

© 2022 AKRF Q:\Projects\190275 - 22-60 46TH STREET\Technical\GIS and Graphics\hazmat\190275 Fig 1 BCP Site Location.mxd 10/13/2022 3:07:05 PM mvelieux



440 Park Avenue South, New York, NY 10016

22-60 46th Street
Queens, New York

BCP SITE LOCATION

DATE

10/13/2022

PROJECT NO.

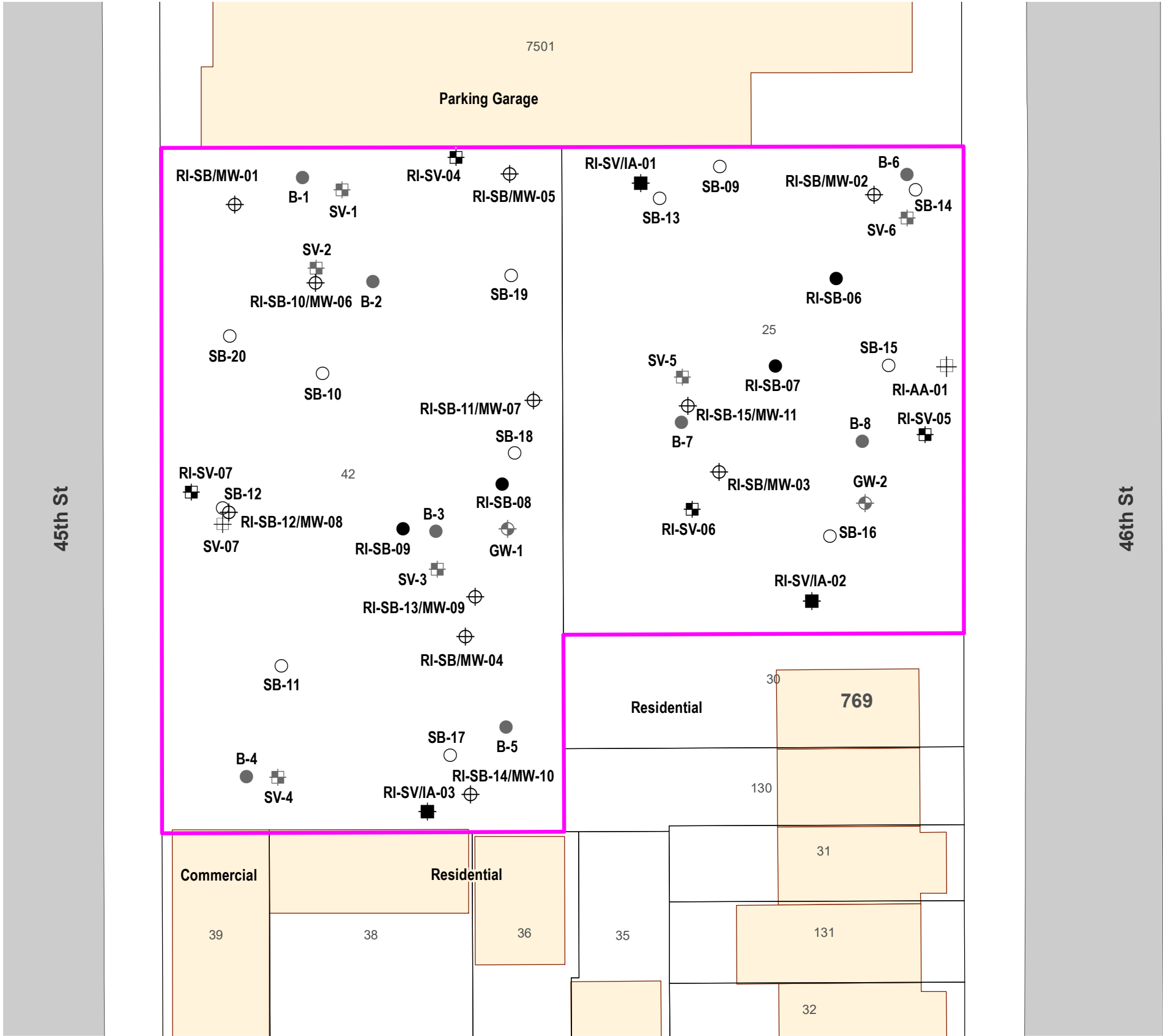
190275

FIGURE

1

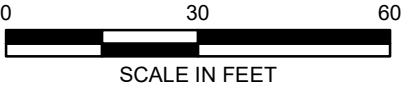
C:\Projects\190275 - 22-60 46TH STREET\Technical\GIS and Graphics\hazmat\MP\190275 Fig 2 BCP Site and Sample Location Plan.mxd 9/12/2022 8:28:31 AM mvelleux

Map Source:
NYC DCP (NYC Dept. of City Planning) GIS database.



LEGEND

- BCP SITE BOUNDARY
- BUILDING
- 25 LOT BOUNDARY AND TAX LOT NUMBER
- 769 BLOCK NUMBER
- SUPPLEMENTAL PHASE II INVESTIGATION SOIL BORING LOCATION (AUGUST 2019)
- SUPPLEMENTAL PHASE II INVESTIGATION SOIL VAPOR SAMPLE LOCATION (AUGUST 2019)
- PHASE II INVESTIGATION SOIL BORING LOCATION (MAY 2019)
- PHASE II INVESTIGATION GROUNDWATER SAMPLE LOCATION (MAY 2019)
- PHASE II INVESTIGATION SOIL VAPOR SAMPLE LOCATION (MAY 2019)
- REMEDIAL INVESTIGATION SOIL BORING LOCATION (DECEMBER 2020)
- REMEDIAL INVESTIGATION SOIL BORING/PERMANENT MONITORING WELL LOCATION (DECEMBER 2020/MAY 2021)
- REMEDIAL INVESTIGATION SOIL VAPOR SAMPLE LOCATION (DECEMBER 2020)
- REMEDIAL INVESTIGATION SOIL VAPOR/INDOOR AIR SAMPLE LOCATION (DECEMBER 2020)
- REMEDIAL INVESTIGATION AMBIENT AIR SAMPLE LOCATION (DECEMBER 2020)



22-60 46th Street
Queens, New York

BCP SITE AND SAMPLE LOCATION PLAN

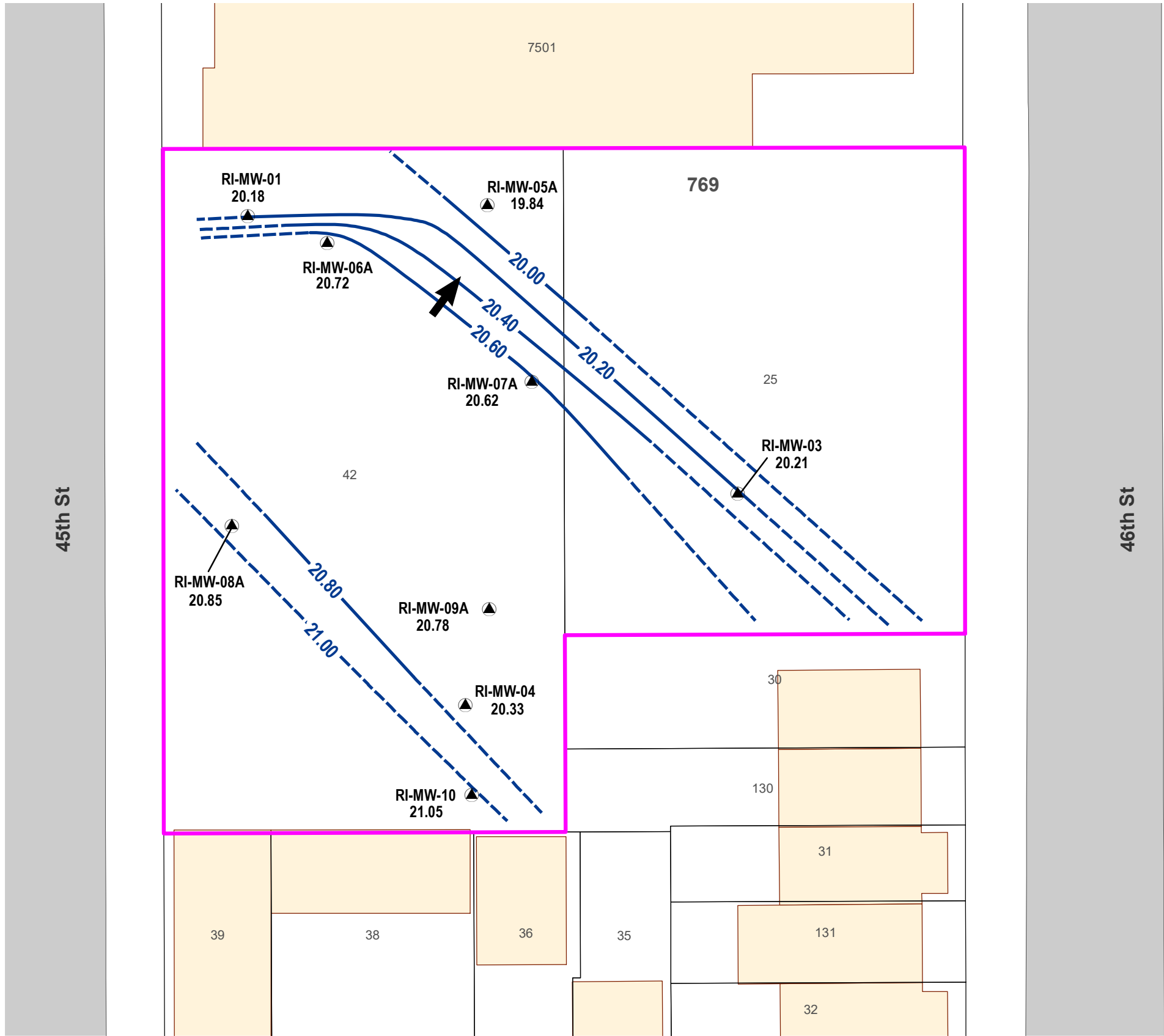
AKRF

440 Park Avenue South, New York, NY 10016

DATE
9/12/2022
PROJECT NO.
190275
FIGURE
2

© 2022 AKRF C:\Projects\190275 - 22-60 46TH STREET\Technical\GIS and Graphics\hazmat\SMP\190275 Fig 3 Groundwater Contour Map.mxd 10/13/2022 4:37:31 PM nveilleux

Map Source:
NYC DCP (NYC Dept. of City Planning) GIS database



LEGEND

- PROJECT SITE BOUNDARY
- 25 LOT BOUNDARY AND TAX LOT NUMBER
- 769 BLOCK NUMBER
- BUILDING
- GROUNDWATER ELEVATION CONTOUR LINE (DASHED WHERE INFERRED)
- PERMANENT MONITORING WELL LOCATION

NOTE:
RI-MW-04 WAS CONSIDERED AN OUTLIER
AND NOT INCLUDED IN THE GENERATION
OF CONTOURS.

Well ID	Top of Casing Elevation (feet)	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet)
RI-MW-01	44.5	24.32	20.18
RI-MW-03	43.3	23.05	20.21
RI-MW-04	44.5	24.17	20.33
RI-MW-05A	42.4	22.56	19.84
RI-MW-06A	44.04	23.32	20.72
RI-MW-07A	43.63	23.01	20.62
RI-MW-08A	47.3	26.45	20.85
RI-MW-09A	44.45	23.67	20.78
RI-MW-10	45.36	24.31	21.05

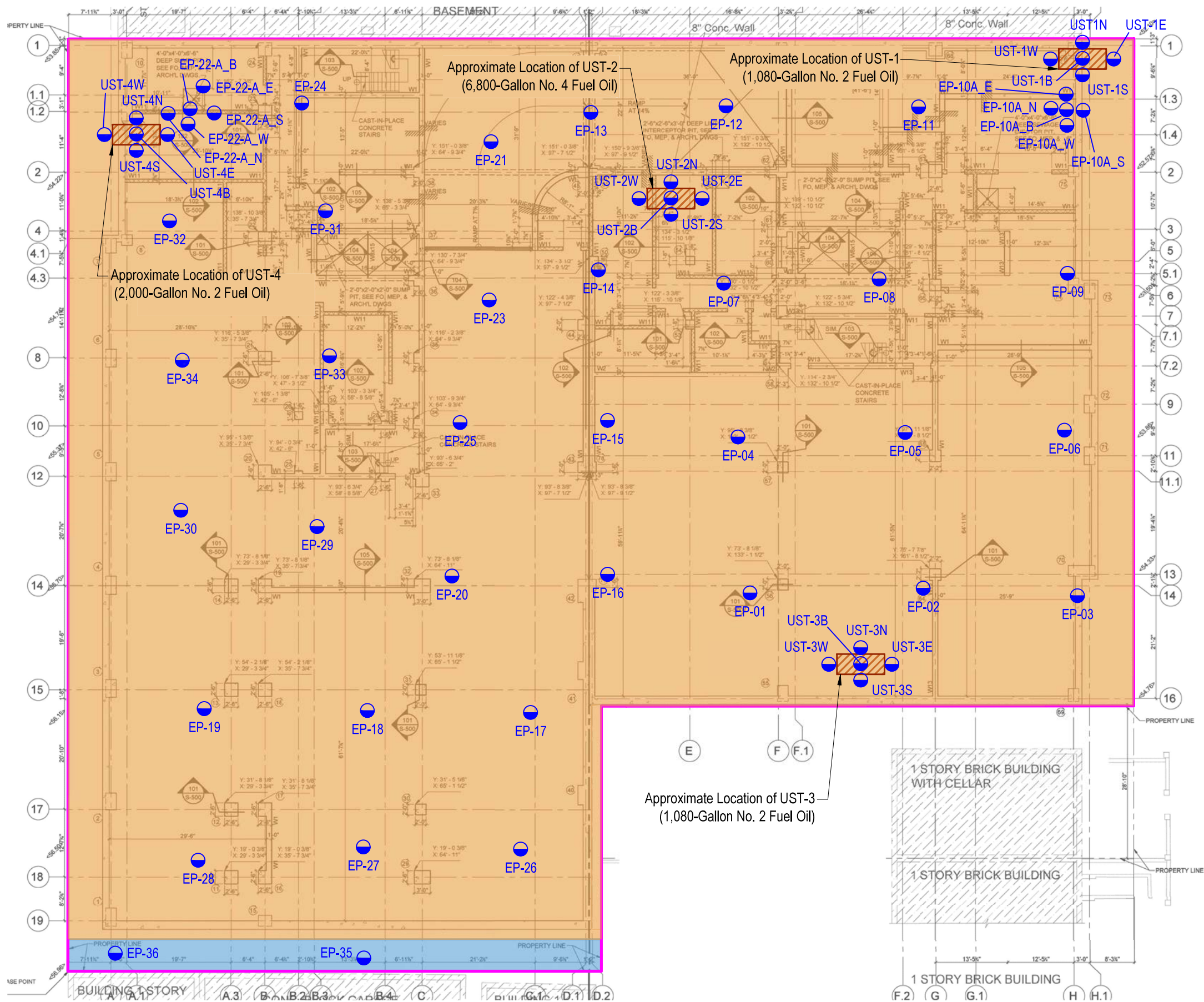
Notes:
All elevations are referenced to the North American Vertical Datum of 1988 (NAVD88).
TOC = Top of Casing



22-60 46th Street
Queens, New York

GROUNDWATER ELEVATION CONTOUR MAP - JULY 2022

©2022 AKRF, Inc. Q:\Projects\190275 - 22-60 46TH STREET\Technical\Hazmat\FER\CAD\190275 Fig 7 Extent of Remedial Excavation and USTs and EPs.dwg last save: mvelieux 10/17/2022 12:59 PM



Map Source:
Dattner Architects, "Cellar Plan", DWG No. S-100.00,
Dated 09-30-2020.

LEGEND

- BCP SITE BOUNDARY
- ENDPOINT SAMPLE LOCATION
- REMEDIAL EXCAVATION TO 3-FEET BELOW GRADE
- REMEDIAL EXCAVATION TO 15-FEET BELOW GRADE
- UST = UNDERGROUND STORAGE TANK



440 Park Avenue South, New York, NY 10016

22-60 46th Street
Queens, New York

DATE
10/17/2022

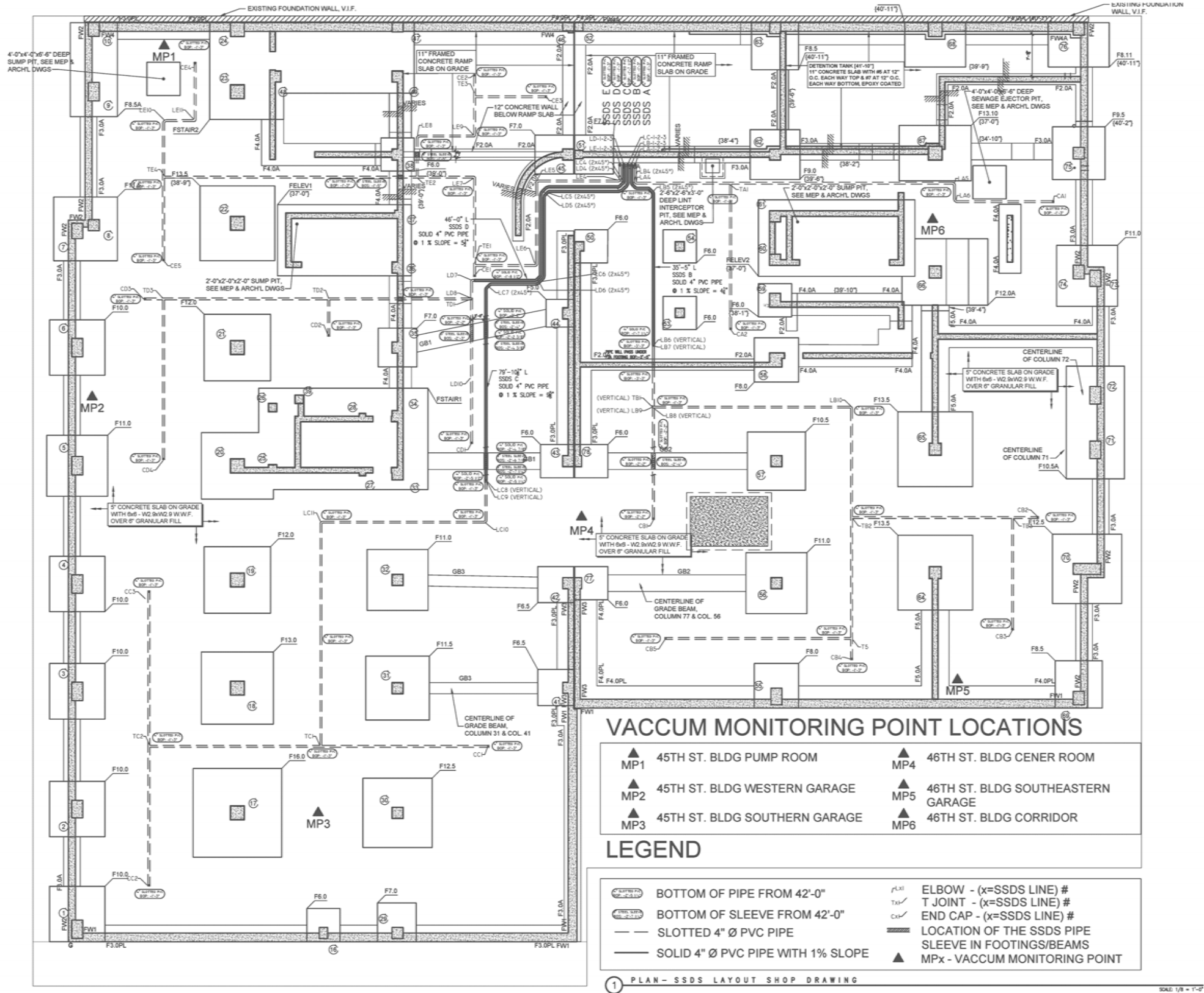
PROJECT NO.
190275

FIGURE
4

EXTENT OF REMEDIAL EXCAVATION AND UST LOCATIONS

©2022 AKRF, Inc. Q:\Projects\190275 - 22-60 46TH STREET\Technical\Hazmat\SMPCAD\190275 Fig 5 SSDS Layout Plan.dwg last save: mvelieux 9/27/2022 1:18 PM

Map Source:
Mega Contracting Group LLC "Plan - SSDS Layout Shop Drawing",
DWG No. MSSDS-100, Dated June 2nd, 2022.



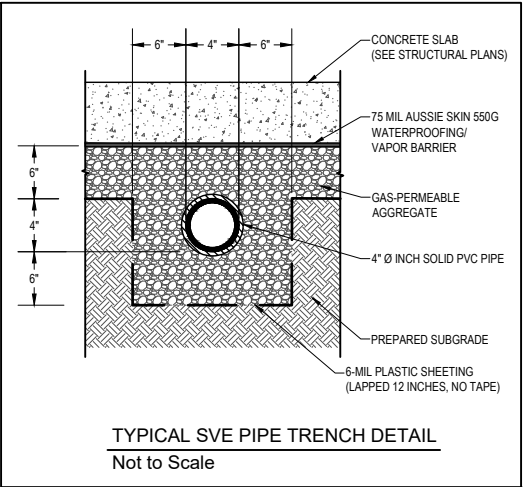
22-60 46th Street
Queens, New York

SSDS LAYOUT PLAN



440 Park Avenue South, New York, NY 10016

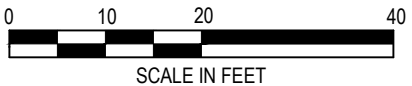
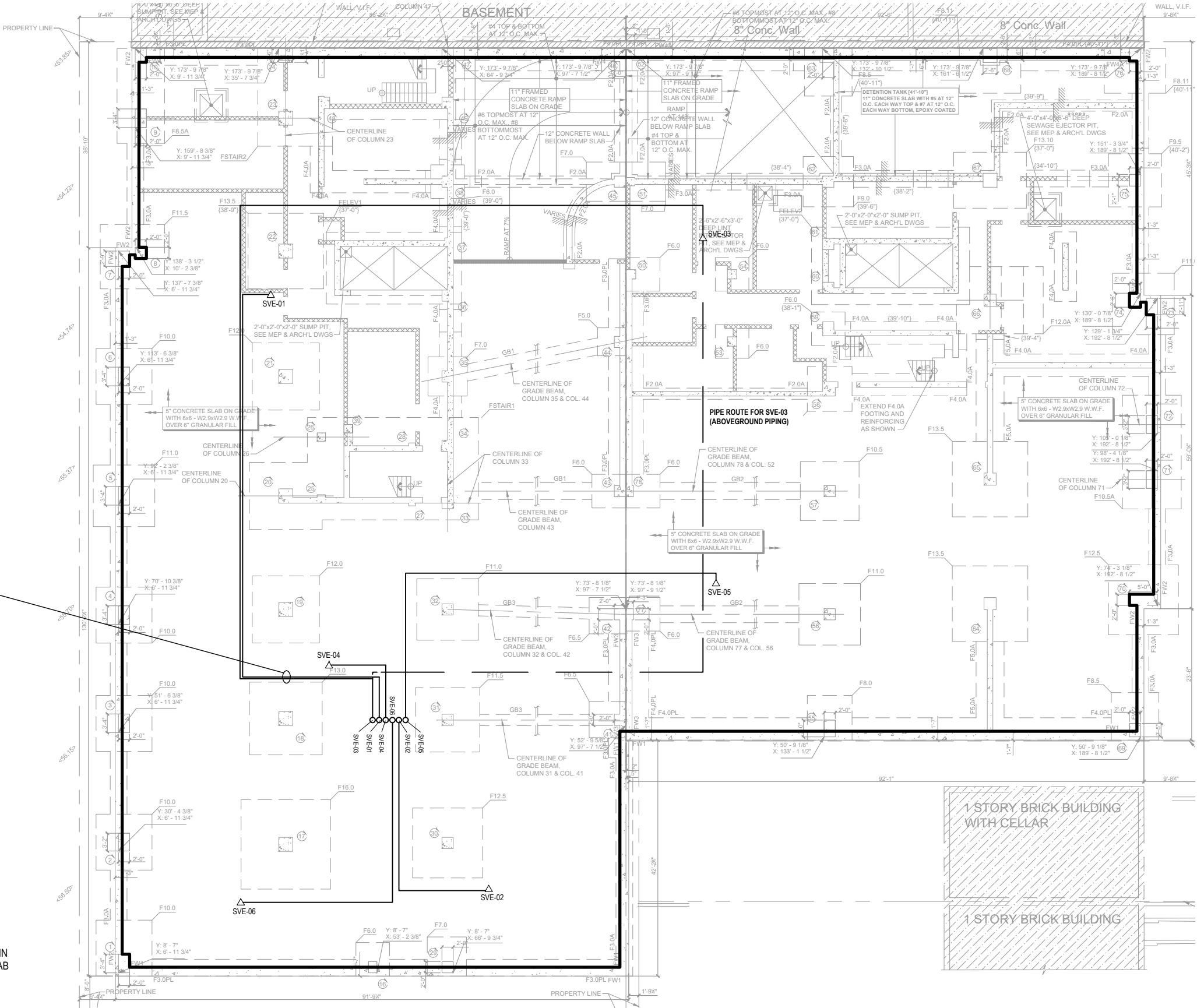
DATE
9/27/2022
PROJECT NO.
190275
FIGURE
5



45TH STREET
(15th AVENUE) (LUYSTER STREET)

LEGEND

- EXTENT OF VAPOR BARRIER AND GAS PERMEABLE AGGREGATE UNDERLAIN BY 6-MIL PLASTIC SHEETING (LAPPED 12 INCHES AND NO TAPE) UNDER SLAB
- BELOWGROUND 4" Ø SOLID SCHEDULE 40 PVC PIPE
- ABOVEGROUND 4" Ø SOLID CORRUGATED PIPE
- SVE MANIFOLD AT CELLAR
- SOIL VAPOR EXTRACTION WELL (SEE DETAIL 1 ON ENV-107)



22-60 46th Street
Queens, New York

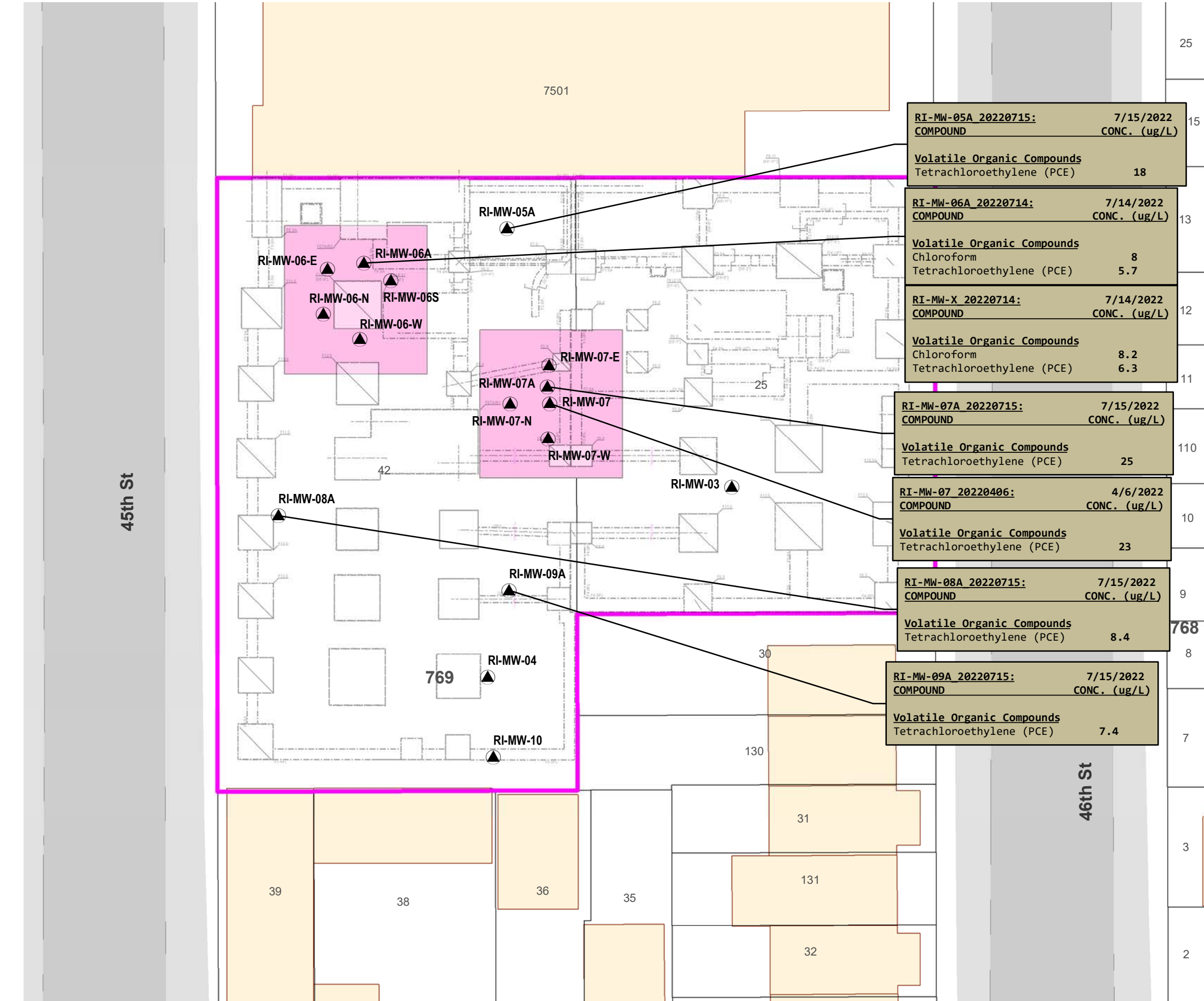
SVE LAUOUT PLAN



440 Park Avenue South, New York, NY 10016

DATE	10/13/2022
PROJECT NO.	190275
FIGURE	6

© 2022 AKRF. C:\Projects\190275 - 22-60 46TH STREET\Technical\GIS and Graphics\hazmat\MP\190275 Figure 7 GW Treatment Area and PCE Concentrations.mxd 9/27/2022 1:31:25 PM mvelieux



RI-MW-05A 20220715: COMPOUND	7/15/2022 CONC. (ug/L)
Volatile Organic Compounds	
Tetrachloroethylene (PCE)	18

RI-MW-06A 20220714: COMPOUND	7/14/2022 CONC. (ug/L)
Volatile Organic Compounds	
Chloroform	8
Tetrachloroethylene (PCE)	5.7

RI-MW-X 20220714: COMPOUND	7/14/2022 CONC. (ug/L)
Volatile Organic Compounds	
Chloroform	8.2
Tetrachloroethylene (PCE)	6.3

RI-MW-07A 20220715: COMPOUND	7/15/2022 CONC. (ug/L)
Volatile Organic Compounds	
Tetrachloroethylene (PCE)	25

RI-MW-07 20220406: COMPOUND	4/6/2022 CONC. (ug/L)
Volatile Organic Compounds	
Tetrachloroethylene (PCE)	23

RI-MW-08A 20220715: COMPOUND	7/15/2022 CONC. (ug/L)
Volatile Organic Compounds	
Tetrachloroethylene (PCE)	8.4

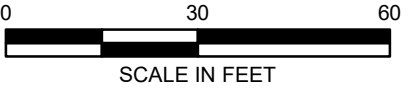
RI-MW-09A 20220715: COMPOUND	7/15/2022 CONC. (ug/L)
Volatile Organic Compounds	
Tetrachloroethylene (PCE)	7.4

LEGEND

- ▲ PERMANENT MONITORING WELL LOCATION
- BCP SITE BOUNDARY
- 25 LOT BOUNDARY AND TAX LOT NUMBER
- 769 BLOCK NUMBER
- EXISTING BUILDING
- IN-SITU GROUNDWATER TREATMENT

NYSDEC AWQSGVs
ug/l

Volatile Organic Compounds	
Chloroform	7
Tetrachloroethylene (PCE)	5



Map Source:
NYC DCP (NYC Dept. of City Planning) GIS database

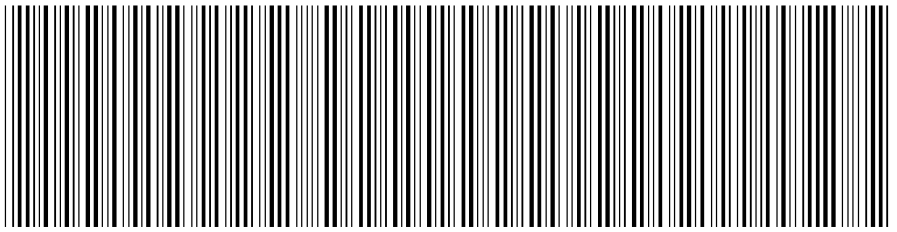
22-60 46th Street
Queens, New York

GROUNDWATER TREATMENT AREA AND REMAINING PCE CONCENTRATIONS

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.



2022121300440001002E8D73

RECORDING AND ENDORSEMENT COVER PAGE

PAGE 1 OF 10

Document ID: 2022121300440001

Document Date: 07-01-2022

Preparation Date: 12-16-2022

Document Type: EASEMENT

Document Page Count: 9

PRESENTER:

FIRST AMERICAN TITLE INSURANCE COMPANY
666 THIRD AVENUE-5TH FLOOR
3020-1159239*ACCOMCQ
NEW YORK, NY 10017
212-850-0670
CQUARTARARO@FIRSTAM.COM

RETURN TO:

CONNELL FOLEY
875 THIRD AVENUE
21ST FLOOR
NEW YORK, NY 10022
NAOMI JAWAHAR

PROPERTY DATA

Borough	Block	Lot	Unit	Address
QUEENS	769	25	Entire Lot	22-60 46TH STREET

Property Type: OTHER Easement

Borough	Block	Lot	Unit	Address
QUEENS	769	42	Entire Lot	22-61 45TH STREET

Property Type: OTHER Easement

CROSS REFERENCE DATA

CRFN _____ or DocumentID _____ or _____ Year _____ Reel _____ Page _____ or File Number _____

PARTIES

GRANTOR/SELLER:

MD45 DEVELOPERS LLC
4802 25TH AVE STE 400
LONG ISLAND CITY, NY 11103-1027

GRANTEE/BUYER:

N.Y.S DEPARTMENT OF ENVIRONMENTAL
CONSERVATION
625 BROADWAY
ALBANY, NY 12233

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:	\$	85.00
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Affidavit Fee:	\$	0.00
----------------	----	------

Filing Fee:

\$	100.00
----	--------

NYC Real Property Transfer Tax:

\$	0.00
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NYS Real Estate Transfer Tax:

\$	0.00
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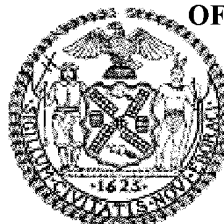
**RECORDED OR FILED IN THE OFFICE
OF THE CITY REGISTER OF THE**

CITY OF NEW YORK

Recorded/Filed 12-21-2022 14:16

City Register File No.(CRFN):

2022000457089



Annette McMill

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 ^{as of} 15th day of December, 2022, between Owner(s) MD45 Developers LLC, having an office at 4802 25th Avenue, Suite 400 Long Island City NY 11103-1027, County of Queens, 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 22-61 45th Street and 22-60 46th Street in the City of New York, County of Queens and State of New York, known and designated on the tax map of the County Clerk of Queens as tax map parcel numbers: County of Queens Block 769 Lots 42 and 25, being the same as that property conveyed to Grantor by deed dated April 2, 2019 and recorded in the City Register of the City of New York as CFRN 2019000107707 and 2020000132172. The property subject to this Environmental Easement (the "Controlled Property") comprises approximately .689 +/- acres, and is hereinafter more fully described in the Land Title Survey dated May 25, 2022 prepared by Robert J. Fehringer, 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: C241244-09-20, 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 Queens County Department of Health 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) or raising livestock or producing animal products for human consumption, 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: C241244
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.

MD45 Developers LLC:

By:

Print Name: Hercules Argyrion

Title: Manager Date: 11/3/22

Grantor's Acknowledgment

STATE OF NEW YORK)
) ss:
COUNTY OF *Queens*)

On the 3rd day of November, in the year 2022, before me, the undersigned, personally appeared Hercules Argonov 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.

Rosalie A. Bue
Notary Public - State of New York

ROSALIE A. BRANCACCIO
Notary Public, State of New York
No. 01BR6396872
Qualified in Queens County
Commission Expires August 26, 2023

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: Andrew Guglielmi
Andrew Guglielmi, Director
Division of Environmental Remediation

Grantee's Acknowledgment

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

On the 1st day of December, in the year 2022 before me, the undersigned, personally appeared Andrew Guglielmi, 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.

Jennifer Andaloro
Notary Public - State of New York

JENNIFER ANDALORO
Notary Public, State of New York
No. 02AN6098246
Qualified in Albany County
Commission Expires January 14, 2024

SCHEDULE "A" PROPERTY DESCRIPTION

ENVIRONMENTAL EASEMENT DESCRIPTION

ALL that certain plot, piece or parcel of land, situate, lying and being in the Borough and County of

Queens, City and State of New York, bounded and described as follows:

BEGINNING at a point on the Easterly side of 45th Street (formerly 15th Avenue, formerly Luyster Street) distant 100.02 feet (100 feet tax map) Northerly from the corner formed by the intersection of the Northerly side of 23rd Avenue (Potter Avenue) with the Easterly side of 45th Street;

RUNNING THENCE Easterly and parallel with the Northerly side of 23rd Avenue, 100.01 feet;

THENCE Northerly parallel with the easterly 45th Street, 50.01 feet;

THENCE Easterly parallel with the Northerly side of 23rd Avenue, 100.01 feet;

THENCE Northerly along the westerly side of 46th Street, 125.02 feet;

THENCE Westerly at right angles to the Westerly side of 46th Street 200.02 feet to the Easterly side of 45th Street;

THENCE southerly along the westerly side of 45th Street 175.03 feet to the point or place of BEGINNING

CONTAINING WITHIN SAID BOUNDS 0.689 ACRES OR 30,008.00 SQUARE FEET

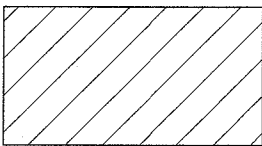
TITLE SURVEY

45TH STREET
(70' WIDE/ASPHALT PAVED/PUBLIC ROAD)

46TH STREET
(70' WIDE/ASPHALT PAVED/PUBLIC ROAD)

23RD AVENUE

23RD AVENUE



:INDICATES ENVIRONMENTAL EASEMENT AREA
AREA= 30,008.00 SQ. FT. = 0.689 ACRES

ENVIRONMENTAL EASEMENT DESCRIPTION

ALL that certain plot, piece or parcel of land, situate, lying and being in the Borough and County of Queens, City and State of New York, bounded and described as follows:

BEGINNING at a point on the Easterly side of 45th Street (formerly 15th Avenue, formerly Luyster Street) distant 100.02 feet (100 feet tax map) Northerly from the corner formed by the intersection of the Northerly side of 23rd Avenue (Potter Avenue) with the Easterly side of 45th Street;

RUNNING THENCE Easterly and parallel with the Northerly side of 23rd Avenue, 100.01 feet;

THENCE Northerly parallel with the easterly 45th Street, 50.01 feet;

THENCE Easterly parallel with the Northerly side of 23rd Avenue, 100.01 feet;

THENCE Northerly along the westerly side of 46th Street, 125.02 feet;

THENCE Westerly at right angles to the Westerly side of 46th Street 200.02 feet to the Easterly side of 45th Street;

THENCE southerly along the westerly side of 45th Street 175.03 feet to the point or place of BEGINNING.

CONTAINING WITHIN SAID BOUNDS 0.689 ACRES OR 30,008.00 SQUARE FEET

LEGAL DESCRIPTION

LOT 25

ALL that certain plot, piece or parcel of land, situate, lying and being in the Borough and County of Queens, City and State of New York, bounded and described as follows:

BEGINNING at a point on the westerly side of 46th Street, distant 150.03 feet (150.00 feet tax map) northerly from the corner formed by the intersection of the westerly side of 46th Street with the northerly side of 23rd Avenue;

RUNNING THENCE westerly parallel with 23rd Avenue, 100.01 feet;

THENCE northerly parallel with 46th Street, 125.02 feet;

THENCE easterly parallel with 23rd Avenue, 100.01 feet to the westerly side of 46th Street;

THENCE southerly along the westerly side of 46th Street, 125.02 feet to the point or place of BEGINNING.

LOT 42

ALL that certain plot, piece or parcel of land, situate, lying and being in the Borough and County of Queens, City and State of New York, designated as Block 769 Lot 42, bounded and described as follows:

BEGINNING at a point on the Easterly side of 45th Street (formerly 15th Avenue, formerly Luyster Street) distant 100.02 feet (100 feet tax map) Northerly from the corner formed by the intersection of the Northerly side of 23rd Avenue (Potter Avenue) with the Easterly side of 45th Street;

RUNNING THENCE Northerly along the Easterly side of 45th Street, 175.03 feet;

THENCE Easterly parallel with the Northerly side of 23rd Avenue, 100.01 feet;

THENCE Southerly at right angles to the last mentioned course 175.03 feet;

THENCE Westerly at right angles to the Westerly side of 46th Street; 100.01 feet to the Easterly side of the street, the point or place of BEGINNING.

DEC SITE NUMBER C241244

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 more detail 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, NY 12233 or at derweb@dec.ny.gov

FEHRINGER SURVEYING, P.C.

ROBERT FEHRINGER
LICENSED LAND SURVEYOR
WWW.FEHRINGERSURVEYING.COM
2200 JACKSON AVENUE
SEAFORD, N.Y. 11783
(516) 763 - 5515 FAX NO. (516) 763 - 5525
FS@FEHRINGERSURVEYING.COM

UNAUTHORIZED ALTERATION OR ADDITION TO THIS SURVEY IS A VIOLATION OF SECTION 7209 OF THE NEW YORK STATE EDUCATION LAW.
COPIES OF THIS SURVEY MAP NOT BEARING THE LAND SURVEYOR'S INKED SEAL OR EMBOSSED SEAL SHALL NOT BE CONSIDERED TO BE A VALID TRUE COPY
GUARANTEES INDICATED HEREON SHALL RUN ONLY TO THE PERSON FOR WHOM THE SURVEY IS PREPARED, AND ON HIS BEHALF TO THE TITLE COMPANY, GOVERNMENTAL AGENCY AND LENDING INSTITUTION LISTED HEREON, AND TO THE ASSIGNEES OF THE LENDING INSTITUTION. GUARANTEES ARE NOT TRANSFERABLE TO ADDITIONAL INSTITUTIONS OR SUBSEQUENT OWNERS.

SURVEYED: MAY 25, 2022

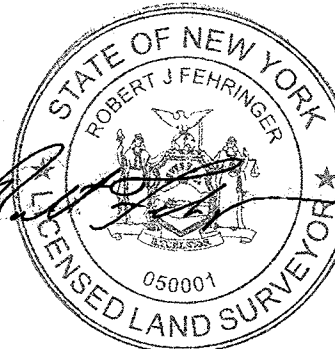
DRAWN BY: MF

FEET
8.00' 16.00' 24.00'

0 8 24 48

METERS
3 M 5 M 8 M

0 3 M 8 M 16 M



SURVEY OF PROPERTY SITUATED IN:

22-60 46TH STREET
BOROUGH OF QUEENS
COUNTY OF QUEENS
CITY OF NEW YORK
STATE OF NEW YORK

BLOCK: 769
LOTS: 25, 42

LOT 25 AREA:
SQ. FT.: 12,503.25
ACRES: 0.2870

LOT 42 AREA:
SQ. FT.: 17,504.75
ACRES: 0.4019

TOTAL LOT AREA:
SQ. FT.: 30,008.00
ACRES: 0.689

LEGEND	
HYD	FIRE HYDRANT
T.P.	TREE PIT
DC	DROP CURB
CB	CATCH BASIN
MM	MUNI-METER
EB	ELECTRIC BOX
TSP	TRAFFIC SIGN POLE
LP	LIGHT POLE
SOE	SUPPORT OF EXCAVATION
TC	TOP OF CURB
BC	BOTTOM OF CURB
BW	BACK OF WALK
CLF	CHAIN LINK FENCE
WIF	WROUGHT IRON FENCE
WSF	WOOD STOCKADE FENCE
PRF	POST AND RAIL FENCE
CE	CELLAR ENTRANCE
PA	PLANTED AREA
~	SIGN
○	TAX LOT
---	OVERHEAD UTILITY WIRES
-W-	WATER
-E-	ELECTRIC
-G-	GAS
-S-	SEWER
-ST-	STEAM
-T-	TELEPHONE
CE MH	CON ED MANHOLE COVER
EMH	ELECTRIC MANHOLE COVER
WMH	WATER MANHOLE COVER
SMH	SEWER MANHOLE COVER
TMH	TELEPHONE MANHOLE COVER
CO MH	CLEAN OUT MANHOLE COVER
WV	WATER VALVE
GV	GAS VALVE
UP	UTILITY POLE
AS	AUTO SPRINKLER
SP	STAND PIPE
OF	OIL FILL

APPENDIX B
SITE CONTACT INFORMATION

APPENDIX B – LIST OF SITE CONTACTS

Name	Phone/Email Address
MD45 Developers LLC	(718) 932-6342 / ekokinakis@megagroup.nyc
Rebecca Kinal (PE/Qualified Environmental Professional)	(914) 922-2362 / rkinal@akrf.com
George Duke (Client Attorney)	(212) 542-3772 / gduke@connellfoley.com
Meghan Medwid NYSDEC Project Manager 625 Broadway Albany, NY 12233-7014	(518) 402-8610 / megan.medwid@dec.ny.gov
Sally Rushford Bureau of Environmental Exposure Investigation New York State Department of Health	(518) 402-5465 / beei@health.ny.gov
Chief, Site Control Section New York State Department of Environmental Conservation Division of Environmental Remediation	(518) 402-9543

APPENDIX C
PBS REGISTRATION



PBS # :
2-613355

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Petroleum Bulk Storage Program
Facility Information Report

Printed : 7/22/2022

pbsfacrpt_foil.rpt

Page 1 of 1

Site Information

22-60 46TH STREET
22-60 46TH STREET
QUEENS, NY 11105

Tax Map Information

Boro/Sec.: Queens
Block: 769
Lot: 25

Site Owner Information

MD 45 DEVELOPERS, LLC
48-02 25TH AVENUE, SUITE 400
QUEENS, NY 11103

Mail Correspondent Information

MD 45 DEVELOPERS, LLC C/O MEGA
48-02 25TH AVENUE, SUITE 400
QUEENS, NY 11103

Site Phone: (718) 932-6342

Town: New York City

County: Queens

Facility Operator: N/A

(718) 932-6342

Owner Type : Corporate/Commercial/Other

ATTN: EMANUEL KOKINAKIS

(718) 932-6342

Authorized Representative: EMANUEL KOKINAKIS

Emergency Contact: EMANUEL KOKINAKIS

Emergency Phone: (718) 932-6342

Site Status : Unregulated/Closed
Site Type: Other

Reg Expires : 07/22/2027 Cert Printed:

Cert Issued: 07/22/2022

Total Active Tanks : 0

Total Active Capacity : 0

Last Inspected:

Inspected By:

<u>(2)</u> <u>Tank</u> <u>No</u>	<u>(3)</u> <u>Tank</u> <u>Loc</u>	<u>(4)</u> <u>Status</u>	<u>(5)</u> <u>Date</u> <u>Instal</u>	<u>(5)</u> <u>Date</u> <u>Closed</u>	<u>(6)</u> <u>Capacity</u> <u>(gals)</u>	<u>(7)</u> <u>Product</u>	<u>(8)</u> <u>Tank</u> <u>Type</u>	<u>(9)</u> <u>Tank</u> <u>IP</u>	<u>(10)</u> <u>Tank</u> <u>EP</u>	<u>(11)</u> <u>Tank</u> <u>SC</u>	<u>(12)</u> <u>Tank</u> <u>LD</u>	<u>(13)</u> <u>Tank</u> <u>OP</u>	<u>(14)</u> <u>Tank</u> <u>SP</u>	<u>(15)</u> <u>Tank</u> <u>Disp</u>	<u>(16)</u> <u>Pipe</u> <u>Loc</u>	<u>(17)</u> <u>Pipe</u> <u>Type</u>	<u>(18)</u> <u>Pipe</u> <u>EP</u>	<u>(19)</u> <u>Pipe</u> <u>SC</u>	<u>(20)</u> <u>Pipe</u> <u>LD</u>	<u>(21)</u> <u>UDC</u>	<u>Next</u> <u>Tank</u> <u>Test</u>	<u>Next</u> <u>Line</u> <u>Test</u>	<u>Tank</u> <u>Owner</u>
UST-1	5	3	04/15/2020	03/31/2022	1,080	0001	01	00	00	00	00	00	00	00	00	00	00	00	00				
Subpart: 3		Category: 3																					
UST-2	5	3	04/15/2020	03/31/2022	6,800	0002	01	00	00	00	00	00	00	00	00	00	00	00	00				
Subpart: 3		Category: 3																					
UST-3	5	3	04/15/2020	04/05/2022	1,080	0001	01	00	00	00	00	00	00	00	00	00	00	00	00				
Subpart: 3		Category: 3																					
UST-4	5	3	04/15/2020	04/26/2022	2,000	0001	01	00	00	00	00	00	00	00	00	00	00	00	00				
Subpart: 3		Category: 3																					

(See Reverse Side or Last Page for Code Keys)

PETROLEUM BULK STORAGE APPLICATION - SECTION B - TANK INFORMATION - CODE KEYS

Action (1)

1. Initial Listing
2. Add Tank
3. Close/Remove Tank
4. Information Correction
5. Recondition/Repair/Reline

Tank Location (3)

1. Aboveground-contact w/soil
2. Aboveground-contact w/
impervious barrier
3. Aboveground on saddles, legs,
stilts, rack or cradle
4. Tank 10% or more below ground
5. Underground including vaulted
with no access for inspection
6. Aboveground in Subterranean

Status (4)

1. In-service
2. Out-of-service
3. Closed-Removed
4. Closed- In Place
5. Tank converted to Non-
Regulated use

Products Stored (7)

Heating Oils: On-Site

Consumption

- 0001. #2 Fuel Oil
- 0002. #4 Fuel Oil
- 0259. #5 Fuel Oil
- 0003. #6 Fuel Oil
- 0012. Kerosene
- 0591. Clarified Oil
- 2711. Biodiesel (Heating)
- 2642. Used Oil (Heating)

Heating Oils: Resale/

Redistribution

- 2718. #2 Fuel Oil
- 2719. #4 Fuel Oil
- 2720. #5 Fuel Oil
- 2721. #6 Fuel Oil
- 2722. Kerosene
- 2723. Clarified Oil
- 2724. Biodiesel (Heating)

Motor Fuels

- 0009. Gasoline
- 2712. Gasoline/Ethanol
- 0008. Diesel
- 2710. Biodiesel
- 0011. Jet Fuel
- 1044. Jet Fuel (Biofuel)
- 2641. Aviation Gasoline

Lubricating/Cutting Oils

- 0013. Lube Oil
- 0015. Motor Oil
- 1045. Gear/Spindle Oil
- 0010. Hydraulic Oil
- 0007. Cutting Oil
- 0021. Transmission Fluid
- 1836. Turbine Oil

Oils Used as Building Materials

- 2626. Asphaltic Emulsions
- 0748. Form Oil

Petroleum Spirits

- 0014. White/Mineral Spirits
- 1731. Nanth

Mineral/Insulating Oils

- 0020. Insulating Oil (e.g.,
Transformer, Cable Oil)
- 2630. Mineral Oil

Waste/Used/Other Oils

- 0022 Waste/Used Oil
- 9999. Other-Please list:*

Crude Oil

- 0006. Crude Oil
- 0701. Crude Oil Fractions

Tank Type (8)

- 01. Steel/Carbon Steel/Iron
- 02. Galvanized Steel Alloy
- 03. Stainless Steel Alloy
- 04. Fiberglass Coated Steel
- 05. Steel Tank in Concrete
- 06. Fiberglass Reinforced Plastic
(FRP)
- 07. Plastic
- 08. Equivalent Technology
- 09. Concrete
- 10. Urethane Clad Steel
- 99. Other-Please list:*

Internal Protection (9)

- 00. None
- 01. Epoxy Liner
- 02. Rubber Liner
- 03. Fiberglass Liner (FRP)
- 04. Glass Liner
- 99. Other-Please list:*

External Protection (10/18)

- 00. None
- 01. Painted/Asphalt Coating
- 02. Original Sacrificial Anode
- 03. Original Impressed Current
- 04. Fiberglass
- 05. Jacketed
- 06. Wrapped (Piping)
- 07. Retrofitted Sacrificial Anode
- 08. Retrofitted Impressed Current
- 09. Urethane

Tank Secondary Containment (11)

- 00. None
- 01. Diking (AST Only)
- 02. Vault (w/access)
- 03. Vault (w/o access)
- 04. Double-Walled (UST Only)
- 05. Synthetic Liner
- 06. Remote Impounding Area
- 07. Excavation Liner
- 09. Modified Double-Walled
(AST Only)
- 10. Impervious Underlayment
(AST Only)**
- 11. Double Bottom (AST Only)**
- 12. Double-Walled (AST Only)
- 99. Other - Please List:*

Tank Leak Detection (12)

- 00. None
- 01. Interstitial Electronic
Monitoring
- 02. Interstitial Manual Monitoring
- 03. Vapor Well
- 04. Groundwater Well
- 05. In-Tank System (Auto Tank
Gauge)
- 06. Impervious Barrier/Concrete
Pad (AST Only)
- 07. Statistical Inventory Reconciliation (SIR)
- 08. Weep holes in vaults with no access for
inspection.

Overfill Protection (13)

- 00. None
- 01. Float Vent Valve
- 02. High Level Alarm
- 03. Automatic Shut-Off
- 04. Product Level Gauge (AST)
- 05. Vent Whistle
- 99. Other-Please list:*

Spill Prevention (14)

- 00. None
- 01. Catch Basin
- 99. Other-Please list:*

Pumping/Dispensing Method (15)

- 00. None
- 01. Presurized Dispenser
- 02. Suction Dispenser
- 03. Gravity
- 04. On-Site Heating System
(Suction)
- 05. On-Site Heating System
(Supply/Return)
- 06. Tank-Mounted Dispenser

Piping Location (16)

- 00. No Piping
- 01. Aboveground
- 02. Underground/On-ground
- 03. Aboveground/Underground
Combination

Piping Type (17)

- 00. None
- 01. Steel/Carbon Steel/Iron
- 02. Galvanized Steel
- 03. Stainless Steel Alloy
- 04. Fiberglass Coated Steel
- 05. Steel Encased in Concrete
- 06. Fiberglass Reinforced Plastic
(FRP)
- 07. Plastic
- 08. Equivalent Technology
- 09. Concrete
- 10. Copper
- 11. Flexible Piping

Piping Secondary Containment (19)

- 00. None
- 01. Diking (Aboveground Only)
- 02. Vault (w/access)
- 04. Double-Walled (Underground
Only)
- 06. Remote Impounding Area
- 07. Trench Liner
- 12. Double-Walled (Aboveground
Only)
- 99. Other - Please List:*

Pipe Leak Detection (20)

- 00. None
- 01. Interstitial Electronic
Monitoring
- 02. Interstitial Manual Monitoring
- 03. Vapor Well
- 04. Groundwater Well
- 07. Pressurized Piping Leak
Detector
- 09. Exempt Suction Piping
- 10. Statistical Inventory
Reconciliation
(SIR)
- 99. Other-Please list:*

Under Dispenser Containment (UDC) (21)

Check.Box if Present.

* If other, please list on a
separate sheet including tank
number.

** Each of these codes must be
combined with code 01 or 06
to meet compliance
requirements

APPENDIX D
IMPORT APPROVALS

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation, Remedial Bureau B

625 Broadway, 12th Floor, Albany, NY 12233-7016

P: (518) 402-9767 | F: (518) 402-9773

www.dec.ny.gov

TO: Ashutosh Sharma, AKRF, Inc.

FROM: Meghan Medwid, Project Manager
NYS DEC, Remedial Bureau B, Section D

SUBJECT: Request to Import
Site Name: 22-60 46th Street
Site No.: C241244

DATE: 04/04/2022

Approved:

The Department has reviewed the request dated 03/31/2022 to import 4,000 cubic yards of stone from Braen Stone of Sparta, NJ. Based on the information provided, the request is hereby approved.

The proposed fill material meets the requirements for material other than soil (i.e., gravel, rock, stone, recycled concrete or recycled brick) as specified in section 5.4(e)5 of DER-10. Therefore, this material may be placed as backfill behind the support of excavation and foundation walls, and below the site cap.

Testing in accordance with DER-10 and the Remedial Design Work Plan and approval by the Department is required for any additional material imported from this source.



Department of
Environmental
Conservation

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation, Remedial Bureau B

625 Broadway, 12th Floor, Albany, NY 12233-7016

P: (518) 402-9767 | F: (518) 402-9773

www.dec.ny.gov

TO: Ashutosh Sharma, AKRF, Inc.

FROM: Meghan Medwid, Project Manager
NYS DEC, Remedial Bureau B, Section D

SUBJECT: Request to Import
Site Name: 22-60 46th Street
Site No.: C241244

DATE: 04/04/2022

Approved:

The Department has reviewed the request dated 03/31/2022 to import 500-800 cubic yards of stone from Braen Stone of Sparta, NJ. Based on the information provided, the request is hereby approved.

The proposed fill material meets the requirements for material other than soil (i.e., gravel, rock, stone, recycled concrete or recycled brick) as specified in section 5.4(e)5 of DER-10. Therefore, this material may be placed as backfill around the foundation elements and below the concrete slab.

Testing in accordance with DER-10 and the Remedial Design Work Plan and approval by the Department is required for any additional material imported from this source.



Department of
Environmental
Conservation

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation, Remedial Bureau B

625 Broadway, 12th Floor, Albany, NY 12233-7016

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www.dec.ny.gov

TO: Ashutosh Sharma, AKRF, Inc.

FROM: Meghan Medwid, Project Manager
NYS DEC, Remedial Bureau B, Section D

SUBJECT: Request to Import
Site Name: 22-60 46th Street
Site No.: C241244

DATE: 04/04/2022

Approved:

The Department has reviewed the request dated 03/31/2022 to import 200-300 cubic yards of stone from Braen Stone of Sparta, NJ. Based on the information provided, the request is hereby approved.

The proposed fill material meets the requirements for material other than soil (i.e., gravel, rock, stone, recycled concrete or recycled brick) as specified in section 5.4(e)5 of DER-10. Therefore, this material may be placed on site for use as truck tracking pad.

Testing in accordance with DER-10 and the Remedial Design Work Plan and approval by the Department is required for any additional material imported from this source.



Department of
Environmental
Conservation

APPENDIX E
FOUNDATION MANAGEMENT PLAN

FOUNDATION MANAGEMENT PLAN (FMP)

1.1 Notification

At least 15 days prior to the start of any activity that is anticipated to disturb the EC system of the on-site buildings, the Site owner or their representative will notify the NYSDEC. No contaminated soil is known to remain at the Site. The following table includes contact information for notification. The information on this table will be updated as necessary to provide accurate contact information.

FMP Table 1
Notifications*

Meghan Medwid NYSDEC Project Manager	(518) 402-8610 meghan.medwid@dec.ny.gov
Sally Rushford NYSDEC, Superfund & Brownfield Cleanup Section, Region 2	(518) 402-5465 sally.rushford@health.ny.gov
Kelly Lewandowski, P.E. NYSDEC, Chief, Site Control Section	(518) 402-9569 kelly.lewandowski@dec.ny.gov

*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 F 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.

The NYSDEC project manager will review the notification and may impose additional requirements for the excavation that are not listed in this FMP.

1.2 EC System Restoration

After the completion of soil removal and any other invasive activities that disturb any ECs, the system(s) will be restored in a manner that complies with the RAWP and RMR. The ECs include the active SSDS (including a vapor barrier) and the SVE system. A figure showing the modified surface will be included in the subsequent Periodic Review Report and in an updated SMP.

1.3 Backfill from Off-Site Sources

All materials proposed for import onto the Site will be approved by the QEP and will be in compliance with provisions in this SMP prior to receipt at the Site. Any fill imported to the Site would meet the criteria outlined in 6 NYCRR Part 375. Non-virgin imported material that does not have an approved NYSDEC Beneficial Use Determination will be tested from a segregated stockpile at the originating facility for full list VOCs, SVOCs, pesticides, PCBs, 1,4-dioxane, PFAS, and Target Analyte List (TAL) metals by a New York State-certified laboratory. The sampling should be conducted by an environmental professional in accordance with DER-10 Section 5.4(e). The results will be compared to the appropriate Part 375 SCOs and submitted to the NYSDEC for review and approval prior to importing of the material from a segregated stockpile. No construction and demolition (C&D) debris will be imported to the Site for use as fill.

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 will be the Part 375 SCOs for Restricted Residential Use. 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.

1.4 Stormwater Pollution Prevention

During any soil excavation, erosion and sediment control measures including 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

APPENDIX F
HEALTH AND SAFETY PLAN AND COMMUNITY AIR MONITORING PLAN

22-60 46TH STREET

QUEENS, NEW YORK

Health and Safety Plan and Community Air Monitoring Plan

NYSDEC BCP Site #: C241244

AKRF Project Number: 190275

Prepared for:

New York State Department of Environmental Conservation
Division of Environmental Remediation, Remedial Bureau B
625 Broadway, 12th Floor
Albany, New York 12233

On Behalf Of:

MD45 Developers LLC
48-02 25th Avenue, Suite 400
Queens, NY 11103

Prepared by:



AKRF, Inc.

440 Park Avenue South, 7th Floor
New York, NY 10016
212-696-0670

DECEMBER 2022

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Figure 1 – Site Location

Figure 2 – Hospital Location Map

APPENDICES

Attachment A – Potential Health Effects from On-Site Contaminants

Attachment B – West Nile Virus/St. Louis Encephalitis Prevention

Attachment C – Report Forms

Attachment D – Emergency Hand Signals

Attachment E – Special Requirements CAMP

1.0 INTRODUCTION

This environmental Health and Safety Plan (HASP) has been developed for implementation of Site Management Plan (SMP) activities conducted by all personnel on-Site, both AKRF, Inc. (AKRF) employees and others, at 22-60 46th Street (the “Site”). The Site is located at 22-60 46th Street in Queens, New York. The legal definition of the Site is Tax Block 769, Lots 25 and 42. A Site Location plan is provided as Figure 1.

MD45 Developers LLC (MD45) entered into a Brownfield Cleanup Agreement (BCA) (Index No. C241244-09-20) on September 17, 2020 with the NYSDEC as a participant to remediate the Site. To support the proposed redevelopment, the Site was rezoned in February 2020 from M1-1 (manufacturing) to R6A (residential) and C2-3 (commercial). The Site is currently being redeveloped into two 8-story, mixed-use buildings. The buildings will contain approximately 96 residential units, including 30 permanently affordable units. The first floor will contain approximately 3,721-square feet of commercial space, approximately 11,740-square feet of community facility space, and residential amenities. Floors two through eight will contain residential units. Additionally, an exterior courtyard is proposed between the two buildings on the first and second floors. The two proposed buildings will occupy the entirety of the Site.

After completion of the remedial work in accordance with the NYSDEC-approved RAWP, some contamination was left at this Site. Institutional and Engineering Controls (ICs/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 Queens County Clerk, requires compliance with the SMP and all ICs/ECs placed on the Site.

This HASP and CAMP does not discuss routine health and safety issues common to general construction and excavation, including, but not, limited to slips, trips, falls, shoring, and other physical hazards. All AKRF employees are directed that all work must be performed in accordance with the AKRF's Generic HASP and all Occupation Safety and Health Administration (OSHA)-applicable regulations for the work activities required for the project. All project personnel are furthermore directed that they are not permitted to enter Permit Required Confined Spaces (as defined by OSHA). For issues unrelated to contaminated materials, all non-AKRF employees are to be bound by all applicable OSHA regulations as well as any more stringent requirements specified by their employer in their corporate HASP or otherwise. AKRF is not responsible for providing oversight for issues unrelated to contaminated materials for non-employees. This oversight shall be the responsibility of the employer of that worker or other official designated by that employer.

2.0 HEALTH AND SAFETY GUIDELINES AND PROCEDURES**2.1 Hazard Evaluation****2.1.1 Hazards of Concern**

Check all that apply		
<input checked="" type="checkbox"/> Organic Chemicals	<input checked="" type="checkbox"/> Inorganic Chemicals	<input type="checkbox"/> Radiological
<input type="checkbox"/> Biological	<input type="checkbox"/> Explosive/Flammable	<input type="checkbox"/> Oxygen Deficient Atm
<input checked="" type="checkbox"/> Heat Stress	<input checked="" type="checkbox"/> Cold Stress	<input type="checkbox"/> Carbon Monoxide
Comments: No personnel are permitted to enter permit confined spaces.		

2.1.2 Physical Characteristics

Check all that apply		
<input checked="" type="checkbox"/> Liquid	<input checked="" type="checkbox"/> Solid	<input type="checkbox"/> Sludge
<input checked="" type="checkbox"/> Vapors	<input type="checkbox"/> Unknown	<input type="checkbox"/> Other
Comments:		

2.1.3 Hazardous Materials

Check all that apply					
Chemicals	Solids	Sludges	Solvents	Oils	Other
<input type="checkbox"/> Acids	<input type="checkbox"/> Ash	<input type="checkbox"/> Paints	<input type="checkbox"/> Halogens	<input type="checkbox"/> Transformer	<input type="checkbox"/> Lab
<input type="checkbox"/> Caustics	<input type="checkbox"/> Asbestos	<input type="checkbox"/> Metals	<input checked="" type="checkbox"/> Petroleum	<input type="checkbox"/> Other DF	<input type="checkbox"/> Pharm
<input checked="" type="checkbox"/> Pesticides	<input type="checkbox"/> Tailings	<input type="checkbox"/> POTW	<input checked="" type="checkbox"/> Other	<input type="checkbox"/> Motor or Hydraulic Oil	<input type="checkbox"/> Hospital
<input checked="" type="checkbox"/> Petroleum	<input checked="" type="checkbox"/> Other	<input type="checkbox"/> Other	Chlorinated Solvents	<input checked="" type="checkbox"/> Gasoline	<input type="checkbox"/> Rad
<input type="checkbox"/> Inks	Fill material			<input checked="" type="checkbox"/> Fuel Oil	<input type="checkbox"/> MGP
<input checked="" type="checkbox"/> PCBs					<input type="checkbox"/> Mold
<input checked="" type="checkbox"/> Metals					<input type="checkbox"/> Cyanide
<input checked="" type="checkbox"/> Other: VOCs & SVOCs					

2.1.4 Chemicals of Concern

Chemicals	REL/PEL/STEL (ppm)	Health Hazards
1,2-dichloroethane	REL = 1 ppm PEL = 50 ppm	Irritation eyes, corneal opacity; central nervous system depression; nausea, vomiting; dermatitis; liver, kidney, cardiovascular system damage; [potential occupational carcinogen].
Barium	PEL = 0.5 mg/m ³ REL = 0.5 mg/m ³	Irritation eyes, skin, upper respiratory system; skin burns; gastroenteritis; muscle spasm; slow pulse, extrasystoles; hypokalemia
Benzene	REL = 0.1 ppm PEL = 1 ppm STEL = 5 ppm	Irritation eyes, skin, nose, respiratory system; dizziness; headache, nausea, staggered gait; anorexia, lassitude, dermatitis; bone marrow depression, potential occupational carcinogen.
Cadmium	PEL = 0.005 mg/m ³	Pulmonary edema, dyspnea (breathing difficulty), cough, chest tightness, substernal (occurring beneath the sternum) pain; headache; chills, muscle aches; nausea, vomiting, diarrhea; anosmia (loss of the sense of smell), emphysema, proteinuria, mild anemia; [potential occupational carcinogen].
Chromium	REL = 0.5 mg/m ³ PEL = 1 mg/m ³	Irritation eyes, skin; lung fibrosis (histologic).
Copper	REL = 1 mg/m ³ PEL = 1 mg/m ³	Irritation eyes, nose, pharynx; nasal septum perforation; metallic taste; dermatitis; in animals: lung, liver, kidney damage; anemia
DDT (pesticide)	REL = 0.5 mg/m ³ PEL = 1 mg/m ³ [skin]	Irritation eyes, skin; paresthesia tongue, lips, face; tremor; anxiety, dizziness, confusion, malaise (vague feeling of discomfort), headache, lassitude (weakness, exhaustion); convulsions; paresis hands; vomiting; potential carcinogen.
Ethylbenzene	REL = 100 ppm PEL = 100 ppm	Irritation eyes, skin, mucous membrane; headache; dermatitis; narcosis, coma.
Fuel Oil	REL = 350 mg/m ³ PEL = 400 ppm	Nausea, irritation – eyes, hypertension, headache, light-headedness, loss of appetite, poor coordination; long-term exposure – kidney damage, blood clotting problems; potential carcinogen.
Lead	REL = 0.05 mg/m ³ PEL = 0.05 mg/m ³	Lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidney disease; irritation eyes; hypertension.
Mercury	REL = 0.1 mg/m ³ PEL = 0.05 mg/m ³	Irritation eyes, skin; cough, chest pain, dyspnea (breathing difficulty), bronchitis, pneumonitis; tremor, insomnia, irritability, indecision, headache, lassitude (weakness, exhaustion); stomatitis, salivation; gastrointestinal disturbance, anorexia, weight loss; proteinuria.
Naphthalene	REL = 15 ppm PEL = 10 ppm	Irritation eyes; headache, confusion, excitement, malaise (vague feeling of discomfort); nausea, vomiting, abdominal pain; irritation bladder; profuse sweating; jaundice; hematuria (blood in the urine), renal shutdown; dermatitis, optical neuritis, corneal damage.
Polycyclic Aromatic Hydrocarbons (PAHs)	PEL = 5 mg/m ³	Harmful effects to skin, bodily fluids, and ability to fight disease, reproductive problems; potential carcinogen.
Tetrachloroethylene	PEL = 100 ppm	Irritation eyes, skin, nose, throat, respiratory system; nausea; flush face, neck; dizziness, incoordination; headache, drowsiness; skin erythema (skin redness); liver damage; [potential occupational carcinogen].
Toluene	REL = 100 ppm PEL = 200 ppm STEL = 300 ppm	Irritation eyes, nose; lassitude, confusion, euphoria, dizziness, headache; dilated pupils, lacrimation (discharge of tears); anxiety, muscle fatigue, insomnia; paresthesia; dermatitis; liver, kidney damage.
Xylenes	REL = 100 ppm	Irritation eyes, skin, nose, throat; dizziness, excitement,

Chemicals	REL/PEL/STEL (ppm)	Health Hazards
	REL = 100 ppm	drowsiness, poor coordination, staggering gait; corneal vacuolization; anorexia, nausea, vomiting, abdominal pain; dermatitis.
Zinc	REL = 5 mg/m ³ PEL = 10 mg/m ³	Chills, muscle ache, fever, dry throat, cough, weakness or exhaustion, headache, blurred vision, low back pain, vomiting, chest tightness, breathing difficulty.
Comments: REL = National Institute for Occupational Safety and Health (NIOSH) Recommended Exposure Limit PEL = OSHA Permissible Exposure Limit STEL = OSHA Short Term Exposure Limit		

2.2 Designated Personnel

AKRF will appoint one of its on-site personnel as the Site Safety Officer (SSO). This individual will be responsible for implementation of the HASP. The SSO will have a 2-year or 4-year college degree in occupational safety or a related environmental science/engineering field, and experience in implementation of air monitoring and hazardous materials sampling programs. Health and safety training required for the SSO and all field personnel are outlined in Section 2.3 of this HASP.

2.3 Training

All personnel who enter the work area while intrusive activities are being performed will have completed a 40-hour training course that meets OSHA requirements of 29 CFR Part 1910, Occupational Safety and Health Standards. In addition, all personnel will have up-to-date 8-hour refresher training. The training will allow personnel to recognize and understand the potential hazards to health and safety. All field personnel must attend a training program, whose purpose is to:

- Make them aware of the potential hazards they may encounter;
- Provide the knowledge and skills necessary for them to perform the work with minimal risk to health and safety and make them aware of the purpose and limitations of safety equipment; and
- Ensure that they can safely avoid or escape from emergencies.

Each member of the field crew will be instructed in these objectives before he/she goes onto the Site. A Site safety meeting will be conducted at the start of the project. Additional meetings shall be conducted, as necessary, for new personnel working at the Site.

2.4 Medical Surveillance Program

All AKRF and subcontractor personnel performing field work involving subsurface disturbance at the Site are required to have passed a complete medical surveillance examination in accordance with 29 CFR 1910.120 (f). A physician's medical release for work will be confirmed by the SSO before an employee can begin Site activities. The medical release shall consider the type of work to be performed and the required personal protective equipment (PPE). The medical examination will, at a minimum, be provided annually and upon termination of hazardous waste Site work.

2.5 Site Work Zones

During any activities involving subsurface disturbance, the work area must be divided into various zones to prevent the spread of contamination, ensure that proper protective equipment is donned, and provide an area for decontamination.

The Exclusion Zone is defined as the area where exposure to impacted media could be encountered. The Contamination Reduction Zone (CRZ) is the area where decontamination procedures take place and is located next to the Exclusion Zone. The Support is the zone area where support facilities such as vehicles, fire extinguisher, and first aid supplies are located. The emergency staging area (part of the Support Zone) is the area where all workers on-site would assemble in the event of an emergency. A summary of these areas is provided below. These zones may be changed by the SSO, depending on that day's activities. All field personnel will be informed of the location of these zones before work begins. The exclusion zone and CRZ are 10 and 25 feet from the drill rig during excavation and/or sampling. Control measures such as caution tape and/or traffic cones will be placed around the perimeter of the work area when needed.

Task	Exclusion Zone	CRZ	Support Zone
Excavation and/or Sampling	10 ft from Drill Rig or Excavator	25 ft from Drill Rig or Excavator	As Needed
Comments: Control measures such as "caution tape" and/or traffic cones will be placed around the perimeter of the work area when work is being done in a public area.			

2.6 Air Monitoring

The purpose of the air monitoring program is to identify any exposure of the field personnel to potential environmental hazards in the soil and groundwater. Results of the air monitoring will be used to determine the appropriate response action, if needed.

1.1.1 Volatile Organic Compound (VOC) Monitoring

Continuous monitoring for VOCs will be conducted during all ground-intrusive activities, including soil boring advancement and groundwater monitoring well installation. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background concentrations. VOCs will be monitored continuously at the downwind perimeter of the exclusion zone. Monitoring will be conducted with a PID equipped with an 10.6 eV lamp capable of calculating 15-minute running average concentrations.

More frequent intervals of monitoring will be conducted if required as determined by the SSO. All PID readings will be recorded and available for NYSDEC and NYSDOH personnel to review. Instantaneous readings, if any, will also be recorded.

1.1.2 Community Air Monitoring Action Levels

VOC Action Levels

The following actions will be taken based on organic vapor levels measured:

- If total organic vapor levels exceed 5 ppm above background for the 15-minute average at the exclusion zone perimeter, work activities will be temporarily halted and monitoring continued. If levels readily decrease (per instantaneous readings) below 5 ppm above background, work activities will resume with continued monitoring.
- If total organic vapor levels at the downwind perimeter of the exclusion zone persist at levels in excess of 5 ppm above 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 will resume provided that the total organic vapor level 200 feet downwind of the hot 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 above background for the 15-minute average.

- If the total organic vapor level is above 25 ppm at the perimeter of the exclusion zone, activities will be shutdown.

Major Vapor Emission Response Plan

If any organic levels greater than 5 ppm over background are identified 200 feet downwind from the work Site, or half the distance to the nearest residential or commercial property, whichever is less, all work activities must be halted or vapor controls must be implemented.

If, following the cessation of the work activities, or as the result of an emergency, organic levels persist above 5 ppm above background 200 feet downwind or half the distance to the nearest residential or commercial property from the exclusion zone, then the air quality must be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20 Foot Zone).

If either of the following criteria is exceeded in the 20 Foot Zone, then the Major Vapor Emission Response Plan shall automatically be implemented:

- Sustained organic vapor levels approaching 1 ppm above background for a period of more than 30 minutes; or
- Organic vapor levels greater than 5 ppm above background for any time period.

Upon activation, the following activities shall be undertaken as part of the Major Vapor Emission Response Plan:

- The NYSDEC, NYSDOH, and local police authorities will be immediately contacted by the SSO and advised of the situation;
- Frequent air monitoring will be conducted at 30-minute intervals within the 20-Foot Zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the Site Health and Safety Officer; and
- All Emergency contacts will go into effect as appropriate.
- All readings will be recorded and be available for NYSDEC and NYSDOH personnel to review.

Instrument	Action Level	Response Action
PID	Less than 5 ppm in breathing zone	Level D or D-Modified
	Between 5 ppm and 50 ppm	Level C
	More than 50 ppm	Stop work. Resume work when readings are less than 50 ppm.
ppm = parts per million		

2.7 Special Requirements CAMP

As the Site is located within 20 feet of potentially occupied structures, a Special Requirements CAMP will be implemented during activities involving subsurface disturbance. One of the two fixed CAMP stations will be located near potentially exposed individuals. Private residences are located south-adjacent to the Site.

The additional CAMP provisions included in the Special Requirements CAMP are as follows:

1. Use of engineering controls such as vapor/dust barriers or special ventilation devices will be considered; and
2. Special consideration will be given to implementing planned activities when potentially exposed populations are at a minimum.

The following Site-Specific CAMP provisions will be implemented at the Site, as necessary:

1. If total VOC concentrations near the outside walls or next to intake vents of the south-adjacent occupied structures exceed 1 ppm, air monitoring should occur within the occupied structures; and
2. If total particulate concentrations near the outside walls or next to intake vents of the south-adjacent occupied structures exceed 0.150 mg/m³, work activities should be suspended until controls are implemented.

Additional information regarding the Special Requirements CAMP is provided in Attachment E.

2.8 Personal Protection Equipment

The PPE required for various kinds of investigation tasks are based on 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response, Appendix B, "General Description and Discussion of the Levels of Protection and Protective Gear."

AKRF field personnel and other site personnel shall wear, at a minimum, Level D PPE. The protection will be based on the air monitoring described in Section 2.6.

Level D PPE includes donning of the following during drilling and sampling:

1. Steel Toed Boots
2. Hard Hat
3. Work Gloves
4. Safety Glasses
5. Ear Plugs
6. Nitrile Gloves
7. Tyvek Suit if NAPL is present

If PID readings exceed 5 ppm in the breathing zone, personnel will don Level C PPE, which includes Level D PPE and a half- or full-face respirator with a dual organic and particulate cartridge.

LEVEL OF PROTECTION & PPE		Excavation/ Sampling
Level D	(X) Safety Glasses	Yes
(X) Steel Toe Shoes	() Face Shield	
(X) Hard Hat	(X) Ear Plugs (within 25 ft of	
(within 25 ft of drill rig)	drill rig)	

LEVEL OF PROTECTION & PPE		Excavation/ Sampling
(X) Work Gloves	(X) Nitrile Gloves (X) Tyvek for drill rig operator if NAPL present	
Level C (in addition to Level D) (X) Half-Face Respirator OR (X) Full Face Respirator () Full-Face PAPR	() Particulate Cartridge () Organic Cartridge (X) Dual Organic/Particulate Cartridge	If PID > 10 ppm (breathing zone)
Comments: Cartridges to be changed out at least once per shift unless warranted beforehand (e.g., more difficult to breathe or any odors detected).		

2.9 General Work Practices

To protect the health and safety of the field personnel, field personnel will adhere to the guidelines listed below during activities involving subsurface disturbance:

- Eating, drinking, chewing gum or tobacco, and smoking are prohibited, except in designated areas on the Site. These areas will be designated by the SSO.
- Workers must wash their hands thoroughly on leaving the work area and before eating, drinking, or any other such activity.
- The workers should shower as soon as possible after leaving the Site. Contact with contaminated or suspected surfaces should be avoided.
- The buddy system should always be used; each buddy should watch for signs of fatigue, exposure, and heat/cold stress.

3.0 EMERGENCY PROCEDURES AND EMERGENCY RESPONSE PLAN

The field crew will be equipped with emergency equipment, such as a first aid kit and disposable eye washes. In the case of a medical emergency, the SSO will determine the nature of the emergency and he/she will have someone call for an ambulance, if needed. If the nature of the injury is not serious, i.e., the person can be moved without expert emergency medical personnel, he/she should be taken to a hospital by on-site personnel. Directions to the hospital are provided below, and a hospital route map is provided as Figure 2.

3.1 Hospital Directions

Hospital Name:	Mount Sinai Queens
Phone Number:	718-932-1000
Address/Location:	25-10 30 th Avenue, Queens, NY 11102
Directions:	1. Turn LEFT from the Site onto 45th Street 2. Turn right onto Astoria Boulevard North. 3. Continue onto Hoyt Avenue North. 4. Turn left onto Crescent Street. The Emergency Room will be on the LEFT at the corner of Crescent Street and 30 th Road.

3.2 Emergency Contacts

Company	Individual Name	Title	Contact Number
AKRF	Rebecca Kinal	Remedial Engineer	914-922-2362 (office) 914-263-8730 (cell)
	Deborah Shapiro	Project Principal	646-388-9544 (office) 917-957-8991 (cell)
	Adrianna Bosco	Project Manager	646-388-9576 (office) 914-874-3358 (cell)
	Ashutosh Sharma	Project Manager Alternate	646-388-9865 (office) 347-249-0652 (cell)
MD45 Developers LLC	Emanuel Kokinakis	Requestor Representative	718-932-6342 (office)
Ambulance, Fire Department & Police Department	-	-	911
NYSDEC Spill Hotline	-	-	800-457-7362

4.0 APPROVAL & ACKNOWLEDGMENTS OF HASP**APPROVAL**

Signed: _____ Date: _____
AKRF Project Manager

Signed: _____ Date: _____
AKRF Health and Safety Officer

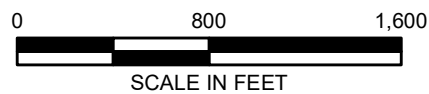
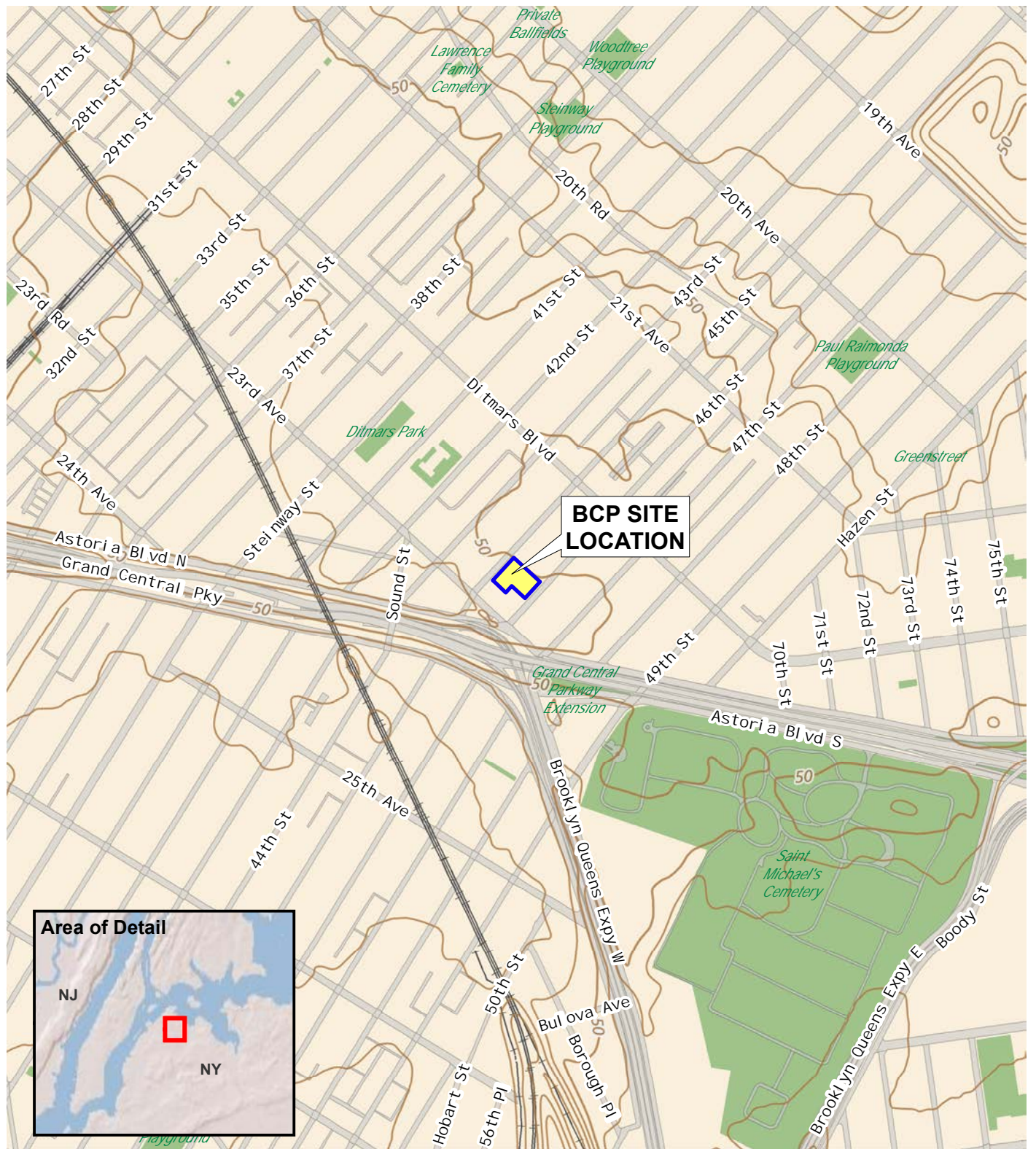
Below is an affidavit that must be signed by all workers who enter the site. A copy of the HASP must be on-site at all times and will be kept by the SSO.

AFFIDAVIT

I, _____ (name), of _____ (company name), have read the Health and Safety Plan (HASP) for the property located at 22-60 46th Street in Queens, New York. I agree to conduct all on-site work in accordance with the requirements set forth in this HASP and understand that failure to comply with this HASP could lead to my removal from the site.

Signed: _____	Company: _____	Date: _____
Signed: _____	Company: _____	Date: _____
Signed: _____	Company: _____	Date: _____
Signed: _____	Company: _____	Date: _____
Signed: _____	Company: _____	Date: _____
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FIGURES



440 Park Avenue South, New York, NY 10016

22-60 46th Street
Queens, New York

SITE LOCATION




DATE 2/11/2021
PROJECT NO. 190275
FIGURE 1

© 2022 AKRF Q:\Projects\190275 - 22-60 46TH STREET\Technical\GIS and Graphics\hazmat\RW\190275 Fig 2 Hospital Route Map.mxd 7/8/2022 1:17:47 PM mvelieux

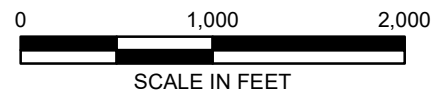


Service Layer Credits: ESRI World Street Map 2019

LEGEND

-  PROJECT SITE BOUNDARY
-  HOSPITAL LOCATION
-  ROUTE TO HOSPITAL

Mount Sinai Queens
25-10 30th Avenue
Long Island City, NY 11102
(718) 932-1000



440 Park Avenue South, New York, NY 10016

22-60 46th Street
Queens, New York

HOSPITAL ROUTE MAP

DATE
7/8/2022

PROJECT NO.
190275

FIGURE
2

ATTACHMENT A
POTENTIAL HEALTH EFFECTS FROM ON-SITE CONTAMINANTS

This fact sheet answers the most frequently asked health questions (FAQs) about 1,2-Dichloroethane. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to 1,2-dichloroethane usually occurs by breathing contaminated air in workplaces that use 1,2-dichloroethane. Breathing or ingesting high levels of 1,2-dichloroethane can cause damage to the nervous system, liver, kidneys, and lungs and may cause cancer. This substance has been found in at least 570 of the 1,585 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is 1,2-dichloroethane?

1,2-Dichloroethane, also called ethylene dichloride, is a manufactured chemical that is not found naturally in the environment. It is a clear liquid and has a pleasant smell and sweet taste.

The most common use of 1,2-dichloroethane is in the production of vinyl chloride which is used to make a variety of plastic and vinyl products including polyvinyl chloride (PVC) pipes, furniture and automobile upholstery, wall coverings, housewares, and automobile parts. It is also used to as a solvent and is added to leaded gasoline to remove lead.

What happens to 1,2-dichloroethane when it enters the environment?

- ☐ Most of the 1,2-dichloroethane released to the environment is released to the air. In the air, 1,2-dichloroethane breaks down by reacting with other compounds formed by sunlight. It can stay in the air for more than 5 months before it is broken down.
- ☐ 1,2-Dichloroethane can also be released into rivers and lakes. It breaks down very slowly in water and most of it will evaporate to the air.

- ☐ 1,2-Dichloroethane released in soil will either evaporate into the air or travel down through the soil and enter underground water.

How might I be exposed to 1,2-dichloroethane?

- ☐ The general population may be exposed to 1,2-dichloroethane by breathing air or drinking water that contains 1,2-dichloroethane.
- ☐ People who work or live near a factory where 1,2-dichloroethane is used, may be exposed to higher than usual levels.
- ☐ People living near uncontrolled hazardous waste sites may also be exposed to higher than usual levels of 1,2-dichloroethane.

How can 1,2-dichloroethane affect my health?

Nervous system disorders, liver and kidney diseases, and lung effects have been reported in humans ingesting or inhaling large amounts of 1,2-dichloroethane.

In laboratory animals, breathing or ingesting large amounts of 1,2-dichloroethane have also caused nervous system disorders and liver, kidney, and lung effects. Animal studies also suggest that 1,2-dichloroethane may damage the

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immune system. Kidney disease has also been seen in animals ingesting low doses of 1,2-dichloroethane for a long time. Studies in animals indicate that 1,2-dichloroethane does not affect reproduction.

How likely is 1,2-dichloroethane to cause cancer?

Human studies examining whether 1,2-dichloroethane can cause cancer have been considered inadequate. In animals, increases in the occurrence of stomach, mammary gland, liver, lung, and endometrium cancers have been seen following inhalation, oral, and dermal exposure.

The Department of Health and Human Services (DHHS) has determined that 1,2-dichloroethane may reasonably be expected to cause cancer. The EPA has determined that 1,2-dichloroethane is a probable human carcinogen and the International Agency for Cancer Research (IARC) considers it to be a possible human carcinogen.

How can 1,2-dichloroethane affect children?

We do not know if exposure to 1,2-dichloroethane will result in birth defects or other developmental effects in people. Studies in animals suggest that 1,2-dichloroethane does not produce birth defects.

It is likely that health effects seen in children exposed to high levels of 1,2-dichloroethane will be similar to the effects seen in adults.

How can families reduce the risk of exposure to 1,2-dichloroethane?

The general population is not likely to be exposed to large amounts of 1,2-dichloroethane. In the past, it was used in small amounts in household products such as cleaning agents, pesticides, and wallpaper and carpet glue. Risk of

exposure from this source could be eliminated if these older products were immediately discarded.

Children should avoid playing in soils near uncontrolled hazardous waste sites where 1,2-dichloroethane may have been discarded.

Is there a medical test to show whether I've been exposed to 1,2-dichloroethane?

Tests are available to measure 1,2-dichloroethane in breath, blood, breast milk, and urine of exposed people. Because 1,2-dichloroethane leaves the body fairly quickly, these tests need to be done within a couple of days of exposure. These tests cannot be used to predict the nature or severity of toxic effects. These tests are not usually done in the doctor's office.

Has the federal government made recommendations to protect human health?

The EPA allows 0.005 milligrams of 1,2-dichloroethane per liter of drinking water (0.005 mg/L).

The Occupational Safety and Health Administration has set a limit of 50 parts of 1,2-dichloroethane per million parts of air (50 ppm) in workplace air for 8 hour shifts and 40 hour work weeks.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2001. Toxicological Profile for 1,2-Dichloroethane. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



This fact sheet answers the most frequently asked health questions (FAQs) about barium and barium compounds. For more information, call the ATSDR Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because these substances may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to barium occurs mostly in the workplace or from drinking contaminated water. Ingesting drinking water containing levels of barium above the EPA drinking water guidelines for relatively short periods of time can cause gastrointestinal disturbances and muscle weakness. Ingesting high levels for a long time can damage the kidneys. Barium and barium compounds have been found in at least 798 of the 1,684 National Priority List sites identified by the Environmental Protection Agency (EPA).

What is barium?

Barium is a silvery-white metal which exists in nature only in ores containing mixtures of elements. It combines with other chemicals such as sulfur or carbon and oxygen to form barium compounds.

Barium compounds are used by the oil and gas industries to make drilling muds. Drilling muds make it easier to drill through rock by keeping the drill bit lubricated. They are also used to make paint, bricks, ceramics, glass, and rubber.

Barium sulfate is sometimes used by doctors to perform medical tests and to take x-rays of the gastrointestinal tract.

What happens to barium when it enters the environment?

- ☐ Barium gets into the air during the mining, refining, and production of barium compounds, and from the burning of coal and oil.
- ☐ The length of time that barium will last in air, land, water, or sediments depends on the form of barium released.
- ☐ Barium compounds, such as barium sulfate and barium carbonate, which do not dissolve well in water, can last a long time in the environment.

☐ Barium compounds, such as barium chloride, barium nitrate, or barium hydroxide, that dissolve easily in water usually do not last in these forms for a long time in the environment. The barium in these compounds that is dissolved in water quickly combines with sulfate or carbonate that are naturally found in water and become the longer lasting forms (barium sulfate and barium carbonate).

☐ Fish and aquatic organisms can accumulate barium.

How might I be exposed to barium?

- ☐ Ingesting small amounts present in your food and water or breathing air containing very low levels of barium.
- ☐ Living in areas with unusually high natural levels of barium in the drinking water.
- ☐ Working in a job that involves barium production or use.
- ☐ Living or working near waste sites where barium has been disposed of.

How can barium affect my health?

The health effects of the different barium compounds depend on how well the compound dissolves in water or in the stomach contents. Barium compounds that do not dissolve well, such as barium sulfate, are not generally harmful.

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Barium has been found to potentially cause gastrointestinal disturbances and muscular weakness when people are exposed to it at levels above the EPA drinking water standards for relatively short periods of time. Some people who eat or drink amounts of barium above background levels found in food and water for a short period may experience vomiting, abdominal cramps, diarrhea, difficulties in breathing, increased or decreased blood pressure, numbness around the face, and muscle weakness. Eating or drinking very large amounts of barium compounds that easily dissolve can cause changes in heart rhythm or paralysis and possibly death. Animals that drank barium over long periods had damage to the kidneys, decreases in body weight, and some died.

How likely is barium to cause cancer?

The Department of Health and Human Services (DHHS) and the International Agency for Research on Cancer (IARC) have not classified barium as to its carcinogenicity. The EPA has determined that barium is not likely to be carcinogenic to humans following ingestion and that there is insufficient information to determine whether it will be carcinogenic to humans following inhalation exposure.

How can barium affect children?

We do not know whether children will be more or less sensitive than adults to barium toxicity. A study in rats that swallowed barium found a decrease in newborn body weight; we do not know if a similar effect would be seen in humans.

How can families reduce the risks of exposure to barium?

The greatest potential source of barium exposure is through food and drinking water. However, the amount of barium in foods and drinking water are typically too low to be of concern.

Is there a medical test to determine whether I've been exposed to barium?

There is no routine medical test to determine whether you have been exposed to barium. Doctors can measure barium in body tissues and fluids, such as bones, blood, urine, and feces, using very complex instruments. These tests cannot be used to predict the extent of the exposure or potential health effects.

The geometric mean barium level measured in the U.S. general population aged 6 and older is reported by the Centers for Disease Control and Prevention (CDC) as 1.44 µg/g creatinine (measured in urine).

Has the federal government made recommendations to protect human health?

The EPA has set a limit of 2.0 milligrams of barium per liter of drinking water (2.0 mg/L), which is the same as 2 ppm.

The Occupational Safety and Health Administration (OSHA) has set Permissible Exposure Limits (PELs) of 0.5 milligrams of soluble barium compounds per cubic meter of workplace air (0.5 mg/m³) for 8 hour shifts and 40 hour work weeks. The OSHA limits for barium sulfate dust are 15 mg/m³ of total dust and 5 mg/m³ for respirable fraction.

The National Institute for Occupational Safety and Health (NIOSH) has set Recommended Exposure Limits (RELs) of 0.5 mg/m³ for soluble barium compounds. The NIOSH has set RELs of 10 mg/m³ (total dust) for barium sulfate and 5 mg/m³ (respirable fraction).

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2007. Toxicological Profile for Barium and Compounds (Update). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Environmental Medicine, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-800-232-4636, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



This fact sheet answers the most frequently asked health questions (FAQs) about benzene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Benzene is a widely used chemical formed from both natural processes and human activities. Breathing benzene can cause drowsiness, dizziness, and unconsciousness; long-term benzene exposure causes effects on the bone marrow and can cause anemia and leukemia. Benzene has been found in at least 813 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is benzene?

(Pronounced bĕn'zĕn')

Benzene is a colorless liquid with a sweet odor. It evaporates into the air very quickly and dissolves slightly in water. It is highly flammable and is formed from both natural processes and human activities.

Benzene is widely used in the United States; it ranks in the top 20 chemicals for production volume. Some industries use benzene to make other chemicals which are used to make plastics, resins, and nylon and synthetic fibers. Benzene is also used to make some types of rubbers, lubricants, dyes, detergents, drugs, and pesticides. Natural sources of benzene include volcanoes and forest fires. Benzene is also a natural part of crude oil, gasoline, and cigarette smoke.

What happens to benzene when it enters the environment?

- ☐ Industrial processes are the main source of benzene in the environment.
- ☐ Benzene can pass into the air from water and soil.
- ☐ It reacts with other chemicals in the air and breaks down within a few days.
- ☐ Benzene in the air can attach to rain or snow and be carried back down to the ground.

- ☐ It breaks down more slowly in water and soil, and can pass through the soil into underground water.
- ☐ Benzene does not build up in plants or animals.

How might I be exposed to benzene?

- ☐ Outdoor air contains low levels of benzene from tobacco smoke, automobile service stations, exhaust from motor vehicles, and industrial emissions.
- ☐ Indoor air generally contains higher levels of benzene from products that contain it such as glues, paints, furniture wax, and detergents.
- ☐ Air around hazardous waste sites or gas stations will contain higher levels of benzene.
- ☐ Leakage from underground storage tanks or from hazardous waste sites containing benzene can result in benzene contamination of well water.
- ☐ People working in industries that make or use benzene may be exposed to the highest levels of it.
- ☐ A major source of benzene exposures is tobacco smoke.

How can benzene affect my health?

Breathing very high levels of benzene can result in death, while high levels can cause drowsiness, dizziness, rapid heart rate, headaches, tremors, confusion, and unconsciousness. Eating or drinking foods containing high levels of benzene can cause vomiting, irritation of the stomach, dizziness, sleepiness, convulsions, rapid heart rate, and death.

ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>

The major effect of benzene from long-term (365 days or longer) exposure is on the blood. Benzene causes harmful effects on the bone marrow and can cause a decrease in red blood cells leading to anemia. It can also cause excessive bleeding and can affect the immune system, increasing the chance for infection.

Some women who breathed high levels of benzene for many months had irregular menstrual periods and a decrease in the size of their ovaries. It is not known whether benzene exposure affects the developing fetus in pregnant women or fertility in men.

Animal studies have shown low birth weights, delayed bone formation, and bone marrow damage when pregnant animals breathed benzene.

How likely is benzene to cause cancer?

The Department of Health and Human Services (DHHS) has determined that benzene is a known human carcinogen. Long-term exposure to high levels of benzene in the air can cause leukemia, cancer of the blood-forming organs.

Is there a medical test to show whether I've been exposed to benzene?

Several tests can show if you have been exposed to benzene. There is test for measuring benzene in the breath; this test must be done shortly after exposure. Benzene can also be measured in the blood, however, since benzene disappears rapidly from the blood, measurements are accurate only for recent exposures.

In the body, benzene is converted to products called metabolites. Certain metabolites can be measured in the urine. However, this test must be done shortly after exposure and is not a reliable indicator of how much benzene you have been exposed to, since the metabolites may be present in urine from other sources.

Has the federal government made recommendations to protect human health?

The EPA has set the maximum permissible level of benzene in drinking water at 0.005 milligrams per liter (0.005 mg/L). The EPA requires that spills or accidental releases into the environment of 10 pounds or more of benzene be reported to the EPA.

The Occupational Safety and Health Administration (OSHA) has set a permissible exposure limit of 1 part of benzene per million parts of air (1 ppm) in the workplace during an 8-hour workday, 40-hour workweek.

Glossary

Anemia: A decreased ability of the blood to transport oxygen.

Carcinogen: A substance with the ability to cause cancer.

CAS: Chemical Abstracts Service.

Chromosomes: Parts of the cells responsible for the development of hereditary characteristics.

Metabolites: Breakdown products of chemicals.

Milligram (mg): One thousandth of a gram.

Pesticide: A substance that kills pests.

References

This ToxFAQs information is taken from the 1997 Toxicological Profile for Benzene (update) produced by the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services, Public Health Service in Atlanta, GA.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-498-0093. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html> ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



This fact sheet answers the most frequently asked health questions (FAQs) about cadmium. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to cadmium happens mostly in the workplace where cadmium products are made. The general population is exposed from breathing cigarette smoke or eating cadmium contaminated foods. Cadmium damages the lungs, can cause kidney disease, and may irritate the digestive tract. This substance has been found in at least 776 of the 1,467 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is cadmium?

(Pronounced kăd'mē-əm)

Cadmium is a natural element in the earth's crust. It is usually found as a mineral combined with other elements such as oxygen (cadmium oxide), chlorine (cadmium chloride), or sulfur (cadmium sulfate, cadmium sulfide).

All soils and rocks, including coal and mineral fertilizers, contain some cadmium. Most cadmium used in the United States is extracted during the production of other metals like zinc, lead, and copper. Cadmium does not corrode easily and has many uses, including batteries, pigments, metal coatings, and plastics.

What happens to cadmium when it enters the environment?

- ☐ Cadmium enters air from mining, industry, and burning coal and household wastes.
- ☐ Cadmium particles in air can travel long distances before falling to the ground or water.
- ☐ It enters water and soil from waste disposal and spills or leaks at hazardous waste sites.
- ☐ It binds strongly to soil particles.
- ☐ Some cadmium dissolves in water.

- ☐ It doesn't break down in the environment, but can change forms.
- ☐ Fish, plants, and animals take up cadmium from the environment.
- ☐ Cadmium stays in the body a very long time and can build up from many years of exposure to low levels.

How might I be exposed to cadmium?

- ☐ Breathing contaminated workplace air (battery manufacturing, metal soldering or welding).
- ☐ Eating foods containing it; low levels in all foods (highest in shellfish, liver, and kidney meats).
- ☐ Breathing cadmium in cigarette smoke (doubles the average daily intake).
- ☐ Drinking contaminated water.
- ☐ Breathing contaminated air near the burning of fossil fuels or municipal waste.

How can cadmium affect my health?

Breathing high levels of cadmium severely damages the lungs and can cause death. Eating food or drinking water with very high levels severely irritates the stomach, leading to vomiting and diarrhea. Long-term exposure to lower levels of cadmium in air, food, or water leads to a buildup of cadmium in the kidneys and possible kidney disease.

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Other long-term effects are lung damage and fragile bones. Animals given cadmium in food or water had high blood pressure, iron-poor blood, liver disease, and nerve or brain damage.

We don't know if humans get any of these diseases from eating or drinking cadmium. Skin contact with cadmium is not known to cause health effects in humans or animals.

How likely is cadmium to cause cancer?

The Department of Health and Human Services (DHHS) has determined that cadmium and cadmium compounds may reasonably be anticipated to be carcinogens.

How can cadmium affect children?

The health effects in children are expected to be similar to those in adults (kidney, lung and intestinal damage).

We don't know if cadmium causes birth defects in people. Cadmium does not readily go from a pregnant woman's body into the developing child, but some portion can cross the placenta. It can also be found in breast milk. The babies of animals exposed to high levels of cadmium during pregnancy had changes in behavior and learning ability. Cadmium may also affect birth weight and the skeleton in developing animals.

Animal studies also indicate that more cadmium is absorbed into the body if the diet is low in calcium, protein, or iron, or is high in fat. A few studies show that younger animals absorb more cadmium and are more likely to lose bone and bone strength than adults.

How can families reduce the risk of exposure to cadmium?

In the home, store substances that contain cadmium safely, and keep nickel-cadmium batteries out of reach of young

children. If you work with cadmium, use all safety precautions to avoid carrying cadmium-containing dust home from work on your clothing, skin, hair, or tools.

A balanced diet can reduce the amount of cadmium taken into the body from food and drink.

Is there a medical test to show whether I've been exposed to cadmium?

Tests are available in some medical laboratories that measure cadmium in blood, urine, hair, or nails. Blood levels show recent exposure to cadmium, and urine levels show both recent and earlier exposure. The reliability of tests for cadmium levels in hair or nails is unknown.

Has the federal government made recommendations to protect human health?

The EPA has set a limit of 5 parts of cadmium per billion parts of drinking water (5 ppb). EPA doesn't allow cadmium in pesticides.

The Food and Drug Administration (FDA) limits the amount of cadmium in food colors to 15 parts per million (15 ppm).

The Occupational Safety and Health Administration (OSHA) limits workplace air to 100 micrograms cadmium per cubic meter (100 $\mu\text{g}/\text{m}^3$) as cadmium fumes and 200 μg cadmium/ m^3 as cadmium dust.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1999. Toxicological profile for cadmium. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html> ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



This fact sheet answers the most frequently asked health questions (FAQs) about copper. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Copper is a reddish metal that occurs naturally in the environment. It also occurs naturally in plants and animals. Low levels of copper are essential for maintaining good health. High levels can cause harmful effects such as irritation of the nose, mouth and eyes, vomiting, diarrhea, stomach cramps, and nausea. Copper has been found in at least 884 of the 1,613 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is copper?

Copper is a reddish metal that occurs naturally in rocks, soil, water, and air. Copper also occurs naturally in plants and animals.

Metallic copper can be easily molded or shaped. Metallic copper can be found in the U.S. penny, electrical wiring, and some water pipes. Metallic copper is also found in mixtures (called alloys) with other metals such as brass and bronze. Copper is also found as part of other compounds forming salts. Copper salts occur naturally, but are also manufactured. The most common copper salt is copper sulfate. Most copper compounds are blue-green in color. Copper compounds are commonly used in agriculture to treat plant diseases like mildew, for water treatment and, as preservatives for wood, leather, and fabrics.

What happens to copper when it enters the environment?

- ☐ Copper can enter the environment from the mining of copper and other metals and from factories that make or use metallic copper or copper compounds.
- ☐ It can also enter the environment through domestic waste water, combustion of fossil fuels and wastes, wood production, phosphate fertilizer production, and natural sources (e.g., windblown dust from soils, volcanoes, decaying vegetation, forest fires, and sea spray).
- ☐ Copper in soil strongly attaches to organic material and minerals.

- ☐ Copper that dissolves in water becomes rapidly bound to particles suspended in the water.
- ☐ Copper does not typically enter groundwater.
- ☐ Copper carried by particles emitted from smelters and ore processing plants is carried back to the ground by gravity or in rain or snow.
- ☐ Copper does not break down in the environment.

How might I be exposed to copper?

- ☐ Breathing air, drinking water, eating food, and by skin contact with soil, water, or other copper-containing substances.
- ☐ Some copper in the environment can be taken up by plants and animals.
- ☐ Higher exposure may occur if your water is corrosive and you have copper plumbing and brass water fixtures. ☐ You may be exposed to higher amounts of copper if you drink water or swim in lakes or reservoirs recently treated with copper to control algae or receive cooling water from a power plant that may have high amounts of dissolved copper.
- ☐ Using some garden products (e.g., fungicides) to control plant diseases.
- ☐ Living near bronze and brass production facilities may expose you to higher copper levels in soil.
- ☐ You may breathe copper-containing dust or have skin contact if you work in the industry of mining copper or

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processing the ore. You may breathe high levels if you grind or weld copper metal.

How can copper affect my health?

Copper is essential for good health, but high amounts can be harmful. Long-term exposure to copper dust can irritate your nose, mouth, and eyes, and cause headaches, dizziness, nausea, and diarrhea.

Drinking water with higher than normal levels of copper may cause vomiting, diarrhea, stomach cramps, and nausea. Intentionally high intakes of copper can cause liver and kidney damage and even death.

How likely is copper to cause cancer?

We do not know whether copper can cause cancer in humans. The EPA has determined that copper is not classifiable as to carcinogenicity.

How can copper affect children?

Exposure to high levels of copper will result in the same type of effects in children and adults. Studies in animals suggest that the young children may have more severe effects than adults; we do not know if this would also be true in humans. There is a very small percentage of infants and children who are unusually sensitive to copper.

We do not know if copper can cause birth defects or other developmental effects in humans. Studies in animals suggest that ingestion of high levels of copper may cause a decrease in fetal growth.

How can families reduce the risk of exposure to copper?

- ☐ The greatest potential source of copper exposure is through drinking water, especially in water that is first drawn in the morning after sitting in copper pipes and brass faucets overnight.
- ☐ To reduce exposure, run the water for at least 15-30 seconds before using it.
- ☐ If you are exposed to copper at work, you may carry

copper home on your skin, clothes, or tools. You can avoid this by showering, and changing clothing before leaving work, and your work clothes should be kept separate from other clothes and laundered separately.

Is there a medical test to show whether I've been exposed to copper?

Copper is normally found in all tissues of the body, blood, urine, feces, hair, and nails. High levels of copper in these samples can show that you have been exposed to higher than normal levels of copper. Tests to measure copper levels in the body are not routinely available at the doctor's office because they require special equipment. These tests cannot tell the extent of exposure or whether you will experience harmful effects.

Has the federal government made recommendations to protect human health?

The EPA has determined that drinking water should not contain more than 1.3 milligrams of copper per liter of water (1.3 mg/L).

The Occupational Safety and Health Administration (OSHA) has set a limit of 0.1 mg per cubic meter (0.1 mg/m³) of copper fumes (vapor generated from heating copper) and 1 mg/m³ of copper dusts (fine metallic copper particles) and mists (aerosol of soluble copper) in workroom air during an 8-hour work shift, 40-hour workweek.

The Food and Nutrition Board of the Institute of Medicine recommends dietary allowances (RDAs) of 340 micrograms (340 µg) of copper per day for children aged 1-3 years, 440 µg/day for children aged 4-8 years, 700 µg/day for children aged 9-13 years, 890 µg/day for children aged 14-18 years, and 900 µg/day for adults.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. Toxicological Profile for Copper (Draft for Public Comment). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



This fact sheet answers the most frequently asked health questions (FAQs) about DDT, DDE, and DDD. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to DDT, DDE, and DDD occurs mostly from eating foods containing small amounts of these compounds, particularly meat, fish and poultry. High levels of DDT can affect the nervous system causing excitability, tremors and seizures. In women, DDE can cause a reduction in the duration of lactation and an increased chance of having a premature baby. DDT, DDE, and DDD have been found in at least 441 of the 1,613 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What are DDT, DDE, and DDD?

DDT (dichlorodiphenyltrichloroethane) is a pesticide once widely used to control insects in agriculture and insects that carry diseases such as malaria. DDT is a white, crystalline solid with no odor or taste. Its use in the U.S. was banned in 1972 because of damage to wildlife, but is still used in some countries.

DDE (dichlorodiphenyldichloroethylene) and DDD (dichlorodiphenyldichloroethane) are chemicals similar to DDT that contaminate commercial DDT preparations. DDE has no commercial use. DDD was also used to kill pests, but its use has also been banned. One form of DDD has been used medically to treat cancer of the adrenal gland.

What happens to DDT, DDE, and DDD when they enter the environment?

- ☐ DDT entered the environment when it was used as a pesticide; it still enters the environment due to current use in other countries.
- ☐ DDE enters the environment as contaminant or breakdown product of DDT; DDD also enters the environment as a breakdown product of DDT.
- ☐ DDT, DDE, and DDD in air are rapidly broken down by sunlight. Half of what's in air breaks down within 2 days.
- ☐ They stick strongly to soil; most DDT in soil is broken down slowly to DDE and DDD by microorganisms; half the DDT in soil will break down in 2-15 years, depending on the type of soil.

- ☐ Only a small amount will go through the soil into groundwater; they do not dissolve easily in water.
- ☐ DDT, and especially DDE, build up in plants and in fatty tissues of fish, birds, and other animals.

How might I be exposed to DDT, DDE, and DDD?

- ☐ Eating contaminated foods, such as root and leafy vegetables, fatty meat, fish, and poultry, but levels are very low.
- ☐ Eating contaminated imported foods from countries that still allow the use of DDT to control pests.
- ☐ Breathing contaminated air or drinking contaminated water near waste sites and landfills that may contain higher levels of these chemicals.
- ☐ Infants fed on breast milk from mothers who have been exposed.
- ☐ Breathing or swallowing soil particles near waste sites or landfills that contain these chemicals.

How can DDT, DDE, and DDD affect my health?

DDT affects the nervous system. People who accidentally swallowed large amounts of DDT became excitable and had tremors and seizures. These effects went away after the exposure stopped. No effects were seen in people who took small daily doses of DDT by capsule for 18 months. A study in humans showed that women who had high amounts of a form of DDE in their breast milk were unable to

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breast feed their babies for as long as women who had little DDE in the breast milk. Another study in humans showed that women who had high amounts of DDE in breast milk had an increased chance of having premature babies. In animals, short-term exposure to large amounts of DDT in food affected the nervous system, while long-term exposure to smaller amounts affected the liver. Also in animals, short-term oral exposure to small amounts of DDT or its breakdown products may also have harmful effects on reproduction.

How likely are DDT, DDE, and DDD to cause cancer?

Studies in DDT-exposed workers did not show increases in cancer. Studies in animals given DDT with the food have shown that DDT can cause liver cancer. The Department of Health and Human Services (DHHS) determined that DDT may reasonably be anticipated to be a human carcinogen. The International Agency for Research on Cancer (IARC) determined that DDT may possibly cause cancer in humans. The EPA determined that DDT, DDE, and DDD are probable human carcinogens.

How can DDT, DDE, and DDD affect children?

There are no studies on the health effects of children exposed to DDT, DDE, or DDD. We can assume that children exposed to large amounts of DDT will have health effects similar to the effects seen in adults. However, we do not know whether children differ from adults in their susceptibility to these substances.

There is no evidence that DDT, DDE, or DDD cause birth defects in people. A study showed that teenage boys whose mothers had higher DDE amounts in the blood when they were pregnant were taller than those whose mothers had lower DDE levels. However, a different study found the opposite in preteen girls. The reason for the discrepancy between these studies is unknown.

Studies in rats have shown that DDT and DDE can mimic the action of natural hormones and in this way affect the development of the reproductive and nervous systems. Puberty was delayed in male rats given high amounts of DDE as juveniles. This could possibly happen in humans.

A study in mice showed that exposure to DDT during the first weeks of life may cause neurobehavioral problems later in life.

How can families reduce the risk of exposure to DDT, DDE, and DDD?

- ☐ Most families will be exposed to DDT by eating food or drinking liquids contaminated with small amounts of DDT.
- ☐ Cooking will reduce the amount of DDT in fish.
- ☐ Washing fruit and vegetables will remove most DDT from their surface.
- ☐ Follow health advisories that tell you about consumption of fish and wildlife caught in contaminated areas.

Is there a medical test to show whether I've been exposed to DDT, DDE, and DDD?

Laboratory tests can detect DDT, DDE, and DDD in fat, blood, urine, semen, and breast milk. These tests may show low, moderate, or excessive exposure to these compounds, but cannot tell the exact amount you were exposed to, or whether you will experience adverse effects. These tests are not routinely available at the doctor's office because they require special equipment.

Has the federal government made recommendations to protect human health?

The Occupational Safety and Health Administration (OSHA) sets a limit of 1 milligram of DDT per cubic meter of air (1 mg/m³) in the workplace for an 8-hour shift, 40-hour workweek.

The Food and Drug Administration (FDA) has set limits for DDT, DDE, and DDD in foodstuff at or above which the agency will take legal action to remove the products from the market.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. Toxicological Profile for DDT/DDE/DDD (Update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



This fact sheet answers the most frequently asked health questions (FAQs) about ethylbenzene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Ethylbenzene is a colorless liquid found in a number of products including gasoline and paints. Breathing very high levels can cause dizziness and throat and eye irritation. Ethylbenzene has been found in at least 731 of the 1,467 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is ethylbenzene?

(Pronounced ĕth' əl bĕn' zĕn')

Ethylbenzene is a colorless, flammable liquid that smells like gasoline. It is found in natural products such as coal tar and petroleum and is also found in manufactured products such as inks, insecticides, and paints.

Ethylbenzene is used primarily to make another chemical, styrene. Other uses include as a solvent, in fuels, and to make other chemicals.

What happens to ethylbenzene when it enters the environment?

- ☐ Ethylbenzene moves easily into the air from water and soil.
- ☐ It takes about 3 days for ethylbenzene to be broken down in air into other chemicals.
- ☐ Ethylbenzene may be released to water from industrial discharges or leaking underground storage tanks.
- ☐ In surface water, ethylbenzene breaks down by reacting with other chemicals found naturally in water.
- ☐ In soil, it is broken down by soil bacteria.

How might I be exposed to ethylbenzene?

- ☐ Breathing air containing ethylbenzene, particularly in areas near factories or highways.
- ☐ Drinking contaminated tap water.
- ☐ Working in an industry where ethylbenzene is used or made.
- ☐ Using products containing it, such as gasoline, carpet glues, varnishes, and paints.

How can ethylbenzene affect my health?

Limited information is available on the effects of ethylbenzene on people's health. The available information shows dizziness, throat and eye irritation, tightening of the chest, and a burning sensation in the eyes of people exposed to high levels of ethylbenzene in air.

Animals studies have shown effects on the nervous system, liver, kidneys, and eyes from breathing ethylbenzene in air.

How likely is ethylbenzene to cause cancer?

The EPA has determined that ethylbenzene is not classifiable as to human carcinogenicity.

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No studies in people have shown that ethylbenzene exposure can result in cancer. Two available animal studies suggest that ethylbenzene may cause tumors.

How can ethylbenzene affect children?

Children may be exposed to ethylbenzene through inhalation of consumer products, including gasoline, paints, inks, pesticides, and carpet glue. We do not know whether children are more sensitive to the effects of ethylbenzene than adults.

It is not known whether ethylbenzene can affect the development of the human fetus. Animal studies have shown that when pregnant animals were exposed to ethylbenzene in air, their babies had an increased number of birth defects.

How can families reduce the risk of exposure to ethylbenzene?

Exposure to ethylbenzene vapors from household products and newly installed carpeting can be minimized by using adequate ventilation.

Household chemicals should be stored out of reach of children to prevent accidental poisoning. Always store household chemicals in their original containers; never store them in containers children would find attractive to eat or drink from, such as old soda bottles. Gasoline should be stored in a gasoline can with a locked cap.

Sometimes older children sniff household chemicals, including ethylbenzene, in an attempt to get high. Talk with your children about the dangers of sniffing chemicals.

Is there a medical test to show whether I've been exposed to ethylbenzene?

Ethylbenzene is found in the blood, urine, breath, and

some body tissues of exposed people. The most common way to test for ethylbenzene is in the urine. This test measures substances formed by the breakdown of ethylbenzene. This test needs to be done within a few hours after exposure occurs, because the substances leave the body very quickly.

These tests can show you were exposed to ethylbenzene, but cannot predict the kind of health effects that might occur.

Has the federal government made recommendations to protect human health?

The EPA has set a maximum contaminant level of 0.7 milligrams of ethylbenzene per liter of drinking water (0.7 mg/L).

The EPA requires that spills or accidental releases into the environment of 1,000 pounds or more of ethylbenzene be reported to the EPA.

The Occupational Safety and Health Administration (OSHA) has set an occupational exposure limit of 100 parts of ethylbenzene per million parts of air (100 ppm) for an 8-hour workday, 40-hour workweek.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1999. Toxicological profile for ethylbenzene. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html> ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



This fact sheet answers the most frequently asked health questions (FAQs) about fuel oils. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

SUMMARY: Fuel oils are liquid mixtures produced from petroleum, and their use mostly involves burning them as fuels. Drinking or breathing fuel oils may cause nausea or nervous system effects. However, exposure under normal use conditions is not likely to be harmful. Fuel oils have been found in at least 26 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What are fuel oils?

(Pronounced fyoo'əl oilz)

Fuel oils are a variety of yellowish to light brown liquid mixtures that come from crude petroleum. Some chemicals found in fuel oils may evaporate easily, while others may more easily dissolve in water.

Fuel oils are produced by different petroleum refining processes, depending on their intended uses. Fuel oils may be used as fuel for engines, lamps, heaters, furnaces, and stoves, or as solvents.

Some commonly found fuel oils include kerosene, diesel fuel, jet fuel, range oil, and home heating oil. These fuel oils differ from one another by their hydrocarbon compositions, boiling point ranges, chemical additives, and uses.

What happens to fuel oils when they enter the environment?

- ☐ Some chemicals found in fuel oils may evaporate into the air from open containers or contaminated soil or water.
- ☐ Some chemicals found in fuel oils may dissolve in water after spills to surface waters or leaks from underground storage tanks.

- ☐ Some chemicals found in fuel oils may stick to particles in water, which will eventually cause them to settle to the bottom sediment.
- ☐ Some of the chemicals found in fuel oils may be broken down slowly in air, water, and soil by sunlight or small organisms.
- ☐ Some of the chemicals found in fuel oils may build up significantly in plants and animals.

How might I be exposed to fuel oils?

- ☐ Using a home kerosene heater or stove, or using fuel oils at work.
- ☐ Breathing air in home or building basements that has been contaminated with fuel oil vapors entering from the soil.
- ☐ Drinking or swimming in water that has been contaminated with fuel oils from a spill or a leaking underground storage tank.
- ☐ Touching soil contaminated with fuel oils.
- ☐ Using fuel oils to wash paint or grease from skin or equipment.

How can fuel oils affect my health?

Little information is available about the health effects that may be caused by fuel oils. People who use kerosene

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stoves for cooking do not seem to have any health problems related to their exposure.

Breathing some fuel oils for short periods may cause nausea, eye irritation, increased blood pressure, headache, light-headedness, loss of appetite, poor coordination, and difficulty concentrating. Breathing diesel fuel vapors for long periods may cause kidney damage and lower your blood's ability to clot.

Drinking small amounts of kerosene may cause vomiting, diarrhea, coughing, stomach swelling and cramps, drowsiness, restlessness, painful breathing, irritability, and unconsciousness. Drinking large amounts of kerosene may cause convulsions, coma, or death. Skin contact with kerosene for short periods may cause itchy, red, sore, or peeling skin.

How likely are fuel oils to cause cancer?

The International Agency for Research on Cancer (IARC) has determined that some fuel oils (heavy) may possibly cause cancer in humans, but for other fuel oils (light) there is not enough information to make a determination. IARC has also determined that occupational exposures to fuel oils during petroleum refining are probably carcinogenic in humans.

Some studies with mice have suggested that repeated contact with fuel oils may cause liver or skin cancer. However, other mouse studies have found this not to be the case. No studies are available in other animals or in people on the carcinogenic effects of fuel oils.

Is there a medical test to show whether I've been exposed to fuel oils?

There is no medical test that shows if you have been exposed to fuel oils. Tests are available to determine if some of

the chemicals commonly found in fuel oils are in your blood. However, the presence of these chemicals in blood may not necessarily mean that you have been exposed to fuel oils.

Has the federal government made recommendations to protect human health?

The Occupational Safety and Health Administration (OSHA) and the Air Force Office of Safety and Health (AFOSH) have set a permissible exposure level (PEL) of 400 parts of petroleum distillates per million parts of air (400 ppm) for an 8-hour workday, 40-hour workweek.

The National Institute for Occupational Safety and Health (NIOSH) recommends that average workplace air levels not exceed 350 milligrams of petroleum distillates per cubic meter of air (350 mg/m³) for a 40-hour workweek.

The Department of Transportation (DOT) lists fuel oils as hazardous materials and, therefore, regulates their transportation.

Glossary

Carcinogenic: Able to cause cancer.

CAS: Chemical Abstracts Service.

Evaporate: To change into a vapor or a gas.

Hydrocarbon: Any compound made up of hydrogen and carbon.

Milligram (mg): One thousandth of a gram.

ppm: Parts per million.

Sediment: Mud and debris that have settled to the bottom of a body of water.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for fuel oils. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-498-0093. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html> ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



This fact sheet answers the most frequently asked health questions (FAQs) about lead. For more information, call the ATSDR Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to lead can happen from breathing workplace air or dust, eating contaminated foods, or drinking contaminated water. Children can be exposed from eating lead-based paint chips or playing in contaminated soil. Lead can damage the nervous system, kidneys, and reproductive system. Lead has been found in at least 1,272 of the 1,684 National Priority List sites identified by the Environmental Protection Agency (EPA).

What is lead?

Lead is a naturally occurring bluish-gray metal found in small amounts in the earth's crust. Lead can be found in all parts of our environment. Much of it comes from human activities including burning fossil fuels, mining, and manufacturing.

Lead has many different uses. It is used in the production of batteries, ammunition, metal products (solder and pipes), and devices to shield X-rays. Because of health concerns, lead from paints and ceramic products, caulking, and pipe solder has been dramatically reduced in recent years. The use of lead as an additive to gasoline was banned in 1996 in the United States.

What happens to lead when it enters the environment?

- ☐ Lead itself does not break down, but lead compounds are changed by sunlight, air, and water.
- ☐ When lead is released to the air, it may travel long distances before settling to the ground.
- ☐ Once lead falls onto soil, it usually sticks to soil particles.
- ☐ Movement of lead from soil into groundwater will depend on the type of lead compound and the characteristics of the soil.

How might I be exposed to lead?

- ☐ Eating food or drinking water that contains lead. Water pipes in some older homes may contain lead solder. Lead can leach out into the water.

- ☐ Spending time in areas where lead-based paints have been used and are deteriorating. Deteriorating lead paint can contribute to lead dust.

- ☐ Working in a job where lead is used or engaging in certain hobbies in which lead is used, such as making stained glass.

- ☐ Using health-care products or folk remedies that contain lead.

How can lead affect my health?

The effects of lead are the same whether it enters the body through breathing or swallowing. Lead can affect almost every organ and system in your body. The main target for lead toxicity is the nervous system, both in adults and children. Long-term exposure of adults can result in decreased performance in some tests that measure functions of the nervous system. It may also cause weakness in fingers, wrists, or ankles. Lead exposure also causes small increases in blood pressure, particularly in middle-aged and older people and can cause anemia. Exposure to high lead levels can severely damage the brain and kidneys in adults or children and ultimately cause death. In pregnant women, high levels of exposure to lead may cause miscarriage. High-level exposure in men can damage the organs responsible for sperm production.

How likely is lead to cause cancer?

We have no conclusive proof that lead causes cancer in humans. Kidney tumors have developed in rats and mice that had been given large doses of some kind of lead compounds. The Department of Health and Human Services

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(DHHS) has determined that lead and lead compounds are reasonably anticipated to be human carcinogens and the EPA has determined that lead is a probable human carcinogen. The International Agency for Research on Cancer (IARC) has determined that inorganic lead is probably carcinogenic to humans and that there is insufficient information to determine whether organic lead compounds will cause cancer in humans.

How can lead affect children?

Small children can be exposed by eating lead-based paint chips, chewing on objects painted with lead-based paint, or swallowing house dust or soil that contains lead.

Children are more vulnerable to lead poisoning than adults. A child who swallows large amounts of lead may develop blood anemia, severe stomachache, muscle weakness, and brain damage. If a child swallows smaller amounts of lead, much less severe effects on blood and brain function may occur. Even at much lower levels of exposure, lead can affect a child's mental and physical growth.

Exposure to lead is more dangerous for young and unborn children. Unborn children can be exposed to lead through their mothers. Harmful effects include premature births, smaller babies, decreased mental ability in the infant, learning difficulties, and reduced growth in young children. These effects are more common if the mother or baby was exposed to high levels of lead. Some of these effects may persist beyond childhood.

How can families reduce the risks of exposure to lead?

- ☐ Avoid exposure to sources of lead.
- ☐ Do not allow children to chew on mouth surfaces that may have been painted with lead-based paint.
- ☐ If you have a water lead problem, run or flush water that has been standing overnight before drinking or cooking with it.
- ☐ Some types of paints and pigments that are used as make-up or hair coloring contain lead. Keep these kinds of products away from children
- ☐ If your home contains lead-based paint or you live in an area contaminated with lead, wash children's hands and faces

often to remove lead dusts and soil, and regularly clean the house of dust and tracked in soil.

Is there a medical test to determine whether I've been exposed to lead?

A blood test is available to measure the amount of lead in your blood and to estimate the amount of your recent exposure to lead. Blood tests are commonly used to screen children for lead poisoning. Lead in teeth or bones can be measured by X-ray techniques, but these methods are not widely available. Exposure to lead also can be evaluated by measuring erythrocyte protoporphyrin (EP) in blood samples. EP is a part of red blood cells known to increase when the amount of lead in the blood is high. However, the EP level is not sensitive enough to identify children with elevated blood lead levels below about 25 micrograms per deciliter ($\mu\text{g}/\text{dL}$). These tests usually require special analytical equipment that is not available in a doctor's office. However, your doctor can draw blood samples and send them to appropriate laboratories for analysis.

Has the federal government made recommendations to protect human health?

The Centers for Disease Control and Prevention (CDC) recommends that states test children at ages 1 and 2 years. Children should be tested at ages 3–6 years if they have never been tested for lead, if they receive services from public assistance programs for the poor such as Medicaid or the Supplemental Food Program for Women, Infants, and Children, if they live in a building or frequently visit a house built before 1950; if they visit a home (house or apartment) built before 1978 that has been recently remodeled; and/or if they have a brother, sister, or playmate who has had lead poisoning. CDC considers a blood lead level of 10 $\mu\text{g}/\text{dL}$ to be a level of concern for children.

EPA limits lead in drinking water to 15 μg per liter.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2007. Toxicological Profile for lead (Update). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Environmental Medicine, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-800-232-4636, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



This fact sheet answers the most frequently asked health questions (FAQs) about mercury. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to mercury occurs from breathing contaminated air, ingesting contaminated water and food, and having dental and medical treatments. Mercury, at high levels, may damage the brain, kidneys, and developing fetus. This chemical has been found in at least 714 of 1,467 National Priorities List sites identified by the Environmental Protection Agency.

What is mercury?

(Pronounced mŭr'kyə-rē)

Mercury is a naturally occurring metal which has several forms. The metallic mercury is a shiny, silver-white, odorless liquid. If heated, it is a colorless, odorless gas.

Mercury combines with other elements, such as chlorine, sulfur, or oxygen, to form inorganic mercury compounds or "salts," which are usually white powders or crystals. Mercury also combines with carbon to make organic mercury compounds. The most common one, methylmercury, is produced mainly by microscopic organisms in the water and soil. More mercury in the environment can increase the amounts of methylmercury that these small organisms make.

Metallic mercury is used to produce chlorine gas and caustic soda, and is also used in thermometers, dental fillings, and batteries. Mercury salts are sometimes used in skin lightening creams and as antiseptic creams and ointments.

What happens to mercury when it enters the environment?

- ☐ Inorganic mercury (metallic mercury and inorganic mercury compounds) enters the air from mining ore deposits, burning coal and waste, and from manufacturing plants.
- ☐ It enters the water or soil from natural deposits, disposal of wastes, and volcanic activity.

- ☐ Methylmercury may be formed in water and soil by small organisms called bacteria.
- ☐ Methylmercury builds up in the tissues of fish. Larger and older fish tend to have the highest levels of mercury.

How might I be exposed to mercury?

- ☐ Eating fish or shellfish contaminated with methylmercury.
- ☐ Breathing vapors in air from spills, incinerators, and industries that burn mercury-containing fuels.
- ☐ Release of mercury from dental work and medical treatments.
- ☐ Breathing contaminated workplace air or skin contact during use in the workplace (dental, health services, chemical, and other industries that use mercury).
- ☐ Practicing rituals that include mercury.

How can mercury affect my health?

The nervous system is very sensitive to all forms of mercury. Methylmercury and metallic mercury vapors are more harmful than other forms, because more mercury in these forms reaches the brain. Exposure to high levels of metallic, inorganic, or organic mercury can permanently damage the brain, kidneys, and developing fetus. Effects on brain functioning may result in irritability, shyness, tremors, changes in vision or hearing, and memory problems.

Short-term exposure to high levels of metallic mercury vapors may cause effects including lung damage, nausea,

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vomiting, diarrhea, increases in blood pressure or heart rate, skin rashes, and eye irritation.

How likely is mercury to cause cancer?

There are inadequate human cancer data available for all forms of mercury. Mercuric chloride has caused increases in several types of tumors in rats and mice, and methylmercury has caused kidney tumors in male mice. The EPA has determined that mercuric chloride and methylmercury are possible human carcinogens.

How can mercury affect children?

Very young children are more sensitive to mercury than adults. Mercury in the mother's body passes to the fetus and may accumulate there. It can also can pass to a nursing infant through breast milk. However, the benefits of breast feeding may be greater than the possible adverse effects of mercury in breast milk.

Mercury's harmful effects that may be passed from the mother to the fetus include brain damage, mental retardation, incoordination, blindness, seizures, and inability to speak. Children poisoned by mercury may develop problems of their nervous and digestive systems, and kidney damage.

How can families reduce the risk of exposure to mercury?

Carefully handle and dispose of products that contain mercury, such as thermometers or fluorescent light bulbs. Do not vacuum up spilled mercury, because it will vaporize and increase exposure. If a large amount of mercury has been spilled, contact your health department. Teach children not to play with shiny, silver liquids.

Properly dispose of older medicines that contain mercury. Keep all mercury-containing medicines away from children.

Pregnant women and children should keep away from

rooms where liquid mercury has been used.

Learn about wildlife and fish advisories in your area from your public health or natural resources department.

Is there a medical test to show whether I've been exposed to mercury?

Tests are available to measure mercury levels in the body. Blood or urine samples are used to test for exposure to metallic mercury and to inorganic forms of mercury. Mercury in whole blood or in scalp hair is measured to determine exposure to methylmercury. Your doctor can take samples and send them to a testing laboratory.

Has the federal government made recommendations to protect human health?

The EPA has set a limit of 2 parts of mercury per billion parts of drinking water (2 ppb).

The Food and Drug Administration (FDA) has set a maximum permissible level of 1 part of methylmercury in a million parts of seafood (1 ppm).

The Occupational Safety and Health Administration (OSHA) has set limits of 0.1 milligram of organic mercury per cubic meter of workplace air (0.1 mg/m³) and 0.05 mg/m³ of metallic mercury vapor for 8-hour shifts and 40-hour work weeks.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1999. Toxicological profile for mercury. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html> ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



This fact sheet answers the most frequently asked health questions (FAQs) about naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because these substances may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene happens mostly from breathing air contaminated from the burning of wood, tobacco, or fossil fuels, industrial discharges, or moth repellents. Exposure to large amounts of naphthalene may damage or destroy some of your red blood cells. Naphthalene has caused cancer in animals. Naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene have been found in at least 687, 36, and 412, respectively, of the 1,662 National Priority List sites identified by the Environmental Protection Agency (EPA).

What are naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene?

Naphthalene is a white solid that evaporates easily. Fuels such as petroleum and coal contain naphthalene. It is also called white tar, and tar camphor, and has been used in mothballs and moth flakes. Burning tobacco or wood produces naphthalene. It has a strong, but not unpleasant smell. The major commercial use of naphthalene is in the manufacture of polyvinyl chloride (PVC) plastics. Its major consumer use is in moth repellents and toilet deodorant blocks.

1-Methylnaphthalene and 2-methylnaphthalene are naphthalene-related compounds. 1-Methylnaphthalene is a clear liquid and 2-methylnaphthalene is a solid; both can be smelled in air and in water at very low concentrations.

1-Methylnaphthalene and 2-methylnaphthalene are used to make other chemicals such as dyes and resins. 2-Methylnaphthalene is also used to make vitamin K.

What happens to naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene when they enter the environment?

- ☐ Naphthalene enters the environment from industrial and domestic sources, and from accidental spills.
- ☐ Naphthalene can dissolve in water to a limited degree and may be present in drinking water from wells close to hazardous waste sites and landfills.
- ☐ Naphthalene can become weakly attached to soil or pass through soil into underground water.
- ☐ In air, moisture and sunlight break it down within 1 day. In water, bacteria break it down or it evaporates into the air.
- ☐ Naphthalene does not accumulate in the flesh of animals or fish that you might eat.

☐ 1-Methylnaphthalene and 2-methylnaphthalene are expected to act like naphthalene in air, water, or soil because they have similar chemical and physical properties.

How might I be exposed to naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene?

- ☐ Breathing low levels in outdoor air.
- ☐ Breathing air contaminated from industrial discharges or smoke from burning wood, tobacco, or fossil fuels.
- ☐ Using or making moth repellents, coal tar products, dyes or inks could expose you to these chemicals in the air.
- ☐ Drinking water from contaminated wells.
- ☐ Touching fabrics that are treated with moth repellents containing naphthalene.
- ☐ Exposure to naphthalene, 1-methylnaphthalene and 2-methylnaphthalene from eating foods or drinking beverages is unlikely.

How can naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene affect my health?

Exposure to large amounts of naphthalene may damage or destroy some of your red blood cells. This could cause you to have too few red blood cells until your body replaces the destroyed cells. This condition is called hemolytic anemia. Some symptoms of hemolytic anemia are fatigue, lack of appetite, restlessness, and pale skin. Exposure to large amounts of naphthalene may also cause nausea, vomiting, diarrhea, blood in the urine, and a yellow color to the skin. Animals sometimes develop cloudiness in their eyes after swallowing high amounts of naphthalene. It is not clear whether this also develops in people. Rats and mice that breathed naphthalene vapors daily for a lifetime developed irritation and inflammation of their nose and lungs. It is unclear if naphthalene

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causes reproductive effects in animals; most evidence says it does not.

There are no studies of humans exposed to 1-methylnaphthalene or 2-methylnaphthalene.

Mice fed food containing 1-methylnaphthalene and 2-methylnaphthalene for most of their lives had part of their lungs filled with an abnormal material.

How likely are naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene to cause cancer?

There is no direct evidence in humans that naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene cause cancer. However, cancer from naphthalene exposure has been seen in animal studies. Some female mice that breathed naphthalene vapors daily for a lifetime developed lung tumors. Some male and female rats exposed to naphthalene in a similar manner also developed nose tumors.

Based on the results from animal studies, the Department of Health and Human Services (DHHS) concluded that naphthalene is reasonably anticipated to be a human carcinogen. The International Agency for Research on Cancer (IARC) concluded that naphthalene is possibly carcinogenic to humans. The EPA determined that naphthalene is a possible human carcinogen (Group C) and that the data are inadequate to assess the human carcinogenic potential of 2-methylnaphthalene.

How can naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene affect children?

Hospitals have reported many cases of hemolytic anemia in children, including newborns and infants, who either ate naphthalene mothballs or deodorants cakes or who were in close contact with clothing or blankets stored in naphthalene mothballs. Naphthalene can move from a pregnant woman's blood to the unborn baby's blood. Naphthalene has been detected in some samples of breast milk from the general U.S. population, but not at levels that are expected to be of concern.

There is no information on whether naphthalene has affected development in humans. No developmental abnormalities were observed in the offspring from rats, mice, and rabbits fed naphthalene during pregnancy.

We do not have any information on possible health effects of 1-methylnaphthalene or 2-methylnaphthalene on children.

How can families reduce the risks of exposure to naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene?

❑ Families can reduce the risks of exposure to naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene by avoiding smoking tobacco, generating smoke during cooking, or using

fireplaces or heating appliances in their homes.

❑ If families use naphthalene-containing moth repellents, the material should be enclosed in containers that prevent vapors from escaping, and kept out of the reach from children.

❑ Blankets and clothing stored with naphthalene moth repellents should be aired outdoors to remove naphthalene odors and washed before they are used.

❑ Families should inform themselves of the contents of air deodorizers that are used in their homes and refrain from using deodorizers with naphthalene.

Is there a medical test to determine whether I've been exposed to naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene?

Tests are available that measure levels of these chemicals and their breakdown products in samples of urine, feces, blood, maternal milk, or body fat. These tests are not routinely available in a doctor's office because they require special equipment, but samples can be sent to special testing laboratories. These tests cannot determine exactly how much naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene you were exposed to or predict whether harmful effects will occur. If the samples are collected within a day or two of exposure, then the tests can show if you were exposed to a large or small amount of naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene.

Has the federal government made recommendations to protect human health?

The EPA recommends that children not drink water with over 0.5 parts per million (0.5 ppm) naphthalene for more than 10 days or over 0.4 ppm for any longer than 7 years. Adults should not drink water with more than 1 ppm for more than 7 years. For water consumed over a lifetime (70 years), the EPA suggests that it contain no more than 0.1 ppm naphthalene.

The Occupational Safety and Health Administration (OSHA) set a limit of 10 ppm for the level of naphthalene in workplace air during an 8-hour workday, 40-hour workweek. The National Institute for Occupational Safety and Health (NIOSH) considers more than 500 ppm of naphthalene in air to be immediately dangerous to life or health. This is the exposure level of a chemical that is likely to impair a worker's ability to leave a contaminate area and therefore, results in permanent health problems or death.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2005. Toxicological Profile for Naphthalene, 1-Methylnaphthalene, and 2-Methylnaphthalene (Update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



This fact sheet answers the most frequently asked health questions (FAQs) about polycyclic aromatic hydrocarbons (PAHs). For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

SUMMARY: Exposure to polycyclic aromatic hydrocarbons usually occurs by breathing air contaminated by wild fires or coal tar, or by eating foods that have been grilled. PAHs have been found in at least 600 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What are polycyclic aromatic hydrocarbons?

(Pronounced pŏl'ī-sī'klīk ār'ə-măĭ'īk hī'drə-kar'bənz)

Polycyclic aromatic hydrocarbons (PAHs) are a group of over 100 different chemicals that are formed during the incomplete burning of coal, oil and gas, garbage, or other organic substances like tobacco or charbroiled meat. PAHs are usually found as a mixture containing two or more of these compounds, such as soot.

Some PAHs are manufactured. These pure PAHs usually exist as colorless, white, or pale yellow-green solids. PAHs are found in coal tar, crude oil, creosote, and roofing tar, but a few are used in medicines or to make dyes, plastics, and pesticides.

What happens to PAHs when they enter the environment?

- ☐ PAHs enter the air mostly as releases from volcanoes, forest fires, burning coal, and automobile exhaust.
- ☐ PAHs can occur in air attached to dust particles.
- ☐ Some PAH particles can readily evaporate into the air from soil or surface waters.
- ☐ PAHs can break down by reacting with sunlight and other chemicals in the air, over a period of days to weeks.

- ☐ PAHs enter water through discharges from industrial and wastewater treatment plants.
- ☐ Most PAHs do not dissolve easily in water. They stick to solid particles and settle to the bottoms of lakes or rivers.
- ☐ Microorganisms can break down PAHs in soil or water after a period of weeks to months.
- ☐ In soils, PAHs are most likely to stick tightly to particles; certain PAHs move through soil to contaminate underground water.
- ☐ PAH contents of plants and animals may be much higher than PAH contents of soil or water in which they live.

How might I be exposed to PAHs?

- ☐ Breathing air containing PAHs in the workplace of coking, coal-tar, and asphalt production plants; smoke-houses; and municipal trash incineration facilities.
- ☐ Breathing air containing PAHs from cigarette smoke, wood smoke, vehicle exhausts, asphalt roads, or agricultural burn smoke.
- ☐ Coming in contact with air, water, or soil near hazardous waste sites.
- ☐ Eating grilled or charred meats; contaminated cereals, flour, bread, vegetables, fruits, meats; and processed or pickled foods.
- ☐ Drinking contaminated water or cow's milk.

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- ❑ Nursing infants of mothers living near hazardous waste sites may be exposed to PAHs through their mother's milk.

How can PAHs affect my health?

Mice that were fed high levels of one PAH during pregnancy had difficulty reproducing and so did their offspring. These offspring also had higher rates of birth defects and lower body weights. It is not known whether these effects occur in people.

Animal studies have also shown that PAHs can cause harmful effects on the skin, body fluids, and ability to fight disease after both short- and long-term exposure. But these effects have not been seen in people.

How likely are PAHs to cause cancer?

The Department of Health and Human Services (DHHS) has determined that some PAHs may reasonably be expected to be carcinogens.

Some people who have breathed or touched mixtures of PAHs and other chemicals for long periods of time have developed cancer. Some PAHs have caused cancer in laboratory animals when they breathed air containing them (lung cancer), ingested them in food (stomach cancer), or had them applied to their skin (skin cancer).

Is there a medical test to show whether I've been exposed to PAHs?

In the body, PAHs are changed into chemicals that can attach to substances within the body. There are special tests that can detect PAHs attached to these substances in body tissues or blood. However, these tests cannot tell whether any

health effects will occur or find out the extent or source of your exposure to the PAHs. The tests aren't usually available in your doctor's office because special equipment is needed to conduct them.

Has the federal government made recommendations to protect human health?

The Occupational Safety and Health Administration (OSHA) has set a limit of 0.2 milligrams of PAHs per cubic meter of air (0.2 mg/m^3). The OSHA Permissible Exposure Limit (PEL) for mineral oil mist that contains PAHs is 5 mg/m^3 averaged over an 8-hour exposure period.

The National Institute for Occupational Safety and Health (NIOSH) recommends that the average workplace air levels for coal tar products not exceed 0.1 mg/m^3 for a 10-hour workday, within a 40-hour workweek. There are other limits for workplace exposure for things that contain PAHs, such as coal, coal tar, and mineral oil.

Glossary

Carcinogen: A substance that can cause cancer.

Ingest: Take food or drink into your body.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for polycyclic aromatic hydrocarbons. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html> ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



This fact sheet answers the most frequently asked health questions (FAQs) about tetrachloroethylene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Tetrachloroethylene is a manufactured chemical used for dry cleaning and metal degreasing. Exposure to very high concentrations of tetrachloroethylene can cause dizziness, headaches, sleepiness, confusion, nausea, difficulty in speaking and walking, unconsciousness, and death. Tetrachloroethylene has been found in at least 771 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is tetrachloroethylene?

(Pronounced tět'rə-klôr' ō-ěth'ə-lēn')

Tetrachloroethylene is a manufactured chemical that is widely used for dry cleaning of fabrics and for metal-degreasing. It is also used to make other chemicals and is used in some consumer products.

Other names for tetrachloroethylene include perchloroethylene, PCE, and tetrachloroethene. It is a nonflammable liquid at room temperature. It evaporates easily into the air and has a sharp, sweet odor. Most people can smell tetrachloroethylene when it is present in the air at a level of 1 part tetrachloroethylene per million parts of air (1 ppm) or more, although some can smell it at even lower levels.

What happens to tetrachloroethylene when it enters the environment?

- ☐ Much of the tetrachloroethylene that gets into water or soil evaporates into the air.
- ☐ Microorganisms can break down some of the tetrachloroethylene in soil or underground water.
- ☐ In the air, it is broken down by sunlight into other chemicals or brought back to the soil and water by rain.
- ☐ It does not appear to collect in fish or other animals that live in water.

How might I be exposed to tetrachloroethylene?

- ☐ When you bring clothes from the dry cleaners, they will release small amounts of tetrachloroethylene into the air.
- ☐ When you drink water containing tetrachloroethylene, you are exposed to it.

How can tetrachloroethylene affect my health?

High concentrations of tetrachloroethylene (particularly in closed, poorly ventilated areas) can cause dizziness, headache, sleepiness, confusion, nausea, difficulty in speaking and walking, unconsciousness, and death.

Irritation may result from repeated or extended skin contact with it. These symptoms occur almost entirely in work (or hobby) environments when people have been accidentally exposed to high concentrations or have intentionally used tetrachloroethylene to get a "high."

In industry, most workers are exposed to levels lower than those causing obvious nervous system effects. The health effects of breathing in air or drinking water with low levels of tetrachloroethylene are not known.

Results from some studies suggest that women who work in dry cleaning industries where exposures to tetrachloroethyl-

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ene can be quite high may have more menstrual problems and spontaneous abortions than women who are not exposed. However, it is not known if tetrachloroethylene was responsible for these problems because other possible causes were not considered.

Results of animal studies, conducted with amounts much higher than those that most people are exposed to, show that tetrachloroethylene can cause liver and kidney damage. Exposure to very high levels of tetrachloroethylene can be toxic to the unborn pups of pregnant rats and mice. Changes in behavior were observed in the offspring of rats that breathed high levels of the chemical while they were pregnant.

How likely is tetrachloroethylene to cause cancer?

The Department of Health and Human Services (DHHS) has determined that tetrachloroethylene may reasonably be anticipated to be a carcinogen. Tetrachloroethylene has been shown to cause liver tumors in mice and kidney tumors in male rats.

Is there a medical test to show whether I've been exposed to tetrachloroethylene?

One way of testing for tetrachloroethylene exposure is to measure the amount of the chemical in the breath, much the same way breath-alcohol measurements are used to determine the amount of alcohol in the blood.

Because it is stored in the body's fat and slowly released into the bloodstream, tetrachloroethylene can be detected in the breath for weeks following a heavy exposure.

Tetrachloroethylene and trichloroacetic acid (TCA), a breakdown product of tetrachloroethylene, can be detected in the blood. These tests are relatively simple to perform. These tests aren't available at most doctors' offices, but can be per-

formed at special laboratories that have the right equipment.

Because exposure to other chemicals can produce the same breakdown products in the urine and blood, the tests for breakdown products cannot determine if you have been exposed to tetrachloroethylene or the other chemicals.

Has the federal government made recommendations to protect human health?

The EPA maximum contaminant level for the amount of tetrachloroethylene that can be in drinking water is 0.005 milligrams tetrachloroethylene per liter of water (0.005 mg/L).

The Occupational Safety and Health Administration (OSHA) has set a limit of 100 ppm for an 8-hour workday over a 40-hour workweek.

The National Institute for Occupational Safety and Health (NIOSH) recommends that tetrachloroethylene be handled as a potential carcinogen and recommends that levels in workplace air should be as low as possible.

Glossary

Carcinogen: A substance with the ability to cause cancer.

CAS: Chemical Abstracts Service.

Milligram (mg): One thousandth of a gram.

Nonflammable: Will not burn.

References

This ToxFAQs information is taken from the 1997 Toxicological Profile for Tetrachloroethylene (update) produced by the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services, Public Health Service in Atlanta, GA.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html> ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



This fact sheet answers the most frequently asked health questions (FAQs) about toluene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to toluene occurs from breathing contaminated workplace air, in automobile exhaust, some consumer products paints, paint thinners, fingernail polish, lacquers, and adhesives. Toluene affects the nervous system. Toluene has been found at 959 of the 1,591 National Priority List sites identified by the Environmental Protection Agency

What is toluene?

Toluene is a clear, colorless liquid with a distinctive smell. Toluene occurs naturally in crude oil and in the tolu tree. It is also produced in the process of making gasoline and other fuels from crude oil and making coke from coal.

Toluene is used in making paints, paint thinners, fingernail polish, lacquers, adhesives, and rubber and in some printing and leather tanning processes.

What happens to toluene when it enters the environment?

☐ Toluene enters the environment when you use materials that contain it. It can also enter surface water and groundwater from spills of solvents and petroleum products as well as from leaking underground storage tanks at gasoline stations and other facilities.

☐ When toluene-containing products are placed in landfills or waste disposal sites, the toluene can enter the soil or water near the waste site.

☐ Toluene does not usually stay in the environment long.

☐ Toluene does not concentrate or buildup to high levels in animals.

How might I be exposed to toluene?

☐ Breathing contaminated workplace air or automobile exhaust.

☐ Working with gasoline, kerosene, heating oil, paints, and lacquers.

☐ Drinking contaminated well-water.

☐ Living near uncontrolled hazardous waste sites containing toluene products.

How can toluene affect my health?

Toluene may affect the nervous system. Low to moderate levles can cause tiredness, confusion, weakness, drunken-type actions, memory loss, nausea, loss of appetite, and

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hearing and color vision loss. These symptoms usually disappear when exposure is stopped.

Inhaling High levels of toluene in a short time can make you feel light-headed, dizzy, or sleepy. It can also cause unconsciousness, and even death.

High levels of toluene may affect your kidneys.

How likely is toluene to cause cancer?

Studies in humans and animals generally indicate that toluene does not cause cancer.

The EPA has determined that the carcinogenicity of toluene can not be classified.

How can toluene affect children?

It is likely that health effects seen in children exposed to toluene will be similar to the effects seen in adults. Some studies in animals suggest that babies may be more sensitive than adults.

Breathing very high levels of toluene during pregnancy can result in children with birth defects and retard mental abilities, and growth. We do not know if toluene harms the unborn child if the mother is exposed to low levels of toluene during pregnancy.

How can families reduce the risk of exposure to toluene?

- ☐ Use toluene-containing products in well-ventilated areas.

- ☐ When not in use, toluene-containing products should be tightly covered to prevent evaporation into the air.

Is there a medical test to show whether I've been exposed to toluene?

There are tests to measure the level of toluene or its breakdown products in exhaled air, urine, and blood. To determine if you have been exposed to toluene, your urine or blood must be checked within 12 hours of exposure. Several other chemicals are also changed into the same breakdown products as toluene, so some of these tests are not specific for toluene.

Has the federal government made recommendations to protect human health?

EPA has set a limit of 1 milligram per liter of drinking water (1 mg/L).

Discharges, releases, or spills of more than 1,000 pounds of toluene must be reported to the National Response Center.

The Occupational Safety and Health Administration has set a limit of 200 parts toluene per million of workplace air (200 ppm).

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2000. Toxicological Profile for Toluene. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs™ Internet address is <http://www.atsdr.cdc.gov/toxfaq.html>. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



This fact sheet answers the most frequently asked health questions (FAQs) about xylene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

SUMMARY: Exposure to xylene occurs in the workplace and when you use paint, gasoline, paint thinners and other products that contain it. People who breathe high levels may have dizziness, confusion, and a change in their sense of balance. This substance has been found in at least 658 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is xylene?

(Pronounced zī'lēn)

Xylene is a colorless, sweet-smelling liquid that catches on fire easily. It occurs naturally in petroleum and coal tar and is formed during forest fires. You can smell xylene in air at 0.08–3.7 parts of xylene per million parts of air (ppm) and begin to taste it in water at 0.53–1.8 ppm.

Chemical industries produce xylene from petroleum. It's one of the top 30 chemicals produced in the United States in terms of volume.

Xylene is used as a solvent and in the printing, rubber, and leather industries. It is also used as a cleaning agent, a thinner for paint, and in paints and varnishes. It is found in small amounts in airplane fuel and gasoline.

What happens to xylene when it enters the environment?

- ☐ Xylene has been found in waste sites and landfills when discarded as used solvent, or in varnish, paint, or paint thinners.
- ☐ It evaporates quickly from the soil and surface water into the air.

- ☐ In the air, it is broken down by sunlight into other less harmful chemicals.
- ☐ It is broken down by microorganisms in soil and water.
- ☐ Only a small amount of it builds up in fish, shellfish, plants, and animals living in xylene-contaminated water.

How might I be exposed to xylene?

- ☐ Breathing xylene in workplace air or in automobile exhaust.
- ☐ Breathing contaminated air.
- ☐ Touching gasoline, paint, paint removers, varnish, shellac, and rust preventatives that contain it.
- ☐ Breathing cigarette smoke that has small amounts of xylene in it.
- ☐ Drinking contaminated water or breathing air near waste sites and landfills that contain xylene.
- ☐ The amount of xylene in food is likely to be low.

How can xylene affect my health?

Xylene affects the brain. High levels from exposure for short periods (14 days or less) or long periods (more than 1 year) can cause headaches, lack of muscle coordination, dizziness, confusion, and changes in one's sense of balance. Exposure of

ToxFAQs Internet home page via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>

people to high levels of xylene for short periods can also cause irritation of the skin, eyes, nose, and throat; difficulty in breathing; problems with the lungs; delayed reaction time; memory difficulties; stomach discomfort; and possibly changes in the liver and kidneys. It can cause unconsciousness and even death at very high levels.

Studies of unborn animals indicate that high concentrations of xylene may cause increased numbers of deaths, and delayed growth and development. In many instances, these same concentrations also cause damage to the mothers. We do not know if xylene harms the unborn child if the mother is exposed to low levels of xylene during pregnancy.

How likely is xylene to cause cancer?

The International Agency for Research on Cancer (IARC) has determined that xylene is not classifiable as to its carcinogenicity in humans.

Human and animal studies have not shown xylene to be carcinogenic, but these studies are not conclusive and do not provide enough information to conclude that xylene does not cause cancer.

Is there a medical test to show whether I've been exposed to xylene?

Laboratory tests can detect xylene or its breakdown products in exhaled air, blood, or urine. There is a high degree of agreement between the levels of exposure to xylene and the levels of xylene breakdown products in the urine. However, a urine sample must be provided very soon after exposure ends because xylene quickly leaves the body. These tests are not routinely available at your doctor's office.

Has the federal government made recommendations to protect human health?

The EPA has set a limit of 10 ppm of xylene in drinking water.

The EPA requires that spills or accidental releases of xylenes into the environment of 1,000 pounds or more must be reported.

The Occupational Safety and Health Administration (OSHA) has set a maximum level of 100 ppm xylene in workplace air for an 8-hour workday, 40-hour workweek.

The National Institute for Occupational Safety and Health (NIOSH) and the American Conference of Governmental Industrial Hygienists (ACGIH) also recommend exposure limits of 100 ppm in workplace air.

NIOSH has recommended that 900 ppm of xylene be considered immediately dangerous to life or health. This is the exposure level of a chemical that is likely to cause permanent health problems or death.

Glossary

Evaporate: To change from a liquid into a vapor or a gas.

Carcinogenic: Having the ability to cause cancer.

CAS: Chemical Abstracts Service.

ppm: Parts per million.

Solvent: A liquid that can dissolve other substances.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for xylenes (update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-498-0093. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html> ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



This fact sheet answers the most frequently asked health questions (FAQs) about zinc. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Zinc is a naturally occurring element. Exposure to high levels of zinc occurs mostly from eating food, drinking water, or breathing workplace air that is contaminated. Low levels of zinc are essential for maintaining good health. Exposure to large amounts of zinc can be harmful. It can cause stomach cramps, anemia, and changes in cholesterol levels. Zinc has been found in at least 985 of the 1,662 National Priority List sites identified by the Environmental Protection Agency (EPA).

What is zinc?

Zinc is one of the most common elements in the earth's crust. It is found in air, soil, and water, and is present in all foods. Pure zinc is a bluish-white shiny metal.

Zinc has many commercial uses as coatings to prevent rust, in dry cell batteries, and mixed with other metals to make alloys like brass, and bronze. A zinc and copper alloy is used to make pennies in the United States.

Zinc combines with other elements to form zinc compounds. Common zinc compounds found at hazardous waste sites include zinc chloride, zinc oxide, zinc sulfate, and zinc sulfide. Zinc compounds are widely used in industry to make paint, rubber, dyes, wood preservatives, and ointments.

What happens to zinc when it enters the environment?

- ☐ Some is released into the environment by natural processes, but most comes from human activities like mining, steel production, coal burning, and burning of waste.
- ☐ It attaches to soil, sediments, and dust particles in the air.
- ☐ Rain and snow remove zinc dust particles from the air.
- ☐ Depending on the type of soil, some zinc compounds can move into the groundwater and into lakes, streams, and rivers.
- ☐ Most of the zinc in soil stays bound to soil particles and

does not dissolve in water.

- ☐ It builds up in fish and other organisms, but it does not build up in plants.

How might I be exposed to zinc?

- ☐ Ingesting small amounts present in your food and water.
- ☐ Drinking contaminated water or a beverage that has been stored in metal containers or flows through pipes that have been coated with zinc to resist rust.
- ☐ Eating too many dietary supplements that contain zinc.
- ☐ Working on any of the following jobs: construction, painting, automobile mechanics, mining, smelting, and welding; manufacture of brass, bronze, or other zinc-containing alloys; manufacture of galvanized metals; and manufacture of machine parts, rubber, paint, linoleum, oilcloths, batteries, some kind of glass, ceramics, and dyes.

How can zinc affect my health?

Zinc is an essential element in our diet. Too little zinc can cause problems, but too much zinc is also harmful.

Harmful effects generally begin at levels 10-15 times higher than the amount needed for good health. Large doses taken by mouth even for a short time can cause stomach cramps, nausea, and vomiting. Taken longer, it can cause anemia and decrease the levels of your good cholesterol. We do not know if high levels of zinc affect reproduction in humans. Rats that were fed large amounts of zinc became infertile.

ToxFAQs™ Internet address is <http://www.atsdr.cdc.gov/toxfaq.html>

Inhaling large amounts of zinc (as dusts or fumes) can cause a specific short-term disease called metal fume fever. We do not know the long-term effects of breathing high levels of zinc.

Putting low levels of zinc acetate and zinc chloride on the skin of rabbits, guinea pigs, and mice caused skin irritation. Skin irritation will probably occur in people.

How likely is zinc to cause cancer?

The Department of Health and Human Services (DHHS) and the International Agency for Research on Cancer (IARC) have not classified zinc for carcinogenicity. Based on incomplete information from human and animal studies, the EPA has determined that zinc is not classifiable as to its human carcinogenicity.

How can zinc affect children?

Zinc is essential for proper growth and development of young children. It is likely that children exposed to very high levels of zinc will have similar effects as adults. We do not know whether children are more susceptible to the effects of excessive intake of zinc than the adults.

We do not know if excess zinc can cause developmental effects in humans. Animal studies have found decreased weight in the offspring of animals that ingested very high amounts of zinc.

How can families reduce the risks of exposure to zinc?

- ☐ Children living near waste sites that contain zinc may be exposed to higher levels of zinc through breathing contaminated air, drinking contaminated drinking water, touching or eating contaminated soil.
- ☐ Discourage your children from eating soil or putting their hands in their mouths and teach them to wash their hands frequently and before eating.
- ☐ If you use medicines or vitamin supplements containing

zinc, make sure you use them appropriately and keep them out of the reach of children.

Is there a medical test to determine whether I've been exposed to zinc?

There are tests available to measure zinc in your blood, urine, hair, saliva, and feces. These tests are not usually done in the doctor's office because they require special equipment. High levels of zinc in the feces can mean high recent zinc exposure. High levels of zinc in the blood can mean high zinc consumption and/or high exposure. Tests to measure zinc in hair may provide information on long-term zinc exposure; however, the relationship between levels in your hair and the amount of zinc you were exposed to is not clear.

Has the federal government made recommendations to protect human health?

The EPA recommends that drinking water should contain no more than 5 milligrams per liter of water (5 mg/L) because of taste. The EPA requires that any release of 1,000 pounds (or in some cases 5,000 pounds) into the environment be reported to the agency.

To protect workers, the Occupational Safety and Health Administration (OSHA) has set an average limit of 1 mg/m³ for zinc chloride fumes and 5 mg/m³ for zinc oxide (dusts and fumes) in workplace air during an 8-hour workday, 40-hour workweek.

Similarly, the National Institute for Occupational Safety and Health (NIOSH) has set the same standards for up to a 10-hour workday over a 40-hour workweek.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2005. Toxicological Profile for Zinc (Update). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



ATTACHEMENT B
WEST NILE VIRUS/ST. LOUIS ENCEPHALITIS PREVENTION

WEST NILE VIRUS/ST. LOUIS ENCEPHALITIS PREVENTION

The following section is based upon information provided by the CDC Division of Vector-Borne Infectious Diseases. Symptoms of West Nile Virus include fever, headache, and body aches, occasionally with skin rash and swollen lymph glands, with most infections being mild. More severe infection may be marked by headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, paralysis, and, rarely, death. Most infections of St. Louis encephalitis are mild without apparent symptoms other than fever with headache. More severe infection is marked by headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, occasional convulsions (especially infants) and spastic (but rarely flaccid) paralysis. The only way to avoid infection of West Nile Virus and St. Louis encephalitis is to avoid mosquito bites. To reduce the chance of mosquito contact:

- Stay indoors at dawn, dusk, and in the early evening.
- Wear long-sleeved shirts and long pants whenever you are outdoors.
- Spray clothing with repellents containing permethrin or DEET (N, N-diethyl-meta-toluamide), since mosquitoes may bite through thin clothing.
- Apply insect repellent sparingly to exposed skin. An effective repellent will contain 35% DEET. DEET in high concentrations (greater than 35%) provides no additional protection.
- Repellents may irritate the eyes and mouth.
- Whenever you use an insecticide or insect repellent, be sure to read and follow the manufacturer's directions for use, as printed on the product.

ATTACHMENT C
REPORT FORMS

WEEKLY SAFETY REPORT FORM

Week Ending: _____ Project Name/Number: _____

Report Date: _____ Project Manager Name: _____

Summary of any violations of procedures occurring that week:

Summary of any job related injuries, illnesses, or near misses that week:

Summary of air monitoring data that week (include and sample analyses, action levels exceeded, and actions taken):

Comments:

Name: _____ Company: _____

Signature: _____ Title: _____

INCIDENT REPORT FORM

Date of Report: _____

Injured: _____

Employer: _____

Site: _____ Site Location: _____

Report Prepared By: _____
Signature Title

ACCIDENT/INCIDENT CATEGORY (check all that applies)

<input type="checkbox"/> Injury	<input type="checkbox"/> Illness	<input type="checkbox"/> Near Miss
<input type="checkbox"/> Property Damage	<input type="checkbox"/> Fire	<input type="checkbox"/> Chemical Exposure
<input type="checkbox"/> On-site Equipment	<input type="checkbox"/> Motor Vehicle	<input type="checkbox"/> Electrical
<input type="checkbox"/> Mechanical	<input type="checkbox"/> Spill	<input type="checkbox"/> Other

DATE AND TIME OF ACCIDENT/INCIDENT: Narrative report of Accident/Incident: Identify: 1) actions leading to or contributing to the accident/incident; 2) the accident/incident occurrence; and 3) actions following the accident/incident.

WITNESS TO ACCIDENT/INCIDENT:

Name: _____	Company: _____
Address: _____	Address: _____
Phone No.: _____	Phone No.: _____
Name: _____	Company: _____
Address: _____	Address: _____
Phone No.: _____	Phone No.: _____

INJURED - ILL:

Name: _____ SSN: _____

Address: _____ Age: _____

Length of Service: _____ Time on Present Job: _____

Time/Classification: _____

SEVERITY OF INJURY OR ILLNESS:

___ Disabling ___ Non-disabling ___ Fatality

___ Medical Treatment ___ First Aid Only

ESTIMATED NUMBER OF DAYS AWAY FROM JOB: _____**NATURE OF INJURY OR ILLNESS:** __________
_____**CLASSIFICATION OF INJURY:**

___ Abrasions	___ Dislocations	___ Punctures
___ Bites	___ Faint/Dizziness	___ Radiation Burns
___ Blisters	___ Fractures	___ Respiratory Allergy
___ Bruises	___ Frostbite	___ Sprains
___ Chemical Burns	___ Heat Burns	___ Toxic Resp. Exposure
___ Cold Exposure	___ Heat Exhaustion	___ Toxic Ingestion
___ Concussion	___ Heat Stroke	___ Dermal Allergy
___ Lacerations		

Part of Body Affected: _____

Degree of Disability: _____

Date Medical Care was Received: _____

Where Medical Care was Received: _____

Address (if off-site): _____

(If two or more injuries, record on separate sheets)

PROPERTY DAMAGE:

Description of Damage: _____

Cost of Damage: \$ _____

ACCIDENT/INCIDENT LOCATION: _____

ACCIDENT/INCIDENT ANALYSIS: Causative agent most directly related to accident/incident
(Object, substance, material, machinery, equipment, conditions)

Was weather a factor?: _____

Unsafe mechanical/physical/environmental condition at time of accident/incident (Be specific):

Personal factors (Attitude, knowledge or skill, reaction time, fatigue):

ON-SITE ACCIDENTS/INCIDENTS:

Level of personal protection equipment required in Site Safety Plan:

Modifications:

Was injured using required equipment?:

If not, how did actual equipment use differ from plan?:

ACTION TAKEN TO PREVENT RECURRENCE: (Be specific. What has or will be done? When will it be done? Who is the responsible party to insure that the correction is made?)

ACCIDENT/INCIDENT REPORT REVIEWED BY:

SSO Name Printed

SSO Signature

OTHERS PARTICIPATING IN INVESTIGATION:

Signature

Title

Signature

Title

Signature

Title

ACCIDENT/INCIDENT FOLLOW-UP: Date:

Outcome of accident/incident:

Physician's recommendations:

Date injured returned to work:

Follow-up performed by:

Signature

Title

ATTACH ANY ADDITIONAL INFORMATION TO THIS FORM

ATTACHMENT D
EMERGENCY HAND SIGNALS

EMERGENCY SIGNALS

In most cases, field personnel will carry portable radios for communication. If this is the case, a transmission that indicates an emergency will take priority over all other transmissions. All other site radios will yield the frequency to the emergency transmissions.

Where radio communications is not available, the following air-horn and/or hand signals will be used:

EMERGENCY HAND SIGNALS

OUT OF AIR, CAN'T BREATHE!



Hand gripping throat

**LEAVE AREA IMMEDIATELY,
NO DEBATE!**

(No Picture) Grip partner's wrist or place both hands around waist

NEED ASSISTANCE!



Hands on top of head

**OKAY! – I'M ALL RIGHT!
- I UNDERSTAND!**



Thumbs up

NO! - NEGATIVE!



Thumbs down

ATTACHMENT E
SPECIAL REQUIREMENTS CAMP

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 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.
- Depending upon the nature of contamination and remedial activities, other parameters (e.g., explosivity, oxygen, hydrogen sulfide, carbon monoxide) may also need to be monitored. Response levels and actions should be pre-determined, as necessary, for each site.

Special Requirements for Indoor Work With Co-Located Residences or Facilities

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

APPENDIX G
SSDS AND SVE SYSTEM AS-BUILTS



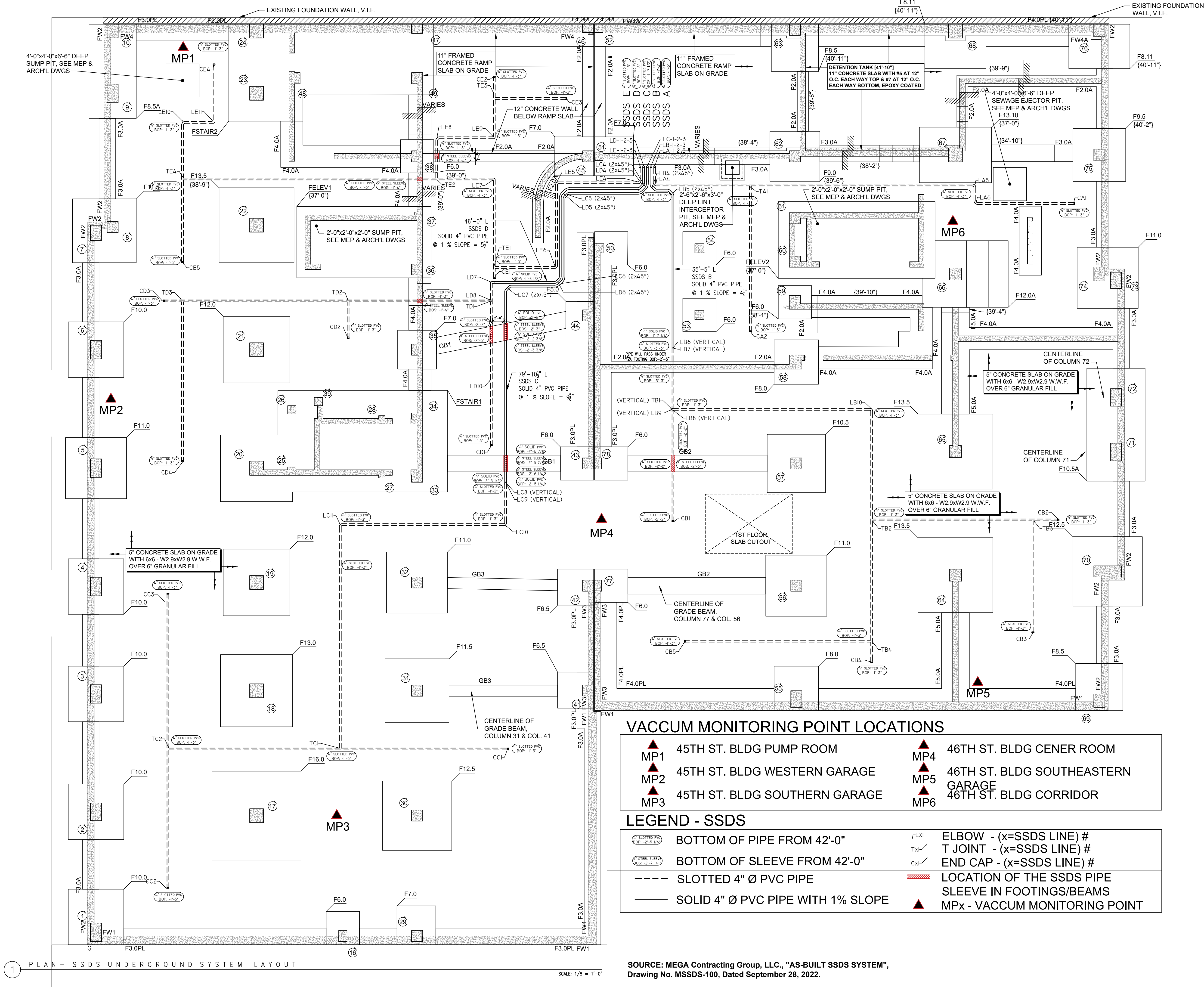
VACCUM MONITORING POINT LOCATIONS

- | | |
|-------------------------------------|---|
| ▲ MP1 45TH ST. BLDG PUMP ROOM | ▲ MP4 46TH ST. BLDG CENER ROOM |
| ▲ MP2 45TH ST. BLDG WESTERN GARAGE | ▲ MP5 46TH ST. BLDG SOUTHEASTERN GARAGE |
| ▲ MP3 45TH ST. BLDG SOUTHERN GARAGE | ▲ MP6 46TH ST. BLDG CORRIDOR |

LEGEND - SSDS

- | | |
|-----------------------------------|--|
| BOTTOM OF PIPE FROM 42'-0" | ELBOW - (x=SSDS LINE) # |
| BOTTOM OF SLEEVE FROM 42'-0" | T JOINT - (x=SSDS LINE) # |
| SLOTTED 4" Ø PVC PIPE | END CAP - (x=SSDS LINE) # |
| SOLID 4" Ø PVC PIPE WITH 1% SLOPE | LOCATION OF THE SSDS PIPE SLEEVE IN FOOTINGS/BEAMS |
| | ▲ MPx - VACCUM MONITORING POINT |

SOURCE: MEGA Contracting Group, LLC., "AS-BUILT SSDS SYSTEM",
Drawing No. MSSDS-100, Dated September 28, 2022.



1 PLAN - SSDS UNDERGROUND SYSTEM LAYOUT

SCALE: 1/8" = 1'-0"

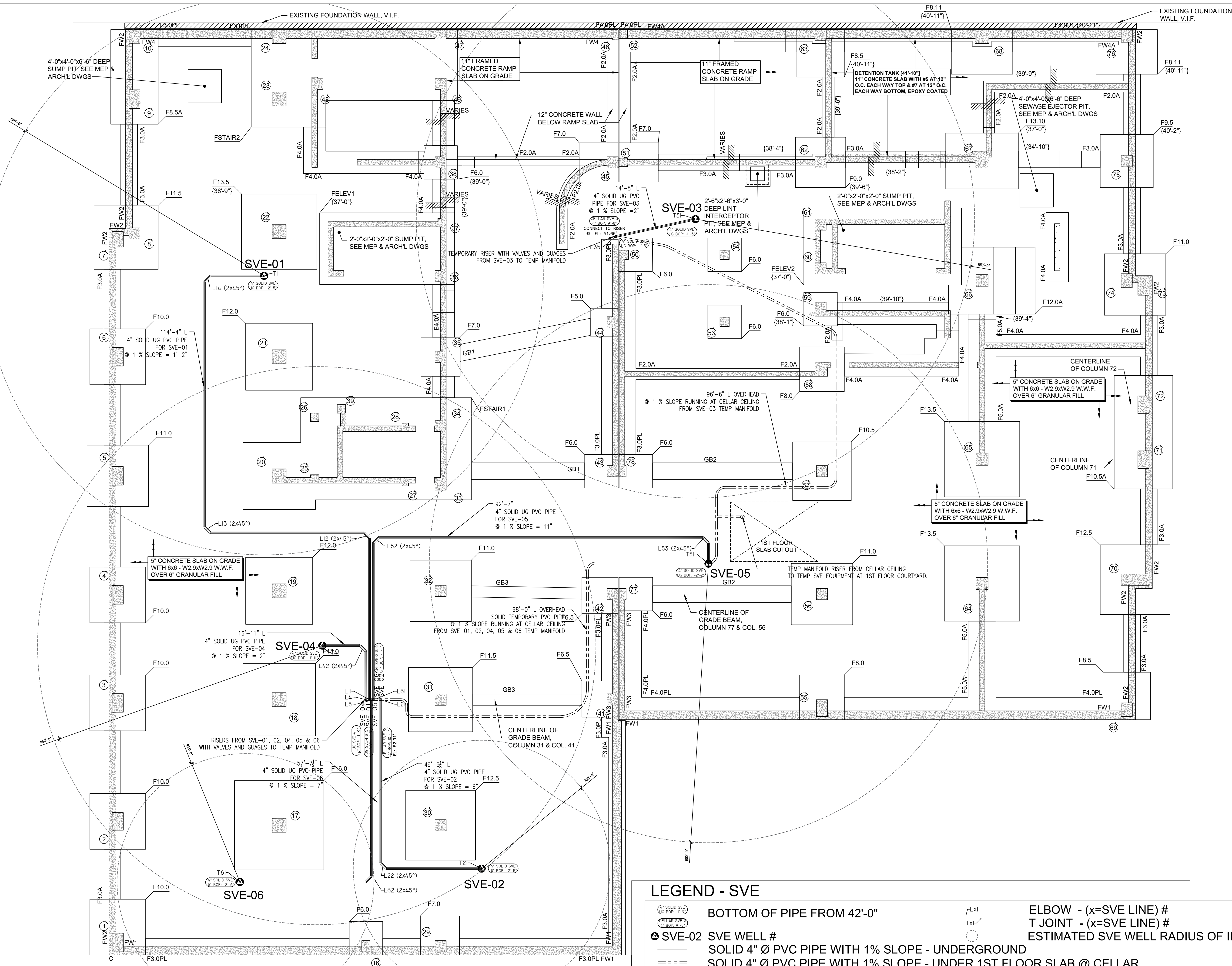


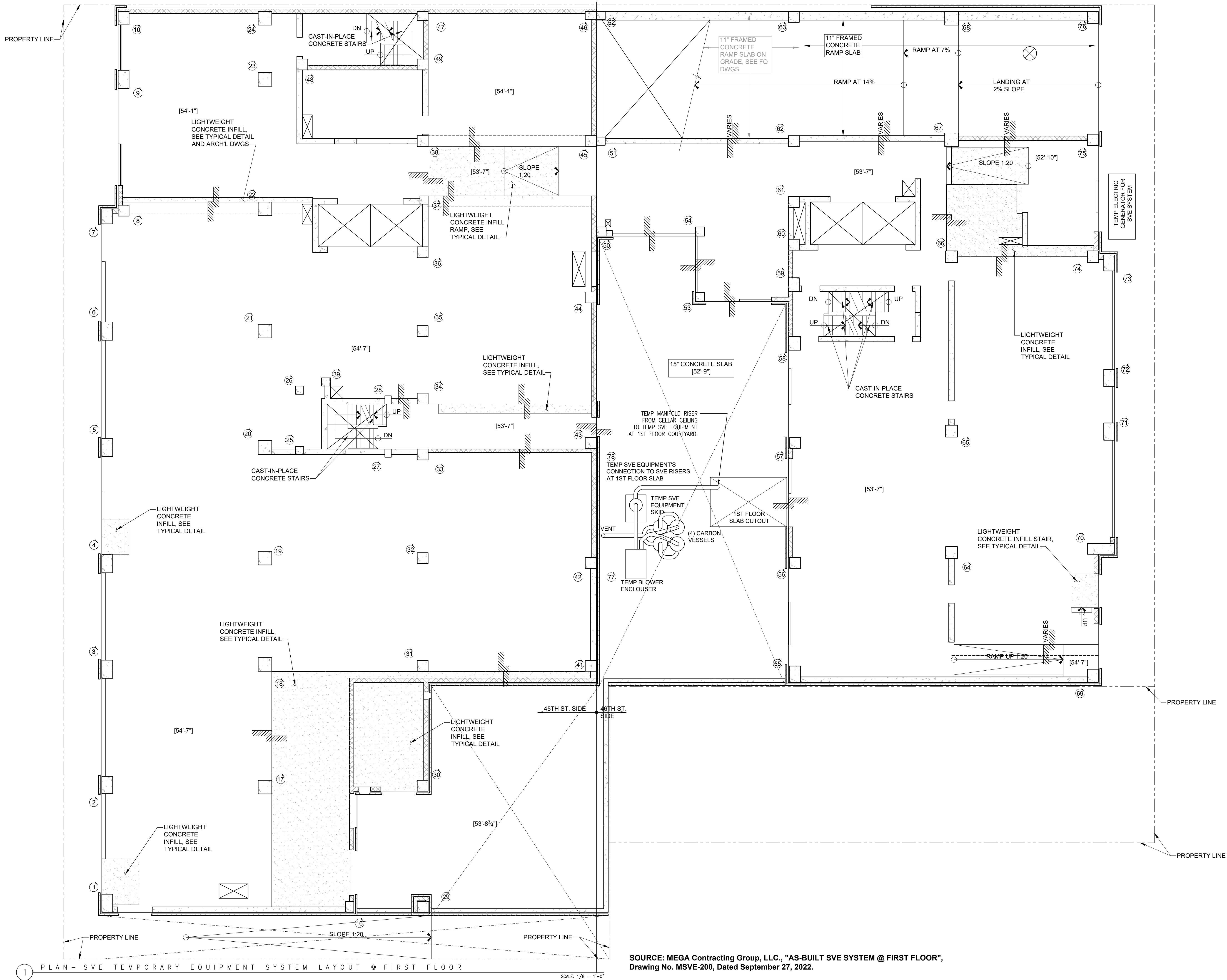
LEGEND - SVE

	SVE-02 SVE WELL #		ELBOW - (x=SVE LINE) #
	SOLID 4" Ø PVC PIPE WITH 1% SLOPE - UNDERGROUND		T JOINT - (x=SVE LINE) #
	SOLID 4" Ø PVC PIPE WITH 1% SLOPE - UNDER 1ST FLOOR SLAB @ CELLAR		ESTIMATED SVE WELL RADIUS OF INFLUENCE

SOURCE: MEGA Contracting Group, LLC., "AS-BUILT SVE SYSTEM @ CELLAR FLOOR",
Drawing No. MSVE-100, Dated September 27, 2022.

1 PLAN - SVE SYSTEM LAYOUT W / PERMANENT UNDERGROUND AND TEMP OVERHEAD @ CELLAR
SCALE: 1/8" = 1'-0"





SOURCE: MEGA Contracting Group, LLC., "AS-BUILT SVE SYSTEM @ FIRST FLOOR",
Drawing No. MSVE-200, Dated September 27, 2022.



22-60 46th Street & 22-61 45th Street
Astoria, New York

SVE BLOWER CONFIGURATION

AKRF
440 Park Avenue South, New York, NY 10016

DATE
12/10/2022

PROJECT NO.
190275

FIGURE
AB-3

APPENDIX H
QUALITY ASSURANCE PROJECT PLAN

22-60 46TH STREET
QUEENS, NEW YORK
Quality Assurance Project Plan

AKRF Project Number: 190275
BCP Site Number: C241244

Prepared for:

New York State Department of Environmental Conservation
Division of Environmental Remediation, Remedial Bureau B
625 Broadway, 12th Floor
Albany, New York 12233

On Behalf Of:

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48-02 25th Avenue, Suite 400
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Prepared by:



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DECEMBER 2022

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ATTACHMENTS

- Attachment A – Resumes for Project Director, Quality Assurance Officer, Project Manager, Project Manager Alternates, and Field Team Leaders

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) describes the protocols and procedures that will be followed during implementation of the Site Management Plan (SMP) at the 22-60 46th Street site (the Site), hereafter referred to as the Site. The legal definition of the Site is Queens Borough Tax Block 769, Lots 25 and 42. The Site is abutted to the north by a parking garage, followed by a multi-story residential building; to the east by 46th Street, followed by private residences; to the south by private residences and commercial uses; and to the west by 45th Street, followed by a shopping center and warehouses. A Site Location Plan is provided as Figure 1.

The objective of this QAPP is to provide for Quality Assurance (QA) and maintain Quality Control (QC) during sampling performed under the SMP) for BCP Site No. C241244. Adherence to the QAPP will ensure that defensible data will be obtained to confirm the successful operation and maintenance of remedial systems or other engineering controls.

2.0 PROJECT TEAM

The project team will be drawn from AKRF professional and technical personnel, and AKRF's subcontractors. All field personnel and subcontractors will have completed a 40-hour training course and updated 8-hour refresher course that meet the Occupational Safety and Health Administration (OSHA) requirements of 29 CFR Part 1910. The following sections describe the key project personnel and their responsibilities.

2.1 PROJECT DIRECTOR

The project director will be responsible for the general oversight of all aspects of the project, including scheduling, budgeting, data management, and field program decision-making. The project director will communicate regularly with all members of the AKRF project team and the NYSDEC to ensure a smooth flow of information between involved parties. Deborah Shapiro will serve as the project director for the SMP. Ms. Shapiro's resume is included in Attachment A.

2.2 REMEDIAL ENGINEER

The Remedial Engineer is a registered professional engineer licensed by the State of New York. The Remedial Engineer will have primary direct responsibility for implementation of the SMP. The Remedial Engineer will certify in the Periodic Review Reports which summarize that the engineering controls were monitored, maintained, and remain effective. The Remedial Engineer will certify that the Site management activities were conducted by qualified environmental professionals under her supervision and that the remediation requirements set forth in the SMP and any other relevant provisions of ECL 27-1419 have been achieved in full conformance with that Plan. The Remedial Engineer for this project will be Rebecca Kinal, P.E. Ms. Kinal's resume is included in Attachment A.

2.3 PROJECT MANAGER

The project manager will be responsible for directing and coordinating all elements of the SMP. The project manager will prepare reports and participate in meetings with the Site owner/BCP Requestor, and/or the NYSDEC. Adrianna Bosco will serve as the project manager for the SMP. Ms. Bosco's resume is included in Attachment A.

2.4 PROJECT MANAGER ALTERNATE

The project manager alternate will be responsible for assisting the project manager. The project manager alternate will help prepare reports and will participate in meetings with the Site owner/Volunteer, and/or the NYSDEC. Ashutosh Sharma will serve as the project manager alternate for the SMP. Mr. Sharma's resume is included in Attachment A.

2.5 FIELD TEAM LEADER, FIELD TECHNICIAN, AND SITE SAFETY OFFICER, AND ALTERNATES

The field team leader will be responsible for conducting routine operations maintenance and monitoring and health and safety activities in the field and will ensure adherence to the SMP and Health and Safety Plan (HASP), included in Appendix D of the SMP. The field team leader will also act as the field technician and Site safety officer (SSO) and will report to the project manager or project manager alternate on a regular basis regarding daily progress and any deviations from the work plan. The field team leader will be a qualified and responsible person able to act professionally and promptly during environmental work at the Site. Stephen Schmid will act as the field team leader. The field team leader alternate is Antonio Cardenas. Resumes for Mr. Schmid and Mr. Cardenas are included in Attachment A.

2.6 LABORATORY QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) OFFICER

The laboratory QA/QC officer will be responsible for quality control procedures and checks in the laboratory and ensuring adherence to laboratory protocols. The QA/QC officer will track the movement of samples from the time they are checked in at the laboratory to the time that analytical results are issued, and will conduct a final check on the analytical calculations and sign off on the laboratory reports. The laboratory QA/QC officer will be Carl Armbruster of Eurofins TestAmerica Laboratories (TestAmerica), the New York State Department of Health (NYSDOH) Environmental Laboratory Accreditation Program (ELAP)-certified laboratory being employed for all environmental sampling at the Site.

2.7 LABORATORY DATA VALIDATOR

The laboratory data validator will be responsible for third party data validation and preparation of Data Usability Summary Reports (DUSRs). The third-party laboratory data validator will be Lori Beyer of L.A.B. Validation Corp.

3.0 STANDARD OPERATING PROCEDURES (SOPS)

The following sections describe the SOPs for the monitoring activities included in the SMP. During these operations, safety monitoring will be performed as described in the HASP, included as Appendix F of the SMP. SMP implementation will include routine inspection of the soil vapor extraction system (SVES) and active sub-slab depressurization system (SSDS), and quarterly groundwater monitoring and sampling (for the first year, then as needed) and soil vapor intrusion evaluation for new buildings (once after building completion and then as needed).

3.1 WELL INSTALLATION AND DEVELOPMENT

Groundwater monitoring, injection, and soil vapor extraction wells have been installed throughout the Site. The following procedure should be followed in the event that a well requires replacement or redevelopment or additional wells are installed. The well locations and/or screen depths may be adjusted based on observations and data compiled during the necessary field activities. Details outlined below may be altered based on the preparation and submittal of a work plan submitted to NYSDEC and NYSDOH. This QAPP will be updated accordingly and included in the SMP.

All monitoring, soil vapor extraction and/or injection wells will be advanced using a Geoprobe direct push technology, Geoprobe sonic technology or hollow stem auger technology. A target depth of approximately 10-feet below the water table will be used for monitoring wells, a target depth of 10-feet below grade will be used for injection wells, and a target depth of up to a minimum of 1-foot above the observed water table will be used for the soil vapor extraction wells. During the RI, groundwater beneath the Site ranged from elevation 19.79 to elevation 21.07 (NAVD88), or 32.92 to 33.73 feet below grade across the Site. Monitoring and injection wells will be constructed with 10 feet of PVC screen, whereas the soil vapor extraction wells will be constructed with 15 feet of polyvinyl chloride (PVC) screen (based on the elevation of the existing concrete slab).

Morie sand will be backfill around the screen zone of each new well to a depth of 2 feet above the screen. The annular space around the well riser will be sealed with bentonite extending one to two feet above the sand filter pack and completed with a non-shrinking cement mixture to approximately one foot below grade. Each injection, monitoring and SVE well will be completed using flush to grade locking gate boxes. The monitoring and injection wells will be developed by agitating the well screen with a surge block and pumping out the sediment until below 50 nephelometric turbidity units (NTU), if practical. The location/elevation of each new PVC well will be surveyed by a licensed surveyor and incorporated into the existing Site map.

3.2 DECONTAMINATION OF SAMPLING EQUIPMENT

All sampling equipment (augers, drilling rods, split spoon samplers, probe rods, pumps, etc.) will be either dedicated or decontaminated between sampling locations. Decontamination will be conducted on plastic sheeting (or equivalent) that is bermed to prevent discharge to the ground. The decontamination procedure will be as follows:

1. Scrub using tap water/Simple Green[®] mixture and bristle brush.
2. Rinse with tap water.
3. Scrub again with tap water/Simple Green[®] mixture and bristle brush.
4. Rinse with tap water.
5. Rinse with distilled water.

6. Air-dry the equipment, if possible.

3.3 MANAGEMENT OF INVESTIGATION DERIVED WASTE (IDW)

IDW will be containerized in New York State Department of Transportation (NYSDOT)-approved 55-gallon drums during the site management activities. The drums will be sealed at the end of each work day and labeled with the date, the boring location(s), the type of waste e.g., drill cuttings, excavated trenching material), and the name and phone number of an AKRF point-of-contact. All IDW collected into drums will be sampled and disposed of or treated according to applicable local, state, and federal regulations.

4.0 SAMPLING AND LABORATORY PROCEDURES

4.1 MONITORING WELL SAMPLING

Groundwater samples for post remedial monitoring will be collected using low-flow sampling techniques, as described in U.S. EPA's Ground-Water Sampling Guidelines for Superfund and Resource Conservation and Recovery Act (RCRA) Project Managers [EPA 542-S-02-001, May 2002]. Sampling will be conducted according to the following procedure:

- Prepare the sampling area by placing plastic sheeting over the well. Cut a hole in the sheeting to provide access to the well cover.
- Slowly remove the locking cap and immediately measure the vapor concentrations in the well with a PID calibrated to the manufacturer's specifications.
- Measure the depth to water and total well depth, and check for the presence of non-aqueous phase liquid (NAPL) using an oil/water interface probe. Measure the thickness of NAPL, if any, and record in field book and well log. Groundwater samples will not be collected from wells containing measurable NAPL.
- Use the water level and total well depth measurements to calculate the length of the mid-point of the water column within the screened interval. For example, for a well where the total depth is 20 feet, screened interval is 10 to 20 feet, and depth to water is 14 feet, the mid-point of the water column within the screened interval would be 17 feet.
- Connect dedicated tubing to a submersible bladder pump, and lower the pump such that the intake of the pump is set at the mid-point of the water column within the screened interval of the well. Connect the discharge end of the tubing to the flow-through cell of a YSI multi-parameter (or equivalent) meter. Connect tubing to the output of the cell and place the discharge end of the tubing in a five-gallon bucket.
- Activate the pump at the lowest flow rate setting of the pump.
- Measure the depth to water within the well. The pump flow rate may be increased such that the water level measurements do not change by more than 0.3 feet as compared to the initial static reading. The well-purging rate should be adjusted so as to produce a smooth, constant (laminar) flow rate and so as not to produce excessive turbulence in the well. The expected targeted purge rate will be approximately 100 milliliters/minute and will be no greater than 500 milliliters/minute.
- Transfer discharged water from the 5-gallon buckets to on-site 55-gallon drums.
- During purging, collect periodic samples and analyze for water quality indicators (e.g., turbidity, pH, temperature, dissolved oxygen (DO), reduction-oxidation potential (ORP), and specific conductivity) with measurements collected approximately every five minutes.
- Continue purging the well until turbidity is less than 50 nephelometric turbidity units (NTUs) and water quality indicators have stabilized to the extent practicable. The criteria for stabilization will be three successive readings for the following parameters and criteria:

Stabilization Criteria

Parameter	Stabilization Criteria
PH	+/- 0.1 pH units
Specific Conductance	+/- 3% mS/cm

ORP/Eh	+/- 10mV
Turbidity	<50 NTU
Dissolved Oxygen	+/- 0.3 mg/l

Notes: mS/cm = millisievert per centimeter
mV = millivolts
NTU = nephthalometric turbidity units
mg/l = milligrams per liter

- If the water quality parameters do not stabilize and/or turbidity is greater than 50 NTU within two hours, purging may be discontinued. Efforts to stabilize the water quality for the well must be recorded in the field book, and samples may then be collected as described herein.
- After purging, disconnect the tubing to the inlet of the flow-through cell. Collect groundwater samples directly from the discharge end of the tubing and place into the required sample containers as described in Section 4.4 of this QAPP. Label the containers as described in Section 4.4.1.1, Table 2 of this QAPP and place in a chilled cooler.
- Once sampling is complete, remove the pump and tubing from the well. Dispose of the sampling materials and PPE in accordance with applicable regulations. The purge water will be managed as described in Section 3.4 of this QAPP.
- Decontaminate the pump, oil/water interface probe, and flow-through cell, as described in Section 3.3 of this QAPP.
- Record all measurements (depth to water, depth to NAPL, water quality parameters, turbidity), calculations (well volume) and observations in the project logbook and field data sheet, if applicable.

A figure illustrating the SMP groundwater sampling locations is included in the Monitoring Locations for Site Management on Figure 8 of the SMP.

4.2 SUB-SLAB SOIL VAPOR and INDOOR AIR SAMPLING

Sub-slab soil vapor and indoor air sampling, if needed in the future, will be conducted using Summa canisters with 24-hour flow regulators. Samples will be collected using the following procedures:

4.2.1 Sample Set-up

1. Conduct a pre-sampling inspection and record chemical inventory of the Site building.
2. Install flexible hose to a Gilian GilAir plus (or equivalent) sampling pump and connect the Teflon sample tubing to the hose. Connect the other end (discharge end) of the flexible tubing to a 1-liter Tedlar bag. Purge the soil gas sampler of approximately three sampler volumes by activating the pump to fill the Tedlar bag to near capacity. The air withdrawal flow rate shall be 0.2 liters/minute or less.
3. The Tedlar bag will be analyzed in the field using a PID calibrated to the manufacturer's specifications to check for levels of volatile organic compounds (VOCs) in the sub-slab soil vapor.
4. Disconnect the sample tubing from the Gilian GilAir plus (or equivalent) pump and connect it to the inlet of a labeled 6-liter Summa canister.
5. Repeat procedure for all sampling locations.

4.2.2 Sample Collection

1. After Summa canisters are set up at all of the sampling locations, record the vacuum reading from the vacuum gauge on the canister at the beginning of the 24-hour sampling period. Open the valve of the canister and record the time in the field book. In addition, place labeled Summa canisters at the breathing zone level (minimum of 3- to 5-feet above the ground floor) adjacent to the monitoring point locations for collection of co-located indoor air (IA) samples from the cellar level, and place canisters at select locations on the first floor space for collection of IA samples over a 24-hour period.
2. At the end of the 24-hour sampling period, close the valve, remove the flow-rate controllers and vacuum gauges, install caps on canisters, and record the time at the end of the sampling period.
3. Place the sub-slab soil vapor and co-located IA sample, and the first floor IA sample canisters in shipping containers for transportation to laboratory.
4. Repeat procedure for all sampling locations.

4.3 SSDS and SVE System Vacuum Monitoring

A network of 6 vacuum monitoring points (MP-1 through MP-6) was installed during remedial action implementation at strategic locations to inspect induced vacuum conditions during the operation of the SSDS and SVE system. Vacuum will be monitored at these locations at regular intervals as designated in the SMP. The procedures for instantaneously screening the vacuum monitoring points are as follows:

- Slowly remove the access manhole.
- Attach the analog vacuum gauge or digital manometer with male Quick-Connect fitting to the female Quick-Connect fitting at the monitoring point and document reading.
- Detach vacuum gauge/manometer and confirm that Quick-Connect female fitting is closed/sealed.
- Replace the access manhole and twist to tighten seal.

4.4 Influent/Effluent Vapor Sampling

Confirmatory effluent vapor sampling will be conducted following 6 months and 12 months after startup (and as determined by the SMP and NYSDEC thereafter) as part of a reassessment of VOC emissions calculations according to the following procedure:

- Confirmatory sampling will comprise grab samples from each individual SVE line and combined influent, intermediate and effluent samples, as appropriate.
- A Gilian GilAir plus (or equivalent) pump will be used to extract influent/effluent vapors from each of the sample ports installed on the SVE line. A 1-liter tedlar bag will be filled with extracted vapors by attaching dedicated silicon-lined or silicon tubing from the sampling port to the inlet of the pump. The tedlar bag fill port will be attached to the outlet of the pump. Both ports will be opened and the pump will be started. The pump rate will be throttled to fill the 1-liter Tedlar bag in approximately 10 minutes, resulting in an approximate air flow rate of 0.1 liters per minute. The tedlar bag will be removed after its fill port has been closed.
- The tedlar bag will be properly labeled and enclosed in a zip-lock bag which will be used as an added protection layer to ensure safety in transit to the laboratory.

- The tubing used will be replaced after each sample collected.
- Place tedlar bags in a shipping container for transportation to laboratory (do not put the tedlar bags on ice).
- Samples will be collected in accordance with the QAPP and analyzed for CVOCs by EPA Method TO-15.
- Decontaminate all non-dedicated sampling equipment between sampling locations as described in Section 3.3 of this QAPP.

4.5 Carbon Sampling

Based on monitoring inspections performed during the operation of the SVE system, a representative grab sample of spent carbon will be collected and submitted for laboratory analysis prior to off-site disposal according to the following procedure:

- Access carbon treatment filter in accordance with manufacturer's specification and component manuals.
- Note any visual or field observations.
- Collect one aliquot of spent carbon material into a laboratory supplied sampling container.
- Relinquish sealed sampling container to a certified laboratory for analysis of total VOCs.

4.6 Condensate Water Sampling

Based on monitoring inspections performed during the operation of the SVE system, a representative sample of condensate water will be collected and submitted for laboratory analysis prior to off-site disposal according to the following procedure:

- Slowly remove the lid of the 55-gallon drum containing the collected condensate water and immediately measure the vapor concentrations in the well with a PID calibrated to the manufacturer's specifications.
- Lightly stir the water in the drum with clean, dedicated sample collection equipment or tubing to homogenize the collected condensate water.
- Collect a representative sample directly from a dedicated bailer or tubing connected to a peristaltic pump and place into the required sample containers. Sample should be collected for VOCs and submitted to a NYSDOH-certified laboratory.

4.7 LABORATORY METHODS

Table 1 summarizes the laboratory methods that will be used to analyze field samples and the sample container type, preservation, and applicable holding times. Eurofins Environment Testing America - Edison of Edison, New Jersey, a NYSDOH ELAP-certified laboratory subcontracted to AKRF, will be used for all chemical analyses in accordance with the Division of Environmental Remediation (DER)-10 2.1(b) and 2.1(f) with Category B Deliverables.

Table 1
Laboratory Analytical Methods

Matrix	Analysis	EPA Method	Bottle Type	Preservative	Hold Time
Soil (if needed)	Volatile Organic Compounds (VOCs)	8260C	EnCore [®] samplers (3) and 2 oz. plastic jar	≤ 6 °C	48 hours to extract; 14 days to analyze
	Semivolatile Organic Compounds (SVOCs)	8270D	8 oz. Glass Jar	≤ 6 °C	14 days to extract; 40 days to analyze
	1,4-Dioxane	8270D; 0.1 mg/kg RL	4 oz. Glass Jar	≤ 6 °C	14 days to extract; 40 days to analyze
	Total Analyte List (TAL) Metals, and Hexavalent Chromium	6000/7000 Series, 6010C, and 7196A	8 oz. Glass Jar	≤ 6 °C	6 months holding time; Mercury 28 days holding time; Hexavalent chromium 30 days to extract, 7 days to analyze
	Pesticides	8081B	8 oz. Glass Jar	≤ 6 °C	14 days to extract; 40 days to analyze
	Polychlorinated Biphenyls (PCBs)	8082A	8 oz. Glass Jar	≤ 6 °C	14 days to extract; 40 days to analyze
	Per- and Polyfluorinated Compounds (PFAS)	Modified 537.1; 0.2 ng/L RL	4 oz. HDPE Plastic Container	≤ 6 °C	14 days to extract; 40 days to analyze
Groundwater	Chlorinated VOCs (CVOCs)	8260C	3 40 mL Glass Vials	HCl to pH < 2 and ≤ 6 °C	14 days to analyze
Sub-Slab Soil Vapor	VOCs	TO-15	6L Summa Canisters (24-hr flow controllers)	None	30 days
Indoor Air	VOCs	TO-15	6L Summa Canisters (24-hr flow controllers)	None	30 days
Influent/Effluent SVE and SSDS Vapor	CVOCs	TO-15	1L Tedlar Bag	None	72 hours
Carbon Sampling	VOCs	8260C	EnCore sampler	4°C	48 hours

Condensate Water Sampling	VOCs	8260C	3 40 mL Glass Vials	HCl to pH < 2 and ≤ 6 °C	14 days to analyze
Notes: EPA - Environmental Protection Agency HDPE – High Density Poly Ethylene					

4.8 QUALITY CONTROL (QC) SAMPLING

In addition to the laboratory analysis of the groundwater samples, additional analysis will be included for QC measures, as required by the Category B sampling techniques. These samples will include field blank, trip blank, matrix spike/matrix spike duplicate (MS/MSD), and blind duplicate samples at a frequency of one sample per 20 field samples collected. QC samples will be analyzed for the same parameters as the accompanying samples, with the exception of any trip blanks, which will be analyzed for the VOC list only.

Table 2
Field Sample and QC Sample Quantities

Sample Type	Parameters	EPA Method ¹	Field Samples	QC Samples			
				Duplicate ³	MS/MSD ³	Field Blank	Trip Blank ²
Soil	VOCs	EPA 8260C	TBD	1/20 (TBD)	1/20 (TBD)	1/20 (TBD)	1 (Laboratory-Supplied)
	SVOCs, TAL Metals, Mercury, PCBs, Pesticides, and PFAS	EPA 8270D, 6010C/7471B, 8082A, 8081B, and 537.1	TBD	1/20 (TBD)	1/20 (TBD)	1/20 (TBD)	NA
Groundwater	CVOCs	EPA 8260	TBD	1/20 (TBD)	1/20 (TBD)	1/20 (TBD)	1
Sub-Slab Soil Vapor	VOCs	TO-15	6	1	NA	NA	1 Ambient Air
Indoor Air	VOCs	TO-15	18	1	NA	NA	1 Ambient Air (TBD)
Influent/Intermediate/Effluent SVE Vapor	CVOCs	TO-15	3	1	NA	NA	1

Notes:

MS/MSD - matrix spike/matrix spike duplicate

TBD – To be determined based on planned work activities

NA – Not Applicable

¹ - NYSDEC July 2005 ASP Category B deliverables

² - One trip blank per shipment with VOC analyses

³ - One MS/MSD and Duplicate sample per twenty field samples or sample shipment

4.9 SAMPLE HANDLING**4.9.1 Sample Identification**

All samples will be consistently identified in all field documentation, chain-of-custody (COC) documents, and laboratory reports. All samples will be amended with a collection date at the end of the sample name in a year, month, day (YYYYMMDD) format. Blind duplicate sample nomenclature will consist of the sample type, followed by an “X”; MS/MSD samples nomenclature will consist of the parent sample name, followed by “MS/MSD”; and trip and field blanks will consist of “TB-” and “FB-”, respectively, followed by a sequential number of the trip/field blanks collected within the SDG. Special characters, including primes/apostrophes (’), will not be used for sample nomenclature.

4.9.1.1. Site Management (SM) Sample Identification

All samples will be consistently identified in all field documentation, chain-of-custody documents and laboratory reports using an alpha-numeric code. Groundwater samples collected during the Site Management phase will be identified with “RI-MW-” followed by groundwater monitoring well number. The field duplicate samples will be labeled with a dummy sample location to ensure that they are submitted as blind samples to the laboratory. Trip blanks and field blanks will be identified with “TB” and “FB”, respectively. Table 3 provides examples of the sampling identification scheme for samples collected during the Site management activities.

Table 3
Sample Nomenclature

Sample Description	Sample Designation
Groundwater sample collected from groundwater monitoring well RI_MW-07A on August 1, 2023	RI-MW-07A_20230801
Matrix spike/matrix spike duplicate sample of groundwater sample collected from groundwater monitoring well RI-MW-07A on August 1, 2023	RI-MW-07A_20230801_MS/MSD
Blind duplicate sample of groundwater sample collected from groundwater monitoring well RI-MW-07A on August 1, 2023	RI-MW-X01_20230801
Second trip blank collected on August 1, 2023	TB-02_20230801
Sub-slab soil vapor sample collected from sub-slab soil vapor point MP-01 on August 1, 2023	MP-01_20230801
Indoor air sample collected from the cellar of the building on August 1, 2023	IA-01_20230801
Soil sample (if needed) collected from 1 to 2 feet below basement grade on August 1, 2023	SS-01_20230801
SVE effluent sample collected from the effluent port on August 1, 2023	SVE-EFF_20230801

4.9.1.2. Waste Classification

Any waste classification samples (if needed) will be amended with “WC-” and the alphanumeric drum identification. Table 4 provides examples of the sampling identification scheme for proposed waste classification samples.

Table 4
Waste Classification Sample Nomenclature

Sample Description	Sample Designation
Waste classification sample collected from Drum 1 on August 1, 2023	WC-D1 20230801

Sample Labeling and Shipping

All sample containers will be provided with labels containing the following information:

- Project identification, including Site name, BCP Site number, Site address
- Sample identification
- Date and time of collection
- Analysis(es) to be performed
- Sampler’s initials

Once the samples are collected and labeled, they will be placed in chilled coolers (except for sub-slab soil vapor or IA samples) and stored in a cool area away from direct sunlight to await shipment to the laboratory. All samples will be shipped to the laboratory at least twice per week. At the start and end of each workday, field personnel will add ice to the cooler(s) as needed.

The samples will be prepared for shipment by placing each sample in laboratory-supplied glassware, then wrapping each container in bubble wrap to prevent breakage, and adding freezer packs and/or fresh ice in sealable plastic bags. The COC form will be properly completed by the sampler in ink, and all sample shipment transactions will be documented with signatures, and the date and time of custody transfer. Samples will be shipped overnight (e.g., Federal Express) or transported by a laboratory courier. All coolers shipped to the laboratory will be sealed with mailing tape and a COC seal to ensure that the samples remain under strict COC protocol.

Sample Custody

Field personnel will be responsible for maintaining the sample coolers in a secured location until they are picked up and/or sent to the laboratory. The record of possession of samples from the time they are obtained in the field to the time they are delivered to the laboratory or shipped off-site will be documented on COC forms. The COC forms will contain the following information: project name; names of sampling personnel; sample number; date and time of collection and matrix; and signatures of individuals involved in sample transfer, and the dates and times of transfers. Laboratory personnel will note the condition of the custody seal and sample containers at sample check-in.

4.10 FIELD INSTRUMENTATION

Field personnel will be trained in the proper operation of all field instruments at the start of the field program. Instruction manuals for the equipment will be on file at the Site for referencing proper operation, maintenance, and calibration procedures. The equipment will be calibrated according to manufacturer specifications at the start of each day of fieldwork. If an instrument fails calibration, the project manager or QA/QC officer will be contacted immediately to obtain a replacement instrument. A calibration log will be maintained to record the date of each calibration, any failure to calibrate and corrective actions taken. The PID will be equipped with a 10.6 electron volt (eV) lamp and will be calibrated each day using 100 parts per million (ppm) isobutylene standard gas in accordance with the manufacturer's standards.

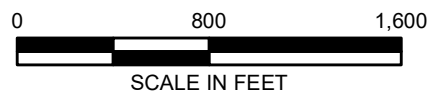
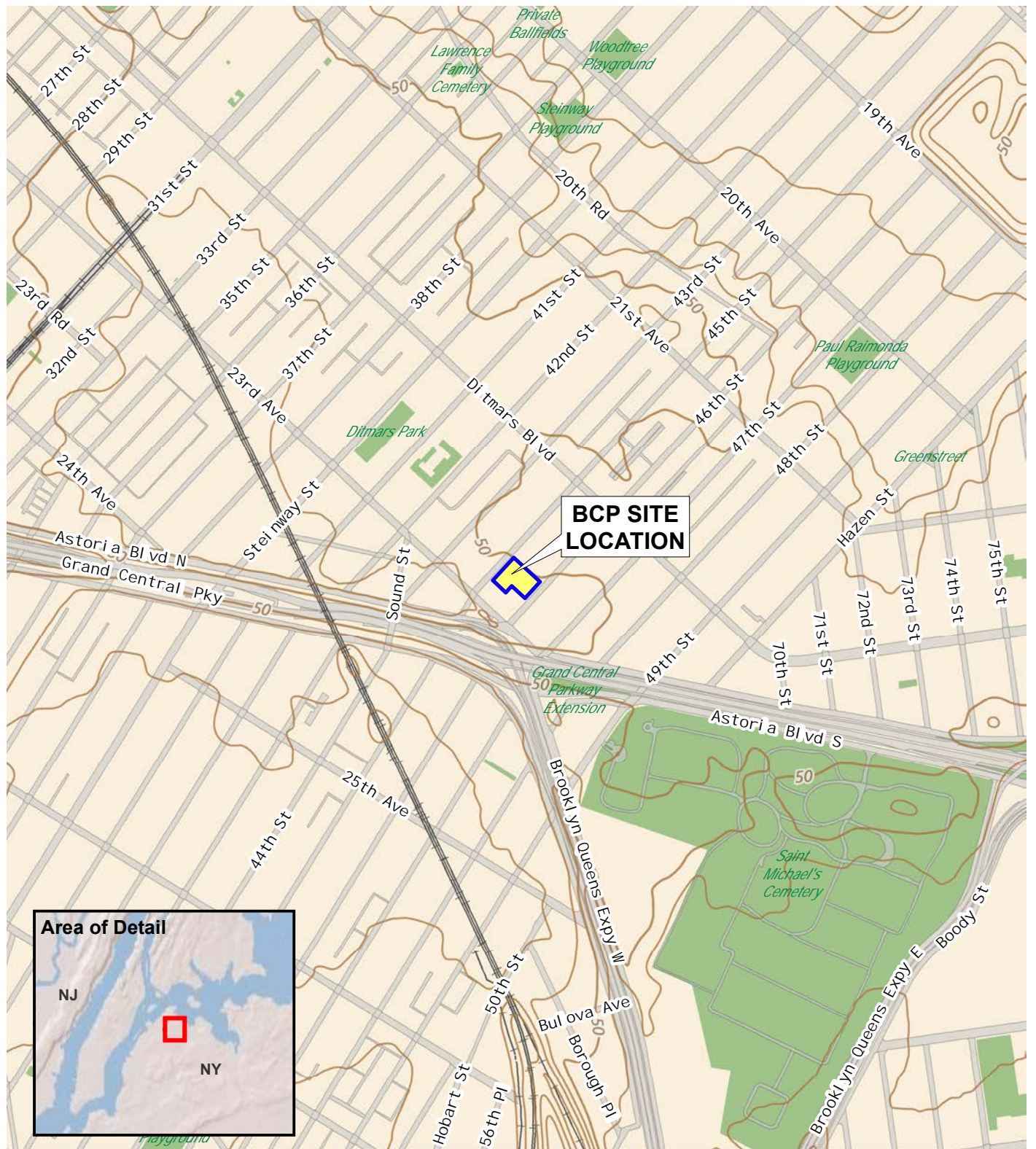
4.11 QUALITY ASSURANCE (QA)

All soil and groundwater laboratory analytical data will be reviewed by a third-party validator and a Data Usability Summary Report (DUSR) will be prepared to document the usability and validity of the data. The objective of the third-party validator is to provide an unbiased review to confirm that the laboratory followed all method and reporting requirements, and to provide a basis for making decisions about the minimum quality of environmental data that is sufficient to support risk assessment remedial performance decisions. The quarterly reports will include a detailed description of sampling activities, data summary tables, concentration map showing sample locations and concentrations, DUSR, and laboratory reports.

4.12 REPORTING OF DATA

All data generated during the monitoring activities will be submitted in the appropriate EQUIS™ EDD format.

FIGURES



440 Park Avenue South, New York, NY 10016

22-60 46th Street
Queens, New York

SITE LOCATION

DATE
2/11/2021

PROJECT NO.
190275

FIGURE
1

ATTACHMENT A
RESUMES OF PROJECT DIRECTOR, PROJECT MANAGER, PROJECT MANAGER ALTERNATE, AND
FIELD TEAM LEADER

REBECCA KINAL, P.E.

VICE PRESIDENT

Rebecca Kinal has over 20 years of experience in the assessment and remediation of soil and groundwater contamination and other hazardous/non-hazardous waste problems. Ms. Kinal's experience includes environmental due diligence, soil and groundwater investigations, leaking underground storage tank studies, soil gas/vapor intrusion surveys, and oversight of small- and large-scale remediation programs, including design of groundwater remediation systems and vapor mitigation systems. She has directed numerous Phase I and Phase II investigations and remediation programs, many of them in conjunction with commercial/residential developers, law firms, lending institutions, and public agencies. She is experienced in the cleanup of contaminated properties under New York State Brownfield Cleanup Program (BCP) regulations and the New York City "E-designation" program. As a part of this work, her duties have included technical and report review, proposal writing, scheduling, budgeting, and acting as liaison between clients and regulatory agencies, and project coordination with federal, state, and local authorities.

BACKGROUND

Education

M.S., Hydrogeology, Rensselaer Polytechnic Institute, 1995

B.S., Civil Engineering, Lafayette College, 1992

Licenses/Certifications

State of New York, P.E. Registration No. 082046, 2004

Years of Experience

Year started in company: 2000

Year started in industry: 1996

RELEVANT EXPERIENCE

White Plains Mall/Hamilton Green

Ms. Kinal managed environmental due diligence and remediation planning for the project, which included Phase I and II environmental assessments, a petroleum Spill investigation, preparation of remediation cost estimates, and application to the NYSDEC BCP.

New York City School Construction Authority On-Call Contracts for Environmental Consulting Services, Various Sites, NY

Ms. Kinal serves as the project manager for AKRF's on-call hazardous materials consulting contract with the New York City School Construction Authority for over 8 years. For potential new school sites, assignments include initial due diligence, Phase I environmental site assessments, (ESAs) and subsurface investigation of soil, groundwater, and soil vapor to determine the suitability of a site for development as a school, likely remediation requirements, and associated costs. For sites undergoing design and development, assignments include preparation of remediation plan, contract specifications, and design drawings. The work has also included conducting indoor air quality testing, vapor intrusion assessments, preparation of specifications, supervision of storage tank removals, and investigation and remediation of spills for existing schools. Due to the sensitivity of school sites, work under this contract is often conducted on short notice and during non-school hours.



REBECCA KINAL, P.E.

**VICE PRESIDENT-ENVIRONMENTAL
ENGINEER** | p. 2

USTA National Tennis Center, Queens, NY

AKRF prepared an EIS for the New York City Departments of City Planning (DCP) and Environmental Protection (DEP) as co-lead agencies to analyze the expansion of the National Tennis Center, which includes multiple improvements and construction projects at the USTA campus over several years. As part of the EIS requirements, AKRF prepared a Remedial Action Plan for implementation during the proposed project's construction. In accordance with the RAP, vapor mitigation systems were incorporated into the design for several of the proposed structures at the facility, including two new stadiums, a new transportation center, and several practice court facilities. Ms. Kinal prepared the specifications and design drawings for the vapor mitigation and is providing on-going construction support to review contractor submittals and inspect the vapor barrier and sub-slab depressurization system installations.

Montefiore Medical Center, Various Locations, NY

Ms. Kinal provides due diligence assistance to Montefiore Medical Center (MMC) for the ongoing expansion of their facilities, primarily in the Bronx and Westchester County. She conducts and manages environmental due diligence tasks related to their property transactions, including Phase I Environmental Site Assessments (ESAs), Phase II investigations, and geophysical surveys. She also assists MMC in making decisions with respect to environmental risk issues.

Queens West Development Project, Long Island City, NY

For over 20 years, AKRF has played a key role in advancing the Queens West development, which promises to transform an underused industrial waterfront property into one of largest and most vibrant mixed-use communities just across the East River from the United Nations. AKRF has prepared an Environmental Impact Statement that examines issues pertaining to air quality, land use and community character, economic impacts, historic and archaeological resources, and infrastructure. As part of the project, AKRF also undertook the largest remediation ventures completed to date under the NYSDEC Brownfields Cleanup Program (BCP). Ms. Kinal helped prepare the Remedial Work Plan (RWP) and oversaw the remediation of Parcel 9, a 1.8-acre former industrial site. Remediation includes installation of a sheet pile containment wall, excavation of coal tar- and petroleum-contaminated soil under a temporary structure to control odors during remediation, vapor mitigation for the future buildings, and institutional controls. Upon completion of the remediation activities, Ms. Kinal managed the preparation of a Final Engineering Report (FER) to document the clean-up activities. The NYSDEC issued a Certificate of Completion (COC) for the Parcel 9 site in December 2006. Ms. Kinal continues to oversee post-remediation monitoring and site management activities to ensure that the remedy remains in-place and effective.

Roosevelt Union Free School District, Roosevelt, NY

Ms. Kinal managed environmental investigation and remediation activities for the sites of three new elementary schools and a new middle school in Roosevelt, New York. Remediation activities include removal/closure of contaminated dry wells and underground petroleum storage tanks, and excavation and off-site disposal of petroleum- and pesticide-contaminated soil. Remediation of the new middle school site, which also included a sub-slab depressurization system, was conducted through coordination with the NYSDEC, NYSDOH, New York State Education Department (NYSED), and the local school district. Upon completion of the remediation and school construction, Ms. Kinal managed confirmatory indoor air testing and preparation of a Final Engineering Report to document the site clean-up. The NYSDEC issued a Certificate of Completion and the school was open for the Fall 2008 semester as planned.

Proposed NYC Public School Campus, Bronx, NY

Ms. Kinal provided environmental consulting services to the selected environmental remediation contractor for this former manufactured gas plant in the Mott Haven neighborhood of the Bronx, which was remediated under the NYSDEC BCP. These services included: preparation of an in situ sampling plan and excavation plan for waste



REBECCA KINAL, P.E.

**VICE PRESIDENT-ENVIRONMENTAL
ENGINEER** | p. 3

characterization and disposal; supervision of waste characterization sampling activities; development and implementation of a community air monitoring program during all remediation activities; and daily reporting to the NYC School Construction Authority.

National Grid – Halesite Manufactured Gas Plant Site, Town of Huntington, NY

Ms. Kinal served as the project manager for the remedial design and engineering work associated with remediation of National Grid's former manufactured gas plant (MGP) located in the Town of Huntington. The site is situated in a sensitive location along the waterfront, surround by commercial and residential properties, and half the property where the remediation was conducted is a steep slope. The remedy consisted of soil removal, oxygen injection, and non-aqueous phase liquid recovery. Ms. Kinal developed the remedial work plans, design/construction documents, and managed environmental oversight of the remedial work, including waste characterization and tracking, confirmatory endpoint sampling, air monitoring, and reporting to the NYSDEC. After the remediation work was completed, Ms. Kinal prepared appropriate close-out documentation in accordance with NYSDEC requirements.

Shell Service Station, Millwood, NY

Ms. Kinal planned and oversaw a Phase I Environmental Site Assessment and Phase II Subsurface Investigation of this active gasoline station in northern Westchester County. The Phase I/Phase II investigations were performed for the potential buyer of the property who wished to redevelop it with a more modern service station and convenience store. Ms. Kinal also prepared a conceptual remediation plan to address several areas of petroleum contamination identified during the Phase II. The plan, which was approved by NYSDEC, will be implemented in conjunction with the site redevelopment activities to achieve closure for several spills reported at the site.

Pelham Plaza Shopping Center Site Investigation & Remediation, Pelham Manor, NY

Ms. Kinal managed a Site Investigation at Pelham Plaza, an approximately ten-acre site that formerly contained a manufactured gas plant. The site was investigated under a voluntary clean-up agreement entered into with the NYSDEC by the site owner. The site investigation included advancing over 100 soil borings with continuous soil sampling to bedrock, installing monitoring and recovery wells, and conducting test pitting both indoor and outdoor locations to collect soil and groundwater samples and determine the extent of Non-Aqueous Phase Liquid (NAPL). The investigation also included: soil gas sampling to determine contaminant concentrations in the vapors beneath the foundation of an on-site retail store; sediment sampling in an adjacent creek to identify off-site impacts; and a tidal survey to determine tidal influence on groundwater levels at the site. Ms. Kinal also oversaw interim remedial measures, which include biweekly pumping of recovery wells to remove dense NAPL (DNAPL) from the site subsurface.

Shaws Supermarket Redevelopment Project, New Fairfield, CT

Ms. Kinal managed the Remedial Investigation (RI) for an approximately nine-acre shopping center site that was contaminated by releases from former dry cleaning operations. The site was being redeveloped with a new supermarket and separate retail stores. The investigation included the installation of monitoring wells in the intermediate overburden aquifer and bedrock aquifer, sampling of existing and newly installed wells, geophysical logging in bedrock wells, and pump testing in intermediate and bedrock wells. Ms. Kinal prepared a Remedial Action Work Plan (RAWP) based on results from the RI, which included a groundwater pump and treat system to contain a plume of perchlorethylene (PCE)-contaminated groundwater, and excavation and disposal of contaminated soil in the presumed source area. Following CTDEP approval of the RAWP, Ms. Kinal prepared bid specifications for soil excavation and remediation system installation, and oversaw their implementation. Ms. Kinal also prepared NPDES permit applications for discharges from construction dewatering and the groundwater remediation system, and conducted associated discharge monitoring.



REBECCA KINAL, P.E.

**VICE PRESIDENT-ENVIRONMENTAL
ENGINEER** | p. 4

Yankee Stadium, Bronx, NY

Ms. Kinal performed the hazardous materials analysis for the Draft Environmental Impact Statement for the proposed new Yankee Stadium. The analysis included a Phase I Environmental Site Assessment of the entire project area and Subsurface (Phase II) Investigation in areas where environmental conditions were identified. The Phase II investigation included geophysical surveys to search for potential underground storage tanks; and soil, soil gas, and groundwater sampling at over 40 locations to determine potential environmental impacts during and after the proposed construction. Ms. Kinal also developed an extensive community air monitoring plan and oversaw its implementation during deconstruction of the old Yankee Stadium.

Avalon on the Sound, New Rochelle, NY

Ms. Kinal oversaw environmental investigation and soil remediation during the construction of two luxury high-rise apartment buildings and an associated parking garage. Investigation activities included an electromagnetic survey to search for possible underground storage tanks, and subsurface sampling to characterize soil and groundwater. Remediation activities included removing underground storage tanks, excavating and disposing of soil contaminated with volatile and semi-volatile organic compounds, and collecting end-of-excavation confirmation samples.

Dauids Island Environmental Audit, New Rochelle, NY

Ms. Kinal managed the hazardous materials portion of the audit of this undeveloped island site, including a Phase I Environmental Site Assessment (ESA) and Subsurface (Phase II) Investigation in areas where environmental conditions were identified. The Phase II investigation included collecting soil samples from more than 100 locations and analyzing them for targeted compounds, including volatile organic compounds, semi-volatile compounds, metals, pesticides, and polychlorinated biphenyls (PCBs). Ms. Kinal also oversaw an electromagnetic (EM) survey conducted to identify the location of suspected underground storage tanks on the island. Based on soil sample results, Ms. Kinal estimated the volume of contaminated soil requiring remediation and prepared cost estimates for soil excavation and for transportation and disposal of contaminated soil and hazardous materials.

Outlet City Site Investigation, Queens, NY

Ms. Kinal prepared a work plan for remedial investigation of the Outlet City site, a property in Long Island City that was formerly occupied by a manufacturer of industrial cleaners and pharmaceuticals. The site is being investigated and remediated under the NYSDEC voluntary clean-up program. In preparing the work plan, Ms. Kinal evaluated results from several previous investigations and conducted a limited groundwater sampling program to determine future data needs for designing remediation of creosote-contaminated soil and groundwater. The work plan included additional soil and groundwater sampling, a tidal survey to determine tidal influence on groundwater levels, and pilot free product recovery testing. Ms. Kinal also helped design a venting system for an on-site basement and performed exposure calculations for the vented vapors.

Yonkers Waterfront Redevelopment Project, Yonkers, NY

For this redevelopment along Yonkers' Hudson River waterfront, Ms. Kinal supervised the remediation of Parcels H and I that were contaminated with hazardous soil. During the remediation process, she reviewed the subcontractor health and safety plans, delineated the areas of excavation, and oversaw field activities to ensure compliance with the specifications and appropriate regulations. This property was remediated under the NYSDEC Environmental Restoration Program (ERP).



DEBORAH SHAPIRO, QEP

VICE PRESIDENT

Deborah Shapiro is a Vice President in the Site Assessment and Remediation Department. Ms. Shapiro supervises project teams and manages all aspects of assessment and remediation projects across the New York Metropolitan Area. Ms. Shapiro works with developers, non-profit organizations, architects, local community groups, local businesses, and government agencies. Her projects fall under the regulatory oversight of NYSDEC, NYCDEP, and NYCOER including the New York State Brownfield Cleanup Program (BCP), New York City Voluntary Cleanup Program (VCP), NYSDEC petroleum spills program, RCRA/UIC closures, and NYCOER's E-designation program. Ms. Shapiro has also assisted commercial and industrial property owners with maintaining the integrity of their portfolios by providing compliance related cleanup and chemical storage management services. Ms. Shapiro has also been a moderator and panelist at numerous conferences.

Ms. Shapiro manages all aspects of redevelopment projects from the initial Phase I ESA, Phase II, and remediation through post-remedial site management. In addition, her experience includes groundwater investigations, monitoring, and sampling programs; Brownfield and hazardous waste site investigations; In-Situ Chemical Oxidation; underground storage tank studies, including soil contamination delineation, classification, removal and disposal; waste characterization sampling; exposure assessments; on-going remedial action (especially AS/SVE), and permitting.

BACKGROUND

Education

M.S., Environmental Science, American University, 2001

B.A., Environmental Studies, American University, 1998

Professional Licenses/Certifications

Qualified Environmental Professional

Health and Safety Operations at Hazardous Materials Sites 29 CFR 1910.120

OSHA 8 Hour HAZWOPER Supervisor

OSHA 10 Hour Occupational Construction Safety and Health

CPR

Professional Memberships

Past President, New York City Brownfield Partnership

Board Member, Residents for a More Beautiful Port Washington

Member, Institute of Professional Environmental Practitioners (IPEP)

Awards

Big Apple Brownfield Award recipient as part of the Elton Crossing redevelopment team 2017

Big Apple Brownfield Award recipient as part of the Courtlandt Crescent redevelopment team 2013

Big Apple Brownfield Award recipient as part of the Via Verde redevelopment team 2012

Big Apple Brownfield Award recipient as part of the Cornerstone B1 (LaTerraza) redevelopment team 2011

Years of Experience

Year started in company: 2013

Year started in industry: 1998



DEBORAH SHAPIRO, QEP

VICE PRESIDENT

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RELEVANT EXPERIENCE

Elton Crossing, Bronx, NY

AKRF provided environmental consulting services in connection with the purchase and redevelopment of the Elton Crossing site at 899 Elton Avenue in the Bronx, NY. The work initially involved the preparation of a Phase II subsurface investigation including soil and soil vapor testing to determine if the site would be eligible for the New York State Brownfield Cleanup Program (NYSBCP). Upon completion of the investigation, AKRF prepared a NYCBCP Application and the site was accepted into the NYSBCP. AKRF managed all aspects of the brownfield cleanup including; development of Investigation Work Plans, performing Remedial Investigations and Reports, preparation of Phase I ESAs, preparation of a Citizen Participation Plan, distribution of public notices, preparation and implementation of a Remedial Action Work Plan (RAWP), design of a sub-slab depressurization system, preparation of the Final Engineering Report and Site Management Plan, and sampling and management of soil disposal. AKRF is in the midst of implementing the Site Management Plan. As project manager, Ms. Shapiro was responsible for managing all technical components of the project, communication with NYSDEC and the Client, and managing the budget.

Second Farms, Bronx, NY

AKRF, Inc. was initially contracted by the New York City Office of Environmental Remediation (NYCOER) to conduct a subsurface investigation of a 1.12-acre parcel in the Bronx, New York under the United States Environmental Protection Agency (USEPA) Brownfield Assessment Grant program. The investigation included a geophysical survey and utility mark-outs, and the collection and analysis of soil, groundwater, soil vapor, indoor air and ambient air samples. AKRF continued working on the project for the developer by preparing a Remedial Action Plan and Environmental Assessment Statement. AKRF is in the midst of implementing the remedy. As project manager, Ms. Shapiro was responsible for managing all technical components of the project, communication with OER, NYCDEP, and the Client, and managing the budget.

Bradhurst Cornerstone II Residences, Manhattan, NY

AKRF, Inc. prepared a Part 58 Environmental Assessment and a City Environmental Quality Review Environmental Assessment Statement for the Bradhurst Cornerstone II Apartments project. Issues of concern for the environmental review included the identification of project commitments for certain of the four sites related to historic resources, hazardous materials, air quality, and building attenuation. As part of the mitigation of hazardous materials, AKRF conducted a Phase II investigation, and prepared a Remedial Action Plan and Construction Health and Safety Plan. As project manager, Ms. Shapiro was responsible for managing all technical components of the hazardous materials portion of the project, communication with the regulatory agency and the Client, and managing the budget.

Lambert Houses, Bronx, NY

AKRF performed an EIS of the Lambert Houses affordable housing complex located in the West Farms section of the Bronx, NY. Lambert Houses consisted of multi-story apartment buildings, parking garage, and a multi-tenant retail/commercial building alongside the elevated NYC subway. AKRF also conducted a Phase I ESA with a vapor intrusion screen of the Property to satisfy HUD's vapor intrusion requirements. The Phase I and vapor intrusion screens were prepared in accordance with ASTM E1527-05, ASTM E2600, and EPA's All Appropriate Inquiry (AAI) rule. After completion of the EIS, an E designation for hazardous materials was placed on the Site. A Subsurface Investigation was conducted and a Remedial Action Work Plan was prepared under OER oversight. The Site was subsequently entered in the NYC Voluntary Cleanup Program. AKRF is in the midst of implementing the RAWP, which included remediation of a hydraulic oil spill. As project manager, Ms. Shapiro was responsible for managing all technical components of the hazardous materials portion of the project, communication with the regulatory agency and the Client, and managing the budget.



DEBORAH SHAPIRO, QEP

VICE PRESIDENT

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Brook 156, Bronx, NY

AKRF was retained to provide environmental consulting services in connection with the purchase and development of the Site. AKRF prepared a Phase I Environmental Site Assessment (ESA) of the NYC-owned former gasoline service station and a former railroad. A Tier 1 Vapor Encroachment Screening was also conducted to satisfy HUD's vapor intrusion requirements. AKRF prepared a Remedial Investigation Work Plan (RIWP) and conducted a Remedial Investigation (RI) at the site, which included the collection and analysis of soil, soil vapor, and groundwater. The results of the RI, which were documented in a Remedial Investigation Report (RIR), were used to prepare a New York City Brownfield Cleanup Program (NYCBCP) application. The site was accepted into the New York State Brownfield Cleanup Program (NYSBCP). AKRF prepared a Citizen Participation Plan (CPP), distributed public notices, and conducted multiple Remedial Investigations to further investigate soil, soil vapor, and groundwater at the site prior to redevelopment. The results of the investigations were used to prepare a Remedial Action Work Plan (RAWP), which is undergoing review and approval by NYSDEC. The proposed remedy includes excavation of soil, design and installation of a soil vapor extraction system and sub-slab depressurization system, contingent groundwater treatment program, and installation of a vapor barrier and composite cover system. As project manager, Ms. Shapiro is responsible for managing all technical components of the project, communication with NYSDEC and the Client, and managing the budget.

On-Call Environmental Consulting Services (Various Locations), New York City Mayor's Office of Environmental Remediation (OER) (administered by NYCEDC)

Ms. Shapiro is managing an on-call contract with the OER for brownfields environmental assessment and remediation. The work has included conducting Phase I environmental site assessments (ESAs) and multi-media sampling of soil, groundwater, and soil vapor for various sites funded by EPA grants. The work plans and investigation reports were completed in accordance with OER and EPA requirements. AKRF also implemented a remedial plan for capping a park site in Staten Island. In addition, AKRF provided support to OER and an affordable housing developer to expedite an application for entry into the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP), as well as preparation and implementation of the remedial investigation and remedial plan.

Atlantic Chestnut, Brooklyn, NY

AKRF was retained to provide environmental consulting services in connection with the purchase and redevelopment of former burned manufacturing buildings encompassing an entire city block in Brooklyn, New York. As part of due diligence, AKRF prepared a Phase I Environmental Site Assessment (ESA) Report for the property. After acquisition, the property was divided into three separate sites (3264 Fulton Street, 235 Chestnut Street, and 3301 Atlantic Avenue). AKRF prepared a Subsurface (Phase II) Investigation Work Plans and conducted Phase IIs at each of the sites, which included the collection and analysis of soil, soil vapor, and groundwater samples. Based on the results of the Phase IIs, which were documented in Subsurface (Phase II) Reports, New York State Brownfield Cleanup Program (NYSBCP) applications were prepared for each of the sites. After acceptance into the NYSBCP, AKRF prepared Citizen Participation Plans (CPPs) and distributed public notices. AKRF prepared Remedial Investigation (RI) Work Plans (RIWPs) and implemented numerous Remediation Investigations for each of the sites to further investigate contaminated media at the site prior to redevelopment, and prepared the RI Reports (RIRs). AKRF is in the midst of preparing Interim Remedial Work Plans for each Site, which include installation of a Soil Vapor Extraction to prevent the off-site migration of contaminants. As project manager, Ms. Shapiro was responsible for managing all technical components of the project, communication with NYSDEC and the Client, and managing the budget.



ADRIANNA BOSCO

TECHNICAL DIRECTOR

Adrianna Bosco is a Technical Director in AKRF's Site Assessment and Remediation Department. She has experience in navigating redevelopment projects through regulatory requirements under local and state programs. Ms. Bosco has worked closely with projects enrolled in the NYSDEC Brownfield Cleanup Program, the New York City Voluntary Cleanup Program, and NYSDEC petroleum spills program, from initial stages of investigation and remediation, through site closure and post-remedial management. Ms. Bosco also has experience in preparing Phase I Environmental Site Assessments and Subsurface (Phase II) Investigations, in addition to conducting environmental/construction oversight and the associated reporting elements. Prior to joining AKRF, she worked as an Environmental Scientist for PS&S Engineering, Inc.

BACKGROUND

Education

BS, Manhattan College, Environmental Engineering, 2011

Licenses/Certifications

OSHA 40 Hour HAZWOPER

OSHA 8 Hour Refresher

Professional Memberships

Committee Member - Policy Innovation Network, Citizens Housing Planning Council

Years of Experience

11 years in the industry

8 years with AKRF

Contact Information

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RELEVANT EXPERIENCE

22-60 46th Street, Queens, NY

AKRF is providing environmental consulting services during to further investigate and remediate the property under the Brownfield Cleanup Program. This property has a long history of industrial and manufacturing uses, including a knitting mill and electronics manufacturer. As a result of the former operations, soil vapor beneath the site is contaminated with chlorinated solvents. As Project Manager, Ms. Bosco led the Remedial Investigation and assisted in the design and implementation of an active sub-slab depressurization system, soil vapor extraction system, and in-situ groundwater treatment program. Ms. Bosco oversees the day-to-day activities during remediation, and was the primary author of the Final Engineering Report and Site Management Plan.

601 West 29th Street, Manhattan, NY

This site is currently enrolled in the Brownfield Cleanup Program and contains E-Designations for air quality, noise, and hazardous materials. Historically, the site was developed with various industrial and automotive operations since the early 1800s. As the Project Manager, Ms. Bosco managed various pertinent tasks from



ADRIANNA BOSCO

TECHNICAL DIRECTOR

preparation of the Brownfield Cleanup Program Application to implementation of the Remedial Investigation, and successfully managing the remediation. A Certificate of Completion was issued in December 2020. Ms. Bosco is also managing the post-remedial monitoring and site inspections.

East Side Coastal Resiliency (ESCR) Preliminary & Final Design, New York, NY

AKRF is leading a multidisciplinary design team that was selected by the New York City agency partnership of the New York Department of Design and Construction (NYCDDC), New York City Department of Parks and Recreation (NYC Parks), New York City Department of Transportation (NYCDOT), and the Mayor's Office of Recovery and Resiliency (ORR) to provide engineering, planning, landscape architecture, urban design and community engagement services for the Preliminary and Final Design Services for ESCR.

Adrianna conducted a portion of the 2016 subsurface investigation. The ESCR subsurface exploration program involved a review of available utility plans and environmental reports involving manufactured gas plant (MGP) and petroleum-related contamination. Responsibilities included groundwater sampling, soil boring and temporary well installation, and compliance with the Supplemental Subsurface Investigation Work Plan.

147-25 94th Avenue, Queens, NY

This historical meat refrigeration facility is enrolled in the Brownfield Cleanup Program to remediate the property and construct a 23-story affordable residential building. Although the site has an E-Designation for hazardous materials, noise, and air quality, AKRF assisted with applying for entry into the NYSDEC Brownfield Cleanup Program, due to the presence of contaminated soil and soil vapor beneath the site. AKRF is providing environmental consulting services throughout the project.

As the Deputy Project Manager, Ms. Bosco prepared the Brownfield Cleanup Program application and Remedial Action Work Plan. Ms. Bosco also managed field activities associated with the Remedial Investigation, to determine the vertical and horizontal extent of on-site contamination. During construction, Ms. Bosco managed the on-site remediation and prepared NYSDEC-required submittals and reports.

1888 Bathgate Avenue Redevelopment Site, Bronx, NY

AKRF provided environmental consulting services in connection to the investigation and remediation of an approximately 36,000-square foot parcel enrolled in the Brownfield Cleanup Program. This former steel door manufacturing facility was contaminated with chlorinated solvents, including tetrachloroethene. The selected remedy included site-wide excavation of soil and bedrock, continuous air monitoring, collection of post-excavation endpoint samples, and implementation of an in-situ groundwater treatment program.

As the Deputy Project Manager for this project, Ms. Bosco managed various field efforts, including a Remedial Design Investigation to develop the groundwater treatment program and implementation of the Remedial Action Work Plan. Upon completion of the remediation, Ms. Bosco prepared the Final Engineering Report and Site Management Plan for submission to the NYSDEC.

On-Call for Professional Services for an Environmental Assessment Statement (EAS), New York, NY

AKRF worked with NYCDDC, NYCDOT, and the New York State Department of Transportation (NYSDOT) on a full roadway and sidewalk reconstruction project along Main Street between 38th Avenue and 40th Road in Downtown Flushing, Queens. The goal of the project was focused on formalizing a NYCDOT pilot program for improving pedestrian circulation and safety in an area that experiences some of the highest pedestrian traffic in New York City given its proximity to the terminus of the 7-train subway line at Flushing Main Street station and Long Island Rail Road (LIRR) Flushing Main Street station as well as numerous bus routes, in conjunction with traffic study and analysis, and environmental impact analysis for the proposed widening of sidewalks within the project limits. This unique project tied together the interconnected relationship between the proposed reconstruction engineering and the balance of improving



ADRIANNA BOSCO

TECHNICAL DIRECTOR

pedestrian accommodation, flow, and safety with maintaining modified vehicular flow and acceptable level of service along Main Street which experiences notably high volumes of intermodal pedestrian, train, bus, and vehicular traffic. Design scope included reconstruction of the roadway and curb to widen sidewalks, traffic study and analysis, and environmental impact assessment including Design Approval Document and Plans, Specifications and Estimate (PS&E) submission to NYSDOT for review and approval associated with Federal funding allocated for the project. AKRF developed the preliminary design and final design plans for the reconstruction project.

New York City Mayor's Office of Environmental Remediation (OER) On-Call Contract, Various Locations, NY

The work has included conducting Phase I environmental site assessments (ESAs) and multi-media sampling of soil, groundwater, and soil vapor for various sites funded by U.S. Environmental Protection Agency (USEPA) grants. The work plans and investigation reports were completed in accordance with OER and USEPA requirements. AKRF also implemented a remedial plan for capping a park site in Staten Island. In addition, AKRF provided support to OER and an affordable housing developer to expedite an application for entry into the New York State Department of Environmental Conservation (NYSDEC) BCP, as well as preparation and implementation of the remedial investigation and remedial plan.

On-Call Environmental Consulting for NYCSCA, Various locations, NY

AKRF's on-call hazardous materials consulting contract with NYCSCA. AKRF performed lead in drinking water sampling in about 160 schools during two three-month periods. AKRF continues to provide lead sampling, reporting and remedial recommendations, as new plumbing is installed. AKRF also oversees plumbing disinfection work, which is required prior to new plumbing being placed into service. The assignments involve reviewing and commenting on disinfection plans, supervision of the disinfection and confirmation testing, and preparation of reports documenting the work was conducted in accordance with the specifications and applicable requirements. Due to the sensitivity of school sites, work under this contract is often conducted on short notice and during non-school hours.

Adrianna worked on the following assignments under this contract:

- PS 11Q - Addition
- PS 340M – Design
- PS K680 – Design
- Upk Sites – Brooklyn, Staten Island, and the Bronx

New York City Housing Authority (NYCHA), Settlement Housing Fund Inc., Twin Parks Terrace, Bronx, NY

AKRF provided site assessment/remediation services on behalf of NYCHA in connection with a joint application for conversion of assistance under the U.S. Department of Housing and Urban Development (HUD)'s Rental Assistance Demonstration and Section 18 disposition programs. We then supported the public/private partnership formed between NYCHA and Highbridge Affordable Group for leasing, financing, capital rehabilitation, operation, property management, and social service delivery at several public housing developments in the Bronx, including Twin Parks West (Sites 1 and 2). AKRF proceeded to work on behalf of Settlement Housing Fund for Twin Parks Terrace, the proposed redevelopment of a parking lot adjacent to Twin Parks West (Sites 1 and 2). Twin Parks Terrace will be a 14-story building with 182 units of affordable housing, 10,000 square feet of commercial space, and 1,800 square feet of community facility space. Social services will be provided by BronxWorks.



Ashutosh Sharma

Senior Environmental Professional

Ashutosh Sharma is an Environmental Scientist with over 10 years of experience in the environmental consulting field. He has managed and implemented investigations and remedial measures for various properties, including those under different regulatory programs such as the New York State Department of Environmental Conservation's (NYSDEC) Voluntary Cleanup Program and Brownfield Cleanup Program, New York State's Spill Response Program, the Mayor's Office of Environmental Remediation (OER) E-Designation Program. Mr. Sharma has extensive experience in Phase I and Phase II (subsurface) site assessment and remedial investigation, remediation and cleanup of contaminated sites, and construction oversight. He has experience with subsurface soil, groundwater and sub-slab air/vapor sampling procedures, coordinating and running Community Air Monitoring Plans (CAMP) and is familiar with relevant United States Environmental Protection Agency (USEPA), New York State Department of Environmental Conservation (NYSDEC), and New York City Department of Environmental Protection (NYCDEP) environmental laws and regulations.

Background

Education

M.S., Environmental Science, New Jersey Institute of Technology, 2007

B.Tech, Dr. B.R. Ambedkar National Institute of Technology, India, 2005

Years of Experience

Year started in industry: 2007

Year started in company: 2007

Relevant Experience

New York City School Construction Authority: On Call Environmental Consulting

Under an on-call contract, AKRF provides the New York City School Construction Authority (NYCSCA) with hazardous materials consulting services. Mr. Sharma has provided assistance with various environmental assessment tasks including Phase II (Subsurface) Environmental Site Investigations (soil, groundwater and soil gas investigations); Indoor Air Quality (IAQ) and Vapor Intrusion (VI) Assessments; and Underground Storage Tank (UST) investigations. He evaluates the results of the investigations in the context of applicable environmental regulations to assist the project manager and/or project engineer in developing recommendations for remedial actions. Mr. Sharma also provided assistance with the lead in drinking water and plumbing disinfection tasks under the current on-call contract. AKRF also oversees plumbing disinfection work, which is required prior to new plumbing being placed into service. The assignments involve reviewing and commenting on disinfection plans, supervision of the disinfection and confirmation testing, and preparation of reports documenting the work was conducted in accordance with the specifications and applicable requirements. Due to the sensitivity of school sites, work under this contract is often conducted on short notice and during non-school hours.

RXR Realty, NY: Multiple Projects

AKRF has worked with RXR Realty on multiple projects and provided services for completion of Phase I Environmental Site Assessments (ESAs), implemented Phase II Environmental Site Investigations (ESI) and soil waste characterization sampling. Mr. Sharma acted as project manager, overseeing field personnel

implementing the Phase I ESA site reconnaissance the subsurface investigations, as well as completing reports for delivery to the client.

Larkin Plaza, Yonkers, NY

RXR SoYo Exalta LLC enrolled in the New York State Brownfield Cleanup Program (NYS BCP) to investigate and remediate the property located at 25 Warburton Avenue in Yonkers, NY. Mr. Sharma assisted the client in preparing the application to enroll the site in the NYS BCP program.. Mr. Sharma acted as the project manager for the project and prepared the Remedial Investigation Work Plan (RIWP), the Remedial Investigation Report (RIR), the Interim Remedial Measure Work Plan (IRMWP), the Remedial Action Work Plan (RAWP), the Interim Remedial Measures Construction Completion Report and the Site Management Plan (SMP) for the BCP site. Mr. Sharma also managed the field implementation of the remedial investigation and site cleanup activities during the development. Mr. Sharma maintained constant communication with the NYS Department of Environmental Conservation (NYSDEC) project manager and the client during the site redevelopment.

810 Fulton Street, Brooklyn, NY

RXR 810 Fulton Owner LLC developed the property located at 810 Fulton Street in Brooklyn. Mr. Sharma acted as project manager, overseeing field personnel implementing the requirements of the NYC Office of Environmental Remediation (OER)-approved Remedial Action Plan (RAP). Mr. Sharma also coordinated with the OER on behalf of the client on the day to day activities during the remedial action. Mr. Sharma also completed reports for delivery to the client and OER.

Lambert Houses, Bronx, NY

988 East 180th Street Housing Development Fund Corporation enrolled in the New York City Voluntary Cleanup Program (NYC VCP) to investigate and remediate the property located at 988 East 180th Street in the Bronx. Mr. Sharma acted as the deputy project manager overseeing field personnel implementing the construction oversight during site redevelopment, and coordinated with the client and their subcontractors. Mr. Sharma prepared the spill investigation work plan, coordinated spill cleanup and prepared the spill closure report to address the petroleum spill encountered during site redevelopment.

Melrose Commons Site C, Bronx, NY

The Bridge Inc. enrolled in the New York City Voluntary Cleanup Program (NYC VCP) to investigate and remediate the property located at 988 East 18th Street in the Bronx. Mr. Sharma acted as the deputy project manager overseeing field personnel implementing the construction oversight during site redevelopment, and coordinated with the client and their subcontractors. Mr. Sharma prepared the remedial closure report for delivery to the client.

Essex Crossing Sites 1, 2, 3, 4, 5, 6, and 8, Manhattan, NY

AKRF provided various services during the redevelopment of the Essex Crossing sites in the lower east of Manhattan. Mr. Sharma acted as the deputy project manager overseeing field personnel implementing the construction oversight during site redevelopment, and coordinated with the client and their subcontractors. Mr. Sharma also coordinated spill cleanups and prepared the spill closure reports to address the multiple petroleum spills encountered during redevelopment. Mr. Sharma also coordinated with the client and the New York City Department of Housing & Preservation (HPD) during the implementation of the NYC Department of Environmental Protection (DEP)-approved Remedial Action Plan (RAP). Mr. Sharma also completed reports for delivery to the client.

NYU Langone Medical Center (NYULMC) – Kimmel Pavilion, New York, NY

New York University Langone Medical Center enrolled in the New York City Voluntary Cleanup Program (NYC VCP) to investigate and remediate the property located at 424 East 34th Street in Manhattan. The proposed development consisted of a new medical facility. Mr. Sharma acted as the deputy project manager overseeing field personnel implementing the construction oversight during site redevelopment, and coordinated with the client and their subcontractors.

551 Tenth Avenue, New York, NY

Extell 4110 LLC enrolled in the New York City Voluntary Cleanup Program (NYC VCP) to investigate and remediate the property located at 547-551 Tenth Avenue in Manhattan. The property was developed with a 52-story residential building with one sub-grade level. Mr. Sharma provided construction oversight during site excavation, spill remediation, coordination and management of soil removal and fill material imports, oversight of the on-site air monitoring program, identification and proper management of contamination encountered during excavation work, and maintenance of critical paperwork and preparation of the final closure report.

Zerega Avenue – Phase I, Phase II and Wetland Survey, Bronx, NY

AKRF was contracted by EDC to conduct perform environmental services at an approximately 255,000-square foot project area located at 530 to 590 Zerega Avenue, Bronx, New York. The work included a Phase I Environmental Site Assessment (ESA), and Phase II Environmental Site Investigation which included preparation of a site-specific health and safety plan, a geophysical survey and utility mark-outs, and the collection and analysis of soil, groundwater, soil vapor, indoor air and ambient air samples. Mr. Sharma provided assistance with subsurface soil, groundwater and soil gas investigation as part of the Phase II investigation of the project site.

Rego Park Home Depot, Queens, NY

Solvent contamination was encountered during retail development of a former industrial property in Rego Park, Queens, New York. The site work included an extensive investigation and a multi-phase remediation performed under the NYSDEC Voluntary Cleanup Program (BCP). Remediation included removal of aboveground and underground storage tanks (ASTs and USTs) and hotspot soil removal. An Air Sparging/Soil Vapor Extraction (AS/SVE) groundwater remediation system designed by AKRF was installed as part of the building construction. Continued remediation work included upgrading and expanding the AS/SVE system after the store was opened. AKRF prepared the Final Engineering Report and obtained closure with a Release and Covenant Not to Sue issued by NYSDEC in 2013. AKRF continues operations, maintenance, and monitoring under the NYSDEC-approved Site Management Plan. Mr. Sharma assisted with ongoing operation, maintenance and monitoring of the AS/SVE system.

TF Cornerstone – 606 West 57th Street, New York, NY

AKRF has been retained by TF Cornerstone to provide environmental services for the proposed redevelopment of a portion of the block bounded by Eleventh and Twelfth Avenues and West 56th and 57th Streets. The proposed actions include a zoning map amendment, zoning text amendments, a special permit, and an authorization to facilitate development of approximately 1.2 million square feet of residential and retail space. AKRF is currently preparing an Environmental Impact Statement (EIS) for the New York City Department of City Planning (DCP) to analyze the effects of the proposed actions and development of the proposed building. The EIS will address the full range of environmental impacts associated with the proposed development. As part of the project's review, AKRF also prepared documents and graphics submitted to DCP under its Blue Print program, a pre-application process that presents basic project information to DCP and clarifies major issues prior to the filing of a land use- or zoning-related application. The process is intended to standardize the pre-application process and expedite DCP's overall project review. Mr. Sharma was responsible for contractor oversight for the spill remediation activities as requested by the NYSDEC.

Whitney Museum of American Art, NY

Mr. Sharma provided assistance with subsurface soil and groundwater investigation, construction oversight and soil disposal management during the remediation phase of the project. The project included the construction of an approximately 230,000-square foot museum building with one sub-grade level with exhibition galleries, administrative offices, accessory use (café and bookstore), storage space, and an approximately 4,000-square foot restaurant.

Yankee Stadium Demolition, Bronx, NY

The New York City Economic Development Corporation (NYCEDC) project included demolition of the old Yankee Stadium and construction of a ball field known as Heritage Field. Mr. Sharma provided air monitoring and remedial action plan (RAP) oversight during the demolition and soil disturbance work.

East River Science Park, New York, NY

The New York City Economic Development Corporation (NYCEDC) proposed to construct two seventeen-story buildings to serve as a biomedical research center. The space between the two towers included an elevated atrium and an outdoor plaza on top of a parking garage. Mr. Sharma provided construction oversight during site excavation, coordination and management of soil removal and fill material imports, oversight of the on-site air monitoring program, identification and proper management of contamination encountered during excavation work, and maintenance of critical paperwork and preparation of the final closure report.

W 61st Street Site, NY

Mr. Sharma provided assistance with construction oversight during site excavation activities and helped prepare the final closure report for the site which, as part of the Brownfield Cleanup Program (BCP), was slated for redevelopment as two residential buildings with a courtyard and a tennis court.

164 Kent Avenue, Brooklyn, NY

The project was a multi-phase development consisting of a large waterfront block in the Williamsburg Rezoning Area. The project site has been developed with a mixed-use residential-commercial high rise towers with an esplanade and a pier along the East River. AKRF provided acquisition and development support, including performing Phase I and II environmental site assessments, and preparation of Remedial Action Plans (RAPs) and Construction Health and Safety Plan (CHASPs) for approval by DEP and OER. AKRF provided assistance with construction oversight during soil handling activities and managing the Community Air Monitoring Plan (CAMP) activities. To date, closure reports have been prepared and occupancy achieved for three of the four buildings. Mr. Sharma provided construction oversight during soil handling activities and running the Community Air Monitoring Plan (CAMP).

285 Jay Street, Brooklyn, NY

Under contract with the Dormitory Authority of the State New York (DASNY), AKRF completed a Phase II Subsurface investigation at the site of a proposed CUNY educational building to satisfy New York City E-designation requirements. As part of the work AKRF performed at the site, Mr. Sharma conducted sub-surface soil and groundwater investigation work and coordinated with the driller and the property owner for successful completion of the work. Mr. Sharma prepared the remedial closure report for delivery to the client.

MTA Long Island Railroad, East Side Access Project, New York, NY

The Metropolitan Transportation Authority (MTA) sponsored the East Side Access project to connect the Long Island Railroad to the Grand Central Terminal, thereby allowing Long Island commuters direct access to the East Side of Manhattan. Mr. Sharma provided assistance with the execution of the Community Air Monitoring Plan (CAMP) at various locations during the construction phase.

Adam Clayton Powell Jr. Boulevard, New York, NY

AKRF performed a Phase II study to meet the requirements of the New York City Department of Environmental Protection (NYCDEP) and to determine whether subsurface conditions had been affected by the on-site and/or off-site petroleum storage tanks and to ascertain whether current or former on- or off-site activities had adversely affected the subject property. Mr. Sharma conducted sub-surface soil and groundwater investigation at the abandoned site slated for future development. He was responsible for coordinating with the driller and the property owner for successful completion of the work.

ANTONIO CARDENAS

ENVIRONMENTAL SCIENTIST

Mr. Cardenas is an Environmental Scientist in the AKRF, Inc. Site Assessment and Remediation Group. His experience includes Phase I Environmental Site Assessments, soil, groundwater, and soil gas sampling, and environmental monitoring of construction sites.

BACKGROUND

Education

B.S., Geology, City College of the City University of New York, NY, 2017

Certifications

OSHA 40-hour Health & Safety Training for Hazardous Waste Operations

OSHA 10-hour Health & Safety Training for Hazardous Waste Operations

USEPA Air Monitoring for Emergency Response Training Program, AMFER Certificate

Years of experience

Year started in company: 2018

Year started in the industry: 2018

RELEVANT EXPERIENCE – AKRF

85 Jay Street, Brooklyn, NY – NYS Brownfield Redevelopment

Remediation of a former lead smelter is being conducted under the New York State Brownfield Cleanup Program (BCP). AKRF completed a Phase II Subsurface Investigation, Remedial Investigation, and prepared a Remedial Action Work Plan (RAWP) to address subsurface contamination during site redevelopment including in-situ stabilization of lead impacted soil. For this project, Mr. Cardenas served as an on-site environmental monitor who conducted work zone and community air monitoring, and oversaw excavation and export of soil. Additionally, Mr. Cardenas collected confirmatory soil samples at the bottom of excavation and throughout soil stabilization. The project is in the midst of remediation, and Mr. Cardenas assists in overseeing the soil conditioning program, the excavation monitoring (CAMP and CHASP), and the daily reporting obligation to NYSDEC. The project anticipates a 12-month construction period and is projected to achieve a Track 1 cleanup in 2019.

Rego Park Home Depot, Queens, NY

Solvent contamination was encountered during retail development of a former industrial property in Rego Park, Queens, New York. The site work included an extensive investigation and a multi-phase remediation performed under the NYSDEC Voluntary Cleanup Program (VCP). Remediation included removal of aboveground and underground storage tanks (ASTs and USTs) and hotspot soil removal. An Air Sparging/Soil Vapor Extraction (AS/SVE) groundwater remediation system designed by AKRF was installed as part of the building construction. Continued remediation work included upgrading and expanding the AS/SVE system after the store was opened. AKRF continues operations, maintenance, and monitoring under the NYSDEC-approved Site Management Plan. Mr. Cardenas performed low flow sampling as part this process.



ANTONIO CARDENAS

ENVIRONMENTAL SCIENTIST | p. 2

Manhattan West, Manhattan, NY

AKRF is providing environmental consulting services to Brookfield Office Properties in connection with the Manhattan West development site, which encompasses an entire city-block above the Amtrak approach to Penn Station. The four towers that comprise the Manhattan west development site are being remediated as four different sites under the New York City Office of Environmental Remediation (NYCOER), due to an E-Designation for hazardous materials, air quality, and noise attenuation. Mr. Cardenas provided environmental oversight.

34 Berry Street, Brooklyn, NY

AKRF was retained to prepare close-out documentation for this former industrial/warehouse facility in Williamsburg, which was remediated under the NYCOER E-designation and NYSDEC Spills programs. The closure report, which was based on documentation provided by the environmental contractor, was prepared on an expedited basis so that the developer could obtain a Certificate of Occupancy in time for the scheduled opening of the new building. AKRF is currently providing on-going remediation monitoring services to fulfill NYSDEC Spill closure requirements. For this project, Mr. Cardenas performed soil sampling.

Queens Animal Shelter Site, Queens, NY

The Queens Animal Shelter Site is currently an automobile wrecking facility. AKRF is assisting the Client in taking the Site into the BCP to investigate and remediate the property as part of redevelopment into a new state-of-the-art animal shelter and care facility. For this project, Mr. Cardenas performed low flow sampling for laboratory analyses as part of the Remedial Investigation at the Site.

RELEVANT EXPERIENCE – OTHER

Interior Management Inc. (2011-2013)

Before joining AKRF, Mr. Cardenas worked in the maintenance department of Interior Management Inc. He learned how to manage a work site, detect and report leaks, identify building damages, and foster a positive work environment for employees.



STEPHEN SCHMID

ENVIRONMENTAL SCIENTIST

Stephen Schmid is an Environmental Scientist in AKRF's Hazardous Materials Department with five years of experience. He has experience in Phase I and II site assessments, asbestos surveying and monitoring, and construction/remediation. Mr. Schmid is a 2011 graduate from the University of New Hampshire, where he studied marine and freshwater biology, and environmental conservation. Prior to joining AKRF Mr. Schmid conducted fieldwork, water sampling and analysis in addition to assisting in a study of lakes in the North Eastern United States.

BACKGROUND

Education

BS Marine & Freshwater Biology, University of New Hampshire, Durham, NH

Licenses/Certifications

40 Hour OSHA HAZWOPER

10 Hour OSHA Construction Health and Safety

NYS DEC Erosion and Sediment Control Certificate

Asbestos Project Monitor, Air Sampling Technician, Inspector and Investigator

Years of Experience

Year started in company: 2012

Year started in industry: 2011

RELEVANT EXPERIENCE

Willets Point, Queens, NY

AKRF supported the New York City Economic Development Corporation (EDC) with Phase 1 of the Willets Point Redevelopment Plan, which includes the demolition of existing structures. Mr. Schmid performed pre-demolition asbestos-containing materials and universal waste surveys of approximately 70 structures throughout the 23-acre area site in Queens along with an AKRF licensed NYC asbestos investigator.

Adelaar, Monticello, NY

The project is a multi-phase development consisting of approximately 1,700 acres. The project site has been developed with a mixed-use residential-commercial hotel, casino, water park and entertainment village. AKRF provided acquisition and development support, including performing Phase I and II environmental site assessments. Mr. Schmid provided assistance with Phase I assessments, oversight during remedial soil handling activities and conducted inspections in accordance with the Stormwater Pollution and Prevention Plans.

NYCHA Randolph Houses, W 114th Street, Harlem, NY

AKRF was directed to survey 14 five story affordable housing apartment buildings for potential asbestos containing materials prior to the renovation of the buildings. Mr. Schmid along with AKRF licensed NYC asbestos investigators performed the collection of bulk samples throughout the building's main floors, basements and roofs to confirm the presence of asbestos in some of the building materials.



STEPHEN SCHMID

ENVIRONMENTAL SCIENTIST | p. 2

25 Broad Street, Manhattan, NY

AKRF was contracted by LCOR during the demolition of a residential building on a property which will eventually be redeveloped. AKRF was responsible for creating and implementing a community air monitoring program during demolition activities. As the environmental scientist Mr. Schmid was the on-site monitor responsible for calibrating equipment and monitoring levels of volatile organic compounds and particulate matter for the surrounding area and construction personnel. Reports of the daily activity including data collected throughout the day were prepared for submittal to the client.

Kent Avenue, Brooklyn, NY (AKA Northside Piers and 1 North 4th Place)

The project was a multi-phase development consisting of a waterfront block in the Williamsburg Rezoning Area. The project site has been developed with a mixed-use residential-commercial high rise towers with an esplanade and a pier along the East River. AKRF provided acquisition and development support, including performing Phase I and II environmental site assessments, and preparation of Remedial Action Plans (RAPs) and Construction Health and Safety Plan (CHASPs) for approval by DEP and OER. As the environmental scientist Mr. Schmid provided assistance with construction oversight during soil handling activities and managing the Community Air Monitoring Plan (CAMP) activities.

250 North 10th Street, LLC., Residential Redevelopment Site, Brooklyn, NY

AKRF was retained to investigate and remediate this former industrial property in the Williamsburg section of Brooklyn, New York in connection with site redevelopment. The site is approximately 50,000 square feet, and redevelopment included a six story residential building and parking garage. The work was completed to satisfy the requirements of the NYC E-designation Program and NYC Voluntary Cleanup Program (NYC VCP). AKRF completed a Remedial Investigation (RI) to evaluate the nature and extent of site contamination, and developed a Remedial Action Work Plan (RAWP) to properly address site contamination during redevelopment. Remediation included removal of underground storage tanks, more than 7,500 tons of contaminated soil, and installation of a vapor barrier and site cap across the entire property. The remediation was completed under oversight of the NYC Office of Environmental Remediation (OER), and in a manner that has rendered the Site protective of public health and the environment consistent with residential use of the property. As the environmental scientist Mr. Schmid conducted construction oversight and community air monitoring during the removal of contaminated soil.

Pier 40, 353 West Street, New York, NY

AKRF was directed to survey the property for potential asbestos containing materials prior to renovations and upgrades to multiple rooms. As the environmental scientist Mr. Schmid collected bulk samples to test for asbestos along with an AKRF licensed NYC asbestos investigator. Results confirmed the presence of asbestos in some of the rooms and Mr. Schmid subsequently provided project monitoring and the collection of air samples during the abatement.

137-44 94th Avenue, Queens, NY

AKRF was contracted to survey the building for potential asbestos containing materials prior to demolition. As the environmental scientist Mr. Schmid collected bulk samples to test for asbestos along with an AKRF licensed NYC asbestos investigator. Results confirmed the presence of asbestos in an office, trailer and the roof. During abatement Mr. Schmid served as the project monitor and collected daily air samples.

The Home Depot, Rego Park, NY

AKRF has designed, installed and performed upgrades to an air sparging and soil vapor extraction system being used to remediate tetrachloroethene contamination at this site under the NYSDEC Voluntary Cleanup Program. As the environmental scientist Mr. Schmid has performed low flow, indoor air and effluent sampling as part of ongoing monitoring activities to assess the progress of the cleanup.



STEPHEN SCHMID

ENVIRONMENTAL SCIENTIST | p. 3

AP-Williamsburg, LLC, 50 North 5th Street Development, Brooklyn, NY

AKRF directed the remedial program at a 55,000-square foot site located in the Williamsburg section of Brooklyn, New York. The site had an industrial and manufacturing history for over 100 years that included a barrel making factory, use of kilns, and a carpet and flooring materials warehouse. AKRF completed a Remedial Investigation (RI) to evaluate the nature and extent of site contamination, and developed a Remedial Action Work Plan (RAWP) to properly address site contamination during redevelopment. Remediation included removal of more than 5,000 tons of contaminated soil, and installation of a vapor barrier and sub-slab depressurization system (SSDS) beneath the site building. The remediation was completed in a manner that has rendered the Site protective of public health and the environment consistent with commercial and residential use of the property, and in accordance with the requirements of the NYC OER E-designation program. The site includes a seven story residential apartment building with street level retail space and a parking garage. As the environmental scientist Mr. Schmid provided oversight and community air monitoring during construction activities.

Gedney Way Leaf and Yard Waste Composting Facility, White Plains, NY

AKRF directed the remediation and landfill closure project at the existing composting facility. The project included investigation to document disposal history, extent of landfill materials and a solvent plume, preparation of a landfill closure plan, and management of landfill closure and cap construction. The landfill investigation and closure activities were completed to satisfy the requirements of a New York State Department of Environmental Conservation's (NYSDEC) consent order, and were completed in compliance with NYSDEC DER-10 and 6NYCRR Part 360. As the environmental scientist Mr. Schmid performed construction oversight and low-flow groundwater sampling during construction activities.

443 Greenwich Street, New York, NY

AKRF was retained to investigate and remediate this property in the Tribeca section of Manhattan, New York in connection with site redevelopment for a multi-story residential building. AKRF completed a Remedial Investigation (RI) to evaluate the nature and extent of site contamination, and developed a Remedial Action Work Plan (RAWP) to properly address site contamination during redevelopment. Remediation included removal of contaminated soil and installation of a vapor barrier. The remediation was completed under oversight of the NYC Office of Environmental Remediation (OER), and in a manner that has rendered the Site protective of public health and the environment consistent with residential use of the property. As the environmental scientist Mr. Schmid conducted construction oversight and community air monitoring during the removal of contaminated soil.

606 W 57th Street, New York, NY

AKRF was retained to investigate and remediate this property in Manhattan, New York in connection with site redevelopment for a multi-story residential structure. The work is being completed to satisfy the requirements of the NYC E-designation Program. AKRF completed a Remedial Investigation (RI) to evaluate the nature and extent of site contamination, and developed a Remedial Action Work Plan (RAWP) to properly address site contamination during redevelopment. Remediation includes removal of underground storage tanks and contaminated soil. The remediation is being completed under oversight of the NYC Office of Environmental Remediation (OER), and in a manner that has rendered the Site protective of public health and the environment consistent with residential use of the property. As the environmental scientist Mr. Schmid conducted construction oversight and community air monitoring during the removal of contaminated soil.

NYCEDC Office of Environmental Remediation (OER) On-Call Environmental Consulting Services

Second Farms, Bronx, NY

AKRF, Inc. was contracted by OER to conduct a subsurface investigation of a 1.12-acre parcel in the Bronx, New York under the United States Environmental Protection Agency (USEPA) Brownfield Assessment Grant program.



STEPHEN SCHMID

ENVIRONMENTAL SCIENTIST | p. 4

As the environmental scientist Mr. Schmid assisted in the investigation which included a geophysical survey and utility mark-outs, and the collection and analysis of soil, groundwater, soil vapor, indoor air and ambient air samples.

Former Nelson Foundry, Long Island City, NY

AKRF, Inc. was contracted by OER to conduct a subsurface investigation around the perimeter of a former foundry property in Long Island City, New York under the USEPA Brownfield Assessment Grant program. The work included preparation of a rigorous investigation work plan, Quality Assurance Project Plan, and Health and Safety Plan. The investigation will include a geophysical survey and utility mark-outs and the collection and analysis of soil, groundwater, soil vapor, and ambient air samples. The project also requires careful coordination of investigation-derived waste due to lack of on-site storage and daily drum pick-ups. As the environmental scientist Mr. Schmid conducted low flow sampling for the analysis of groundwater.

APPENDIX I
GROUNDWATER AND SOIL VAPOR SAMPLING LOGS



Well Sampling Log

Job No: 190275					Client: MD45 Developers LLC			Well No:	
Project Location: 22-60 46th Street, Queens, NY 11105					Sampled By:				
Date:					Sampling Time:				
LEL at surface:									
PID at surface:									
Total Depth: ft. below top of casing					Water Column (WC): feet			*= 0.163 * WC for 2" wells	
Depth to Water: ft. below top of casing					Well Volume*: gallons			*= 0.653 * WC for 4" wells	
Depth to Product: ft. below top of casing					Volume Purged: gallons			*= 1.469 * WC for 6" wells	
Depth to top of screen: ft. below top of casing					Well Diam.: 2 inches			Target maximum flow rate is 100 ml/min	
Depth to bottom of screen: ft. below top of casing					Purging Device (pump type):				
Approx. Pump Intake: ft. below top of casing									
Time	Depth to Water (Ft.)	Purge Rate (ml/min)	Temp (°C)	Conductivity (mS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Comments (problems, odor, sheen)
Sampling									
Stabilization Criteria:				+/- 3 mS/cm	+/- 0.3 mg/L	+/- 0.1 pH units	+/- 10 mV	<50 NTU	If water quality parameters do not stabilize and/or turbidity is greater than 50 NTU within two hours, discontinue purging and collect sample.



Soil Vapor Sample Log

AKRF Project No:	190275	Point Installed By:	
Project Location:	22-60 46th Street Queens, NY	Installation Method:	
Client:	MD45 Developers LLC	Sampled By:	
Date:		Weather:	
Sample Setup			
Vapor Point Depth:		Inches	Total Time of Purge: minutes
Purging Pump:			Purge Volume: Liters
Pump Flow Rate*:		L/min	Purged Vapor PID: ppb
			Helium Concentration: %
Sample Identification			
Soil Vapor Point ID:		SUMMA® Canister ID:	
Flow Controller ID:		Soil Vapor Sample ID:	
Sample Collection			
Time	Vacuum (in/Hg)	Background PID	Notes
Time Started:			
Time Halfway:			
Time Stopped:			
Notes:	*Purge flow rate not to exceed 0.2 L/min.		
	ND = non-detect ppm = parts per million L/min = Liters per minute		
	Soil vapor sample collected in a -L SUMMA® canister using a -hour flow controller.		

APPENDIX J
SSDS COMPONENT MANUALS



Submittal Documentation

For:
AWT ENVIRONMENTAL
PO BOX 128
SAYREVILLE, NJ 08871

Quote # 220210JG.1
PO: 18261-SGT

Equipment Description:
Gasho Custom Centrifugal Fan SSDS Package consisting of:
Howden Fan Model AF-12B13031-7, 1.5 HP TEFC Direct
Coupled Motor, 6" Inlet and Outlat Flanged Conections,
Discharge Damper, 6" Butterfly Valve – Gear Operator,
Gauges, Connectors, 6" Inline Filter, Nema 3R VFD Control
Panel – UL Stamped

REV A, 11/8/22

Supplier:
Gasho, Inc.
460 West Gay Street
West Chester, PA 19380


JG22H-3597
August 29, 2022



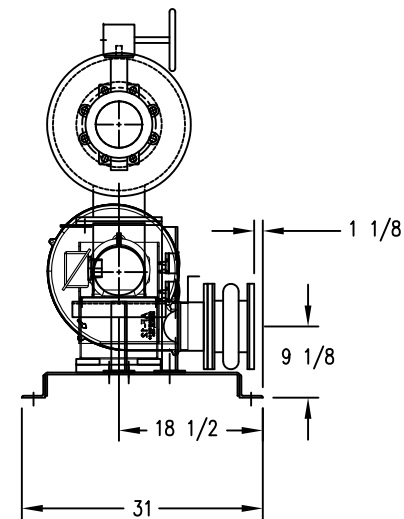
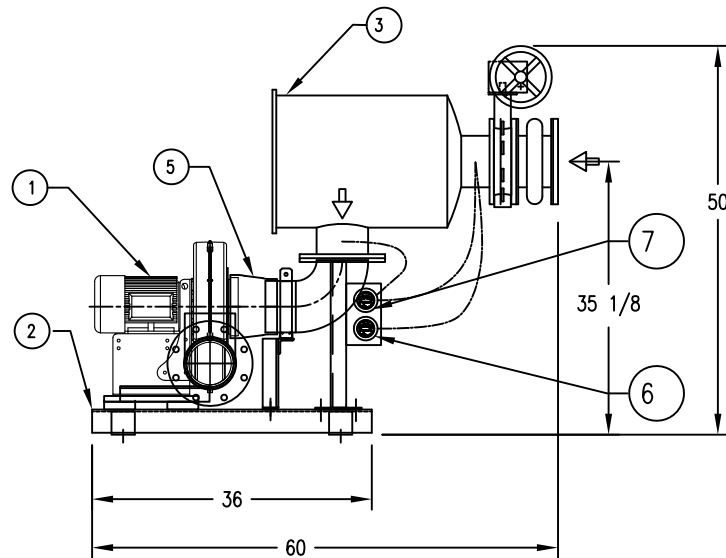
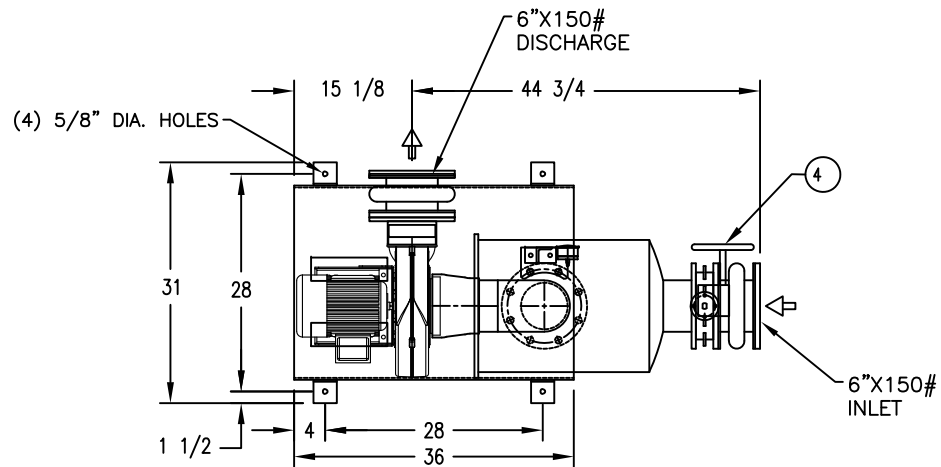
Gasho, Inc.
Blower Package
JG22H-3597
 500 CFM, 7" H2O VACUUM

Description	Date	Revision
#220210JG.1 AWT		
500 cfm at 7" H2O vacuum		

Item	Qty.	Supplier	Component	Description	Supplier Part Number	Gasho Part Number	Misc ID	Weight
1	1	Howden	Fan	1.5 hp TEFC VFD 230/460/3/60	AF-12-B13031-7	H3AF12-B13031-7		60
					7" Inlet 6" Flanged Outlet	Discharge damper		
2	1	Gasho	Base	Base Weldment	B52	Z4BW-20.00-0000		110
3	1	Solberg	Inline Filter	6" Inline filter with polyester element	CSL-275P-600F	Z2FIL-SL2-6.0-F-1050		110
4	1	Value Valve	Butterfly Valve	6" Butterfly valve, Gear	6VF913-221-3	Z2VBF-6.00-W-IEG-0100		12
5	1	Pipeline Plastics	Flex Connector	7.38 x 6.38 x 6" lg Flex Coupler	1001-65	Z2PIP-1001-65		2
6	1	Dwyer	Vacuum Gauge	Minihelic Vacuum Gauge	'2-5020	Z2GD-2.1-0-020WC-1004	20"WC	1
7	1	Dwyer	Gauge/Switch	Mini Photohelic gauge/switch	MP-020	Z2DWY-MP-020	0-20" H2O	1
								296
900	1	ICP	Control Panel	Nema 4 control panel	Custom	with VFD 230/3/60, dead face, 1 1/2 hp	Q201222-SG-2	

	ASTORIA 46 22-60 46TH STR, ASTORIA, NY 22-61 45TH STR, ASTORIA, NY	
	<h3>SUBMITTAL REVIEW</h3>	
CONTRACTOR: MEGA CONTRACTING GROUP		
SPECIFICATION SECTION: <u>312113</u>		
SUBMITTAL NUMBER: <u>7</u> REVISION: <u>2</u>		
SUBSTITUTIONS: NO YES - SUBSTITUTION REQUEST <u>N/A</u>		
CHANGES, NOTES FLAGGED: YES <u>N/A</u>		
RECOMMEND FOR APPROVAL: <u>YES</u> FOR RECORD		
REVIEWED BY: <u>AK</u> DATE: <u>11/14/22</u>		
<small>THIS SUBMITTAL HAS BEEN REVIEWED FOR GENERAL COMPLIANCE WITH THE CONTRACT DOCUMENTS TO THE BEST OF OUR KNOWLEDGE FOR ARCHITECT APPROVAL. IN NO CASE IS THE SUBCONTRACTOR OR SUPPLIER RELIEVED OF FULL RESPONSIBILITY FOR ADHERANCE TO THE CONTRACT DOCUMENTS AND ALL NOTATIONS PROVIDED ON SUBMITTALS. ALL FIELD VERIFICATIONS AND DIMENSIONS ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR ASSOCIATED WITH THIS SUBMISSION. IT IS THE RESPONSIBILITY OF THE ARCHITECT TO CONFIRM ALL DESIGN PARTIES REQUIRED, HAVE REVIEWED AND APPLIED THEIR STAMPS ACCORDINGLY, TO PRODUCE A FULLY REVIEWED SUBMITTAL. MEGA CONTRACTING GROUP CONSIDERS SUBMITTALS RETURNED WITH THE ARCHITECTS STAMP OF APPROVAL ARE FINAL, AND UNDERSTANDS THE REVIEW PERIOD TO BE 10 WORKING DAYS FROM THE DATE OF SUBMISSION. SUBMITTALS WHICH ARE NOT RETURNED WITHIN THIS TIMEFRAME ARE SUBJECT TO POTENTIAL TIME EXTENSION. ANY NOTATIONS MADE BY ANY DESIGN PARTY WHICH INCREASE THE CONTRACTUALLY AGREED UPON SCOPE OF WORK WILL BE IDENTIFIED BY THE PRIME CONTRACTOR WHO WILL ADVISE THE DESIGN AND OWNERSHIP ENTITIES OF ANY COST OR SCHEDULE CHANGES.</small>		

AKRF, Inc. 440 Park Avenue South, New York, NY 10018
<input checked="" type="checkbox"/> CONFORMS. <input type="checkbox"/> CONFORMS AS NOTED. <input type="checkbox"/> REVISE AS NOTED AND RESUBMIT. <input type="checkbox"/> REJECTED, RESUBMIT. <input type="checkbox"/> REVIEW NOT REQUIRED. BY <u>ERIC PARK</u> DATE <u>11/22/2022</u>
THIS DOCUMENT HAS BEEN REVIEWED FOR GENERAL CONFORMANCE WITH THE DESIGN CONCEPT ONLY.
<p>This review does not relieve the contractor or any subcontractor of responsibility for full compliance with contract requirements; for correctness of dimensions, clearances, and material quantities; for proper design of details; for proper fabrication and construction techniques; for proper coordination with other trades; and for providing all devices required for safe and satisfactory construction and operation.</p>

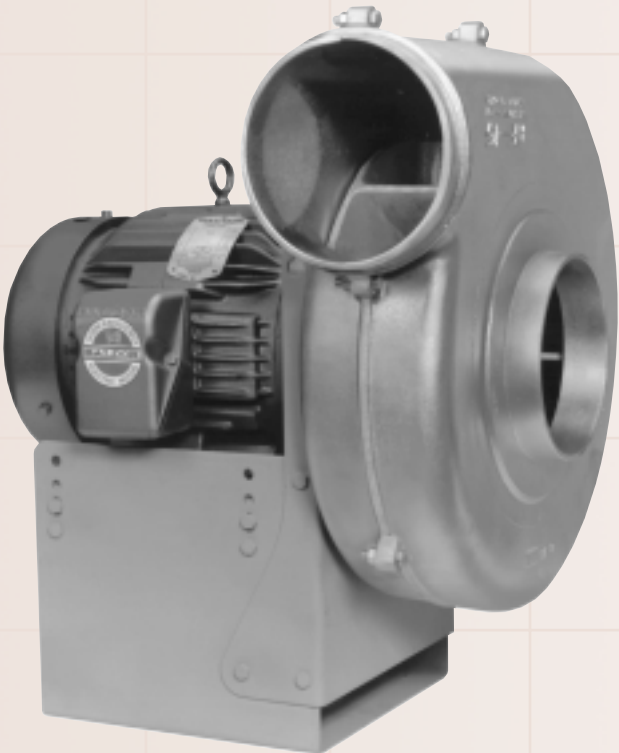


NOTES:

1. CUSTOMER PIPING TO BE INDEPENDENTLY SUPPORTED. PACKAGE PIPE SUPPORTS PROVIDED BUT NOT SHOWN.
2. PACKAGE IS TO BE MOUNTED SECURELY TO A LEVEL CONCRETE PAD
3. TOLERANCE $\pm 1/2"$
4. DIM ARE CRITICAL DIMENSIONS

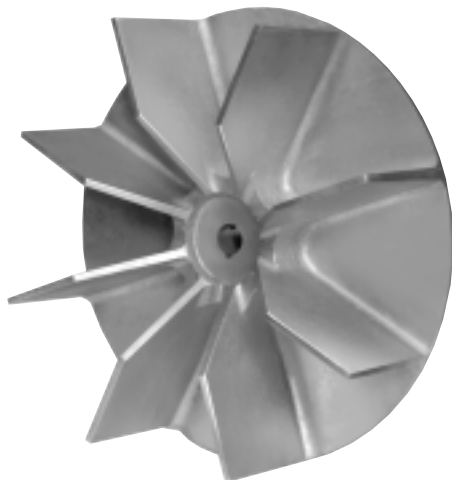
			DRAWN BY: JJH	DATE 8/26/22	J.E.GASHO & Assoc., Inc. 460 W. GAY ST. WEST CHESTER, PENNSYLVANIA 19380	
			APPROVED BY:	DATE		
			DIMENSIONS IN INCHES			
			SCALE NA		SUB-SLAB SYSTEM AF12 1.5HP TEFC SKID MOUNT	
			TOLERANCE ±1/2"	ANGULAR TOLERANCE		
			MATERIAL	WEIGHT 400		
			SHEET 1 OF 1		JG22-H-3597	
REV.	DATE	DESCRIPTION				

JG22-H-3597



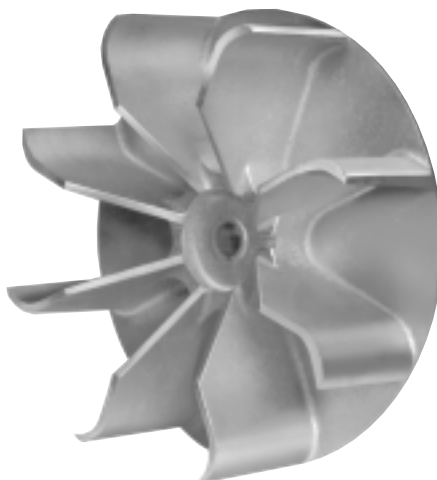
AF CAST ALUMINUM PRESSURE BLOWERS

WHEEL TYPES



Radial Wheel (Code R)

Cast aluminum radial open design for air and light material applications. Also available in welded steel construction.



Backward Curve Wheel (Code B)

Cast aluminum backward curve blade tip design for clean air applications where lower noise level is a consideration.



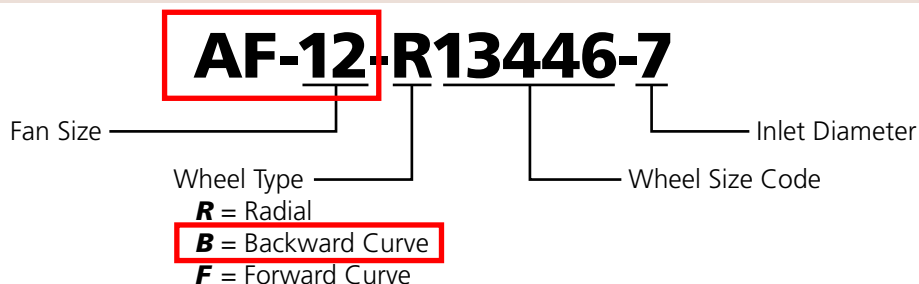
Forward Curve Wheel (Code F)

Fabricated aluminum forward curve with cast iron hub design for clean air applications. Has highest performance at a given speed making it ideal for 50 Hz applications where space is a problem.

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FAN CODES



TESTING

All fan/wheel/inlet combinations shown in this catalog have each been thoroughly air and sound performance tested at the American Fan Company Test Laboratory.

Air testing was performed per AMCA 210-85 figure 7, installation type B (free inlet, ducted outlet). Sound testing was performed per AMCA 300-85, installation type B. Fans in this catalog **are not** licensed to bear the AMCA certified ratings seal.

MOTOR SPEEDS

USED FOR DIRECT DRIVE SELECTIONS

BHP Range	60 Hz RPM	50 Hz RPM
up to 2.00	3450	2875
2.01-5.00	3500	2875
5.01 & higher	3515	2900

FEATURES

Model AF features a rugged, lightweight and rustproof cast aluminum housing making it ideal for demanding industrial applications. Model AF is available in direct or belt drive with a variety of accessories to meet your requirements.

Capacity selections are available up to 4000 CFM and pressure selections up to 20" SP w.g.

- Split housing for maintenance ease
- Even O.D. pipe sizes on inlet and outlet
- Non-sparking cast aluminum housing
- Assortment of wheel sizes to pin-point your performance requirement
- Reliability
- Wheel both statically and dynamically balanced
- Rustproof
- Low initial cost
- Available in arrangements 1,2,4,8 and 9

APPLICATIONS

- Rubber processing
- Food processing
- Chemical processing
- Fume control
- Dust control
- Combustion air for incinerators, ovens, furnaces, kilns and dryers
- Paper and printing machinery
- Cooling electronic equipment, motors, generators and transformers
- Textile machinery
- Light materials conveying
- Woodworking machinery
- Forced drying

OPTIONS

- Inlet flange
- Outlet flange
- Housing drain
- Cast Iron housing
- Fabricated steel wheel
- Shaft seal
- Sound attenuator
- Inlet filter
- Corrosive resistant coatings
- Inlet and/or outlet guard
- Fabricated stainless wheel and housing
- Full or half cut-off
- Heat slinger
- Drive guard system

Inlet Venturi

(shown with inlet guard)

Spun steel venturi provides efficient smooth airflow into fan inlet on non inlet-ducted applications.



Inlet Guard

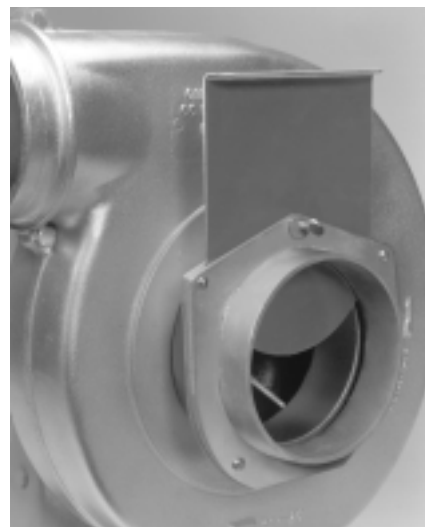
(shown welded to inlet venturi)

1" square wire cloth is welded to large end of inlet venturi providing OSHA type guarding with minimal airflow restriction.



Inlet Filter

Oil wetted, crimped steel wire mesh media provides 94% filtration efficiency of particulate of 10 micron or larger. Filters are cleanable and reusable.



Full Cut-off Damper

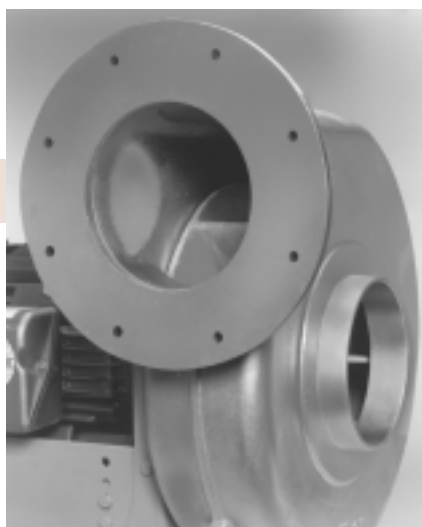
(shown mounted to fan inlet)

Cast aluminum housing with steel gate allows manual adjustment of CFM. Thumbscrew locks gate in place. Can be mounted on inlet or outlet.

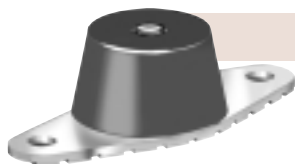
Flanges

(outlet flange shown)

Cast aluminum flange matches ANSI flange bolt patterns. Available with either ANSI mounting hole diameters or 7/16" diameter (standard).



Vibration Isolators



Neoprene isolators with molded-in steel mounting plate and threaded top mounting hole. Provides 1/4" static deflection.

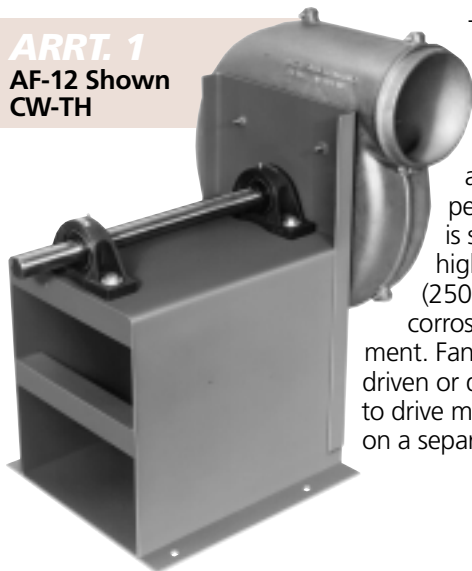
Half Cut-off Dampers



Similar to full cut-offs except half cut-offs are saddle mounted to ductwork on inlet or outlet.

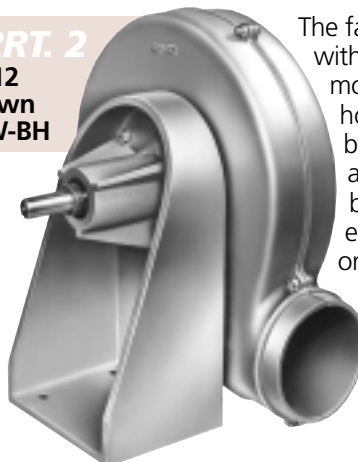
ARRANGEMENTS

ARRT. 1
AF-12 Shown
CW-TH



The fan wheel is overhung with both bearings mounted on a common pedestal. ARRT. 1 is suitable for high temperature (250°F max.) and/or corrosive environment. Fan can be belt driven or directly coupled to drive motor mounted on a separate base.

ARRT. 2
AF-12
Shown
CCW-BH

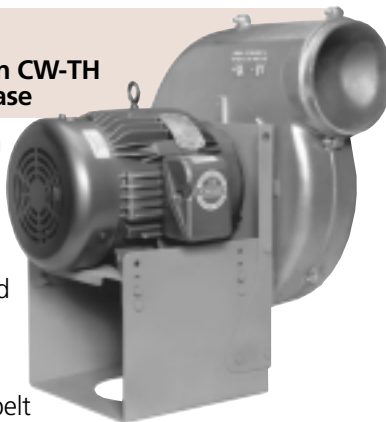


The fan wheel is overhung with both bearings mounted in a cast iron housing supported by the fan housing and a cast aluminum base. Unit can be either belt driven or direct coupled to an independently supported motor.

ARRT. 4
AF-9 Shown CW-TH
with cast
alum.
base

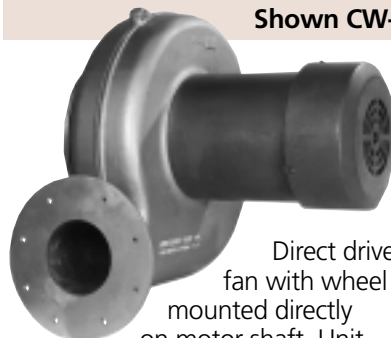


ARRT. 4
AF-15 Shown CW-TH
with steel base



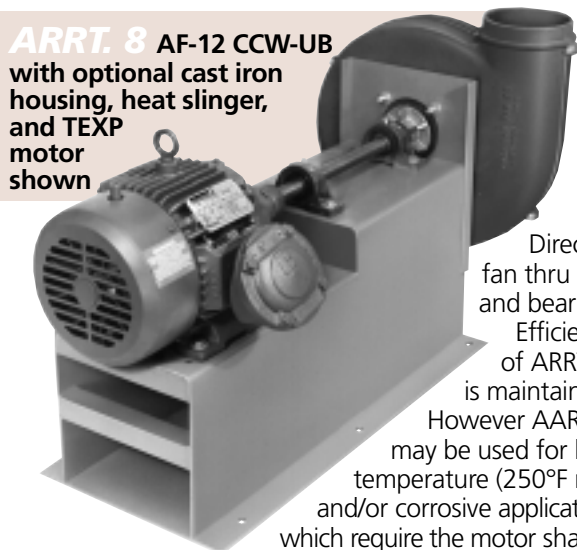
Direct drive fan with wheel mounted directly on motor shaft. Unit is designed for standard temperature applications only. With no belt losses, the direct drive fan operates at a higher efficiency.

ARRT. 4 **FLANGE MOUNT AF-9**
Shown CW-FM



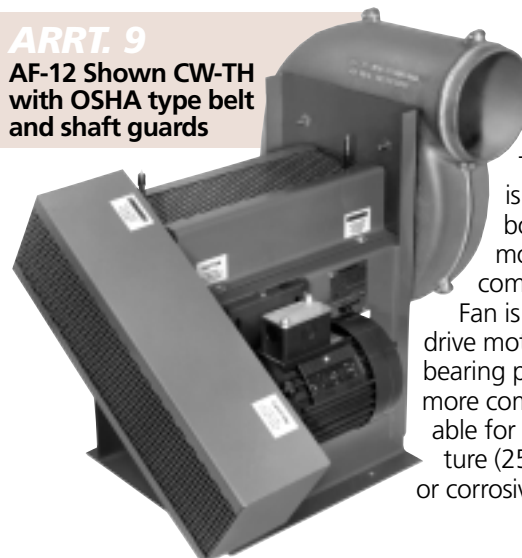
Direct drive fan with wheel mounted directly on motor shaft. Unit is designed to be supported by the outlet flange.

ARRT. 8 **AF-12 CCW-UB**
with optional cast iron
housing, heat slinger,
and TEXP
motor
shown



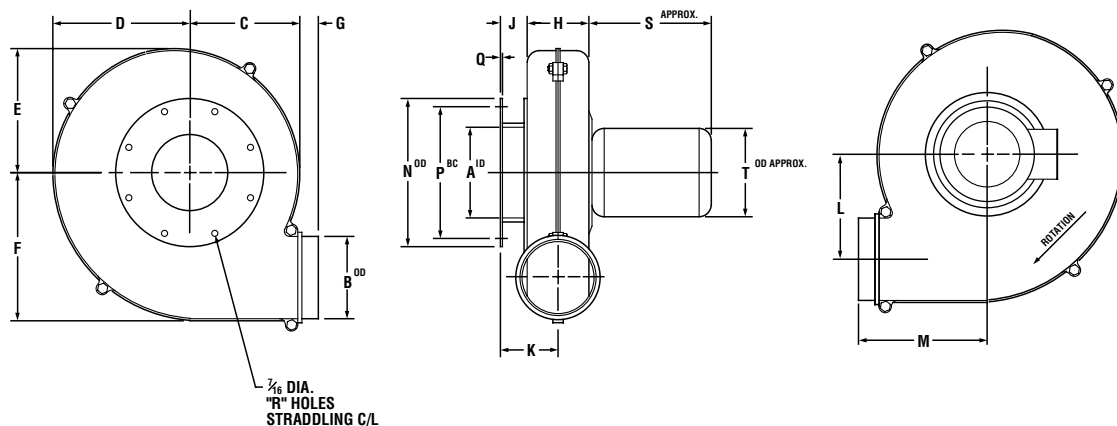
Direct drive fan thru shaft and bearings. Efficiency of ARRT. 4 is maintained. However AART. 8 may be used for high temperature (250°F max.) and/or corrosive applications which require the motor shaft to be outside of airstream.

ARRT. 9
AF-12 Shown CW-TH
with OSHA type belt
and shaft guards



The fan wheel is overhung with both bearings mounted on a common pedestal. Fan is driven with drive motor mounted on bearing pedestal for a more compact unit suitable for high temperature (250°F max.) and/or corrosive environment.

ARR'T 4 INLET FLANGE MOUNT



ALL DIMENSIONS SHOWN IN INCHES

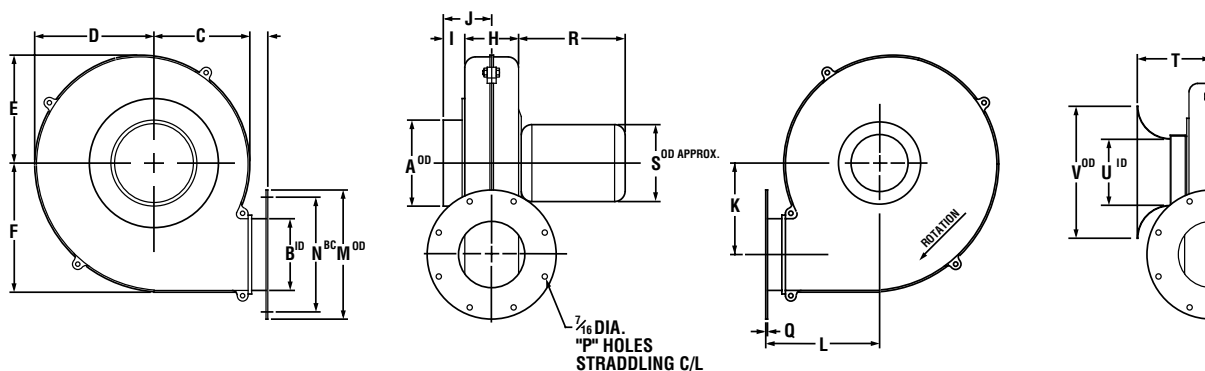
FAN SIZE	MOTOR FRAME SIZE	INLET DIA. A	OUTLET DIA. B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	NET WTS. NO MOTOR LBS.
AF-8	56-C, 143-TC, 145-TC	2 ⁹ / ₁₆ 3 ⁹ / ₁₆	4	4 ¹⁵ / ₁₆	5 ³ / ₁₆	5 ³ / ₃₂	6 ¹ / ₁₆	1 ¹ / ₁₆	3 ¹ / ₂	1 ³ / ₁₆	3 ¹ / ₁₆	4 ⁹ / ₁₆	6 ⁵ / ₁₆	7 ¹ / ₂ 9	6 7 ¹ / ₂	1 8	4 8	14
AF-9	56-C, 143-TC, 145-TC	3 ³ / ₁₆ 4 ⁹ / ₁₆	4	6	7 ¹ / ₄	6 ⁷ / ₃₂	7 ¹ / ₄	1 ¹ / ₁₆	3 ³ / ₄	1 ¹ / ₁₆	3 ⁵ / ₁₆	5 ⁵ / ₁₆	7 ⁹ / ₁₆	9 10	7 ¹ / ₂ 8 ¹ / ₂	1 8	8	20
AF-10	56-C, 143-TC, 145-TC	5 ¹ / ₂	5	6 ¹ / ₁₆	8 ³ / ₁₆	7 ¹ / ₃₂	9	1 ¹ / ₁₆	3 ³ / ₄	1 ¹ / ₁₆	3 ¹ / ₁₆	6 ³ / ₁₆	7 ³ / ₁₆	11	9 ¹ / ₂	1 8	8	35
AF-12	56-C, 143-TC, 145-TC 182-TC, 184-TC	6 ¹ / ₄	6	7 ¹ / ₄	9 ¹ / ₄	8 ¹ / ₂	10 ¹ / ₁₆	1 ¹ / ₁₆	4 ¹ / ₄	1 ¹ / ₁₆	3 ⁵ / ₁₆	7 ⁵ / ₁₆	8 ⁵ / ₁₆	11	9 ¹ / ₂	5 8	8	40
AF-15	143-TC, 145-TC, 182-TC, 184-TC, 213-TC, 215-TC	6 ¹ / ₄ 7 ¹ / ₂ 9 ¹ / ₁₆	8	9 ¹ / ₁₆	11	10	12	1 ¹ / ₁₆	5 ¹ / ₁₆	2	4 ⁵ / ₁₆	7 ⁵ / ₁₆	10 ⁵ / ₁₆	11 13 ¹ / ₂ 16	9 ¹ / ₂ 11 ¹ / ₄ 14 ¹ / ₄	1 1 12	8 8 12	56

MOTORS			
FRAME SIZE	WT. LBS.	S	T
56-C	25	11 ¹ / ₂	6 ¹ / ₄
143-TC	33	11 ¹ / ₂	7
145-TC	45	11 ¹ / ₂	7
182-TC	60	14 ¹ / ₂	9
184-TC	70	14 ¹ / ₂	9
213-TC	120	16	10 ¹ / ₂
215-TC	140	16	10 ¹ / ₂

NOTES:

- For optional outlet flange, see drawing AFA11421F
- Inlet flange is welded to inlet side housing
- Housing, flange, and wheel are constructed of cast aluminum

ARR'T 4 OUTLET FLANGE MOUNT



ALL DIMENSIONS SHOWN IN INCHES

FAN SIZE	MOTOR FRAME SIZE	INLET DIA. A	OUTLET DIA. B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	NET WTS. NO MOTOR LBS.
AF-8	56-C, 143-TC, 145-TC	3 4	3 ³ / ₁₆	4 ¹⁵ / ₁₆	5 ³ / ₁₆	5 ³ / ₃₂	6 ¹ / ₁₆	1 ¹ / ₁₆	3 ¹ / ₂	1 ³ / ₁₆	2 ¹ / ₁₆	4 ⁹ / ₁₆	6 ⁵ / ₁₆	9	7 ¹ / ₂	8	1 8	14
AF-9	56-C, 143-TC, 145-TC	4 5	3 ³ / ₁₆	6	7 ¹ / ₄	6 ⁷ / ₃₂	7 ¹ / ₄	1 ¹ / ₁₆	3 ³ / ₄	1 ¹ / ₁₆	3 ⁵ / ₁₆	5 ⁵ / ₁₆	7 ⁹ / ₁₆	9	7 ¹ / ₂	8	1 8	20
AF-10	56-C, 143-TC, 145-TC	6	4 ⁹ / ₁₆	6 ¹ / ₁₆	8 ³ / ₁₆	7 ¹ / ₃₂	9	1 ¹ / ₁₆	3 ³ / ₄	1 ¹ / ₁₆	3 ¹ / ₁₆	6 ³ / ₁₆	8 ¹ / ₁₆	10	8 ¹ / ₂	8	5 8	35
AF-12	56-C, 143-TC, 145-TC 182-TC, 184-TC	7	5 ¹ / ₂	7 ¹ / ₄	9 ¹ / ₄	8 ¹ / ₂	10 ¹ / ₁₆	1 ¹ / ₁₆	4 ¹ / ₄	1 ¹ / ₁₆	3 ⁵ / ₁₆	7 ⁵ / ₁₆	9 ⁵ / ₁₆	11	9 ¹ / ₂	8	5 8	40
AF-15	143-TC, 145-TC, 182-TC, 213-TC, 215-TC	7 8 10	7 ¹ / ₂	9 ¹ / ₁₆	11	10	12	2 ¹ / ₁₆	5 ¹ / ₁₆	1 ¹ / ₂	4 ⁵ / ₁₆	7 ⁵ / ₁₆	11 ⁵ / ₁₆	13 ¹ / ₂	11 ¹ / ₄	8	5 1 12	56

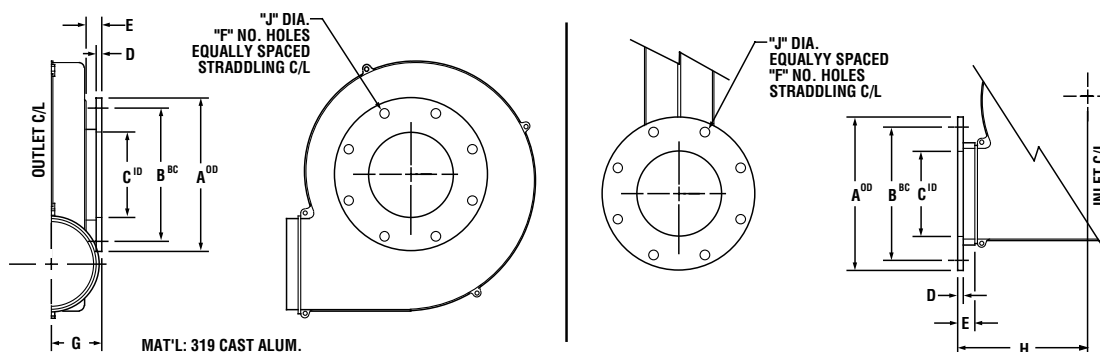
MOTORS			
FRAME SIZE	WT. LBS.	S	T
56-C	25	11 ¹ / ₂	6 ¹ / ₄
143-TC	33	11 ¹ / ₂	7
145-TC	45	11 ¹ / ₂	7
182-TC	60	14 ¹ / ₂	9
184-TC	70	14 ¹ / ₂	9
213-TC	120	16	10 ¹ / ₂
215-TC	140	16	10 ¹ / ₂

FAN SIZE	INLET DIA.	INLET BELL		
		T	U	V
AF-8	3	4 ¹ / ₄	2 ³ / ₄	5 ¹ / ₄
AF-8	4	4 ³ / ₄	3 ³ / ₄	7 ¹ / ₄
AF-9	4	4 ¹⁵ / ₁₆	4 ³ / ₄	9 ¹ / ₄
AF-9	5	5 ¹⁵ / ₁₆	4 ³ / ₄	11
AF-10	6	6 ³ / ₁₆	5 ¹ / ₂	11
AF-12	7	6 ⁵ / ₁₆	6 ¹ / ₂	13
AF-15	7	7 ³ / ₄	7 ¹ / ₂	15
AF-15	8	8 ¹ / ₄	7 ¹ / ₂	15
AF-15	10	9 ¹ / ₄	9 ¹ / ₂	19

NOTES:

- For optional inlet flange, see drawing AFA11421F
- Inlet flange is welded to motor side housing and bolted to inlet side housing
- Housing, flange, and wheel are constructed of cast aluminum

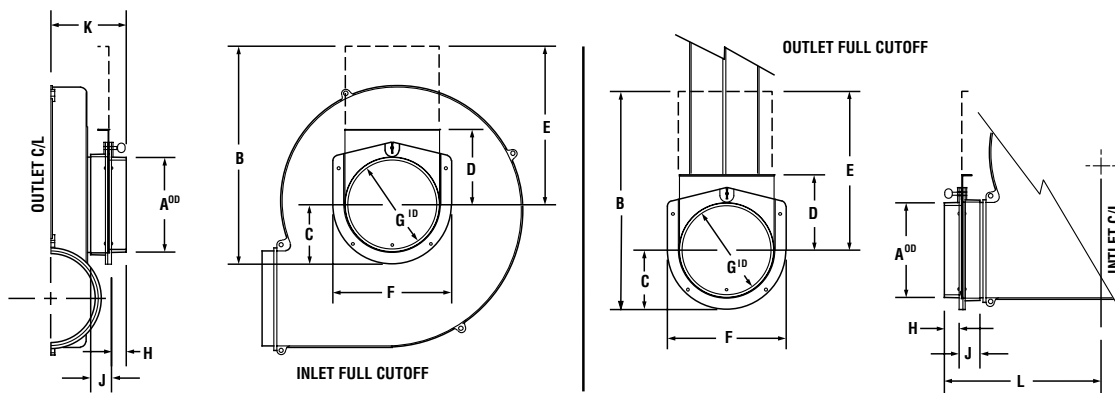
FLANGES



FAN SIZE	INLET	OUTLET	A	B	C	D	E	F	G	H	MATCHES 125/150 lb. ANSI FLANGE BOLT PATTERN		MATCHES 125/150 lb. ANSI FLANGE BOLT PATTERN EXCEPT HOLE DIA. = 7/16 (AFC STANDARD)	
											J	PART NUMBER	J	PART NUMBER
AF-8	3	X	7½	6	2⅞	¼	1¼	4	3⅞	—	¾	24149F	7/16	24149F-7/16
	4	4	9	7½	3⅞	¼	1¼	8	3⅞	6⅞	¾	24101F	7/16	24101F-7/16
AF-9	4	4	9	7½	3⅞	¼	1¼	8	3⅞	7⅞	¾	24101F	7/16	24101F-7/16
	5	X	10	8½	4⅞	¼	1¼	8	3⅞	—	¾	24103F	7/16	24103F-7/16
AF-10	X	5	10	8½	4⅞	¼	1¼	8	—	8⅞	¾	24103F	7/16	24103F-7/16
	6	X	11	9½	5½	⅞	1¼	8	3⅞	—	7/8	24106F	7/16	24106F-7/16
AF-12	X	6	11	9½	5½	⅞	1¼	8	—	9⅞	7/8	24106F	7/16	24106F-7/16
	7*	X	11	9½	6¼	⅞	1¼	8	3⅞	—	7/8	24129F	7/16	24129F-7/16
AF-15	7*	X	11	9½	6¼	⅞	1¼	8	4⅞	—	7/8	24129F	7/16	24129F-7/16
	8	8	13½	11¼	7½	½	1½	8	4⅞	11⅞	7/8	24044F	7/16	24044F-7/16
	10	X	16	14¼	9⅞	½	1½	12	4⅞	—	1	24130F	7/16	24130F-7/16

*O.D. and B.C. match 6" ANSI flange

FULL CUT-OFF DAMPERS

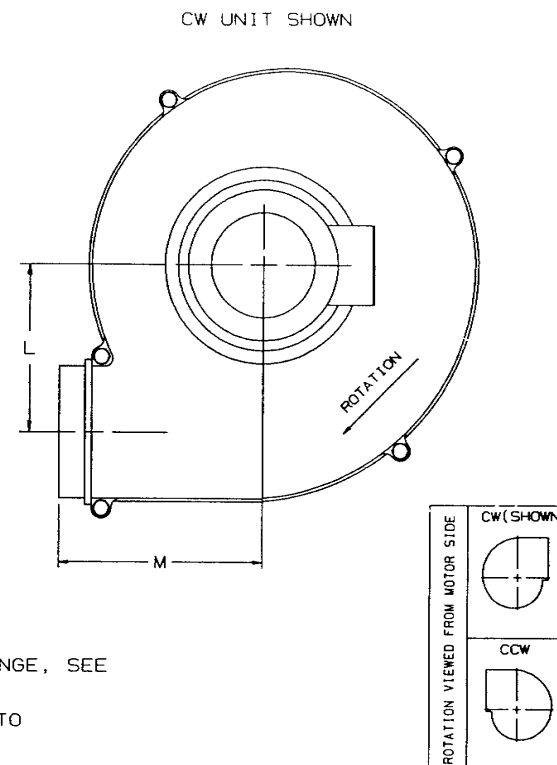
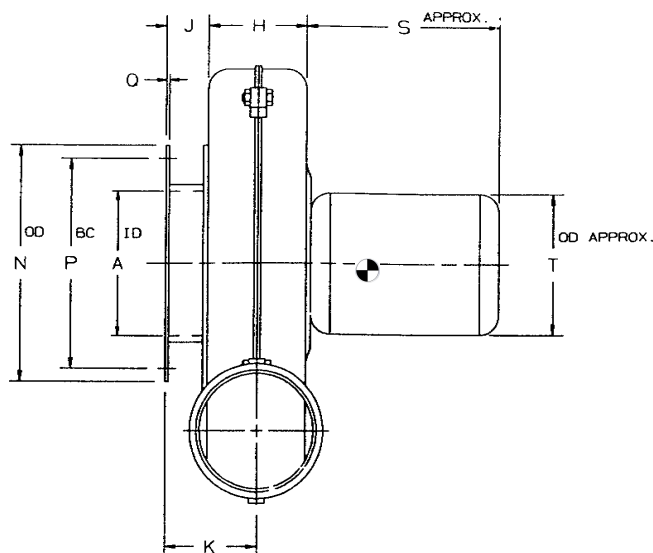
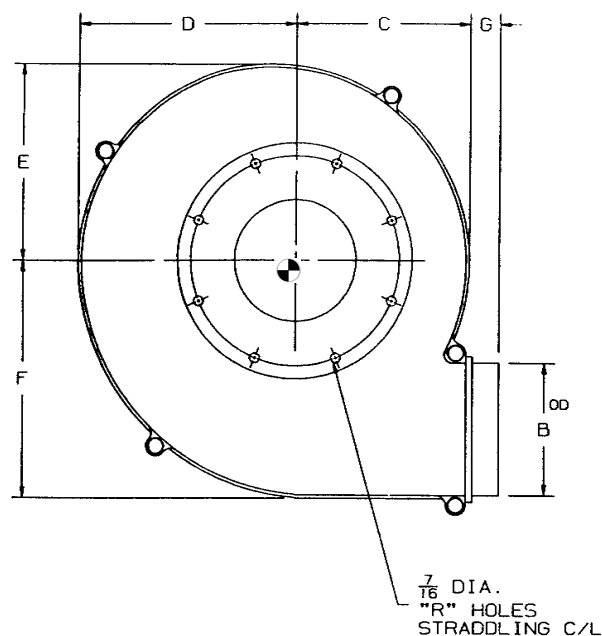


INLET	OUTLET	SIZE	PART NO.	A	B	C	D	E	F	G	H	J	K	L
AF-8	—	3"	63649	2⅞	7⅞	2⅞	3	5⅞	4	2½	1¼	1⅞	5½	8½
AF-8	AF-8	4"	63650	3⅞	9⅞	2¾	3¾	7⅞	5	3½	1¼	1⅞	5½	8½
AF-9	AF-9	5"	63651	4⅞	12⅞	3⅞	4⅞	9	6¾	4½	1¼	1⅞	5⅞	9⅞
AF-10	AF-10	6"	63652	5⅞	13⅞	3¾	4¾	9⅞	7½	5½	1¼	1⅞	5⅞	10⅞
AF-12	—	7"	63653	6⅞	15⅞	4¼	5¼	11⅞	8½	6½	1¼	1⅞	5⅞	10⅞
AF-15	—	8"	63654	7⅞	18⅞	5	6⅞	13⅞	10	7½	1¼	1⅞	6⅞	12⅞
AF-15	AF-15	10"	63655	9⅞	22⅞	6	7⅞	16⅞	12	9½	1¾	1⅞	6⅞	12⅞

AMERICAN FAN COMPANY®

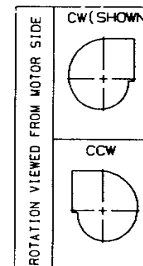
WOODS
U.S.A. DIVISION

2933 Symmes Road, Fairfield, Ohio 45214
Ph. 513-874-2400 Fax 513-870-5577
www.amfan-woods.com



NOTES:

- ① FOR OPTIONAL OUTLET FLANGE, SEE DRAWING AF11421F
 - ② INLET FLANGE IS WELDED TO INLET SIDE HOUSING
 - ③ HOUSING, FLANGE, AND WHEEL ARE CONSTRUCTED OF CAST ALUMINUM
- - CENTER OF MASS



FAN SIZE	MOTOR FRAME SIZE	INLET DIA.	OUTLET DIA.	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	NET WTS. LESS MOTOR LBS.
AF-8	56-C, 143-TC, 145-TC	2 9/16 3 9/16	4	4 15/16	5 13/16	5 3/32	6 11/16	1 3/8	3 1/2	1 3/8	3 1/8	4 9/16	6 5/16	7 1/2	6	9	7 1/2	1/4	4	14
AF-9	56-C, 143-TC, 145-TC	3 9/16 4 9/16	4	6	7 1/4	6 17/32	7 3/4	1 3/16	3 3/4	1 7/16	3 5/16	5 5/8	7 3/16	9	7 1/2	10	8 1/2	1/4	8	20
AF-10	56-C, 143-TC, 145-TC	5 1/2	5	6 11/16	8 5/16	7 15/32	9	1 1/8	3 3/4	1 13/16	3 11/16	6 3/8	7 13/16	11	9 1/2	11	9 1/2	1/4	8	35
AF-12	56-C, 143-TC, 145-TC, 182-TC, 184-TC	6 1/4	6	7 3/4	9 1/4	8 1/2	10 7/16	1 1/8	4 1/4	1 3/16	3 15/16	7 5/16	8 7/8	11	9 1/2	11	9 1/2	5/16	8	40
AF-15	143-TC, 145-TC, 182-TC, 184-TC, 213-TC, 215-TC	6 1/4 7 1/2 9 11/16	8	9 3/8	11	10	12	1 9/16	5 7/8	2	4 15/16	7 7/8	10 15/16	11	9 1/2	13 1/2	11 3/4	1/2	8	56

MOTORS			
FRAME SIZE	WT. LBS.	S	T
56-C	25	11 1/2	6 1/4
143-TC	33	11 1/2	7
145-TC	45	11 1/2	7
182-TC	60	14 1/2	9
184-TC	70	14 1/2	9
213-TC	120	16	10 1/2
215-TC	140	16	10 1/2

Howden American Fan Company
2933 SYMMES ROAD
FAIRFIELD, OHIO 45014
PHONE: (513) 874-2400
FAX: (513) 870-8249



TITLE

AF-8 THRU 15 PRESSURE BLOWERS ARR'T 4
INLET FLANGE MOUNTING

05/21/96	REVISED REDRAWN	JAW	
03/27/96	REV. REMOVED DATA BLOCKS & ACC., ADDED INLET SIZES	REE	
06/32/92	REVISED REDRAWN	PES	
02/26/92	REVISED DIMENSION "A" FOR 15-7 THRU 15-10	PES	
DATE	07/25/92	SCALE	NONE
DRAWN BY:	TK	APPROVED BY:	
CHECKED BY:		DRAWING NO.	AF01327F
		REVISION	4

"L" Style Vacuum Filters

CSL Series 3" - 12"

Benefits

- Reduce piping costs with multiple mounting configurations (mount horizontal or inverted)
- Minimize equipment pressure-drop change with low pressure-drop filter design

Features

- Heavy duty T bolts for easy maintenance
- Corrosive resistant black powder coat carbon steel
- O-ring stays in place with unique U-channel groove
- Inlet & outlet 1/4" gauge taps

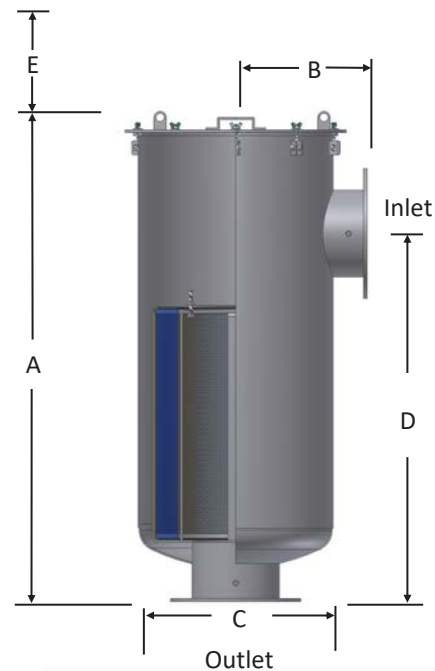
Technical Specifications

- Vacuum Rating: medium vacuum service*
- Filter change out differential: 15-20" H₂O over initial ΔP
- Polyester: 99%+ removal efficiency standard to 5 micron
- Paper: 99%+ removal efficiency standard to 2 micron

Options



- Straight-through configurations
- Various filter media
- Stainless steel
- Various nonstandard finishes and connection styles
- ISO Flange (contact factory for specs, sizes & availability)
- Flange faces free of paint
- Internal surfaces free of paint
- Lifting lugs
- Brackets for optional support legs
- Mounting housing bands
- Nameplate bracket



*See Vacuum Filter Technical Data for vacuum service data.

Rev: CSL 3-12-US1911K

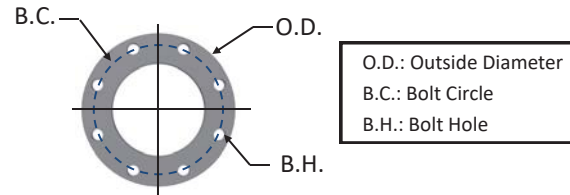
CSL Series 3" - 12"

Flanged Assemblies

Flange Inlet & Outlet	Assembly SCFM Rating	Assembly Part Number		Dimensions - inches				Suggested Service ht. E	Approx. Weight lbs	Replacement Element Part No.		Element SCFM Rating
		Polyester	Paper	A	B	C	D			Polyester	Paper	
4"	520	CSL-235P-400F	CSL-234P-400F	27 3/8	9	14	18 1/2	15"	62	235P	234P	570
4"	520	CSL-335P-400F	CSL-334P-400F	27 3/8	9	14	18 1/2	20"	64	335P	334P	800
5"	800	CSL-245P-500F	CSL-244P-500F	28 1/4	11	18 1/2	19 1/2	15"	88	245P	244P	880
5"	800	CSL-345P-500F	CSL-344P-500F	28 1/4	11	18 1/2	19 1/2	20"	90	345P	344P	1100
6"	1100	CSL-275P-600F	CSL-274P-600F	29 1/4	12	18 1/2	20 1/2	15"	110	275P	274P	1100
6"	1100	CSL-375P-600F	CSL-374P-600F	29 1/4	12	18 1/2	20 1/2	20"	113	375P	374P	1500
8"	1800	CSL-377P-800F	CSL-376P-800F	39 1/8	14	22 1/2	25 1/2	20"	185	377P	376P	1825
10"	2900	CSL-685P-1000F	CSL-384P(2)-1000F*	57 1/2	16	27	45	33"	380	685P	384P (2)	6600
12"	4950	CSL-485P(2)-1200F*	CSL-484P(2)-1200F*	70 1/4	16	27	57	25"	465	485P (2)	484P (2)	9410

See Vacuum Filter Technical Data for sizing guidelines. *Denotes 2 elements stacked in housing.

125/150# Pattern Flange	Dimensions - inches			No. of Holes	Flange Thickness
	O.D.	B.C.	B.H.		
4"	9	7 1/2	0.75	8	0.38
5"	10	8 1/2	0.88	8	0.38
6"	11	9 1/2	0.88	8	0.38
8"	13 1/2	11 3/4	0.88	8	0.38
10"	16	14 1/4	1	12	0.38
12"	19	17	1	12	0.50



All flanges are orientated "split center".

MPT Assemblies

MPT Inlet & Outlet	Assembly SCFM Rating	Assembly Part Number		Dimensions - inches				Suggested Service ht. E	Approx. Weight lbs	Replacement Element Part No.		Element SCFM Rating
		Polyester	Paper	A	B	C	D			Polyester	Paper	
3"	300	CSL-235P-300	CSL-234P-300	27 3/8	9	14	18 1/2	10"	47	235P	234P	570
3"	300	CSL-335P-300	CSL-334P-300	27 3/8	9	14	18 1/2	15"	50	335P	334P	800
4"	520	CSL-235P-400	CSL-234P-400	27 3/8	9	14	18 1/2	10"	52	235P	234P	570
4"	520	CSL-335P-400	CSL-334P-400	27 3/8	9	14	18 1/2	15"	55	335P	334P	800
5"	800	CSL-245P-500	CSL-244P-500	28 1/4	11	18 1/2	19 1/2	10"	82	245P	244P	880
5"	800	CSL-345P-500	CSL-344P-500	28 1/4	11	18 1/2	19 1/2	15"	88	345P	344P	1100
6"	1100	CSL-275P-600	CSL-274P-600	29 1/4	12	18 1/2	20 1/2	10"	95	275P	274P	1100
6"	1100	CSL-375P-600	CSL-374P-600	29 1/4	12	18 1/2	20 1/2	15"	97	375P	374P	1500

See Vacuum Filter Technical Data for sizing guidelines.



SOLBERG®

www.solbergmfg.com

All model offerings and design parameters are subject to change without prior notice.
Contact your representative or Solberg for the most current information.

Technical Data

Inlet Vacuum Filters

Applications & Equipment

- Industrial & Severe Duty
- Vacuum Pumps & Systems: Roots, Rotary Vane, Screw, Piston
- Vacuum Packaging Equipment
- Vacuum Furnace
- Blowers: Side Channel & P.D.
- Vacuum Lifters
- Intake Suction Filters
- Food Industry
- Woodworking/Routers
- Ash Handling
- Printing Industry
- Medical/Hospital
- Remote Installations for Piston & Screw Compressors
- Paper Processing
- Waste Water Aeration
- Cement Processing
- Bag House Systems
- Vacuum Vent Breathers
- Chemical Processing
- Factory Automation Equipment
- Leak Detection Systems

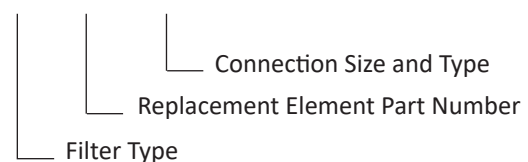
Identification

Standard Solberg assemblies should have an identification label/nameplate that gives the following information:

- Assembly Model #
- Replacement Element #

The part number designates the filter type, the element configuration and housing connection size. For example, the following part number identifies the filter as being a “CSL” design filter with a “235” element, “P” prefilter and 4” flange connection size.

CSL-235P-400F



Vacuum Service Rating Chart

Threaded vacuum filter connections must be free of defect and properly sealed to achieve deeper vacuum levels. Vacuum service levels are given for reference only and serve as a guideline for product selection. Product certification and alternative designs are available for applications requiring deeper vacuum levels and specific leak rates. Please contact factory for details.

Vacuum Level	Pressure (mbar)	Pressure (Torr)	Pressure (Pa)
Atmospheric Pressure	1013	760	1.013×10^5
Coarse Vacuum	1013 to 33	760 to 25	1×10^5 to 3×10^3
Medium Vacuum	33 to 1.3×10^{-3}	25 to 1×10^{-3}	3×10^3 to 1×10^{-1}
High Vacuum	1.3×10^{-3} to 1.3×10^{-9}	1×10^{-3} to 1×10^{-9}	1×10^{-1} to 1×10^{-7}

Rev: IVTD-US1904K

Inlet Vacuum Filters

Choosing the Best Filter for Your Equipment

A. When the connection & airflow is known:

1. select the appropriate connection style. (i.e.: MPT, Flange, NPSC, etc.)
2. check assembly SCFM (flow) rating. Compare with your required airflow.

(Note: Assembly flow ratings are based on 6,000 FPM or 30m/sec for a given connection size to achieve low pressure drop performance. When required flow exceeds assembly flow rating, the pressure drop through the outlet connection will increase. In such cases select by element SCFM (flow) rating.)

3. when required flow rating matches connection size; skip to “C. Selecting Elements”.

B. When the connection size is unknown, flexible, or the required flow rating exceeds assembly flow rating:

1. match required flow rating with the element flow rating.
2. choose related connection size.

C. Selecting Elements: The filter performance is influenced by the actual application duty and the equipment it is installed on. Regular maintenance checks and proper servicing is required.

Application Duty Descriptions:

Industrial Duty: clean workshop or clean outdoor environment - small element sizing is sufficient.

Severe Duty: dirty workshop, wastewater – medium to large element is recommended.

Extreme Duty: cement, steel making, plastics or dusty material conveying – largest element sizing is recommended.

1. Select media required by your application. Options include:

a. Standard media

1. Polyester: all purpose; withstands pulses, moisture, and oily air
2. Paper: mostly dry, smooth flow applications

b. Special Media: for a variety of micron levels and media types, see the “Filter Media Specifications” in the Replacement Element Section or contact Solberg.

2. Select element size by matching the element with the anticipated duty and upsize accordingly.

Filter Assembly Maintenance

Request the appropriate maintenance manual for more in-depth information from your Solberg representative or on our website www.solbergmfg.com.

Element Maintenance

Solberg elements should be replaced once the pressure drop reaches 15-20” H₂O above the initial pressure drop of the installation. Cleaning the element is also an option.

Solberg recommends replacing dirty elements for optimal performance. Any damage which results from by-pass or additional pressure drop created by element cleaning is the sole responsibility of the operator.

Note: The overall performance of a filter element is altered once cleaned. The initial pressure drop after subsequent cleanings will be greater than the original, clean pressure drop of the element. After each cleaning, the pressure drop will continue to increase. Under all circumstances, the initial pressure drop of the element needs to be maintained at less than 15” H₂O.

If the pressure drop exceeds 20” H₂O at start-up; it should be replaced with a new element. With many types of equipment, the maximum pressure drop allowed will be dictated by the ability of the equipment to perform to its rated capacity. Under all circumstances, the operator should avoid exceeding the manufacturer’s recommended maximum pressure drop for their specific equipment.



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CENTRIC **Butterfly Valve**

RUBBER SEATED

VF - 7 Series

LEVER · GEAR · PNEUMATIC
ELECTRIC OPERATED

ALLOWABLE PRESSURE

1.5" - 12.0" : 230 psig

14.0" - 40.0" : 150 psig



INVESTMENT CAST
STAINLESS STEEL BODY

1.5" - 24" (40mm - 600mm)



www.bvcusa.com

VALUE VALVE



RESILIENT SEATED BUTTERFLY VALVES

FACE TO FACE: Valve body designed to meet ISO 5752 table 5 short.

TOP WORKS:

24" and below, valve mounting flange and stem shall be per ISO 5211.

28" and above, valve mounting flange per ISO 5211, stem shall be round keyed.

FLANGE REQUIREMENT:

→ VF-730, VF-733: ANSI 125/150, BS Table E, JIS 10K, DIN PN10, DIN PN16.

All wafers have locating holes for ease of installation.

VF-737: ANSI 150, JIS10K, DIN PN10, DIN PN16

PRESSURE RATING:

Bi-directional bubble-tight shut off to 16bar (230psi)-----1.5"~12.0"
10bar (150psi)-----14.0"~40.0"

and tested to 110% of full rating 18bar (260psi)-----1.5"~12.0"
11bar (160psi)-----14.0"~40.0"

SHELL TESTING:

The body strength can stand 150% of full rating.

24bar (340psi)-----1.5"~12.0"
15bar (220psi)-----14.0"~40.0"

INSTALLATION INSTRUCTIONS:

The valve is designed for use between all types of flat or raised face flanges.

DO NOT USE FLANGE GASKETS. The butterfly valve design eliminates the need for gaskets. For proper installation, the space between flanges must be sufficient to permit valve insertion without disturbing the rubber liner flange seal. Note that the disc sealing edge is 45° from the flat of the shaft, but inline with the scribed line. Rotate the stem to position the disc within the body, place the valve between flanges and hand-tighten the bolts. **SLOWLY OPEN** the valve counterclockwise to check for adequate disc clearance. **RETURN THE DISC TO 10% OPEN POSITION** and cross tighten all bolts, again check for adequate disc clearance.

STEM RETAINING MECHANISM:

The stem is retained in the body by means of a special "Q" type design when the valve size is under 14.0", and hence the stem can be removed from the body and disc without any special tools.

*Unless you intend to disassemble the valve, do not position the disc in the 135° position.

Anti-Condensed: (On customer's requirement)

Cv Values-Valve Sizing Coefficient.

Size		Disc Angle (Open Degree)								
mm	inch	10°	20°	30°	40°	50°	60°	70°	80°	90°
40	1 1/2	0.8	2.8	8.1	16.6	26	42	69	95	132
50	2	1.3	4.4	11.9	25.7	44	70	117	154	226
65	2 1/2	2.3	8.8	21.3	41	71	111	219	281	369
80	3	2.9	11.5	30	56	97	147	250	395	497
100	4	4.4	17	46	84	139	259	422	709	846
125	5	7.6	28	73	138	254	461	701	1214	1454
150	6	12	48	111	205	381	634	1021	1474	2175
200	8	22	75	193	358	670	1164	1833	2703	3655
250	10	33	118	287	528	978	1711	2636	3810	5566
300	12	40	151	365	720	1330	2486	3800	5839	8258
350	14	55	191	456	930	1753	3010	4657	6726	9733
400	16	73	270	594	1260	2308	3956	6300	9476	13406
450	18	88	300	727	1413	2709	4592	7407	11085	15926
500	20	121	405	1005	1980	3611	6257	9960	15338	21935
600	24	163	578	1349	2795	5225	8846	13976	21163	29504
700	28	223	771	1959	3772	7008	12471	20407	29477	43081
750	30	238	819	2079	4001	7434	13229	21649	31271	45703
800	32	301	1138	2693	5304	9635	16524	26935	36987	53814
900	36	385	1466	3452	6859	12648	21275	34815	50185	71421
1000	40	597	2245	5214	9309	15788	25669	42120	63939	80583
1050	42	687	2411	5352	9826	16665	27095	44459	67490	85058
1100	44	823	3082	7109	10230	19436	30924	50837	79709	92686
1200	48	1134	4256	9481	16591	25865	41321	67652	105788	124357

Cv value denotes the flow rate in US gallon/min for water at 70° F under a pressure differential 1 psig. When required $K_v = C_v/1.17$

Expected Seating/ Unseating Torque (in Lbs)

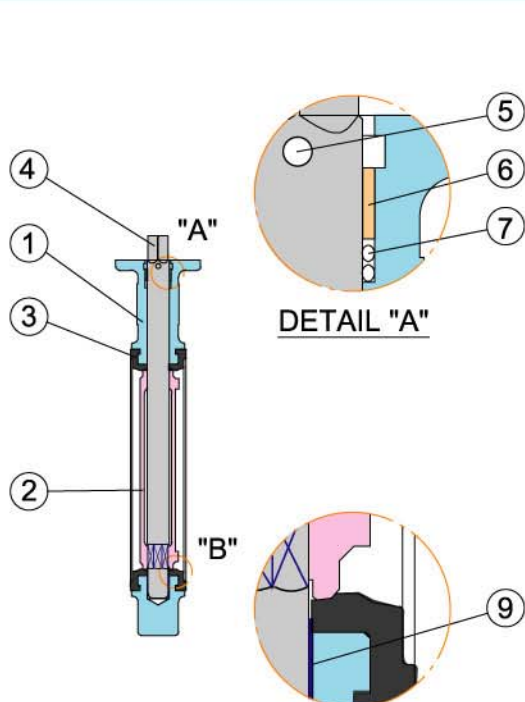
Size		Lubricating (Non-corrosive) ΔP (psig)				Dry (Non-Lubricating) ΔP (psig)			Reduced Disc Diameter P (90 psig)	
mm	inch	45	90	150	230	45	90	150	Lubricating	Dry
40	1 1/2	133	151	169	204	169	186	204	93	118
50	2	133	151	169	204	169	186	204	93	118
65	2 1/2	159	177	195	231	195	213	239	112	136
80	3	248	275	301	363	301	337	372	174	211
100	4	328	363	399	478	399	443	496	229	279
125	5	540	602	673	806	673	744	823	378	471
150	6	1027	1124	1239	1363	1116	1222	1346	719	781
200	8	1514	1682	1868	2239	1868	2071	2301	1060	1308
250	10	2434	2709	3009	3611	3009	3346	3717	1705	2108
300	12	3372	3744	4160	4992	4160	4620	5133	2362	2914
350	14	4824	5355	5948		5948	6611	7346	3379	4166
400	16	6443	7160	7957		7957	8842	9824	4514	5574
450	18	8072	8965	9965		9966	11072	12302	5654	6981
500	20	10045	11160	12399		12399	13780	15311	7037	8686
600	24	11727	13027	14479		14479	16090	17877	8215	10143
700	28	20701	23002	25559		25559	23400	31560	14502	17905
750	30	23081	25648	28497		28497	31666	35179	16169	19964
800	32	26621	29577	32860		32860	36507	40560	18649	23020
900	36	33878	36639	42826		41826	46472	51631	23733	26301
950	38	39073	43542	58499		48233	53543	62835		
1000	40	45047	50268	67437		55578	62039	83279	28755	35501
1050	42								33765	41682
1100	44								34124	42135
1200	48								43015	53108

To Use The Torque Chart, Note The Following

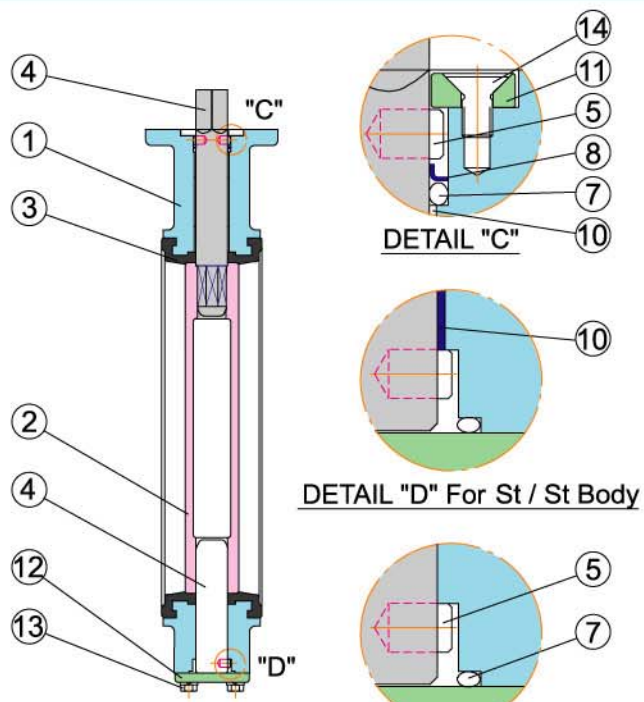
- 1) Seating/Unseating torque values above include friction bearing torque for stated ΔP.
- 2) Do not apply a safety factor to above torque values when determining actuator output torque requirement.

MATERIALS 1.5"~24.0"

VF-730 (WAFFER TYPE)
VF-733 (LUG TYPE)
VF-737 (FLANGE TYPE)



Size 1.5" to 12.0" DETAIL "B"



Size 14.0" to 24.0" DETAIL "D" For DI. & CI. Body

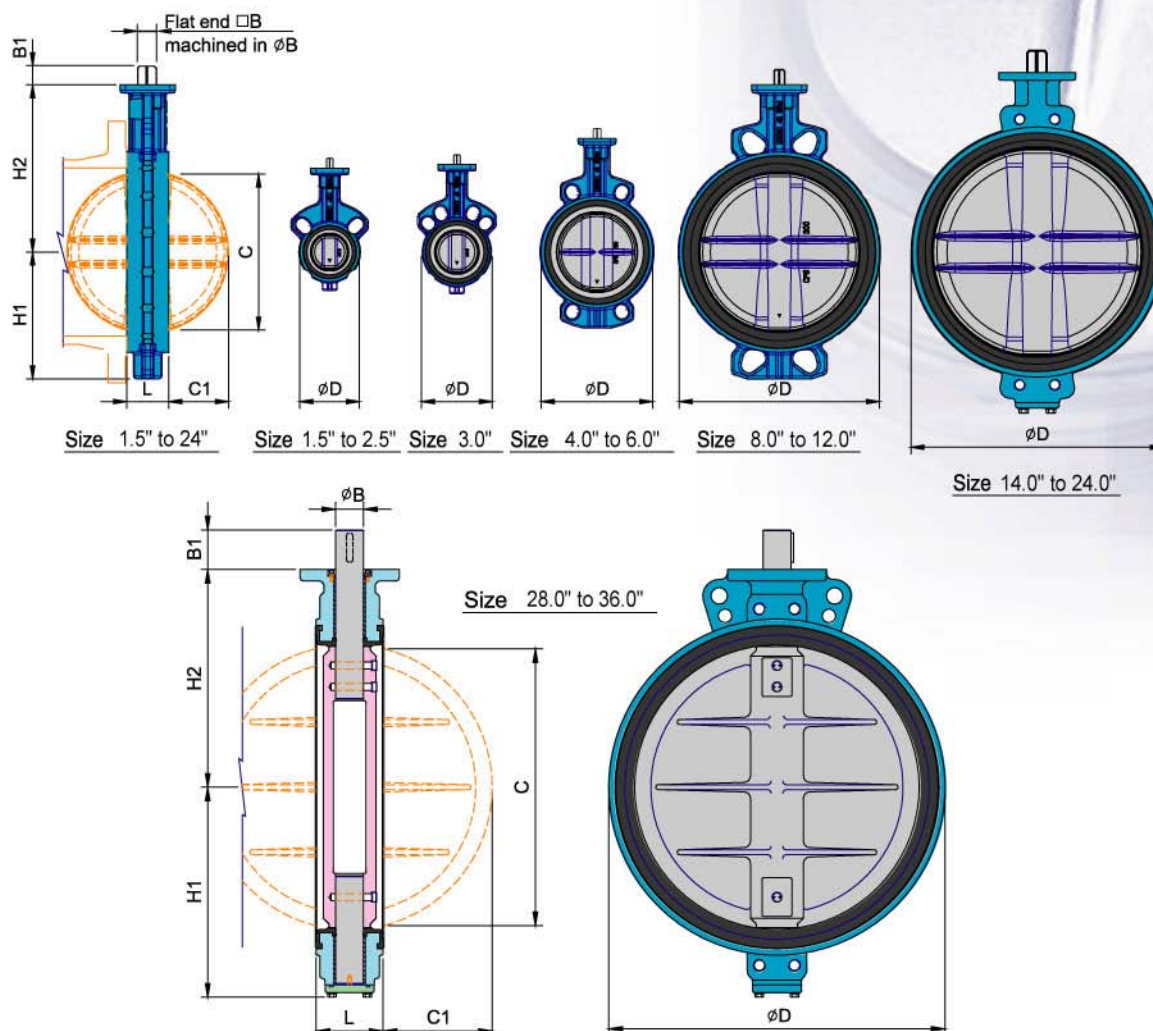
No.	Name	Materials	Specifications		Remark
			JIS	ASTM	
1	Body	CAST IRON	FC 200	A126 Cl. B	
		DUCTILE IRON	FCD 400	A395	
		STAINLESS STEEL	SCS 13A	A351 Gr. CF8	
			SCS 14A	A351 Gr. CF8M	
2	DISC	DUCTILE IRON	FCD 400	A395	Nylon 11 coated
		STAINLESS STEEL	SCS 13A	A351 Gr. CF8	
			SCS 14A	A351 Gr. CF8M	
		ALU-BRONZE	ALBC2	B148 C95400	
3	SEAT	NBR (NITRILE)			-10° ~ 80C° (14° ~ 176°F)
		EPDM			-20° ~ 120C° (-4° ~ 248°F)
		WHITE EPT		100PSIG MAX	-20° ~ 140C° (-4° ~ 284°F)
		NEOPRENE (CR)			0° ~ 80C° (32° ~ 176°F)
		SILICON		100PSIG MAX	-20° ~ 180C° (-4° ~ 356°F)
		HYPALON (CSM)			-20° ~ 135C° (-4° ~ 275°F)
		VITON		100PSIG MAX	-18° ~ 204C° (-0.4° ~ 400°F)
4	STEM	STAINLESS STEEL	SUS 410	A 182 Gr. F6A	
			SUS 304	A 182 Gr. F304	
			SUS 316	A 182 Gr. F316	
5	PIN	STAINLESS STEEL	SUS 304	A 182 Gr. F304	
6	BUSHING	DELFIN			
7	O-RING	NBR (NITRILE)			
8	THRUST RING	STAINLESS STEEL	SUS 304	A 240 Gr. 304	
9	BUSHING	BRONZE	BC6	B62	For cast iron and ductile iron body
10	BUSHING	RTFE+STAINLESS STEEL	RTFE+SUS316	RTFE+A240 Gr. 316	For stainless steel body
11	UPPER COVER	CAST IRON	FC 200	A126 Cl. B	For cast iron and ductile iron body
		STAINLESS STEEL	SCS 13A	A351 Gr. CF8	For stainless steel body
12	BOTTOM COVER	CAST IRON	FC 200	A126-B	For cast iron and ductile iron body
		STAINLESS STEEL	SCS 13A	A351 Gr. CF8	For stainless steel body
13	BOLT	STEEL			
14	BOLT	STEEL			

DIMENSIONS

VF-730 WAFER TYPE

1.5"~36.0"

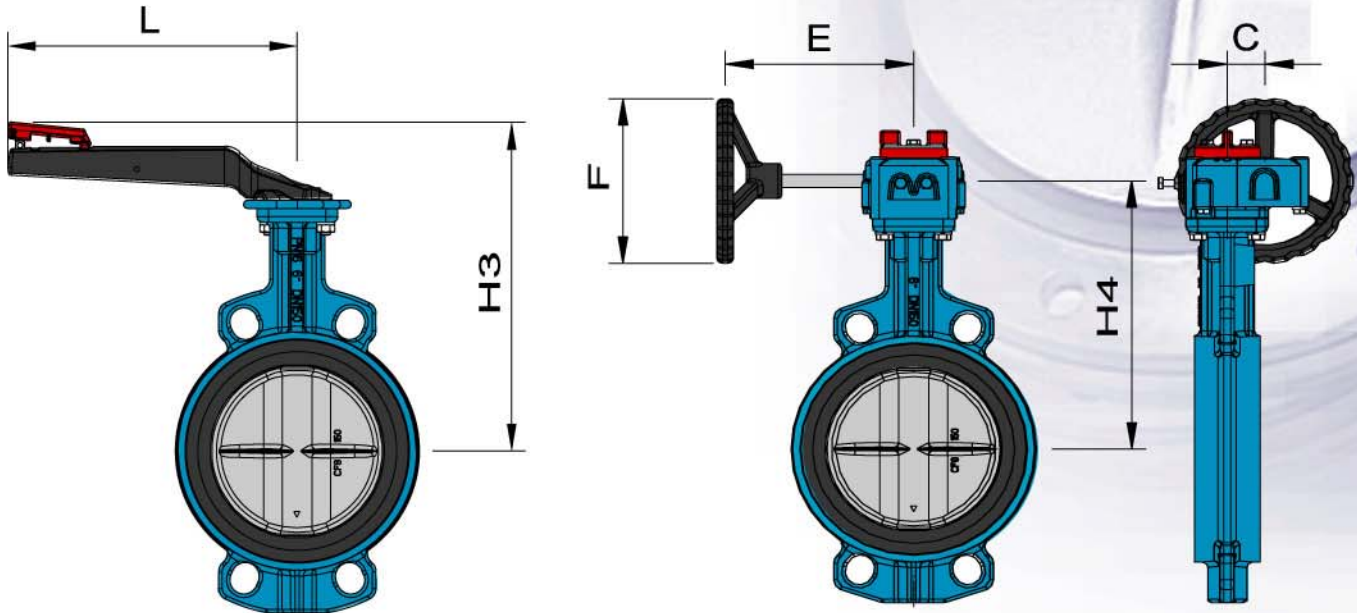
PRESSURE RATING:
1.5"~12.0" 230psig
14.0"~36.0" 150psig



Size		Face to Face L				Mounting Flange (ISO 5211)		Shaft End			Key	Disc Clearance		Weight lbs
mm	inch		H1	H2	D	Type	PCD	øB	□B	B1		C	C1	
40	1 1/2	1.30	2.36	4.72	3.19	F07	2.76	0.55	0.43	0.75		1.34	0.28	4.40
50	2	1.69	2.56	5.63	3.78	F07	2.76	0.55	0.43	0.75		1.54	0.32	6.60
65	2 1/2	1.81	2.80	6.10	4.33	F07	2.76	0.55	0.43	0.75		2.17	0.51	8.36
80	3	1.81	3.03	6.38	4.88	F07	2.76	0.55	0.43	0.75		2.72	0.75	8.80
100	4	2.05	4.21	7.13	5.83	F07	2.76	0.55	0.43	0.75		3.58	1.06	11.66
125	5	2.20	4.80	7.76	7.09	F07	2.76	0.71	0.55	0.75		4.53	1.42	16.06
150	6	2.20	5.51	8.27	8.11	F07	2.76	0.71	0.55	0.75		5.51	1.85	18.04
200	8	2.36	6.50	9.45	10.20	F10	4.02	0.87	0.67	0.95		7.32	2.68	29.70
250	10	2.68	7.91	11.26	12.60	F10	4.02	0.98	0.75	0.95		9.41	3.54	46.64
300	12	3.07	9.21	12.17	14.57	F10	4.02	1.10	0.87	0.95		11.34	4.37	71.50
350	14	3.07	11.93	12.95	16.22	F12/14	4.92/5.51	1.38	1.06	1.14		12.80	5.04	105.60
400	16	4.02	13.19	14.21	18.70	F12/14	4.92/5.51	1.38	1.06	1.14		14.76	5.63	132.00
450	18	4.49	14.29	15.47	20.87	F14/16	5.51/6.50	1.89	1.42	1.50		16.65	6.38	176.00
500	20	5.00	15.63	16.81	23.03	F14/16	5.51/6.50	1.89	1.42	1.50		18.62	7.17	275.00
600	24	6.06	18.07	19.37	27.05	F16	6.50	2.36	1.81	1.89		22.05	8.43	440.00
700	28	6.50	20.12	22.17	31.34	F16	6.50	2.76		3.54	.071 X 0.47	25.79	10.04	869.00
750	30	7.48	21.42	23.03	33.70	F25	10.00	2.95		4.33	0.79 X 0.47	27.24	10.39	1078.00
800	32	7.48	23.31	24.80	34.25	F25	10.00	3.15		4.33	0.79 X 0.47	28.98	11.22	1276.00
900	36	7.99	24.88	25.98	39.49	F25	10.00	3.35		4.33	0.94 X 0.63	33.11	13.03	1606.00

LEVER & GEAR OPERATED

VF-730 (WAFLER TYPE)
VF-733 (LUG TYPE)
VF-737 (FLANGE TYPE)



Size		Operator Series No.	Lever Operator		Gear Operator				Handwheel Turns ON/OFF	Mounting Flange (ISO 5211)	
mm	inch		H3	L	H4	C	E	F		Type	PCD
40	1 1/2	L 7A	7.68	7.87						F07	2.76
		C 07			6.18	1.61	6.1	5.91	10		
50	2	L 7A	8.58	7.87						F07	2.76
		C 07			7.09	1.61	6.1	5.91	10		
65	2 1/2	L 7A	9.06	7.87						F07	2.76
		C 07			7.56	1.61	6.1	5.91	10		
80	3	L 7A	9.33	7.87						F07	2.76
		C 07			7.83	1.61	6.1	5.91	10		
100	4	L 7A	10.08	7.87						F07	2.76
		C 07			8.58	1.61	6.1	5.91	10		
125	5	L 7B	10.71	9.84						F07	2.76
		C 07			9.21	1.61	6.1	5.91	10		
150	6	L 7B	11.22	9.84						F07	2.76
		C 07			9.72	1.61	6.1	5.91	10		
200	8	L10	12.76	13.98						F10	4.02
		C10			11.06	2.48	7.68	7.87	9		
250	10	L 10	14.57	13.98						F10	4.02
		C 10			12.87	2.48	7.68	7.87	9		
300	12	L 10	15.47	13.98						F10	4.02
		C 10			13.78	2.48	7.68	7.87	9		
350	14	C 12			14.57	2.4	9.13	12.2	9	F12	4.92
400	16	C 12			15.82	2.4	9.13	12.2	9	F12	4.92
450	18	C 14			17.52	3.19	11.02	15.75	13	F14	5.51
500	20	C 14			18.86	3.19	11.02	15.75	13	F14	5.51
600	24	A2			21.57	4.84	12.09	15.75	17.5	F16	6.5
700	28	A2			24.37	4.84	12.09	15.75	17.5	F16	6.5
750	30	A3+S3			28.74	6.3	14.57	15.75	52	F25	10
800	32	A3+S3			30.51	6.3	14.57	15.75	52	F25	10
900	36	A3+S3			31.69	6.3	14.57	15.75	52	F25	10
950	38	A3+S3			34.41	6.3	14.57	15.75	52	F25	10
1000	40	A4+S4			37.2	7.76	18.54	23.62	90	F30	11.73

INVESTMENT CAST STAINLESS STEEL BODY

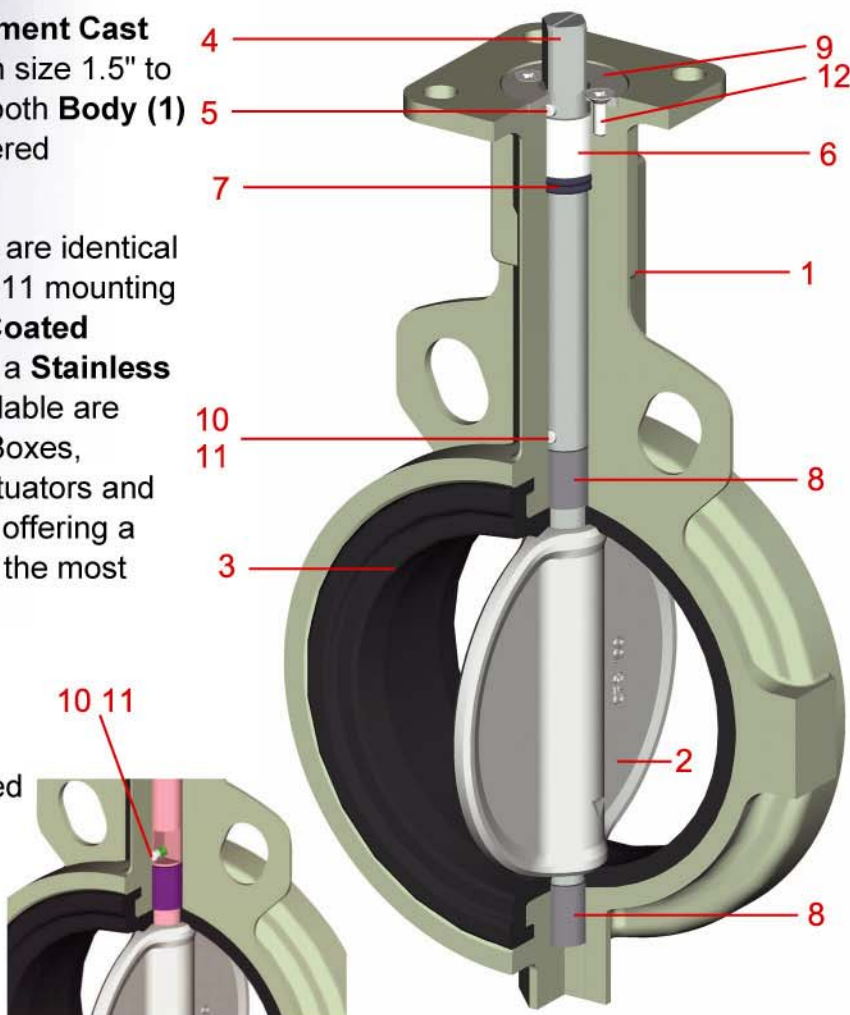
PRESSURE RATING:
1.5"~24.0" 230psig

Value Valves offers a line of **Investment Cast Stainless Steel Butterfly Valves** in size 1.5" to 24.0". Available in Wafer and Lug, both **Body (1)** and **Disc (2)** are low profile engineered investment cast.

The basics features of these valves are identical to the VF730/733 vales with ISO-5211 mounting but offer **Top and Bottom Teflon Coated Stainless Steel Bushings (8)**, and a **Stainless Stem Retainer Pin Cover (9)**. Available are Stainless Steel Handles and Gear Boxes, Stainless Steel Rack and Pinion Actuators and Stainless Steel Limit Switch Boxes, offering a high level of corrosion resistance in the most aggressive atmospheres.

All valves are equipped with **Anti-Static Spring Loaded Stem Pin (10)(11)**, reducing the build up of static electricity possibly produced due to the isolation of the disc and stem from the body by the rubber seat.

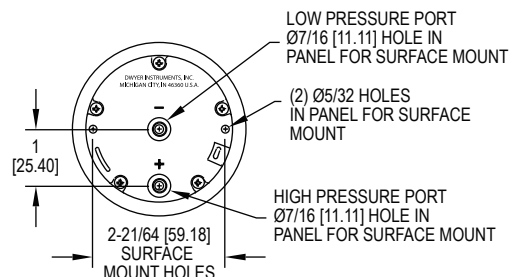
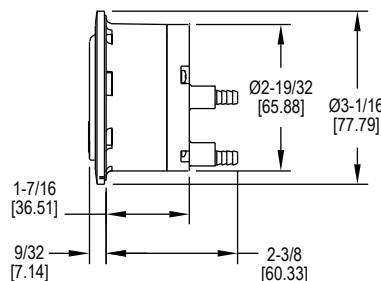
Available are various seats including Food Grade White EPT



No.	Name	Materials	Specifications		Remark
			JIS	ASTM	
1	BODY	STAINLESS STEEL	SCS 13A	A351 Gr. CF8	
			SCS 14A	A351 Gr. CF8M	
2	DISC	STAINLESS STEEL	SCS 13A	A351 Gr. CF8	
			SCS 14A	A351 Gr. CF8M	
3	SEAT	NBR (NITRILE)			-10° ~ 80°C (14° ~ 176°F)
		EPDM			-20° ~ 120°C (-4° ~ 248°F)
		WHITE EPT			-20° ~ 140°C (-4° ~ 284°F)
		NEOPRENE (CR)			0° ~ 80°C (32° ~ 176°F)
		SILICON			-20° ~ 180°C (-4° ~ 356°F)
		HYPALON (CSM)			-20° ~ 135°C (-4° ~ 275°F)
		VITON			-18° ~ 204°C (-0.4° ~ 400°F)
4	STEM	STAINLESS STEEL	SUS 410	A182 Gr. F6A	
			SUS 304	A182 Gr. F304	
			SUS316	A182 Gr. F316	
5	PIN	STAINLESS STEEL	SUS304	A182 Gr. F304	
6	BUSHING	DELTRIN			
7	O-RING	NBR (NITRILE)			
8	BUSHING	RTFE + STAINLESS STEEL	RTFE+SUS 316	RTFE+A240 Gr.316	
9	STEM RETAINER	STAINLESS STEEL	SUS 304	A240 Gr. F304	
10	PIN (ANTI-STATIC)	STAINLESS STEEL	SUS 304	A182 Gr. F316	
11	SPRING	STAINLESS STEEL	SUS 304	A240 Gr. F304	
12	SCREW	STAINLESS STEEL	SUS 304	A193 Gr. B8	

Dwyer**SERIES 2-5000****MINIHELIC® II DIFFERENTIAL PRESSURE GAGE**

Combining High Accuracy, Compactness, Dependability, and Low Cost



Combining clean design, small size and low cost with enough accuracy for all but the most demanding applications our **Series 2-5000 MiniHelic® II Differential Pressure Gage** offers the latest in design features for a dial type differential pressure gage. It is our most compact gage but is easy to read and can safely operate at total pressures up to 30 psig.

FEATURES/BENEFITS

- Removable lens and rear-housing provides easy, cost-effective servicing
- Accuracy and value provides an excellent solution for OEM and user applications
- Durable housing materials make it well-suited for rough environments and total high pressure

APPLICATIONS

- Room positive pressure sensing
- Cabinet air-purging
- Medical respiratory equipment
- Air samplers
- Electronic air cooling systems
- Laminar flow hoods
- Local indication on filter status
- Face velocity on fume hood
- Duct pressures

SPECIFICATIONS

Service: Air and compatible gases.

Wetted Materials: Consult factory.

Housing: Glass filled nylon; polycarbonate lens.

Accuracy: $\pm 5\%$ of FS at 70°F (21.1°C).

Pressure Limits: 30 psig (2.067 bar) continuous to either pressure connection.

Temperature Limits: 20 to 120°F (-6.67 to 48.9°C).

Size: 2-1/16" (52.39 mm) diameter dial face.

Mounting Orientation: Diaphragm in vertical position. Consult factory for other position orientations.

Process Connections: Barbed, for 3/16" ID tubing (standard); 1/8" male NPT (optional).

Weight: 6 oz (170.1 g).

Agency Approvals: Meets the technical requirements of EU Directive 2011/65/EU (RoHS II).

Caution: For use only with air or compatible non-corrosive gases.

MINIHELIC® II DIFFERENTIAL PRESSURE GAGE

Combining High Accuracy, Compactness, Dependability, and Low Cost

Housing is molded from strong mineral and glass filled nylon.

Pointer stops of molded rubber prevent pointer over-travel without damage.

Full view lens is removable and molded of acrylic.

Aluminum scale litho-printed black on white, enhances readability.

Red tipped aluminum pointer, rigidly mounted to helix is easy to see.

Wishbone assembly provides mounting for helix, helix bearings, and pointer shaft.

Jewel bearings provide virtually friction-free helix motion.

Helix is free to rotate in jewel bearings. It aligns with magnetic field of magnet to transmit pressure indications to pointer.

Zero adjustment screw, located behind the removable lens, eliminates tampering.

Range spring calibration clamp fixes live length of spring for proper gage calibration and is factory set and sealed.

Silicone rubber diaphragm allows accurate response to a broad range of temperatures and at extremely low pressure. Incorporates blow out area for overpressure protection.

Diaphragm support plates of lightweight aluminum on each side of the diaphragm minimize position or attitude sensitivity and help define pressure area.

Flat leaf range spring reacts to pressure on the diaphragm. Live length is adjustable for calibration. Small amplitude of motion minimizes inaccuracies and assures long life.

Low pressure tap connects to rear chamber.

Coil spring link provides a resilient connection between the diaphragm and the range spring.

Ceramic magnet mounted on a molded bracket at the end of the range spring rotates the helix without direct mechanical linkage.

High pressure tap connects with the front chamber through passageway in the plastic case and a sealing ring molded into the edge of the diaphragm.

MODEL CHART			
Model	Range, Inches of Water	Model	Range, MM of Water
2-5000-0	0-0.5	2-5000-25MM	0-25
2-5001	0-1.0	2-5000-50MM	0-50
2-5002	0-2.0	2-5000-100MM	0-100
2-5003	0-3.0		
2-5005	0-5.0	Model	Range, Pascals
2-5010	0-10	2-5000-125PA	0-125
2-5020	0-20	2-5000-250PA	0-250
2-5040	0-40	2-5000-500PA	0-500
2-5060	0-60		
2-5100	0-100	Model	Range, kPa
		2-5000-1KPA	0-1
		2-5000-3KPA	0-3
Model	Range, PSI		
2-5205	0-5		

OPTIONS	
To order add suffix:	Description
-NPT	1/8" male NPT connections
Example: 2-5001-NPT	
-BB	Bottom barbed surface mount
Example: 2-5001-BB	
-NIST	NIST traceable calibration certificate
Example: 2-5001-NIST	
-FC	Factory calibration certificate
Example: 2-5001-FC	

ACCESSORIES	
Model	Description
A-302F-A	303 SS static pressure tip with mounting flange; for 3/16" ID rubber or plastic tubing; 4" insertion depth; includes mounting screws
A-434	Portable kit
A-489	4" straight static pressure tip with flange
A-497	Surface mounting bracket
A-609	Air filter kit
A-480	Plastic static pressure tip

SURFACE MOUNTING



Optional surface mounting with back mounting plate allows for quick installation to any surface. Process connections are barbed and point downwards. Add -BB for bottom barbed surface mount option.



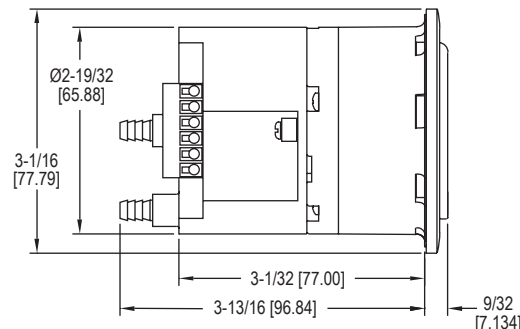
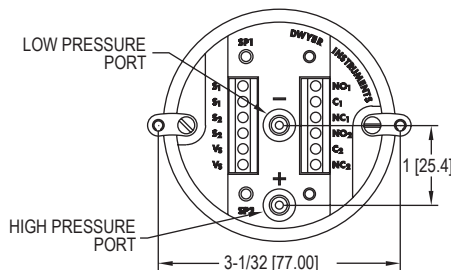
PANEL MOUNTING



Mounting hardware is supplied with the MiniHelic® II gage for panel mounting through a single hole, 2-5/8" (67 mm) in diameter. Panel thickness up to 1/2" (13 mm) can be accommodated with the hardware supplied. If necessary, surface mounting of the gage can be accomplished by means of two 4-40 screws into the tapped mounting bracket stud holes in the rear of the gage. Surface mounting requires clearance holes in the panel for the two pressure taps.

MINI-PHOTOHELIC® DIFFERENTIAL PRESSURE SWITCH/GAGE

Compact, Low Cost Switch Gage



The **Series MP Mini-Photohelic® Differential Pressure Switch/Gage** combines the time proven Minihelic® II differential pressure gage with two SPDT switching set points. The Mini-Photohelic® switch/gage is designed to measure and control positive, negative, or differential pressures consisting of non-combustible and non-corrosive gases. Gage reading is independent of switch operation. Switching status is visible by LED indicators located on the front and rear of the gage. Set points are adjusted with push-buttons on the back of the unit.

FEATURES/BENEFITS

- Gage reading unaffected by switch operation and will continue to read pressure even during power loss
- Visible switch status LED provides indication of set point switching state
- Compact design but with the power of larger devices can meet the same application specifications

APPLICATIONS

- Fume hoods
- Dust collection
- Pneumatic conveying
- Clean room

MODEL CHART			
Model	Range, Inches of Water	Model	Range, Pa
MP-000	0-0.5	MP-125PA	0-125
MP-001	0-1.0	MP-250PA	0-250
MP-002	0-2.0	MP-500PA	0-500
MP-003	0-3.0	Model	Range, kPa
MP-005	0-5.0		
MP-010	0-10	MP-1KPA	0-1
MP-020	0-20	MP-3KPA	0-3

OPTIONS	
To order add suffix:	Description
-NPT	1/8" male NPT connections
Example: MP-000-NPT; Note: Allow additional lead time.	
-NIST	NIST traceable calibration certificate
Example: MP-005-NIST	

ACCESSORIES	
Model	Description
A-301	Static pressure tip for 1/4" metal tubing connection
A-302	Static pressure tip for 3/16" and 1/8" I.D. plastic or rubber tubing
A-302F-A	303 SS static pressure tip with mounting flange; for 3/16" ID rubber or plastic tubing; 4" insertion depth; includes mounting screws
A-489	4" straight static pressure tip with flange

SPECIFICATIONS

GAGE SPECIFICATIONS

Service: Air and non-combustible, compatible gases.

Wetted Materials: Consult factory.

Accuracy: ±5% of FS @ 70°F (21.1°C). Gage face mounted in vertical position.

Pressure Limits: 30 psig (2.067 bar).

Temperature Limits: 20 to 120°F (-6.7 to 49°C).

Process Connections: Barbed for 3/16" ID tubing (STD); 1/8" male NPT (optional).

Size: 4-1/8" (104.78 mm) depth x 3-1/16" (77.79 mm) diameter.

Weight: 23 oz (652 g).

SWITCH SPECIFICATIONS

Switch Type: (2) SPDT relays.

Electrical Rating: 5 A @ 120/240 VAC resistive; 5 A @ 30 VDC.

Electrical Connections: Screw type terminal block. Accepts 22-12 AWG wire.

Power Requirements: 24 VDC / 24 VAC 50/60 Hz 4 watts.

Mounting Orientation: Gage face in vertical position.

Set Point Adjustment: Push-buttons.

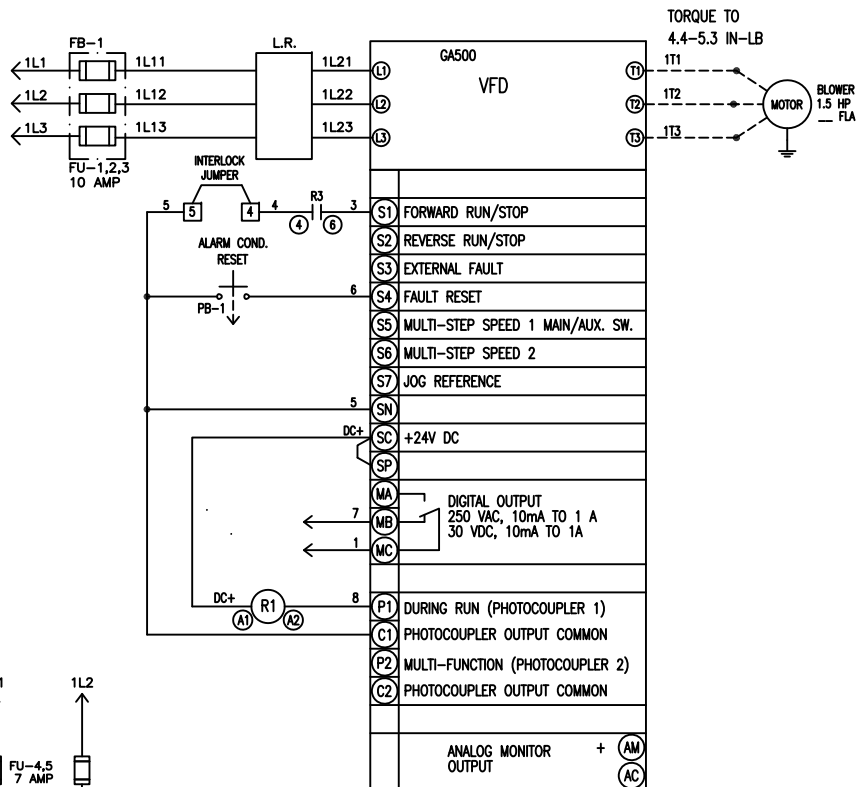
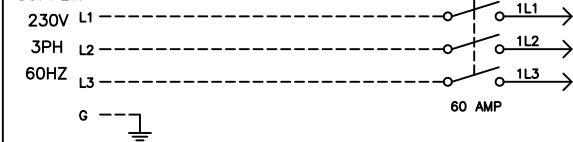
Standard Accessories: (2) mounting screws, (1) .050" hex allen wrench.

Agency Approvals: CE, cULus.

SUITABLE FOR USE ON A CIRCUIT CAPABLE OF DELIVERING NOT MORE THAN 5kA RMS SYMMETRICAL AMPERES MAX., 240V AC VOLTS

UPSTREAM PROTECTION:
FUSIBLE DISCONNECT OR CIRCUIT BREAKER
MUST BE PROVIDED BY INSTALLER AS PER
STATE AND LOCAL REQUIREMENTS.

SUPPLY:



CONT. PAGE 2 OF 2

CONT. PAGE 2 OF 2

NOTES:

1. ☐ INDICATES TERMINAL BLOCK
2. INDICATES COMPONENT TERMINAL POINT
3. USE COPPER WIRE ONLY; MINIMUM 60 DEGREES C
4. REPLACE WITH LIKE FUSES ONLY
5. ALL CONTACTS SHOWN WITH POWER OFF
6. TORQUE TERMINAL BLOCKS TO 5-7 LB-IN
7. UL LISTED CONTROL PANEL

BILL OF MATERIALS

ITEM	QTY	ITEM LABEL	MFG.	DESCRIPTION	PART NUMBE
1	1	ENCL	SCE	30x24x10 NEMA 3R ENCLOSURE	SCE-30EL24
2	1	ENCL	SCE	27x21 STEEL BACK PANEL	SCE-30P24
3	1	ENCL	SCE	27x21 STEEL DEAD FRONT DOOR	SCE-DF30EL
4	1	ENCL	SCE	PADLOCK ATTACHMENT	SCE-PLHG
5	1	FAN	HAMMOND	38 CFM FAN	PF22000T3RE
6	1	FAN	HAMMOND	ENCLOSURE FILTER	PFA20000T3F
7		DISC.	ABB	60A 3P NON-FUSED DISC. SWITCH	OT60F3
8	1	DISC.	ABB	NEMA 3R DISCONNECT HANDLE	OHBS2AJ
9	1	DISC.	ABB	DISCONNECT SHAFT	OXS6X180
10	1	FB-1	MERSEN	3P 30A CLASS J FUSE BLOCK	60308SJ
11	3	FU1,2,3	EDISON	10 AMP CLASS J FUSE	JDL10
12	1	VFD	YASKAWA	1.5HP VFD	GA50U2010AE
13	1	VFD	YASKAWA	LCD DIGITAL OPERATOR	JVOP-KPLCA
14	1	VFD	YASKAWA	KEYPAD INSTALL KIT	900-192-93
15	1	CAT5	PANDUIT	5' CAT 5E CABLE	NK5EPC5BUY
16	1	L.R.	AD	LINE REACTOR	LR2-21P5
17	1	SS-1	ABB	3 POS. S.S. SPRG. RET. L TO C (2 N.O.)	M3SS7-1B-2
18	4	PL-1,3,4,5	ABB	RED F.V. PILOT LIGHT - 120V	CL-100R
19	1	PL-2	ABB	GREEN F.V. PILOT LIGHT - 120V	CL-100G
20	1	PB-1	ABB	BLACK FLUSH P.B. (2 N.O./1 N.C.)	MP1-10B-2
21	1	T1	EATON	350VA CONTROL TRANSFORMER	C0350E2AXXF
22	2	FU-4,5	MERSEN	7 AMP CLASS CC FUSE	ATDR7
23	1	FU-6	MERSEN	5 AMP TIME DELAY FUSE	TRM5
24	1	R1	FINDER	1 POLE RELAY - 24V DC	38.51.7.024.(
25	2	R2,R3	FINDER	2 POLE RELAY - 120V	56.32.8.120.(
26	2	R2,R3	FINDER	2 POLE RELAY SOCKET	96.02
27	4	R4,R5,R6,R7	FINDER	4 POLE RELAY - 120V	55.34.8.120.(
28	4	R4,R5,R6,R7	FINDER	4 POLE RELAY SOCKET	94.74
29	1	TR1	FINDER	2 POLE TIMER - 120V	85.02.0.125.(
30	1	TR1	FINDER	2 POLE TIMER SOCKET	94.82
31	1	HTR	STEGO	250 WATT HTR	028119-00
32	1	T-STAT	STEGO	HEATER T-STAT	011409-00
33	17	T.B.'S	PHOENIX	TERMINAL BLOCK	3004362
34	1	T.B.'S	PHOENIX	TERMINAL BLOCK END COVER	3003020
35	2	T.B.'S	PHOENIX	DIN RAIL END RETAINER	0800886
36	2	GROUND	BURNDY	14-2 AWG GROUND LUG	DLA2

REVISIONS

REV.	DATE	BY	CHKD.	DESCRIPTION

J.E. GASHO & ASSOCIATES
PO# 3597

APPROX. WEIGHT: 130 LB'S

HP 1.5

VOLTAGE 230

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TITLE VFD CONTROL PANEL

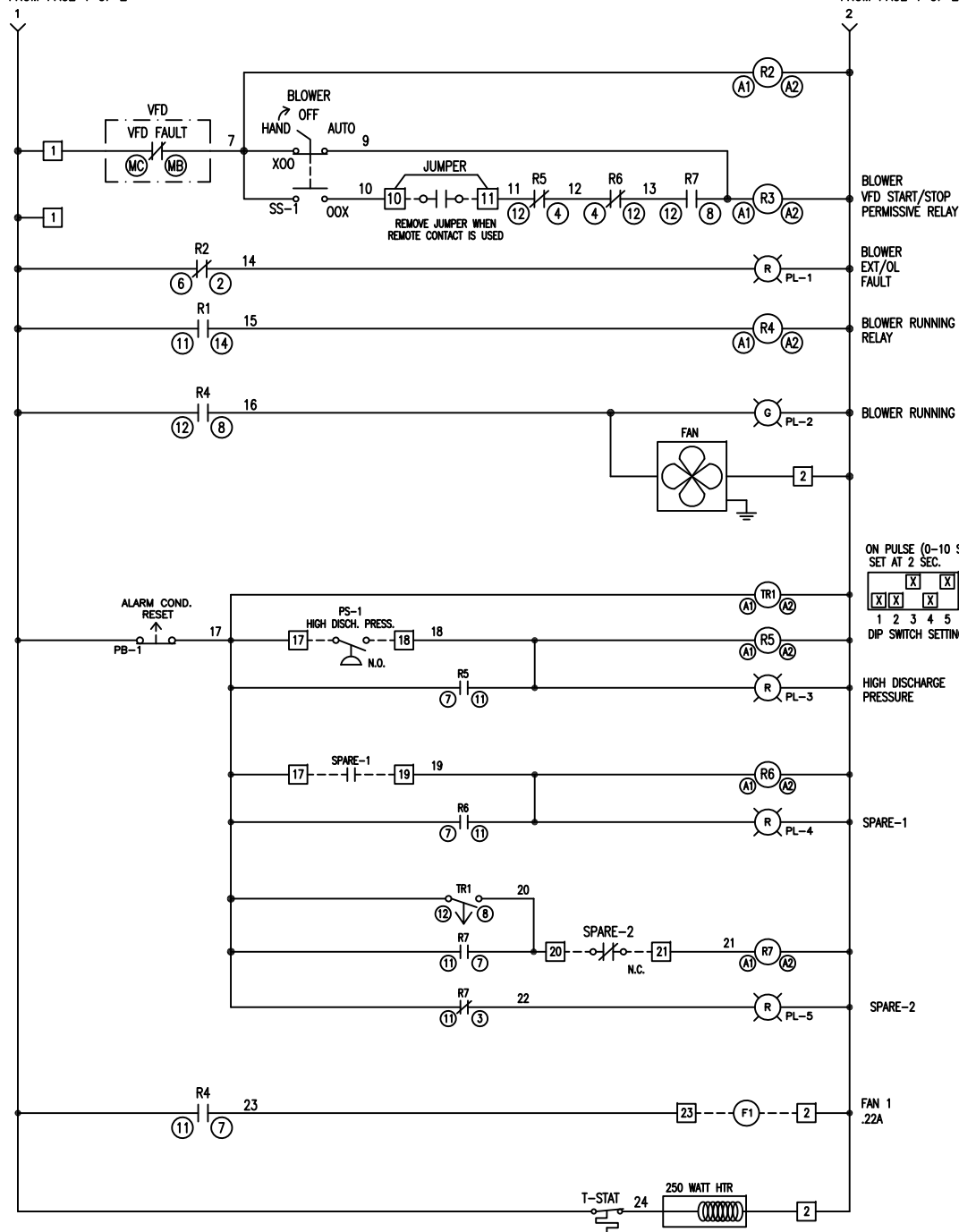
DATE 8/26/22

PAGE 1 OF 2

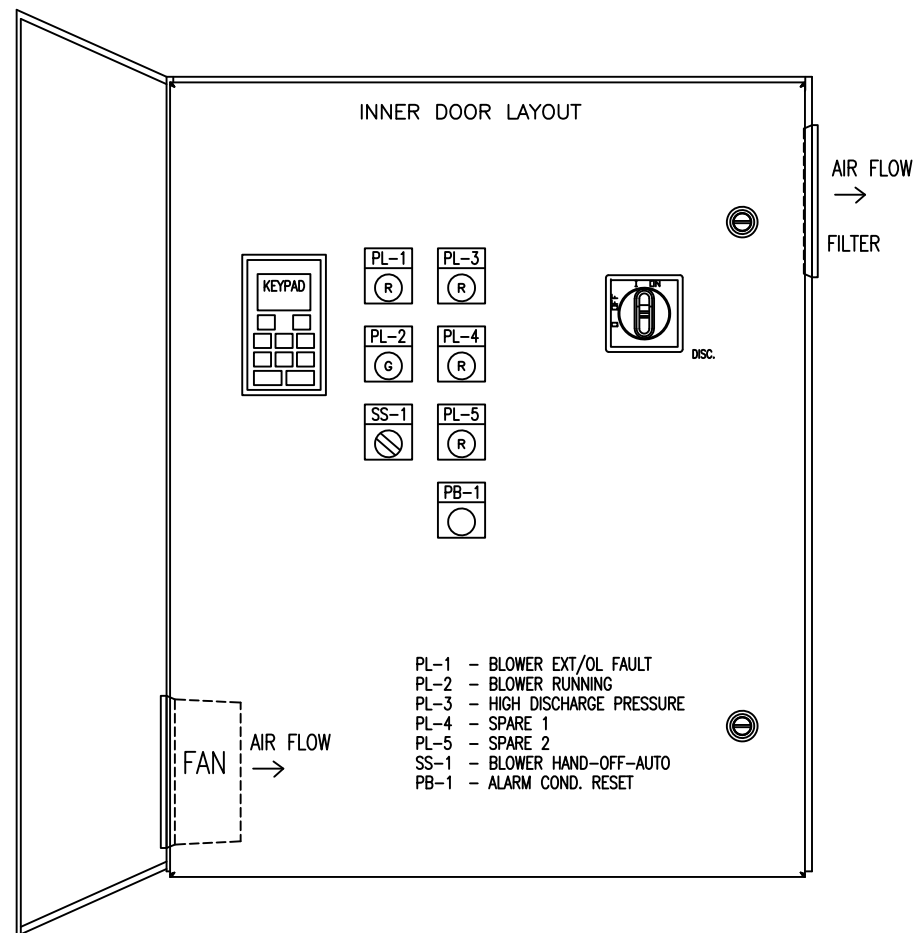
DWG NO. GASH300

INTERNATIONAL CONTROL PRODUCTS, INC.

FROM PAGE 1 OF 2



FROM PAGE 1 OF 2



REVISIONS				
REV.	DATE	BY	CHKD.	DESCRIPTION

J.E. GASHO & ASSOCIATES
PO# 3597

APPROX. WEIGHT: 130 LB'S

HP 1.5
VOLTAGE 230

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TITLE			
VFD CONTROL PANEL			
DATE	PAGE	DWG NO.	INTERNATIONAL CONTROL PRODUCTS, INC.
8/26/22	2 OF 2	GASH300	

APPENDIX K
SVE MANUFACTURER'S SPECIFICATIONS AND MANUALS



The Leader in Blower & Vacuum Solutions

Submittal Documentation

22 9

For:

AWT Environmental

PO Box 128

Sayreville, NJ 08871

Purchase Order #:

**Equipment Description: Skid mounted DRP9BL72D
Ametek Rotron Blower, 1 hp with GX125-DL moisture
separator, control panel**

R B 11/11/22

Supplier:

Geiger Gasho, Inc.

460 West Gay Street

West Chester, PA 19380

	ASTORIA 46 22-60 46TH STR, ASTORIA, NY 22-61 45TH STR, ASTORIA, NY
SUBMITTAL REVIEW	
CONTRACTOR: <u>MEGA CONTRACTING GROUP</u>	
SPECIFICATION SECTION: <u>022221</u>	
SUBMITTAL NUMBER: <u>3</u>	REVISION: <u>2</u>
SUBSTITUTIONS: NO YES - SUBSTITUTION REQUEST <u>N/A</u>	
CHANGES, NOTES FLAGGED: YES <u>N/A</u>	
RECOMMEND FOR APPROVAL: <u>YES</u> FOR RECORD	
REVIEWED BY: <u>AK</u>	DATE: <u>11/14/22</u>
<small>THIS SUBMITTAL HAS BEEN REVIEWED FOR GENERAL COMPLIANCE WITH THE CONTRACT DOCUMENTS TO THE BEST OF OUR KNOWLEDGE FOR ARCHITECT APPROVAL. IN NO CASE IS THE SUBCONTRACTOR OR SUPPLIER RELIEVED OF FULL RESPONSIBILITY FOR ADHERANCE TO THE CONTRACT DOCUMENTS AND ALL NOTATIONS PROVIDED ON SUBMITTALS. ALL FIELD VERIFICATIONS AND DIMENSIONS ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR ASSOCIATED WITH THIS SUBMISSION. IT IS THE RESPONSIBILITY OF THE ARCHITECT TO CONFIRM ALL DESIGN PARTIES REQUIRED, HAVE REVIEWED AND APPLIED THEIR STAMPS ACCORDINGLY, TO PRODUCE A FULLY REVIEWED SUBMITTAL. MEGA CONTRACTING GROUP CONSIDERS SUBMITTALS RETURNED WITH THE ARCHITECTS STAMP OF APPROVAL ARE FINAL, AND UNDERSTANDS THE REVIEW PERIOD TO BE 10 WORKING DAYS FROM THE DATE OF SUBMISSION. SUBMITTALS WHICH ARE NOT RETURNED WITHIN THIS TIMEFRAME ARE SUBJECT TO POTENTIAL TIME EXTENSION. ANY NOTATIONS MADE BY ANY DESIGN PARTY WHICH INCREASE THE CONTRACTUALLY AGREED UPON SCOPE OF WORK WILL BE IDENTIFIED BY THE PRIME CONTRACTOR WHO WILL ADVISE THE DESIGN AND OWNERSHIP ENTITIES OF ANY COST OR SCHEDULE CHANGES.</small>	

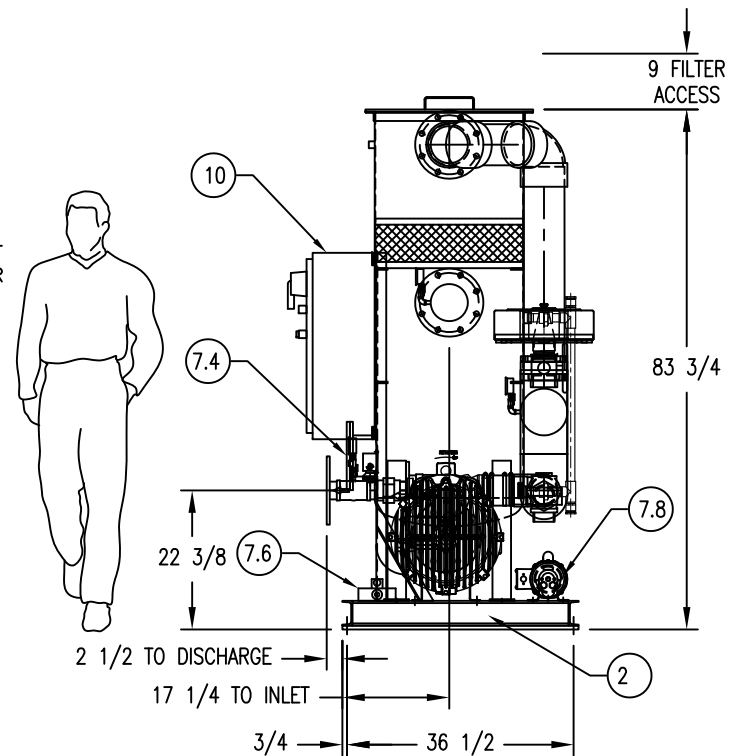
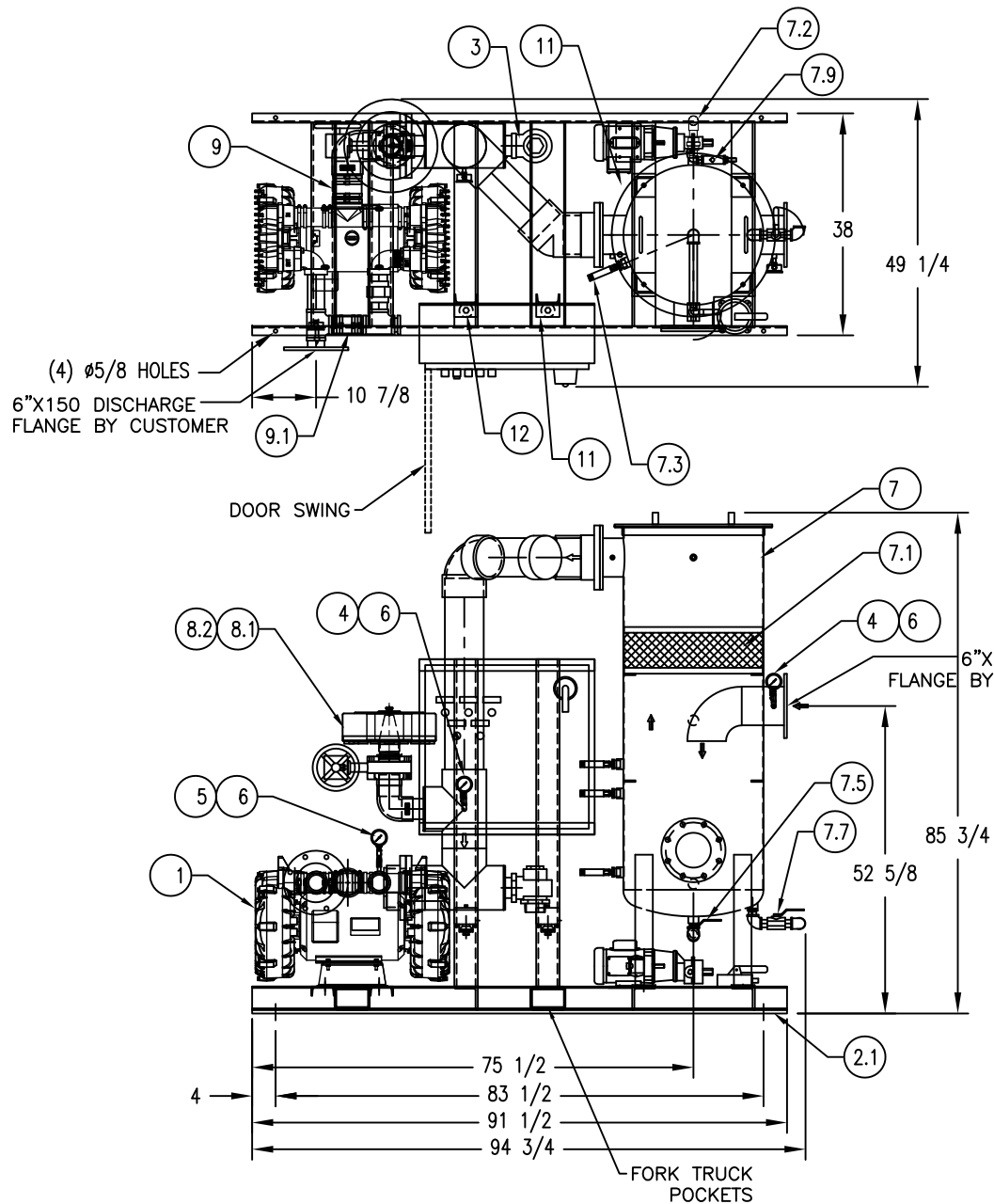
500 scfm at 50" H₂O

Description	Date	Revision
Revise per cust comments	9/26/2022	A
Item 1 was DR979	11/8/2022	B
Item 11 was 1"Hg set pt		

#220618JG.1

Paint Gasho Blue Oil Base

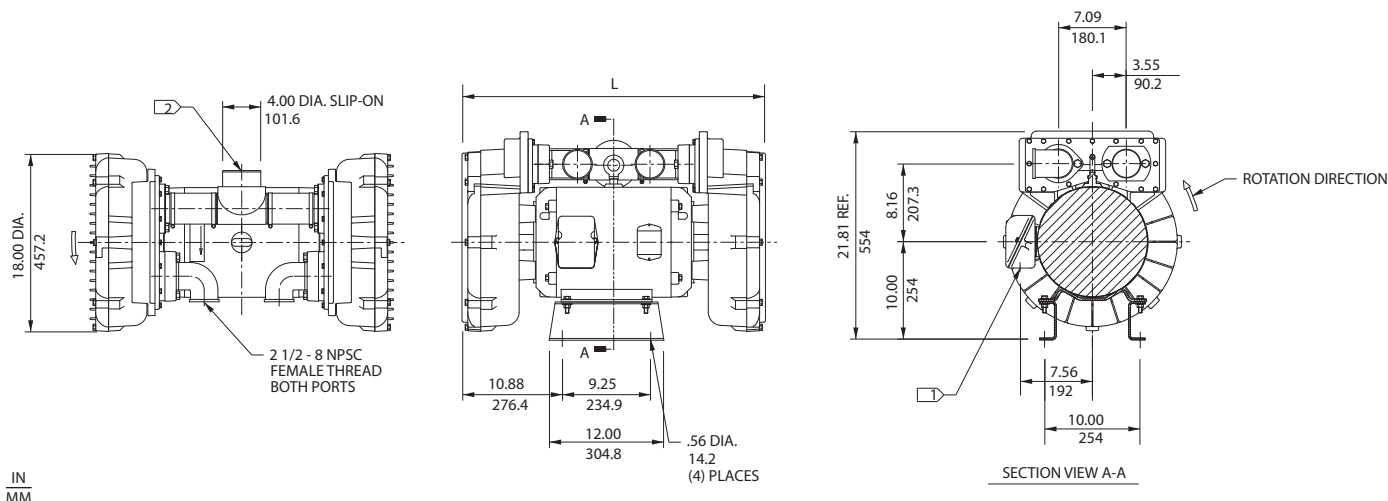
[illegible]



NOTES:

1. CUSTOMER PIPING TO BE INDEPENDENTLY SUPPORTED. PACKAGE PIPE SUPPORTS PROVIDED BUT NOT SHOWN.
2. PACKAGE IS TO BE MOUNTED SECURELY TO A LEVEL CONCRETE PAD OR EQUAL
3. TOLERANCE $\pm 1/2"$
4. DIM ARE CRITICAL DIMENSIONS
5. 900 ITEMS SHIP LOOSE

			DRAWN BY: JJH	DATE 8/11/22	J.E.GASHO & Assoc., Inc. 460 W. GAY ST. WEST CHESTER, PENNSYLVANIA 19380	
			APPROVED BY:	DATE		
			DIMENSIONS IN INCHES			
			SCALE NA		REGEN BLOWER PKG DRP9BL72D 15HP GX125-DL M.S.	
			TOLERANCE ±1/2"	ANGULAR TOLERANCE		
			MATERIAL	WEIGHT 1750		
B	11/9 2022	BLOWER WAS DR979			JG22-G-3595	
A	9/26 2022	CTRL BOX WAS 24 X 30				
REV.	DATE	DESCRIPTION	SHEET 1 OF 1		B	

IN
MM

NOTES

- 1) TERMINAL BOX CONNECTOR HOLE 1.37 (34.8) DIA.
- 2) PRESSURE OUTLET CONNECTION.
- 2 DRAWING NOT TO SCALE, CONTACT FACTORY FOR SCALE CAD DRAWING.
- 3 CONTACT FACTORY FOR BLOWER MODEL LENGTHS NOT SHOWN.

MODEL	L (IN/MM)
DRP9BM72C	31.75/806.5
DRP9BL72C	33.44/849.4

		Part/ Model Number					
Specification	Units	DRP9BM72C 037033	DRP9BM72D 036275	DRP9BM86C 037040	DRP9BM86D 036276	DRP9BL72C 036512	DRP9BL72D 036513
Motor Enclosure - Shaft Mtl.	-	ODP-CS	ODP - CS	ODP-CS	ODP - CS	ODP-CS	ODP - CS
Horsepower	-	20	20	20	20	15	15
Voltage	AC	230/460	230/460	575	575	230/460	230/460
Phase - Frequency	-	Three-60 hz	Three - 60 hz	Three-60 hz	Three - 60 hz	Three-60 hz	Three - 60 hz
Insulation Class	-	F	F	F	F	F	F
NEMA Rated Motor Amps	Amps (A)	49/24.5	49/24.5	20	20	37/18.5	37/18.5
Service Factor	-	1.15	1.15	1.15	1.15	1.15	1.15
Max. Blower Amps	Amps (A)	60/30	60/30	22.2	22.2	50/25	50/25
Locked Rotor Amps	Amps (A)	306/153	306/153	115	115	256/128	256/128
NEMA Starter Size	-	3/2	3/2	2	2	2/2	2/2
Shipping Weight	Lbs Kg	400 181.4	408 185.1	464 210.5	408 185.1	380 172.4	418 189.6
Description	-	Pressure Mode	Suction Mode	Pressure Mode	Suction Mode	Pressure Mode	Suction Mode

Voltage - ROTRON motors are designed to handle a broad range of world voltages and power supply variations. Our dual voltage 3 phase motors are factory tested and certified to operate on both: **208-230/415-460 VAC-3 ph-60 Hz** and **190-208/380-415 VAC-3 ph-50 Hz**. Our dual voltage 1 phase motors are factory tested and certified to operate on both: **104-115/208-230 VAC-1 ph-60 Hz** and **100-110/200-220 VAC-1 ph-50 Hz**. All voltages above can handle a $\pm 10\%$ voltage fluctuation. Special wound motors can be ordered for voltages outside our certified range.

Operating Temperatures - Maximum operating temperature: Motor winding temperature (winding rise plus ambient) should not exceed 140°C for Class F rated motors or 120°C for Class B rated motors. Blower outlet air temperature should not exceed 140°C (air temperature rise plus inlet temperature). Performance curve maximum pressure and suction points are based on a 40°C inlet and ambient temperature. Consult factory for inlet or ambient temperatures above 40°C .

Maximum Blower Amps - Corresponds to the performance point at which the motor or blower temperature rise with a 40°C inlet and/or ambient temperature reaches the maximum operating temperature.

This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. AMETEK is not responsible for blowers driven beyond factory specified speed, temperature, pressure, flow or without proper alignment. Actual performance will vary depending on the operating environment and application. AMETEK products are not designed for and should not be used in medical life support applications. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For product designed to meet specific applications, contact AMETEK Technical & Industrial Products Sales department.

FEATURES

- Manufactured in the USA - ISO 9001 and NAFTA compliant
- CE compliant - Declaration of Conformity on file
- Maximum flow: 800 SCFM
- Maximum pressure: 116 IWG
- Maximum vacuum: 95 IWG
- Standard motor: 20 HP, ODP
- Cast aluminum blower housing, impeller & cover; cast iron flanges (threaded)
- UL & CSA approved motor with permanently sealed ball bearings
- Inlet & outlet internal muffling
- Quiet operation within OSHA standards when properly piped or muffled - 2 mufflers included part #515185

MOTOR OPTIONS

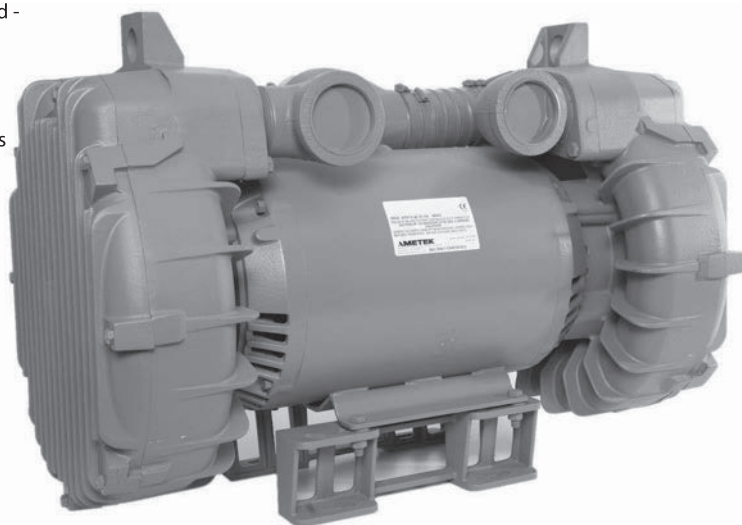
- International voltage & frequency (Hz)
- Chemical duty, high efficiency, inverter duty or industry-specific designs
- Various horsepower for application-specific needs

BLOWER OPTIONS

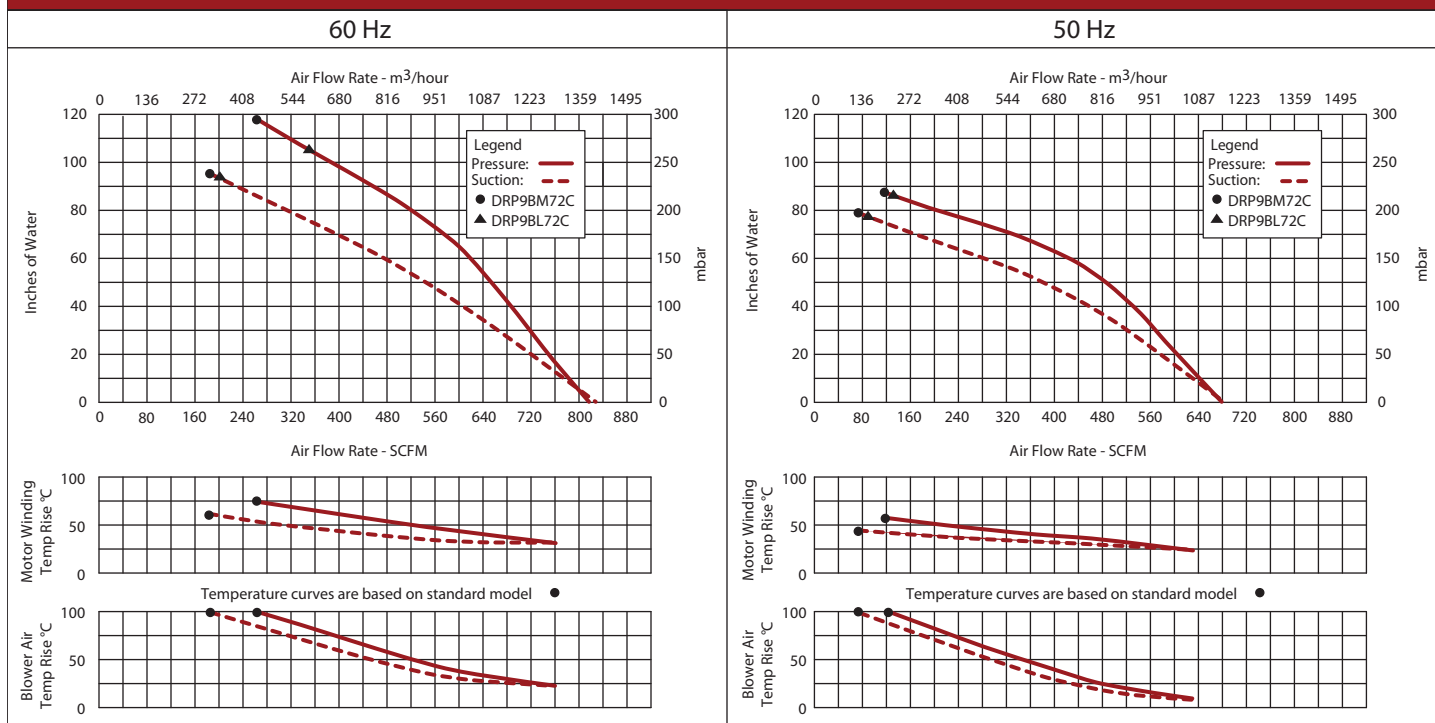
- Corrosion resistant surface treatments & sealing options
- Remote drive (motorless) models
- Slip-on or face flanges for application-specific needs

ACCESSORIES

- Flowmeters reading in SCFM
- Filters & moisture separators
- Pressure gauges, vacuum gauges, & relief valves
- Switches - air flow, pressure, vacuum, or temperature
- External mufflers for additional silencing
- Air knives (used on blow-off applications)
- Variable frequency drive package



Blower Performance at Standard Conditions



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RUBBER MAT, BLACK, 4 FT. X 6 FT. X 3/4 IN.

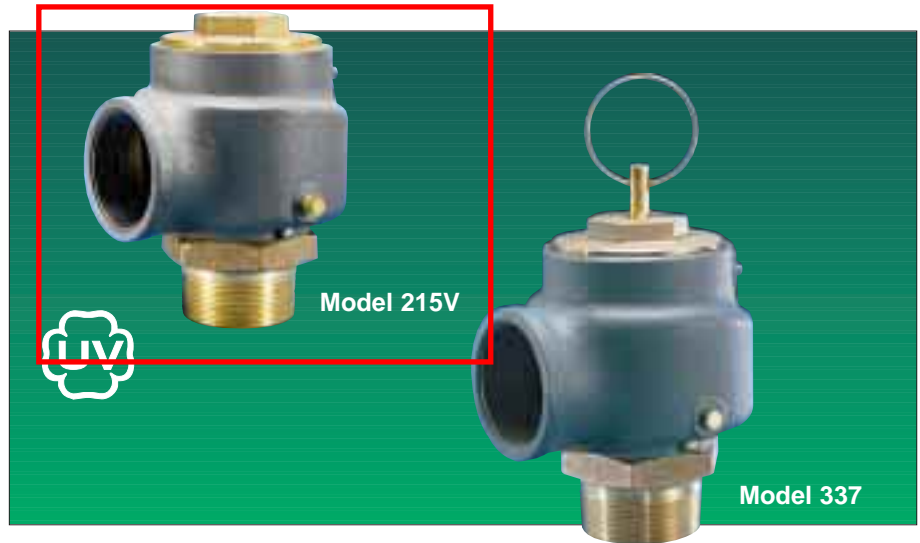
This Rubber Mat is ideal for agricultural, commercial and sporting uses. The anti-skid surface is safe and comfortable. Mats can be cut or interlocked, glued or fastened to any surface.

- 4 ft. x 6 ft. x 3/4 in.
- Heavy-duty 100% recycled rubber
- Insulating properties
- Noise and vibration absorbent
- Surface pattern may vary by location
- 5 year limited warranty



Specification	Description
Material:	100% Recycled Rubber
Product Length:	72 in.
Product Thickness:	3/4 in.
Product Type:	Rubber Matting
Product Width:	48 in.
Warranty:	5-Year Limited
Manufacturer Part Number	

Models 215V, 337 Model 337 is ASME Section VIII,
Air/Gas vacuum, 'UV' National Board Certified, Safety Valves



Pressure and Temperature Limits

Model 337:

1 to 60 psig [0.07 to 4.1 barg]
-20° to 406°F [-29° to 208°C]

Vacuum Limits

Model 215V:

2-inch HG
to 29-inch HG
[67.7 to 982 mbarg]
-20° to 400°F [-29° to 205°C]

Applications

- Protection of low to medium pressure high volume blowers, compressors and pneumatic conveying systems.
- Bulk hauling trailers/equipment.
- Light gauge tanks.
- Protection of high volume vacuum pumps and conveying systems.

Features and Benefits

- **Large nozzle design** provides high capacity.
- **Flat bronze valve seats are lapped** for optimum performance.
- **Warn ring offers easy adjustability** for precise opening with minimum pre-open or simmer and exact blowdown control.
- **Pivot between disc and spring** corrects misalignment and compensates for spring side thrust.

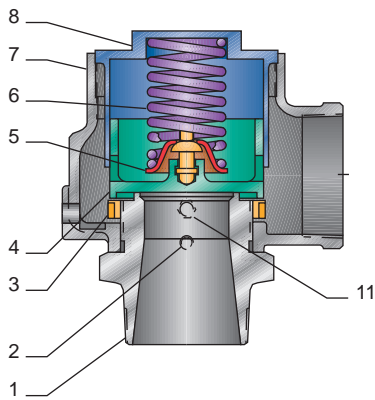
Model Descriptions

- **Model 337 has 'pull-ring' lift device** for easy manual testing.
- **Every valve is 100% tested/inspected** for pressure setting, blowdown and leakage.
- **All adjustments are factory sealed** to prevent tampering or disassembly.

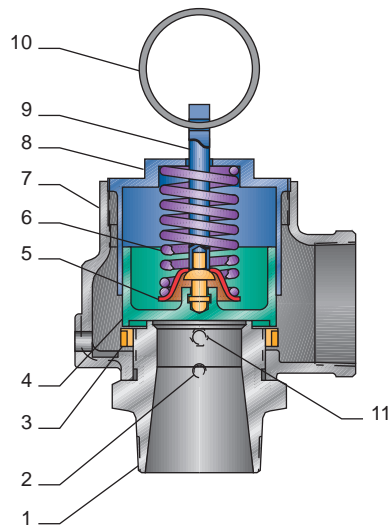
Option

- SS trim. (nozzle and disc) (Variation 03)

Models 215V, 337



Model 215V



Model 337

Parts and Materials - Models 215V, 337

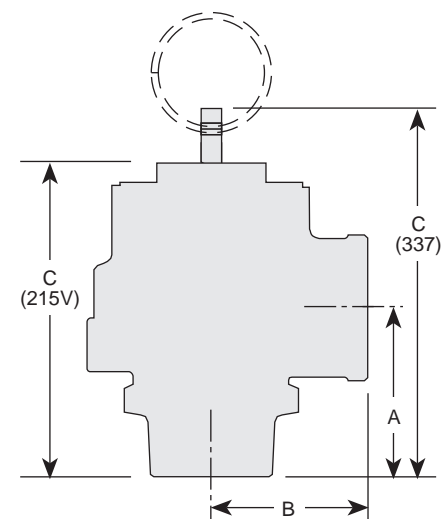
No.	Part Name	215V	337
1	Nozzle ¹	Bronze, B62	Bronze, B62
2	Set Screw	Steel A108-1018 Brass Plated	Steel A108-1018 Brass Plated
3	Regulator Ring	Bronze B584 Alloy 84400	Bronze B584-C84400
4	Disc ¹	Bronze B584 Alloy 84400	Bronze B584-C84400
5	Spring Step	Steel A-109 Cadmium Plated	Steel A109, CAD Plated
6	Spring	SS, A313 TY 302	SS A313-302
7	Body	Cast Iron, Zinc Plated, B633	Iron A-126, CL A or B
8	Compression Screw	Bronze, B-584 Alloy 84400	Bronze, B584-C84400
9	Stem ²	N/A	Brass B16
10	Lift Ring ²	N/A	SS A313-302
11	Regulator Ring Set Screw	N/A	Brass B16

Specifications

Size Inlet and Outlet		Dimensions, in [mm]						Weight			
		A		B		C 215V		C 337		lb	[kg]
2"	[50.8 mm]	3 1/4	[82.5]	3	[76.2]	6 1/2	[165.1]	7	[177.8]	8	[3.6]
2 1/2"	[63.5 mm]	3 3/4	[95.2]	3 1/2	[88.9]	7 5/8	[194.6]	8	[203.2]	12	[5.4]
3"	[76.2 mm]	4 1/4	[107.9]	4	[101.6]	8 1/2	[215.9]	9	[228.6]	20	[4.1]

Notes

1. Disc and nozzle available in SSA-479 TY 316.
2. Stem and lift ring available on Model 337 only.



Model 337

Model 215V

Non-code Vacuum Air (SCFM) - Flow Coefficient

Relief Set (in, HG)	Valve Inlet and Outlet Size		
	2" Orifice Area, in ² 1.84	2 1/2" Orifice Area, in ² 2.79	3" Orifice Area, in ² 4.04
2	229	347	503
5	338	512	742
10	415	630	912
15	426	646	936
20	426	646	936

Non-code Vacuum Air [Metric, Nm³/h]

Relief Set [mbarg]	Valve Inlet and Outlet Size		
	5.08 cm Orifice Area [11.86 cm ²]	6.35 cm Orifice Area [17.97 cm ²]	7.62 cm Orifice Area [26.05 cm ²]
50	328	498	722
100	450	682	988
150	533	807	1170
200	593	899	1303
250	638	966	1400
300	669	1014	1470
350	690	1046	1516
400	701	1062	1540
450	704	1067	1546
500	704	1067	1546
550	704	1067	1546
600	704	1067	1546
650	704	1067	1546
700	704	1067	1546
750	704	1067	1546

Models 215V, 337

Model Number/Order Guide

Model Number Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Example	2	1	5	V	—	H	0	1	A	Q	E				
Model															
215V															
0337															
Inlet Size															
H - 2-inch [50.8 mm]															
J - 2½-inch [63.5 mm]															
K - 3-inch [76.2 mm]															
Variation (01 through 99)															
01 - Bronze Disc and Nozzle															
03 - SS Disc and Nozzle															
60 - BSP Connections															
Design Revision															
Indicates non-interchangeable revision															
Current Design is at Revision 'A'															
Valve Service															
K - Air ASME Section VIII (Model 337 only)															
Q - Vacuum (Model 215V only)															
N - Non-code Air/Gas (Model 337 only)															
Spring Material															
E - SS															
Set Pressure															
Model 337, 1 psig [0.7 barg] (0001) through 60 psig [4.1 barg] (0060)															
Model 215V, 2-inch HG [68 mbarg] (0002) through 22-inch HG [743 mbarg] (0022) vacuum															

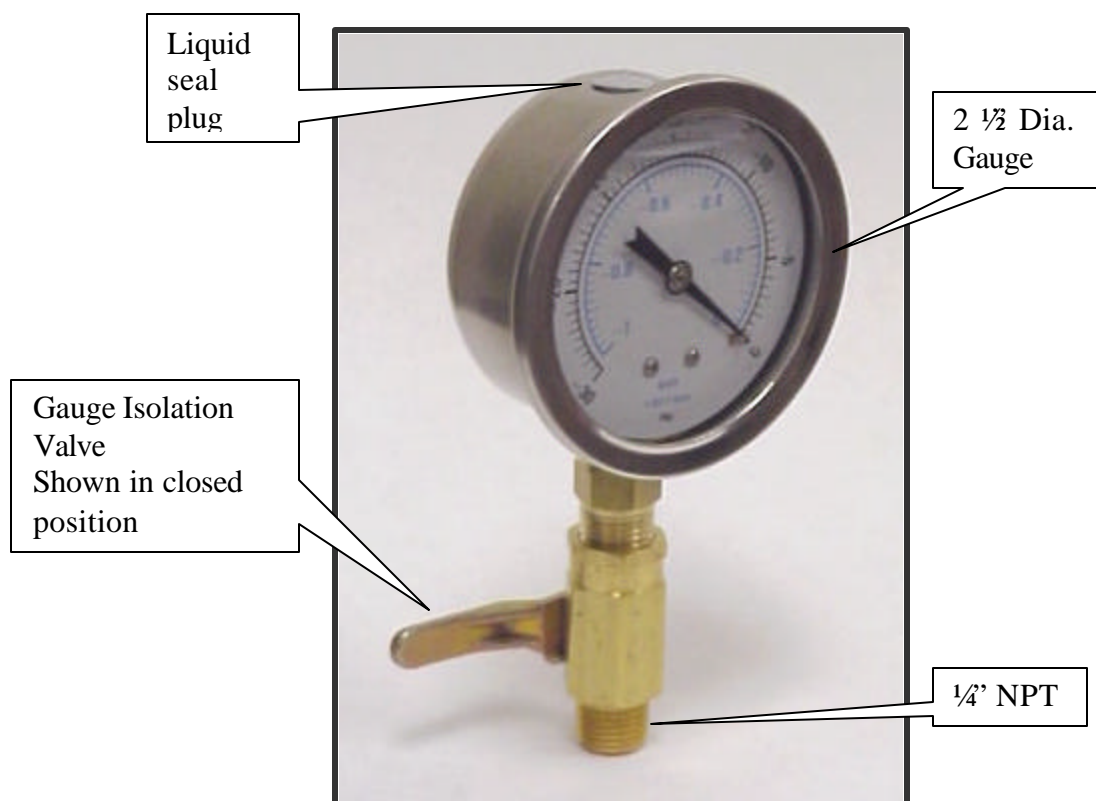
J. E. GASHO & ASSOCIATES, INC.

Authorized Manufacturer's Representative
Air / Gas Moving Equipment
460 W. GAY STREET
WEST CHESTER, PA 19380
PHONE: 610-692-5650 FAX: 610-692-5837

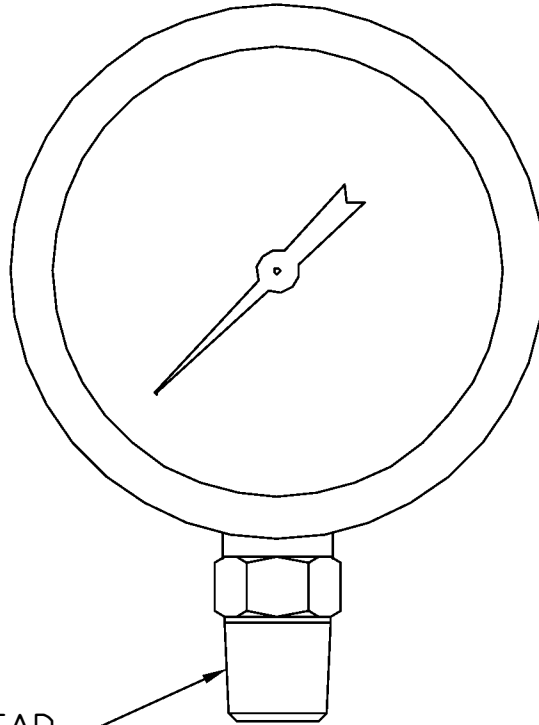
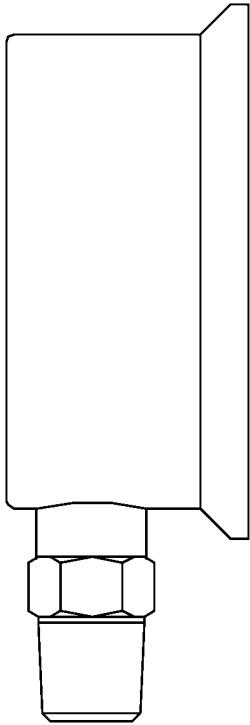
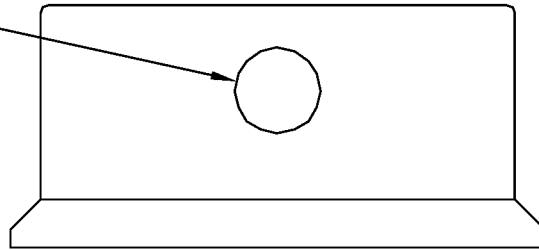
Pressure and Vacuum Gauges

We use both standard gauges and liquid filled gauges from a variety of manufacturers. Gauges are installed on our packages with gauge isolation valves (gauge cocks) part number VIS-0.25-FM-B-0000. The gauge isolation valve can be used as a snubber while reading the gauge by opening it slightly. To protect gauges from damage due to shocks or pulsations in the system, gauge isolation valves should be closed except when the gauge is being read.

Liquid filled gauges may display incorrect readings due to variations in atmospheric pressure. To determine if a gauge is subject to this condition, the liquid filled cavity should be temporarily vented to atmosphere. Most liquid filled gauges have a seal plug in the liquid filled cavity. Remove this plug to allow the cavity to be vented to atmosphere. In some instances the case can be lightly squeezed to burp it. Replace the plug.



VENT PLUG
LIQUID FILLED ONLY



1/4" NPT THREAD

25.0.015PSI

NOMINAL SIZE	
25 = 2.5in	
40 = 4.0 in.	
TYPE	
0 = NON-FILLED	
1 = LIQUID FILLED	
RANGE	

NOTES:

1. WE USE BOTH STANDARD GAUGES & LIQUID FILLED GAUGES FROM A VARIETY OF MANUFACTURERS
2. STANDARD RANGES:
PRESSURE: 0-6 PSI & 0-160 IWC
0-15 PSI
0-30 PSI
VACUUM: 0-12 IN. HG. & 0-160 IWC
0-30 IN., HG.

			DRAWN BY:	DATE	J. E. GASHO & Assoc., Inc. 480 W. GAY ST. WEST CHESTER, PENNSYLVANIA 19380
			M. WITTE	8-18-00	
			APPROVED BY:	DATE	PRESSURE GAUGE NUMBERING SYSTEM
			DIMENSIONS IN INCHES		
			SCALE		
			TOLERANCE	ANGULAR TOLERANCE	
			MATERIAL	WEIGHT	
REV.	DATE	DESCRIPTION	SHEET 1 OF 1		

025 SERIES BALL VALVE



Maximum Operating Pressure - 500 psi
Maximum Operating Temperature - 180 Degrees F
Ball Through Hole Diameter - .218

025 One-Way Ball Valve Design Considerations

The 025 Series One-Way Ball Valve compact design promotes multiple configurations to fit the exact end use application. The 025 Ball Valve Series is rated to 500 psi and will support flow and pressure only in the flow direction. The 025 Series has a one-piece body construction, stamped with directional flow arrows, to cover 1/4" NPT end configuration applications. The Zinc Die Cast Lever Handle is standard. Handles can be ordered Reversed - to lie over the outlet when the valve is in the open position. UL configurations are available and rated to 250 psi. UR configurations are available and rated to 500 psi.

Example:	<u>Inlet End</u>	<u>Outlet End</u>	<u>Seal</u>	<u>Handle</u>	<u>Plating</u>
	1/4 FNPT	1/4 MNPT	Buna-N	Steel	ENP
SMC Part Number: 025-4F4M-B,SH,ENP					

The handle will lie over the Inlet port when the valve is in the open position. SMC Part Numbers are a description of the valve as read left to right, Inlet to Outlet.

Example: 025-4F4M-B,SH,ENP = 1/4 FNPT Inlet x 1/4 MNPT Outlet

025 Series Options

Material Options Brass Body, Nickel Plated Brass Ball, Teflon® Seats, Stainless Handle Screw

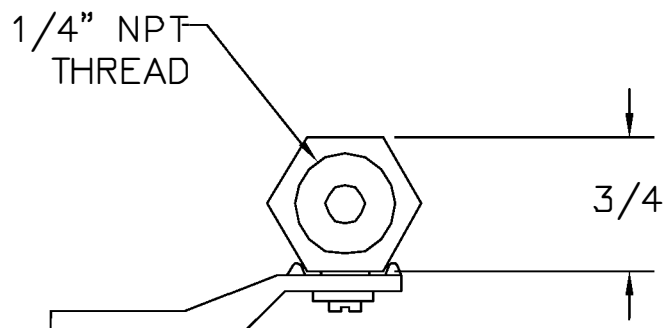
Seal Options Buna-N, Ethylene Propylene, Fluoroelastomer (Viton®), Neoprene

Body Options	1/4 Female x 1/4 Female NPT	1/4 Female x 1 1/16-16 Male
	1/4 Female x 1/4 Male NPT	1/4 Female x 7/16-24 Female
	1/4 Female x 1/8 Female NPT	1/4 Female x 1/4 Female Flare
	1/4 Female x 1/8 Male NPT	1/4 Female x 3/8 Compression
	1/4 Female x 1/4 Hose Barb	

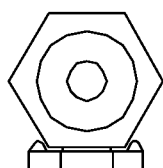
Handle Options Zinc Die Cast Lever (Standard), Zinc Die Cast Lever with Red Vinyl Sleeve, Steel Lever, Steel Lever, Round Handle, Steel Lever, Steel Lever with Red Vinyl Sleeve, Round Zinc Die Cast Handle, Black Nylon T-Handle, Blue Nylon Knob, .312 x 1" Stem, Screw Slot Headed Ball

Plating Options Electroless Nickel, Black Zinc

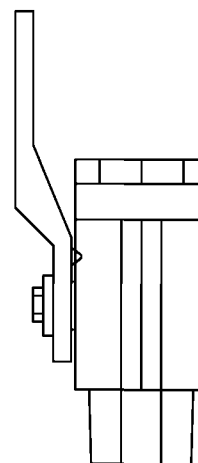
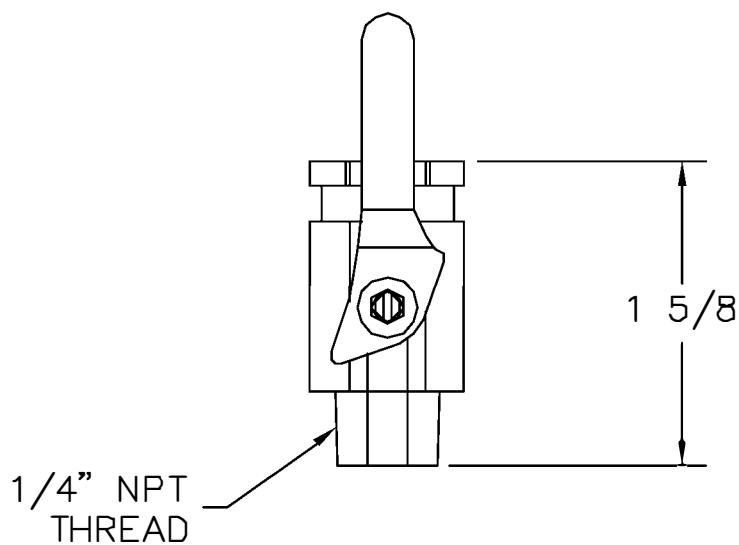
SMC will quote alternate materials or customize our standard products when quantities ensure competitive pricing.
Contact Customer Service at (651) 653-0599, FAX - (651) 653-0989, E-Mail - info@specialtymfg.com



PLAN VIEW – CLOSED



PLAN VIEW – OPEN



			DRAWN BY: M. WITTE	DATE 8-17-00	J. E. GASHO & Assoc., Inc. 460 W. GAY ST. WEST CHESTER, PENNSYLVANIA 19380	
			APPROVED BY:	DATE		
			DIMENSIONS IN INCHES		GAUGE ISOLATION VALVE SMC VA BRS 025-4F4M-BT	
			SCALE			
			TOLERANCE	ANGULAR TOLERANCE		
			MATERIAL	WEIGHT		
REV.	DATE	DESCRIPTION	SHEET 1 OF 1			—

460 West Gay Street
West Chester, PA
610-692-5650 Fax:



The Leader in Blower & Vacuum Solutions

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cs@gasho.org

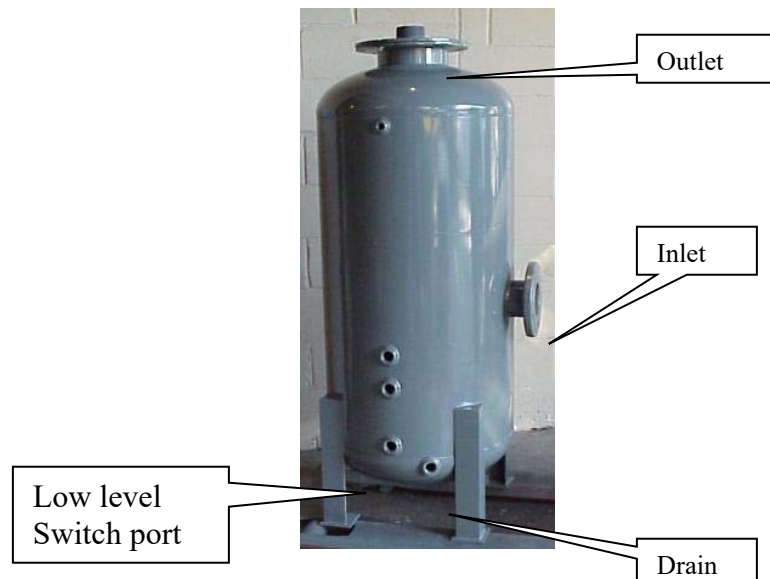
Moisture Separators

Moisture separators are used to remove water and other liquids from air streams. They are typically used on the inlet of vacuum systems to remove water and other contaminants before they enter the vacuum pump. The air volume of the moisture separator reduces the velocity of the air stream to allow liquids to precipitate. Up to 95% water removal is possible. The models GX-30 & GX-60 are rated for full vacuum. Other moisture separators are rated to 18 in. Hg. Higher vacuum ratings available.

Inside the top of the separators is a basket with stainless steel demister/filter media to trap entrained water droplets. Standard accessories include a sight gauge and drain valve.

Options include: 1 to 3 level switches, hand operated sludge pump, automatic pump down systems, heat tracing, vacuum gauges, and thermometers.

Model Number	Nominal Flow Rate	Liquid Capacity	Diameter (inches)	Height (inches)	Inlet Size	Discharge Size	Cleanout Size	Weight (Pounds)
GX-30	250	8	16	47	3"	3"	4"	125
GX-60	500	22	20	57	4"	4"	4"	175
GX-90	1200	30	24	58	6" Flange	6" Flange	4"	240
GX-100DL	1300	40	27	70	4"	4"	6" Flange	305
GX-125DL	1500	40	27	82	6" Flange	6" Flange	6" Flange	320





CWI Tech-Mesh™ Knitted Products

Stainless and Specialty Alloy Wire Mesh Technology

The Right Wire Grade for your Unique Demister Application

CWI Tech-Mesh™ typically employs 300 series stainless grades (304, 304L, 316, 316L, 321, 347) for its wire mesh mist eliminators. For extreme or aggressive process conditions with unique product chemistries, CWI has a wide range of specialty alloys such as Monel 400, Copper, Duplex, Alloy 20Cb3, and Inconel. Other exotics and copper base metals may be available upon request.

www.centralwire.com



Made in the USA



A Leader In Wire Technology

Central Wire Industries is a world leader in the manufacture of wire in specialty alloys tailored to their customers specific requirements. Our product range includes stainless steel, nickel, cobalt, copper, brass, bronze, and zinc wires, in diameters ranging from 0.003 inches (0.0762 mm) to 1.000 inches (25.4 mm).

CWI Tech-Mesh™ products are engineered for maximum separation efficiency or minimum pressure drop in order to meet your specifications and vessel configurations.

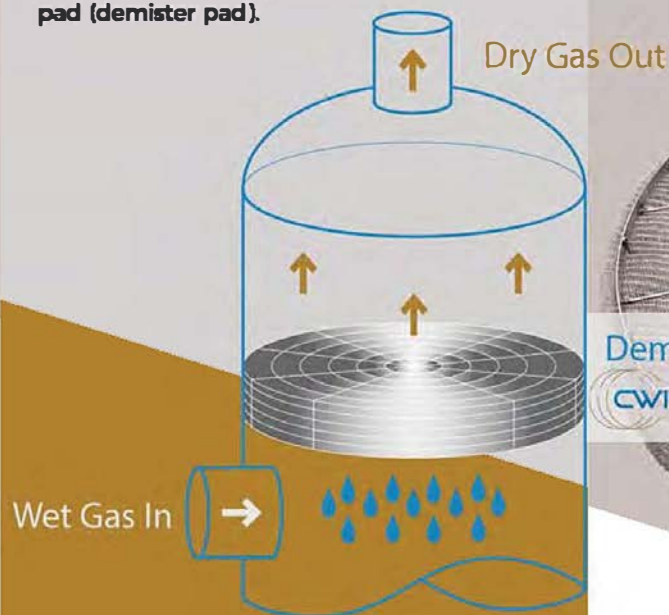
CONTACT US TODAY!

**HOUSTON, Tx
800-325-5861**



Applications

Liquid mist extraction from a vapor-liquid process stream using a knitted wire mesh pad (demister pad).



CWI Tech-Mesh™ demister pads are engineered and designed for specific process conditions.



CWI Tech-Mesh™ Engineered products

CWI Tech-Mesh™ is knitted on state of the art equipment under strict quality control processes. Your demanding mist extraction applications require that our demister pads meet rigorous technical specifications. Whether the process is mist elimination or coalescing, CWI offers product options in a variety of wire diameters, alloys, mesh densities, and product geometries. CWI Tech-Mesh™ products are engineered for maximum separation efficiency or minimum pressure drop in order to meet your specifications and vessel configurations.

Central Wire Industries is a world leader in the manufacture of wire in specialty alloys tailored to their customers specific requirements. Our product range includes stainless steel, nickel, cobalt, copper, brass, bronze, and zinc wires, in diameters ranging from 0.003 inches (0.0762 mm) to 1.000 inches (25.4 mm).

The industry standard size wire for mist eliminators is 0.011 inches (0.28 mm). The most common alloys used are 304 and 316 stainless steel.



Process Applications

- Gas-liquid separators
- Distillation equipment
- Process absorbers, precipitators, and scrubbers
- Chemical separators and extractors
- Oil and gas processing equipment
- Combustion gas scrubbers
- Knock-out drums and receivers
- Refinery towers
- Liquid-Liquid coalescers
- Pollution control equipment
- Liquid entrainment for compressor equipment
- Product recovery systems

CONTACT US TODAY!

HOUSTON, Tx / 800-325-5861



Custom Manufactured with Exceptional Quality

Mist eliminators are custom designed specifically to meet each customers' specifications and equipment geometry.

A wide array of product configurations and geometries

CWI's engineering team designs exactly what you need and follows a rigorous design process:

- Wire grade selection and verification
- Drawing wire to exact size diameter
- Wire surface finishing/coating
- Knit configuration setup
- Crimped for correct mesh density construction
- Pad design and construction



CWI Tech-Mesh™ wire is drawn and treated under the highest quality standards in one of our several manufacturing locations in North America

Mist eliminators are configured and constructed to ensure minimum liquid entrainment at maximum flow conditions.



CWI Tech-Mesh™ Quality Assurance

Meeting exact customer product dimensional, ductility, and performance specifications requires specialized alloy selection and engineered manufacturing. CWI Tech-Mesh™ can be manufactured in a wide range of wire diameters, alloys, mesh densities, and product geometries under precise production and processing equipment capabilities. Mist Eliminator Mesh Densities typically range from 5.0 to 12.0 lb/ft³.

- Engineering and design consultation services
- Mechanical wire testing measures tensile strength, yield strength, and elongation
- Microscopy evaluation for alloy grain structure and surface quality
- Engineering and manufacturing process step checks
- Final product thorough inspection
- Fast, reliable shipping, customized inventory and delivery programs
- Customer service: in person, on-line or over the phone



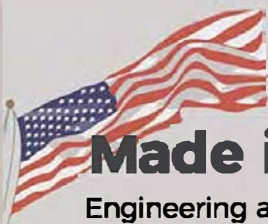
CWI produces the core products in-house that comprise the final product including wire, support rods, and welding wire.

CONTACT US TODAY!

HOUSTON, TX / 800-325-5861



The Right Wire Grade for your Unique Demister Application



Made in the USA

Engineering and designing the best mist extraction mesh products.

CWI has the widest range of alloys.

300 series stainless grades (304, 304L, 316, 316L, 321, 347)

Monel 400, Copper, Duplex, Alloy 20Cb3, and Inconel.

Exotics and Copper base metals - available upon request

CWI engineered products are tailored to your requirements to ensure that your process is optimized and the product lasts.

CWI has the materials and resources to meet your custom mist elimination requirements.



The Right Wire Grade for your Unique Demister Application

CWI Tech-Mesh™ typically employs **300 series stainless grades (304, 304L, 316, 316L, 321, 347)** for its wire mesh mist eliminators. For extreme or aggressive process conditions with unique product chemistries, CWI has a wide range of specialty alloys such as **Monel 400, Copper, Duplex, Alloy 20Cb3, and Inconel**. Other **exotics and copper base metals** may be available upon request. You can choose the wire alloy most suitable to withstand and last under your harsh operating conditions. CWI has the widest range of alloys.

We can also design "co-knits" using a range of non-metallic synthetic materials such as fiberglass, polypropylene, Dacron, Teflon, and other polymers.

Contact our engineering team to discuss your special mist elimination challenge.

If you have any additional questions about our products, check out the Live Chat Option on our website. **www.centralwire.com**

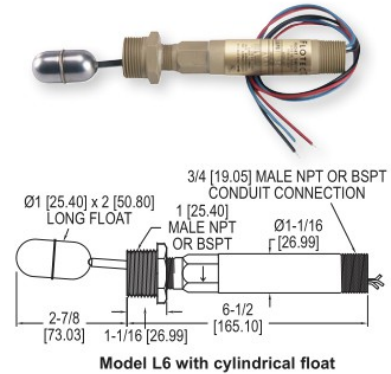
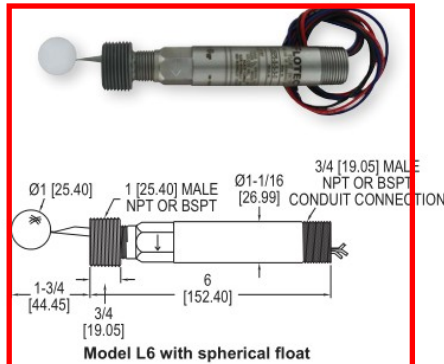
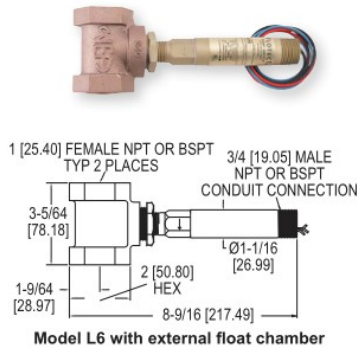


SERIES L6 | W.E. ANDERSON™ BY DWYER



FLOTECT® LIQUID LEVEL SWITCHES

Easy In-wall or External Installation, Up to 2000 psig (138 bar), Compact Size



The **Series L6 FloTECT® Liquid Level Switches** are rugged and reliable float switches which operates automatically to indicate tank level. It is offered with a 303 SS or brass body with spherical or cylindrical float options.

FEATURES/BENEFITS

- Compact design is built for years of trouble-free service
- Simple and dependable operation with no mechanical linkage
- Float lever pivoted within the body moves when the process liquid displaces the float and magnet on the opposite end of the float lever controls a second magnet on the switch actuating lever located in the switch housing
- Leak proof lower body machined from bar stock
- Side wall or direct tee mounting options available to act as an external float chamber
- Weatherproof and explosion-proof body for demanding outdoor applications
- Electrical assembly can be easily replaced without removing the unit from the installation so that the process does not have to be shut down
- Sensitive to level changes of less than 1/2" (12 mm)

APPLICATIONS

- Direct pump control for maintaining level
- Automatic tank dump operations
- Level control
- Valve control
- Level alarm in sumps, scrubber systems, hydro-pneumatic tanks, boilers, and water/wastewater treatment processes

OPTIONS

To order add suffix:	Description
-MV	Gold plated contacts for dry circuits (see electrical rating in specifications)
-MT	High temperature rated 400°F (204°C) (see electrical rating in specifications, no listings or approvals, only available on models with stainless steel floats)
-CSA	CSA and UL approved construction, includes weatherproof and explosion-proof junction box
-AT	ATEX compliant construction includes, weatherproof and explosion-proof, junction box
-IEC	IECEx certified construction, weatherproof and explosion-proof, junction box

Note: M25 is not available with the CSA housing.

DPDT Contacts

Note: To order, change seventh character in model number to "D".

Example: L6EPB-B-D-3-O

Options Not Shown: 1-1/2" and 2" (38.10 and 50.80 mm) male NPT or 1-1/2" and 2" (38.10 and 50.80 mm) male BSPT process connection, 2" female NPT or 2" female BSPT.

MODEL CHART

Model	Body	Installation	Float Material	Process Connection	Max. Pressure psig (bar)	Min. S.G.
L6EPB-B-S-3-O	Brass	Side wall mounting	Polypropylene spherical	NPT	1000 (69)	0.9
L6EPB-B-S-3-A	Brass	Side wall mounting	304 SS cylindrical	NPT	200 (13.8)	0.5
L6EPB-B-S-3-C	Brass	Side wall mounting	304 SS spherical	NPT	350 (24.1)	0.7
L6EPB-B-S-3-B	Brass	Brass external float chamber (tee)	Polypropylene spherical	NPT	250 (17.2)	0.9
L6EPB-B-S-3-H	Brass	Brass external float chamber (tee)	304 SS spherical	NPT	250 (17.2)	0.7
L6EPS-S-S-3-O	303 SS	Side wall mounting	Polypropylene spherical	NPT	2000 (138)	0.9
L6EPS-S-S-3-A	303 SS	Side wall mounting	304 SS cylindrical	NPT	200 (13.8)	0.5
L6EPS-S-S-3-C	303 SS	Side wall mounting	304 SS spherical	NPT	350 (24.1)	0.7
L6EPS-S-S-3-S	303 SS	304 SS external float chamber (tee)	Polypropylene spherical	NPT	2000 (138)	0.9
L6EPS-S-S-3-L	303 SS	304 SS external float chamber (tee)	304 SS spherical	NPT	350 (24.1)	0.7

BSPT process connection and M25 conduit connection. **Note:** To order, change eighth character in model to "4". **Example:** L6EPB-B-S-4-A

SPECIFICATIONS

Service: Liquids compatible with wetted materials.

Wetted Materials: Float: Solid polypropylene or 304 SS; Lower body: Brass or 303 SS; Magnet: Ceramic; External float chamber (tee): Matches lower body choice of brass or 303 SS; Other: Lever arm, spring, pin, etc.: 301 SS.

Temperature Limit: -4 to 220°F (-20 to 105°C) Standard, MT high temperature option 400°F (205°C) (MT not UL, CSA, ATEX, IECEx and KC). ATEX compliant AT, IECEx IEC and KC option ambient temperature -4 to 167°F (-20 to 75°C) process temperature: -4 to 220°F (-20 to 105°C).

Pressure Limits: See model chart.

Enclosure Rating: Weatherproof and Explosion-proof. Listed with UL and CSA for Class I, Groups A, B, C and D; Class II, Groups E, F, and G. (Group A on stainless steel body models only).

ATEX CE 0344 Ex II 2 G Ex d IIC T6 Gb Process Temp 75°C.

EC-Type Certificate No.: KEMA 04ATEX2128.

ATEX Standards: EN 60079-0: 2009; EN60079-1: 2007.

IECEx Certified: For Ex d IIC T6 Gb Process Temp 75°C.

IECEx Certificate of Conformity: IECEx DEK II.0039.

IECEx Standards: IEC 60079-00: 2007; IEC 60079-1: 2007.

Korean Certified (KC) for Ex d IIC T6 Gb Process Temp 75°C.

KTL Certificate Number: 2012-2454-75.

Switch Type: SPDT snap switch standard, DPDT snap switch optional.

Electrical Rating: UL models: 5 A @ 125/250 VAC (V~), CSA, ATEX and IECEx models: 5 A @ 125/250 VAC (V~); 5 A res., 3 A ind. @ 30 VDC (V---). MV option: 1 A @ 125 VAC (V~). MT option: 5 A @ 125/250 VAC (V~). [MT option not UL, CSA, ATEX or IECEx].

Electrical Connections: UL models: 18 AWG, 18" (457.20 mm) long. ATEX/CSA/IECEx models: terminal block.

Upper Body: Brass or 303 SS.

Conduit Connection: 3/4" (19.05 mm) male NPT standard, 3/4" (19.05) female NPT or M25 with BSPT option on junction box models.

Process Connection: 1" (25.40 mm) male NPT or 1" (25.40 mm) male BSPT on models without external float chamber, 1" (25.40 mm) female NPT or 1" (25.40 mm) female BSPT on models with external float chamber.

Mounting Orientation: Horizontal with index arrow pointing down.

Specific Gravity: See chart.

Weight: Approximately 1 lb (.5 kg) without external float chamber, 1.75 lb (.8 kg) with external float chamber.

Agency Approvals: ATEX, CE, CSA, IECEx, KTL, UL.

USA: California Proposition 65

⚠ WARNING: Cancer and Reproductive Harm - www.P65Warnings.ca.gov

77-100 SERIES

Bronze Full Port Ball Valve

Female NPT Thread, 600 CWP (psig), Cold Non-Shock. (See referenced P/T chart)
150 psig Saturated Steam.
Vacuum Service to 29 inches Hg.
MSS SP-110 compliant.



FEATURES

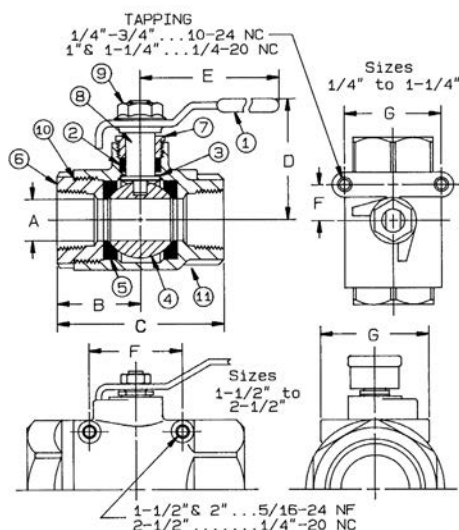
- Two-piece body
- Reinforced seats
- Mounting pad for easy actuator mounting
- Blow-out-proof stem design
- Adjustable packing gland
- Full port for full flow & min. pressure drop

VARIATIONS AVAILABLE

77-140 Series (316 SS Ball & Stem)
77-190 Series (Locked Retainer)

OPTIONS AVAILABLE: (More information in Section J)

- Minimum quantities apply
- To specify an option, replace the "01" standard suffix with the suffix of the option.
- To specify multiple options, replace the "01" suffix with the desired suffixes in the numerical order shown below. NOTE: Not all suffixes can be combined together.



STANDARD MATERIAL LIST

	PART	MATERIAL
1	Lever and grip	Steel, zinc plated w/vinyl
2	Stem packing	MPTFE
3	Stem bearing	RPTFE
4	Ball	B16 Brass, chrome plated
5	Seat (2)	RPTFE
6	Retainer	B16 Brass (1/4" to 1") B584-C84400 (1.25" to 2.5")
7	Gland nut	B16 Brass
8	Stem	B16 Brass
9	Lever nut	Steel, zinc plated
10	Body seal	PTFE (1.25" to 2.5")
11	Body	B584-C84400

PRODUCT NUMBER	SIZE	A	B	C	D	E	F	G	WT.
77-101-01	1/4"	0.43	1.09	2.18	1.77	3.87	0.50	1.12	0.79
77-102-01	3/8"	0.50	1.09	2.18	1.77	3.87	0.50	1.12	0.75
77-103-01	1/2"	0.50	1.09	2.18	1.77	3.87	0.50	1.12	0.69
77-104-01	3/4"	0.81	1.56	3.12	2.17	4.87	0.87	1.37	1.83
77-105-01	1"	1.00	1.81	3.62	2.68	5.50	0.93	1.50	3.32
77-106-01	1.25"	1.25	2.12	4.25	2.90	5.50	0.93	1.50	5.05
77-107-01	1.5"	1.50	2.37	4.75	3.10	8.00	2.08	3.06	6.71
77-108-01	2"	2.00	2.65	5.37	3.50	8.00	2.41	3.52	11.75
77-109-01	2.5"	2.50	3.25	6.50	4.06	8.00	2.75	3.37	17.25

FOR PRESSURE/TEMPERATURE RATINGS,
REFER TO PAGE M-10, GRAPH NO. 4

(SUFFIX)	OPTION	SIZES
-01	Standard Configuration	All
-P -01-	BSPP (Parallel) Thread Connection	1/4" to 2.5"
-T -01-	BSPT (Tapered) Thread Connection	1/4" to 2.5"
-02-	Stem Grounded	1/4" to 2.5"
-04-	2.25" Stem Extension (Carbon Steel, Zinc Plated)	1/4" to 2.5"
-05-	Plain Ball	1/4" to 2.5"
-07-	Steel Tee Handle	1/4" to 1.25"
-08-	90° Reversed Stem	1/4" to 2.5"
-10-	SS Lever & Nut	1/4" to 2.5"
-11-	Therma-Seal™ Insulating Tee Handle	1/4" to 2"
-14-	Side Vented Ball (Uni-Directional)	1/4" to 2.5"
-15-	Wheel Handle, Steel	1/4" to 1.25"
-16-	Chain Lever - Vertical	3/4" to 2.5"
-17-	Rough Chrome Plated - Bronze Valves	1/4" to 2.5"
-18-	Plain Yellow Grip	1/4" to 2.5"
-20-	Slot Vented Ball	1/4" to 2.5"
-21-	UHMWPE Trim (Non-PTFE)	1/4" to 2.5"
-24-	Graphite Packing	1/4" to 2.5"
-27-	SS Latch-Lock Lever & Nut	1/4" to 2.5"
-28-	Mounting Pad Not Drilled & Tapped	1/4" to 2.5"
-30-	Cam-Lock and Grounded	1/4" to 1.25"
-32-	SS Tee Handle & Nut	1/4" to 1.25"
-35-	PTFE Trim	1/4" to 2.5"
-36-	SS High-Rise Round Handle & Nut	1/4" to 1.25"
-40-	Cyl-Loc and Grounded	1/4" to 1.25"
-45-	Less Lever & Nut	1/4" to 2.5"
-46-	Latch Lock Lever - Lock in Closed Position Only	1/4" to 2.5"
-47-	SS Oval Latch-Lock Handle & Nut	1/4" to 3/4"
-48-	SS Oval Handle (No Latch) & Nut	1/4" to 2"
-49-	No Lubrication. Assembled Dry.	1/4" to 2.5"
-50-	2.25" CS Locking Stem Extension	1/4" to 2.5"
-56-	Multifill Seats & Packing	1/4" to 2.5"
-57-	Oxygen Cleaned	1/4" to 2.5"
-58-	Chain Lever - Horizontal	3/4" to 2.5"
-60-	Static Grounded Ball & Stem	1/4" to 2.5"
-63-	NPT x Solder/Socket Weld	1/4" to 2.5"
-64-	250# Steam Trim (MPTFE Seats & Packing) Use with 316 SS Ball & Stem Variation	1/4" to 2.5"
-92-	Balancing Stop	1/4" to 2.5"
-94-	2.25" Stem Extension, Balancing Stop	1/4" to 2.5"
-SV-	Safety Vent (H-12)	1/4" to 2"



FLOW DATA

For Apollo® Ball Valves

The listed Cv "factors" are derived from actual flow testing, in the Apollo® Ball Valve Division, Conbraco Industries, Inc., Pageland, South Carolina. These tests were completed using standard "off the shelf" valves with no special preparation and utilizing standard schedule 40 pipe. It should be understood that these factors are for the valve only and also include the connection configuration. The flow testing is done utilizing water as a fluid media and is a direct statement of the gallons of water flowed per minute with a 1 psig pressure differential across the valve/connection unit. Line pressure is not a factor. Because the Cv is a factor, the formula can be used to estimate flow of most media for valve sizing.

FLOW OF LIQUID

$$Q = C_v \sqrt{\frac{\Delta P}{\text{SpGr}}}$$

$$\text{or } \Delta P = \frac{(Q)^2 (\text{SpGr})}{(C_v)^2}$$

Where:

Q = flow in US gpm
 ΔP = pressure drop (psig)
 SpGr = specific gravity at flowing temperature
 Cv = valve constant

FLOW OF GAS

$$Q = 1360 C_v \sqrt{\frac{(\Delta P) (P_2)}{(\text{SpGr}) (T)}}$$

$$\text{or } \Delta P = \frac{5.4 \times 10^{-7} (\text{SpGr}) (T) (Q)^2}{(C_v)^2 (P_2)}$$

Where:

Q = flow in SCFH
 ΔP = pressure drop (psig)
 SpGr = specific gravity (based on air = 1.0)
 P₂ = outlet pressure-psia (psig + 14.7)
 T = (temp. °F + 460)
 Cv = valve constant

CAUTION: The gas equation shown, is valid at very low pressure drop ratios. The gas equation is NOT valid when the ratio of pressure drop (ΔP) to inlet pressure (P1) exceeds 0.02.

NOTE: Only use the gas equation shown if (P1-P2)/P1 is less than 0.02.

Cv FACTORS FOR APOLLO VALVES

VALVE	SIZE (IN.)														
	1/4	3/8	1/2	3/4	1	1.25	1.5	2	2.5	3	4	6	8	10	12
70B-140 Series	8.4	7.2	15	30	43	48	84	108	190	370	670	--	--	--	--
70-100/200 Series	8.4	7.2	15	30	43	48	84	108	190	370	670	--	--	--	--
70-300/400 Series	--	--	15	30	43	48	84	108	--	--	--	--	--	--	--
70-600 Series	2.3	4.5	5.4	12	14	21	34	47	--	--	--	--	--	--	--
70-800 Series	8.4	7.2	15	30	43	48	84	--	--	--	--	--	--	--	--
71-AR Series	--	--	--	30	43	48	84	108	190	370	--	--	--	--	--
71-100/200 Series	--	--	--	30	43	48	84	108	190	370	--	--	--	--	--
72-100/900 Series	--	--	26	48	65	125	170	216	--	--	--	--	--	--	--
73A-100 Series	8.4	7.2	15	30	43	48	84	108	--	--	--	--	--	--	--
73-300/400 Series	--	--	26	48	65	125	170	216	--	--	--	--	--	--	--
74-100 Series	8.4	7.2	15	30	43	48	84	108	190	370	670	--	--	--	--
75-100 Series	8.4	7.2	15	30	43	48	84	108	190	370	670	--	--	--	--
76-AR Series	8.4	7.2	15	30	43	48	84	108	190	370	670	--	--	--	--
76F-100 Series	8.1	15	15	51	68	125	177	389	--	--	--	--	--	--	--
76FJ-100 Series	8.1	15	15	51	68	125	177	389	--	--	--	--	--	--	--
76FK-100 Series	8.1	15	15	51	68	125	177	389	--	--	--	--	--	--	--
76-100 Series	8.4	7.2	15	30	43	48	84	108	190	370	--	--	--	--	--
76-300/400 Series	--	--	26	48	65	125	170	216	--	--	--	--	--	--	--
76-600 Series	2.3	4.5	5.4	12	14	21	34	47	--	--	--	--	--	--	--
76J-100 Series	8.4	7.2	15	30	43	48	84	108	190	370	--	--	--	--	--
76J-AR Series	8.4	7.2	15	30	43	48	84	108	190	370	670	--	--	--	--
76K-100 Series	8.4	7.2	15	30	43	48	84	108	190	370	--	--	--	--	--
76K-AR Series	8.4	7.2	15	30	43	48	84	108	190	370	670	--	--	--	--
7K-100 Series	--	--	15	51	68	125	177	389	503	--	--	--	--	--	--
77-AR Series	8.1	15	15	51	68	125	177	389	--	--	--	--	--	--	--
77C-100/200 Series	4.5	7.2	16	36	68	125	177	389	503	--	--	--	--	--	--
77D-140 Series	4.5	7.2	16	36	68	125	177	389	--	--	--	--	--	--	--

continued on next page

FLOW DATA

For Apollo® Ball Valves

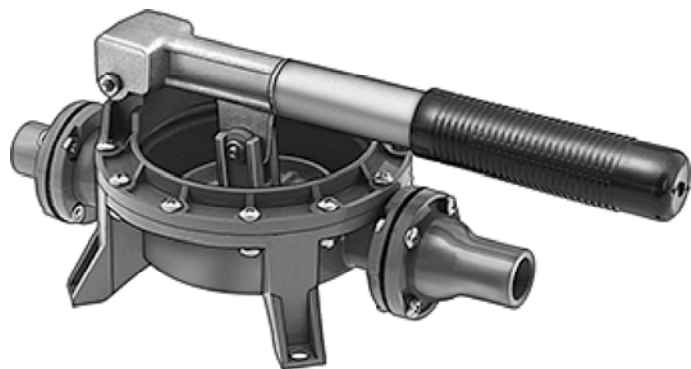
Cv FACTORS FOR APOLLO VALVES (continued from M-3)

VALVE	SIZE (IN.)														
	1/4	3/8	1/2	3/4	1	1.25	1.5	2	2.5	3	4	6	8	10	12
77D-640 Series	--	--	--	11	24	35	--	--	--	--	--	--	--	--	--
77G-UL Series	4.5	7.2	16	36	68	125	177	389	503	--	--	--	--	--	--
77W Series	--	--	16	36	68	125	177	389	--	--	--	--	--	--	--
77-100/200 Series	8.1	15	15	51	68	125	177	389	503	--	--	--	--	--	--
79 Series	8.5	8.5	9.8	32	44	66	148	218	440	390	--	--	--	--	--
80 Series	8.4	7.2	15	30	43	48	84	108	190	370	--	--	--	--	--
82-100/200 Series	8.1	14	26	51	68	120	170	376	510	996	1893	--	--	--	--
83A/83B Series	8.1	14	26	51	68	120	170	376	--	--	--	--	--	--	--
83R-100/200 Series	--	--	--	--	--	--	170	376	--	996	1893	--	--	--	--
86A/86B Series	8.1	14	26	51	68	120	170	376	--	--	--	--	--	--	--
86R-100/200 Series	--	--	--	--	--	--	170	376	--	996	1893	--	--	--	--
87A-100 Series	--	--	--	--	--	--	86	104	234	375	673	1099	1902	3890	--
87A-200 Series	--	--	15	19	75	--	195	410	545	1021	2016	4837	9250	15170	22390
87A-700 Series	--	--	--	--	--	--	86	104	234	375	673	1099	1902	3890	--
87A-900 Series	--	--	15	19	75	--	195	410	545	1021	2016	4837	9250	15170	22390
87A-F00 Series	--	--	--	--	75	--	195	410	545	1021	2016	4837	--	--	--
87B-100 Series	--	--	--	--	--	--	--	--	--	375	673	1099	1902	3890	--
87J-100 Series	--	--	--	--	--	--	86	104	234	375	673	1099	1902	3890	--
87J-200 Series	--	--	15	19	75	--	195	410	545	1021	2016	4837	9250	15170	22390
87J-700 Series	--	--	--	--	--	--	86	104	234	375	673	1099	1902	3890	--
87J-900 Series	--	--	15	19	75	--	195	410	545	1021	2016	4837	9250	15170	22390
87K-100 Series	--	--	--	--	--	--	86	104	234	375	673	1099	1902	3890	--
87K-200 Series	--	--	15	19	75	--	195	410	545	1021	2016	4837	9250	15170	22390
87K-700 Series	--	--	--	--	--	--	86	104	234	375	673	1099	1902	3890	--
87K-900 Series	--	--	15	19	75	--	195	410	545	1021	2016	4837	9250	15170	22390
88A-100 Series	--	--	--	--	--	--	86	104	234	375	673	1099	1902	3890	--
88A-200 Series	--	--	15	19	75	--	195	410	545	1021	2016	4837	9250	15170	22390
88A-700 Series	--	--	--	--	--	--	86	104	234	375	673	1099	1902	3890	--
88A-900 Series	--	--	15	19	75	--	195	410	545	1021	2016	4837	9250	15170	22390
88A-F00 Series	--	--	--	--	75	--	195	410	545	1021	2016	4837	--	--	--
88B-100 Series	--	--	--	--	--	--	--	--	--	375	673	1099	1902	3890	--
89-100 Series	8.4	7.2	15	30	43	48	84	108	190	370	--	--	--	--	--
9A-100 Series	8.3	6.7	5.7	10	16	25	40	62	--	--	--	--	--	--	--
90-100 Series	8.3	6.7	5.7	10	16	25	40	62	--	--	--	--	--	--	--
92-100 Series	8.3	6.7	5.7	10	16	25	40	62	--	--	--	--	--	--	--
93-100 Series	8.3	6.7	5.7	10	16	25	40	62	--	--	--	--	--	--	--
94A-100/200 Series	6	7	19	34	50	104	268	309	629	1018	1622	--	--	--	--
96-100 Series	8.3	6.7	5.7	10	16	25	40	62	--	--	--	--	--	--	--
399-100 Series	8.4	7.2	15	30	43	48	84	108	190	370	--	--	--	--	--
489-100 Series	8.4	7.2	15	30	43	48	84	108	190	370	--	--	--	--	--

Hand-Operated Water-Removal Pump

14 oz./Stroke Maximum Flow Rate

4332K31



Pump Type	Sump
Pump Style	Diaphragm
Power Source	Manual
Maximum Flow Rate	14 oz./stroke
Maximum Discharge Pressure	35 Feet of Head (15 psi)
Maximum Solids Diameter	1/8"
Maximum Viscosity	100,000 cp
Temperature Range, °F	
Min.	35°
Maximum	150°
Intake Connection Type	Hose
For Hose ID	1"
Hose Connection Type	Barbed
Gender	Male
Discharge Connection Type	Hose
For Hose ID	1"
Hose Connection Type	Barbed
Gender	Male
Self-Priming	Self-Priming
Housing Material	Acetal Plastic
	Buna-N Rubber

Diaphragm	
Material	
Overall	
Height	4 3/8"
Width	4 3/8"
Depth	12 3/4"
For Use With	Water, Deionized Water, Salt Water
Warning Message	Chemical compatibility must be determined by the customer based on the conditions in which the product is being used, including the presence of other chemicals, temperature, and consistency.
Chemical Resistance	
Excellent	Deionized Water, Ethylene Glycol, Hydraulic Oil, Motor Oil, Salt Water, Sodium Hydroxide (20%), Sodium Hydroxide (50%), Water
Moderate	Ammonium Hydroxide
Poor	Acetone, Diesel Fuel, Ethanol, Gasoline, Hydrochloric Acid (100%), Hydrochloric Acid (20%), Hydrochloric Acid (37%), Isopropyl Alcohol, Kerosene, Lacquer Thinner, Methanol, Methyl Chloride, Methyl Ethyl Ketone (MEK), Mineral Spirits, Nitric Acid (20%), Nitric Acid (50%), Nitric Acid (Concentrated), Paint, Phosphoric Acid (<40%),

	Phosphoric Acid (Greater Than or Equal to 40%), Sodium Hydroxide (80%), Sodium Hypochlorite (Bleach), Sulfuric Acid (<10%), Sulfuric Acid (10- 75%), Sulfuric Acid (75-100%), Xylene
Wetted Parts Material	304 Stainless Steel, Acetal Plastic, Buna-N Rubber

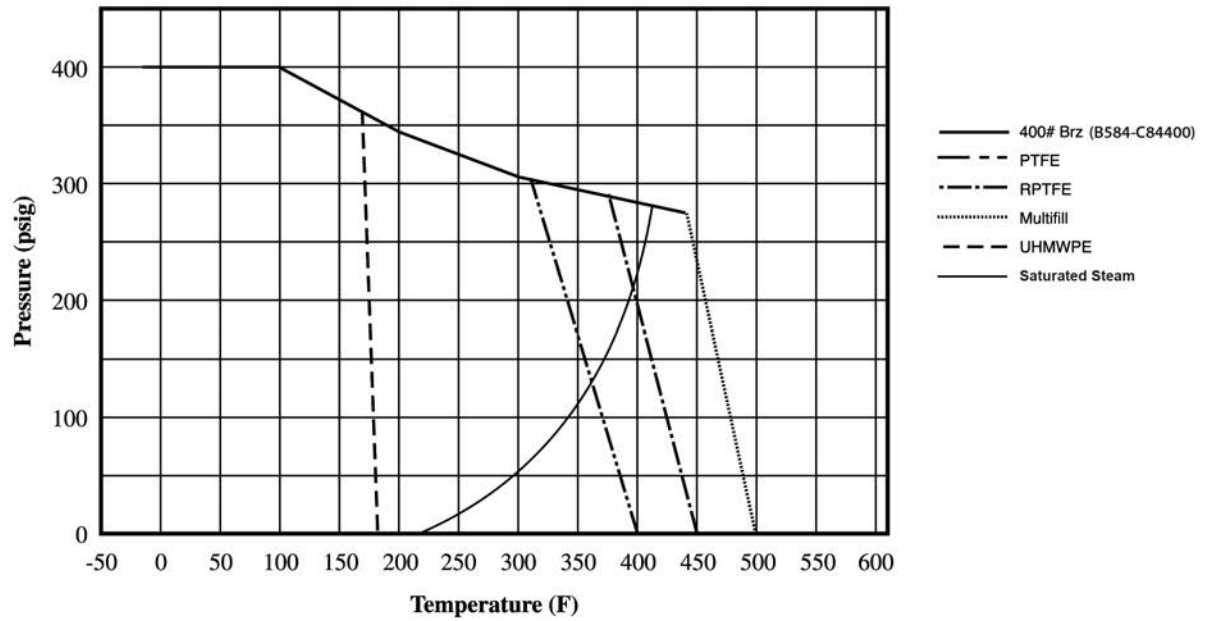
Install these pumps right in your line and engage the lever handle to start pumping. They have few moving parts that can fail for an extended service life.

PRESSURE TEMPERATURE RATINGS

400 CWP

Bronze ASTM B584-C84400

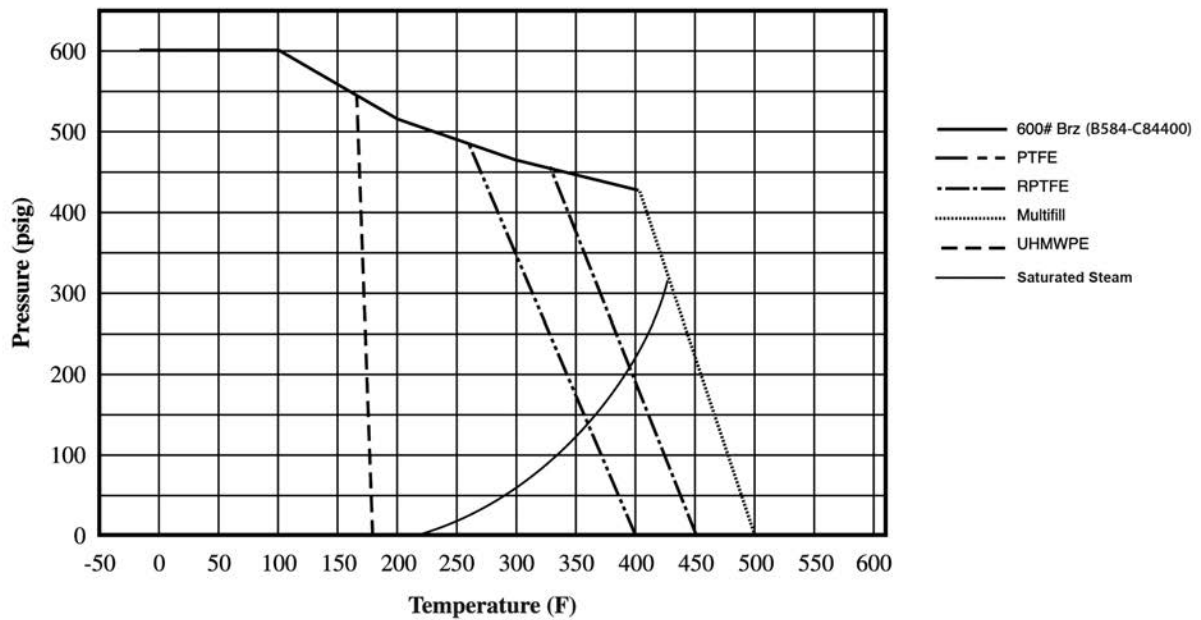
(GRAPH 3)



600 CWP

Bronze ASTM B584-C84400

(GRAPH 4)



BRONZE CLOSE COUPLED ROTARY GEAR PUMPS



OBERDORFER PUMPS
A Subsidiary of Thomas Industries Inc.

**MODEL
N994
SERIES**

MODEL N994 - 1/2" NPT PORTS



FEATURES

- n Bronze Construction with Stainless Steel Shafts
- n Helical gears for quiet operation
- n Easy Field Assembly to Motors
- n Self-Lubricating Carbon Bearings
- n O-ring seal for maximum leak protection

GENERAL DESCRIPTION

Pump housings and gears are made of top quality bronze, shafts are stainless steel 303. Bearings are made of high performance carbon-graphite material selected for wear resistance and long service life.

Gear pumps are positive displacement pumps. Each shaft revolution displaces a definite amount of liquid relatively unaffected by the back pressure in the discharge line. Shaft speed and flow are directly proportional.

DRIVE ARRANGEMENT

Close coupled pumps are mounted directly to the electric motor by means of a suitable adapter bracket. The pump drive shaft is connected to the motor shaft by a flexible coupling.

LIQUIDS AND TEMPERATURE

These pumps are suitable for all liquids that are compatible with bronze. Most common liquids are water, oil, and mild chemicals in the pH-range of 4 to 11. Viscous liquids require reduced shaft speeds of 1150 RPM or lower. Consult factory.

Liquids containing solids, abrasives, powders or paint pigments are definitely not recommended for gear pumps. If abrasives are unavoidable, use a very low shaft speed. The recommended liquid temperature range is 32°F to 140°F for longest pump life. If more extreme temperature conditions exist, our factory should be consulted. Freezing of water-filled pumps can cause damage and must be avoided. Oils at low temperatures are very viscous requiring a lower speed or extra power.

PERFORMANCE

Water 70° F

1725 R.P.M.					Pump & Motor No.	
PSI	GPM	HP Req.	HP Motor	Motor Frame	Single Phase	Three Phase
0	10.5	0.50	1/2	56C	N994HJ45	N994HJ95
20	10.3	0.75	3/4	56C	N994HM26	N994HM95
40	10.1	0.9	1	56C	N994HN26	N994HN95
60	9.9	1.2	1 1/2	145TC	N994JT45	N994JT95
80	9.6	1.5	1 1/2	145TC	N994JT45	N994JT95
100	9.4	1.75	2	145TC	N994JW45	N994JW95
125*	9.2	2	2	145TC	N994JW45	N994JW95
150*	9	2.32	3	182TC	N994KY45	N994KY95

1150 R.P.M.					Pump & Motor No.	
PSI	GPM	HP Req.	HP Motor	Motor Frame	Single Phase	Three Phase
0	6.9	0.24	1/2	56C	N994HJ46	N994HJ96
20	6.6	0.29	1/2	56C	N994HJ46	N994HJ96
40	6.4	0.43	1/2	56C	N994HJ46	N994HJ96
60	6.1	0.58	3/4	56C	N994HM46	N994HM96
80	5.9	0.72	3/4	56C	N994HM46	N994HM96
100	5.6	0.93	1	145TC	N994JN46	N994JN96
125*	5.4	1.25	1 1/2	145TC	N994JT46	N994JT96
150*	5.2	1.63	2	184TC	N994KW46	N994KW96

*For pressures over 100 psi, the above selections are suitable for pumping fluids with lubricity (e.g. oils, polymers). Service life will decrease for fluids without lubricity (e.g. water, solvents).

SUCTION LIFT

As a general rule, the suction lift should be kept at an absolute minimum by placing the pump as close to the liquid source as possible. A gear pump in new condition can lift 20 feet of water in the suction line. A foot valve (preferably with built-in strainer) is recommended at the beginning of the suction line. For a first start-up, the pump should be primed to avoid dry running. Minimum size of the suction pipe is the size of the pump inlet port. For longer suction lines (over 3 feet), or for viscous liquids, the pipe size should be at least one size or two sizes larger than the pump inlet port.

ROTATION AND RELIEF VALVE

The relief valve is not intended to be a metering or flow control device. Its main purpose is to function as a discharge pressure relief when the spring tension is exceeded by the discharge pressure. Overheating can occur within 5-10 minutes if the discharge line is completely shut off for extended periods.

Unless otherwise specified, the pump motor unit is supplied by the factory for shaft rotation clockwise from shaft end. Reversing the motor rotation will reverse the "in" and "out" ports and also requires changing the relief valve location. The relief valve is always on the discharge side in this pump series. The factory pressure setting is 50 PSIG. To increase pressure, turn the relief valve adjusting screw in a clockwise direction.

To reverse single phase motors, find instructions on the inside of the junction box cover or on the name plate of the motor.

Three phase motors are not wired for any particular rotation. They can be reversed by interchanging any two (2) wires of the three (3) wire leads.

MODEL N994 SERIES

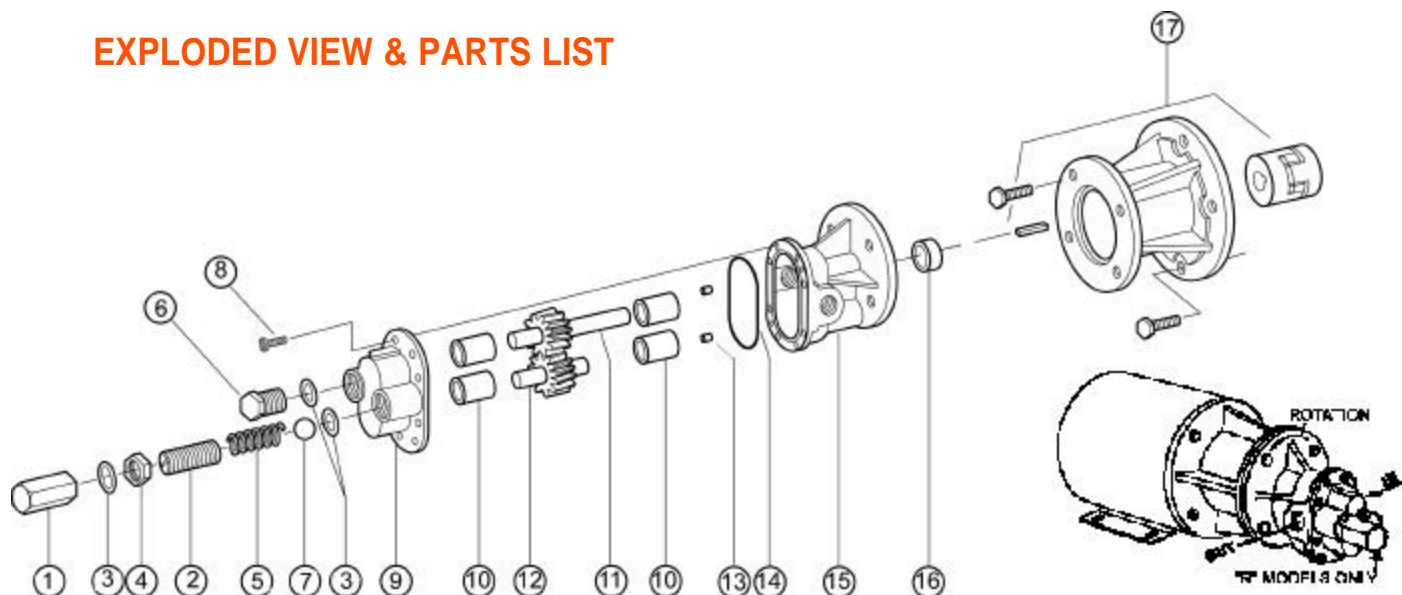
BRONZE CLOSE COUPLED ROTARY GEAR PUMPS



OBERDORFER PUMPS

A Subsidiary of Thomas Industries Inc.

EXPLODED VIEW & PARTS LIST



Pump No.	1	2	3	4	5	6	7	8	9	10 ¹	11 ¹	12 ¹	13	14 ¹	15	16 ^{1,2}	17
	Bypass Nut	Adj. Screw	Fiber Washer	Locknut	Spring	Plugnut	Ball	Screw	Cover	Bearing	Drive Gear Assy.	Idle Gear Assy.	Dowel Pin	O-Ring	Body	Lipseal	Adapter Kits
	1 Req'd	1 Req'd	3 Req'd	1 Req'd	1 Req'd	1 Req'd	1 Req'd	8 Req'd	1 Req'd	4 Req'd	1 Req'd	1 Req'd	2 Req'd	1 Req'd	1 Req'd	1 Req'd	
N994	—	—	—	—	—	—	—	5385	9322NN5N	5091	33011	33008	8885	9797-041	9320ND2N	5463	See
N994R	5204	5200	6964	5209	5207	5205	5206	5385	9323NN5B	5091	33011	33008	8885	9797-041	9320ND2N	5463	Below

¹ Repair kits contain items 10, 11, 12, 14 & 16. Repair kit for N994(R) is 11333.

² Part # 5463 is standard Buna N, part #9997 is Viton(R)*-Teflon(R)*.

Adapter Kits

Adapter Kit	Part Number	Description
H	11299	56C Frame
J	11300	143TC/145TC
K	11301	182TC/184TC
L	11302	213TC/215TC

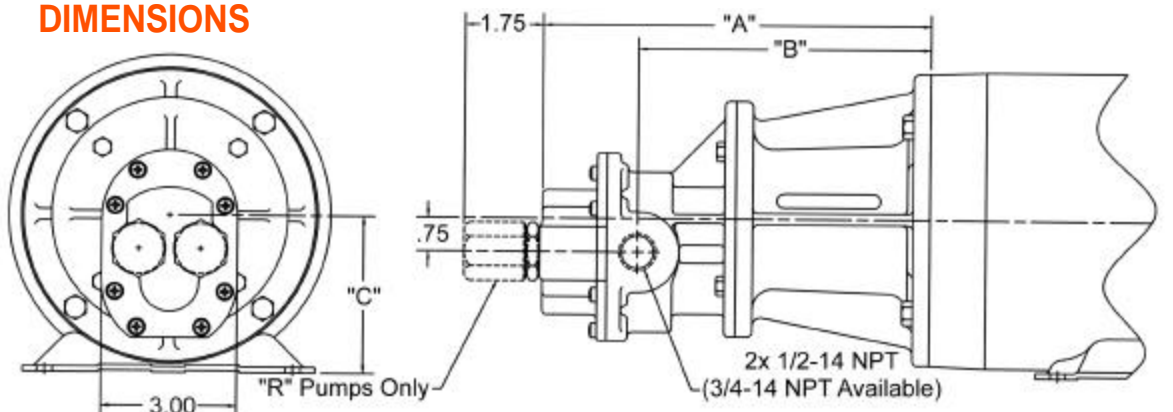
Variations

Pump Model	16 ^{1,2} Lipseal	Description	Repair Kit
N994S15	9997	Viton(R)*-Teflon(R)*	12100
N994RS15	9997	Viton(R)*-Teflon(R)*	12100

Motor/Adapter Kit Dimensions (see below)

Model	Motor Frame	"A"	"B"	"C"
N994(R)H	56C	8.63	6.50	3.50
N994(R)J	143TC/145TC	8.63	6.50	3.50
N994(R)K	182TC/184TC	9.45	7.31	4.50
N994(R)L	213TC/215TC	9.45	7.31	5.25

DIMENSIONS



*Viton(R) or equivalent FKM will be used. Viton(R) is a trademark of DuPont Dow Elastomers.

Teflon(R) or equivalent PTFE will be used. Teflon(R) is a registered trademark of DuPont.

Low-Lead Silicon Bronze Spring-Loaded Piston Check Valves

Maximum Pressure: 400 psi @ 190° F
Cracking Pressure: Less than 0.5 psi
Temperature Range: 32° to 190° F

Engineered for cold water service. Body and piston are silicon bronze and contain less than 0.05% lead (considered lead free); spring is Type 316 stainless steel, and seal is Buna-N. Has a soft seat.
Note: Cv factor not rated.

Connections: NPT female.



Pipe Size	End-to-End Lg.	Part No.
1/2"	2 5/8"	4616K91
3/4"	3 3/8"	4616K92
1"	3 5/8"	4616K93
1 1/4"	3 3/4"	4616K94
1 1/2"	4 1/8"	4616K95
2"	5 1/8"	4616K96
2 1/2"	7 3/8"	4616K97
3"	7 1/4"	4616K98

Compact Filter Silencers

FS Series 1/2" - 6"

Features

- Fully drawn weatherhood
- Tubular silencing design - tubes are positioned to maximize attenuation and air flow while minimizing pressure drop
- Corrosive resistant gray powder coat carbon steel

Technical Specifications

- Temp (continuous): min -15°F (-26°C) max 220°F (104°C)
- Filter change out differential: 15-20" H₂O over initial ΔP
- Pressure drop graphs available upon request
- Polyester: 99%+ removal efficiency standard to 5 micron
- Paper: 99%+ removal efficiency standard to 2 micron

Options



- Tap holes available
- Pressure drop indicator
- Various media for different environments
- Stainless steel construction
- Various nonstandard finishes and connection styles
- Side Access Silencer Filters (LQB Series) for space restricted enclosures (select models)



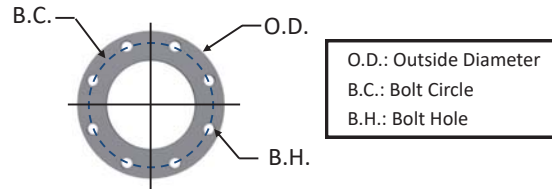
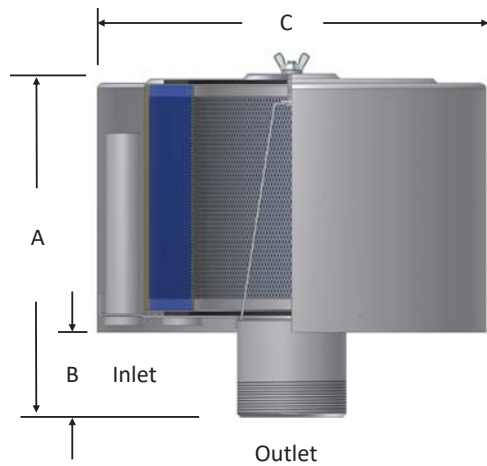
Threaded Outlet Assembly



Flange Outlet Assembly

Rev: FS .5-6-US1903K

FS Series 1/2" - 6"



125/150# Pattern Flange	Dimensions - inches			No. of Holes	Flange Thickness
	O.D.	B.C.	B.H.		
4"	9	7 1/2	0.75	8	0.5
5"	10	8 1/2	0.88	8	0.5
6"	11	9 1/2	0.88	8	0.5

MPT Outlet	Assembly SCFM Rating	Assembly Part Number		Dimensions - inches			Suggested Service ht. inches	No. of Silencing Tubes	Approx. Weight lbs.	Replacement Element Part No.		Element SCFM Rating
		Polyester	Paper	A	B	C				Polyester	Paper	
1/2"	10	FS-15-050	FS-14-050	3 7/16	1	6	3	1	2	15	14	35
3/4"	25	FS-15-075	FS-14-075	4	1 1/4	6	3	2	2	15	14	35
1"	35	FS-15-100	FS-14-100	4	1 5/16	6	3	3	2	15	14	35
1"	55	FS-19P-100	FS-18P-100	6 3/8	1 4/16	6	5	3	3	19P	18P	100
1 1/4"	70	FS-19P-125	FS-18P-125	6 3/4	1 5/8	6	5	5	3	19P	18P	100
1 1/2"	85	FS-19P-150	FS-18P-150	6 3/4	1 5/8	6	5	5	4	19P	18P	100
2"	135	FS-31P-200	FS-30P-200	7 1/2	2 1/4	10	5	5	8	31P	30P	195
2"	135	FS-231P-200	FS-230P-200	12	2 3/8	10	10	5	14	231P	230P	300
2 1/2"	195	FS-31P-250	FS-30P-250	7 1/2	2 1/2	10	5	5	8	31P	30P	195
2 1/2"	195	FS-231P-250	FS-230P-250	12 3/8	2 5/8	10	10	9	15	231P	230P	300
3"	300	FS-231P-300	FS-230P-300	12 3/4	3 1/8	10 1/4	10	9	15	231P	230P	300
3"	300	FS(12)-235P-300	FS(12)-234P-300	12 7/8	2 11/16	12 1/4	10	3	29	235P	234P	570
3"	300	FS-275P-300	FS-274P-300	13	3	16	10	9	33	275P	274P	1100
4"	520	FS(12)-235P-400	FS(12)-234P-400	13 7/8	3 11/16	12 1/4	10	6	29	235P	234P	570
4"	520	FS-275P-400	FS-274P-400	14	4	16	10	9	34	275P	274P	1100
5"	800	FS-245P-500	FS-244P-500	14	4 1/8	16	10	14	33	245P	244P	880
5"	800	FS-275P-500	FS-274P-500	14	4 1/8	16	10	14	36	275P	274P	1100
6"	1100	FS-275P-600	FS-274P-600	15	5 1/8	16	10	18	38	275P	274P	1100

Flange Outlet	Assembly SCFM Rating	Assembly Part Number		Dimensions - inches			Suggested Service ht. inches	No. of Silencing Tubes	Approx. Weight lbs.	Replacement Element Part No.		Element SCFM Rating
		Polyester	Paper	A	B	C				Polyester	Paper	
4"	520	FS(12)-235P-400F	FS(12)-234P-400F	13 7/8	3 11/16	12 1/4	10	6	32	235P	234P	570
4"	520	FS-275P-400F	FS-274P-400F	14	4	16	10	9	39	275P	274P	1100
5"	800	FS-245P-500F	FS-244P-500F	14	4 1/8	16	10	14	38	245P	244P	880
5"	800	FS-275P-500F	FS-274P-500F	14	4 1/8	16	10	14	41	275P	274P	1100
6"	1100	FS-275P-600F	FS-274P-600F	15	5 1/8	16	10	18	42	275P	274P	1100

See Filter Silencer Technical Data for sizing guidelines.



SOLBERG®

www.solbergmfg.com

All model offerings and design parameters are subject to change without prior notice.
Contact your representative or Solberg for the most current information.



CENTRIC **Butterfly Valve**

RUBBER SEATED
VF - 7 Series

*LEVER · GEAR · PNEUMATIC
ELECTRIC OPERATED*

ALLOWABLE PRESSURE

1.5" - 12.0" : 230 psig

14.0" - 40.0" : 150 psig



www.bvcusa.com

***INVESTMENT CAST
STAINLESS STEEL BODY***

1.5" - 24" (40mm - 600mm)

VALUE VALVE



RESILIENT SEATED BUTTERFLY VALVES

FACE TO FACE: Valve body designed to meet ISO 5752 table 5 short.

TOP WORKS:

24" and below, valve mounting flange and stem shall be per ISO 5211.

28" and above, valve mounting flange per ISO 5211, stem shall be round keyed.

FLANGE REQUIREMENT:

→ VF-730. VF-733: ANSI 125/150. BS Table E. JIS 10K. DIN PN10. DIN PN16.

All wafers have locating holes for ease of installation.

VF-737: ANSI 150. JIS10K. DIN PN10. DIN PN16

PRESSURE RATING:

Bi-directional bubble-tight shut off to 16bar (230psi)-----1.5"~12.0"

10bar (150psi)-----14.0"~40.0"

and tested to 110% of full rating

18bar (260psi)-----1.5"~12.0"

11bar (160psi)-----14.0"~40.0"

SHELL TESTING:

The body strength can stand 150% of full rating.

24bar (340psi)-----1.5"~12.0"

15bar (220psi)-----14.0"~40.0"

INSTALLATION INSTRUCTIONS:

The valve is designed for use between all types of flat or raised face flanges.

DO NOT USE FLANGE GASKETS. The butterfly valve design eliminates the need for gaskets. For proper installation, the space between flanges must be sufficient to permit valve insertion without disturbing the rubber liner flange seal. Note that the disc sealing edge is 45° from the flat of the shaft, but inline with the scribed line. Rotate the stem to position the disc within the body, place the valve between flanges and hand-tighten the bolts. **SLOWLY OPEN** the valve counterclockwise to check for adequate disc clearance. **RETURN THE DISC TO 10% OPEN POSITION** and cross tighten all bolts, again check for adequate disc clearance.

STEM RETAINING MECHANISM:

The stem is retained in the body by means of a special "Q" type design when the valve size is under 14.0", and hence the stem can be removed from the body and disc without any special tools.

*Unless you intend to disassemble the valve, do not position the disc in the 135° position.

Anti-Condensed: (On customer's requirement)

Cv Values-Valve Sizing Coefficient.

Size		Disc Angle (Open Degree)								
mm	inch	10°	20°	30°	40°	50°	60°	70°	80°	90°
40	1 1/2	0.8	2.8	8.1	16.6	26	42	69	95	132
50	2	1.3	4.4	11.9	25.7	44	70	117	154	226
65	2 1/2	2.3	8.8	21.3	41	71	111	219	281	369
80	3	2.9	11.5	30	56	97	147	250	395	497
100	4	4.4	17	46	84	139	259	422	709	846
125	5	7.6	28	73	138	254	461	701	1214	1454
150	6	12	48	111	205	381	634	1021	1474	2175
200	8	22	75	193	358	670	1164	1833	2703	3655
250	10	33	118	287	528	978	1711	2636	3810	5566
300	12	40	151	365	720	1330	2486	3800	5839	8258
350	14	55	191	456	930	1753	3010	4657	6726	9733
400	16	73	270	594	1260	2308	3956	6300	9476	13406
450	18	88	300	727	1413	2709	4592	7407	11085	15926
500	20	121	405	1005	1980	3611	6257	9960	15338	21935
600	24	163	578	1349	2795	5225	8846	13976	21163	29504
700	28	223	771	1959	3772	7008	12471	20407	29477	43081
750	30	238	819	2079	4001	7434	13229	21649	31271	45703
800	32	301	1138	2693	5304	9635	16524	26935	36987	53814
900	36	385	1466	3452	6859	12648	21275	34815	50185	71421
1000	40	597	2245	5214	9309	15788	25669	42120	63939	80583
1050	42	687	2411	5352	9826	16665	27095	44459	67490	85058
1100	44	823	3082	7109	10230	19436	30924	50837	79709	92686
1200	48	1134	4256	9481	16591	25865	41321	67652	105788	124357

Cv value denotes the flow rate in US gallon/min for water at 70° F under a pressure differential 1 psig. When required $K_v = C_v/1.17$

Expected Seating/ Unseating Torque (in Lbs)

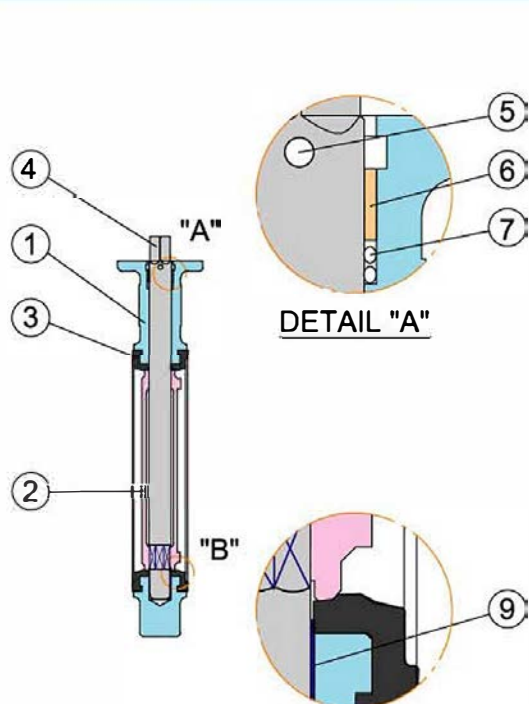
Size		Lubricating (Non-corrosive) ΔP (psig)				Dry (Non-Lubricating) ΔP (psig)			Reduced Disc Diameter P (90 psig)	
mm	inch	45	90	150	230	45	90	150	Lubricating	Dry
40	1 1/2	133	151	169	204	169	186	204	93	118
50	2	133	151	169	204	169	186	204	93	118
65	2 1/2	159	177	195	231	195	213	239	112	136
80	3	248	275	301	363	301	337	372	174	211
100	4	328	363	399	478	399	443	496	229	279
125	5	540	602	673	806	673	744	823	378	471
150	6	1027	1124	1239	1363	1116	1222	1346	719	781
200	8	1514	1682	1868	2239	1868	2071	2301	1060	1308
250	10	2434	2709	3009	3611	3009	3346	3717	1705	2108
300	12	3372	3744	4160	4992	4160	4620	5133	2362	2914
350	14	4824	5355	5948		5948	6611	7346	3379	4166
400	16	6443	7160	7957		7957	8842	9824	4514	5574
450	18	8072	8965	9965		9966	11072	12302	5654	6981
500	20	10045	11160	12399		12399	13780	15311	7037	8686
600	24	11727	13027	14479		14479	16090	17877	8215	10143
700	28	20701	23002	25559		25559	23400	31560	14502	17905
750	30	23081	25648	28497		28497	31666	35179	16169	19964
800	32	26621	29577	32860		32860	36507	40560	18649	23020
900	36	33878	36639	42826		41826	46472	51631	23733	26301
950	38	39073	43542	58499		48233	53543	62835		
1000	40	45047	50268	67437		55578	62039	83279	28755	35501
1050	42								33765	41682
1100	44								34124	42135
1200	48								43015	53108

To Use The Torque Chart, Note The Following

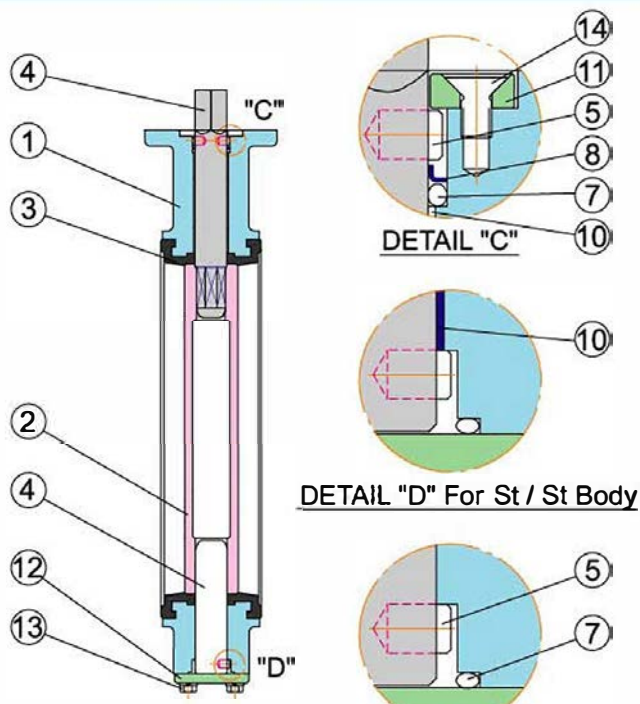
- 1) Seating/Unseating torque values above include friction bearing torque for stated ΔP.
- 2) Do not apply a safety factor to above torque values when determining actuator output torque requirement.

MATERIALS 1.5"~24.0"

VF-730 (WAFER TYPE)
VF-733 (LUG TYPE)
VF-737 (FLANGE TYPE)



Size 1.5" to 12.0" DETAIL "B"

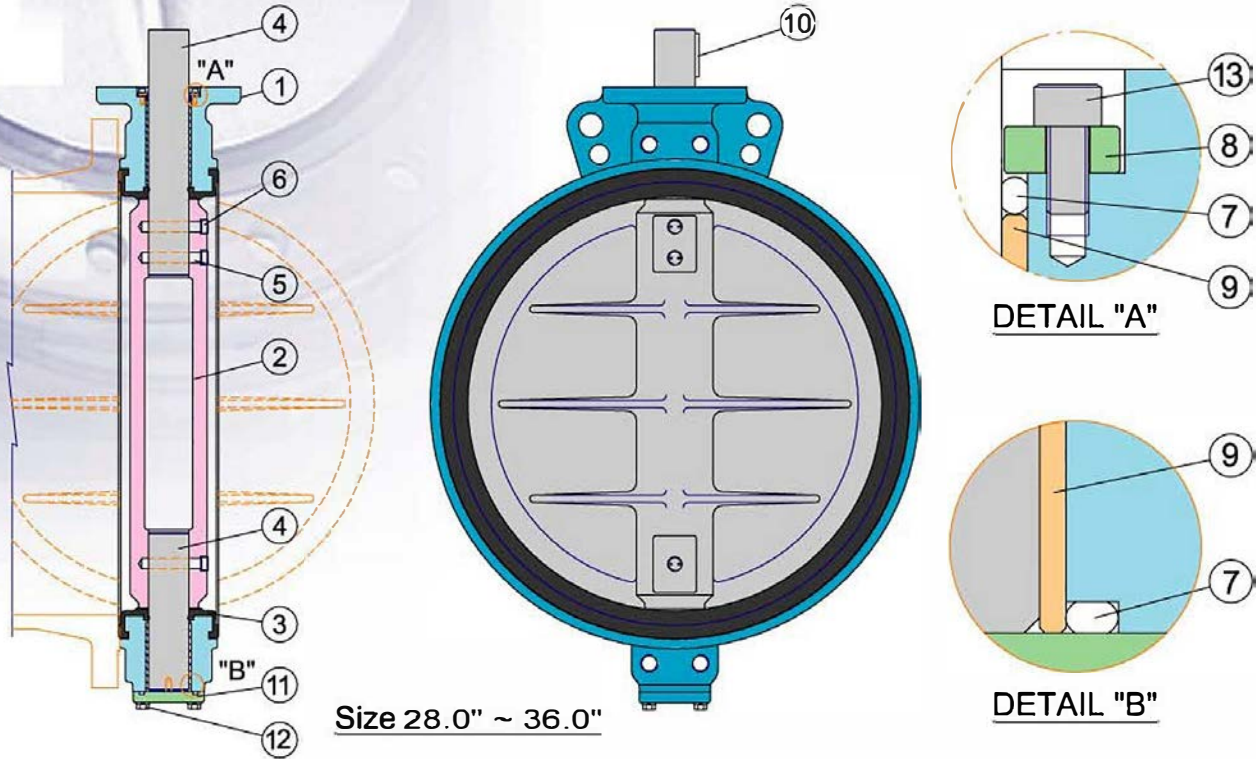


Size 14.0" to 24.0" DETAIL "D" For DI. & CI. Body

No.	Name	Materials	Specifications		Remark
			JIS	ASTM	
1	Body	CAST IRON	FC 200	A126 Cl. B	
		DUCTILE IRON	FCD 400	A395	
		STAINLESS STEEL	SCS 13A	A351 Gr. CF8	
			SCS 14A	A351 Gr. CF8M	
2	DISC	DUCTILE IRON	FCD 400	A395	Nylon 11 coated
		STAINLESS STEEL	SCS 13A	A351 Gr. CF8	
			SCS 14A	A351 Gr. CF8M	
		ALU-BRONZE	ALBC2	B148 C95400	
3	SEAT	NBR (NITRILE)			-10° ~ 80C° (14° ~ 176°F)
		EPDM			-20° ~ 120C° (-4° ~ 248°F)
		WHITE EPT		100PSIG MAX	-20° ~ 140C° (-4° ~ 284°F)
		NEOPRENE (CR)			0° ~ 80C° (32° ~ 176°F)
		SILICON		100PSIG MAX	-20° ~ 180C° (-4° ~ 356°F)
		HYPALON (CSM)			-20° ~ 135C° (-4° ~ 275°F)
		VITON		100PSIG MAX	-18° ~ 204C° (-0.4° ~ 400°F)
4	STEM	STAINLESS STEEL	SUS 410	A 182 Gr. F6A	
			SUS 304	A 182 Gr. F304	
			SUS 316	A 182 Gr. F316	
5	PIN	STAINLESS STEEL	SUS 304	A 182 Gr. F304	
6	BUSHING	DELFIN			
7	O-RING	NBR (NITRILE)			
8	THRUST RING	STAINLESS STEEL	SUS 304	A 240 Gr. 304	
9	BUSHING	BRONZE	BC6	B62	For cast iron and ductile iron body
10	BUSHING	RTFE+STAINLESS STEEL	RTFE+SUS316	RTFE+A240 Gr. 316	For stainless steel body
11	UPPER COVER	CAST IRON	FC 200	A126 Cl. B	For cast iron and ductile iron body
		STAINLESS STEEL	SCS 13A	A351 Gr. CF8	For stainless steel body
12	BOTTOM COVER	CAST IRON	FC 200	A126-B	For cast iron and ductile iron body
		STAINLESS STEEL	SCS 13A	A351 Gr. CF8	For stainless steel body
13	BOLT	STEEL			
14	BOLT	STEEL			

MATERIALS 28.0"~36.0"

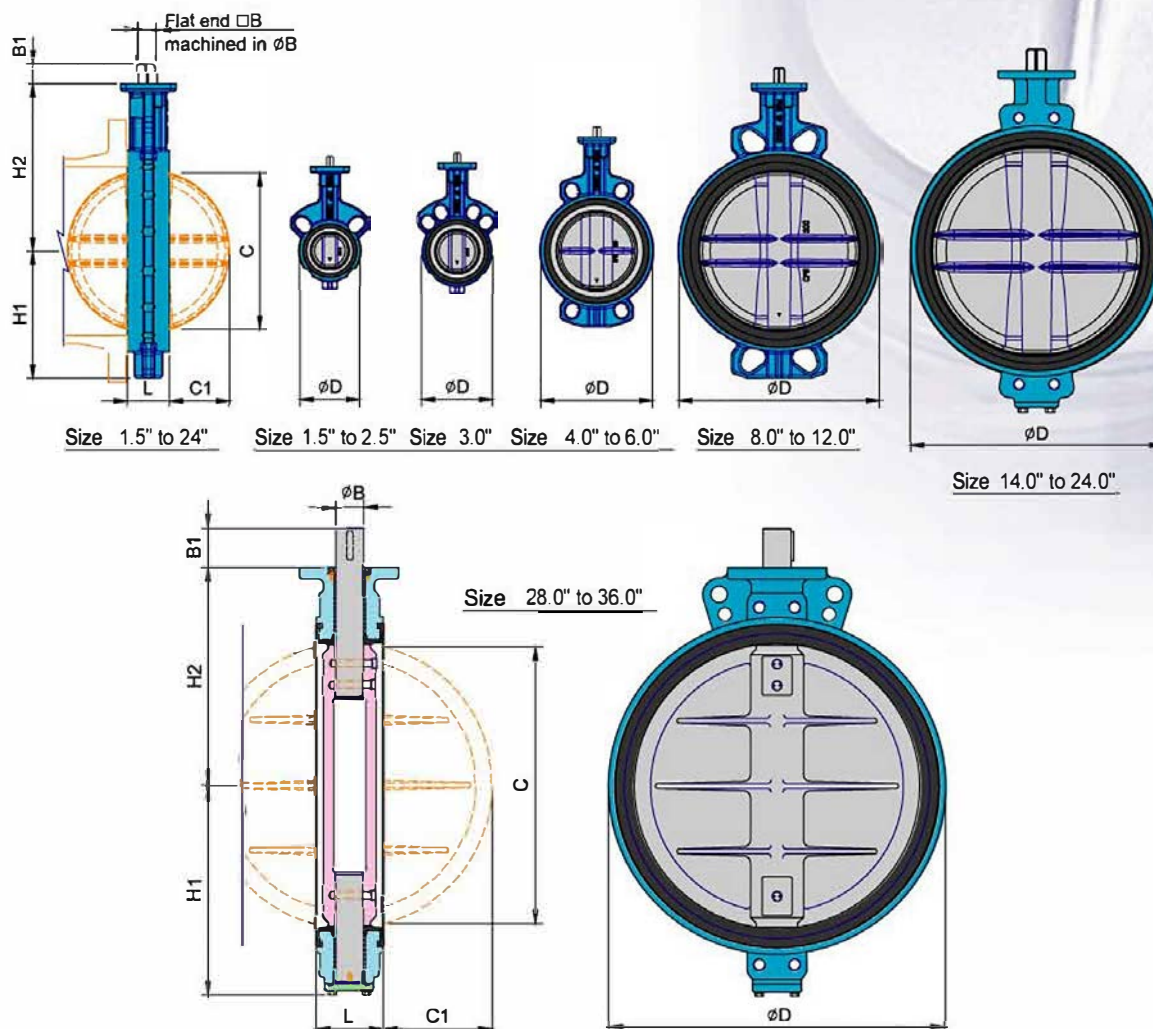
VF-730 (WAFER TYPE)
VF-737 (FLANGE TYPE)



No.	Name	Materials	Specifications		Remark
			JIS	ASTM	
1	Body	DUCTILE IRON	FCD 400	A395	
		STAINLESS STEEL	SCS 13A	A351 Gr. CF8	
			SCS 14A	A351 Gr. CF8M	
2	DISC	DUCTILE IRON	FCD 400	A395	Nylon 11 coated
		STAINLESS STEEL	SCS 13A	A351 Gr. CF8	
			SCS 14A	A351 Gr. CF8M	
3	SEAT	ALU-BRONZE	ALBC2	B148 C95400	
		NBR (NITRILE)			-10° ~ 80C° (14° ~176°F)
		EPDM			-20° ~ 120C° (-4° ~248°F)
		WHITE EPT		100PSIG MAX	-20° ~ 140C° (-4° ~284°F)
		NEOPRENE (CR)			0° ~ 80C° (32° ~176°F)
		SILICON		100PSIG MAX	-20° ~ 180C° (-4° ~356°F)
		HYPALON (CSM)			-20° ~ 135C° (-4° ~275°F)
4	STEM	STAINLESS STEEL	VITON	100PSIG MAX	-18° ~ 204C° (-0.4°~400°F)
			SUS 410	A 182 Gr. F6A	
			SUS 304	A 182 Gr. F304	
			SUS 316	A 182 Gr. F316	
5	PIN	STAINLESS STEEL	SUS 304	A 182 Gr. F304	
6	PLUG	STAINLESS STEEL			
7	O-RING	NBR (NITRILE)			
8	UPPER COVER	STEEL	SS400	A36	For cast iron and ductile iron body
		STAINLESS STEEL	SUS 304	A240 Gr. 304	For stainless steel body
9	BUSHING	BRONZE	BC6	B62	For cast iron and ductile iron body
		RTFE+STAINLESS STEEL	RTFE+SUS316	RTFE+A240 Gr. 316	For stainless steel body
10	KEY	STEEL			
11	BOTTOM COVER	CAST IRON	FC 200	A126 Cl. B	For cast iron and ductile iron body
		STAINLESS STEEL	SCS 13A	A351 Gr. CF8	For stainless steel body
12	BOLT	STEEL			
13	BOLT	STEEL			

DIMENSIONS **VF-730 WAFER TYPE** **1.5"~36.0"**

PRESSURE RATING:
1.5"~12.0" 230psig
14.0"~36.0" 150psig



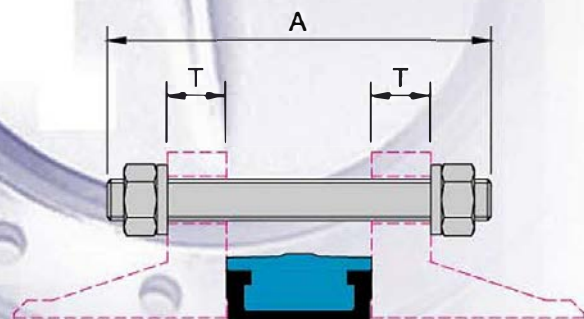
Size		Face to Face L				Mounting Flange (ISO 5211)		Shaft End			Key	Disc Clearance		Weight lbs
mm	inch		H1	H2	D	Type	PCD	øB	□B	B1		C	C1	
40	1 1/2	1.30	2.36	4.72	3.19	F07	2.76	0.55	0.43	0.75		1.34	0.28	4.40
50	2	1.69	2.56	5.63	3.78	F07	2.76	0.55	0.43	0.75		1.54	0.32	6.60
65	2 1/2	1.81	2.80	6.10	4.33	F07	2.76	0.55	0.43	0.75		2.17	0.51	8.36
80	3	1.81	3.03	6.38	4.88	F07	2.76	0.55	0.43	0.75		2.72	0.75	8.80
100	4	2.05	4.21	7.13	5.83	F07	2.76	0.55	0.43	0.75		3.58	1.06	11.66
125	5	2.20	4.80	7.76	7.09	F07	2.76	0.71	0.55	0.75		4.53	1.42	16.06
150	6	2.20	5.51	8.27	8.11	F07	2.76	0.71	0.55	0.75		5.51	1.85	18.04
200	8	2.36	6.50	9.45	10.20	F10	4.02	0.87	0.67	0.95		7.32	2.68	29.70
250	10	2.68	7.91	11.26	12.60	F10	4.02	0.98	0.75	0.95		9.41	3.54	46.64
300	12	3.07	9.21	12.17	14.57	F10	4.02	1.10	0.87	0.95		11.34	4.37	71.50
350	14	3.07	11.93	12.95	16.22	F12/14	4.92/5.51	1.38	1.06	1.14		12.80	5.04	105.60
400	16	4.02	13.19	14.21	18.70	F12/14	4.92/5.51	1.38	1.06	1.14		14.76	5.63	132.00
450	18	4.49	14.29	15.47	20.87	F14/16	5.51/6.50	1.89	1.42	1.50		16.65	6.38	176.00
500	20	5.00	15.63	16.81	23.03	F14/16	5.51/6.50	1.89	1.42	1.50		18.62	7.17	275.00
600	24	6.06	18.07	19.37	27.05	F16	6.50	2.36	1.81	1.89		22.05	8.43	440.00
700	28	6.50	20.12	22.17	31.34	F16	6.50	2.76		3.54	.071 X 0.47	25.79	10.04	869.00
750	30	7.48	21.42	23.03	33.70	F25	10.00	2.95		4.33	0.79 X 0.47	27.24	10.39	1078.00
800	32	7.48	23.31	24.80	34.25	F25	10.00	3.15		4.33	0.79 X 0.47	28.98	11.22	1276.00
900	36	7.99	24.88	25.98	39.49	F25	10.00	3.35		4.33	0.94 X 0.63	33.11	13.03	1606.00

BOLTING FOR INSTALLATION

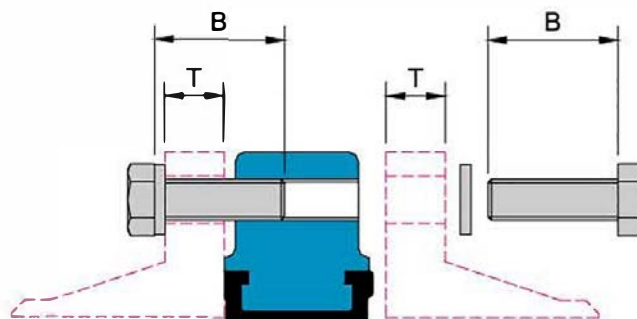
VF-730 (WAFFER TYPE)

VF-733 (LUG TYPE)

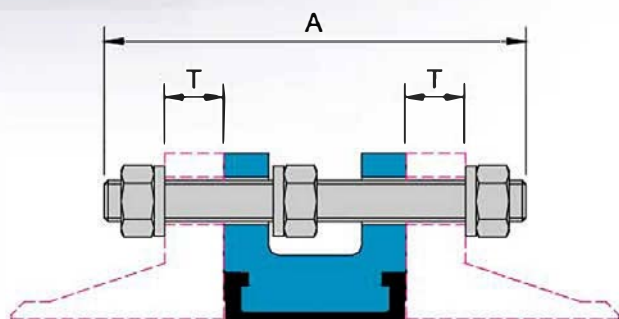
VF-737 (FLANGE TYPE)



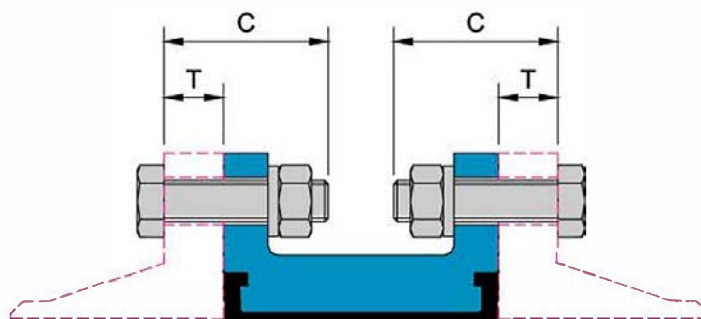
VF-730 WAFFER TYPE
1.5" to 36.0"



VF-733 FULL LUG TYPE
1.5" to 24.0"



VF-737 FLANGE TYPE
20.0"

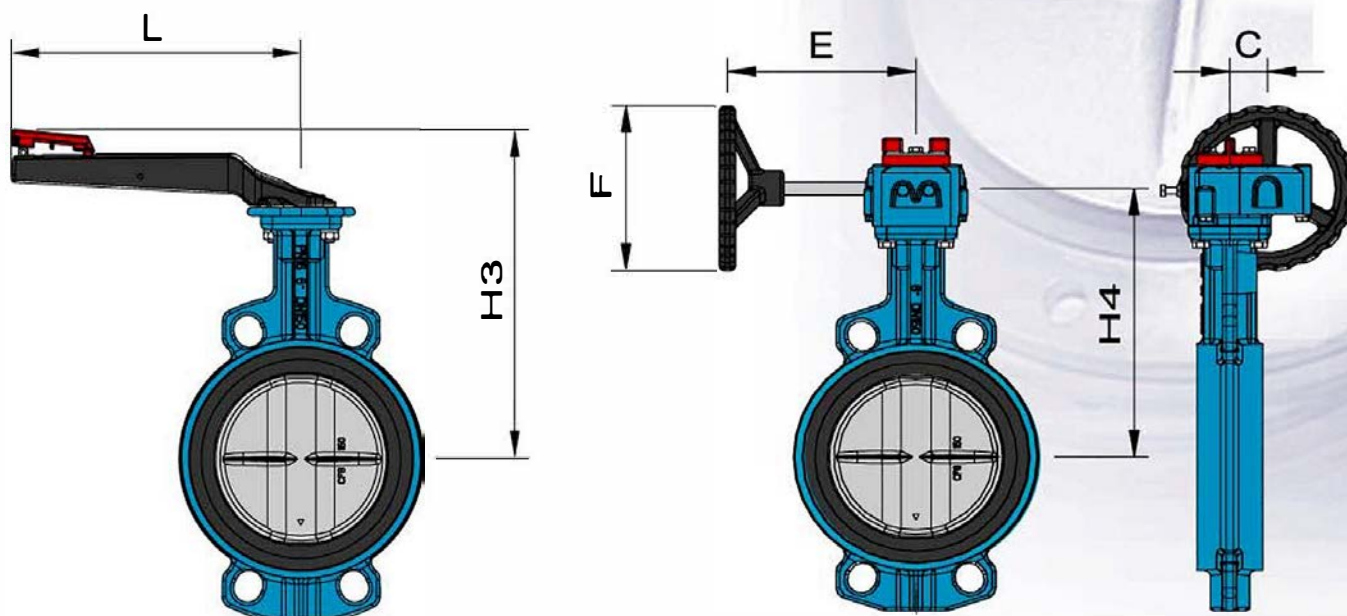


VF-737 FLANGE TYPE
24.0" to 40.0"

Size		PN10					PN16					ASME B 16.50 CLASS 150 ASME B 16.47 CLASS 150 SERIES A					JIS10K				
mm	inch	Bolt Size	A	B	C	T	Bolt Size	A	B	C	T	Bolt Size	A	B	C	T	Bolt Size	A	B	C	T
40	1 1/2	M16	115	35		18	M16	115	35		18	1/2 - 12X4	4.1	1.38		0.71	M16	110	35		16
50	2	M16	130	40		20	M16	130	40		20	5/8 - 11X4	4.9	1.57		0.75	M16	120	40		116
65	2 1/2	M16	130	45		20	M16	130	45		20	5/8 - 11X4	5.3	1.77		0.87	M16	125	45		18
80	3	M16	130	45		20	M16	130	45		20	5/8 - 11X4	5.5	1.77		0.94	M16	125	45		18
100	4	M16	140	50		22	M16	140	50		22	5/8 - 11X8	5.7	1.97		0.94	M16	135	45		18
125	5	M16	145	50		22	M16	145	50		22	3/4 - 10X8	6.1	2.17		0.94	M20	145	55		20
150	6	M20	160	55		24	M20	160	55		24	3/4 - 10X8	6.3	2.17		0.98	M20	155	55		22
200	8	M20	165	55		24	M20	160	55		24	3/4 - 10X8	6.7	2.36		1.1	M20	160	55		22
250	10	M20	175	60		26	M24	180	60		26	7/8 - 9X12	7.3	2.56		1.18	M22	175	60		24
300	12	M20	185	60		26	M24	195	70		28	7/8 - 9X12	7.9	2.76		1.26	M22	185	60		24
350	14	M20	185	60		26	M24	200	70		30	1 - 8X12	8.5	2.95		1.38	M22	185	65		26
400	16	M24	220	65		26	M27	235	80		32	1 - 8X16	9.7	3.15		1.46	M24	225	70		28
450	18	M24	235	70		28	M27	265	85		40	1 1/8 - 8X16	10	3.35		1.57	M24	240	70		30
500	20	M24	250	70		28	M30	290	100		44	1 1/8 - 8X20	11	3.54		1.69	M24	250	70		30
600	24	M27	295	80	100	34	M33	345	110	130	54	1 1/4 - 8X20	13	3.94	4.72	1.89	M30	295	80	100	32
700	28	M27	295		100	30	M33	325		120	38		15		5.91	2.8	M30	310		110	34
750	30											1 1/4 - 8X28	17		5.91	2.95	M30	335		110	36
800	32	M30	330		110	32	M36	355		120	38		18		6.69	3.19	M30	335		110	36
900	36	M30	345		110	34	M36	370		130	40	1 1/2 - 8X32	19		7.09	3.54	M30	355		120	38
950	38												19		7.28	3.43					
1000	40	M33	365		125	34	M39	395		140	42		19		7.48	3.54	M36	385		135	40

LEVER & GEAR OPERATED

VF-730 (WAFLER TYPE)
VF-733 (LUG TYPE)
VF-737 (FLANGE TYPE)



Size		Operator Series No.	Lever Operator		Gear Operator				Handwheel Turns ON/OFF	Mounting Flange (ISO 5211)	
mm	inch		H3	L	H4	C	E	F		Type	PCD
40	1 1/2	L 7A	7.68	7.87						F07	2.76
		C 07			6.18	1.61	6.1	5.91	10		
50	2	L 7A	8.58	7.87						F07	2.76
		C 07			7.09	1.61	6.1	5.91	10		
65	2 1/2	L 7A	9.06	7.87						F07	2.76
		C 07			7.56	1.61	6.1	5.91	10		
80	3	L 7A	9.33	7.87						F07	2.76
		C 07			7.83	1.61	6.1	5.91	10		
100	4	L 7A	10.08	7.87						F07	2.76
		C 07			8.58	1.61	6.1	5.91	10		
125	5	L 7B	10.71	9.84						F07	2.76
		C 07			9.21	1.61	6.1	5.91	10		
150	6	L 7B	11.22	9.84						F07	2.76
		C 07			9.72	1.61	6.1	5.91	10		
200	8	L10	12.76	13.98						F10	4.02
		C10			11.06	2.48	7.68	7.87	9		
250	10	L 10	14.57	13.98						F10	4.02
		C 10			12.87	2.48	7.68	7.87	9		
300	12	L 10	15.47	13.98						F10	4.02
		C 10			13.78	2.48	7.68	7.87	9		
350	14	C 12			14.57	2.4	9.13	12.2	9	F12	4.92
400	16	C 12			15.82	2.4	9.13	12.2	9	F12	4.92
450	18	C 14			17.52	3.19	11.02	15.75	13	F14	5.51
500	20	C 14			18.86	3.19	11.02	15.75	13	F14	5.51
600	24	A2			21.57	4.84	12.09	15.75	17.5	F16	6.5
700	28	A2			24.37	4.84	12.09	15.75	17.5	F16	6.5
750	30	A3+S3			28.74	6.3	14.57	15.75	52	F25	10
800	32	A3+S3			30.51	6.3	14.57	15.75	52	F25	10
900	36	A3+S3			31.69	6.3	14.57	15.75	52	F25	10
950	38	A3+S3			34.41	6.3	14.57	15.75	52	F25	10
1000	40	A4+S4			37.2	7.76	18.54	23.62	90	F30	11.73

Ordering Matrix

36.0"			(NOTE 1) See Valve Tag or Order for Complete Details		(NOTE 2) Please specify ONLY If stem material is different from standard 410SS		
40.0"	LEGEND:					NYLON COATED:	
42.0"	A/O	AIR OPERATED				STD NYLON BODY	BLACK
44.0"	U/C	UNDERCUT/90 PSIG				90 PSIG DISK	BLUE
48.0"	F/P	FULL PRESSURE				150 PSIG DISK	BLACK
	D/A	DOUBLE ACTING				230 PSIG DISK	GRAY
	S/R	SPRING RETURN					
	E/O	ELECTRIC OPERATED					

SEE ELECTRIC OPERATOR BROCHURE FOR COMPLETE OPTIONS

REV. 3/2009



Value in Valving

MATERIAL CHEMICAL RESISTANCE

The ratings furnished in this listing table have been developed from information furnished by manufacturers of the raw materials, publications and industry applications. This information may be considered as a basis for evaluation, but not as a guarantee.

E = Excellent, recommended. U = Unsatisfactory - = Not tested

G = Good. May sometimes be used depending upon the concentration and temperature.

Testing is recommended before full scale usage.

FLUID	NDI	AB	316	Buna-N	EPDM	VITON	PTFE
Acetaldehyde (CH ₃ CHO)	E	E	E	U	E	U	E
Acetamide	G	-	E	E	G	U	E
Acetic Acid (CH ₃ COOH) 50%, < 80°F	G	U	E	U	U	G	E
Acetic Anhydride [(CH ₃ CO) ₂ O] < 80°F	G	U	E	U	G	U	E
Acetone (CH ₃ COCH ₃) < 70°F	E	E	E	U	G	U	E
Acetophenone	G	-	E	U	G	U	E
Acetylene (C ₂ H ₂) < 80°F	E	G	E	-	E	E	E
Acrylonitrile (CH ₂ CHCN)	G	E	E	U	G	G	E
Air (Dry)	E	E	E	E	E	E	E
Alcohol n V Amyl	E	E	E	G	E	E	E
Alcohol n V Butyl	E	E	E	G	E	E	E
Alcohol n Methyl	E	E	E	G	E	U	E
Aluminum Sulfate [Al ₂ (SO ₄) ₃]	E	U	G	E	E	E	E
Amines	E	G	E	U	G	-	E
Ammonia Solutions	G	U	E	G	G	-	E
Ammonia Hydroxide (NH ₄ OH)	E	U	A	U	G	-	E
Amyl Acetate (CH ₃ COOC ₅ H ₁₁)	E	G	E	U	E	U	E
Aniline Dye (C ₆ H ₅ NH ₂)	G	U	E	U	G	G	E
Aqua Regia (HCl+HNO ₃)	G	U	U	U	U	G	E
Arsenic Acid (H ₃ AsO ₄ · 1/2 H ₂ O)	G	-	E	U	U	G	E
Asphalt < 150°F	G	E	E	G	U	E	U
Beer	E	U	E	E	E	E	E
Beet Sugar Liquors	E	E	E	E	E	E	E
Benzaldehyde < 80°F	E	E	E	U	U	U	E
Benzene (C ₆ H ₆) < 70°F	E	E	E	U	U	G	E
Benzoic Acid (C ₆ H ₅ COOH)	E	E	E	U	U	G	E
Black sulfate Liquor	G	U	E	G	G	E	E
Bleaching Powder Solution	G	U	U	U	E	E	E
Brine	E	G	E	E	E	E	E
Butadiene (C ₄ H ₆)	E	E	E	U	U	E	E
Butyl Acetate (CH ₃ COOC ₄ H ₉)	E	G	E	U	U	U	E
Butyric Acid < 5%, < 100°F	G	U	E	U	G	G	E
Calcium Bisulfite (Ca(H ₂ SO ₃) ₂)	E	U	E	U	G	E	E
Cane Sugar Liquors	E	E	E	E	E	E	E
Carbolic Acid (C ₆ H ₅ OH) < 10%, < 80°F	U	U	E	U	U	U	E
Carbon Dioxide - Dry (CO ₂)	E	E	E	E	E	E	E
Carbon Dioxide - Wet (CO ₂)	E	U	E	G	E	E	E
Carbon Disulfide (CS ₂)	E	E	E	U	U	E	E
Carbon Monoxide (CO)	E	E	E	E	E	E	E
Carbon Tetrachloride (CCl ₄)	G	E	E	U	U	E	E
Carbonic Acid (CO ₂ ·H ₂ O)	E	U	E	G	G	E	E
Cellosolve 2-2	E	-	E	U	G	U	E
Cement	E	E	E	E	E	E	U
China Wood Oil	E	E	E	E	G	E	E
Chlorine Gas (Dry) (Cl ₂) < 70°F	U	U	U	U	U	G	E
Chlorobenzene (C ₆ H ₅ Cl)	G	E	E	U	U	G	E
Chloroform (CHCl ₃)	G	E	E	U	U	G	E
Chromic Acid (H ₂ CrO ₄) < 10% < 70°F	U	U	G	U	U	G	E
Cider	E	E	E	E	E	E	E
Citric Acid < 100°F	E	G	E	E	E	E	E
Citrus Juices	G	G	E	E	E	E	E
Cola Syrup	G	U	E	E	G	E	E
Cresol	-	-	E	U	U	E	E

MATERIAL CHEMICAL RESISTANCE

FLUID	NDI	AB	316	Buna-N	EPDM	VITON	PTFE
Detergents	E	G	E	E	E	E	G
Developers (Photography) < 70°F	E	U	E	E	G	E	E
Dibutyl Phthalate (C ₁₆ H ₂₂ O ₄)	G	U	E	U	G	U	E
Diesel Fuel	E	E	E	E	U	E	E
Diethyl Ether {(C ₂ H ₅) ₂ O}	G	U	E	U	U	U	E
Diethylene Glycol {(HOCH ₂ CH ₂) ₂ O}	E	E	E	E	E	E	E
Dowtherm	G	G	E	U	U	E	E
Drilling Mud	E	E	E	E	U	E	U
Dyes	E	E	E	U	U	E	E
Enamel	G	E	E	U	U	G	E
Epoxy Resins	G	G	E	U	U	G	E
Ethane	E	E	E	G	U	-	E
Ethers	G	E	E	U	U	-	E
Ethyl Acetate (CH ₃ COOC ₂ H ₅)	E	E	E	U	U	U	E
Ethyl Chloride (C ₂ H ₅ Cl) < 5%, < 60°F	E	G	E	G	E	-	E
Ethylene Glycol [C ₂ H ₄ (OH) ₂] < 100 °F	E	E	E	E	E	E	E
Fatty Acids	E	U	E	E	U	E	E
Ferric Sulfate [Fe ₂ (SO ₄) ₃] < 10%, < 70°F	E	U	G	E	E	E	E
Flue Gas	G	U	G	E	U	E	E
Fluoboric Acid (HBF ₄)	G	-	E	G	G	G	E
Formaldehyde (HCHO) < 40%, < 180°F	E	G	E	U	E	E	E
Formic Acid (HCOOH) < 90%, < 150°F	U	E	E	U	U	U	E
Freons	G	E	E	G	U	U	E
Fruit Juices	E	G	E	E	E	-	E
Furfural (C ₄ H ₃ OCHO)	E	E	E	-	G	-	E
Gas ñ Furnace..	G	E	E	E	U	E	E
Gas Natural	G	E	E	E	U	E	E
Gasoline Regular	E	E	E	E	U	E	E
Glucose (C ₆ H ₁₂ O ₆ .H ₂ O)	E	E	E	E	E	E	E
Glue	G	E	E	E	E	E	E
Glycols (CH ₂ OHCH ₂ OH)	E	E	E	E	E	E	E
Grease	E	E	E	E	U	E	E
Helium (He)	E	E	E	E	E	E	E
Hexane(C ₆ H ₁₄)100%, < 75°F	E	E	E	E	U	G	E
Hexyl Alcohol	E	E	E	E	U	E	E
Hydrazine(H ₂ N.NH ₂) < 75°F	E	U	E	U	G	U	E
Hydrochloric Acid (HCl) < 5%, < 100°F	E	U	U	G	E	E	E
Hydrocyanic Acid (HCN) < 75°F	E	U	E	U	G	G	E
Hydrogen Chloride (Gas-Dry) (HCl)	G	U	E	G	E	E	E
Hydrogen Gas	E	E	E	E	E	E	E
Hydrogen Peroxide (H ₂ O ₂) < 75°F	U	U	E	U	E	E	E
Ink	E	G	E	G	E	E	E
Isobutyl Alcohol < 75°F	E	-	E	E	E	E	E
Isooctane	E	E	E	E	U	G	E
Jet Fuels	E	E	E	E	U	G	E
Kerosene	E	E	E	E	U	G	E
Ketchup	E	U	E	E	E	E	E
Lacquers	G	E	E	U	U	U	G
Lacquer Solvents	G	E	E	U	U	U	G
Lactic Acid(CH ₃ CHOHCOOH)	E	U	E	U	E	E	E
Lard Oil	E	E	E	E	U	E	E
Latex	E	U	E	G	U	G	E
Lead Acetate [Pb(C ₂ H ₃ O ₂) ₂ .3H ₂ O]	U	U	E	E	E	E	E
Linoleic Acid	E	U	E	U	G	G	E
Liquid Soap	E	-	E	E	E	E	E
Magnesium Carbonate(MgCO ₃) < 50%	E	U	E	E	G	E	E
Magnesium Chloride (MgCl ₂ /6H ₂ O)	E	U	G	E	E	E	E
Magnesium Oxide (MgO)	G	U	E	E	G	E	E
Magnesium Sulfate (MgSO ₄) < 25%, < 150°F	E	E	E	E	E	E	E

MATERIAL CHEMICAL RESISTANCE

FLUID	NDI	AB	316	Buna-N	EPDM	VITON	PTFE
Maleic Acid (HOOCCHCHCOOH)	E	U	E	U	U	E	E
Mercury (Hg)	E	U	E	E	E	E	E
Methane (CH ₄)	E	E	E	E	U	G	E
Methyl Alcohol (CH ₃ OH)	E	E	E	G	E	G	E
Methyl Ethyl Ketone (CH ₃ COC ₂ H ₅) < 70°F	E	E	E	U	G	U	E
Methylene Chloride (CH ₂ CL ₂)	U	U	E	U	U	U	E
Milk	E	E	E	G	G	-	E
Molasses	E	G	E	E	E	E	E
Monochlorobenzene (CH ₂ ClCOOH)	G	E	E	U	U	G	E
Mustard	E	-	E	-	-	-	E
Naphtha	E	E	E	-	-	G	E
Naphthalene	E	E	E	-	-	-	E
Natural Gas	E	E	E	E	U	E	E
Nitric Acid (HNO ₃) < 5%, < 100°F	G	U	E	G	E	E	E
Nitrobenzene(C ₆ H ₅ NO ₂)	G	U	E	U	U	G	E
Nitrogen Gas (N ₂)	E	E	E	E	E	E	E
Octane	E	E	E	U	U	G	E
Octyl Alcohol	E	-	E	G	E	E	E
Oil – Castor	E	E	E	E	U	-	E
Oil – Coconut	E	U	E	E	G	-	E
Oil – Cod Liver	E	U	E	E	E	-	E
Oil – Cooking	E	U	E	E	U	-	E
Oil – Cottonseed	E	E	E	E	E	-	E
Oil – Creosote	G	E	E	U	U	U	E
Oil – Fish	E	U	E	E	U	G	E
Oil – Lavender	G	-	E	U	U	-	E
Oil – Linseed	E	E	E	E	U	-	E
Oil - Lubricant	E	E	E	E	U	-	E
Oil – Hydraulic (Petrol. Base)	E	E	E	E	U	-	E
Oil – Mineral	E	E	E	E	U	-	E
Oil – Olive	E	G	E	E	G	-	E
Oil – Palm	E	G	E	E	U	-	E
Oil – Peanut	E	G	E	E	U	-	E
Oil – Pine	G	G	E	G	U	U	E
Oil – Rosin	E	E	E	E	U	E	E
Oil – Silicone	E	E	E	E	E	E	E
Oil – Soybean	E	G	E	E	U	E	E
Oil – Transformer	E	E	E	E	U	E	E
Oil – Turbine	E	E	E	E	U	E	E
Oil – Vegetable	E	G	E	E	U	E	E
Oxalic Acid (C ₂ H ₂ O ₄ .2H ₂ O) < 10%, < 80°F	E	U	E	U	E	E	E
Oxygen – Gas (O ₂)	E	E	E	G	E	E	E
Ozone (O ₃)	G	-	E	U	G	G	E
Paint (Water Base)	G	E	E	E	U	E	E
Paraffin	E	E	E	E	U	G	E
Perchloroethylene (C ₂ Cl ₄)	E	E	E	U	U	U	E
Perchloric Acid (HClO ₄)	-	-	-	U	G	G	E
Phosphoric Acid (H ₃ PO ₄) < 80%, < 150°F	G	U	E	U	E	E	E
Potassium Hydroxide (KOH) < 50%, < 100°F	E	U	E	U	G	U	E
Propane (C ₃ H ₈) < 70°F	E	E	E	E	U	G	E
Propyl Alcohol	E	E	E	G	E	E	E
Propylene Glycol (C ₃ H ₈ O ₂) < 150°F	E	G	G	G	U	U	E
Pulp Stock < 5%	G	U	E	G	E	G	U
Pyridine Oil (C ₅ H ₅ N)	G	U	E	U	U	U	G
Rum	E	U	E	E	E	-	E
Sewage	E	E	E	E	G	E	E
Shellac	G	E	E	G	U	U	E
Sodium Hydroxide (NaOH) < 50%, < 100°F	E	U	E	G	E	E	E
Sodium Sulfate (NaSO ₄)	E	E	E	E	E	E	E



Value in Valving

MATERIAL CHEMICAL RESISTANCE

FLUID	NDI	AB	31	Buna-N	EPDM	VITON	PTFE
Sodium Sulfide (NaS) < 70°F	E	U	E	E	E	E	E
Sodium Sulfite (Na ₂ SO ₃)	E	U	E	E	E	E	E
Sodium Thiosulfate (Na ₂ S ₂ O ₃ ·5H ₂ O)	G	U	E	E	E	E	E
Stannic Chloride < 10%, < 120°F	E	U	U	E	G	U	E
Starch Solution (C ₆ H ₁₁ O ₅) X	E	E	E	E	E	E	E
Steam L.P. & Hot Water < 220°F	E	E	E	U	E	G	E
Styrene	E	E	E	U	U	U	E
Sugar Solution	E	E	E	E	E	E	E
Sulfite Liquors	G	U	E	G	G	E	E
Sulfur	E	U	E	U	G	G	E
Sulfur Dioxide (SO ₂) (Dry)	G	E	E	G	E	E	E
Sulfur Dioxide (SO ₂) (Wet)	G	U	E	U	U	G	E
Sulfuric Acid (H ₂ SO ₄) < 20%, < 70°F	E	U	E	U	E	E	E
Sulfuric Acid (Fuming)	G	U	E	U	U	G	E
Tannic Acid (C ₁₄ H ₁₀ O ₉)	G	G	E	G	E	E	E
Tar	E	E	E	G	U	G	E
Tartaric Acid [(CHOHCOOH) ₂] < 10%, < 100°F	E	G	E	E	G	G	E
Toluene (CH ₃ C ₆ H ₅)	E	E	E	U	U	U	G
Turpentine	G	E	E	G	U	U	E
Urea [CO(NH ₂) ₂] < 70°F	E	U	E	E	E	E	E
Vaseline (Petrolatum)	E	E	E	E	U	E	E
Vinegar	E	U	E	G	E	E	E
Water (Acidic Mine)	E	U	E	E	E	E	E
Water (Brackish)	E	E	E	E	E	E	E
Water (Carbonated)	E	U	E	E	E	E	E
Water (Chilled)	E	E	E	E	E	E	E
Water (Cooling)	E	E	E	E	E	E	E
Water (Distilled)	E	U	E	E	E	E	E
Water (Fresh)	E	E	E	E	E	E	E
Water (Hot Water) < 212°F	E	E	E	U	E	E	E
Water (Paint Spray Reclamation)	E	E	E	E	E	E	E
Water (Sea Water)	E	E	E	E	E	E	E
Water (Swimming Pool)	E	E	E	E	E	E	E
Waxes	E	E	E	E	U	E	E
Whiskey	E	U	E	G	E	E	E
Wine	E	U	E	E	E	E	E
Wood Alcohol	E	E	E	G	E	E	E
Wood Pulp	G	U	E	E	E	E	E
Wort	G	G	E	G	E	E	E
Xylene (C ₈ H ₁₀)	E	E	E	U	U	U	E
Zinc Acetate [Zn(C ₂ H ₃ O ₂) ₂ ·2H ₂ O]	E	U	E	U	E	E	E

B-Series Switches – Pressure, Differential Pressure & Hydraulic

FEATURES

- Adjustable setpoints 15-100% of range
- Fixed or limited adjustable deadband
- Wide selection of switch elements
- Explosion proof enclosure provides uncompromising protection
- Special designs for NACE & fire applications
- SIL 3 Capable (B and D series only)

TYPICAL USES

- Offshore oil rigs
- Chemical and petrochemical plants
- Pulp and papermills
- Steel mills
- Power plants
- Water and sewage-treatment plants
- Other corrosive environments



SPECIFICATIONS

Setpoint:	Factory set or field adjustable
Setpoint Repeatability:	±1% of full range (Additional setpoint shift of ±1% of range per 50 °F from initial setpoint set at 70 °F typical)
Enclosure Rating:	B4/Hydraulic: NEMA 4X, IP66 B7: NEMA 7/9, IP66
Enclosure Material:	Epoxy coated aluminum (standard) Optional: 316 stainless steel (NEMA 7/9 only)
Diaphragm Material:	Buna N, Viton, Teflon, SS, Monel
Pressure Connection:	¼ NPT Female (standard) Optional: ½ NPT Female , ¼ NPT Female & ½ NPT Male combo
Electrical Output:	SPDT or DPDT
Electrical Termination:	¾ NPT Female (standard) Optional: ½ NPT Female
Ambient Temperature Range:	-20°F to 150°F (-28°C to 65°C) All units calibrated at 70 °F
Process Temperature:	0 °F to 150 °F (Buna N or Teflon diaphragm) 20 °F to 300 °F (Viton diaphragm) 0°F to 300°F (SS or Monel diaphragm)
Pressure Ranges:	Pressure: Vac-3000# Differential: 0-600#D Hydraulic: 1000-7500#
Approvals:	UL E34743 (B4/D4) E38812 (B7/D7) CSA: 55541 ATEX: Sira 02ATEX1391X (B7/D7 with XCN) IECEx SIR 14.0077X FM: Limit Control and Steam Limit Control



SIL 3 CAPABLE



- Highly reliable
- Designed for use in wide range of applications
- Pressure ranges from vacuum to 7500 psi



FACTORY SEALED



CLASS I DIV 1 GROUPS B, C, & D
CLASS II DIV 1 GROUPS E, F, & G



Sira 02ATEX1391X

IECEx
SIR 14.0077X

II 2GD
Ex d IIC T6 Gb
Ex tb IIIC T85°C Db
Ta = -20 °C to +60°C

Data Sheet

B-Series Switches – Pressure, Differential Pressure & Hydraulic

PRESSURE, DIFFERENTIAL PRESSURE & HYDRAULIC RANGES

PRESSURE/VACUUM RANGES ⁽¹⁾			Overpressure Ratings		Approximate Deadband Switch Element ^{(2) (3) (4)} Buna-N Diaphragm				
Nominal Pressure			Proof psi	Burst psi	20, 26, 27	21, 24, 31	50	22	32, 42
Vacuum									
30IMV	-760mm Hg	-100 kPa	250	400	0.3-0.7	1.5-4.0	0.5-2.2	0.4-1.5	2.1-4.2
Compound									
15IWV/15IW	-375mm H ₂ O/375mm H ₂ O	-3.7 kPa/ 3.7 kPa	20	35	0.15-.75/0.15-.75	1.5-2.5/1.5-2.5	0.45-2.0/0.45-2.0	0.5-1.2/0.5-1.2	2.1-3.5/2.1-3.5
30IWV/30IW	-760mm H ₂ O/760mm H ₂ O	-7.5 kPa/ 7.5 kPa	20	35	0.30-.60/0.30-.60	1.5-2.5/1.5-2.5	0.45-2.0/0.45-2.0	0.5-1.5/0.5-1.5	2.1-3.5/ 2.1-3.5
30IMV/15#	-760mm Hg/ 1.0 kg/cm ²	-100 kPa/100 kPa	250	400	0.5-1.0/0.3-0.7	2.0-3.0/0.5-2.5	0.75-2.5/0.5-1.0	0.7-1.8/0.7-1.4	2.8-4.2/0.7-2.1
30IMV/30#	-760mm Hg/1.0 kg/cm ²	-100 kPa/ 200 kPa	250	400	1.0-1.5/0.3-0.8	3.0-6.0/1-3.5	1.2-4.5/0.7-1.5	1.4-2.4/0.4-1.3	4.2-8.4/1.4-2.8
30 IMV/60#	-760mm Hg/4.0 kg/cm ²	-100 kPa/ 400 kPa	250	400	2.0-3.0/0.7-1.5	5.0-9.0/3.0-5.0	2.5-7.0/3.0-5.0	2.8-4.5/3.0-5.0	7.0-12.0/4.2-7.0
Pressure									
10IW	250mm H ₂ O	2.5 kPa	20	35	0.2-0.5	1.0-2.0	0.35-1.5	0.4-1.0	1.4-2.8
30IW	750mm H ₂ O	7.5 kPa	20	35	0.3-0.6	1.5-2.5	0.45-2.0	0.5-2.0	2.1-3.5
60IW	1500mm H ₂ O	15 kPa	20	35	0.5-1.3	1.5-3.5	0.9-2.5	0.7-3.0	2.1-5.0
100IW	2500mm H ₂ O	25 kPa	20	35	0.6-1.6	2.5-5.5	1.1-4.0	1.0-4.0	3.5-7.7
15IW	3750mm H ₂ O	37 kPa	20	35	1.0-2.5	4.5-8.5	1.7-6.5	2.0-6.0	6.0-12.0
15#	1.0 kg/cm ²	100 kPa	500	1500	0.1-0.35	0.5-1.5	0.2-1.0	0.4-1.0	0.7-2.1
30#	2.0 kg/cm ²	200 kPa	500	1500	0.1-0.50	0.5-1.5	0.3-1.0	0.4-1.0	0.7-2.1
60#	4.0 kg/cm ²	400 kPa	500	1500	0.3-1.0	1.0-3.5	0.7-2.5	0.6-2.0	1.4-5.0
100#	7.0 kg/cm ²	700 kPa	1000	3000	0.5-1.7	1.5-5.0	1.1-3.5	1.0-4.5	2.1-7.0
200#	14 kg/cm ²	1400 kPa	1000	3000	1-3	5-13	2-9	3.0-7.5	7.0-18.2
400#	28 kg/cm ²	2800 kPa	2400	3000	4-7.5	5-24	5.5-15	4.0-11.0	7.0-33.6
600#	42 kg/cm ²	4200 kPa	2400	3000	4-11	9-30	7-20	5.0-23.0	12.6-42
1000# ⁽⁵⁾	70 kg/cm ²	7000 kPa	12000 ⁽⁵⁾	18000	7-30	30-110	18-70	15-80	42-154
3000#	210 kg/cm ²	21000 kPa	12000	18000	15-60	80-235	37-160	30.0-230	112-329
DIFFERENTIAL PRESSURE RANGES			Pressure Ratings		Approximate Deadband Switch Element^{(2) (3) (4)} Buna-N Diaphragm				
Nominal Pressure			Static Working Pressure	Proof psi	20, 26, 27	21, 24, 31	50	22	32, 42
30IWD	750mm H ₂ O	7.5 kPa	5.4	21.6	0.3-0.6	1.5-2.5	0.45-2.0	0.5-2.0	2.1-3.5
60IWD	1500mm H ₂ O	15 kPa	5.4	21.6	0.5-1.3	1.5-3.5	0.9-2.5	0.7-3.0	2.1-5.0
100IWD	2500mm H ₂ O	25 kPa	5.4	21.6	0.6-1.6	2.5-5.5	1.1-4.0	1.0-4.0	3.5-7.7
150IWD	3750mm H ₂ O	37 kPa	5.4	21.6	1.0-2.5	4.5-8.5	1.8-6.5	2.0-6.0	6.3-12.0
15#D	1.0 kg/cm ²	100 kPa	500	2000	0.5-1.0	2.0-5.0	0.7-3.5	0.7-1.4	2.8-7.0
30#D	2.0 kg/cm ²	200 kPa	500	2000	1.0-2.0	2.0-5.0	1.5-3.5	1.4-2.8	2.8-7.0
60#D	4.0 kg/cm ²	400 kPa	500	2000	2.0-4.0	3.0-6.0	3.0-4.5	2.8-5.6	4.2-8.5
100#D	7.0 kg/cm ²	700 kPa	1000	4000	4.0-10.0	11.0-20.0	7.0-15.0	6.0-14.0	16.0-28.0
200#D	14.0 kg/cm ²	1400 kPa	1000	4000	5.0-15.0	12.0-40.0	10.0-26.0	7.0-21.0	17.0-56.0
400#D	28.0 kg/cm ²	2800 kPa	1000	8000	10.0-20.0	20.0-60.0	15.0-40.0	14.0-28.0	28.0-84.0
600#D	42.0 kg/cm ²	4200 kPa	1000	8000	20.0-40.0	80.0-150.0	30.0-115.0	30.0-56.0	12.0-210.0

NOTES:

- Switches may generally be set between 15% and 100% of nominal range on increasing pressure. Consult factory for applications where setpoints must be lower.
- All deadbands are given in English units as shown in the nominal range column. Deadbands shown are for switches with Buna N diaphragm.

Approximate deadbands for optional diaphragms:

Viton: Multiply Buna N value by 1.4
 Teflon: Multiply Buna N value by 1.2
 Stainless Steel: Multiply Buna N value by 1.7
 Monel: Multiply Buna N value by 1.7

3. Deadbands given are for zero static working pressure.

4. For approximate deadbands for dual switch elements, multiply the single switch element by 1.6.

5. Proof pressure is 4000 psi with stainless steel and monel welded diaphragms.

Data Sheet

B-Series Switches – Pressure, Differential Pressure

ORDERING CODE

Example: **B4 20 B XPK 600#**

Enclosure

- B4** - Pressure switch, Type 400, watertight enclosure meets NEMA 3, 4, 4X, 13 and IP66 requirements.
- B7** - Pressure switch, Type 700, explosion-proof enclosure meets Div. 1 & 2, NEMA 7, 9 and IP66 requirements. Standard housing epoxy coated aluminum. Use variation code XYW for 316SS housing.
- D4** - Differential pressure switch, Type 400, water-tight enclosure meets NEMA 3, 4, 4X, 13 and IP66 requirements.
- D7** - Differential pressure switch, Type 700, explosion-proof enclosure meets Div. 1 & 2, NEMA 7, 9 and IP66 requirements. Standard housing epoxy coated aluminum. Use variation code XYW for 316SS housing.

Switch Element Selection - UL/CSA Listed SPDT

- 20** - Narrow deadband ac, 15A - 125/250 Vac. Estimated dc rating, 0.4A, 120 Vdc (not UL listed).
- 21** - Ammonia service, 5A - 125/250 Vac
- 22** - Hermetically sealed switch, narrow deadband, 5A - 125/250 Vac. Estimated dc. rating, 2.5A, 28 Vdc (not UL listed).
- 23** - Heavy duty ac, 22A - 125/250 Vac
- 24** - General purpose, 15A - 125/250/480 Vac, ½A - 125 Vdc, ¼A - 250 Vdc; 6A, 30 Vdc. (Standard switch)
- 25** - Heavy duty dc, 10A - 125 Vac or dc, ½ HP - 125 Vac or dc. Not available with psid ranges.
- 26** - Sealed environment proof, 15A - 125/250 Vac. Estimated dc rating, 0.4A, 120 Vdc (not UL listed).
- 27** - High temperature 300°F, 15A - 125/250 Vac
- 28** - Manual reset trip on, increasing 15A - 125/250 Vac. Not available with type 700 enclosure.
- 29** - Manual reset trip on decreasing, 15A - 125/250 Vac. Not available with type 700 enclosure.
- 31** - Low level (gold) contacts, 1A - 125 Vac
- 32** - Hermetically sealed switch, general purpose, 11A - 125/250 Vac, 5A - 30 Vdc
- 42** - Hermetically sealed switch, gold contacts, 1A - 125 Vac
- 50** - Variable deadband, 15A - 125/250 Vac

Switch Element Selection - UL/CSA Listed Dual (2 SPDT)

- 61** - Dual narrow deadband, 15A - 125/250 Vac. Estimated dc rating, 0.4A, 120 Vdc (not UL listed).
- 62** - Dual sealed environment proof, 15A - 125/250 Vac. Estimated dc rating, 0.4A, 120 Vdc (not UL listed).
- 63** - Dual high temp. 300°F, 15A - 125/250 Vac
- 64** - Dual general purpose, 15A - 125/250/480 Vac, ½A - 125 Vdc, ¼A - 250 Vdc
- 65** - Dual ammonia service, 5A - 125/250 Vac
- 67** - Dual hermetically sealed switch, narrow deadband, 5A - 125/250 Vac. Wires cannot be terminated inside B400 switch enclosure. Estimated dc. rating, 2.5A, 28 Vdc (not UL listed).
- 68** - Dual hermetically sealed switch, general purpose, 11A - 125/250 Vac 5A, 30 Vdc. Wires cannot be terminated inside B400 switch enclosure.
- 70** - Dual low level gold contacts, 1A - 125 Vac
- 71** - Dual hermetically sealed switch, gold contacts, 1A - 125 Vac. Wires cannot be terminated inside B400 switch enclosure.

Actuator Seal		Process Temp.	Range				Ambient operating temperature limits -20 to 150 °F, all styles, setpoint shift of ±1% of range per 50 °F temperature change is normal. Switches are calibrated at 70 °F reference
Material	Limits °F ⁽¹⁰⁾	Vac. H ₂ O	0-600 psi	0-1000 psi	0-3000 psi		
B Buna N	0 to 150	•	•	•	•		
V - Viton	20 to 300	•	•	•	•		
T - Teflon	0 to 150	•	•	•	•		
S - 316L	0 to 300		•	•			Available on pressure only.
P - Monel	0 to 300		•	•			Available on pressure only.

Options - Use table from page 5

Range - Select from table page 2

Data Sheet

B-Series Switches – Hydraulic*

ORDERING CODE

Example:

H4 24 V XPK 3000#

Enclosure

H4 - Hydraulic pressure switch, Type 400, watertight enclosure meets NEMA 3, 4, 4X, 13 and IP66 requirements.

Switch Element Selection

- 20** - Narrow deadband ac, 15A - 125/250 Vac. Estimated dc rating, 0.4A, 120 Vdc (not UL listed)
- 22** - Hermetically sealed switch, narrow deadband, 5A - 125/250 Vac. Estimated dc rating, 2.5A, 28 Vdc (not UL listed).
- 23** - Heavy duty ac, 22A - 125/250 Vac
- 24** - General purpose, 15A - 125/250/480 Vac, ½A - 125 Vdc, ¼A - 250 Vdc; 6A, 30 Vdc. Standard switch.
- 25** - Heavy duty dc, 10A - 125 Vac or dc, 1/8 HP - 125 Vac or dc
- 26** - Sealed environment proof, 15A - 125/250 Vac. Estimated dc rating, 0.4A, 120 Vdc (not UL listed)
- 27** - High temperature 300°F, 15A - 125/250 Vac
- 28** - Manual reset trip on increasing, 15A - 125/250
- 29** - Manual reset trip on decreasing, 15A - 125/250 Vac
- 32** - Hermetically sealed switch, general purpose, 11A - 125/250 Vac, 5A - 30 Vdc

Switch Element Selection

- 61** - Dual narrow deadband, 15A - 125/250 Vac. Estimated dc rating, 0.4A, 120 Vdc (not UL listed)
- 62** - Dual sealed environment proof, 15A - 125/250 Vac. Estimated dc rating, 0.4A, 120 Vdc (not UL listed)
- 63** - Dual high temp. 300°F, 15A - 125/250 Vac
- 64** - Dual general purpose, 15A - 125/250/480 Vac, ½A - 125 Vdc, ¼A - 250 Vdc
- 65** - Dual ammonia service, 5A - 125/250 Vac
- 70** - Dual low level gold contacts, 1A - 125 Vac

Actuator Seal

Material	Process Temp. Limits°F	Ambient operating temperature limits -20 to 150 °F; all styles, setpoint shift of ±1% of range per 50 °F temperature change is normal. Switches are calibrated at 70 ° F reference.
V - Viton	20 to 300	Viton O-ring, stainless steel pressure connection

Options Use table from page 6

Range

Range psi	Adjustable Setpoint Limits psi	Proof Pressure psi
1000	150 – 1000	12,000
2000	300 – 2000	12,000
3000	450 – 3000	12,000
5000	750 – 5000	10,000
7500	1125 – 7500	10,000

*Not all B-series hydraulic version (H4) switches are CE compliant. Consult factory for further information

Data Sheet

B-Series Switches – Pressure, Differential Pressure & Hydraulic

OPTIONAL FEATURES AND ACCESSORIES

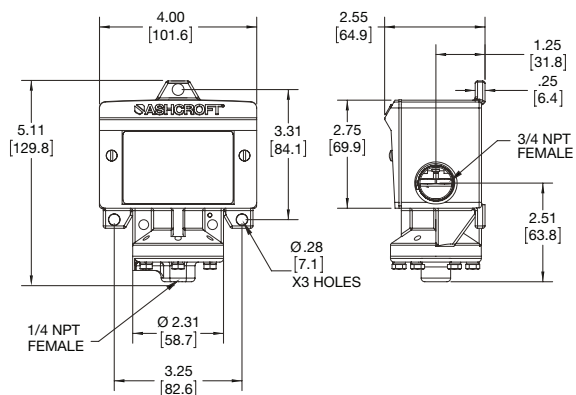
B-SERIES SWITCH OPTIONS						
Applicable Switch Series						
Code	Description	Pressure		Differential Pressure		H
		(psi)	(in. H ₂ O)	(psi)	(in. H ₂ O)	
XBP	Wall Mounting Bracket in. H ₂ O		•		•	
XCH	Chained Cover	•	•	•	•	•
XC8	CSA Approval	•	•	•	•	Standard on 400 Series
XCN	ATEX Directive 94/9/EC/IECEx Rating	•	•	•	•	700 Series only.
XD2	Dual Seal Rating (700 Series only)	•			•	
XFM	FM Approval – Single Element	•	•	•	•	N/A on all combinations.
	FM Approval – Dual Element	•	•	•	•	N/A on all combinations.
XFP	Fungus Proofing	•	•	•	•	•
XFS	Factory Adjusted Setpoint	•	•	•	•	•
XG3	Belleville Actuator	•				Advise static or working pressure for differential pressure switches. 64 or 68 element only. N/A on all combinations.
XG5	UL Limit Control to 150" H ₂ O				•	Buna N and Viton diaphragm. N/A on all combinations.
XG6	UL Limit Control to 600 psi	•				Buna N and Viton diaphragm. N/A on all combinations.
XG7	Secondary Chamber with Vent	•				SS diaphragm required. Teflon diaphragm is the backup. NEMA 7 only.
XG8	Steam Limit Control to 300 psi	•				
XG9	Fire Safe Welded Actuator	•				Stainless steel diaphragm only.
XHS	High Static Differential Pressure			•		12 Buna N and Viton diaphragm – 15#D & 30#D only.
XHX	High Pressure, 40 psi, (static) d/p only		•		•	
	160 psi (proof) d/p only					
	100 psi (proof) pressure only (" H ₂ O)					
XJK	Left Conduit Connection	•	•	•	•	•
XJL	¾" to ½" Reducing Bushing	•	•	•	•	•
XJM	Metric Electrical Conduit Conn. M20 x 1.5	•	•	•	•	•
XK3	Terminal Block (700 Series only)	•	•	•	•	Terminal Blocks standard with 700 dual switches.
XLE	6 foot Leads on the Micro Switch	•	•	•	•	•
XNH	Tagging Stainless Steel	•	•	•	•	•
XNN	Paper Tag	•	•	•	•	•
XPK	Pilot Light(s) Top Mounted	•	•	•	•	•
XPM	¾" Sealed Conduit Connection w/16" Lead Wires	•	•	•	•	•
XTA	316 Stainless Steel Pressure Connection for in. H ₂ O Range		•		•	
XTM	2" Pipe Mounting Bracket	•	•	•	•	
XUD	316 Stainless Steel Pressure Conn.			•		
X06	Pressure Connection:					
	½ NPT Male, ¼ NPT Female 316 Stainless Steel (Combination)	•	•	•	•	Standard with 1000 and 3000 psi ranges. Bottom connection only on DP in H ₂ O ranges.
X07	½ NPTF Press. Conn., 316 SS	•	•	•	•	N/A with Monel diaphragm.
X6B	Cleaned for Oxygen Service	•		•		Buna N cannot be cleaned for oxygen service.
X9F	Inches of Water Housing for Outdoor Use		•			
XYW	316SS Housing	•	•	•	•	
XMD	Metric Range on Label	•	•	•	•	•

Data Sheet

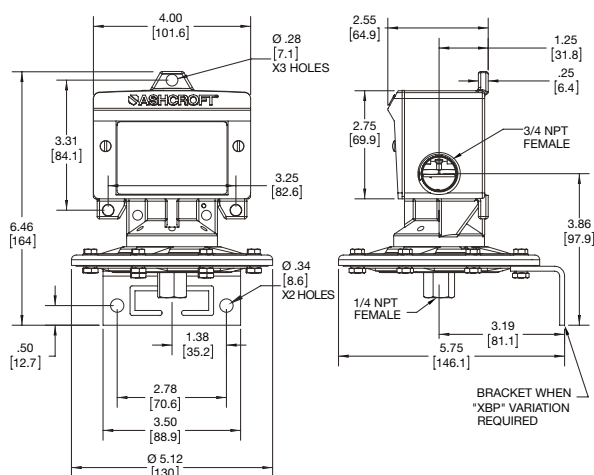
B-Series Switches – Pressure, Differential Pressure & Hydraulic

B 400 DIMENSIONS

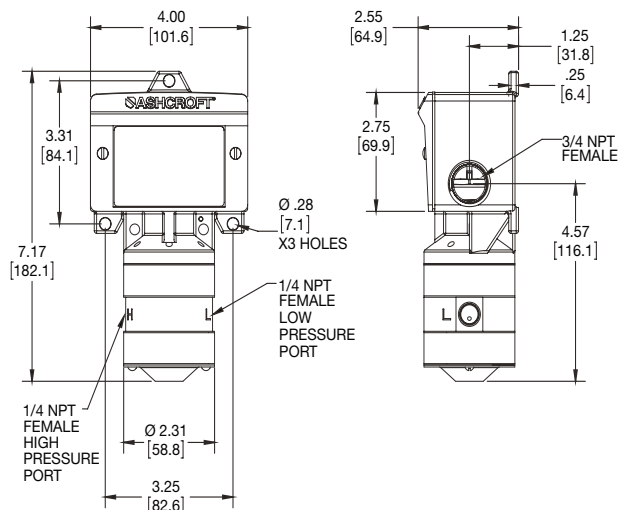
Pressure switch – psi ranges



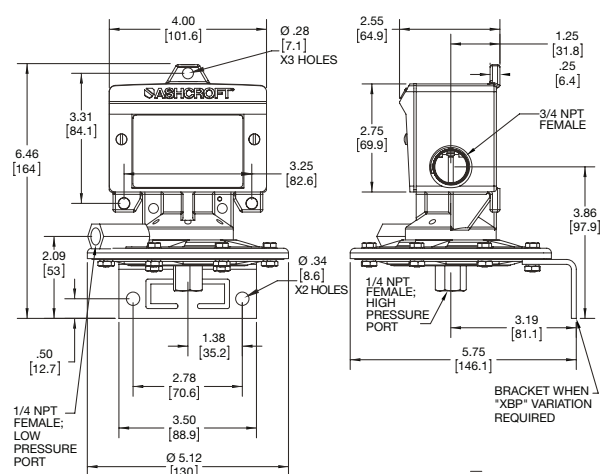
Pressure switch – inches of water ranges



Differential pressure switch – psi differential ranges



Differential pressure switch – inches of water ranges



B-Series Switches – Pressure, Differential Pressure & Hydraulic

Ashcroft Inc. supplies highly reliable Ashcroft® switches and controls for industrial and process applications. We begin with rock-solid designs, matching the most appropriate technology with the safety and reliability requirements of the applications. The materials of construction are specified to Ashcroft's exacting standards, and product is built to last in the toughest applications. Our modern, responsive manufacturing facility is supported by an extensive network of stocking distributors and factory sales offices located in virtually every part of the world. Special application assistance is always just a telephone call away.

The Ashcroft B-Series switch line is designed to satisfy most switch requirements. Materials of construction have been selected for long life. A wide variety of precision switch elements are available to meet every application requirement, including hermetically sealed contacts for added reliability and safety. The actuators we use have been proven in more than 20 years of service in the world's plants and mills. Special designs are available for fire safety, NACE, limit control and other more stringent requirements. Simplicity and ease of use are stressed to improve reliability of the installation.

Applications include: pumps, compressors, washers, filters, degreasers, evaporators, recovery systems, food processing, ground support equipment, reverse osmosis systems, heat exchangers, hydraulic systems, lubrication systems, marine equipment, textile machinery, heating and air conditioning equipment.

Pressure & Differential Pressure Switches

B-Series pressure, differential pressure and vacuum switches use two different actuators depending on setpoint requirements. For setpoints between 2 and 3000 psi, the simple, rugged diaphragm-sealed piston actuator is used. This design features high reliability and choice of actuator seal materials for virtually every application. An optional welded design is also available for setpoints up to 1000 psi for maximum reliability. This design is available in 316 SS or Monel. Differential pressure models use a unique, dual diaphragm-sealed piston design that features very high static operating pressures and small size.

For setpoints between 4.5 and 150 inches of H₂O, a large diaphragm is used for increased sensitivity in both pressure and differential pressure designs with good choice of materials of construction.

All standard models feature ±1 percent of range setpoint repeatability and a minimum of 400 percent of range proof pressures.

These standard designs perform well in applications where shock and vibration could be a problem and may be used in conjunction with Ashcroft diaphragm seals in extreme services such as slurries or abrasive process fluids.

B-Series Temperature Switches



FEATURES

B-Series switches have proven reliable in such harsh environments as:

- Offshore oil rigs
- Chemical and petrochemical plants
- Pulp and paper mills
- Steel mills
- Power plants
- Water and sewage-treatment plants
- Other corrosive environments

Ashcroft Inc. supplies highly reliable Ashcroft® switches and controls for industrial and process applications. We begin with rock-solid designs, matching the most appropriate technology with the safety and reliability requirements of the applications. The materials of construction are specified to Ashcroft's exacting standards, and product is built to last in the toughest applications. Our modern, responsive manufacturing facility is supported by an extensive network of stocking distributors and factory sales offices located in virtually every part of the world. Special application assistance is always just a telephone call away.

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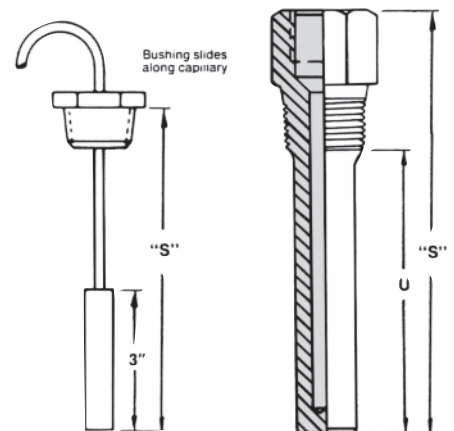
Applications include: pumps, compressors, washers, filters, degreasers, evaporators, recovery systems, food processing, ground support equipment, reverse osmosis systems, heat exchangers, hydraulic systems, lubrication systems, marine equipment, textile machinery, heating and air conditioning equipment.

Thermowells

Thermowells must be used on any application where the stem of the temperature switch may be exposed to pressure, corrosive fluids or high velocity. Additionally, the use of a thermowell permits instrument interchange or calibration check without disturbing or closing down the process.

Ashcroft temperature switches have bulb diameters to match $\frac{3}{8}$ " nominal bore thermowells. The bulbs have a sensitive portion length of 2" which can be used with 2½" "U" dimensioned thermowells or longer. For maximum accuracy, a thermowell's "U" dimension should be selected to permit complete immersion of the sensitive portion plus 1" when measuring the temperature of liquids; an extra 3" should be allowed when measuring the temperature of gases.

Thermowell bushings should be used with remote mount temperature switches. We recommend the standard 3" bulb and code 69 Series bushings for use with any thermowell "U" dimension. A split rubber grommet allows easy installation and "S" dimension adjustment.



B-Series Temperature Switches

Temperature Switches

B-Series temperature switches feature a SAMA Class II vapor pressure thermal system. This system provides quick, accurate response to process temperature changes with negligible ambient temperature effects. This is inherent in the design due to the precise relation-

ship that exists between temperature and pressure according to the vapor pressure laws. A wide selection of sensing bulb and armored capillary lengths is available. The vapor pressure system design features small bulb sizes, making installation easy and cost-effective.

All models feature $\pm 1.0\%$ percent of

span setpoint repeatability with very high overtemperature ratings.

These standard designs perform well in applications where shock and vibration could be a problem and should be used with Ashcroft thermowells for bulb protection and ease of installation and maintenance.

STANDARD TEMPERATURE RANGE SELECTION

Nominal Range ^{(1),(5)}		Maximum Temperature	Approximate Deadband ⁽¹⁾ Switch Element ⁽⁴⁾				
°F	°C	°F	20, 26, 27	21, 24, 31	50	22	32, 42
-40 to 60	-40 to 16	400	1.0-2.0	3.0-8.0	1.5-5.5	1.4-6.0	8.0-16.0
0 to 100	-20 to 40	400	1.5-3.0	5.0-12.0	2.2-8.5	1.5-7.5	9.0-20.0
75 to 205	25 to 95	400	1.5-3.5	8.0-16.0	2.5-12.0	2.0-9.0	10.0-24.0
150 to 260	65 to 125	400	1.5-3.0	5.0-12.0	2.2-8.5	2.0-9.0	10.0-24.0
235 to 375	110 to 190	500	1.5-3.5	5.0-12.0	2.5-8.5	2.0-9.0	10.0-24.0
350 to 525 ⁽³⁾	175 to 275	700	2.0-4.5	8.0-16.0	3.2-12.0	2.5-10.0	15.0-34.0
500 to 750 ⁽²⁾	260 to 400	900	4.0-8.0	16.0-30.0	7.2-24.0	5.0-23.0	30.0-50.0

NOTES:

- 1 All deadbands given in °F.
- 2 Available with remote mount thermal systems only.
- 3 Not available with 2 $\frac{3}{4}$ " stem.
- 4 Dual switch element multiply single switch element value by 1.6 for approximate deadband.
- 5 Set and reset points must fall within the adjustable range.

B-Series Switches – Temperature

OPTIONAL FEATURES AND ACCESSORIES

B-SERIES SWITCH OPTIONS		
	Applicable Switch Series	
	Temperature	
Code	Description	Notes
XBX	1/2" Male NPT Bushing	
XCH	Chained Cover	
XC8	CSA Approval	1
XCN	ATEX Directive 94/9/EC	2
XFP	Fungus Proofing	
XFS	Factory Adjusted Setpoint	3
XJK	Left Conduit Connection	4
XJL	3/4" to 1/2" Reducing Bushing	
XJM	Metric Electrical Conduit Connection M20 x 1.5	
XK3	Terminal Block (700 Series only)	5
XLE	6 foot Leads on the Micro Switch	
XNH	Tagging Stainless Steel	
XNN	Paper Tag	
XPk	Pilot Light(s) Top Mounted	6
XPM	3/4" Sealed Conduit Connection with 16" Lead Wires	
XTM	2" Pipe Mounting Bracket	
XUX	IECEX Rating (700 Series only)	

NOTES:

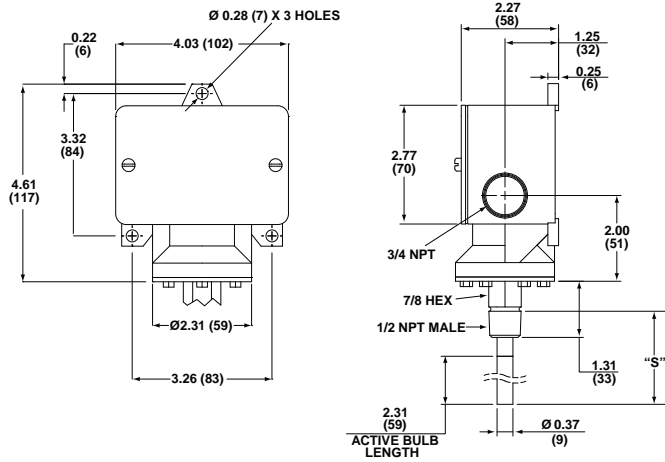
- 1 Standard on 400 Series.
- 2 700 Series only.
- 3 Advise static or working pressure for differential pressure switches.
- 4 Standard on 700 Series. N/A with DPDT element on 400 Series.
- 5 Terminal Blocks standard with 700 dual switches.
- 6 N/A on 700 Series.

 II 2GD
 Ex d IIC T6 Gb
 Ex t IIIIC T85° C Db IP 6X
 (Ta = -20°C to +60°C)

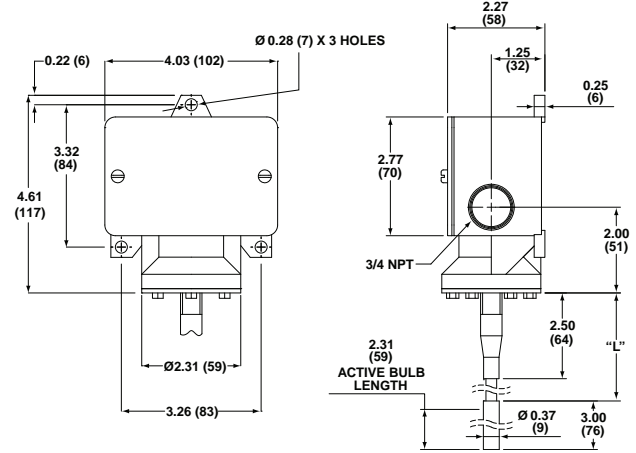
B-Series Temperature Switches

Dimensions – 400 Series

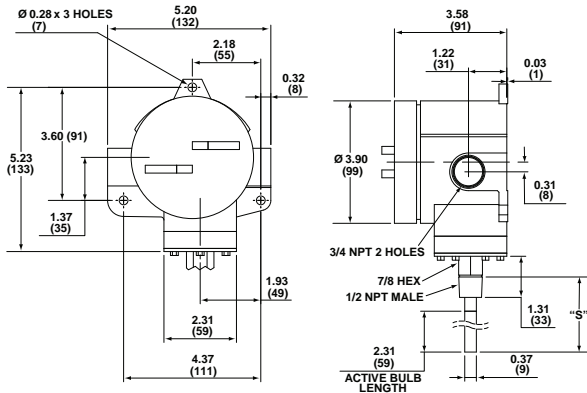
Temperature switch – direct mount



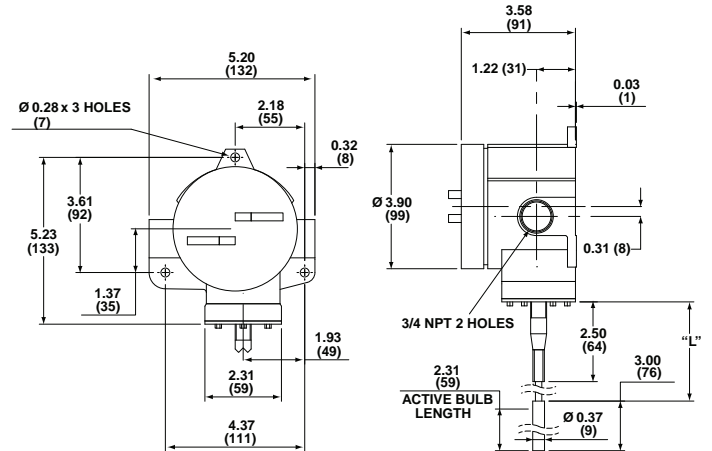
Temperature switch – remote mount



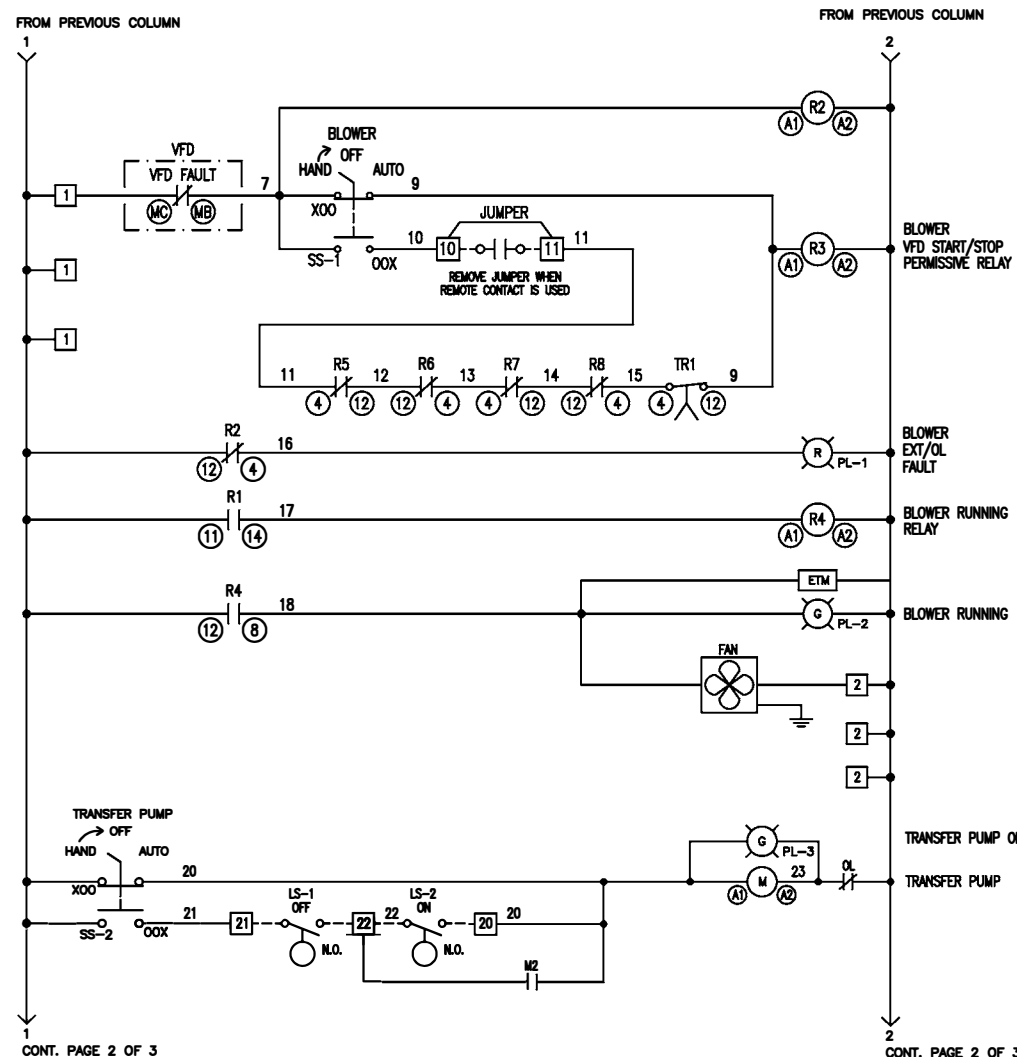
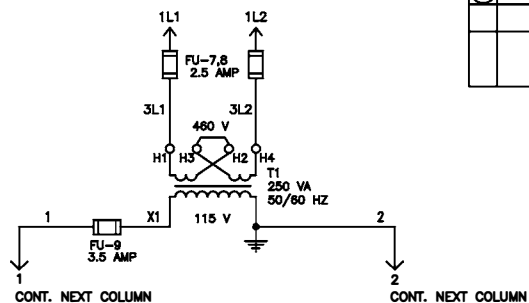
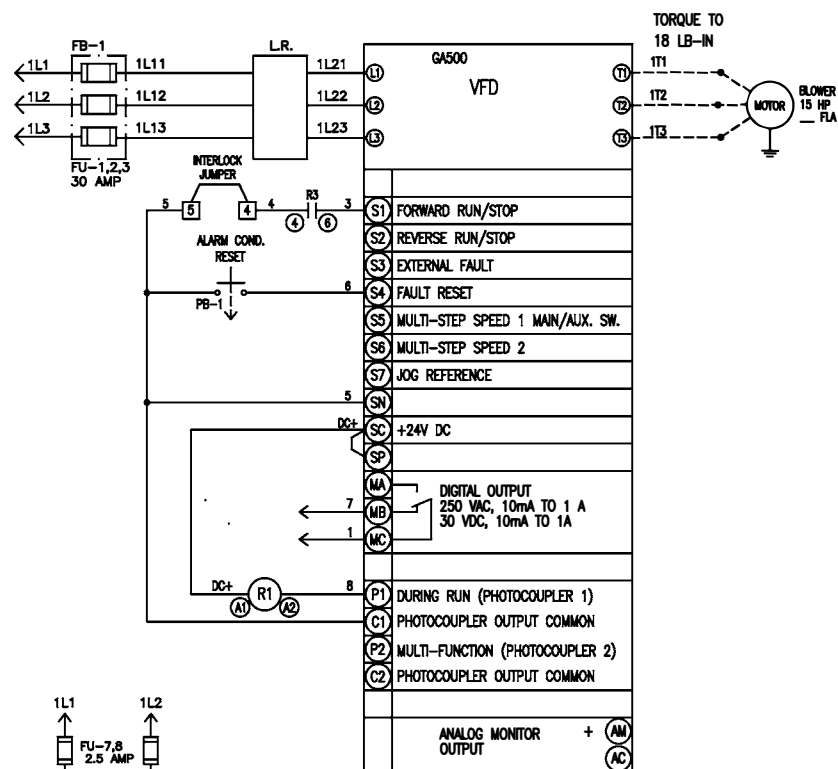
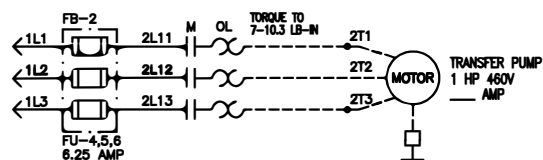
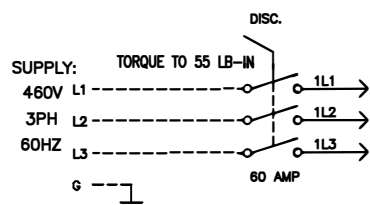
Temperature switch – direct mount



Temperature switch – remote mount



UPSTREAM PROTECTION:
FUSIBLE DISCONNECT OR CIRCUIT BREAKER
MUST BE PROVIDED BY INSTALLER AS PER
STATE AND LOCAL REQUIREMENTS.



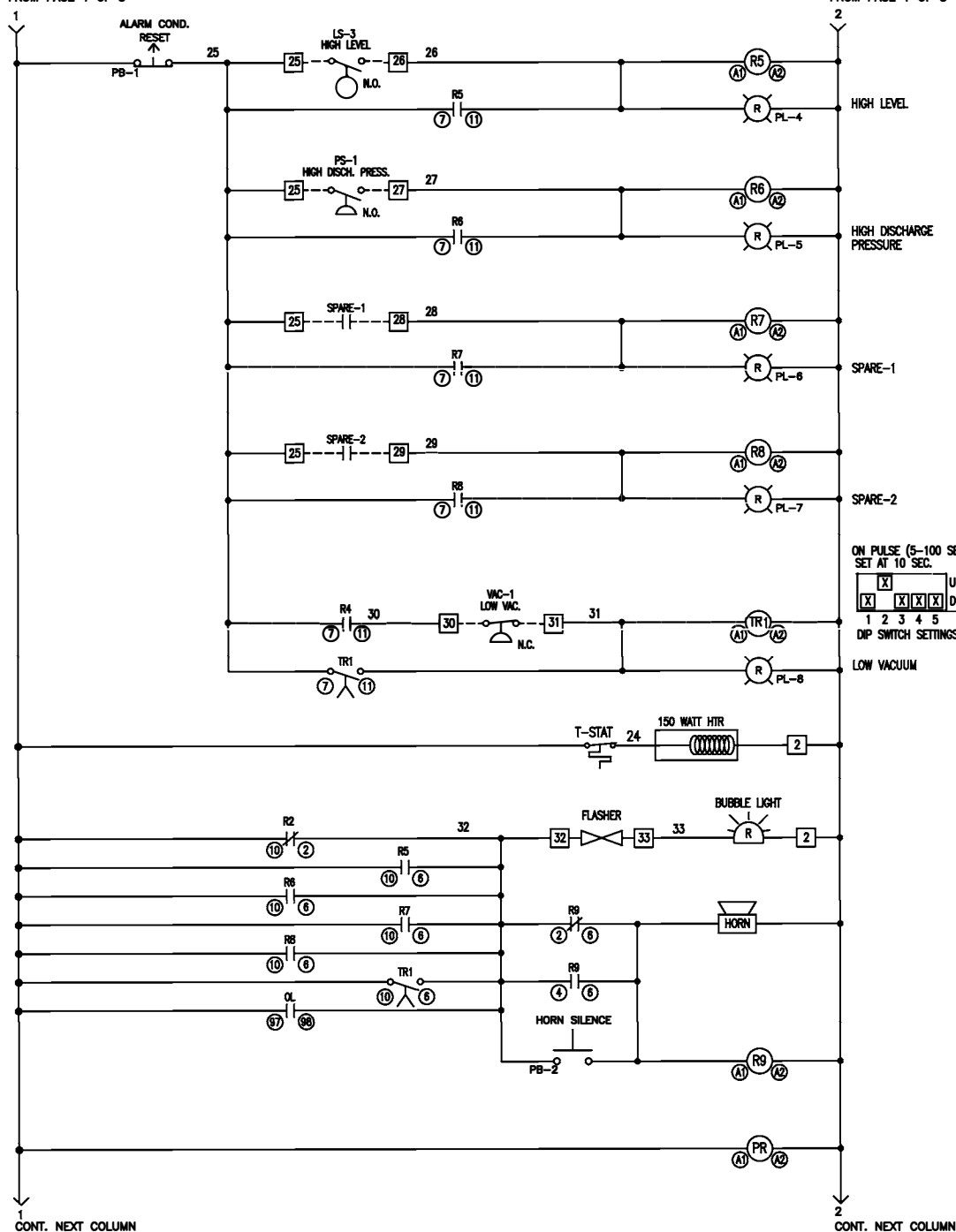
REVISIONS				
REV.	DATE	BY	CHKD.	DESCRIPTION
A	9/23/22	S.G.	R.M.	ADDED DIALER / INCREASED BOX SIZE

1. □ INDICATES TERMINAL BLOCK
2. ○ INDICATES COMPONENT TERMINAL POINT
3. USE COPPER WIRE ONLY; MINIMUM 60 DEGREES C
4. REPLACE WITH LIKE FUSES ONLY
5. ALL CONTACTS SHOWN WITH POWER OFF
6. TORQUE TERMINAL BLOCKS TO 5-7 LB-IN
7. UL LISTED CONTROL PANEL

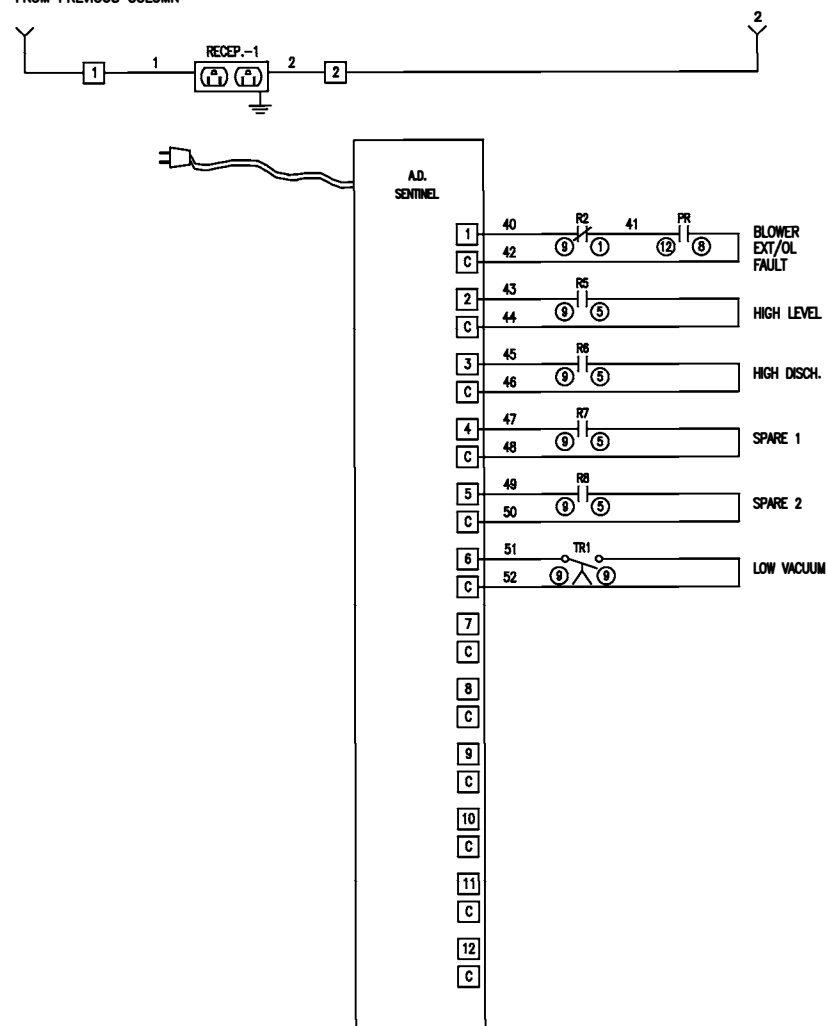
HP	<u>15</u>
VOLTAGE	460

TITLE			VFD CONTROL PANEL
PAGE 1 OF 3	DWG NO. GASH299	INTERNATIONAL CONTROL PRODUCTS, INC.	

FROM PAGE 1 OF 3



FROM PREVIOUS COLUMN



FROM PREVIOUS COLUMN

REVISIONS				
REV.	DATE	BY	CHKD.	DESCRIPTION
A	9/23/22	S.G.	R.M.	ADDED DIALER / INCREASED BOX SIZE

J.E. GASHO & ASSOCIATES
PO# 3595

APPROX. WEIGHT: 150 LB'S

HP 15

VOLTAGE 460

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TITLE VFD CONTROL PANEL

DATE 8/22/22

PAGE 2 OF 3

DWG NO. GASH299

INTERNATIONAL CONTROL PRODUCTS, INC.

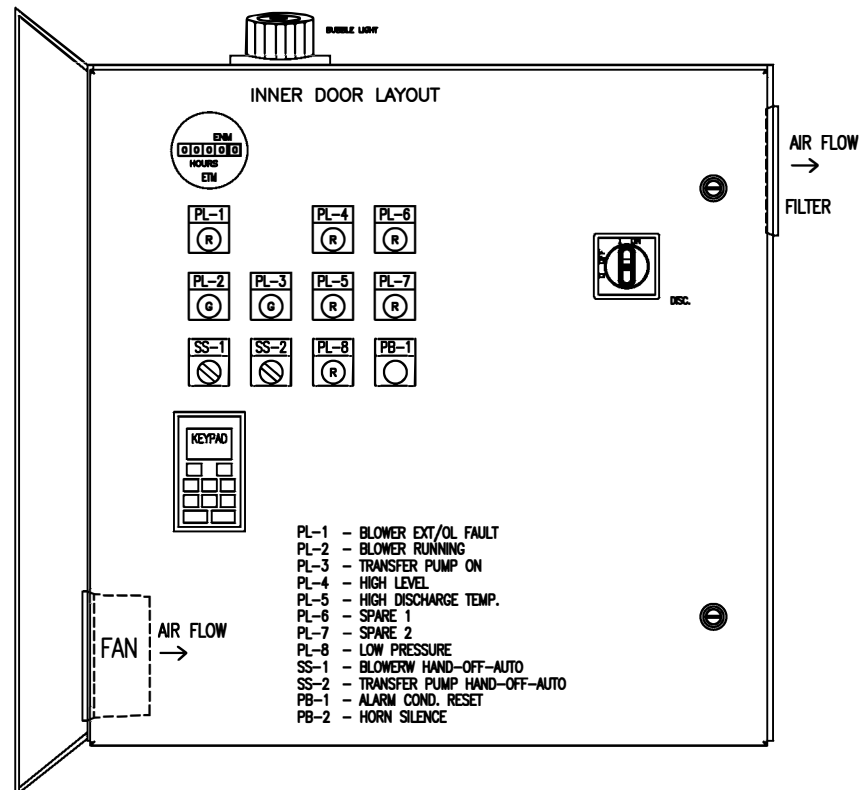
BILL OF MATERIALS

ITEM	QTY	ITEM LABEL	MFG.	DESCRIPTION	PART NUMBER
1	1	ENCL	SCE	30x30x10 NEMA 3R ENCLOSURE	SCE-30EL3010LP
2	1	ENCL	SCE	27x27 STEEL BACK PANEL	SCE-30P30
3	1	ENCL	SCE	27x27 STEEL DEAD FRONT DOOR	SCE-DF30EL30LP
4	1	ENCL	SCE	PADLOCK ATTACHMENT	SCE-PLHG
5	1	FAN	HAMMOND	94 CFM FAN	PF425000T3RBK
6	1	FAN	HAMMOND	ENCLOSURE FILTER	PFA40000T3RBK
7		DISC.	ABB	60A 3P NON-FUSED DISC. SWITCH	OT60F3
8	1	DISC.	ABB	NEMA 3R DISCONNECT HANDLE	OHBS2AJ
9	1	DISC.	ABB	DISCONNECT SHAFT	OX56X180
10	1	FB-1	MERSEN	3P 30A CLASS J FUSE BLOCK	60308SJ
11	3	FU1,2,3	MERSEN	30 AMP CLASS J FUSE	AJT30N
12	1	VFD	INVERTEK	15HP VFD	ODE-3-440300-3F42
13	1	VFD	INVERTEK	LED REMOTE KEYPAD WITH CABLE	OPT-2-OPORT-IN
14	1	L.R.	AD	LINE REACTOR	LR-4015
15	1	FB-2	MERSEN	3P 30A CLASS CC FUSE BLOCK	30323R
16	3	FU4,5,6	BUSSMANN	6.25 AMP CLASS CC FUSE	FNQ-R-6 1/4
17	1	M	SIEMENS	6 AMP IEC CONTACTOR	3RT2015-1AK61
18	1	OL	SIEMENS	OVERLOAD RELAY (1.8-2.5A)	3RU2126-1CB0
19	2	SS-1,2	ABB	3 POS. S.S. SPRG. RET. L TO C (2 N.O.)	M3SS7-10B-20
20	6	PL-1,4,5,6,7,8	ABB	RED F.V. PILOT LIGHT - 120V	CL-100R
21	2	PL-2,3	ABB	GREEN F.V. PILOT LIGHT - 120V	CL-100G
22	1	PB-1	ABB	BLACK FLUSH P.B. (1 N.O./1 N.C.)	MP1-10B-11
23	1	PB-2	ABB	BLACK FLUSH P.B. (1 N.O.)	MP1-10B-10
24	1	HORN	INGRAM	ALARM HORN - 120V AC	AH1158AR
25	1	BUBBLE	INGRAM	BUBBLE LIGHT - 120V AC	LX25RED
26	1	FLASHER	ATC DIV.	FLASHER RELAY - 120V AC	ETN-120-AFT-75
27	1	T1	EATON	250VA CONTROL TRANSFORMER	C0250E2FB
28	2	FU-7,8	MERSEN	2.5 AMP CLASS CC FUSE	ATDR2 1/2
29	1	FU-9	MERSEN	3.5 AMP TIME DELAY FUSE	TRM3 1/2
30	1	R1	FINDER	1 POLE RELAY - 24V DC	38.51.7.024.0050
31	6	R2,4,5,6,7,8	FINDER	4 POLE RELAY - 120V	55.34.8.120.0040
32	6	R2,4,5,6,7,8	FINDER	4 POLE RELAY SOCKET	94.74
33	3	R3,9,PR	FINDER	2 POLE RELAY - 120V	56.32.8.120.0040
34	3	R3,9,PR	FINDER	2 POLE RELAY SOCKET	96.02
35	1	TR1	FINDER	2 POLE TIMER - 120V	85.02.0.125.0000
36	1	TR1	FINDER	2 POLE TIMER SOCKET	94.82
37	1	HTR	STEGO	150 WATT HTR	028009-00
38	1	T-STAT	STEGO	HEATER T-STAT	011409-00
39	1	RECEPT	COMMERCIAL ELEC.	1 GANG BOX	WSB350G
40	1	RECEPT	GFCI	GFCI RECEPTACLE	TGMT20
41	1	A..D.	SENSAPHONE	SENTINEL CELLULAR MONITORING SYSTEM	SCD-1200-4G__SD
42	27	T.B.'S	PHOENIX	TERMINAL BLOCK	3004362
43	1	T.B.'S	PHOENIX	TERMINAL BLOCK END COVER	3003020
44	2	T.B.'S	PHOENIX	DIN RAIL END RETAINER	0800886
45	2	GROUND	BURNDY	14-2 AWG GROUND LUG	DLA2

LEFT SIDE VIEW



INNER DOOR LAYOUT



REVISIONS

REV.	DATE	BY	CHKD.	DESCRIPTION
A	9/23/22	S.G.	R.MAJOR	DAIAR / INCREASED BOX SIZE

J.E. GASHO & ASSOCIATES
 PO# 3595

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APPROX. WEIGHT: 150 LB'S

HP 15
 VOLTAGE 460

TITLE VFD CONTROL PANEL

DATE 8/22/22 PAGE 3 OF 3 DWG NO. GASH299 INTERNATIONAL CONTROL PRODUCTS, INC.

APPENDIX L
SSDS INSPECTION LOG

SSDS MONITORING INSPECTION FORM 22-60 46th Street Queens, NY					
Inspector Name:			Date:		
Time In:			Time Out:		
General					
Weather:	Temperature:	Barometric Pressure:			
When was the last rain event?					
Is the blower currently operating? Yes / No					
If no, please list reason/alarm condition:					
Any evidence of system tampering, vandalism or damage in the first floor equipment room? -					
Is air discharging from the exhaust piping to the roof? -					
Any evidence of system tampering, vandalism, or damage to the exhaust stack? -					
Were all cleanout/sampling port caps securely attached prior to system testing? -					
If no, list location and contact Project Manager/Project Director.					
Is the concrete floor slab overlying all of the SSDS piping runs intact? -					
If no, list location and contact Project Manager/Project Director.					
SSDS Operations					
Monitoring Point (MP) or Riser (R) Identification	Location	Flow Rate ¹ cfm	Applied Vacuum ¹ in. H ₂ O	Induced Vacuum ² in. H ₂ O	Notes
MP-1		NA	NA		
MP-2		NA	NA		
MP-3		NA	NA		
MP-4		NA	NA		
MP-5		NA	NA		
MP-6		NA	NA		
R-1				NA	
R-2				NA	
R-3				NA	
R-4				NA	
R-5				NA	
Comments: Combined applied vacuum on VR-1 riser =					
Notes: 1. Normal system flow rates range from 40 to 100 cfm. Applied vacuum readings range from 1 to 15 in. H ₂ O. System readings will be obtained from each riser leg (R-1 through R-5). 2. Normal system induced vacuum readings should be a minimum of 0.004 in. H ₂ O. System readings will be obtained from each monitoring point (MP-1 through MP-6). 3. If observations are confirmed to be outside of this range, inform emergency contacts below and prepare corrective action plan, if necessary. in. of H ₂ O - inches of water cfm - cubic feet per minute NA - not applicable					

APPENDIX M
SSDS SHUTDOWN LOG

SSDS System Shutdown Log
TRACKING FORM
22-60 46th Street, Queens, NY

Date	Time	Message	Unusual conditions on arrival	Restart successful?	Description of persistent problem(s)
MM/DD/YY	HH:MM	Alarm	fan shut down.	Yes	

APPENDIX N
SVE INSPECTION AND SAMPLING LOGS

SVE INSPECTION LOG MONTHLY SOIL VAPOR EXTRACTION SYSTEM INSPECTION 22-60 46th Street, Queens, NY			
Inspector Name:		Date:	
Time IN:		Time OUT:	
GENERAL			
Weather:	Temperature:	Barometric Pressure:	Equipment Room Temperature:
When was the last rain event?			
Is the SVE blower currently operating? Yes / No (circle one) If no, ALERT PROJECT MANAGER and please list reason/alarm condition:			
What is the VFD setting? If under 30 Hz, ALERT PROJECT MANAGER:			
Is condensate in the knockout tank gauge below the low-high float sensor? Yes / No (circle one) If no, ALERT PROJECT MANAGER and manually drain knockout tank			
Is transfer pump working? Yes / No (circle one) If no, ALERT PROJECT MANAGER.			
Is 55-gallon drum full? Yes / No (circle one) If yes, acknowledge alarm on panel and ALERT PROJECT MANAGER.			
Any evidence of system tampering, vandalism or damage? Yes / No (circle one) If yes, ALERT PROJECT MANAGER and please note findings:			
Any evidence of system tampering, vandalism or damage to the exhaust stack? Yes / No (circle one) If yes, ALERT PROJECT MANAGER and please note findings:			
Notes: This SVE Inspection Log should be completed along with the sampling log for each sampling event. PID - Photoionization Detector; ppm - parts per million; NA - Not applicable; GAC - Granular Activated Carbon			
Comments:			
Emergency Contact Information			
	Name	Title	Contact Number
	Adrianna Bosco	AKRF Project Manager	646-388-9576 (office)
			914-874-3358 (cell)
	Ashutosh Sharma	AKRF Deputy Project Manager	646-388-9865 (office)
			347-249-0652 (cell)
	Emanuel Kokinakis	Owner's Representative	718-932-6342 (office)

SVE INSPECTION LOG MONTHLY SOIL VAPOR EXTRACTION SYSTEM INSPECTION 22-60 46th Street, Queens, NY				
SVE Operation CALL PROJECT MANAGER IF READING OUTSIDE ACCEPTABLE/TYPICAL RANGE (IN GRAY)				
Pre-Blower Inlet Temperature (°F): 40-80°F		Post-Blower Outlet Temperature (°F): 70-110°F		Knockout Tank Vacuum (Inches of water column): 0-90 inH2O
Pre-filter Vacuum (Inches of water column): 0-90 inH2O		Post-filter Vacuum (Inches of water column): 0-90 inH2O		Post-Blower Pressure (Inches of water column): 0-90 inH2O
GAC Influent PID (ppm):		GAC Intermediate PID (ppm): Less than GAC Influent PID		GAC Effluent PID (ppm): 0 ppm
Monitoring Location	Vacuum Reading "H2O <small>Between 0 and 90 "H2O</small>	Air Flow Reading "H2O <small>Between 0.000 and 0.050 "H2O</small>	Air Flow Reading CFM	Notes
SVE-01				
SVE-02				
SVE-03				
SVE-04				
SVE-05				
SVE-06				

<p align="center"> SOIL VAPOR EXTRACTION SYSTEM EXTRACTED VAPOR SAMPLING 22-60 46th Street, Queens, NY </p>

Inspector Name:

Date:

Time IN: _____

Time OUT:

Location	Start Time	Start Vacuum	End Time	End Vacuum	PID Field Screen	Sample ID	Notes
SVE Carbon Influent							
SVE Carbon Intermediate							
SVE Carbon Effluent							

Comments:	
------------------	--

Note: The SVE Inspection Log should also be completed for each sampling event. Samples to be collected and analyzed for VOCs by TO-15. Individual lines are not anticipated to be sampled in the routine sampling events. Sampling will be conducted as necessary at the discretion of the remedial engineer, in consultation with NYSDEC and NYSDOH.

APPENDIX O
SVE SHUTDOWN LOG

SVE System Shutdown Log
TRACKING FORM
 22-60 46th Street, Queens, NY

Date	Time	Message	Unusual conditions on arrival	Restart successful?	Description of persistant problem(s)
MM/DD/YY	HH:MM	Alarm	fan shut down.	Yes	High Temperature

APPENDIX P
RESPONSIBILITIES OF OWNER AND REMEDIAL PARTY AND SITE MANAGEMENT INSPECTION FORM

Responsibilities

The responsibilities for implementing the Site Management Plan (SMP) for the 22-60 46th Street Site (the Site), number 241244 are divided between the site owner(s) and a Remedial Party, as defined below. The owner is currently listed as:

MD45 Developers LLC
48-02 25th Avenue, Suite 400
Queens, NY 11103

Solely for the purposes of this document and based upon the facts related to a particular site and the remedial program being carried out, the term Remedial Party (RP) refers to any of the following: certificate of completion holder, volunteer, applicant, responsible party, and, in the event the New York State Department of Environmental Conservation (NYSDEC) is carrying out remediation or Site management, NYSDEC and/or an agent acting on its behalf. The RP is:

MD45 Developers LLC
48-02 25th Avenue, Suite 400
Queens, NY 11103

Nothing on this page shall supersede the provisions of an Environmental Easement, Consent Order, Consent Decree, agreement, or other legally binding document that affects rights and obligations relating to the Site.

Site Owner's Responsibilities:

- The owner shall follow the provisions of the SMP as they relate to future construction and excavation at the Site.
- In accordance with a periodic time frame determined by NYSDEC, the owner shall periodically certify, in writing, that all Institutional Controls set forth in an Environmental Easement remain in place and continue to be complied with. The owner shall provide a written certification to the RP, upon the RP's request, in order to allow the RP to include the certification in the Site's Periodic Review Report (PRR) certification to NYSDEC.
- In the event the Site is delisted, the owner remains bound by the Environmental Easement and shall submit, upon request by NYSDEC, a written certification that the Environmental Easement is still in place and has been complied with.
- The owner shall grant access to the Site to the RP and NYSDEC and its agents for the purposes of performing activities required under the SMP and assuring compliance with the SMP.
- The owner is responsible for assuring the security of the remedial components located on its property to the best of its ability. In the event that damage to the remedial components or vandalism is evident, the owner shall notify the Site's RP and NYSDEC in accordance with the timeframes indicated in Section 1.4 of the SMP - Notifications.
- In the event some action or inaction by the owner adversely impacts the Site, the owner must notify the Site's RP and NYSDEC in accordance with the timeframes indicated in Section 1.4 of the SMP - Notifications.
- The owner must notify the RP and NYSDEC of any change in ownership of the Site property (identifying the tax map numbers in any correspondence) and provide contact information for the new owner of the Site property. 6 NYCRR Part 375 contains notification requirements applicable to any construction or activity changes and changes in ownership. Among the

notification requirements is the following: 60 days prior written notification must be made to NYSDEC. Notification is to be submitted to the NYSDEC Division of Environmental Remediation's Site Control Section. Notification requirements for a change in use are detailed in Section 1.4 of the SMP. A 60-Day Advance Notification Form and Instructions are found at <http://www.dec.ny.gov/chemical/76250.html>.

- In accordance with the tenant notification law, within 15 days of receipt, the owner must supply a copy of any vapor intrusion data that is produced with respect to structures and that exceeds the New York State Department of Health (NYSDOH) or United States Occupational Safety and Health Administration (OSHA) guidelines on the Site, whether produced by NYSDEC, the RP, or owner, to the tenants on the property. The owner must otherwise comply with the tenant and occupant notification provisions of Environmental Conservation Law Article 27, Title 24.

Remedial Party's Responsibilities

- The RP must follow the SMP provisions regarding any construction and/or excavation it undertakes at the Site.
- The RP shall report to NYSDEC all activities required for remediation, operation, maintenance, monitoring, and reporting. Such reporting includes, but is not limited to, periodic review reports and certifications, electronic data deliverables, corrective action work plans and reports, and updated SMPs.
- Before accessing the Site property to undertake a specific activity, the RP shall provide the owner with advanced notification that shall include an explanation of the work expected to be completed. The RP shall provide to (i) the owner, upon the owner's request, (ii) NYSDEC, and (iii) other entities, if required by the SMP, a copy of any data generated during the Site visit and/or any final report produced.
- If NYSDEC determines that an update of the SMP is necessary, the RP shall update the SMP and obtain final approval from NYSDEC. Within 5 business days after NYSDEC approval, the RP shall submit a copy of the approved SMP to the owner(s).
- The RP shall notify NYSDEC and the owner of any changes in RP ownership and/or control and of any changes in the party/entity responsible for the operation, maintenance, and monitoring of and reporting with respect to any remedial system (Engineering Controls). The RP shall provide contact information for the new party/entity. Such activity constitutes a Change of Use pursuant to 375-1.11(d) and requires 60-day prior notice to NYSDEC. A 60-Day Advance Notification Form and Instructions are found at <http://www.dec.ny.gov/chemical/76250.html>.
- The RP shall notify NYSDEC of any damage to or modification of the systems as required under Section 1.4 of the SMP.
- Prior to a change in use that impacts the remedial system or requirements and/or responsibilities for implementing the SMP, the RP shall submit to NYSDEC for approval an amended SMP.
- Any change in use, change in ownership, change in Site classification (*e.g.*, delisting), reduction or expansion of remediation, and other significant changes related to the Site may result in a change in responsibilities and, therefore, necessitate an update to the SMP and/or

updated legal documents. The RP shall contact the Department to discuss the need to update such documents.

Change in RP ownership and/or control and/or Site ownership does not affect the RP's obligations with respect to the Site unless a legally binding document executed by NYSDEC releases the RP of its obligations.

Future Site owners and RPs and their successors and assigns are required to carry out the activities set forth above.

Annual Site-Wide Inspection**Overview of Annual Site-Wide Inspection requirements:**

- 1) General Site conditions at time of inspection;
- 2) SMP-related Site Activities being conducted, upcoming SMP-related tasks;
- 3) Institutional Control (IC) Checklist (SMP, FMP maintained on-Site, routine SMP tasks being conducted);
- 4) Evaluation of Engineering Controls; and
- 5) Site Documentation.

1) General Site conditions at time of inspection:

NAME:	DATE:
TIME:	WEATHER:
Annual Inspection or Emergency Inspection (if emergency, specify nature)?	

Notes: _____

2) Are any SMP-related site activities currently being conducted (SSDS and SVE Operation)?

Notes/Details:

3) IC Checklist (SMP maintained on-Site, routine SMP tasks being conducted)

<i>Copy of SMP on-Site?</i>	<input type="checkbox"/> YES <input type="checkbox"/> NO
<i>Building Use Still Consistent with SMP (Restricted Residential)?</i>	<input type="checkbox"/> YES <input type="checkbox"/> NO

Have the required SMP tasks been conducted during the reporting period?

SSDS inspections/monitoring

SVE system monitoring

Quarterly groundwater monitoring/sampling

☐ YES ☐ NO

Notes: _____

4) Evaluation of ECs

Environmental Control Type: SVE System	
Is the SVE system currently operating?	<input type="checkbox"/> YES <input type="checkbox"/> NO
If no, describe reason/alarm condition(s):	
Are the various gauges and components of system and the digital control panel clean?	<input type="checkbox"/> YES <input type="checkbox"/> NO
Have any problems occurred that require corrective action to the treatment system components or well access manifolds?	
<input type="checkbox"/> YES <input type="checkbox"/> NO	
If yes, describe:	

SVE System operations have also been documented using the applicable inspections logs (see attached) that will be provided as part of the PRR.

Notes: _____

Environmental Control Type: Active SSDS	
Are there any unusual odors, spills or leaks near the SSDS piping in the basement?	<input type="checkbox"/> YES <input type="checkbox"/> NO
If yes, describe source and plans for repair:	
Are the above grade components of the SSDS clean?	<input type="checkbox"/> YES <input type="checkbox"/> NO
Is the SSDS blower running?	<input type="checkbox"/> YES <input type="checkbox"/> NO
If yes, describe:	
Any evidence of SSDS piping tampering, vandalism or damage on the SSDS piping or system components?	<input type="checkbox"/> YES <input type="checkbox"/> NO
If yes, describe:	

Notes: _____

5) Site documentation

Including updates regarding notification to NYSDEC regarding any changes to Site conditions/operations, routine reporting to NYSDEC, etc.).

Notes: _____

