27-09 40th Avenue

Long Island City, Queens County, New York

SITE MANAGEMENT PLAN

NYSDEC Site Number: C241241

Prepared for:

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Revisions to Final Approved Site Management Plan:

Revision No.	Date Submitted	Summary of Revision	NYSDEC Approval Date

DECEMBER 2025

CERTIFICATION STATEMENT

I, JAMES P. CINELLI, certify that I am currently a NYS registered professional engineer or Qualified Environmental Professional as in 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) and Green Remediation (DER-31).

079794-01_____ P.E.

12-30-2025_____DATE

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List of Acronyms

AS	Air Sparging
ASP	Analytical Services Protocol
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
BMP	Best Management Practice
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CAMP	Community Air Monitoring Plan
C/D	Construction and Demolition
CFR	Code of Federal Regulation
CLP	Contract Laboratory Program
COC	Certificate of Completion
CO2	Carbon Dioxide
CP	Commissioner Policy
DER	Division of Environmental Remediation
DUSR	Data Usability Summary Report
EC	Engineering Control
ECL	Environmental Conservation Law
ELAP	Environmental Laboratory Approval Program
ERP	Environmental Restoration Program
EWP	Excavation Work Plan
GHG	Greenhouse Gas
GWE&T	Groundwater Extraction and Treatment
HASP	Health and Safety Plan
IC	Institutional Control
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSDOHMH	New York State Department of Health and Mental Hygiene
NYCRR	New York Codes, Rules and Regulations
O&M	Operation and Maintenance
OM&M	Operation, Maintenance and Monitoring
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
PCE	Tetrachloroethylene
P.E or PE	Professional Engineer
PFAS	Per- and Polyfluoroalkyl Substances
PID	Photoionization Detector
PRP	Potentially Responsible Party
PRR	Periodic Review Report
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
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RP	Remedial Party
RSO	Remedial System Optimization
SAC	State Assistance Contract
SCG	Standards, Criteria and Guidelines
SCO	Soil Cleanup Objective
SMP	Site Management Plan
SOP	Standard Operating Procedures
SOW	Statement of Work
SPDES	State Pollutant Discharge Elimination System
SSD	Sub-slab Depressurization
SVE	Soil Vapor Extraction
SVI	Soil Vapor Intrusion
TAL	Target Analyte List
TCE	Trichloroethylene
TCL	Target Compound List
TCLP	Toxicity Characteristic Leachate Procedure
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VCA	Voluntary Cleanup Agreement
VCP	Voluntary Cleanup Program

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:

Site Identification: C2412421-03-20

27-09 40th Avenue, Queens, New York

Institutional Controls:	1. The property may be used for restricted residential, commercial and industrial use.
	2. The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the New York City Department of Health 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.
	3. Groundwater and other environmental or public health monitoring must be performed as defined in this SMP.
	4. Data and information pertinent to site management must be reported at the frequency and in a manner as defined in this SMP.
	5. Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in this SMP.
	6. Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical component of the remedy shall be performed as defined in this SMP.
	7. 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 Environmental Easement.
	8. All ECs must be inspected at a frequency and in a manner defined in the SMP.

Site Identification: C2412421-03-20

27-09 40th Avenue, Queens, New York

Engineering Controls:	1. An active SSDS was installed as an engineering control to mitigate the risk of soil vapor intrusion into the building on-Site.	
	2. Contingent Remedial Elements identified in the Decision Document included a 1) a Cover System, 2) an Institutional Control, and 3) a Site Management Plan. A cover system was not installed because endpoint sampling indicated that unrestricted use SCOs were achieved. An environmental easement was prepared and recorded on May 9, 2025. A copy is provided in Appendix C.	
	3. An SVE system was installed to reduce concentrations of soil vapor on-Site and mitigate the potential for off-site migration of soil vapor that may result from the presence of PCE in groundwater.	
Monitoring:		Frequency
1. Groundwater Monitoring Wells MW-101, MW-102, MW-104, MW-105R, MW-106R, MW-108R, MW-109R, MW-110R, MW-111		Quarterly
2. Soil Vapor Intrusion Evaluation for New Buildings		As needed
Maintenance:		Frequency
1. SSDS fan maintenance		Quarterly
2. SVE blower maintenance		Quarterly
3. SVE carbon drum exchange		As Needed
Reporting:		Frequency
1. Groundwater and Treatment System Data		Quarterly
2. Periodic Review Report		Annually

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

1.0 INTRODUCTION

1.1 General

This Site Management Plan (SMP) is a required element of the remedial program for the 27-09 40th Avenue located in Long Island City, Queens, New York (hereinafter referred to as the "Site"). See Figure 1. The Site is currently in the New York State (NYS) Brownfield Cleanup Program (BCP), Site No. C2412421-03-20 which is administered by New York State Department of Environmental Conservation (NYSDEC or Department).

40th Avenue Dutch Kills Realty, LLC entered into a Brownfield Cleanup Agreement (BCA), on Apri14, 2020 with the NYSDEC to remediate the site. A figure showing the site location and boundaries of this site is provided in Figure 1.

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

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

It is important to note that:

- This SMP details the site-specific implementation procedures that are required by the Environmental Easement. Failure to properly implement the SMP is a

violation of the Environmental Easement, which is grounds for revocation of the Certificate of Completion (COC); and

- Failure to comply with this SMP is also a violation of Environmental Conservation Law, 6 NYCRR Part 375 and the BCA, (Index #C2412421-03-20; Site #C2412421) for the site, and thereby subject to applicable penalties.

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

This SMP was prepared by Liberty Environmental, on behalf of 40th Avenue Dutch Kills Realty, LLC, in accordance with the requirements of the NYSDEC's DER-10 ("Technical Guidance for Site Investigation and Remediation"), dated May 2010, and the guidelines provided by the NYSDEC. This SMP addresses the means for implementing the ICs and/or ECs that are required by the Environmental Easement for the site.

1.2 Revisions and Alterations

Revisions and alterations to this plan will be proposed in writing to the NYSDEC's project manager. The NYSDEC can also make changes to the SMP or request revisions from the remedial party. Revisions will be necessary upon, but not limited to, the following occurring: a change in media monitoring requirements, upgrades to or shutdown of a remedial system, post-remedial removal of contaminated sediment or soil, or other significant change to the site conditions. All approved alterations must conform with Article 145 Section 7209 of the Education Law regarding the application of professional seals and alterations. For example, any changes to as-built drawings must be stamped by a New York State Professional Engineer. In accordance with the Environmental Easement for the site, the NYSDEC project manager will provide a notice of any approved changes to the SMP, and append these notices to the SMP that is retained in its files.

1.3 Notifications

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

1. 60-day advance 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.

2. 7-day advance notice of any field activity associated with the remedial program.

3. 15-day advance notice of any proposed ground-intrusive activity pursuant to the Excavation Work Plan. 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.

4. Notice within 48-hours of any damage or defect to the foundation, structures or EC that reduces or has the potential to reduce the effectiveness of an EC, and likewise, any action to be taken to mitigate the damage or defect.

5. Notice within 48 hours of any non-routine maintenance activites.

6. 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.

7. Follow-up status reports on actions taken to respond to any emergency event requiring ongoing responsive action submitted to the NYSDEC within 45 days describing and documenting actions taken to restore the effectiveness of the ECs.

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

8. At least 60 days prior to the change, the NYSDEC will be notified in writing of the proposed change. This will include a certification that the prospective purchaser/Remedial Party has been provided with a copy of the Brownfield Cleanup Agreement (BCA), and all approved work plans and reports, including this SMP.

9. 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 the NYSDEC.

Table 1 on the following page includes contact information for the above 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 Appendix A.

Table 1: Notifications*

Name	**Contact Information**	**Required Notification****
NYSDEC Project Manager – Sydney Sobol	(518)402-4799; sydney.sobol@dec.ny.gov	All notifications
NYSDEC Project Manager Supervisor– Doug O'Connell	(518)402-9662; douglas.macneal@dec.ny.gov	All notifications
NYSDEC Site Control	(518)402-9569; dersitecontrol@dec.ny.gov	Notifications 1 and 8
NYSDOH Project Manager – Johnathan Robinson	518-402-7881; Johnathan.Robinson@health.ny.gov	Notifications 4, 6, and 7
NYSDEC Regional Hazardous Waste Engineer – Jane O'Connell	(718)482-4599; jane.oconnell@dec.ny.gov	All notifications

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

** Note: Numbers in this column reference the numbered bullets in the notification list in this section.

2.0 SUMMARY OF PREVIOUS INVESTIGATIONS AND REMEDIAL ACTIONS

2.1 Site Location and Description

The site is located in Long Island City, Queens County, New York and is identified as Block [397] and Lot 35 on the New York City Tax Map (see Figure 1). The site is an approximately 0.40-acre area and is bounded by a three-story residential building with automobile garage to the north, 40th Avenue to the south, 28th Street to the east, and a three-story residential building to the west (see Figure 2 – Site Layout Map). The boundaries of the site are more fully described in Appendix C – Environmental Easement. The owner of the site parcel at the time of issuance of this SMP is 40th Avenue Dutch Kills Realty, LLC

2.2 Physical Setting

2.2.1 Land Use

The Site consists of the following: a six-story mixed-use building including retail space, offices, and apartment. The building is occupied.

The properties adjoining the Site and in the neighborhood surrounding the Site primarily include residential dwellings and commercial buildings. The properties immediately south of the Site include residential dwellings and a large commercial building; the properties immediately north of the Site include residential dwellings and a large commercial building; the properties immediately east of the Site include residential dwellings and large commercial buildings; and the properties to the west of the Site include residential dwellings, a large apartment building, and medium sized commercial buildings.

2.2.2 Geology

In general, contaminated historic fill material is underlain by layers of fine to medium silty sands and silt which overlie thick, competent, plastic clay. The continuous soil borings performed as part of the SRI indicated the presence of between 2 and 5 feet of clay at grade or under de-minimis urban fill across most of the site. This horizon overlies approximately 3 to 8 feet of black coarse sands transitioning to silt and silty clay. The sands from 8 to 37 ft bgs are consistent with distal glacial deposits in a low velocity shallow marine environment; the sands were characterized as alternating deposits of fine silty to coarse sands with varying degrees of clay content. A coherent high plasticity brown clay layer was encountered at approximately 31 to 36 ft bgs in all soil borings conducted on and off-site as part of the SRI. The high plasticity clay layer dips significantly towards the west, with a variation of up to 7 feet noted between the eastern and westernmost soil borings. The available boring logs indicate that the top of an extensive, competent, thick plastic clay layer exists at approximately from 31 to 36 ft bgs across the Site with top of clay shallower on the eastern side and trending deeper to the western margin of the Site. None of the borings performed as part of the SRI penetrated the full thickness of the clay but the available information, including geotechnical boring logs, indicates that the lay may be approximately 10 to 15 ft thick. The high plasticity clay acts as a hydraulic boundary layer expected to always remain saturated because it is approximately coincident with mean sea level, but which is also likely to delay natural recession of groundwater mounding following recharge events.

A geologic cross section is shown in Figure 3. Site specific monitoring well logs are provided in Appendix D.

2.2.3 Hydrogeology

Depth to groundwater varies from approximately 33 to 38 feet bgs on Site. Groundwater resides in the deep clay horizon. As indicated in the geologic cross section, depth-to-water appears to be 1.5 to 5.5 feet below the top of clay at on-Site monitoring

wells, with an overlying silty clay horizon. The extensive, competent, thick (10 to 15 ft) plastic clay layer is present beneath the Site at approximately 31 to 36 ft bgs with top of clay shallower on the eastern side and trending deeper to the western margin of the Site. The Site lies mid-way between the East River and the Newtown Creek and groundwater elevations are within 10 feet of sea level, and as such hydraulic gradients are presumed to be extremely low. Rates of groundwater migration at the Site appear to be extremely slow because of low geologic permeability and regional hydraulic gradients. The hydraulic gradient was calculated to be approximately 0.015 ft/ft along the groundwater flow path, which appears to be unusually high and may not accurately reflect actual conditions. Conservatively assuming a hydraulic conductivity of 10-4 cm/sec for silt and a porosity of 0.22, a groundwater seepage velocity of approximately 7 ft / year for the Site is assumed. Groundwater contour maps indicate that groundwater generally flows to the west-southwest.

A groundwater contour map is shown in Figures 4a and 4b. Groundwater monitoring well construction logs are provided in Appendix D.

2.3 Investigation and Remedial History

The site was previously developed with three one-story commercial buildings occupied with a dry cleaner, auto repair and machine shop, glass factory, and a woodworking and photo engraving shop. The commercial buildings have since been demolished and redevelopment of the site is complete. The site is now developed with a mix-use building including retail spaces, offices, and apartments.

The following narrative provides a remedial history timeline and a 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.

The results of investigations performed at the site and referenced in Section 8.0 indicated the localized presence of chlorinated aliphatic hydrocarbon related-constituents in

soil and the presence of chlorinated aliphatic hydrocarbon related-constituents in soil vapor and groundwater throughout the property. The data indicate the potential of presence of PCE source material to a depth of approximately 27 ft bgs at a hot spot at AOC 1 in the central portion of the Site, to a depth of potentially 35 ft bgs at a hot spot at AOC 2 in the eastern portion of the Site, and to a depth of approximately 20 ft bgs at a hot spot at AOC 3. The available information indicates that at least one potentially upgradient source, the Bridge Cleaners Site, may be contributing to the presence of chlorinated aliphatic hydrocarbon related constituents, including PCE, in groundwater at and around the Site.

Summary of work performed during the Supplementary Remedial Investigation

As part of the Supplemental Remedial Investigation (SRI) a total of fifty-five (55) soil samples were collected and analyzed throughout the Site, including:

- Eleven (11) samples at AOC 1 from 5 boring locations (SB-101 through SB-101D,)
- Twenty-three (23) samples at AOC 2 from 8 boring locations (SB-102 through SB-102I,)
- Two (2) samples at AOC 3 from boring SB-103,
- Seventeen (17) samples from eight (8) boring locations (SB104 through SB111,) and
- Two (2) samples at AOC 7 from boring SB-112.

A total of ten (10) groundwater monitoring wells were installed on-Site and off-Site as part of the SRI to address data gaps in groundwater quality and to confirm localized groundwater flow direction at the Site. Four (4) off-Site permanent groundwater monitoring wells were installed in sidewalks and driveways adjoining the Site (MW-101, MW-102, MW-103, and MW-104). Two (2) permanent on-Site groundwater monitoring wells, MW-105 and MW-106, were installed within 10 feet of locations hydraulically downgradient of the suspected source areas (e.g. at SV-1 and SV-4) and analyzed for VOCs, SVOCs, PFAs, 1,4-dioxane, and TAL metals. On-Site groundwater monitoring wells were installed in the southern (MW-107) and southwest (MW-108) corners of the Site and along the northern Site boundary (MW-109 and MW-110). The groundwater at

MW-101, MW-102, MW-103, and MW-104 was analyzed for VOCs, PFAs, and 1,4-dioxane. The groundwater at MW-105, MW-106, and MW-108 was analyzed for VOCs, SVOCs, PFAs, 1,4-dioxane, and TAL Metals (total and dissolved). Groundwater at MW-109 and MW-110 was analyzed for VOCs only. Monitoring well MW-107 was not sampled but was used in determining Site specific groundwater flow direction. A total of eight soil vapor samples (four on-site and four off-site) were collected.

Geophysical Survey

A geophysical found three geophysical anomalies. test pit was performed at the location of each geophysical anomaly. Buried construction debris (e.g. old roofing material and bricks) were encountered at test pit locations TP-1 and TP-3. The geophysical anomaly at TP-2 was identified as an apparent sewer connection likely servicing the former 27-09 40th Avenue and 39-44 28th Street buildings. A 4-foot section of cast iron pipe was found to be rusting and cracked. Discolored white soil with a strong chemical odor was noted in proximity to the cast iron piping. The discolored soil was encountered approximately 15 feet southeast of the proposed soil boring location designation SB-102. In addition, a floor drain was located within the former 27-03 40th Avenue building, towards the northern property boundary. The floor drain was traced southwest towards 40th Avenue, where it likely discharges into public sewer. No evidence of staining was noted in or on the concrete slab surrounding the floor drain.

To confirm that Track 1 clean-up requirements have been achieved post-excavation, additional post-excavation soil samples will be collected as indicated below. The following presents a summary of the RI findings, conclusions, and recommendations for each AOC.

Area of Concern 1 – Former Dry Cleaner

A total of eleven (11) soil samples collected from 5 borings locations in AOC 1 were submitted for laboratory analysis of VOCs, PFAs, and 1-4 dioxane. PCE was detected above NYSDEC UUSCO in 1 of the 5 soil borings. A localized PCE hotspot extends to a depth of approximately 5 ft bgs at SB-101B. The vertical delineation of VOCs to the NYSDEC UUSCO is complete in this AOC. No other compounds were detected at or above the NYSDEC UUSCO from soil samples in this area during the SRI. Historical

results indicate the presence of PAHs and metals associated with contaminated historic fill material (CHFM) in shallow soil up to at least 4 ft bgs.

Groundwater samples collected from monitoring well MW-105 in AOC 1 contained 170 µg/l PCE. In addition, PCE was present in soil vapor samples collected in AOC -1 including a concentration of 270,000 µg/m3 PCE at SV-107 during the 2020 SRI and a concentration of 1,600,00 at SV-4 d µg/m3 PCE during the 2019 RI. Both of these soil vapor samples were collected at 25 feet bgs indicating the potential presence of residual PCE in soil at depth in this AOC, perhaps bound in silt-clay horizons, and thus present in soil vapor samples but not significantly detected in groundwater.

The following conclusions and recommendations are presented in connection with AOC 1:

- Soil in the vicinity of AOC 1 will be excavated to approximately 27 ft bgs, and deeper as necessary, to remove PCE source material and achieve Track 1 UUSCOs.
- Soil, structures, and related piping will be properly removed and disposed.
- Post-excavation soil samples will be collected in the vicinity of the historic SV-4 sample as well as SRI sampling locations SB-101B and SV-107 to confirm that Track 1 UUSCOs have been achieved.
- There are no public drinking water wells in the vicinity of the Site that will complete a route of exposure.

Area of Concern 2 – Former Photo Engraving Shop, Machine Shop, and Subsurface Piping

A total of twenty-three (23) soil samples collected from 8 boring locations in AOC 2 were submitted for laboratory analysis of VOCs, PFAs, and 1-4 dioxane. PCE was detected above NYSDEC UUSCO in 2 of the 8 soil borings performed as part of the SRI including:

- SB-102C, which contained PCE at a concentration of 30 mg/kg at a depth of 0 to 2 ft bgs and 17 mg/kg at 15 to 17 ft bgs. The PCE concentration was 0.02 mg/kg at a depth of 36 to 38 ft bgs at SB-102C, which is below the UUSCO.

- SB-102G, which contained PCE at a concentration of 17 mg/kg at a depth of 0 to 2 ft bgs and 0.021 mg/kg at 25 to 27 ft bgs.

In addition, historic boring B-A contained PCE at a concentration of 2.5 mg/kg at a depth of 0 to 2 ft bgs and 11 mg/kg at 25 to 27 ft bgs.

These results indicate that a PCE hotspot centered around historic boring B-A and SB-102C is approximately 10 ft wide and approximately 25 ft long. Consistent with expectations regarding the fate and transport of PCE in soil containing silts and clays, PCE concentrations within the hotspot do not appear to exhibit predictable concentration gradients throughout. The available information indicates that PCE is expected to be present in soil at this hotspot to depths of between 17 and 27 ft bgs, and potentially deeper in the vicinity of historic boring B-A. The top of the extensive, thick, competent, plastic clay layer that is present throughout the Site is present at depths of approximately 33 to 35 ft bgs in the vicinity of this hotspot. Depth-to-water in the vicinity of this hotspot at MW-106 was 35.1 ft bgs during the SRI. No other compounds were detected at or above the NYSDEC U SCO from soil samples in this area during the SRI.

The following conclusions and recommendations are presented in connection with AOC 2:

- Soil in the vicinity of AOC 2 will be excavated to approximately 27 ft bgs, and deeper as necessary, potentially up to approximately 36 ft bgs, which is approximately 1 foot into the top of the clay, to remove PCE source material and achieve Track 1 UUSCOs.
- Soil, structures, and related piping will be properly removed and disposed.
- Post-excavation soil samples will be collected in the vicinity of the historic B-A sample as well as SRI sampling locations SB-102C and SB-102H to confirm that Track 1 UUSCOs have been achieved.

Area of Concern 3 – Vicinity of B-1

A total of two (2) samples collected from one (1) boring location in AOC 3 were submitted for laboratory analysis of VOCs, PFAs, and 1-4 dioxane. PCE was detected above NYSDEC UUSCO in the 1 to 4-foot interval at this location. PCE was detected above NYSDEC UUSCO in the 1 to 4-foot interval at this location. A PID response of 26 ppm was recorded in the elastic silt at 16 to 20 ft bgs at SB-103 which indicates the likely

presence of PCE at concentrations that exceed applicable UUSCOs. No other compounds were detected at or above the NYSDEC UUSCO from soil samples in this area during the SRI.

The following conclusions and recommendations are presented in connection with AOC 3:

- Soil in the vicinity of AOC 3 will be excavated to a depth of at least 20 ft bgs, to remove PCE source material and achieve Track 1 UUSCOs.
- Soil, structures, and related piping will be properly removed and disposed.
- Post-excavation soil samples will be collected in the vicinity of SB-103 to confirm that Track 1 UUSCOs have been achieved.

Area of Concern 4 – Contaminated Historic Fill Material

A total of seventeen (17) samples were submitted from eight (8) boring locations in this AOC for laboratory analysis of VOCs, SVOCs, TAL Metals, PCBs, Pesticides, PFAs, and 1-4 dioxane. One (1) sample was submitted for analysis of VOCs only (SB-107 0 to 2 ft bgs). Visual observations indicate the presence of CHFM to depths of approximately 4 ft bgs throughout the Site. The non-native HFM generally appears to consist of brown silty sands, concrete, brick, coal ash, and other construction debris. PCE was detected above NYSDEC UUSCO in 1 of the 11 soil borings (SB-107 from 0 to 2 ft bgs). PCE was not detected in any other soil samples at concentrations exceeding the UUSCOs.

The SVOCs benzo(a)anthracene (1.19mg/kg), chrysene (1.06mg/kg), and indeno (1,2,3-cd) pyrene (0.503 mg/kg) were detected at SB-106 in the 5 to 7-foot interval, at concentrations exceeding their respective UUSCOs of 1 mg/kg, 1 mg/kg, and 0.5 mg/kg. No other SVOCs were detected at concentrations exceeding the UUSCOs. The pesticide dieldrin was detected in SB-105 at the 13 to 15-foot interval at a concentration of 0.00578 mg/kg, which exceeds the UUSCOs of 0.005 mg/kg. No other pesticides were detected at concentrations exceeding the UUSCOs. No other compounds were detected at or above the UUSCOs in any samples from this area during the SRI. Historical results indicate the presence of PAHs and metals associated with CHFM in shallow soil up to at least 4 ft bgs.

The following conclusions and recommendations are presented in connection with AOC 4:

- Contaminated historic fill consists of concrete, brick, coal ash, and other construction debris and contains VOCs, SVOCs, and metals.
- Soil throughout the Site will be excavated to a depth of approximately 4 ft bgs to remove CHFM material and achieve Track 1 UUSCOs.
- Soil in the vicinity of SB-105 will be excavated to a depth of 15 ft bgs to remove soil containing pesticides above the UUSCO and achieve Track 1 UUSCOs over an area approximately 15 wide and 15 ft deep.
- Post-excavation confirmation soil samples will be collected throughout the Site to confirm that Track 1 UUSCOs are achieved.

Area of Concern 5 – Groundwater

Groundwater quality at the Site is consistent with the ubiquitous presence of chlorinated aliphatic hydrocarbons in groundwater throughout highly industrialized and densely populated urban areas such as Long Island City in the Borough of Queens in New York City. The findings of the SRI indicate that chlorinated aliphatic hydrocarbons (CAHs,) including PCE, were detected in groundwater on-Site and are migrating onto the Site from upgradient sources. On-site sources may also be contributing to concentrations of dissolved-phase PCE in groundwater at monitoring wells MW-105, MW-106, MW-108, and MW-110 at concentrations that are above background concentrations migrating onto the Site.

The results of the SRI are summarized below:

- PCE was detected in all on-site groundwater samples at concentrations exceeding the NYSDEC Class GA Groundwater standard of 5 µg/L. The highest concentration of PCE in groundwater was at MW-108, along the western Site boundary, which contained 400 µg/L. The concentration of PCE in groundwater was 170 µg/L at MW-105 (AOC 1) and 250 µg/L at MW-106 (AOC 2) in the central and eastern portions of the Site, respectively. The concentration of PCE in groundwater along the northern boundary of the Site was 46 µg/L at MW-109 and 340 µg/L at MW-110.
- Dissolved-phase PCE was detected in groundwater above its NYSDEC Class GA Groundwater standard (5 µg/L) at a concentration of 49 µg /L at MW-101 and 64 µg/L

at MW-102, which are plausibly located hydraulically upgradient of the Site and representative of groundwater potentially migrating onto the Site.

- The VOC chloroform was found in MW-108 at a concentration of 8.5 µg/L, which exceeds the NYSDEC Class GA Groundwater standard of 7 µg/L. Chloroform was not detected in on-Site soil and is not considered Site-related.
- No other VOCs were found to exceed their respective NYSDEC Class GA Groundwater standards.
- No SVOCs were found in any on-site groundwater samples at concentrations exceeding their respective NYSDEC Class GA Groundwater standards.
- The heavy metals barium, chromium, copper, lead, magnesium, manganese, nickel, selenium, and sodium were found undissolved in groundwater at concentrations exceeding their respective NYSDEC Class GA Groundwater standards.
- The heavy metals magnesium, manganese, selenium, and sodium were found dissolved in groundwater at concentrations exceeding their respective NYSDEC Class GA Groundwater standards. The presence of these metals in groundwater appears to be attributable to naturally occurring conditions related to the brackish nature of groundwater in this part of the city.
- Concentrations of PFOA were found to exceed the NYSDEC interim guidance values for emerging contaminants in the sample collected from MW-106. The concentration of PFOA at 0.0108 µg/L is above the NYSDEC interim guidance value of 0.01 µg/L. PFOA was not detected in any other on-site groundwater samples at concentrations exceeding the NYSDEC interim guidance values. Given that PFOA was not detected in soil samples at concentrations that exceed 1 ppb, PFOA in groundwater at the Site is not considered Site-related.
- Concentrations of PFOS in on-site groundwater were not found to exceed the NYSDEC interim guidance values for emerging contaminants of 0.01 µg/L. The compound 1-4 dioxane was detected in MW-108 at a concentration of 0.5 µg/L, which is below the NYSDEC interim guidance value of 1 µg/L. 1-4 dioxane was not detected in any other on-site groundwater samples.

At the Former Bridge Cleaners Site, 514 feet east of the Site, PCE has been detected at concentrations of up to 1,470 µg/L in groundwater, up to 668,000 µg/m3 in soil vapor, and up to 9.6 mg/kg in soil at the Site. The proximity of the Bridge Cleaners Site to the Site, as well as its potentially hydraulically upgradient location and the presence of an extensive, thick, competent, plastic clay layer across the Site appears to indicate that the Bridge Cleaners Site may be contributing to PCE present in groundwater at and around the Site. In addition, it is generally understood that the presence of dissolved-phase PCE at these concentrations is ubiquitous in the upper glacial aquifer throughout most of New York City. Dissolved phase PCE was detected in groundwater at a concentration of 49 µg /L at MW-101 and 64 µg/L at MW-102, which are plausibly located hydraulically upgradient of the Site and representative of groundwater potentially migrating onto the Site. These lines of evidence indicate that the presence of dissolved-phase chlorinated solvents in groundwater may potentially be attributed to migration onto the Site from an off-property source. Furthermore, local groundwater is not used for potable purposes.

The following conclusions are presented in connection with AOC 5:

- Dissolved-phase chlorinated solvents in groundwater may potentially be attributed to migration onto the Site from an off-property source.
- On-site concentrations of PCE in groundwater at the Site exceed the concentration of PCE that is migrating onto the Site by a factor of approximately 2 to 8 times indicating a potential on-site source.
- The concentration of PCE observed in groundwater is less than 0.1% of the aqueous solubility of PCE which indicates that DNAPL is not present at the Site.
- Dissolved phase chlorinated aliphatic hydrocarbons such as PCE have the potential to represent a source of vapor intrusion at the Site.
- Aerobic processes presently dominate groundwater.
- There are no public drinking water wells in the vicinity of the Site that will complete a route of exposure.
- The presence of metals in groundwater appears to be attributable to naturally occurring conditions related to the brackish nature of groundwater in this part of the city.

- PFOA, PFOS, and 1,4-dioxane are not considered Site-related and are not relevant to the remedy for this Site.

The following recommendations are presented for AOC 5:

- Remove PCE source material that could impact groundwater as described above for AOCs 1 through 4, and elsewhere, as necessary, based on field observations and post-excavation sampling.
- To mitigate the potential soil vapor intrusion risk at the Site, a sub-slab depressurization system (SSDS) will be designed and installed.
- To mitigate the potential for off-site migration of soil vapor, a soil vapor extraction (SVE) system will be designed and installed.
- To prevent the off-site migration of contaminated groundwater, groundwater treatment consisting of soil amendments, passive reactive barrier, and in-situ chemical oxidation will be designed and installed.

Area of Concern 6 – Soil Vapor

The findings of the SRI indicate the presence of PCE concentrations in soil vapor at the Site that may require action under future conditions following redevelopment according to the New York State Department of Health Guidance for Evaluating Soil Vapor Intrusion in the State of New York (2006, with updates) (NYSDOH Guidance). The available information indicates that the PCE in soil vapor may represent a potential threat to human health and the environment under future conditions unless the exposure pathway is eliminated through remedial action. Even after the on-Site soil source material is removed as part of the proposed remediation, the presence of dissolved-phase constituents in groundwater will continue to represent a source of vapor intrusion that will require mitigation for some time.

The following conclusions and recommendations are presented in connection with AOC 6:

- Even after the on-Site soil source material is removed, the presence of dissolved-phase constituents remaining in groundwater may represent a source of vapor intrusion.

- To mitigate the potential soil vapor intrusion risk at the Site, a sub-slab depressurization system (SSDS) will be designed and installed.
- To mitigate the potential for off-site migration of soil vapor, a soil vapor extraction (SVE) system will be designed and installed.

Area of Concern 7 – Vent Pipes

A total of two (2) samples collected from 1 boring location in AOC 7 were submitted for laboratory analysis of VOCs, PFAs, and 1-4 dioxane. No compounds were detected at or above the NYSDEC UUSCO from soil samples in this area. The vertical delineation of VOCs to the NYSDEC UUSCO is complete in this AOC.

The following conclusions and recommendations are presented in connection with AOC 7:

- No further action is warranted.

Area of Concern 8 – Floor Drains

One (1) floor drain was identified at the Site during the geophysical survey. The floor drain was located within the former 27-03 40th Avenue building, towards the northern property boundary. The floor drain was traced southwest towards 40th Avenue, where it likely discharges into public sewer. No evidence of staining was noted in or on the concrete slab surrounding the floor drain. The floor drain is a potential pathway for subsurface contamination through leaks or cracks in the piping. The floor drain was established and investigated as AOC 8.

Soil samples locations SB-104 and SB-105 were placed in proximity to the former floor drain within the former 27-03 40th Avenue building at the Site. Soil samples SB-104 (5-7’ and 13-15’) and SB-105 (5-7’ and 13-15’) were collected from in proximity to the floor drain. The only exceedance of UUSCOs found in either of these two soil boring locations, was the pesticide dieldrin in SB-105 at the 13 to 15-foot interval. The laboratory analytical results indicate that the floor drain has not impacted subsurface soils. Furthermore, no tenants of the former 27-03 40th Avenue building are known to have utilized PCE or other halogenated solvents, which is the primary contaminant of concern at the Site.

The following conclusions and recommendations are presented in connection with AOC 8:

- No further action is warranted.

Conceptual Site Model

Pursuant to DER-10, a conceptual site model (CSM) has been prepared to develop a general understanding of the Site and evaluate potential human exposure pathways and impacts to the environment. This CSM considers Site history and context, including the factors that influence distribution, and fate and transport of remedy-relevant constituents, as well as potential receptors and pathways for exposure. These factors include potential sources and release mechanisms, the physical-chemical mechanisms that control constituent fate and transport, and the likely exposure pathways that govern the potential for adverse effects to human and ecological receptors. The CSM will be used to identify remedy relevant data gaps that will be addressed as part of the remedial action. The CSM reflects data collected through November 2020 as part of the SRI.

Potential Sources

Dissolved-phase chlorinated aliphatic hydrocarbon (CAH) - related constituents, including PCE, have been detected in soil, groundwater, and soil vapor at the Site and may be attributed to releases associated with historical operations including former dry cleaning, glass manufacturing, photo engraving, motor manufacturing, and parts washing operations from the former machine shop.

According to historical sources, the 27-09 40th Avenue building was occupied as a dry-cleaning facility from 2000 to 2017. The facility was equipped with a Turbo Dry 1131 closed loop dry cleaning system, with steel secondary containment within an enclosed and ventilated room. This system utilized PCE, which, even when properly stored and disposed of, may be released from dry cleaning facilities in small, frequent releases through floor drains, cracked concrete, and sewer systems. Chlorinated solvents are highly mobile chemicals that can easily accumulate in soil. PCE was reportedly not stored on-site and was only present within the closed loop dry cleaning system.

The 27-09 and 27-11 40th Avenue buildings were occupied by a glass manufacturer, Scientific Glass and Modern Glass Works, from 1950 until 1992. No

information as to specific on-site operations is available. The geophysical survey and associated test pitting, conducted as part of the SRI, identified a cracked pipe at approximately 2 ft bgs in the vicinity of AOC 2. This pipe appears to have provided sanitary service to the former buildings at the Site. Discolored soil with a chemical odor was identified in proximity to the cracked pipe. It is possible that this leaking pipe may be a source of release of fluids containing PCE and / or other chemicals into the subsurface. Visual observations and laboratory analytical results for subsurface soils collected during the SRI indicate that poor housekeeping practices, the presence of contaminated historic fill, and use of pesticides may be responsible for the presence of VOCs, including PCE, as well as SVOCs, pesticides, and metals in soils.

High VOC concentrations in soil vapor were also detected throughout the Site. At AOC 1, the concentration of PCE in soil vapor (SV-107 at 270,000 µg/m3) during the SRI, and historical 2019 results (SV-4 at 1,600,000 PCE µg/m3), both sampled from 25 ft bgs, indicate the potential presence of PCE in soil at depth at or near this AOC. No underground storage tanks have been identified in historical records or in the geophysical survey conducted as part of the SRI.

Environmental Fate and Transport - Soil

Previous investigations at this Site have indicated the presence of PCE in shallow subsurface soil samples throughout the Site at concentrations that exceed UUSCOs, with localized deep hotspots identified in the vicinity of the former dry-cleaning operations and well as the former photo engraving and parts washing operations at depths of at least 27 ft bgs. Contaminated historic fill material is underlain by a shallow clay horizon also then covering layers of fine to medium silty sands and silt which overlie an extensive layer of thick, competent, plastic clay. Low plasticity elastic silt layers are present throughout the Site which limits the horizontal migration of contamination, and an extensive, competent, plastic clay layer is present beneath the Site.

Environmental Fate and Transport – Groundwater

On-site concentrations of PCE in groundwater range from 170 ug/L (MW-105) and 250 ug/L (MW-106) in the eastern portion of the Site and are 400 ug/L at MW-108 in the far western, downgradient portion of the Site. The concentrations of PCE observed in

groundwater at the Site is less than 0.1% of the aqueous solubility of PCE (200,000 μg/l) which indicates that DNAPL is not present at the Site. In addition, upgradient sources are contributing to the presence of PCE in groundwater at the Site at concentration of approximately 49 ug/L (MW101) and 64 ug/L (MW-102.)

Depth to groundwater varies from approximately 33 to 38 feet bgs on Site. Groundwater resides in the deep clay horizon. As indicated in the geologic cross section, depth-to-water appears to be 1.5 to 5.5 feet below the top of clay at on-Site monitoring wells, with an overlying silty clay horizon. The extensive, competent, thick (10 to 15 ft) plastic clay layer is present beneath the Site at approximately 31 to 36 ft bgs with top of clay shallower on the eastern side and trending deeper to the western margin of the Site. The clay layer limits the vertical migration of fluids and any potential PCE related impacts to soil may be limited to the top foot of the clay.

Rates of groundwater migration at the Site appear to be extremely slow based on low geologic permeability and regional hydraulic gradients. The hydraulic gradient was calculated to be approximately 0.015 ft/ft along the groundwater flow path, which appears to be unusually high and may not accurately reflect actual conditions. Conservatively assuming a hydraulic conductivity of 10-4 cm/sec for silt and a porosity of 0.22, a groundwater seepage velocity of approximately 7 ft / year for the Site is assumed. Groundwater contour maps indicate that groundwater generally flows to the west-southwest.

The available information and the complexity of the geology indicates that the true nature of groundwater flow direction at the Site is subject to uncertainty. It is possible that CAHs may both be explained by on-Site residual sources, as well as by contributing off-site sources which may include the Bridge Cleaners Site, all of which may have the potential to contaminate groundwater at the Site and represent a potential source vapor intrusion. A 2017 report prepared in connection with the Bridge Cleaners Site, located approximately 500 feet to the east, states that “the inferred predominant groundwater flow direction in shallow overburden was towards the west-southwest in the northern part of the Investigation Area” and that the site exhibited a “component of radial groundwater flow.”

A review of historical hydrogeological maps indicates that the clay may have been formed in estuarine deposits associated with vestiges of Newtown Creek.

To prevent the off-site migration of contaminated groundwater, a groundwater treatment system will be designed and installed. To mitigate the potential soil vapor intrusion risk at the Site, a sub-slab depressurization system (SSDS) will be designed and installed. To mitigate the potential for off-site migration of soil vapor, a soil vapor extraction (SVE) system will be designed and installed.

Environmental Fate and Transport – Soil Vapor

CAH-related constituents in soil and groundwater have the potential to volatilize and enter building through cracks and joints in foundation walls, or porous concrete at the Site. The results of soil vapor sampling performed to date indicate the presence of CAH-related constituents in soil vapor at concentrations that are orders of magnitude above their respective guidance values. The greatest concentrations are in the vicinity of AOC 1, with lesser concentrations at AOC 2. At AOC 1, the concentration of PCE in soil vapor samples collected from 25 ft bgs during the 2020 SRI (SV-107 at 270,000 µg/m3) and the 2019 RI (SV-4 at 1,600,000 PCE µg/m3) indicate the potential presence of PCE in soil at depth at or near this AOC. Concentrations of PCE in soil at AOC 2 indicate the presence of a hotspot centered around historic boring B-A and SB-102C.

The proposed remedy involves excavation to remove potential source material that may remain on the Site. Site sources, as well as any dissolved-phase chlorinated aliphatic hydrocarbons in groundwater may also represent a potential source of vapor intrusion. Therefore, the proposed remedy includes an SSDS to mitigate the potential exposure from soil vapor intrusion on-site. The remedy also includes an SVE system to mitigate the potential for off-Site migration of soil vapor.

2.4 Remedial Action Objectives

The Remedial Action Objectives (RAOs) for the Site as listed in the Decision Document dated May 2021 are as follows:

Groundwater

RAOs for Public Health Protection

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

RAOs for Environmental Protection

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

Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation 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

RAOs for Public Health Protection

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

2.5 Remaining Contamination

2.5.1 Soil

On March 6, 2023 Laurel collected nineteen (19) soil endpoint samples for full Part 375 parameters, with five (5) samples including PFAS analysis in previous hotspot areas at the site. All results were below UUSCOs, except for an Acetone exceedance at Q5-EP1, which was marginally above the UUSCO at 0.056 mg/kg (vs 0.05 mg/kg).

To remedy the acetone hotspot, an additional 6 yards of soil was excavated on March 16. An additional five (5) samples were collected from the hotspot excavation and analyzed for Part 375 VOCs. The hotspot excavation was successful, and all hotspot excavation samples were below UUSCOs. On March 20, the hotspot soils were exported along with the remaining Quadrant 4 soils and disposed of at the South Amboy Landfill. Soil remediation activities (excavation and off-site disposal) resulted in the removal of all contaminated soil from the property.

Soil remediation activities (excavation and off-site disposal) resulted in the removal of all contaminated soil from the property.

2.5.2 Groundwater

Remaining contaminants in groundwater at the property consist of chlorinated volatile organic compounds including PCE and cis,1-2-DCE. The attached Table 2 and Figure 5 summarize the results of all samples of groundwater that exceed the SCGs. PCE concentrations exceed the NYSDEC groundwater standard of 5 ug/L in monitoring wells MW-101, MW-102, MW-104, MW-105R, MW-106R, MW-108R, MW-109R, MW-110R and MW-111. PCE concentrations in these wells range between 6 ug/L in MW-102 and 1,200 ug/L in MW-104. Cis-1,2-DCE concentrations exceed the NYSDEC groundwater standard of 5 ug/L in MW-106R (160 ug/L), MW-108R (19 ug/L), MW-111 (160 ug/L). Copper exceeded the standard of 200 ug/L in MW-102 (260 ug/L), mercury exceeded standard of 0.7 ug/L in MW-105R (4.5 ug/L), and lead exceeded the standard of 25 ug/L in MW-108R (70.6 ug/L).

2.5.3 Soil Vapor

The attached Table 3 and Figure 6 summarize the results of all samples of soil vapor that exceed the SCGs. Sub-slab vapor sampling will be performed in the future to document any remaining concentrations of vapor-phase volatile organic compounds.

3.0 INSTITUTIONAL AND ENGINEERING CONTROL PLAN

3.1 General

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

This plan provides:

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

3.2 Institutional Controls

A series of ICs is required by the Decision Document to: (1) implement, maintain and monitor Engineering Control systems and (2) prevent future exposure to remaining contamination. Adherence to these ICs on the site is required by the Environmental

Easement and will be implemented under this SMP. ICs identified in the Environmental Easement may not be discontinued without an amendment to or extinguishment of the Environmental Easement. The IC boundaries are shown on Figure 7. These ICs are:

- The property may be used for: restricted residential, commercial, and industrial use;
- All ECs must be operated and maintained as specified in this SMP;
- All ECs must be inspected at a frequency and in a manner defined in the SMP.
- The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOHMH or the New York City Department of Health and Mental Hygiene to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department.
- Groundwater and other environmental or 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 Environmental Easement.
- Vegetable gardens and farming on the site are prohibited; and

An evaluation shall be performed to determine the need for further investigation and remediation should large scale redevelopment occur, if any of the existing structures are demolished, or if the subsurface is otherwise made accessible.

3.3 Engineering Controls

3.3.1 Sub-slab Depressurization System and Soil Vapor Extraction System

Sub-slab Depressurization System

An active SSDS was installed on August 12, 2024 as an engineering control to mitigate the risk of soil vapor intrusion into the building on-Site. Liberty performed sub-slab vacuum testing on August 12, 2024, to evaluate the performance of the SSDS. With the system running, vacuum readings were collected using a digital manometer at the eight vacuum monitoring points (VAC-1 through VAC-8) that were installed in accordance with Liberty's *Remedial Design Report* dated October 3, 2023. The results showed observed vacuums ranging between 0.29 and 1.8 in. w.g. The field log is provided in Appendix N. A schematic SSDS design is attached as Appendix E. The system was installed from approximately 25 to 27 ft bgs. The SSDS may be used for up to five years for a Conditional Track 1 remedy.

On August 12, 2024, Liberty collected soil gas and indoor air samples from the sub-cellar of the building. Laboratory results from the sampling are provided in Table 3.

An additional round of post-mitigation confirmatory indoor air sampling will be performed in accordance with NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (2006, with updates). This event will occur during the 2025-2026 heating season and will be completed simultaneously with annual pressure testing. A work plan will be submitted for the State's review and approval prior to execution of this event to ensure the work proposed is in accordance with established standards, guidance and criteria.

Soil Vapor Extraction System

An SVE system was installed on August 12, 2024 to reduce concentrations of soil vapor on-Site and mitigate the potential for off-site migration of soil vapor that may result from the presence of PCE in groundwater.

The SVE system consists of seven extraction wells installed to the top of clay with approximately 5 feet of slotted screen along the northern, southern, and western property

boundaries. The SVE system may be used for up to five years for a Conditional Track 1 remedy. The soil vapor extraction system layout is presented in Appendix E.

Procedures for operating and maintaining the Sub-slab Depressurization System and SVE System are documented in the Operation and Maintenance Plan (Section 5.0 of this SMP). As built drawings, signed and sealed by a professional engineer, are included in Appendix F with the Operations and Maintenance Manual. Figure 8 shows the location of the ECs for the site.

3.3.2 Criteria for Completion of Remediation/Termination of Remedial Systems

Generally, remedial processes are considered completed when monitoring indicates that the remedy has achieved the remedial action objectives identified by the decision document. The framework for determining when remedial processes are complete is provided in Section 6.4 of NYSDEC DER-10. 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. When a remedial party receives this approval, the remedial party will decommission all site-related monitoring, injection and recovery wells as per 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.

3.3.2.1 - Sub-Slab Depressurization (SSD) System

The vapor intrusion risk will continue to be monitored for up to five years. The vapor intrusion monitoring will include the collection of samples from the sub-slab of the proposed building and the indoor air in accordance with the NYSDOH *Guidance for Evaluating Soil Vapor in the State of New York* (2006, with updates) and the May 2017: Updates to Soil Vapor / Indoor Air Decision Matrices. If within the 5 years the soil vapor levels have dropped to below the "no further action" sub-slab vapor concentrations, then the SSDS will not be considered an EC anymore and the condition on the Track 1 remedy will be removed.

The active SSD system will not be discontinued unless prior written approval is granted by the NYSDEC and the NYSDOH project managers. If the monitoring data indicates that the SSD system may no longer be required, a work plan to discontinue the SSD system will be submitted by the remedial party to the NYSDEC and NYSDOH project managers. The work plan must include soil vapor instruction sampling to verify that the SSD system is no longer needed and must comply with the NYSDOH Soil Vapor Intrusion Guidance.

If the NYSDEC project manager approves termination of operation and maintenance of an SSD system, the remedial party will notify the property owner and ask whether the property owner wants to keep the SSD system. If the property owner elects to keep the system, the property owner will be responsible for the operation and maintenance of the system going forward. If the property owner wants the system removed, the remedial party will remove and dispose of the system and repair any parts of the structure that were altered or modified by the SSD system, such as holes in the basement floor or walls.

3.3.2.2 - Soil Vapor Extraction System (SVE) System

The SVE system will be monitored for up to five years and may be terminated upon demonstration that soil vapor concentrations have achieved asymptotic concentrations.

The SVE system will not be discontinued unless prior written approval is granted by the NYSDEC project manager. In the event that monitoring data indicates that the SVE

system may no longer be required, a proposal to discontinue the system will be submitted by the remedial party to the NYSDEC project manager. Conditions that may warrant discontinuing the SVE system include contaminant concentrations in groundwater and/or soil that: (1) reach levels that are consistently below ambient water quality standards or the site SCGs, as appropriate; (2) have become asymptotic to a low level over an extended period of time, as accepted by the NYSDEC; or (3) the NYSDEC has determined that the SVE system has reached the limit of its effectiveness. This assessment will be based in part on post-remediation contaminant levels in groundwater collected from monitoring wells located throughout the site. Systems will remain in place and operational until permission to discontinue their use is granted in writing by the NYSDEC project manager.

3.3.3 – Monitoring Wells associated with In-Situ Technology

Groundwater monitoring activities to assess in-situ technology will continue, as determined by the NYSDEC project manager in consultation with NYSDOH project manager, until residual groundwater concentrations are found to be consistently below ambient water quality standards or the site SCGs, or have become asymptotic at an acceptable level over an extended period. If monitoring data indicates that monitoring may no longer be required, a proposal to discontinue the remedy will be submitted by the remedial party. Monitoring will continue until permission to discontinue is granted in writing by the NYSDEC project manager. If groundwater contaminant levels become asymptotic at a level that is not acceptable to the NYSDEC, additional injections, source removal, treatment and/or control measures will be evaluated.

4.0 MONITORING AND SAMPLING PLAN

4.1 General

This Monitoring and Sampling Plan describes the measures for evaluating the overall performance and effectiveness of the remedy. This Monitoring and Sampling Plan may only be revised with the approval of the NYSDEC project manager. 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 provided in Appendix G.

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

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

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

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

Reporting requirements are provided in Section 7.0 of this SMP.

An additional round of post-mitigation confirmatory indoor air sampling will be performed in accordance with NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (2006, with updates). This event will occur during the 2025-2026 heating season and will be completed simultaneously with annual pressure testing. A work plan will be submitted for the State's review and approval prior to execution of this event to ensure the work proposed is in accordance with established standards, guidance and criteria.

4.2 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 as defined in 6 NYCRR Part 375, a Professional Engineer (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 (depending on the need to evaluate engineering controls). 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 H – Site Management Forms. The form will compile sufficient information to assess the following:

- Compliance with all ICs, including site usage;
- An evaluation of the condition and continued effectiveness of ECs;
- General site conditions at the time of the inspection;
- 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. 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;
- If site records are complete and up to date.

Reporting requirements are outline in Section 7.0 of this plan.

Inspections will also be performed in the event of an emergency. If an emergency, such as a natural disaster or an unforeseen failure of any of the ECs occurs that reduces or has the potential to reduce the effectiveness of ECs in place at the site, verbal notice to the NYSDEC 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 IC/ECs implemented at the site by a qualified environmental professional, as defined in 6 NYCCR 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. The remedial party will submit follow-up status reports to the NYSDEC within 45 days of the event on actions taken to respond to any emergency event requiring ongoing responsive action, describing and documenting actions taken to restore the effectiveness or the EC's.

The remedial party will conduct exterior inspections of all sub-slab depressurization (SSD) systems and perform comprehensive inspections. Exterior inspections will include: confirming that the fan is running correctly, determining whether there is damage to the stack or other exterior system components, and determining whether

there have been structural changes, such as an addition to the structure. Comprehensive inspections include all of the activities required in the exterior inspection and an interior inspection, which includes: confirming a pressure differential on the manometer, inspecting the interior components for damage, recording vacuum readings from sub-slab vacuum monitoring points, and inspecting the basement area for cracks in the basement floors and walls that may have developed since the SSD system was installed. The remedial party will notify the DEC project manager about any problems within three days of inspections. Inspection reports will be emailed to the DEC Project Manager and included in the next PRR. Any needed repairs will be made promptly according to the procedures in the Operation and Maintenance Plan (Section 5.0).

4.3 Treatment System Monitoring and Sampling

4.3.1 Remedial System Monitoring

Monitoring of the SSD and SVE systems will be performed on a routine basis, as identified in Table 4 Remedial System Monitoring Requirements and Schedule (see below). The monitoring of remedial systems must be conducted by a qualified environmental professional as defined in 6 NYCRR Part 375, a Professional Engineer (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 (depending on the need to evaluate engineering controls). Modification to the frequency or sampling requirements will require approval from the NYSDEC project manager. A visual inspection of the complete system will be conducted during each monitoring event. Unscheduled inspections and/or sampling may take place when a suspected failure of the SSD or SVE system has been reported or an emergency occurs that is deemed likely to affect the operation of the system. SSD and SVE system components to be monitored include, but are not limited to, the components included in Table 4 below.

Table 4 – Remedial System Monitoring Requirements and Schedule

Remedial System Component	Monitoring Parameter	Operating Range	Monitoring Schedule
Sub-Slab Depressurization	Riser vacuum Vacuum points	0-4.4 in. water 0.01 in. water	Quarterly

Soil Vapor Extraction	Influent Vacuum Flowrate Exhaust PID (pre-carbon) Exhaust PID (post-carbon)	-12 to -50 in. water 110-150 cfm 0-1000 ppm 95% removal	Monthly
Monitoring Wells	Sample for SCOs	Groundwater SCOs	Quarterly

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

4.3.2 Remedial System Sampling

Effluent and influent air sampling is not required for the SSDS. Vacuum monitoring points will be monitored quarterly using a digital manometer.

Samples shall be collected from the SVE system influent and effluent on a routine basis. Sampling locations, required analytical parameters and schedule are provided in Table 5 – Remedial System Sampling Requirements and Schedule below. Modification to the frequency or sampling requirements will require approval from the NYSDEC project manager.

Table 5 – Remedial System Sampling Requirements and Schedule

Sampling Location	Analytical Parameters	Schedule
SVE Vapor-Phase Carbon Influent and Effluent	VOCs (TO-15) Total VOCs (handheld PID)	Quarterly Monthly

Detailed sample collection and analytical procedures and protocols are provided in Appendix I – Field Sampling Plan and Appendix G – Quality Assurance Project Plan. The sampling procedures will comply with the most current version of the NYSDOH Vapor Intrusion Guidance.

The remedial party will properly dispose of all wastes generated by the remedial system at off-site disposal facilities according to local, state and federal laws and regulations. Wastes will be tested before disposal to comply with the permit conditions of the disposal facility. Wastes generated at this site include: spent activated carbon.

4.4 Post-Remediation Media Monitoring and Sampling

Samples shall be collected from the groundwater monitoring wells and soil vapor monitoring points on a routine basis. Sampling locations required analytical parameters and schedule are provided in Table 6 – Post-Remedial System Sampling Requirements and Schedule below. Modification to the frequency or sampling requirements will require approval from the NYSDEC project manager.

Prior to shutdown of the SVE system a work plan is to be submitted to, and approved by the New York State Departments of Environmental and Health, that outlines the data collected to date, remedial goals, proposed system shutdown schedule, sampling, and reporting requirements. The SVE system is not to be shut down or turned off without prior communication with, and approval from, the departments.

Table 6 – Post-Remediation Sampling Requirements and Schedule

Sampling Location	Analytical Parameters		Schedule
	VOCs (EPA Method 624)	VOCs (EPA Method TO-15)	
Monitoring Wells	X		Quarterly
Soil Vapor Monitoring Points		X	2 weeks after shutdown of SVE

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

4.4.1 Groundwater Sampling

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

The network of monitoring wells has been installed to monitor upgradient, on-site and downgradient groundwater conditions at the site.

Table 7 summarizes the wells' identification number, as well as the purpose, location, depths, diameter and screened intervals of the wells. As part of the groundwater monitoring, 3 upgradient wells, 2 on-site wells and 5 downgradient wells are sampled to evaluate the effectiveness of the remedial system. The remedial party will measure depth to the water table for each monitoring well in the network before sampling.

Table 7 – Monitoring Well Construction Details

Monitoring Well ID				Elevation (above mean sea level)

	Well Location	Coordinates (longitude/ latitude)	Well Diameter (inches)	Casing	Screen Top	Screen Bottom
MW-101	Upgradient	40.753055° N, 73.936185° W	2	42.5	13.5	3.5
MW-102	Upgradient	40.752835° N, 73.936142° W	2	42.2	16.2	6.2
MW-104	Downgradient	40.753158° N, 73.937023° W	2	43.6	9.6	-0.4
MW-105R	On-Site	40.753003° N, 73.936666° W	2	19.76	13.76	3.76
MW-106R	On-Site	40.753008° N, 73.936431° W	1	19.74	9.74	2.74
MW-108R	Downgradient	40.753026° N, 73.936952° W	1	42.96	7.96	-2.04
MW-109R	Downgradient	40.753234° N, 73.936762° W	1	19.79	13.76	3.79
MW-110R	Upgradient	40.753124° N, 73.936463° W	1	19.80	14.80	4.80
MW-111	Downgradient	40.753158° N, 73.936815° W	2	19.82	9.82	-0.18

Monitoring well construction logs are included in Appendix D of this document.

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

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

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

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

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

4.4.2 Soil Vapor Sampling

Soil vapor sampling will be performed indirectly through the SVE system influent to assess the performance of the remedy. Modification to the frequency or sampling requirements will require approval from the NYSDEC project manager.

The network of on-site soil vapor sample locations was established in the remedial design report, and includes three sub-slab monitoring points below the sub-cellar floor slab.

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

Deliverables for the soil vapor sampling program are specified in Section 7.0 – Reporting Requirements.

4.4.3 Soil Vapor Intrusion Sampling

Annual soil vapor field extension testing will be performed to demonstrate that an effective vacuum is present beneath the entire slab, ensuring an adequate depressurization and that soil vapor intrusion is not a concern.

Deliverables for the annual vacuum field extension test program are specified in Section 7.0 – Reporting Requirements.

4.4.4 Monitoring and Sampling Protocol

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

5.0 OPERATION AND MAINTENANCE PLAN

5.1 General

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

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

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

5.2 Remedial System Performance Criteria

Based on pilot test data, the SVE system has been designed to operate at a wellhead vacuum of approximately 20 inches of water column (in. w.c.) and a flow rate of approximately 120 standard cubic feet per minute (scfm) per extraction well. The system includes a 15-horsepower regenerative blower with a maximum flow rate of 1,100 scfm. Soil vapor is drawn from seven soil vapor wells. Six wells were proposed in the remedial design report; however, due to access limitations during site construction, locations had to be adjusted and a seventh well was deemed to be appropriate. The system is exhausted through two pairs of granular activated carbon (GAC) drums in series prior to discharge to the atmosphere. A remote-reading monitoring system including Onset Hobo data loggers is being provided for continuous monitoring of the SVE system pressure and voltage. Volatile organic vapors will be monitored periodically in the system's exhaust, prior to and after the GAC drums. The drums will be replaced when VOC removal drops below 95%.

The SSDS system includes three 172-watt fans capable of applying a vacuum of 4.4 in. w.c. Following installation of the SSD system, sub-slab vacuum as monitored to confirm that at least 0.01 in. w.c. of vacuum is being achieved across the entire sub-slab plenum.

5.3 Operation and Maintenance of Sub-slab Depressurization System

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

5.3.1 System Start-Up and Testing

Following start-up of the system, all visible system components were inspected. Pipe joints in the exposed (aboveground) suction piping were checked for leaks using smoke tests. Vacuums on the risers were observed, and the vacuums were balanced with the in-line flow control valves. The low pressure alarms were tested by removing the connection tubes from the risers. Liberty performed sub-slab vacuum testing on August 12, 2024, to evaluate the performance of the SSDS. With the system running, vacuum readings were collected using a digital manometer at the eight vacuum monitoring points (VAC-1 through VAC-8) that were installed in accordance with Liberty's *Remedial Design Report* dated October 3, 2023. The results showed observed vacuums ranging between 0.29 and 1.8 in. w.g. The vacuums observed at the sub-slab vacuum monitoring points confirmed that a minimum of 0.01 in. w.c. was achieved throughout the sub-slab plenum. The SVE system was not operating during the SSD system start-up and testing.

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

5.3.2 Routine System Operation and Maintenance

Routine SSDS Operation and Maintenance will follow the manufacturer's recommendations for the fans. Inspections will be completed per the Remedial Systems

Monitoring Requirements and Schedule on Table 4. If the system is not operating properly, the troubleshooting guidance will be consulted first and if that does not provide the necessary answers to address the situation, the system's technical advisors will be contacted. The system is designed to operate continuously until such time as it needs to be replaced or the DEC and DOH permit a reduction in operation or termination of either system.

There are few adjustments that can be made to the SSDS. Repairs will be made as required during the operating life of the exhaust fans. The SVE system will be adjusted based on the removal efficiency and the offsite vapor intrusion data from the DEC. Adjustments may include shutting down a portion of the extraction points so that no air is being evacuated, reducing the rate of the mechanical blowers, sizing of the carbon canisters, etc. Any of these adjustments will be made only with the approval of the DEC and/or DOH. Other adjustments may be made based solely on the mechanical operation of the equipment when necessary.

A copy of an Operations and Maintenance Manual specific to the remedial systems is provided in Appendix F, which will provide further detail on the above.

5.3.3 Non-Routine Operation and Maintenance

Non-routine O&M will be performed on an as-needed basis given the situation. The situations could include the activation of warning devices or alarms, damage to system components, reduced effectiveness not associated with the reduction in concentrations of contaminants, and/or if part replacement is necessary sooner than anticipated. The maintenance will be conducted as required and the system will be thoroughly inspected to determine the cause of the system component failure. The reasons for non-routine maintenance may be indicative of a larger operational issue or changes in site conditions which need to be understood.

5.3.4 System Monitoring Devices and Alarms

The SSD system has warning devices (low vacuum alarms) above each fan to indicate that the system is not operating properly. In the event that warning device is

activated, applicable maintenance and repairs will be conducted, as specified in the Operation and Maintenance Plan, and the SSD system will be restarted. Operational problems will be noted in the Periodic Review Report to be prepared for that reporting period.

5.3.5 Fire Safety

This section will include descriptions of all fire protection and life safety systems, as well as maintenance, inspection, and record keeping requirements. Topics include, but are not limited to:

- State or local fire inspections
- Fire extinguishers — monthly and annual inspections
- Emergency lighting — 90-minute test
- Sprinklers — monthly and annual inspections
- Emergency exits — free from debris
- Alarm system — local or broadcast
- Electrical system.

The contents of this section will meet or exceed the minimum requirements for building fire protection and life safety systems as described in the Fire Code of New York State. All fire safety items shall comply with federal and state laws as well as local ordinances and building codes. The maintenance and inspections shall conform to NFPA 1584 guidance. Appendix M contains the Fire Alarm System Plan.

The remedial party will conduct an annual facility walk with the local fire chief and/or fire suppression team. The site walk will allow for the addition of the facility to any local preplanning efforts. The NYSDEC project manager will be provided with the local fire chiefs/fire suppression team's recommendations as soon as they become available. Following review, the NYSDEC project manager may direct the remedial party to implement the recommendations and/or revise the SMP.

5.4 Operation and Maintenance of Soil Vapor Extraction System

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

5.4.1 System Start-Up and Testing

Upon start-up of the system, all visible system components were inspected. Pipe joints in the exposed (aboveground) suction piping were checked for leaks using smoke tests. Vacuums on the risers were observed, and the vacuums were balanced with the in-line flow control valves. The system monitoring device were observed and programmed to alert users of a system failure (loss of pressure or drop in voltage). Vacuums were observed on gauges located throughout the system, including the blower, and before and after the activated carbon drums. The SSD system was not operating during the SVE system start-up and testing.

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

5.4.2 Routine System Operation and Maintenance

Routine SVE System Operations and Maintenance will follow the manufacturer's recommendations for the blower and activated carbon drums. Inspections will be completed per the Remedial Systems Inspection Schedule on Table 4. If the system is not operating properly, the troubleshooting guidance will be consulted first and if that does not provide the necessary answers to address the situation, the system's technical advisors will be contacted. The system is designed to operate continuously until such time as it needs to be replaced or the DEC and DOH permit a reduction in operation or termination of either system.

Repairs will be made as required during the operating life of the blower. The SVE system will be adjusted based on the removal efficiency and the offsite vapor intrusion data from the DEC. Adjustments may include shutting down a portion of the extraction points so that no air is being evacuated, reducing the rate of the mechanical blowers, sizing of the

carbon canisters, etc. Any of these adjustments will be made only with the approval of the DEC and/or DOH. Other adjustments may be made based solely on the mechanical operation of the equipment when necessary.

A copy of an Operations and Maintenance Manual specific to the remedial systems is provided in Appendix F, which will provide further detail on the above.

5.4.3 Non-Routine Operation and Maintenance

Non-routine O&M will be performed on an as-needed basin given the situation. The situations could include the activation of warning devices or alarms, damage to system components, reduced effectiveness not associated with the reduction in concentrations of contaminants, and/or if part replacement is necessary sooner than anticipated. The maintenance will be conducted as required and the system will be thoroughly inspected to determine the cause of the system component failure. The reasons for non-routine maintenance may be indicative of a larger operational issue or changes in site conditions which need to be understood.

5.4.4 System Monitoring Devices and Alarms

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

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

6.0 PERIODIC ASSESSMENTS/EVALUATIONS

6.1 Climate Change Vulnerability Assessment

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

This section provides a current vulnerability assessment that evaluates the vulnerability of the site and/or engineering controls to severe storms/weather events and associated flooding. This section also identifies vulnerability assessment updates that will be conducted for the site in Period Review Reports.

- Flood Plain: The site is not located in a flood plain, low-lying or low-groundwater recharge area.
- Sea Level Rise: The site is not proximal to a shoreline and sits approximately 40 feet above mean sea level, and therefore sea level rise is not a site vulnerability.
- Site Drainage and Storm Water Management: No areas of the site have been identified as susceptible to flooding during severe rain events due to insufficient groundwater recharge capabilities or inadequate storm water management systems.
- Erosion: There is no evidence of erosion at the site and the site is completely developed, therefore no areas of the site are susceptible to erosion during periods of severe rain events.
- High Wind: Although unlikely, it is possible that during periods of high winds, the exhaust stacks for the SSD and SVE systems could be damaged. Monthly inspections of the systems will include inspection of exhaust stacks.
- Drought: Drought conditions will not have an impact on remediation system operation. It is possible that drought conditions could lower water tables below monitoring well depths, and in such a situation, replacement of monitoring wells may be warranted.
- Electricity: Sustained, long-term, loss of electricity will impact the ability of the remedial systems to operate and potentially cause exposure to onsite

contaminants. This is more of a concern with the SVE system not being able to control the vapor intrusion conditions for the neighboring properties. It may be necessary to have a back-up generator on standby for instances when there is long term power loss.

- Spill/Contaminant Release: The remediation systems being installed at the site do not contain any petroleum products or hazardous substances in liquid form, thus there is no threat of spills. Should there be a failure of an activated carbon drum, standard housekeeping procedures (shoveling, sweeping, etc.) will be sufficient to address the spill.
- Wildfires: The site is not located in a forested area, so the threat of wildfires is not a concern.

6.2 Green Remediation Evaluation

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

Discussion and Measurement of Environmental Impacts: The following items were considered for the operation and maintenance of the selected remedy.

- Waste generation will be limited to the regeneration of spent carbon from the SVE system. The carbon units will be used to the maximum extent possible before being regenerated on or offsite. If possible, they will be regenerated onsite to reduce travel requirements.
- Energy usage will be reduced to the extent possible by minimizing the use of the operation of the SVE system and potentially the SSDS as quickly as possible. If possible, a reduction in the fan and/or motor size will be evaluated
- Emissions will be limited by the proper operation of the SSDS and SVE systems. SSDS emissions will be dispersed at roof top level and little to no impact on health or the environment. SVE emissions will be limited by the removal efficiency of the system. In addition, to the extent possible, the SVE operations will be reduced or terminated as quickly as possible.

Methods proposed to reduce energy consumption, resource usage, waste generation, water usage, etc. will be included in the PRR.

As part of the site management program, to promote implementation of green and sustainable remediation principles, an environmental footprint analysis was completed and included in this SMP (provided as Attachment X). The environmental footprint analysis was completed using the accepted environmental footprint analysis calculator SEFA (Spreadsheets for Environmental Footprint Analysis, USEPA). Water consumption, greenhouse gas emissions, renewable and non-renewable energy use, waste reduction and material use were estimated, and goals for the project related to these green and sustainable remediation metrics, as well as for minimizing community impacts, protecting habitats and natural and cultural resources, and promoting environmental justice, will be established for the site management activities, as appropriate. Further, progress with respect to green and sustainable remediation metrics will be tracked and reported in periodic review reports and remedial system optimization reports as part of the site management program, and opportunities to further reduce the environmental footprint of the project will be identified as appropriate. Attachment J provides the summary tables for the SEFA worksheets related to the OM&M program for the Site. The spreadsheets were split into three remedy components these include the soil vapor extraction system, sub-slab depressurization system, and groundwater treatment (ISCO and PRB). For the purpose of these worksheets the OM&M program was evaluated for 4 years. OM&M components for these remedies include the following activities related to the OM&M program: system monitoring and operation, system inspections, system maintenance, and analytical testing (both post-ISCO injection groundwater sampling and air sampling).

The following inputs were used in the SEFA worksheets to calculate the environmental footprint:

1. Remedy Component 1 – Soil Vapor Extraction System
    a. Personnel Transportation:
        i. OM&M personnel transportation to and from the site for system inspections/maintenance.
        ii. Laboratory personnel for sample pick-up of air samples.
    b. On-site Electricity Use:
        i. Electricity use for equipment associated with the operations of the system.
    c. Material Use and Transportation:

i. Granular activated carbon used for treatment.

d. Waste Disposal and Transportation:
    i. Liquids from KO tank disposed off-site.
    ii. Granular activated carbon.
e. Other Energy Use and Air Emissions:
    i. Calculations for the on-site HAP process emissions associated with the Soil Vapor Extraction System.
    ii. Calculations for GHG emissions associated with on-site electricity use.
f. Off-Site Laboratory Analysis:
    i. Air sampling to be conducted during OM&M program.

2. Remedy Component 2 – Sub-Slab Depressurization System
    a. Personnel Transportation:
        i. OM&M personnel transportation to and from the site for system inspections/maintenance (this is not included in the calculation for the environmental footprint analysis of this component due to the fact this inspection will be conducted with the inspection of the Soil Vapor Extraction System).
    b. On-Site Electricity Use:
        i. Electricity use for equipment associated with the operations of the system.
    c. Energy Use and Air Emissions:
        i. Calculations for GHG emissions associated with on-site electricity use.
3. Remedy Component 3 – Groundwater Treatment (ISCO and PRB)
    a. Personnel Transportation:
        i. OM&M personnel transportation to and from the site for groundwater sampling and pick-up of rental equipment to conduct sampling.
        ii. Laboratory personnel for sample pick-up of groundwater samples.
    b. Off-Site Laboratory Analysis:
        i. Groundwater sampling to be conducted during the OM&M program.

6.2.1 Timing of Green Remediation Evaluations

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

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

6.2.2. Remedial Systems

Remedial systems will be operated properly considering the current site conditions to conserve materials and resources to the greatest extent possible. Consideration will be given to operating rates and use of reagents and consumables. Spent materials will be sent for recycling, as appropriate.

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

- Soil vapor extraction points (operating rates/locations);
- Activated carbon systems (spent carbon replacement and disposal/regeneration);
- SSDS operations.

6.2.3 Building Operations

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

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

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

6.2.4 Frequency of System Checks, Sampling and Other Periodic Activities

Transportation to and from the Site, use of consumables in relation to visiting the Site in order to conduct system checks and or collect samples and shipping samples to a laboratory for analyses have direct and/or inherent energy costs. The schedule and/or

means of these periodic activities have been prepared so that these tasks can be accomplished in a manner that does not impact remedy protectiveness but reduces expenditure of energy or resources.

To the extent possible, onsite staff (building superintendent, janitorial staff, etc.) will be trained to inspect, observe, and report on system operations so as to reduce the number of visits by offsite personnel. It is assumed that they will use public transportation to get to the site and/or live on the premises. Once the system has been in operation for approximately 6-12 months, a review will be done to optimize inspections by offsite personnel.

6.2.5 Metrics and Reporting

As discussed in Section 7.0 and as shown in Appendix H – Site Management Forms, information on energy usage, solid waste generation, transportation and shipping, water usage and land use and ecosystems will be recorded to facilitate and document consistent implementation of green remediation during site management and to identify corresponding benefits. A set of metrics has been developed and will be evaluated over time to ensure that green remediation actions are achieving the desired results.

6.3 Remedial System Optimization

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

- The remedial actions have not met or are not expected to meet RAOs in the time frame estimated in the Decision Document;
- The management and operation of the remedial system is exceeding the estimated costs;
- The remedial system is not performing as expected or as designed;
- Previously unidentified source material may be suspected;

- Plume shift has potentially occurred;
- Site conditions change due to development, change of use, change in groundwater use, etc.;
- There is an anticipated transfer of the site management to another remedial party or agency; and
- A new and applicable remedial technology becomes available.

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

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

When evaluating the remedial systems (RSO), the following questions should be asked:

1. Is the remedial technology employed at the site appropriate for current site conditions?

   Many systems/remedies may be overdesigned, since the design process generally considers worst case scenarios and adds a factor of safety. In addition, a large portion of the contaminant mass may be removed or destroyed in the first few years of operation, after which contaminant mass removal rates generally decrease. This is often the case for groundwater pump and treat remedies. Given these two general factors, the RSO often reveals that current site conditions do not match initial design conditions and much of the system that was put in place during the original design may not be needed or is not cost effective to complete the remediation. For instance, if a groundwater treatment system was designed to treat influent at 100 gallons per minute with concentrations of 1,200 micrograms/liter (µg/L) of trichloroethylene (TCE), the system may include an air stripper, two granular activated carbon (GAC) units and a catalytic oxidizer to remove the TCE from the vapor discharge of the air stripper. If, after a year of

operation, actual site conditions are flows of 40 gallons per minute and influent TCE concentrations of 250 µg/1, the Professional Engineer could consider removing the air stripper and catalytic oxidizer from the treatment process and treating the influent with two GAC units plumbed in series. This removes two energy-intensive and labor-intensive pieces of equipment from the treatment process, thereby lowering the O&M costs and decreasing the environmental footprint of the remedy.

2. Can green and sustainable technologies be employed to enhance the existing remedy, making it more sustainable, saving costs or bringing the site to closure more quickly?

   The RSO will examine site conditions and determine whether the existing remedy can be enhanced by employing green or sustainable technologies. These technologies may include in-situ chemical oxidation or enhanced monitored natural attenuation techniques, or installation of passive venting, solar powered extraction wells, variable-speed drives, geothermal climate control, or tertiary wetland treatment. These technologies may also include activities such as limited excavation and treatment of source area soils that will allow natural attenuation to be the remedy for residual contamination at a site as opposed to the installation of a remediation system.

3. Is the remedy being properly maintained?

   As a remedy ages, equipment maintenance becomes an issue as parts wear out and need to be replaced. This generally occurs at the same time there is pressure to reduce O&M costs. The RSO should evaluate effectiveness and efficiency of the system, not just system operation time. Improper maintenance can lead to the system working inefficiently from both a contaminant removal and contaminant destruction aspect. Inefficient contaminant removal or degradation could lead to prolonging the remedial process at a site, while inefficient contaminant destruction could potentially lead to a violation of the regulatory discharge criteria. An example of this would be an improperly maintained air stripper that loses its contaminant mass removal efficiency due to clogging of the air flow pathways. If the stripper is designed to remove 99 percent of the contaminants in the influent and that mass removal efficiency drops to 50 percent due to clogging, the remaining 50 percent of contaminant mass will still be in the effluent from the stripper, which creates a problem.

4. Can the system operation be modified using the existing technology or equipment to be equally or more effective but use less energy?

   In the past, remedies often focused on contaminant destruction with little emphasis on energy conservation. During the RSO, the remedy should be examined to determine if the remedial equipment or process can be altered to save energy or maximize contaminant mass removal using the existing technology. An example

of this would be operating a Soil Vapor Extraction (SVE) system such that the SVE blower would alternately extract vapor from different groups (legs) of wells for set time intervals. By using such a procedure, the SVE system would remove significant mass from one set of wells for a time and then extract vapors from a different set of wells. During the period when soil vapor is not being extracted, contaminant mass on the soils is allowed to equilibrate with the soil vapor. This recharging of the soil vapor with contaminants allows for higher mass removal rates once the leg is reactivated. By employing this strategy, a higher contaminant mass removal rate could be achieved using a smaller SVE blower and vapor treatment system. This may be equally effective at removing contaminant mass but would use significantly less energy. However, this procedure should not be used if the SVE system is being used to mitigate soil vapor intrusion into a building.

5. Can the system be taken offline in phases as the site is remediated?

   The RSO should evaluate whether parts of the treatment system can be taken offline. Consider whether all of the vapor and groundwater extraction wells are still needed, given the current contaminant plume. In addition, an SVE system can be designed to be converted into a bioventing system to aid in the degradation of heavier compounds not yet stripped from the vadose zone.

6. Is our exit strategy defined well enough or should we enhance it?

   Remedies are often implemented with no clear path to closure other than when the established regulatory threshold is met, the remedy is complete, and the site can be closed. This gives a beginning and an end to the process, but no directions to get from one point to the other within the process. An exit strategy provides a path to closure and lays out metrics that, once achieved, lead to the next step or phase of the remedy.

   An exit strategy provides the shortest path to closure, which ultimately decreases the environmental footprint of the remedy.

   The exit strategy should be short and concise. It defines the cleanup goals and the methods that will be used to assess whether the goals are being attained.

   The exit strategy should address stakeholder concerns, meet all applicable regulations, identify all performance metrics, assess costs/risks/future use/benefits of the remedial actions, and identify all requirements to terminate remedial activities at the site. It must also determine the following:

   1. How performance of the remedy will be measured.
   2. Which decision logic/metrics will be used to select operational changes.
   3. How attainment of cleanup goals will be demonstrated.
   4. How system(s) operation and long-term monitoring will be terminated.

7.0. REPORTING REQUIREMENTS

7.1 Site Management Reports

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

All site management inspection, maintenance, and monitoring events will be conducted by a Professional Engineer (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.

All applicable inspection forms and other records, including media sampling data and system maintenance reports, generated for the site during the reporting period will be provided in electronic format to the NYSDEC in accordance with the requirements of Table 8 and summarized in the Periodic Review Report.

Table 8: Schedule of Interim Monitoring/Inspection Reports

Task/Report	Reporting Frequency*
Inspection Report	Monthly
Periodic Review Report	Annually, or as otherwise determined by the NYSDEC

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

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

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

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

- Type of samples collected (e.g., sub-slab vapor, indoor air, outdoor air);

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

- Sampling results in comparison to appropriate standards/criteria;

- A figure illustrating sample type and sampling locations;

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

- Any observations, conclusions, or recommendations; and

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

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

- Date of event;

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

- Description of maintenance activities performed;

- Any modifications to the 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 include, at a minimum:

- Date of event;

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

- Description of non-routine activities performed;

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

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

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

7.2 Periodic Review Report

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

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

- Results of the required annual site inspections, fire inspections, and severe condition inspections, if applicable.

- Description of any change of use, import of materials, or excavation that occurred during the certifying period.

- 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 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; and

  - A groundwater elevation contour map for each gauging event.

- 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 Remedial Action Work Plan (RAWP), ROD or Decision Document;

  – The operation and the effectiveness of all treatment units, etc., including identification of any needed repairs or modifications;

  – Any new conclusions or observations regarding site contamination based on inspections or data generated by the Monitoring and Sampling Plan for the media being monitored;

  – Recommendations regarding any necessary changes to the remedy and/or Monitoring and Sampling Plan;

  – An update to the climate change vulnerability assessment if site or external conditions have changed since the previous assessment, and recommendations to address vulnerabilities.

- A summary of the Green Remediation evaluation, including a quantitative and qualitative overview of a site's environmental impacts and recommendations to improve the remedy's environmental footprint. The PRR will include the completed Summary of Green Remediation Metrics form provided in Appendix J.

- 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, ROD, or Decision Document.

- The overall performance and effectiveness of the remedy.

- A performance summary for all treatment systems at the site during the calendar year, including information such as:

  - The number of days the system operated for the reporting period;

  - The average, high, and low flows per day;

  - The contaminant mass removed and the cost per pound of 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.

7.2.1 Certification of Institutional and Engineering Controls

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

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

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

"I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law. I, James P. Cinelli, of 600 Third Avenue, New York, New York, 10016, am certifying as 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 certification will be included in the Periodic Review Report.

The Periodic Review Report will be submitted, in electronic format, to the NYSDEC project manager and the NYSDOH project manager. The Periodic Review Report may also 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 institutional or engineering control or failure to conduct site management activities, a Corrective Measures Work Plan will be submitted to the NYSDEC project manager for approval. This plan will explain the failure and provide the details and schedule for performing work necessary to correct the failure. Unless an emergency condition exists, no work will be performed pursuant to the Corrective Measures Work Plan until it has been approved by the NYSDEC project manager.

7.4 Remedial System Optimization Report

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

The RSO report will be submitted, in electronic format, to the NYSDEC project managerand the NYSDOH project manager.

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 Environmental Site Assessment – June 2008 – prepared by AEI Environmental & Engineering Services (AEI)

Phase II Subsurface Investigation – August 2008 – prepared by AEI

Focused Sub-surface Site Investigation – January 2017 – prepared by Merritt Environmental Consulting Corp. (Merritt)

Remedial Investigation Report – August 2019 – prepared by Athenica Environmental Services Inc. (Athenica)

Supplemental Remedial Investigation Report – November 2020 – prepared by Laurel Environmental Geosciences DPC (Laurel)

FIGURES

TABLES

APPENDIX A – LIST OF SITE CONTACTS

Name	Phone/Email Address
Remediator - Tony Raouf	917-907-4037; tonyraouf@gmail.com
Remediator - Gus Vorillas	917-538-2656; gus@firsteliteny.com
QEP/P.E. – James P. Cinelli	800-305-6019; jcinelli@libertyenviro.com
NYSDEC Project Manager – Sydney Sobol	518-402-4799 sydney.sobol@dec.ny.gov
NYSDEC Regional HW Engineer – Jane O'Connell	(718)482-4599; jane.oconnell@dec.ny.gov
NYSDEC Site Control	(518)_402-9569; dersitecontrol@dec.ny.gov
Attorney - Ted Firetog, Esq.	516-845-8087; tfiretog@eniinternet.com
NYSDOH Project Manager – Johnathan Robinson	518-402-7881; Johnathan.Robinson@health.ny.gov

APPENDIX B – EXCAVATION WORK PLAN (EWP)

1 NOTIFICATION

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

Table 1: Notifications*

NYSDEC Project Manager – Sydney Sobol	(518)402-4799; sydney.sobol@dec.ny.gov
NYSDEC Regional HW Engineer – Jane O'Connell	(718)482-4599; jane.oconnell@dec.ny.gov
NYSDEC Site Control	(518)_402-9569; dersitecontrol@dec.ny.gov
NYSDOH Project Manager – Johnathan Robinson	518-402-7881; Johnathan.Robinson@health.ny.gov

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

This notification will include:

- A detailed description of the work to be performed, including the location and areal extent of excavation, plans/drawings for site re-grading, intrusive elements or utilities to be installed below the soil cover, estimated volumes of contaminated soil to be excavated, any modifications to truck routes, 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; and submittals (e.g., reports) to the NYSDEC documenting the completed intrusive work;

- A summary of the applicable components of this EWP;
- A statement that the work will be performed in compliance with this EWP, 29 CFR 1910.120 and 29 CFR 1926 Subpart P;
- A copy of the contractor's health and safety plan (HASP), in electronic format, if it differs from the HASP provided in Appendix H of this SMP;
- Identification of disposal facilities for potential waste streams; and
- Identification of sources of any anticipated backfill, along with the required request to import form and all supporting documentation including, but not limited to, 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 EWP. The alteration, restoration and modification of engineering controls must conform with Article 145 Section 7209 of the Education Law regarding the application professional seals and alterations.

2 SOIL SCREENING METHODS

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

Primary contaminant sources (including, but not limited, to hotspots) identified during Site Characterization, Remedial Investigation, and Remedial Action will be surveyed by a surveyor licensed to practice in the State of New York. This information will be provided on maps in the Final Engineering Report.

Screening will be performed by qualified environmental professionals. Resumes of key personnel are provided in Appendix X provided for personnel responsible for field

screening of invasive work for unknown contaminant sources during remediation and development work.

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

Soils will be segregated based on previous environmental data and screening results into material that requires off-site disposal and material that requires testing to determine if the material can be reused on-site as soil beneath a cover or if the material can be used as cover soil. Further discussion of off-site disposal of materials and on-site reuse is provided in Sections 5, 6 and 7 of this Appendix.

3 SOIL STAGING METHODS

Soil excavated from hotspots may be stockpiled prior to disposal. Stockpiles will be inspected at a minimum once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by NYSDEC.

Stockpiles will be placed on top of a tarp and be kept covered with appropriately anchored tarps. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced.

Soil stockpiles will be continuously encircled with silt fences. Hay bales will be used as needed near catch basins, surface waters and other discharge points.

Water must be available on site at suitable supply and pressure for use in dust control, such as a dedicated water truck equipped with a water cannon.

Soil stockpiles will be continuously encircled with a berm and/or silt fence. Hay bales will be used as needed near catch basins, surface waters and other discharge points.

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

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

4 MATERIALS EXCAVATION AND LOAD-OUT

The Remedial Engineer or a qualified environmental professional under his/her supervision will oversee invasive work and the excavation and load-out of excavated material.

The Volunteer and its contractors are solely responsible for safe execution of invasive and other work performed under this Plan.

The presence of utilities and easements on the Site has been investigated by the Remedial Engineer Team. It has been determined that no risk or impediment to the planned work under this Remedial Action Work Plan is posed by utilities or easements on the Site.

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

A truck wash will be operated on-Site. The Remedial Engineer will be responsible for ensuring that outbound trucks wheels will be washed at the truck wash before leaving the Site until the remedial construction is complete.

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

The Remedial Engineer Team will be responsible for ensuring that egress points for truck and equipment transport from the Site will be clean of dirt and other materials derived from the Site during Site remediation and development. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to Site-derived materials.

The Volunteer and associated parties preparing the remedial documents submitted to the State, and parties performing this work, are completely responsible for the safe performance of invasive work, the structural integrity of excavations, and for structures that may be affected by excavations (such as building foundations and bridge footings).

The Remedial Engineer Team will ensure that Site development activities will not interfere with, or otherwise impair or compromise, remedial activities proposed in this Remedial Action Work Plan.

Each hotspot and structure to be remediated (USTs, vaults and associated piping, transformers, etc.) will be removed and end-point remedial performance sampling completed before excavations related to Site development commence proximal to the hotspot or structure.

Development-related grading cuts and fills will not interfere with, or otherwise impair or compromise, the performance of remediation required by this plan. Fills will not be performed with NYSDEC approval of fill material.

Mechanical processing of historical fill and contaminated soil on-Site is prohibited.

Primary contaminant sources (including, but not limited to, hotspots) identified during the Remedial Action will be surveyed by a surveyor licensed to practice in the State of New York. The survey information will be shown on maps to be reported in the Final Engineering Report.

A qualified environmental professional 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 will oversee all invasive work and the excavation and load-out of all excavated material.

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

The presence of utilities and easements on the site will be investigated by the qualified environmental professional. It will be determined whether a risk or impediment to the planned work under this SMP is posed by utilities or easements on the site. A site utility stakeout will be completed for all utilities prior to any ground intrusive activities at the site.

Loaded vehicles leaving the site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State, local, and NYSDOT requirements (and all other applicable transportation requirements). Trucks transporting contaminated soil must have either tight-fitting opaque covers that are secured on the sides and/or back, or opaque covers that are locked on all sides.

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

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

The qualified environmental professional will be responsible for ensuring that all egress points for truck and equipment transport from the site are clean of dirt and other materials derived from the site during intrusive excavation activities. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to site-derived materials. Material accumulated from the street cleaning and egress cleaning activities will be disposed off-site at a permitted landfill facility in accordance with all applicable local, State, and Federal regulations.

5 MATERIALS TRANSPORT OFF-SITE

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

Proposed in-bound and out-bound truck routes to the Site are shown in Figure B-1. All trucks loaded with Site materials will exit the vicinity of the Site using only these approved truck routes. This is the most appropriate route and considers: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting off- Site queuing of trucks entering the facility; (d) limiting total distance to major highway(e) promoting safety in access to highways; and (f) overall safety in transport.

Trucks loaded with Site materials will exit the vicinity of the Site using only these approved truck routes. Truck operators are responsible for obeying traffic signs and detours.

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

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

Queuing of trucks will be performed adjacent to the Site.

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

Trucks will be washed prior to leaving the Site. Truck wash waters will be collected and disposed of off-Site in an appropriate manner.

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

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

Truck transport routes are shown on Figure B-1. All trucks loaded with site materials will exit the vicinity of the site using only these approved truck routes. This is the most appropriate route and takes into account: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting off-site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport.

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

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

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

6 MATERIALS DISPOSAL OFF-SITE

No soil excavation is anticipated at the site, as it is fully-developed. Soil disposal locations will be determined if any future excavation is planned. Non-hazardous PCE contaminated soil to ACUA, Atlantic City (with “contained in” determination)

Soil/fill/solid waste excavated and removed from the Site will be treated as contaminated and regulated material and will be disposed off-site in a permitted facility in

accordance with local, State (including 6NYCRR Part 360) and Federal regulations. If disposal of soil/fill from this Site is proposed for unregulated disposal (i.e. clean soil removed for development purposes), a formal request with an associated plan will be made to NYSDEC's Project Manager. Unregulated off-Site management of materials from this Site is prohibited without formal NYSDEC project manager approval.

Material that does not meet Track 1 UUSCOs is prohibited from being taken to a New York State recycling facility (6NYCRR Part 360-15 Registration Facility).The following documentation will be obtained and reported by the Remedial Engineer for each disposal location used in this project to demonstrate that the disposal of material derived from the Site conforms with all applicable laws: (1) a letter from the Remedial Engineer or BCP Volunteer to the receiving facility describing the material to be disposed and requesting formal written acceptance of the material. This letter will state that material to be disposed is contaminated material generated at an environmental remediation Site in New York State, and provide the Site ID number and the name and phone number of the Remedial Engineer. The letter will include as an attachment a summary of all chemical data for the material being transported (including Site Characterization data); and (2) a letter from all receiving facilities stating it is in receipt of the correspondence (above) and is approved to accept the material. These documents will be included in the FER.

Non-hazardous contaminated soils, including contaminated historic fill, taken off-Site will be handled consistent with 6 NYCRR Parts 360, 361, 362, 363, 364 and 365.

Historic fill and contaminated soils from the Site are prohibited from being disposed at Part 360-15 Registration Facilities (also known as Soil Recycling Facilities).

Soils that are contaminated but non-hazardous and are being removed from the Site are considered by the Division of Materials Management s (DMM in NYSDEC to be Construction and Demolition (C/D) materials with contamination not typical of virgin soils. These soils may be sent to a permitted Part 360 landfill. They may be sent to a permitted C/D processing facility without permit

modifications only upon prior notification of NYSDEC Region 2 DSHM. This material is prohibited from being sent or redirected to a Part 360-16 Registration Facility. In this case, as dictated by DSHM, special procedures will include, at a minimum, a letter to the C/D facility that provides a detailed explanation that the material is derived from a DER remediation Site, that the soil material is contaminated and that it must not be redirected to on- Site or off-Site Soil Recycling Facilities. The letter will provide the project identity and the name and phone number of the Remedial Engineer. The letter will include as an attachment a summary of chemical data for the material being transported.

Pursuant to discussions with, Division of Materials Management, prior to the start of excavation, additional sampling and characteristic analysis of soil will be performed to confirm the extent of material that will require disposal as hazardous and / or non-hazardous in accordance with a Non-Hazardous Waste Contained-In Determination.

The Final Engineering Report will include an accounting of the destination of material removed from the Site during this Remedial Action, including excavated soil, contaminated soil, including contaminated historic fill, solid waste, and hazardous waste, non-regulated material, and fluids. Documentation associated with disposal of material must also include records and approvals for receipt of the material. This information will also be presented in a tabular form in the FER.

Bill of Lading system or equivalent will be used for off-Site movement of non-hazardous wastes and contaminated soils. This information will be reported in the FER.

Hazardous wastes derived from on-Site will be stored, transported, and disposed of in full compliance with applicable local, State, and Federal regulations. Manifests will be provided in the FER.

Appropriately licensed haulers will be used for material removed from this Site and will be in full compliance with applicable local, State and Federal regulations.

Waste characterization will be performed for off-Site disposal in a manner suitable to the receiving facility and in conformance with applicable permits. Sampling and analytical methods, sampling frequency, analytical results and QA/QC will be reported in the FER. Data available for soil/material to be disposed at a given facility must be submitted to the disposal facility with suitable explanation prior to shipment and receipt.

If using the services of a soil broker, the soil broker is required to hold a Business Integrity Commission (BIC) license. The BIC license number shall be provided in the FER.

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

Off-site disposal locations for excavated soils will be identified in the pre-excavation notification. This will include estimated quantities and a breakdown by class of disposal facility if appropriate, (e.g. hazardous waste disposal facility, solid waste landfill, petroleum treatment facility, C&D debris recovery facility). Actual disposal quantities and associated documentation will be reported to the NYSDEC in the Periodic Review Report. This documentation will include, but will not be limited to: waste profiles, test results, facility acceptance letters, manifests, bills of lading and facility receipts.

Non-hazardous historic fill and contaminated soils taken off-site will be handled consistent with 6 NYCRR Parts 360, 361, 362, 363, 364 and 365. Material that does not meet Unrestricted SCOs is prohibited from being taken to a New York State C&D debris recovery facility (6 NYCRR Subpart 361-5 registered or permitted facility).

7 MATERIALS REUSE ON-SITE

Chemical criteria for on-site reuse of material have been established by NYSDEC. Materials planned for reuse (if any) will be segregated and stockpiled from materials slated for off-site disposal. Stockpiles will be placed on and covered with polyethylene sheeting. The stockpiled material will be sampled and analyzed in accordance with Table 5.4(e)10 on page 161 of DER-10 Technical Guidance for Investigation and Remediation. The analytical results will be submitted to NYSDEC via a *Request to Import/Reuse Soil or Fill* form for review and approval prior to placement on-site. All of the materials to be reused on the Site will comply with UUSCOs. Clean soil stockpiles for reuse will be stored on the western position of the site. Approximately 60 cy of soil is expected to be re-used to backfill the AOC 2 excavation. Approximately 20 cy of soil may be re-used to backfill at foundation footing excavations. Soil stockpile for re-use may range in size up to approximately 80 cy.

The qualified environmental professional, as defined in 6 NYCRR Part 375, will ensure that procedures defined for materials reuse in this SMP are followed and that unacceptable material (i.e. contaminated) does not remain on-site. Contaminated on-site material, including historic fill and contaminated soil, that is acceptable for reuse on-site will be placed below the demarcation layer or impervious surface, and will not be reused within the cover system or within landscaping berms. Contaminated on-site material may only be used beneath the site cover as backfill for subsurface utility lines with prior approval from the DEC project manager

Proposed materials for reuse on-site must be sampled for full suite analytical parameters including per- and polyfluoroalkyl substances (PFAS) and 1,4-dioxane. The sampling frequency will be in accordance with DER-10 Table 5.4(e)10 unless prior approval is obtained from the NYSDEC project manager for modification of the sampling frequency. The analytical results of soil/fill material testing must meet the site use criteria presented in NYSDEC DER-10 Appendix 5 — Allowable Constituent Levels for Imported Fill or Soil for all constituents listed, and the NYSDEC Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances [November 2022 or date of current version, whichever is later] guidance values. Approvals for modifications to the analytical

parameters must be obtained from the NYSDEC project manager prior to the sampling event.

. Soil/fill material for reuse on-site will be segregated and staged as described in Sections X-2 and X-3 of this EWP. The anticipated size and location of stockpiles will be provided in the 15-day notification to the NYSDEC project manager. Stockpile locations will be based on the location of site excavation activities and proximity to nearby site features. Material reuse on-site will comply with requirements of NYSDEC DER-10 Section 5.4(e)4. Any modifications to the requirements of DER-10 Section 5.4(e)4 must be approved by the NYSDEC project manager.

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

8 FLUIDS MANAGEMENT

Liquids to be removed from the Site, including dewatering fluids, will be handled, transported, and disposed off-site at a permitted facility in accordance with applicable local, State, and Federal regulations. Liquids discharged into the New York City sewer system will be addressed through approval by NYCDEP, to be obtained by the contractor.

Dewatered fluids will not be recharged back to the land surface or subsurface of the Site. Dewatering fluids will be managed off-Site.

Discharge of water generated during remedial construction to surface waters (i.e. a local pond, stream or river) is prohibited without a SPDES permit.

All liquids to be removed from the site, including but not limited to, excavation dewatering, decontamination waters and groundwater monitoring well purge and development waters, will be handled, transported and disposed off-site at a permitted facility in accordance with applicable local, State, and Federal regulations. Dewatering,

purge and development fluids will not be recharged back to the land surface or subsurface of the site, and will be managed off-site, unless prior approval is obtained from NYSDEC.

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

9 COVER SYSTEM RESTORATION

After the completion of soil removal and any other invasive activities the cover system will be restored in a manner that complies with the Final Engineering Report. The existing cover system is comprised of a minimum of 12 inches of clean soil, asphalt pavement, or concrete covered sidewalks and concrete building. If the type of cover system changes from that which exists prior to the excavation (i.e., a soil cover is replaced by asphalt) this will constitute a modification of the cover element of the remedy and the upper surface of the remaining contamination. A figure showing the modified surface will be included in the subsequent Periodic Review Report and in an updated SMP. The alteration, restoration and modification of engineering controls must conform with Article 145 Section 7209 of the Education Law regarding the application professional seals and alterations.

10 BACKFILL FROM OFF-SITE SOURCES

Structural fill will be needed beneath the foundation and parking garages and will require importation from off-Site. If sampling of material imported to the Site is required, sampling will be conducted in accordance with DER-10 Section 5.4. The NYSDEC will be consulted prior to importation of fill material. In accordance with DER-10, documentation of the source of off-Site fill being brought to the Site must be provided to DER for approval at least one week prior to its arrival and use on site.

If sampling of material imported to the Site is required, sampling will be conducted in accordance with DER-10 Section 5.4. The NYSDEC will be consulted prior to importation of fill material. In accordance with DER-10, documentation of the source of off-Site fill being brought to the Site must be provided to DER for approval at least one week prior to its arrival and use on site. Material from industrial sites, spill sites, other

environmental remediation sites or other potentially contaminated sites will not be imported to the Site.

The Final Engineering Report will include the following certification by the Remedial Engineer: “I certify that import of soils from off-Site, including source evaluation, approval and sampling, has been performed in a manner that is consistent with the methodology defined in the Remedial Action Work Plan.” A map detailing the locations of backfilled material will also be included in the Final Engineering Report.

Imported soils will meet NYSDEC approved backfill or cover soil quality objectives for this Site. These NYSDEC approved backfill or cover soil quality objectives are the lower of the protection of groundwater or the protection of public health soil cleanup objectives for restricted residential as set forth in Table 375- 6.8(b) of 6 NYCRR Part 375 and included as Appendix B. Non-compliant soils will not be imported onto the Site without prior approval by NYSDEC. Nothing in the approved Remedial Action Work Plan or its approval by NYSDEC should be construed as an approval for this purpose.

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. Nothing in this Remedial Action Work Plan should be construed as an approval for this purpose.

Solid waste will not be imported onto the Site.

Trucks entering the Site with imported soils will be securely covered with tight fitting covers.

All materials proposed for import onto the site will be approved by the qualified environmental professional, as defined in 6 NYCRR Part 375, and will be in compliance with provisions in this SMP prior to receipt at the site. A Request to Import/Reuse Fill or Soil form, which can be found at http://www.dec.ny.gov/regulations/67386.html, will be prepared and submitted to the NYSDEC project manager allowing a minimum of 5 business days for review. A copy of the form is presented in Appendix [x].

Material from industrial sites, spill sites, 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) and DER-10 Appendix 5 for commercial and residential use. Based on an evaluation of the land use, protection of groundwater and protection of ecological resources criteria, will meet unrestricted use SCOs. Soils that meet general fill requirements under 6 NYCRR Part 360.13, but do not meet backfill or cover soil objectives for this site, will not be imported onto the site without prior approval by NYSDEC project manager. Soil material will be sampled for the full suite of analytical parameters, including PFAS and 1, 4-dioxane. 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.

12 EXCAVATION CONTINGENCY PLAN

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

Sampling will be performed on product, sediment and surrounding soils, etc. as necessary to determine the nature of the material and proper disposal method. Chemical analysis will be performed for a full list of analytes [TAL metals, TCL volatiles and semi-volatiles (including 1,4-dioxane), TCL pesticides and PCBs, and PFAS], unless the site history and previous sampling results provide sufficient justification to limit the list of analytes. In this case, a reduced list of analytes will be proposed to the NYSDEC project manager for approval prior to sampling. Any tanks will be closed as per NYSDEC regulations and guidance.

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

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

Sampling will be performed on product, sediment and surrounding soils, etc. as necessary to determine the nature of the material and proper disposal method. Chemical analysis will be performed for a full list of analytes (TAL metals; TCL volatiles and semi-volatiles (including 1,4-dioxane) , TCL pesticides, PCBs, PFAS), unless the site history and previous sampling results provide sufficient justification to limit the list of analytes. In this case, a reduced list of analytes will be proposed to the NYSDEC project manager for approval prior to sampling. Any tanks will be closed as per NYSDEC regulations and guidance.

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

13 COMMUNITY AIR MONITORING PLAN

The CAMP provides measures for protection for the downwind community (i.e., off-Site receptors including residences, and businesses) from potential airborne contaminant releases resulting from remedial activities at the Site. Continuous monitoring will be conducted within the work area and along the upwind and downwind perimeter

during intrusive activities such as excavation, product recovery, manipulation of soil piles, extraction of sheet piling, etc. Air monitoring will consist of monitoring for VOCs and dust particulates including particulate matter less than 10 micrometers in size (PM-10) during intrusive activities using a MiniRAE 2000 PID and a PDR-1000 dust monitor, respectively, calculated over a 15-minute running average. Before work begins, background concentrations will be measured.

A figure showing the location of air sampling stations based on generally prevailing wind conditions is shown in Figure B-2. These locations will be adjusted on a daily or more frequent basis based on actual wind directions to provide an upwind and at least two downwind monitoring stations. If a sensitive receptor, such as a school, day care or residential area is adjacent to the site, a fixed monitoring station should be located at that site perimeter, regardless of wind direction, and discussed in the text.

CAMP readings will be provided at least on a weekly basis with all exceedances reported to DEC and DOH the same day or next business day if after hours along with the reason for exceedance, what was done to correct it, and if it was effective. Exceedances of action levels listed in the CAMP will be reported to NYSDEC and NYSDOH Project Managers.

1X1-13A: 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 part-per-million, monitoring should occur within the occupied structure(s). Depending upon the nature of contamination, chemical-specific colorimetric tubes of sufficient sensitivity may be necessary for comparing the exposure point concentrations with appropriate pre-determined response levels (response actions should also be pre-determined). Background readings in the occupied spaces must be taken prior to commencement of the planned work. Any unusual background readings should be discussed with NYSDOH prior to commencement of the work.

- If total particulate concentrations opposite the walls of occupied structures or next to intake vents exceed 150 micrograms per cubic meter, work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 micrograms per cubic meter 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.

[X]-13B: 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.

14 ODOR CONTROL PLAN

This odor control plan is capable of controlling emissions of nuisance odors off-Site. Specific odor control methods to be used on a routine basis will include wetting soils to prevent off-Site migration, application of a foam suppressant on the source area, and/or covering the source area with a tarp. If nuisance odors are identified, work will be halted and the source of odors will be identified and corrected. Work will not resume until nuisance odors have been abated. NYSDEC and NYSDOH will be notified of odor events and of other complaints about the project. Implementation of odor controls, including the halt of work, will be the responsibility of the Volunteer's Remedial Engineer, who is responsible for certifying the Final Engineering Report.

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

Where odor nuisances have developed during remedial work and cannot be corrected, or where the release of nuisance odors cannot otherwise be avoided due to on-Site conditions or close proximity to sensitive receptors, odor control will be achieved by sheltering excavation and handling areas under tented containment structures equipped with appropriate air venting/filtering systems.

This odor control plan is capable of controlling emissions of nuisance odors off-site . Specific odor control methods to be used on a routine basis will include wetting soils to prevent off-Site migration, application of a foam suppressant on the source area, and/or covering the source area with a tarp. If nuisance odors are identified at the site boundary, or if odor complaints are received, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. NYSDEC and NYSDOH will be notified of all odor events and of any other complaints about the project. Implementation of all odor controls, including the halt of work, is the

responsibility of the remedial party's Remediation Engineer, and any measures that are implemented will be discussed in the Periodic Review Report.

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

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

15 DUST CONTROL PLAN

Particulate monitoring must be conducted according to the Community Air Monitoring Plan (CAMP) provided in Section [X]-13. If particulate levels at the site exceed the thresholds listed in the CAMP or if airborne dust is observed on the site or leaving the site, the dust suppression techniques listed below will be employed. The remedial party will also take measures listed below to prevent dust production on the site.

A dust suppression plan that addresses dust management during invasive on-site work will include, at a minimum, the items listed below:

- Dust suppression will be achieved using a dedicated on-site water truck for road wetting. The truck will be equipped with a water cannon capable of spraying water directly onto off-road areas including excavations and stockpiles.
- Clearing and grubbing of larger sites will be done in stages to limit the area of exposed, unvegetated soils vulnerable to dust production.

- Gravel will be used on roadways to provide a clean and dust-free road surface.
- On-site roads will be limited in total area to minimize the area required for water truck sprinkling.

Field generation of contaminated or uncontaminated dust and mobilization of volatile organic compounds may be reduced by new and traditional Best Management Practices (BlVIPs) such as:

- Covering excavated areas with biodegradable fabric that also can control erosion and serve as a substrate for favorable ecosystems, or with synthetic material that can be reused for other onsite or offsite purposes;
- Spraying water in vulnerable areas, in conjunction with water conservation and runoff management techniques;
- Securing and covering material in open trucks while hauling excavated material, and reusing the covers;
- Revegetating excavated areas as quickly as possible; and
- Limiting onsite vehicle speeds to 10 miles per hour.

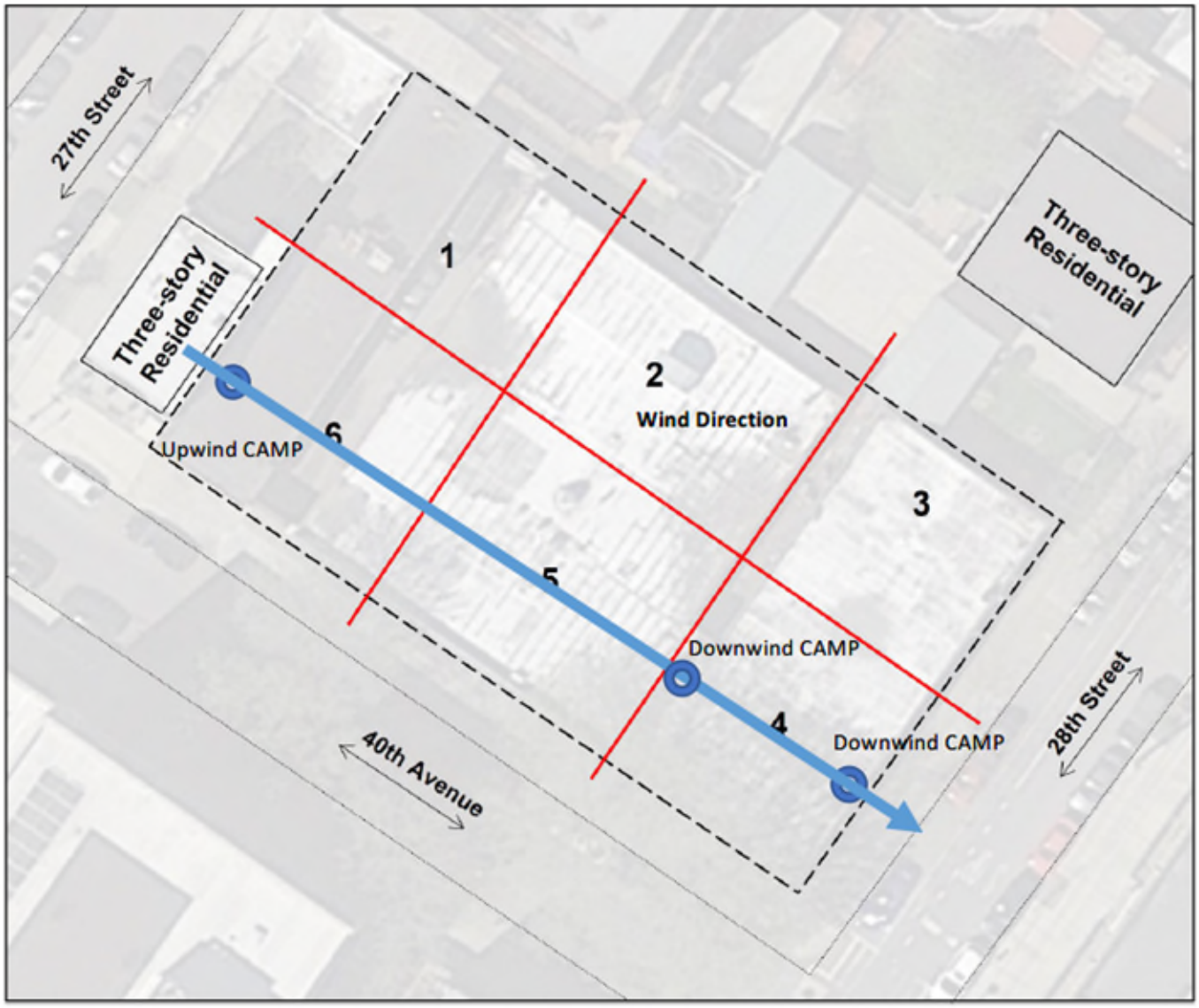
Other approaches can be implemented with the approval of NYSDEC's Project Manager.

Figure B-1 Truck Route Map

Source: Chazen Companies RAWP May 2021

Figure B-2 General Prevailing Wind – Camp Monitoring Locations Map

Source: Laurel Environmental – Daily Status Report, December 9 2022



APPENDIX C – ENVIRONMENTAL EASEMENT/NOTICE/DEED RESTRICTION

To be provided under separate cover.

APPENDIX D – MONITORING WELL BORING AND CONSTRUCTION LOGS

APPENDIX I – FIELD SAMPLING PLAN

APPENDIX G – QUALITY ASSURANCE PROJECT PLAN

APPENDIX L – HEALTH AND SAFETY PLAN

Liberty Environmental
Site Health & Safety Plan

1. General Information

Project Name: 27-09 40th Ave.
Site Address: 27-09 40th Avenue, Long Island City, New York
Project Manager: Craig Herr
HASP Prepared By: Andre Matthews
Date Prepared: 10/25/2022.
HASP Approved By: Craig Herr and James P. Cinelli
Date Approved: 12/11/2022

TEAM MEMBER	RESPONSIBILITIES
David Coyne	Health and Safety Coordinator
Craig Herr	Project Manager
James P. Cinelli	Site Health and Safety Representative/Geologist
Brian Exley	Field Tech

Is a One Call/Dig Safe Required? Yes

2. Training and Medical Surveillance

Training Level Required:
HAZWOPER 40/8 hour, First Aid, CPR

Medical Surveillance Level Required:
HAZWOPER physical

3. Personal Protection

Based on evaluation of potential hazards, the following levels of personal protection have been designated for the applicable work areas or tasks:

LOCATION	JOB FUNCTION	LEVEL OF PROTECTION
Soil Borings	Sampling/Screening/Oversight	**D** C B A
Monitoring Wells	Gauging/Sampling	**D** C B A
Soil Vapor Point	Installation and sampling	**D** C B A
Surface Water	Sampling	**D** C B A
Soil Excavation	Sampling/Screening/Oversight	**D** C B A

Specific protective equipment for each level are as follows: [1]

Level A
Respiratory:
SCBA
Air-Line Supplied Air Respirator
Other (describe)

Level B
Respiratory:
SCBA
Air-Line Supplied Air Respirator
Other – Level C-D plus the following exceptions/modifications

Level C
Respiratory – Air-purifying respirator with
cartridge/canister type:
HEPA, acid gas, organic vapors
(e.g., MSA GMC-H)
HEPA only
Other – Level D plus the following exceptions/modifications –

Level D
Respiratory – None
Other:
Safety glasses
Hard hat
Safety shoes
Hearing protection
Snake chaps/Gaiters
Protective clothing and/or gloves required (i.e., modified Level D)
Other (describe):

Other skin, eyes, and fall protection required:

Gloves:	Protective clothing:
Butyl rubber	Tyvek ® or equivalent
PVC-coated	Tyvek ® polyethylene-coated or equivalent
Neoprene	Tyvek ® Saranex® or equivalent
Nitrile	Other (describe)
Other (describe)	

Radiation Safety:
Dosimeter Badge
Other (describe)

1 See Liberty Health and Safety Manual for minimum criteria.

2 Hard hats are only required when overhead hazards are expected, such as when drilling, advancing soil borings, and performing soil excavation activities.
3 Hearing protection is required when site activities produce sounds greater than 85dB, such as when drilling, advancing soil borings, inside remediation systems, operating generators, activities around large machinery (vacuum trucks).
4 Snake chaps are only required when site activities include walking through undeveloped areas where snake activity is known or when visibility is limited.

Criteria for changing protection levels are as follows:

	Approvals Required		
Change	HSR	PM	CHSM
To Level C when PID deflections in the breathing zone consistently exceed 10 ppm for a period of 60 minutes and engineering measures do not resolve the vapor issue.		X	
To level when			
To level when			
To level when			
Evacuate the area when continuous PID reading is:			

[1] HSR: On-site Health & Safety Representative
PM: Project Manager
CHSM: Corporate Health & Safety Manager
Changes to the level of protection shall be made after the required approvals are obtained. All changes shall be recorded in the field log and reported to the HSC as soon as possible.

4. Air Monitoring
The following monitoring instruments shall be used on-site to measure airborne containment concentrations in the breathing zone:

Instrument	Frequency of Monitoring
Combustible Gas Indicator	
O_2 Monitor	
Colorimetric Tubes (type)	
PID	Periodic
FID	
Other (specify)	

5. Site Control (Describe or attach sketch)

Work Zones:

Support Zone: Greater than 10 feet of heavy equipment or sampling area.

Contamination Reduction Zone (area used for decontamination): Within 10 feet of heavy equipment or sampling area.

Exclusion Zone (area considered contaminated or otherwise hazardous to safety): Within 10 feet of heavy equipment or sampling area.

Site Entry Procedures:

X Notify Site Health and Safety Representative.
X Read Health & Safety Plan and sign Acknowledgment Statement.
Check in with the facility security guard.
X Wear proper personal protective equipment.
Attend facility orientation.
X Conduct "Toolbox" safety meeting.
Other (specify):

Decontamination Procedures:

Personnel: shower as soon as practical
Equipment: wipe PID with paper towel; clean equipment with Alconox/potable water

Investigation-derived Material Disposal:

X Leave on site for disposal.
Other (describe)

Work Limitations (time of day, buddy system, etc.): none

Troxler Radiation Safety:

X Radiation information is not applicable to this project.
Notify RSO.
Wear dosimeter badge when handling gauge.
Post applicable radiation signs.
Post emergency numbers.
Provide at least two lock systems for overnight storage.
Maintain storage at least 15 feet from full-time workstations.
Block and brace gauge during "all" transportation.
Limit "public" exposure to gauge while in use.
Provide sketch of gauge storage to RSO.

6. Contingency Planning

LOCAL EMERGENCY RESOURCES:

Ambulance: 911
Hospital Emergency Room: 911
Poison Control Center Pennsylvania (800) 521-6110
Police: 911
Fire Department: 911
USEPA Contact:
Other (Troxler, NRC, Agreement State Agency, etc.):

SITE RESOURCES:

Water Supply (Type/Location):
Liberty Cell:
Other:

EMERGENCY CONTACTS:

Liberty Technical Contact: James P. Cinelli (610) 633-9780
Liberty Project Manager Craig Herr (717) 203-1852
Liberty Corporate Health & Safety Manager: David Coyne (484) 955-7884
Radiation Safety Officer: David Coyne (484) 955-7884
Liberty Health & Safety Coordinator: David Coyne (484) 955-7884
Contractor Office Contact:
Field Contact: Andre Matthews 347-262-2740
Client Contact:
Facility Manager:

EMERGENCY ROUTES (give directions or attach map):

Nearest Hospital Name and Address: Mount Sinai Queens
3019 Crescent Street at 30th Rd., Astoria, NY 11102
Emergency Room Phone Number 7189321000
Other Nearby Facility (Urgent Care,
Patient First, …):
Other Phone Number:

If an emergency develops at the site, the discoverer will take the following course of action:

- Notify the proper emergency services (fire, police, ambulance, etc.) for assistance. Dial 911
- Notify other affected personnel at the site.
- Contact Liberty and the client representative to inform them of the incident as soon as possible.
- Prepare a summary report of the incident for Liberty and the client representative.

Emergency Equipment Required On-site:

X First Aid/Bloodborne Pathogens Kit Fire Extinguisher
Eye Wash Spill Control Media
Shower Other: (describe)
Other: (describe) Other: (describe)

7. Acknowledgement

Acknowledgement Statement:

I have reviewed the Hazard Assessment and Site Health & Safety Plan. I hereby acknowledge that I have received the required level of training and medical surveillance, that I am knowledgeable about the contents of this site-specific Health & Safety Plan, and that I will use personal protective equipment and follow procedures specified in the Health & Safety Plan.

Signatures of Liberty and Subcontractor Site Personnel (Required):

Date:
Date:
Date:
Date:
Date:
Date:
Date:
Date:

Attachments: Hazard Assessment
Map to Hospital

Attachment A
Hazard Assessment

1. General Information
Proposed Scope of Work and Specific Tasks (include all that apply):

Site Assessment
Drilling of Soil Borings
Collection of Soil Samples
Installation of Monitoring Wells
Groundwater Sampling
Management of Investigation-Derived Waste

Liberty Role
On-site:

	Resident project representative (e.g., observe and document)
	Construction manager (e.g., managing contractor/general contractor)
X	Representative for client (e.g., agent for owner)
	Other (describe)

Proposed Dates of On-site Work: _____

Background Information Review:	X Preliminary	Moderate	Substantial	
Documentation of Overall Hazard: Low	X Moderate	Serious	Unknown	

2. Site Characterization

Facility Description: Commercial/residential
Facility Status: Active Inactive Unknown
Operations (current and past): Dry cleaner, automotive repair and machine shop businesses, Glass factory, wood-working and a photo-engraving shop
Unusual Features (utilities, terrain, etc.): N/A
History (worker or nonworker injury, complaints from public, previous agency action): N/A

3. Site Classification

Site Type Allocated:
1 Known or controlled hazards 2 Unknown hazards 3 Regulated by 29 CFR 1910.120

4. Hazard Evaluation

Substance Name	Physical State	Known Concentration levels present	Potential Routes of Exposure	ACGIH TLV	NYSDEC PEL
tetrachloroethylene (PCE)	Liquid/Vapor	SV-1,600,000 µ/m3 GW-100 µg/L	inhalation, skin absorption, ingestion, skin and/or eye contact		5 µg/L

This list is based on our preliminary evaluation, indicating that these are the major risks identified. Blanks indicate data not available.

Ionizing Radiation:

Did the "client" use radioactive materials on site, past or present: No

Possibility of contamination or exposure due to past or present use of radioactive materials: No

Will a nuclear moisture/density or XRF gauge be used on site? No

If yes, will it be a Liberty gauge? No

Physical Safety Hazards On-Site and Control Measures

Hazard	Control Measure
Heat Stress	Consume proper fluids and monitor for heat stress/exhaustion
Cold Exposure	Wear appropriate clothing and monitor for signs of hypothermia
Heavy Equipment	Stay out of way of heavy equipment
Utilities	Clear utilities prior to drilling
Noise	Wear hearing protection if noise levels exceed 85 db.
Organic Vapor Exposure	Monitor per Plan.
Confined Space	Confined space entry protocols and training per 29 CFR 1910.146 must be followed.

APPENDIX H
SITE MANAGEMENT FORMS

Summary of Green Remediation Metrics for Site Management

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

Initial Report Period (Start Date of period covered by the Initial Report submittal)
Start Date: _____

Current Reporting Period
Reporting Period From: _____ To: _____

Contact Information
Preparer's Name: _____ Phone No.: _____
Preparer's Affiliation: _____

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

	Current Reporting Period	**Total to Date**
Fuel Type 1 (e.g. natural gas (cf))		
Fuel Type 2 (e.g. fuel oil, propane (gals))		
Electricity (kWh)		
Of that Electric usage, provide quantity:		
Derived from renewable sources (e.g. solar, wind)		
Other energy sources (e.g. geothermal, solar thermal (Btu))		

Provide a description of all energy usage reduction programs for the site in the space provided on Page 3.

II. Solid Waste Generation: Quantify the management of solid waste generated on-site.

	Current Reporting Period (tons)	**Total to Date (tons)**
Total waste generated on-site		
OM&M generated waste		
Of that total amount, provide quantity:		
Transported off-site to landfills		
Transported off-site to other disposal facilities		
Transported off-site for recycling/reuse		
Reused on-site		

Provide a description of any implemented waste reduction programs for the site in the space provided on Page 3.

III. Transportation/Shipping: Quantify the distances travelled for delivery of supplies, shipping of laboratory samples, and the removal of waste.

	Current Reporting Period (miles)	**Total to Date (miles)**
Standby Engineer/Contractor		
Laboratory Courier/Delivery Service		
Waste Removal/Hauling		

Provide a description of all mileage reduction programs for the site in the space provided on Page 3. Include specifically any local vendor/services utilized that are within 50 miles of the site.

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

	Current Reporting Period (gallons)	**Total to Date (gallons)**
Total quantity of water used on-site		
Of that total amount, provide quantity:		
Public potable water supply usage		
Surface water usage		
On-site groundwater usage		
Collected or diverted storm water usage		

Provide a description of any implemented water consumption reduction programs for the site in the space provided on Page 3.

V. Land Use and Ecosystems: Quantify the amount of land and/or ecosystems disturbed and the area of land and/or ecosystems restored to a pre-development condition (i.e. Green Infrastructure).

	Current Reporting Period (acres)	**Total to Date (acres)**
Land disturbed		
Land restored		

Provide a description of any implemented land restoration/green infrastructure programs for the site in the space provided on Page 3.

Description of green remediation programs reported above (Attach additional sheets if needed)
Energy Usage:
Waste Generation:
Transportation/Shipping:
Water usage:
Land Use and Ecosystems:
Other:

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

APPENDIX F
O&M MANUAL (FOR EACH ACTIVE EC)

APPENDIX J

GREEN REMEDIATION MATRICS FORMS

APPENDIX E

SSDS AND SVE SYSTE LAYOUT EXHIBITS

APPENDIX K

REMEDIAL SYSTEM OPTIMIZATION TABLE OF CONTENTS

REMEDIAL SYSTEM OPTIMIZATION FOR 27-09 40th AVENUE, LONG ISLAND CITY, NEW YORK

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1.3 REPORT OVERVIEW
2.0 REMEDIAL ACTION DESCRIPTION
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2.2 REGULATORY HISTORY AND REQUIREMENTS
2.3 CLEAN-UP GOALS AND SITE CLOSURE CRITERIA
2.4 PREVIOUS REMEDIAL ACTIONS
2.5 DESCRIPTION OF EXISTING REMEDY
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4.2.3 Process Modifications
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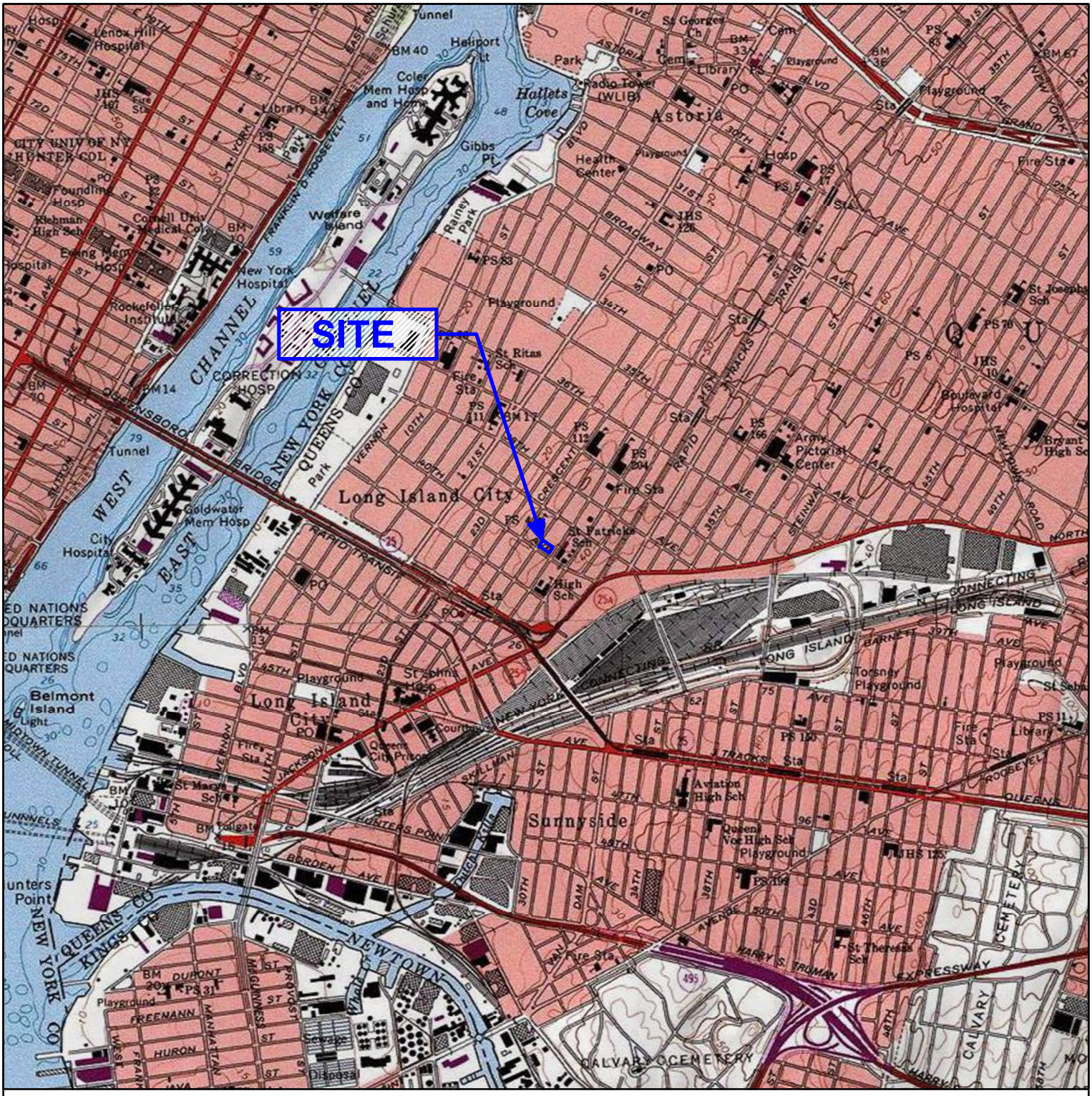
4.3.3 Optimize Monitoring Program
4.3.4 Maintenance and Repairs
4.4 RECOMMENDATIONS FOR IMPLEMENTATION

APPENDIX M - FIRE ALARM SYSTEM PLAN

FIGURES



SOURCE: USA TOPO MAPS - COPYRIGHT © 2013 NATIONAL GEOGRAPHIC SOCIETY, I-CUBED. CENTRAL PARK (SITE - 1995)) AND BROOKLYN (1995) NEW YORK 7.5-MINUTE QUADRANGLES.

SCALE: 1 " = 2,000 '

0 1,000 2,000 4,000'

N

Figure 1 - Site Location Map

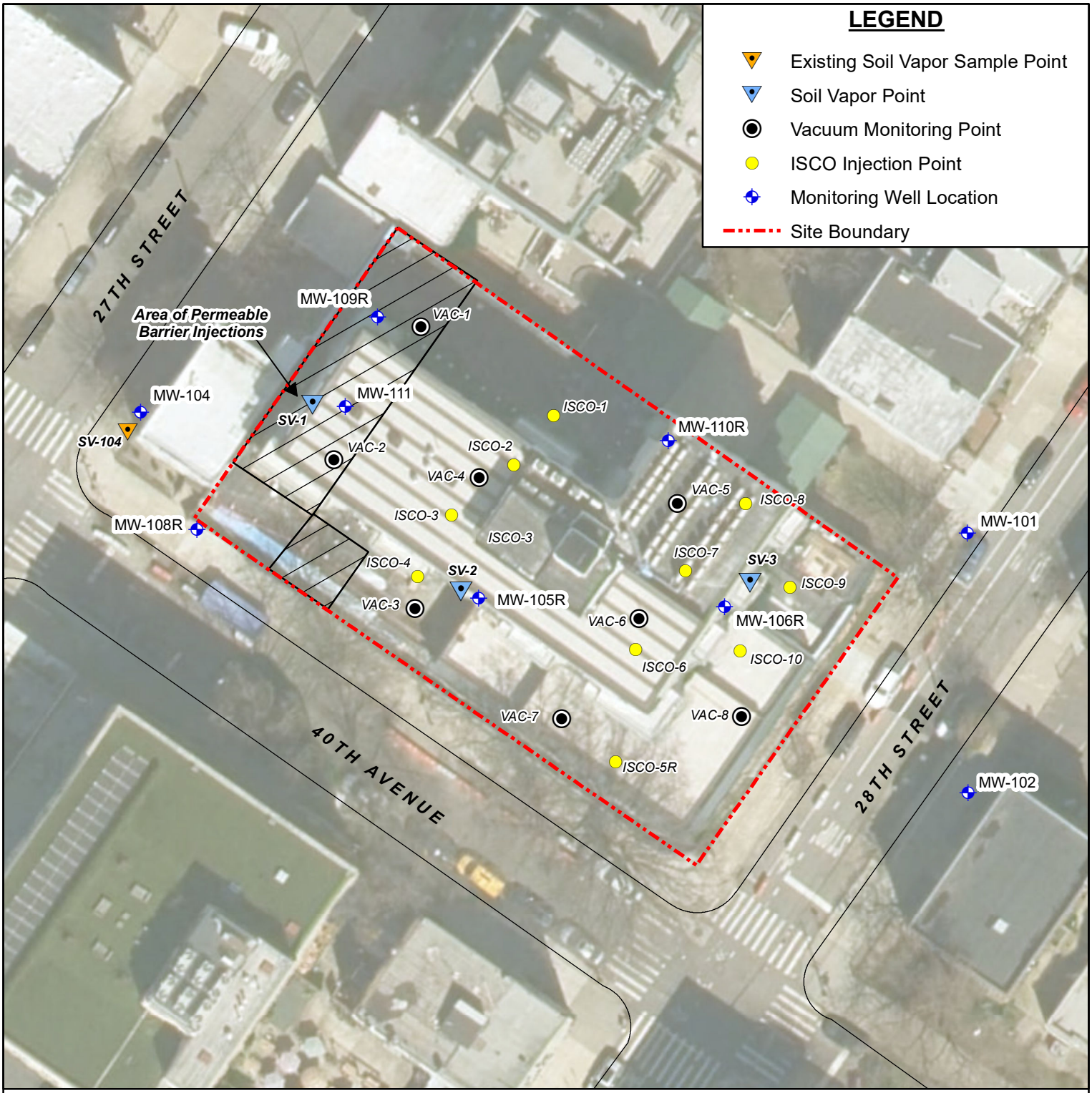
27-09 40th Avenue

Borough of Queens, City of New York, New York

Liberty Environmental, Inc.

600 Third Avenue, Second Floor
New York, NY 10016
Phone: 212-255-0374
www.libertyenviro.com

PROJECT NO.: 220192	REV: 0	PREPARED BY: JRY
DATE: DECEMBER 11, 2023	SCALE: 1" = 2,000'	APPROVED BY: JPC



NOTE: THIS DRAWING INTENDED FOR ILLUSTRATIVE PURPOSES ONLY, AS PART OF A SITE CHARACTERIZATION. NOT TO BE USED AS A BASIS FOR ENGINEERING OR DESIGN
IMAGE SOURCE: ESRI [MICROSOFT], MAXAR AND EARTHSTAR GEOGRAPHICS, DIGITAL GLOBEH. PHOTO DATE: MARCH 16, 2022.

SCALE: 1 " = 40 '

0 20 40 80'

N

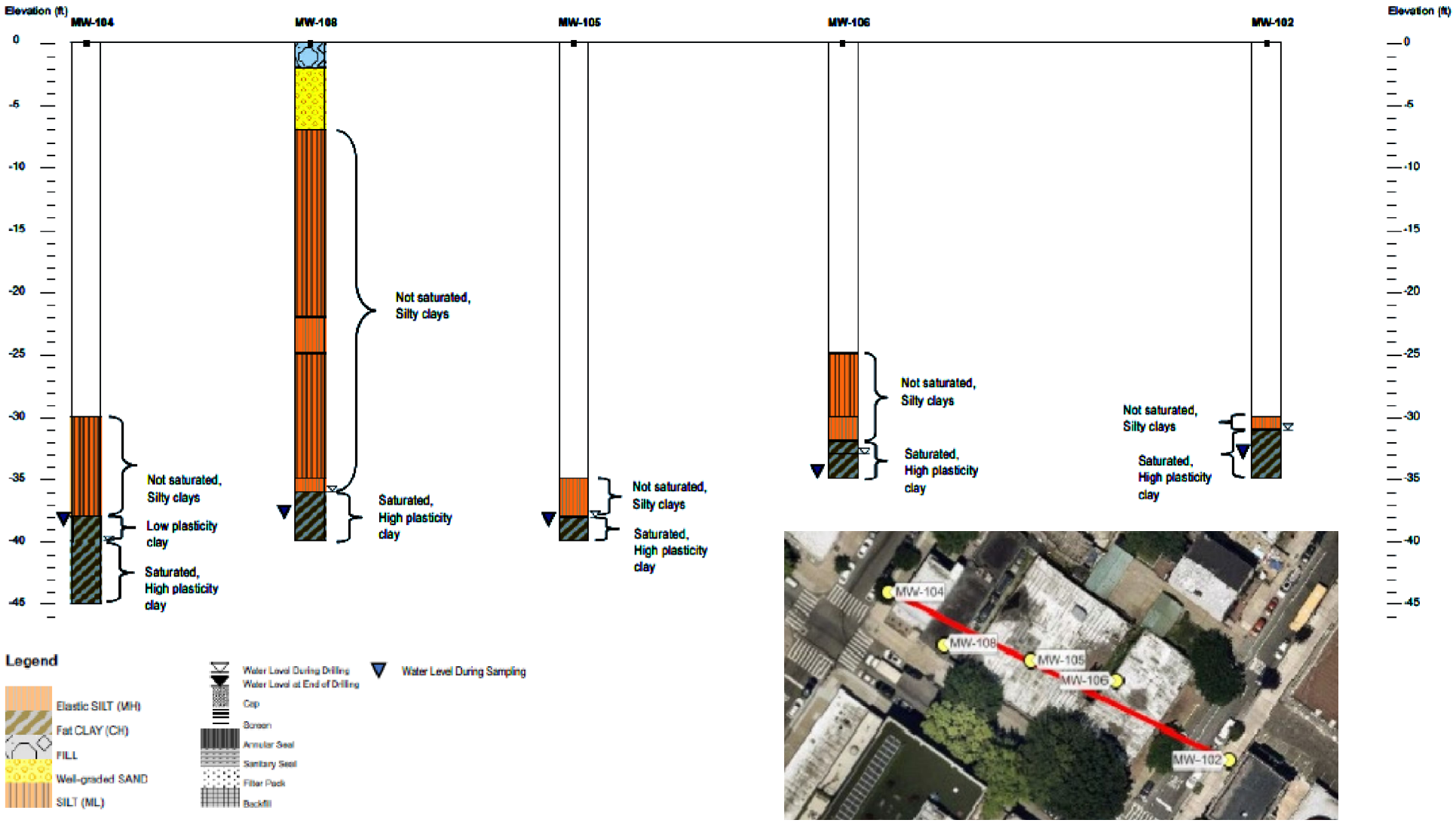
Liberty Environmental, Inc.

600 Third Avenue, Second Floor
New York, NY 10016
Phone: 212-255-0374
www.libertyenviro.com

Figure 2 - Site Layout Map

27-09 40th Avenue
Borough of Queens, City of New York, New York

PROJECT NO.: 220192	REV: 0	PREPARED BY: HJM
DATE: DECEMBER 5, 2025	SCALE: 1" = 40'	APPROVED BY: JPC



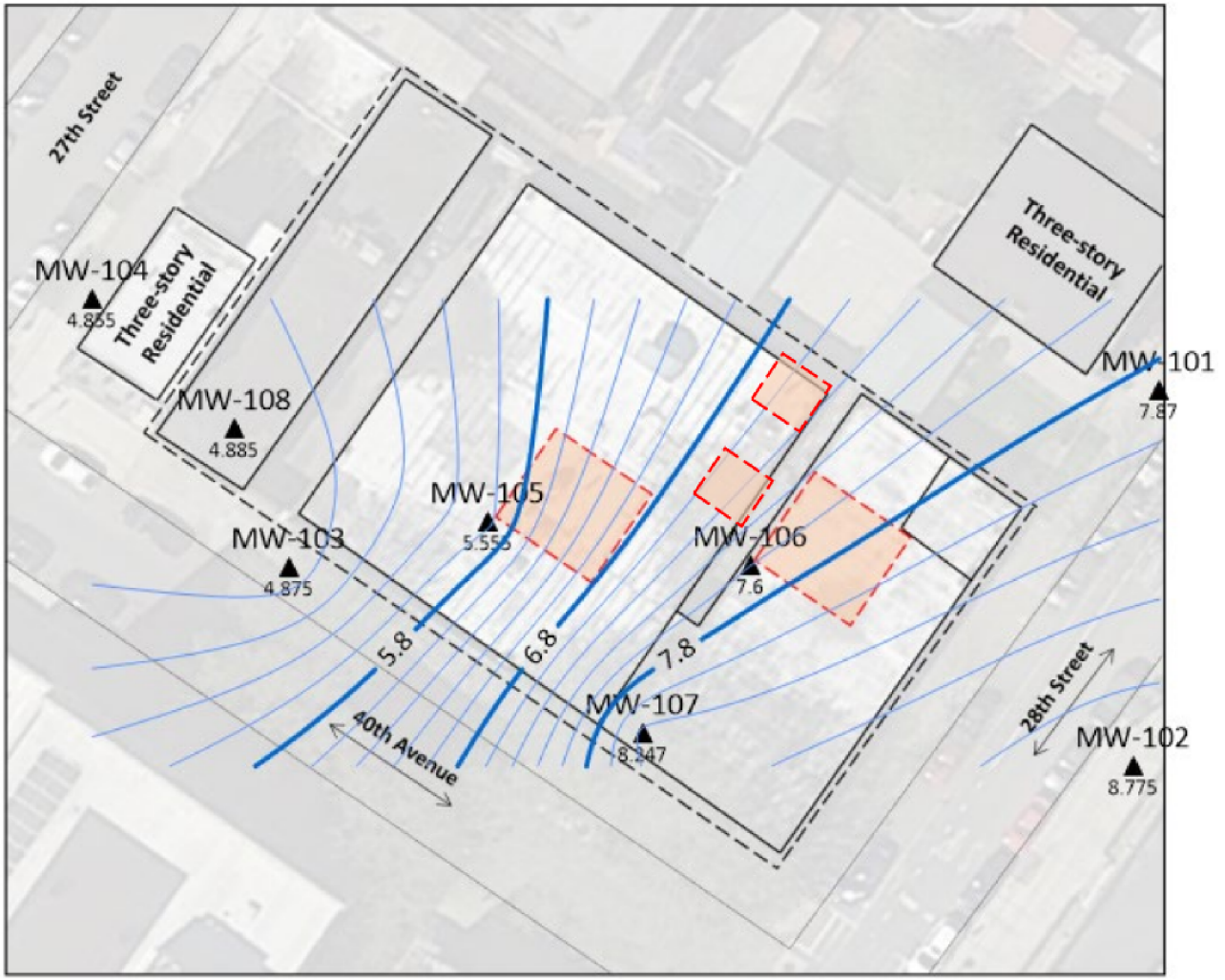
NOTE: THIS DRAWING INTENDED FOR ILLUSTRATIVE PURPOSES ONLY, AS PART OF A SITE CHARACTERIZATION.
NOT TO BE USED AS A BASIS FOR ENGINEERING OR DESIGN
IMAGE SOURCE: LAUREL ENVIRONMENTAL, FIGURE 8 - GEOLOGIC CROSS SECTION. SUBMITTED WITH REMEDIAL ACTION WORK PLAN DATED JANUARY 2021.

Figure 3 - Geologic Cross Section

27-09 40th Avenue
Borough of Queens, City of New York, New York

Liberty Environmental, Inc.
600 Third Avenue, Second Floor
New York, NY 10016
Phone: 212-255-0374
www.libertyenviro.com

PROJECT NO.: 220192	REV: 4	PREPARED BY: JRY
DATE: DECEMBER 11, 2023	NOT TO SCALE	APPROVED BY: JPC



Available USGS maps indicate that the Site is located close to a groundwater divide. The available information and the complexity of the geology indicates that the true nature of groundwater flow surrounding the Site is subject to significant uncertainty.

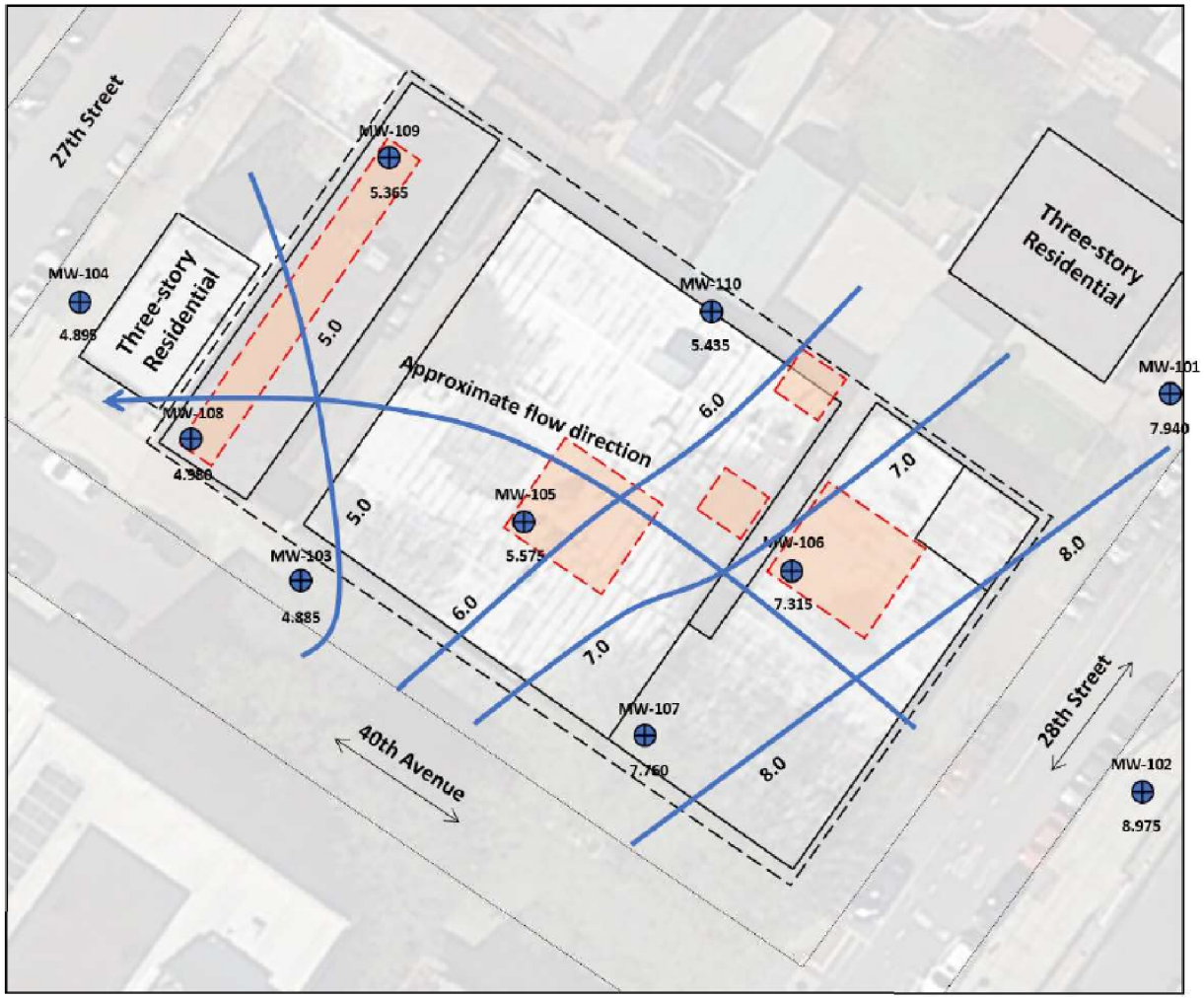
NOTE: THIS DRAWING INTENDED FOR ILLUSTRATIVE PURPOSES ONLY, AS PART OF A SITE CHARACTERIZATION.
NOT TO BE USED AS A BASIS FOR ENGINEERING OR DESIGN
IMAGE SOURCE: LAUREL ENVIRONMENTAL, FIGURE 12 - GROUNDWATER ELEVATION CONTOUR MAP - JULY 18, 2023. SUBMITTED WITH REMEDIAL ACTION WORK PLAN DATED JANUARY 2021.

Figure 4a - Groundwater Contour Map (July 18, 2020)

27-09 40th Avenue
Borough of Queens, City of New York, New York

Liberty Environmental, Inc.
600 Third Avenue, Second Floor
New York, NY 10016
Phone: 212-255-0374
www.libertyenviro.com

PROJECT NO.: 220192	REV: 0	PREPARED BY: JRY
DATE: DECEMBER 11, 2023	NOT TO SCALE	APPROVED BY: JPC



KEY
All units are in feet
Monitoring well location
Groundwater Elevation Contour
Area of Concern
Site boundary

Available USGS maps indicate that the Site is located close to a groundwater divide. The available information and the complexity of the geology indicates that the true nature of groundwater flow surrounding the Site is subject to significant uncertainty.

NOTE: THIS DRAWING INTENDED FOR ILLUSTRATIVE PURPOSES ONLY, AS PART OF A SITE CHARACTERIZATION.
NOT TO BE USED AS A BASIS FOR ENGINEERING OR DESIGN
IMAGE SOURCE: LAUREL ENVIRONMENTAL, FIGURE 12 - GROUNDWATER ELEVATION CONTOUR MAP - NOVEMBER 4, 2020. SUBMITTED WITH REMEDIAL ACTION WORK PLAN DATED JANUARY 2021.

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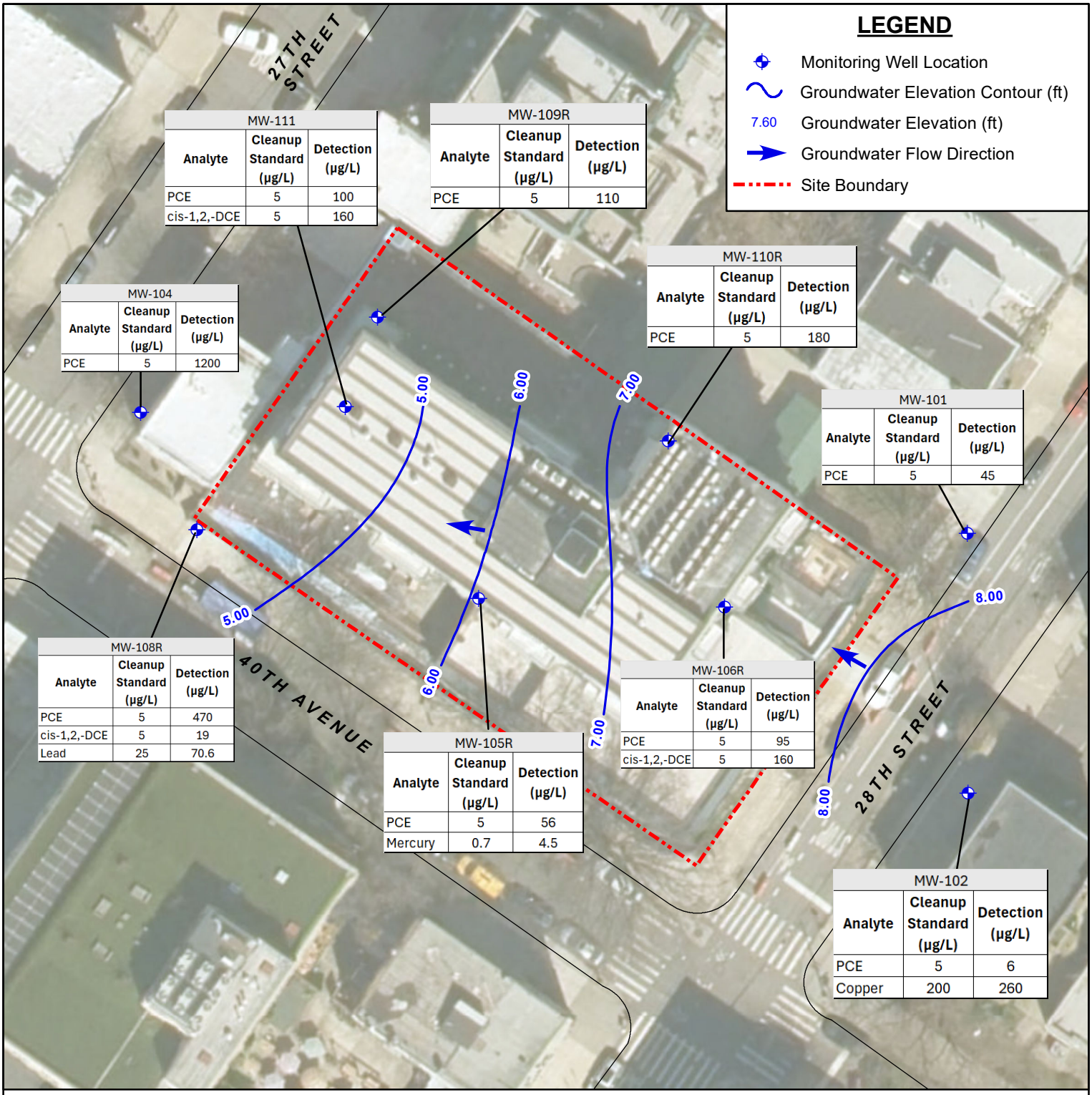
Phone: 212-255-0374
www.libertyenviro.com

Figure 4b - Groundwater Contour Map (November 4, 2020)

27-09 40th Avenue
Borough of Queens, City of New York, New York

PROJECT NO.: 220192	REV: 0	PREPARED BY: JRY
DATE: DECEMBER 11, 2023	NOT TO SCALE	APPROVED BY: JPC



NOTE: THIS DRAWING INTENDED FOR ILLUSTRATIVE PURPOSES ONLY, AS PART OF A SITE CHARACTERIZATION. NOT TO BE USED AS A BASIS FOR ENGINEERING OR DESIGN
IMAGE SOURCE: ESRI [MICROSOFT], MAXAR AND EARTHSTAR GEOGRAPHICS, DIGITAL GLOBEH. PHOTO DATE: MARCH 16, 2022.

SCALE: 1 " = 40 '
0 20 40 80'

N

Figure 5 - Remaining Groundwater Sample Exceedances

27-09 40th Avenue
Borough of Queens, City of New York, New York

Liberty Environmental, Inc.
600 Third Avenue, Second Floor
New York, NY 10016
Phone: 212-255-0374
www.libertyenviro.com

PROJECT NO.: 220192	REV: 1	PREPARED BY: HJM
DATE: DECEMBER 5, 2025	SCALE: 1" = 40'	APPROVED BY: JC

Sample ID	Date	Results and Screening Values in µg/m^3			
		PCE	TCE	cis-1,2-DCE	VC
Soil Gas Sample Results					
SV1	8/12/24	5.2	4.1	<0.27	<0.35
SV2	8/12/24	23	0.77	<0.18	<0.23
SV3	8/12/24	8.3	29	<0.20	<0.26
Indoor Air Sample Results					
SV1-A	8/12/24	6.2	0.18	<0.11	<0.14
SV2-A[1]	8/12/24	na	na	na	na
SV3-A	8/12/24	7.0	0.47	<0.11	<0.14

NOTE: THIS DRAWING INTENDED FOR ILLUSTRATIVE PURPOSES ONLY, AS PART OF A SITE CHARACTERIZATION. NOT TO BE USED AS A BASIS FOR ENGINEERING OR DESIGN
IMAGE SOURCE: ESRI [MICROSOFT], MAXAR AND EARTHSTAR GEOGRAPHICS, DIGITAL GLOBEH. PHOTO DATE: MARCH 16, 2022.

SCALE: 1 " = 40 '
0 20 40 80'

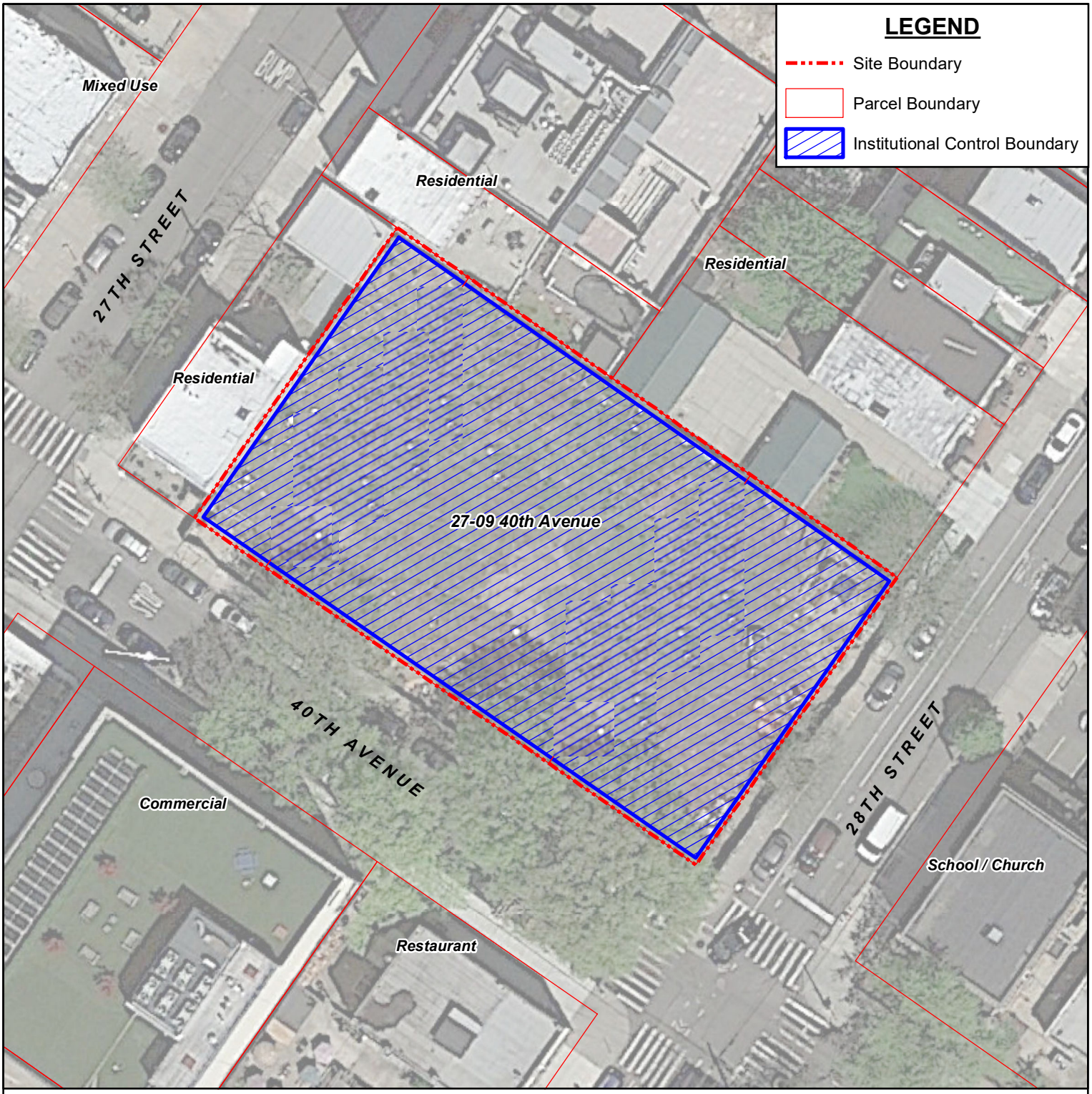
N

Figure 6 - Remaining Soil Vapor Sample Exceedances

27-09 40th Avenue
Borough of Queens, City of New York, New York

Liberty Environmental, Inc.
600 Third Avenue, Second Floor
New York, NY 10016
Phone: 212-255-0374
www.libertyenviro.com

PROJECT NO.: 220192	REV: 0	PREPARED BY: HJM
DATE: DECEMBER 8, 2025	SCALE: 1" = 40'	APPROVED BY: JC



NOTE: THIS DRAWING INTENDED FOR ILLUSTRATIVE PURPOSES ONLY, AS PART OF A SITE CHARACTERIZATION.
NOT TO BE USED AS A BASIS FOR ENGINEERING OR DESIGN
IMAGE SOURCE: GOOGLE EARTH. PHOTO DATE: APRIL 2022.

SCALE: 1 " = 40 '
0 20 40 80'

N

Figure 7 - Institutional Control Boundaries

27-09 40th Avenue
Borough of Queens, City of New York, New York

Liberty Environmental, Inc.
600 Third Avenue, Second Floor
New York, NY 10016
Phone: 212-255-0374
www.libertyenviro.com

PROJECT NO.: 220192	REV: 1	PREPARED BY: JRY
DATE: DECEMBER 11, 2023	SCALE: 1" = 40'	APPROVED BY: JPC

NOTE: THIS DRAWING INTENDED FOR ILLUSTRATIVE PURPOSES ONLY, AS PART OF A SITE CHARACTERIZATION.
NOT TO BE USED AS A BASIS FOR ENGINEERING OR DESIGN
IMAGE SOURCE: GOOGLE EARTH. PHOTO DATE: APRIL 2022.

SCALE: 1 " = 40 '
0 20 40 80'

N

Liberty Environmental, Inc.

600 Third Avenue, Second Floor
New York, NY 10016
Phone: 212-255-0374
www.libertyenviro.com

Figure 8 - Engineering Controls Location

27-09 40th Avenue
Borough of Queens, City of New York, New York

PROJECT NO.: 220192	REV: 1	PREPARED BY: JRY
DATE: DECEMBER 11, 2023	SCALE: 1" = 40'	APPROVED BY: JPC

TABLES

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Groundwater Exceedance Data Summary 2
Remaining Soil Vapor Sample Exceedances.....3
Remedial System Monitoring Requirements and Schedule* 4
Remedial System Sampling Requirements and Schedule* 5
Post-Remediation Sampling Requirements and Schedule*.....6
Monitoring Well Construction Details*.....7
Schedule of Interim Monitoring/Inspection Reports* 8

**Indicates tables found within the main text.*

TABLE 2
Groundwater Exceedance Data Summary
27-09 40th Ave, Long Island City, Pennsylvania
Liberty Project No. 220192

Monitoring Well	Date	Target VOCs		Target Metals (Total)		
		Results and Standards in micrograms per liter (µg/L)				
		Tetrachloroethylene (PCE) *127-18-4*	cis-1,2-Dichloroethylene *156-59-2*	Lead	Mercury	Copper
NYSDEC SCGs - TOGS Class GA		5	5	25	0.7	200
MW-101	9/18/2025	**45**	<0.48	**1.9**	<0.091	**3.0 J**
MW-102	2/17/2025	**6.0**	**1.6**	**18.1**	<0.091	**260**
MW-103	12/1/2022	**30**	**1.2**	*NA*	*NA*	*NA*
MW-104	5/10/2024	**1,200**	<0.20	**6**	<0.2	<22
MW-105R	5/9/2024	**56**	**0.48 J**	**13**	**4.5**	**88**
MW-106R	9/18/2025	**95**	**160**	**4.5**	<0.091	**22.7**
MW-108R	5/15/2025	**470**	**19**	**70.6**	**1.1**	**225**
MW-109R	5/9/2024	**110**	<1.0	<6	<0.2	<22
MW-110R	9/18/2025	**180**	<0.48	**11.9**	**0.15 J**	**50.2**
MW-111	9/18/2025	**100**	**160**	**1.2**	<0.091	**6.9**

Values in bold and yellow shading exceed the applicable NYSDEC standard or guidance value
"J" values indicate a concentration above the method detection limit but below the laboratory reporting limit. This is an estimated value.
Values preceeded by "<" are less than the laboratory reporting limit.

Table 3a - Remaining Soil Vapor Sample Exceedances
Analytes Detected in AOC 6 (Off-Site Soil Vapor)

Sample ID	**SV-101**		**SV-102**		**SV-103**		**SV-104**	
Sampling Date	**7/23/2020**		**7/23/2020**		**7/15/2020**		**7/15/2020**	
Client Matrix	**Soil Vapor**		**Soil Vapor**		**Soil Vapor**		**Soil Vapor**	
Compound	Result	Q	Result	Q	Result	Q	Result	Q
VOCs, TO-15	µg/m^3		µg/m^3		µg/m^3		µg/m^3	
Dilution Factor	7.445		6.208		17.34		34.5	
1,2,4-Trimethylbenzene	53	D	7.600	D	27	D	25	D
1,3,5-Trimethylbenzene	25	D	3.100	J	10	D	9.300	D
2-Butanone	39	D	50	D	140	D	150	D
2-Hexanone	6.100	J	5.100	J	14	U	14	U
4-Methyl-2-pentanone	6.100	D	2.500	U	7.100	UJ	7.100	UJ
Acetone	370	D	660	D	1,300	DJ	2,000	DJ
Benzene	13	D	17	D	33	D	31	D
Carbon disulfide	18	D	7.500	D	5.400	U	5.400	U
Chloroform	92	D	3	D	16	D	8.400	U
Chloromethane	1.500	J	1.300	U	3.600	U	3.600	U
Cyclohexane	23	D	13	D	20	D	11	D
Ethyl acetate	29	D	33	D	12	U	12	U
Ethyl Benzene	11	D	7.800	D	32	D	33	D
Isopropanol	170	D	110	D	8.500	UJ	8.500	UJ
Methyl Methacrylate	3	U	2.500	J	7.100	U	7.100	U
Methylene chloride	6.700	D	9.500	D	12	U	12	U
n-Heptane	54	D	24	D	43	D	34	D
n-Hexane	51	D	40	D	72	D	38	D
o-Xylene	36	D	8.600	D	41	D	41	D
p- & m- Xylenes	99	D	25	D	120	D	120	D
p-Ethyltoluene	60	D	7.600	D	26	D	23	D
Propylene	17	D	1.100	U	55	D	24	D
Styrene	3.200	J	2.600	U	7.400	U	7.300	U
Tetrachloroethylene	250	D	340	D	920	D	180	D
Tetrahydrofuran	10	D	16	D	240	D	260	D
Toluene	70	D	49	D	140	D	150	D
Trichloroethylene	4.400	D	5	D	29	D	2.300	U
Trichlorofluoromethane (Freon 11)	4.200	D	5.600	D	9.700	U	9.700	U

Note:
µg/m^3=micrograms per cubic meter

Q is the qualifier column, where:
D=results is from an analysis that required a dilution
J=analyte detected at or above the method detection limit but below the reporting limit – data is estimated
U=analyte not detected at or above the level indicated

Table 3a - Remaining Soil Vapor Sample Exceedances
Analytes Detected in AOC 6 (On-Site Soil Vapor) [continued]

Sample ID	**SV-105**		**SV-106**		**SV-107**		**SV-108**	
Sampling Date	**7/15/2020**		**7/15/2020**		**7/15/2020**		**7/15/2020**	
Client Matrix	**Soil Vapor**		**Soil Vapor**		**Soil Vapor**		**Soil Vapor**	
Compound	Result	Q	Result	Q	Result	Q	Result	Q
VOCs, TO-15	µg/m^3		µg/m^3		µg/m^3		µg/m^3	
Dilution Factor	244.1		518.2		1496.6		514.2	
1,1-Dichloroethylene	1.700	U	2.200	D	2.500	D	1.800	U
1,2,4-Trimethylbenzene	34	D	31	D	24	D	34	D
1,3,5-Trimethylbenzene	9.200	D	9.800	D	7.700	J	8.800	D
1,3-Butadiene	11	U	12	J	10	U	12	U
2-Butanone	680	D	760	D	410	D	760	D
2-Hexanone	96	D	82	D	100	D	110	D
Acetone	15,000	DJ	17,000	DJ	18,000	DJ	11,000	DJ
Benzene	20	D	21	D	7	D	14	D
Carbon disulfide	6.900	D	18	D	5.400	D	17	D
Chloroform	35	D	41	D	53	D	60	D
Chloromethane	3.500	J	3.700	U	3.200	U	3.700	U
cis-1,2-Dichloroethylene	4.700	D	11	D	22	D	14	D
Cyclohexane	16	D	14	D	5.900	D	9.900	D
Ethyl Benzene	31	D	31	D	18	D	30	D
Isopropanol	280	DJ	210	DJ	57	DJ	78	DJ
Methylene chloride	12	J	13	U	11	U	12	U
n-Heptane	77	D	70	D	31	D	66	D
n-Hexane	54	D	45	D	17	D	30	D
o-Xylene	43	D	42	D	23	D	42	D
p- & m- Xylenes	110	D	120	D	64	D	110	D
p-Ethyltoluene	33	D	31	D	21	D	33	D
Propylene	240	D	240	D	150	D	200	D
Tetrachloroethylene	70,000	D	94,000	D	270,000	D	81,000	D
Tetrahydrofuran	69	D	81	D	30	D	88	D
Toluene	100	D	95	D	54	D	85	D
trans-1,2-Dichloroethylene	6.800	U	7.200	U	8.100	D	7.100	U
Trichloroethylene	520	D	410	D	1,200	D	280	D
Trichlorofluoromethane (Freon 11)	22	D	31	D	31	D	29	D

Note:
µg/m^3=micrograms per cubic meter
Q is the qualifier column, where:

Q is the qualifier column, where:
D=results is from an analysis that required a dilution
J=analyte detected at or above the method detection limit but below the reporting limit – data is estimated

U=analyte not detected at or above the level indicated

TABLE 3b - Remaining Soi Vapor Sample Exceedances
Subslab and Indoor Air Sample Results

27-09 40th Ave, Long Island City, NY
Liberty Project No. 220192.04

Sample ID	Date	Results and Screening Values in µg/m^3			
		PCE	TCE	cis-1,2-DCE	VC
Soil Gas Sample Results					
SV1	8/12/24	5.2	4.1	<0.27	<0.35
SV2	8/12/24	23	0.77	<0.18	<0.23
SV3	8/12/24	8.3	29	<0.20	<0.26
Ambient Air Sample Results					
AA1	8/12/24	0.96	0.18	<0.083	<0.11
Indoor Air Sample Results					
SV1-A	8/12/24	6.2	0.18	<0.11	<0.14
SV2-A[1]	8/12/24	na	na	na	na
SV3-A	8/12/24	7.0	0.47	<0.11	<0.14
SVI Influent Air Sample Results					
SVE-1	8/15/24	420	3.5	0.80	<0.17

Notes:

[1] Sample SV2-A was not analyzed (na) as The integrity of the sample was compromised during the transportation of the sample from the site to the laboratory as a canister valve was found to be opened upon receipt at the laboratory.

PCE = Tetrachloroethylene
TCE = Trichloroethylene
cis-1,2-DCE = cis-1,2-Dichloroethylene
VC = Vinyl Chloride

APPENDICES

APPENDIX A – LIST OF SITE CONTACTS

Name	Phone/Email Address
Remediator - Tony Raouf	917-907-4037; tonyraouf@gmail.com
Remediator - Gus Vorillas	917-538-2656; gus@firsteliteny.com
QEP/P.E. – James P. Cinelli	800-305-6019; jcinelli@libertyenviro.com
NYSDEC Project Manager – Sydney Sobol	518-402-4799 sydney.sobol@dec.ny.gov
NYSDEC Regional HW Engineer – Jane O'Connell	(718)482-4599; jane.oconnell@dec.ny.gov
NYSDEC Site Control	(518)_402-9569; dersitecontrol@dec.ny.gov
Attorney - Ted Firetog, Esq.	516-845-8087; tfiretog@eniinternet.com
NYSDOH PM - Johnathon Robinson	Johnathan.Robinson@health.ny.gov

APPENDIX B – EXCAVATION WORK PLAN (EWP)

1 NOTIFICATION

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

Table 1: Notifications*

NYSDEC Project Manager – Sydney Sobol	(518)402-4799; sydney.sobol@dec.ny.gov
NYSDEC Regional HW Engineer – Jane O'Connell	(718)482-4599; jane.oconnell@dec.ny.gov
NYSDEC Site Control	(518)_402-9569; dersitecontrol@dec.ny.gov

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

This notification will include:

- A detailed description of the work to be performed, including the location and areal extent of excavation, plans/drawings for site re-grading, intrusive elements or utilities to be installed below the soil cover, estimated volumes of contaminated soil to be excavated, any modifications to truck routes, 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; and submittals (e.g., reports) to the NYSDEC documenting the completed intrusive work.
- A summary of the applicable components of this EWP;

- A statement that the work will be performed in compliance with this EWP, 29 CFR 1926 Subpart P, 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 H of this SMP;

- Identification of disposal facilities for potential waste streams; and

Identification of sources of any anticipated backfill, along with the required request to import form and all supporting documentation including, but not limited to 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 EWP. The alteration, restoration and modification of engineering controls must conform with Article 145 Section 7209 of the Education Law regarding the application professional seals and alterations.

2 SOIL SCREENING METHODS

Visual, olfactory and PID soil screening and assessment will be performed during remedial and development excavations into known or potentially contaminated material or a breach of the cover system. A qualified environmental professional 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 will perform the screening. Soil screening will be performed regardless of when the invasive work is done and will include excavation and invasive work performed during the remedy and during development phase, such as excavations for foundations and utility work, prior to issuance of the COC.

Primary contaminant sources (including, but not limited, to hotspots) identified during Site Characterization, Remedial Investigation, and Remedial Action will be surveyed by a surveyor licensed to practice in the State of New York. This information will be provided on maps in the Final Engineering Report.

Screening will be performed by qualified environmental professionals. Resumes of key personnel are provided in Appendix X provided for personnel responsible for field screening of invasive work for unknown contaminant sources during remediation and development work.

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

Soils will be segregated based on previous environmental data and screening results into material that requires off-site disposal and material that requires testing to determine if the material can be reused on-site as soil beneath a cover or if the material can be used as cover soil. Further discussion of off-site disposal of materials and on-site reuse is provided in Sections 5, 6 and 7 of this Appendix.

3 SOIL STAGING METHODS

Soil excavated from hotspots may be stockpiled prior to disposal. Stockpiles will be inspected at a minimum once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by NYSDEC.

Stockpiles will be placed on top of a tarp and be kept covered with appropriately anchored tarps. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced.

Soil stockpiles will be continuously encircled with silt fences. Hay bales will be used as needed near catch basins, surface waters and other discharge points.

Water must be available on site at suitable supply and pressure for use in dust control, such as a dedicated water truck equipped with a water cannon.

Soil stockpiles will be continuously encircled with a berm and/or silt fence. Hay bales will be used as needed near catch basins, surface waters and other discharge points.

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

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

4 MATERIALS EXCAVATION AND LOAD-OUT

The Remedial Engineer or a qualified environmental professional under his/her supervision will oversee invasive work and the excavation and load-out of excavated material.

The Volunteer and its contractors are solely responsible for safe execution of invasive and other work performed under this Plan.

The presence of utilities and easements on the Site has been investigated by the Remedial Engineer Team. It has been determined that no risk or impediment to the planned work under this Remedial Action Work Plan is posed by utilities or easements on the Site.

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

A truck wash will be operated on-Site. The Remedial Engineer will be responsible for ensuring that outbound trucks wheels will be washed at the truck wash before leaving the Site until the remedial construction is complete.

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

The Remedial Engineer Team will be responsible for ensuring that egress points for truck and equipment transport from the Site will be clean of dirt and other materials derived from the Site during Site remediation and development. Cleaning of the adjacent

streets will be performed as needed to maintain a clean condition with respect to Site-derived materials.

The Volunteer and associated parties preparing the remedial documents submitted to the State, and parties performing this work, are completely responsible for the safe performance of invasive work, the structural integrity of excavations, and for structures that may be affected by excavations (such as building foundations and bridge footings).

The Remedial Engineer Team will ensure that Site development activities will not interfere with, or otherwise impair or compromise, remedial activities proposed in this Remedial Action Work Plan.

Each hotspot and structure to be remediated (USTs, vaults and associated piping, transformers, etc.) will be removed and end-point remedial performance sampling completed before excavations related to Site development commence proximal to the hotspot or structure.

Development-related grading cuts and fills will not interfere with, or otherwise impair or compromise, the performance of remediation required by this plan. Fills will not be performed with NYSDEC approval of fill material.

Mechanical processing of historical fill and contaminated soil on-Site is prohibited.

Primary contaminant sources (including, but not limited to, hotspots) identified during the Remedial Action will be surveyed by a surveyor licensed to practice in the State of New York. The survey information will be shown on maps to be reported in the Final Engineering Report.

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

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

The presence of utilities and easements on the site will be investigated by the qualified environmental professional. It will be determined whether a risk or impediment to the planned work under this SMP is posed by utilities or easements on the site. A site utility stakeout will be completed for all utilities prior to any ground intrusive activities at the site.

Loaded vehicles leaving the site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State, local, and NYSDOT requirements (and all other applicable transportation requirements). Trucks transporting contaminated soil must have either tight-fitting opaque covers that are secured on the sides and/or back, or opaque covers that are locked on all sides.

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

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

The qualified environmental professional will be responsible for ensuring that all egress points for truck and equipment transport from the site are clean of dirt and other materials derived from the site during intrusive excavation activities. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to site-derived materials. Material accumulated from the street cleaning and egress cleaning activities will be disposed off-site at a permitted landfill facility in accordance with all applicable local, State, and Federal regulations.

5 MATERIALS TRANSPORT OFF-SITE

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

Proposed in-bound and out-bound truck routes to the Site are shown in Figure B-1. All trucks loaded with Site materials will exit the vicinity of the Site using only these approved truck routes. This is the most appropriate route and considers: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting off- Site queuing of trucks entering the facility; (d) limiting total distance to major highway(e) promoting safety in access to highways; and (f) overall safety in transport.

Trucks loaded with Site materials will exit the vicinity of the Site using only these approved truck routes. Truck operators are responsible for obeying traffic signs and detours.

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

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

Queuing of trucks will be performed adjacent to the Site.

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

Trucks will be washed prior to leaving the Site. Truck wash waters will be collected and disposed of off-Site in an appropriate manner.

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

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

Truck transport routes are shown on Figure B-1. All trucks loaded with site materials will exit the vicinity of the site using only these approved truck routes. This is the most appropriate route and takes into account: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting off-site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport.

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

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

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

6 MATERIALS DISPOSAL OFF-SITE

No soil excavation is anticipated at the site, as it is fully-developed. Soil disposal locations will be determined if any future excavation is planned. Non-hazardous PCE contaminated soil to ACUA, Atlantic City (with “contained in” determination)

Soil/fill/solid waste excavated and removed from the Site will be treated as contaminated and regulated material and will be disposed off-site in a permitted facility in accordance with local, State (including 6NYCRR Part 360) and Federal regulations. If disposal of soil/fill from this Site is proposed for unregulated disposal (i.e. clean soil removed for development purposes), a formal request with an associated plan will be made

to NYSDEC's Project Manager. Unregulated off-Site management of materials from this Site is prohibited without formal NYSDEC project manager approval.

Material that does not meet Track 1 UUSCOs is prohibited from being taken to a New York State recycling facility (6NYCRR Part 360-15 Registration Facility).The following documentation will be obtained and reported by the Remedial Engineer for each disposal location used in this project to demonstrate that the disposal of material derived from the Site conforms with all applicable laws: (1) a letter from the Remedial Engineer or BCP Volunteer to the receiving facility describing the material to be disposed and requesting formal written acceptance of the material. This letter will state that material to be disposed is contaminated material generated at an environmental remediation Site in New York State, and provide the Site ID number and the name and phone number of the Remedial Engineer. The letter will include as an attachment a summary of all chemical data for the material being transported (including Site Characterization data); and (2) a letter from all receiving facilities stating it is in receipt of the correspondence (above) and is approved to accept the material. These documents will be included in the FER.

Non-hazardous contaminated soils, including contaminated historic fill, taken off-Site will be handled consistent with 6 NYCRR Parts 360, 361, 362, 363, 364 and 365.

Historic fill and contaminated soils from the Site are prohibited from being disposed at Part 360-15 Registration Facilities (also known as Soil Recycling Facilities).

Soils that are contaminated but non-hazardous and are being removed from the Site are considered by the Division of Materials Management s (DMM in NYSDEC to be Construction and Demolition (C/D) materials with contamination not typical of virgin soils. These soils may be sent to a permitted Part 360 landfill. They may be sent to a permitted C/D processing facility without permit modifications only upon prior notification of NYSDEC Region 2 DSHM. This material is prohibited from being sent or redirected to a Part 360-16 Registration Facility. In this case, as dictated by DSHM, special procedures will include, at a

minimum, a letter to the C/D facility that provides a detailed explanation that the material is derived from a DER remediation Site, that the soil material is contaminated and that it must not be redirected to on- Site or off-Site Soil Recycling Facilities. The letter will provide the project identity and the name and phone number of the Remedial Engineer. The letter will include as an attachment a summary of chemical data for the material being transported.

Pursuant to discussions with, Division of Materials Management, prior to the start of excavation, additional sampling and characteristic analysis of soil will be performed to confirm the extent of material that will require disposal as hazardous and / or non-hazardous in accordance with a Non-Hazardous Waste Contained-In Determination.

The Final Engineering Report will include an accounting of the destination of material removed from the Site during this Remedial Action, including excavated soil, contaminated soil, including contaminated historic fill, solid waste, and hazardous waste, non-regulated material, and fluids. Documentation associated with disposal of material must also include records and approvals for receipt of the material. This information will also be presented in a tabular form in the FER.

Bill of Lading system or equivalent will be used for off-Site movement of non-hazardous wastes and contaminated soils. This information will be reported in the FER.

Hazardous wastes derived from on-Site will be stored, transported, and disposed of in full compliance with applicable local, State, and Federal regulations. Manifests will be provided in the FER.

Appropriately licensed haulers will be used for material removed from this Site and will be in full compliance with applicable local, State and Federal regulations.

Waste characterization will be performed for off-Site disposal in a manner suitable to the receiving facility and in conformance with applicable permits. Sampling and analytical methods, sampling frequency, analytical results and

QA/QC will be reported in the FER. Data available for soil/material to be disposed at a given facility must be submitted to the disposal facility with suitable explanation prior to shipment and receipt.

If using the services of a soil broker, the soil broker is required to hold a Business Integrity Commission (BIC) license. The BIC license number shall be provided in the FER.

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

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

Non-hazardous historic fill and contaminated soils taken off-site will be handled consistent with 6 NYCRR Parts 360, 361, 362, 363, 364 and 365. Material that does not meet Unrestricted SCOs is prohibited from being taken to a New York State C&D debris recovery facility (6NYCRR Subpart 360-15 registered or permitted facility).

7 MATERIALS REUSE ON-SITE

Chemical criteria for on-site reuse of material have been established by NYSDEC. Materials planned for reuse (if any) will be segregated and stockpiled from materials slated

for off-site disposal. Stockpiles will be placed on and covered with polyethylene sheeting. The stockpiled material will be sampled and analyzed in accordance with Table 5.4(e)10 on page 161 of DER-10 Technical Guidance for Investigation and Remediation. The analytical results will be submitted to NYSDEC via a *Request to Import/Reuse Soil or Fill* form for review and approval prior to placement on-site. All of the materials to be reused on the Site will comply with UUSCOs. Clean soil stockpiles for reuse will be stored on the western position of the site. Approximately 60 cy of soil is expected to be re-used to backfill the AOC 2 excavation. Approximately 20 cy of soil may be re-used to backfill at foundation footing excavations. Soil stockpile for re-use may range in size up to approximately 80 cy.

The qualified environmental professional as defined in 6 NYCRR Part 375, will ensure that procedures defined for materials reuse in this SMP are followed and that unacceptable material (i.e. contaminated) does not remain on-site. Contaminated on-site material, including historic fill and contaminated soil, that is acceptable for reuse on-site will be placed below the demarcation layer or impervious surface, and will not be reused within the cover system or , within landscaping berms. Contaminated on-site material may only be used beneath the site cover, as backfill for subsurface utility lines with prior approval from the DEC project manager

Proposed materials for reuse on-site must be sampled for full suite analytical parameters including per- and polyfluoroalkyl substances (PFAS) and 1,4-dioxane. The sampling frequency will be in accordance with DER-10 Table 5.4(e)10 unless prior approval is obtained from the NYSDEC project manager for modification of the sampling frequency. The analytical results of soil/fill material testing must meet the site use criteria presented in NYSDEC DER-10 Appendix 5 — Allowable Constituent Levels for Imported Fill or Soil for all constituents listed, and the NYSDEC Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances [November 2022 or date of current version, whichever is later] guidance values. Approvals for modifications to the analytical parameters must be obtained from the NYSDEC project manager prior to the sampling event.

. Soil/fill material for reuse on-site will be segregated and staged as described in Sections X-2 and X-3 of this EWP. The anticipated size and location of stockpiles will be provided in the 15-day notification to the NYSDEC project manager. Stockpile locations will be based on the location of site excavation activities and proximity to nearby site features. Material reuse on-site will comply with requirements of NYSDEC DER-10 Section 5.4(e)4. Any modifications to the requirements of DER-10 Section 5.4(e)4 must be approved by the NYSDEC project manager.

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

8 FLUIDS MANAGEMENT

Liquids to be removed from the Site, including dewatering fluids, will be handled, transported, and disposed in accordance with applicable local, State, and Federal regulations. Liquids discharged into the New York City sewer system will be addressed through approval by NYCDEP, to be obtained by the contractor.

Dewatered fluids will not be recharged back to the land surface or subsurface of the Site. Dewatering fluids will be managed off-Site.

Discharge of water generated during remedial construction to surface waters (i.e. a local pond, stream or river) is prohibited without a SPDES permit.

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

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

9 COVER SYSTEM RESTORATION

After the completion of soil removal and any other invasive activities the cover system will be restored in a manner that complies with the Final Engineering Report. The existing cover system is comprised of a minimum of 12 inches of clean soil, asphalt pavement, or concrete covered sidewalks and concrete building. If the type of cover system changes from that which exists prior to the excavation (i.e., a soil cover is replaced by asphalt) this will constitute a modification of the cover element of the remedy and the upper surface of the remaining contamination. A figure showing the modified surface will be included in the subsequent Periodic Review Report and in an updated SMP. The alteration, restoration and modification of engineering controls must conform with Article 145 Section 7209 of the Education Law regarding the application professional seals and alterations.

10 BACKFILL FROM OFF-SITE SOURCES

Structural fill will be needed beneath the foundation and parking garages and will require importation from off-Site. If sampling of material imported to the Site is required, sampling will be conducted in accordance with DER-10 Section 5.4. The NYSDEC will be consulted prior to importation of fill material. In accordance with DER-10, documentation of the source of off-Site fill being brought to the Site must be provided to DER for approval at least one week prior to its arrival and use on site.

If sampling of material imported to the Site is required, sampling will be conducted in accordance with DER-10 Section 5.4. The NYSDEC will be consulted prior to importation of fill material. In accordance with DER-10, documentation of the source of off-Site fill being brought to the Site must be provided to DER for approval at least one week prior to its arrival and use on site. Material from industrial sites, spill sites, other environmental remediation sites or other potentially contaminated sites will not be imported to the Site.

The Final Engineering Report will include the following certification by the Remedial Engineer: "I certify that import of soils from off-Site, including source evaluation, approval and sampling, has been performed in a manner that is consistent with the methodology defined in the Remedial Action Work Plan." A map detailing the locations of backfilled material will also be included in the Final Engineering Report.

Imported soils will meet NYSDEC approved backfill or cover soil quality objectives for this Site. These NYSDEC approved backfill or cover soil quality objectives are the lower of the protection of groundwater or the protection of public health soil cleanup objectives for restricted residential as set forth in Table 375- 6.8(b) of 6 NYCRR Part 375 and included as Appendix B. Non-compliant soils will not be imported onto the Site without prior approval by NYSDEC. Nothing in the approved Remedial Action Work Plan or its approval by NYSDEC should be construed as an approval for this purpose.

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. Nothing in this Remedial Action Work Plan should be construed as an approval for this purpose.

Solid waste will not be imported onto the Site.

Trucks entering the Site with imported soils will be securely covered with tight fitting covers.

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

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

All imported soils will meet the backfill and cover soil quality standards established in 6NYCRR 375-6.7(d) and DER-10 Appendix 5 for commercial and residential use. Based on an evaluation of the land use, protection of groundwater and protection of ecological resources criteria, will meet unrestricted use SCOs. Soils that meet general fill requirements under 6 NYCRR Part 360.13, but do not meet backfill or cover soil objectives for this site, will not be imported onto the site without prior approval by NYSDEC project manager. Soil material will be sampled for the full suite of analytical parameters, including PFAS and 1, 4-dioxane. 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.

12 EXCAVATION CONTINGENCY PLAN

If underground tanks or other previously unidentified contaminant sources are found during on-Site remedial excavation or development related construction, sampling will be performed on product, sediment, and surrounding soils, etc. Chemical analytical work will be for full scan parameters (TAL metals; TCL volatiles and semi-volatiles, TCL pesticides and PCBs). These analyses will not be limited to STARS parameters where tanks are identified without prior approval by NYSDEC. Analyses will not be otherwise limited without NYSDEC approval.

Identification of unknown or unexpected contaminated media identified by screening during invasive Site work will be promptly communicated by phone to NYSDEC's Project Manager. These findings will be also included in daily and periodic electronic media reports.

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

Sampling will be performed on product, sediment and surrounding soils, etc. as necessary to determine the nature of the material and proper disposal method. Chemical analysis will be performed for a full list of analytes (TAL metals; TCL volatiles and semi-volatiles (including 1,4-dioxane) , TCL pesticides, PCBs, PFAS), unless the site history and previous sampling results provide sufficient justification to limit the list of analytes. In this case, a reduced list of analytes will be proposed to the NYSDEC project manager for approval prior to sampling. Any tanks will be closed as per NYSDEC regulations and guidance.

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

13 COMMUNITY AIR MONITORING PLAN

The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community. Continuous monitoring will be conducted within the work area and along the upwind and downwind perimeter during intrusive activities such as excavation, product recovery, manipulation of soil piles, extraction of sheet piling, etc. Air monitoring will consist of monitoring for VOCs and dust particulates including particulate matter less than 10 micrometers in size (PM-10) during intrusive activities using a MiniRAE 2000 PID and a PDR-1000 dust monitor, respectively, calculated over a 15-minute running average. Before work begins, background concentrations will be measured.

A figure showing the location of air sampling stations based on generally prevailing wind conditions is shown in Figure B-2. These locations will be adjusted on a daily or more frequent basis based on actual wind directions to provide an upwind and at least two downwind monitoring stations. If a sensitive receptor, such as a school, day care or

residential area is adjacent to the site, a fixed monitoring station should be located at that site perimeter, regardless of wind direction, and discussed in the text.

Exceedances of action levels listed in the CAMP will be reported to NYSDEC and NYSDOH Project Managers. CAMP readings are to be provided at least on a weekly basis with all exceedances report to DEC and DOH the same day or next business day if it is after hours, along with the reason for teh exceedance, corrective measures, and if the correctice measures were efefctive.

Include the text below if ground-intrusive activities could occur within 20 feet of potentially exposed individuals or structures.

1X1-13A: 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 part-per-million, monitoring should occur within the occupied structure(s). Depending upon the nature of contamination, chemical-specific colorimetric tubes of sufficient sensitivity may be necessary for comparing the exposure point concentrations with appropriate pre-determined response levels (response actions should also be pre-determined). Background readings in the occupied spaces must be taken prior to commencement of the planned work. Any unusual background readings should be discussed with NYSDOH prior to commencement of the work.

- If total particulate concentrations opposite the walls of occupied structures or next to intake vents exceed 150 micrograms per cubic meter, work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 micrograms per cubic meter 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.

Include the text below if ground-intrusive activities could occur indoors with co-located residences or facilities.

[X]-13B: 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.

14 ODOR CONTROL PLAN

This odor control plan is capable of controlling emissions of nuisance odors off-Site. Specific odor control methods to be used on a routine basis will include wetting soils to prevent off-Site migration, application of a foam suppressant on the source area, and/or covering the source area with a tarp. If nuisance odors are identified, work will be halted and the source of odors will be identified and corrected. Work will not resume until nuisance odors have been abated. NYSDEC and NYSDOH will be notified of odor events and of other complaints about the project. Implementation of odor controls, including the halt of work, will be the responsibility of the Volunteer's Remedial Engineer, who is responsible for certifying the Final Engineering Report.

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

Where odor nuisances have developed during remedial work and cannot be corrected, or where the release of nuisance odors cannot otherwise be avoided due to on-Site conditions or close proximity to sensitive receptors, odor control will be achieved by sheltering excavation and handling areas under tented containment structures equipped with appropriate air venting/filtering systems.

This odor control plan is capable of controlling emissions of nuisance odors off-site . Specific odor control methods to be used on a routine basis will include wetting soils to prevent off-Site migration, application of a foam suppressant on the source area, and/or covering the source area with a tarp. If nuisance odors are identified at the site boundary, or if odor complaints are received, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. NYSDEC and NYSDOH will be notified of all odor events and of any other complaints about the project. Implementation of all odor controls, including the halt of work, is the

responsibility of the remedial party's Remediation Engineer, and any measures that are implemented will be discussed in the Periodic Review Report.

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

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

15 DUST CONTROL PLAN

Particulate monitoring must be conducted according to the Community Air Monitoring Plan (CAMP) provided in Section [X]-13. If particulate levels at the site exceed the thresholds listed in the CAMP or if airborne dust is observed on the site or leaving the site, the dust suppression techniques listed below will be employed. The remedial party will also take measures listed below to prevent dust production on the site.

A dust suppression plan that addresses dust management during invasive on-site work will include, at a minimum, the items listed below:

- Dust suppression will be achieved through the use of a dedicated on-site water truck for road wetting. The truck will be equipped with a water cannon capable of spraying water directly onto off-road areas including excavations and stockpiles.

- Clearing and grubbing of larger sites will be done in stages to limit the area of exposed, unvegetated soils vulnerable to dust production.
- Gravel will be used on roadways to provide a clean and dust-free road surface.
- On-site roads will be limited in total area to minimize the area required for water truck sprinkling.

Field generation of contaminated or uncontaminated dust and mobilization of volatile organic compounds may be reduced by new and traditional Best Management Practices (BlVIPs) such as:

- Covering excavated areas with biodegradable fabric that also can control erosion and serve as a substrate for favorable ecosystems, or with synthetic material that can be reused for other onsite or offsite purposes;
- Spraying water in vulnerable areas, in conjunction with water conservation and runoff management techniques;
- Securing and covering material in open trucks while hauling excavated material, and reusing the covers;
- Revegetating excavated areas as quickly as possible; and
- Limiting onsite vehicle speeds to 10 miles per hour.

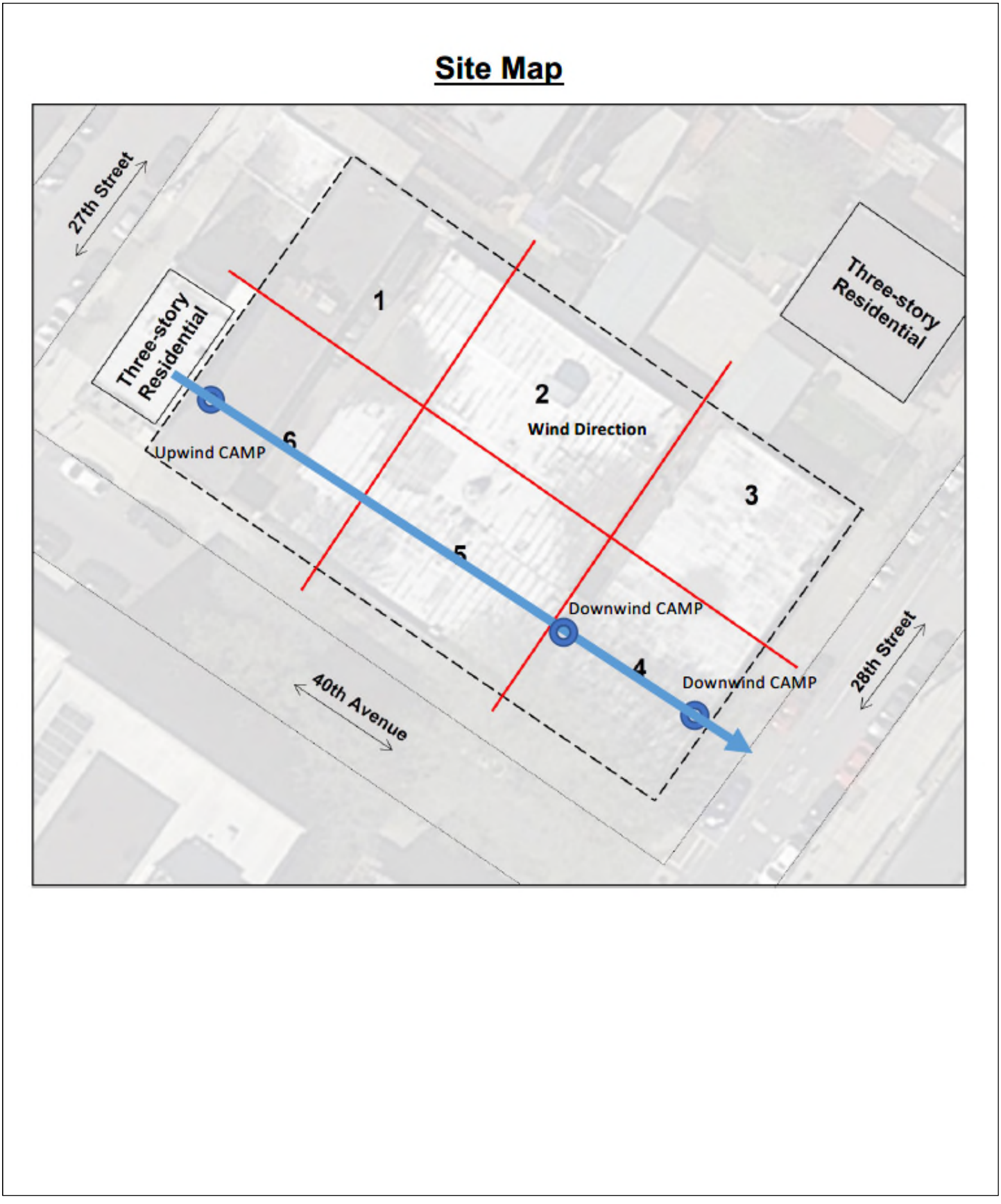
Other approaches can be implemented with the approval of NYSDEC's Project Manager.

Figure B-1 Truck Route Map

Source: Chazen Companies RAWP May 2021

Figure B-2 General Prevailing Wind – Camp Monitoring Locations Map

Source: Laurel Environmental – Daily Status Report, December 9 2022



APPENDIX C – ENVIRONMENTAL EASEMENT/NOTICE/DEED RESTRICTION

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

THIS INDENTURE made this 9th day of May, 2025, between Owner, 40th Ave Dutch Kills Realty LLC, having an office at 36-08 30th Avenue, 2nd Floor, Astoria, 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 27-09 40th Avenue in the City of New York, County of Queens and State of New York, known and designated on the tax map of the New York City Department of Finance as tax map parcel number: Block 397 Lot 35 (fka Lot 33, 35, & 39), being the same as that property conveyed to Grantor by deed dated August 29, 2018 and recorded in the City Register of the City of New York in City Register File No. 2018000325808, by deed dated April 18, 2019 and recorded in the City Register of the City of New York in City Register File No. 2019000133883, and by deed dated April, 18, 2019 and recorded in the City Register of the City of New York in City Register File No. 2019000134079, as confirmed by a confirmatory deed dated August 15, 2024 and recorded August 21, 2024 as CRFN 2024000218387, which was then corrected by a correction deed dated October 30, 2024 and recorded November 14, 2024 as CRFN 2024000297489. The property subject to this Environmental Easement (the "Controlled Property") comprises approximately 0.403 +/- acres, and is hereinafter more fully described in the Land Title Survey dated April 23, 2024, and last revised November 13, 2024, prepared by Laurence Michael Haynes, 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: C241241-03-20, 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 New York City Department of Health and Mental Hygiene to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department;

(5) Groundwater and other environmental or public health monitoring must be

performed as defined in the SMP;

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

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

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

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

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

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

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

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

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

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

This property is subject to an Environmental Easement held by the New York State Department of Environmental Conservation pursuant to Title 36 of Article 71 of the Environmental Conservation Law.

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

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

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

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

(i) are in-place;

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

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

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

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

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

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

(7) the information presented is accurate and complete.

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

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

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

B. The right to give, sell, assign, or otherwise transfer part or all of the underlying fee

interest to the Controlled Property, subject and subordinate to this Environmental Easement;

5. Enforcement

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

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

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

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

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

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

Parties shall address correspondence to:

Site Number: C241241
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.

40th Ave Dutch Kills Realty LLC:

By: _____

Print Name: Konstandinos Vorillas

Title: member Date: 5/1/25

Grantor's Acknowledgment

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

On the 1 day of May, in the year 2025, before me, the undersigned, personally appeared Konstandinos Vorillas personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted, executed the instrument.

_____
Notary Public - State of ~~New York~~

BILL VASILIADIS
NOTARY PUBLIC, STATE OF NEW YORK
Registration No. 02VA6002831
NASSAU COUNTY
Commission Expires AUGUST 30, 2025

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 O. Guglielmi, Director
Division of Environmental Remediation

Grantee's Acknowledgment

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

On the 9th day of May, in the year 2025 before me, the undersigned, personally appeared Andrew O. 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.

_____
Notary Public - State of New York

Cheryl A. Salem
Notary Public State of New York
Registration No. 01SA0002177
Qualified in Albany County
My Commission Expires March 3, 2027

SCHEDULE "A" PROPERTY DESCRIPTION

All that certain plot, piece or parcel of land, with the buildings and improvements erected thereon, situate, lying and being in Astoria, Borough of Queens, City of New York, County of Queens, and State of New York, bounded and described as follows:

BEGINNING at a point on the northerly side of 40th Avenue, distant 25.04 feet easterly from the corner formed by the intersection of the northerly side of 40th Avenue with the easterly side of 27th Street;

running thence northerly at right angles to the northerly side of 40th Avenue and parallel with 27th Street, 100.13 feet;

running thence easterly and parallel with the northerly side of 40th Avenue, 175.20 feet to the westerly side of 28th Street;

running thence southerly along the westerly side of 28th Street, 100.13 feet to the corner formed by the intersection of the westerly side of 28th Street with the northerly side of 40th Avenue;

running thence westerly along the northerly side of 40th Avenue, 175.20 feet to the point or place of BEGINNING.

Area of subject parcel = 17,542.776 square feet
Address: 27-09 40th Avenue, Astoria, NY

Deed Description (Former Lot 35)

ALL that certain plot, piece or parcel of land, situate, lying and being in the First Ward, Borough and County of Queens, at Long Island, City and State of New York, known and designated as and by the Lots Numbers 109, 110, 111 and 112 on a certain map entitled, "Map of Property adjoining Ravenswood, in the Town of Newtown, Queens County, Long Island, belonging to Abraham Payntar", and filed in the Office of the Clerk, now Register of the County of Queens on May 17, 1864 under the File No. 233 and which said lots when taken together as one parcel, are more particularly bounded and described according to said map as follows:

BEGINNING at a point on the northeasterly side of 40th Avenue, formerly Payntar Avenue, distant 50 feet southeasterly from the corner formed by the intersection of the northeasterly side of 40th Avenue with the southeasterly side of 27th Street, formerly Prospect Street;

RUNNING THENCE northeasterly, parallel with the southeasterly side of 27th Street, 100 feet;

THENCE southeasterly, parallel with the northeasterly side of 40th Avenue, 100 feet;

THENCE southwesterly, parallel with the southeasterly side of 27th Street, 100 feet to the northeasterly side of 40th Avenue;

THENCE northwesterly, along the northeasterly side of 40th Avenue, 100 feet to the point or place of BEGINNING.

Deed Description (Former Lot 33)

ALL that certain plot, piece or parcel of land, situate, lying and being in the First Ward of the Borough of Queens, City of New York, County of Queens and State of New York, known and designated as and by the lots numbered one hundred and thirteen and one hundred and fourteen on a certain map entitled "Map of Property adjoining Ravenswood, in the Town of Newtown, Queens County, L.I. belonging to Abraham Payntar, surveyed and drawn 1860, by P.G. Van Alst, C.S." and filed in the office of the clerk of the County of Queens on May 17, 1864, under file number 233, which said lots, when taken together as one parcel are bounded and described as follows, to wit:

BEGINNING at the corner formed by the intersection of the northeasterly side of Fortieth Avenue (Payntar Avenue) with the northwesterly side of Twenty-Eighth Street;

RUNNING THENCE northeasterly along the northwesterly side of Twenty-eighth Street, one hundred feet one and five eighths inches;

THENCE northwesterly parallel with Fortieth Avenue, fifty feet three-quarters of an inch;

THENCE southwesterly parallel with Twenty-eighth Street, one hundred feet and one and five-eighth inches to the northeasterly side of Fortieth Avenue;

THENCE southeasterly along said side of Fortieth Avenue, fifty-feet three-quarters of an inch to the corner, the point or place of BEGINNING.

Deed Description (Former Lot 39)

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, known and designated as and by lot number 108 on a certain map entitled "Map of property adjoining Ravenswood in the Town of Newtown, Queens County, Long Island City, belonging to Abraham Payntar, surveyed and drawn 1860 by P. G. Van Alst, C.S." and filed in the Office of the County Clerk, Queens County, now City Register's Office on May 17, 1864, as Map Number 233, which said lot according to said map is bounded and described as follows:

BEGINNING at a point on the northeasterly side of 40th Avenue, formerly Payntar Avenue, 25 feet southeasterly from the corner formed by the intersection of the northeasterly side of 40th Avenue with the southeasterly side of 27th Street, formerly Prospect Street;

RUNNING THENCE northeasterly parallel with the southeasterly side of 27th Street, 100 feet;

THENCE southeasterly parallel with the northeasterly side of 40th Avenue 25 feet;

THENCE southwesterly parallel with the southeasterly side of 27th Street 100 feet to the northeasterly side of 40th Avenue;

THENCE northwesterly along the northeasterly side of 40th Avenue 25 feet to the point or place of beginning.

APPENDIX D – MONITORING WELL BORING AND CONSTRUCTION LOGS

WELL CONSTRUCTION LOG

Project #: 220192	**Project Name:** 27-09 40th Avenue	**Driller:** EPhase-2
Boring #: MW-105R	**Date:** 11-14-2023	**Page** 1 **of** 1
Method: Geoprobe	**Geologist:** Andre Matthews	**Boring Location:**

Depth (ft)	PID (ppm)	Recovery (ft)	Blow Counts	Sample I.D.	Description	USCS	Remarks
5		N/A			No data 16' well depth		Depth-to-first-water-bearing-zone: 0' Depth-to-bedrock: n/a Depth-to-saturation: 13.5' below grade
10							Borehole Diameter: 2 ½" well borehole **Well Construction:** **Riser Type:** sch. 40 PVC solid, 2" diam
15							**Screen Type:** sch. 40 PVC slotted, 2" diam **Sand Pack Type:** coarse grained, FilPro
20							**Bentonite Type:** Bentonite Chips/Plugs **Grout Type:** N/A
							Concrete Type: N/A From: To: Bags:

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WELL CONSTRUCTION LOG

Project #: 220192	**Project Name:** 27-09 40th Avenue	**Driller:** EPhase-2
Boring #: MW-106R	**Date:** 11-09-2023	**Page** 1 **of** 1
Method: 420 Geoprobe	**Geologist:** Andre Matthews	**Boring Location:**

Depth (ft)	PID (ppm)	Recovery (ft)	Blow Counts	Sample I.D.	Description	USCS	Remarks
5		5/5			0.0' – 5.0': light-medium brown, fine grained sand with < 10% subrounded gravel		Depth-to-first-water-bearing-zone: 0'
							Depth-to-bedrock: n/a
							Depth-to-saturation: 11.5' below grade
10		5/5			5.0' – 10.0': light brown tightly compacted fine grained sand with little to no gravel		Borehole Diameter: 1 ½" well borehole
							Well Construction:
							Riser Type: sch. 40 PVC solid, 1" diam
							10 feet of riser
15		5/5			10.0' – 11.0': brownish, grey fine-grained compacted sand with little to no gravel, moist 11.0' – 15.0': brown and grey fine-grained sand with no gravel, saturated		**Screen Type:** sch. 40 PVC slotted, 1" diam
							10 feet of screen
							Sand Pack Type: coarse grained, FilPro
							17 feet of sand
20		5/5			15.0' – 16.0': light brown tightly compacted fine grained sand with little to no gravel, wet 16.0'– 20.0': greyish brown clay, medium to high plasticity, some silt present, saturated		**Bentonite Type:** Bentonite Chips/Plugs
							3 feet of bentonite
							Grout Type: N/A
					17' well depth		**Concrete Type:** N/A
							From:
							To:
							Bags:

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WELL CONSTRUCTION LOG

Project #: 220192	**Project Name:** 27-09 40th Avenue	**Driller:** EPhase-2
Boring #: MW-108R	**Date:** 11-15-2023	**Page** 1 **of** 1
Method: Geoprobe	**Geologist:** Andre Matthews	**Boring Location:**

Depth (ft)	PID (ppm)	Recovery (ft)	Blow Counts	Sample I.D.	Description	USCS	Remarks
15		5/5			0-1': Concrete 1-3': Light brown clay, some gravel, dry 3-5': Dark brown sandy soil with gravel, dry 5-10': Medium brown sandy soil with some silt and gravel, dry 10-15': Light brown sandy soil, no gravel, dry		Depth-to-first-water-bearing-zone: 0' Depth-to-bedrock: n/a Depth-to-saturation: 38.5' below grade
30		5/5			15-20': Light brown sandy soil, no gravel, dry 20-25': Light brown sandy soil, no gravel, some silt, dry 25-27': Light brown sandy soil, some gravel, dry 27-30': Light tan sandy soil with silt and gravel, dry		Borehole Diameter: 2 ½" well borehole **Well Construction:** **Riser Type:** sch. 40 PVC solid, 1" diam 35 feet of riser
45		5/5			30-35': Light tan sandy soil with silt, dry 35-37': Light tan sandy soil with silt, dry 37-40': Dark brown clay, saturated. Groundwater encountered at 37'		**Screen Type:** sch. 40 PVC slotted, 2" diam 10 feet of screen **Sand Pack Type:** coarse grained, FilPro 42 feet of sand
					45' well depth		**Bentonite Type:** Bentonite Chips/Plugs 3 feet of bentonite **Grout Type:** powder
							Concrete Type: N/A 1 foot of concrete

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WELL CONSTRUCTION LOG

Project #: 220192	**Project Name:** 27-09 40th Avenue	**Driller:** EPhase-2
Boring #: MW-109R	**Date:** 11-09-2023	**Page** 1 **of** 1
Method: 420 Geoprobe	**Geologist:** Andre Matthews	**Boring Location:**

Depth (ft)	PID (ppm)	Recovery (ft)	Blow Counts	Sample I.D.	Description	USCS	Remarks
5		5/5			0.0' – 5.0': light brown, fine grained sand with some gravel, dry		Depth-to-first-water-bearing-zone: 0' Depth-to-bedrock: n/a Depth-to-saturation: 14.5' below grade
10		5/5			5.0' – 10.0': light brown tightly compacted fine grained sand with little to no gravel, dry		Borehole Diameter: 1 ½" well borehole **Well Construction:** **Riser Type:** sch. 40 PVC solid, 1" diam 10 feet of riser
15		5/5			10.0' – 13.5': brownish, grey fine-grained compacted sand with little to no gravel, moist 13.5' – 15.0': grey, wet fine-grained sand with some clay and silt, saturated		**Screen Type:** sch. 40 PVC slotted, 1" diam 10 feet of screen **Sand Pack Type:** coarse grained, FilPro 17 feet of sand
20		5/5			15.0' – 20.0': grey-brownish clay with some fine-grained sand, some gravel, saturated		**Bentonite Type:** Bentonite Chips/Plugs 3 feet of bentonite **Grout Type:** N/A
					16' well depth		**Concrete Type:** N/A From: To: Bags:

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WELL CONSTRUCTION LOG

Project #: 220192	**Project Name:** 27-09 40th Avenue	**Driller:** EPhase-2
Boring #: MW-110R	**Date:** 11-10-2023	**Page** 1 **of** 1
Method: Geoprobe	**Geologist:** Andre Matthews	**Boring Location:**

Depth (ft)	PID (ppm)	Recovery (ft)	Blow Counts	Sample I.D.	Description	USCS	Remarks
5		5/5			0.0' – 5.0': light brown well graded sand with silt and gravel, dry		Depth-to-first-water-bearing-zone: 0'
							Depth-to-bedrock: n/a
							Depth-to-saturation: 12.5' below grade
10		5/5			5.0' – 10.0': Light brown clay with some gravel, medium plasticity, moist		Borehole Diameter: 2 ½" well borehole
							Well Construction:
							Riser Type: sch. 40 PVC solid, 2" diam
							5 feet of riser
15		5/5			10.0' – 15.0': Light brown clay with some gravel, medium plasticity, moist		**Screen Type:** sch. 40 PVC slotted, 2" diam
							10 feet of screen
							Sand Pack Type: coarse grained, FilPro
							12 feet of sand
20							**Bentonite Type:** Bentonite Chips/Plugs
							3 feet of bentonite
							Grout Type: N/A
					15' well depth		**Concrete Type:** N/A
							From:
							To:
							Bags:

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WELL CONSTRUCTION LOG

Project #: 220192	**Project Name:** 27-09 40th Avenue	**Driller:** EPhase-2
Boring #: MW-111	**Date:** 11-14-2023	**Page** 1 **of** 1
Method: Geoprobe	**Geologist:** Andre Matthews	**Boring Location:**

Depth (ft)	PID (ppm)	Recovery (ft)	Blow Counts	Sample I.D.	Description	USCS	Remarks
		N/A			No data 20' well depth		Depth-to-first-water-bearing-zone: 0'
							Depth-to-bedrock: n/a
5							Depth-to-saturation: 14.0' below grade
							Borehole Diameter: 2 ½" well borehole
							Well Construction:
							Riser Type: sch. 40 PVC solid, 2" diam
10							
							Screen Type: sch. 40 PVC slotted, 2" diam
15							**Sand Pack Type:** coarse grained, FilPro
							Bentonite Type: Bentonite Chips/Plugs
20							**Grout Type:** N/A
							Concrete Type: N/A
							From: To: Bags:

WELL CONSTRUCTION LOG

Project #: 220192	**Project Name:** 27-09 40th Avenue	**Driller:** EPhase-2
Boring #: ISCO-1	**Date:** 11-09-2023	**Page** 1 **of** 1
Method: Geoprobe	**Geologist:** Andre Matthews	**Boring Location:**

Depth (ft)	PID (ppm)	Recovery (ft)	Blow Counts	Sample I.D.	Description	USCS	Remarks
5		3.5/5			0.0' – 3.0': light-medium greyish brown, fine grained sand with some silt, moist 3.0'-4.0' : Brown to white fine grain sand, no gravel with some silt		Depth-to-first-water-bearing-zone: 10' Depth-to-bedrock: n/a Depth-to-saturation: 17.0' below grade
10		4/5			5.0' – 9.0': Same as above 9.0' – 10.0': Brown very fine grained sand, no gravel, some silt		Borehole Diameter: 2 ½" well borehole **Well Construction:** **Riser Type:** sch. 40 PVC solid, 2" diam 10 feet of riser
15		4/5			10.0' – 11.0': brownish, grey fine-grained with some white/very light tan with some silt 11.0' – 13.0': Brown sand, medium to fine coarse grained, with silt brownish grey, dry 13.0' – 15.0': Sand, medium to fine grained, with brownish grey clay, high plasticity		**Screen Type:** sch. 40 PVC slotted, 2" diam 10 feet of screen **Sand Pack Type:** coarse grained, FilPro 17 feet of sand
20		5/5			15.0' – 16.0': Brown-gray clay with some sand, wet 16.0'– 17.0': Brown clay with sand, low plasticity, wet 17.0' – 20.0': Brown clay with some sand, saturated		**Bentonite Type:** Bentonite Chips/Plugs 3 feet of bentonite **Grout Type:** N/A
					17' well depth		**Concrete Type:** N/A From: To: Bags:

WELL CONSTRUCTION LOG

Project #: 220192	**Project Name:** 27-09 40th Avenue	**Driller:** EPhase-2
Boring #: ISCO-2	**Date:** 11-09-2023	**Page** 1 **of** 1
Method: Geoprobe	**Geologist:** Andre Matthews	**Boring Location:**

Depth (ft)	PID (ppm)	Recovery (ft)	Blow Counts	Sample I.D.	Description	USCS	Remarks
5		5/5			0.0' – 5.0': Light brown well-graded sand with silt and gravel, some medium-coarse grained sand, some fine gravel, dry		Depth-to-first-water-bearing-zone: 0' Depth-to-bedrock: n/a Depth-to-saturation: 13.0' below grade
10		5/5			5.0' – 10.0': same sand material as above, dry		Borehole Diameter: 2 ½" well borehole **Well Construction:** **Riser Type:** sch. 40 PVC solid, 2" diam 8 feet of riser
15		5/5			10.0' – 13.0': same sand material as above, dry 13.0' – 15.0': Dark brown at clay with sand, medium plasticity, medium stiff, saturated		**Screen Type:** sch. 40 PVC slotted, 2" diam 10 feet of screen **Sand Pack Type:** coarse grained, FilPro 14 feet of sand
20		5/5			15.0' – 20.0': same sand material as above, saturated		**Bentonite Type:** Bentonite Chips/Plugs 4 feet of bentonite **Grout Type:** N/A
					18' well depth		**Concrete Type:** N/A From: To: Bags:

WELL CONSTRUCTION LOG

Project #: 220192	**Project Name:** 27-09 40th Avenue	**Driller:** EPhase-2
Boring #: ISCO-3	**Date:** 11-10-2023	**Page** 1 **of** 1
Method: Geoprobe	**Geologist:** Andre Matthews	**Boring Location:**

Depth (ft)	PID (ppm)	Recovery (ft)	Blow Counts	Sample I.D.	Description	USCS	Remarks
5		5/5			0.0' – 5.0': light-medium greyish brown, moist, fine grained sand with < 10% subrounded gravel		Depth-to-first-water-bearing-zone: 0' Depth-to-bedrock: n/a Depth-to-saturation: 15.5' below grade
10		5/5			5.0' – 5.5': light grey tightly compacted fine grained sand with little to no gravel, moist 5.5' – 10.0': same sand material as above, dry		Borehole Diameter: 2 ½" well borehole **Well Construction:** **Riser Type:** sch. 40 PVC solid, 2" diam 10 feet of riser
15		5/5			10.0' – 11.0': brownish, grey fine-grained compacted sand with little to no gravel, moist 11.0' – 12.0': grey fine-grained sand with no gravel, moist, not saturated 12.0' – 12.5': grey coarse-grained sand with little to no gravel, wet 12.5' – 15.0': grey, wet fine-grained sand with some clay and silt, tightly compacted, little to no plasticity		**Screen Type:** sch. 40 PVC slotted, 2" diam 10 feet of screen **Sand Pack Type:** coarse grained, FilPro 12 feet of sand
20		5/5			15.0' – 15.5': light grey tightly compacted fine grained sand with little to no gravel, wet 15.5'– 18.5': greyish brown clay, medium to high plasticity, some silt present, saturated 18.5' – 20.0': grey clay with some saturated fine-grained, some gravel (~5%) rounded to subrounded		**Bentonite Type:** Bentonite Chips/Plugs 5 feet of bentonite **Grout Type:**
					17' well depth		**Concrete Type:** N/A From: To: Bags:

WELL CONSTRUCTION LOG

Project #: 220192	**Project Name:** 27-09 40th Avenue	**Driller:** EPhase-2
Boring #: ISCO-4	**Date:** 11-10-2023	**Page** 1 **of** 1
Method: Geoprobe	**Geologist:** Andre Matthews	**Boring Location:**

Depth (ft)	PID (ppm)	Recovery (ft)	Blow Counts	Sample I.D.	Description	USCS	Remarks
5		5/5			0.0' – 5.0': Light brown well-graded sand with silt and gravel; some medium-coarse grained sand, some fine-coarse gravel, dry		Depth-to-first-water-bearing-zone: 0'
							Depth-to-bedrock: n/a
							Depth-to-saturation: 10.5' below grade
10		5/5			5.0' – 10.0': same sand material as above, dry		Borehole Diameter: 2 ½" well borehole
							Well Construction:
							Riser Type: sch. 40 PVC solid, 2" diam
							5 feet of riser
15		5/5			10.0' – 15.0': Light brown fat clay with sand; medium plasticity, medium stiff, saturated		**Screen Type:** sch. 40 PVC slotted, 2" diam
							10 feet of screen
							Sand Pack Type: coarse grained, FilPro
							12 feet of sand
20		5/5			15.0' – 20.0': same clay material as above, saturated		**Bentonite Type:** Bentonite Chips/Plugs
							3 feet of bentonite
							Grout Type: N/A
					15' well depth		**Concrete Type:** N/A
							From:
							To:
							Bags:

WELL CONSTRUCTION LOG

Project #: 220192	**Project Name:** 27-09 40th Avenue	**Driller:** EPhase-2
Boring #: ISCO-5R	**Date:** 11-09-2023	**Page** 1 **of** 1
Method: 420 Geoprobe	**Geologist:** Andre Matthews	**Boring Location:**

Depth (ft)	PID (ppm)	Recovery (ft)	Blow Counts	Sample I.D.	Description	USCS	Remarks
5		4/5			0.0’ – 5.0’: Dark brown, fine grained sand with some gravel		Depth-to-first-water-bearing-zone: 0’ Depth-to-bedrock: n/a Depth-to-saturation: 10.5’ below grade
10		5/5			5.0’ – 5.5’: light grey tightly compacted fine grained sand with little to no gravel, moist 5.5’ – 10.0’: same sand material as above, dry		Borehole Diameter: 1 ½” well borehole **Well Construction:** **Riser Type:** sch. 40 PVC solid, 1” diam 9 feet of riser
15		5/5			10.0’ – 11.0’: brownish, grey fine-grained compacted sand with little to no gravel, moist 11.0’ – 15.0’: grey fine-grained sand with no gravel, some clay, saturated		**Screen Type:** sch. 40 PVC slotted, 1” diam 10 feet of screen **Sand Pack Type:** coarse grained, FilPro 16 feet of sand
20		5/5			15.0’ – 16.0’: light brown fine grained sand with little to no gravel, wet 16.0’– 20.0’: greyish brown clay, medium to high plasticity, some silt present, saturated		**Bentonite Type:** Bentonite Chips/Plugs 3 feet of bentonite **Grout Type:** N/A
					14’ well depth		**Concrete Type:** N/A From: To: Bags:

WELL CONSTRUCTION LOG

Project #: 220192	**Project Name:** 27-09 40th Avenue	**Driller:** EPhase-2
Boring #: ISCO-6	**Date:** 11-10-2023	**Page** 1 **of** 1
Method: Geoprobe	**Geologist:** Andre Matthews	**Boring Location:**

Depth (ft)	PID (ppm)	Recovery (ft)	Blow Counts	Sample I.D.	Description	USCS	Remarks
5		5/5			0.0' – 5.0': Light brown well graded sand with some silt and gravel, dry		Depth-to-first-water-bearing-zone: 0'
							Depth-to-bedrock: n/a
							Depth-to-saturation: 10.0' below grade
10		5/5			5.0' – 10.0': same sand material as above, dry		Borehole Diameter: 2 ½" well borehole
							Well Construction:
							Riser Type: sch. 40 PVC solid, 2" diam
							10 feet of riser
15		5/5			10.0' – 15.0': Light brown clay with some sand and gravel, medium plasticity, saturated		
							Screen Type: sch. 40 PVC slotted, 2" diam
							10 feet of screen
							Sand Pack Type: coarse grained, FilPro
							16 feet of sand
20		5/5			15.0' – 20.0': Same material as above, saturated		
							Bentonite Type: Bentonite Chips/Plugs
							4 feet of silica
							Grout Type: N/A
					20' well depth		
							Concrete Type: N/A
							From:
							To:
							Bags:

WELL CONSTRUCTION LOG

Project #: 220192	**Project Name:** 27-09 40th Avenue	**Driller:** EPhase-2
Boring #: ISCO-7	**Date:** 11-10-2023	**Page** 1 **of** 1
Method: Geoprobe	**Geologist:** Andre Matthews	**Boring Location:**

Depth (ft)	PID (ppm)	Recovery (ft)	Blow Counts	Sample I.D.	Description	USCS	Remarks
5		5/5			0.0' – 5.0': white fine grained sand with no gravel, some silt, dry		Depth-to-first-water-bearing-zone: 0' Depth-to-bedrock: n/a Depth-to-saturation: 10.0' below grade
10		5/5			5.0' – 9.0': same material as above, dry 9.0' – 10.0': brown, fine grain sand with no gravel, some silt		Borehole Diameter: 2 ½" well borehole **Well Construction:** **Riser Type:** sch. 40 PVC solid, 2" diam 10 feet of riser
15		5/5			10.0' – 13.0': light brown sand with some silt, moist 13.0' – 15.0': light brown sand, with brown-grayish clay with high plasticity		**Screen Type:** sch. 40 PVC slotted, 2" diam 10 feet of screen **Sand Pack Type:** coarse grained, FilPro 17 feet of sand
20		5/5			15.0' – 16.': gray clay with some plasticity, saturated 16.0'– 17.0': brown clay, low plasticity, some silt present, saturated 17.0' – 20.0': brown-grayish clay with low plasticity, some sand, saturated		**Bentonite Type:** Bentonite Chips/Plugs 3 feet of sand **Grout Type:**
					17' well depth		**Concrete Type:** N/A From: To: Bags:

WELL CONSTRUCTION LOG

Project #: 220192	**Project Name:** 27-09 40th Avenue	**Driller:** EPhase-2
Boring #: ISCO-8	**Date:** 11-14-2023	**Page** 1 **of** 1
Method: Geoprobe	**Geologist:** Andre Matthews	**Boring Location:**

Depth (ft)	PID (ppm)	Recovery (ft)	Blow Counts	Sample I.D.	Description	USCS	Remarks
		N/A			No data 20' well depth		Depth-to-first-water-bearing-zone: 0'
							Depth-to-bedrock: n/a
5							Depth-to-saturation: 12.0' below grade
							Borehole Diameter: 2 ½" well borehole
							Well Construction:
							Riser Type: sch. 40 PVC solid, 2" diam
10							
							Screen Type: sch. 40 PVC slotted, 2" diam
15							**Sand Pack Type:** coarse grained, FilPro
							Bentonite Type: Bentonite Chips/Plugs
20							**Grout Type:** N/A
							Concrete Type: N/A
							From:
							To:
							Bags:

WELL CONSTRUCTION LOG

Project #: 220192	**Project Name:** 27-09 40th Avenue	**Driller:** EPhase-2
Boring #: ISCO-9	**Date:** 11-09-2023	**Page** 1 **of** 1
Method: Geoprobe	**Geologist:** Andre Matthews	**Boring Location:**

Depth (ft)	PID (ppm)	Recovery (ft)	Blow Counts	Sample I.D.	Description	USCS	Remarks
		N/A			Well depth is 13' below grade		Depth-to-first-water-bearing-zone: 0'
							Depth-to-bedrock: n/a
5							Depth-to-saturation: 11.0' below grade
							Borehole Diameter: 2 ½" well borehole
							Well Construction:
							Riser Type: sch. 40 PVC solid, 2" diam
10							N/A
							Screen Type: sch. 40 PVC slotted, 2" diam
							N/A
							Sand Pack Type: coarse grained, FilPro
15							N/A
							Bentonite Type: Bentonite Chips/Plugs
							N/A
20							**Grout Type:**
							Concrete Type: N/A
							From:
							To:
							Bags:

WELL CONSTRUCTION LOG

Project #: 220192	**Project Name:** 27-09 40th Avenue	**Driller:** EPhase-2
Boring #: ISCO-10	**Date:** 11-10-2023	**Page** 1 **of** 1
Method: Geoprobe	**Geologist:** Andre Matthews	**Boring Location:**

Depth (ft)	PID (ppm)	Recovery (ft)	Blow Counts	Sample I.D.	Description	USCS	Remarks
5		N/A			No soil from borings retrieved for ISCO-10. Soil composition is assumed to be the same as ISCO-9 since they are in line with each other. Well depth is 13.5'		Depth-to-first-water-bearing-zone: 0' Depth-to-bedrock: n/a Depth-to-saturation: 11.5' below grade
10							Borehole Diameter: 2 ½" well borehole **Well Construction:** **Riser Type:** sch. 40 PVC solid, 2" diam 5 feet of riser
15							**Screen Type:** sch. 40 PVC slotted, 2" diam 10 feet of screen **Sand Pack Type:** coarse grained, FilPro 13 feet of sand
20							**Bentonite Type:** Bentonite Chips/Plugs 2 feet of sand **Grout Type:**
							Concrete Type: N/A From: To: Bags:

WELL CONSTRUCTION LOG

Project #: 220192	**Project Name:** 27-09 40th Avenue	**Driller:** EPhase-2
Boring #: SVE-1	**Date:** 11-09-2023	**Page** 1 **of** 1
Method: Geoprobe, Push-Point	**Geologist:** Andre Matthews	**Boring Location:**

Depth (ft)	PID (ppm)	Recovery (ft)	Blow Counts	Sample I.D.	Description	USCS	Remarks
	N/A	N/A	N/A	N/A	14' below grade well depth		Depth-to-first-water-bearing-zone: 0'
							Depth-to-bedrock: n/a
							Depth-to-saturation: 15.5' below grade
							Borehole Diameter: 2 ½"
							Well Construction:
							Riser Type: sch. 40 PVC solid, 2" diam
							From: 9'+23' = 32' bgs
							To: 6' above grade
							Feet: 15
							Screen Type: sch. 40 PVC slotted, 2" diam
							From: 14'+23' = 37' bgs
							To: 9'+23'= 32' bgs
							Feet: 5
							Sand Pack Type: FilPro
							From: 14'+23' = 37' bgs
							To: 7'+23' = 30' bgs
							Bags: 1/4
							Bentonite Type: Bentonite Chips/Plugs
							From: 7'+23' = 30' bgs
							To: 1.5'+23' = 24.5' bgs
							Bags: 1/4
							Grout Type: powder
							From: 1.5'+23' = 24.5' bgs
							To: 0' bgs
							Bags: 1/4
							Concrete Type: N/A
							From:
							To:
							Bags:

WELL CONSTRUCTION LOG

Project #: 220192	**Project Name:** 27-09 40th Avenue	**Driller:** EPhase-2
Boring #: SVE-2	**Date:** 11-10-2023	**Page** 1 **of** 1
Method: Geoprobe	**Geologist:** Andre Matthews	**Boring Location:**

Depth (ft)	PID (ppm)	Recovery (ft)	Blow Counts	Sample I.D.	Description	USCS	Remarks
5		5/5			0.0' – 5.0': light brown well graded sand with some silt and gravel, dry		Depth-to-first-water-bearing-zone: 0' Depth-to-bedrock: n/a Depth-to-saturation: 15.0' below grade
10		5/5			5.0' – 10.0': same sand material as above, dry		Borehole Diameter: 2 ½" well borehole **Well Construction:** **Riser Type:** sch. 40 PVC solid, 2" diam 10 feet of riser
15		5/5			10.0' – 15.0': brownish, grey fine-grained compacted sand with little to no gravel, moist		**Screen Type:** sch. 40 PVC slotted, 2" diam 10 feet of screen **Sand Pack Type:** coarse grained, FilPro 17 feet of sand
20		5/5			15.0'– 20.0': greyish brown clay, medium to high plasticity, some silt present, saturated		**Bentonite Type:** Bentonite Chips/Plugs 3 feet of bentonite **Grout Type:** N/A
					17' well depth		**Concrete Type:** N/A From: To: Bags:

WELL CONSTRUCTION LOG

Project #: 220192	**Project Name:** 27-09 40th Avenue	**Driller:** EPhase-2
Boring #: SVE-3	**Date:** 11-10-2023	**Page** 1 **of** 1
Method: Geoprobe	**Geologist:** Andre Matthews	**Boring Location:**

Depth (ft)	PID (ppm)	Recovery (ft)	Blow Counts	Sample I.D.	Description	USCS	Remarks
5		5/5			0.0' – 5.0': light-brown well graded sand with gravel and some silt, dry		Depth-to-first-water-bearing-zone: 0' Depth-to-bedrock: n/a Depth-to-saturation: 10.0' below grade
10		5/5			5.0' – 10.0': same sand material as above, dry		Borehole Diameter: 2 ½" well borehole **Well Construction:** **Riser Type:** sch. 40 PVC solid, 2" diam 5 feet of riser
15		5/5			10.0' – 15.0': Light brown clay with sand, low plasticity, moist		**Screen Type:** sch. 40 PVC slotted, 2" diam 10 feet of screen **Sand Pack Type:** coarse grained, FilPro 12 feet of sand
20							**Bentonite Type:** Bentonite Chips/Plugs 3 feet of bentonite **Grout Type:** N/A
					15' well depth		**Concrete Type:** N/A From: To: Bags:

WELL CONSTRUCTION LOG

Project #: 220192	**Project Name:** 27-09 40th Avenue	**Driller:** EPhase-2
Boring #: SVE-4	**Date:** 11-10-2023	**Page** 1 **of** 1
Method: Geoprobe	**Geologist:** Andre Matthews	**Boring Location:**

Depth (ft)	PID (ppm)	Recovery (ft)	Blow Counts	Sample I.D.	Description	USCS	Remarks
5		5/5			0.0' – 5.0': light brown well graded sand with some silt and gravel, dry		Depth-to-first-water-bearing-zone: 0' Depth-to-bedrock: n/a Depth-to-saturation: 11.0' below grade
10		5/5			5.0' – 10.0': same sand material as above, dry		Borehole Diameter: 2 ½" well borehole **Well Construction:** **Riser Type:** sch. 40 PVC solid, 2" diam 5 feet of riser
15		5/5			10.0' – 11.0': same sand material as above, dry 11.0' – 15.0': light brown well graded sand with some silt and gravel, some clay, moist		**Screen Type:** sch. 40 PVC slotted, 2" diam 10 feet of screen **Sand Pack Type:** coarse grained, FilPro 12 feet of sand
20							**Bentonite Type:** Bentonite Chips/Plugs 3 feet of bentonite **Grout Type:** N/A
					15' well depth .		**Concrete Type:** N/A From: To: Bags:

WELL CONSTRUCTION LOG

Project #: 220192	**Project Name:** 27-09 40th Avenue	**Driller:** EPhase-2
Boring #: SVE-5	**Date:** 11-10-2023	**Page** 1 **of** 1
Method: Geoprobe, Push-Point	**Geologist:** Andre Matthews	**Boring Location:**

Depth (ft)	PID (ppm)	Recovery (ft)	Blow Counts	Sample I.D.	Description	USCS	Remarks
	N/A	5/5	N/A	N/A	0.0' – 2.5':light brown/eggshell loosely compacted, moist for first 1.5', getting drier with 2.5' – 5.0': light brown/tan finely grained sand, soft, medium density with little to no gravel approx. 2% and diameter of </= 0.03", slightly moist		Depth-to-first-water-bearing-zone: 0'
							Depth-to-bedrock: N/A
							Depth-to-saturation: 12 below grade
		5/5			5.0' – 6.0' medium brown finely grained sand with red hue, soft, some silt, no gravel 6.0' – 7.0': brown clay with some silt, no plasticity, some finely grained sand 8.0' – 10.0': medium grey coarse grained sand with clay, medium to high plasticity with 30% gravel, d = 0.1"		Borehole Diameter: 2 ½"
							Well Construction:
							Riser Type: sch. 40 PVC solid, 2" diam
							5 feet of riser
		5/5			10.0' – 12.0': grey clay, medium to high plasticity, moist no gravel or silt 12.0' – 12.5': uniform coarse-grained sand with brownish-grey clay, saturated 12.5' – 14.0': medium grey-brownish, moist clay with no gravel, little-to-no silt, high plasticity, wet 14.0' – 15.0': light grey clay, dry and otherwise same material as above		
							Screen Type: sch. 40 PVC slotted, 2" diam
							5 feet of screen
							Sand Pack Type: FilPro coarse grained
							7 feet of sand
					7' below grade well depth.		
							Bentonite Type: Bentonite Chips/Plugs
							3 feet of bentonite
							Grout Type: N/A

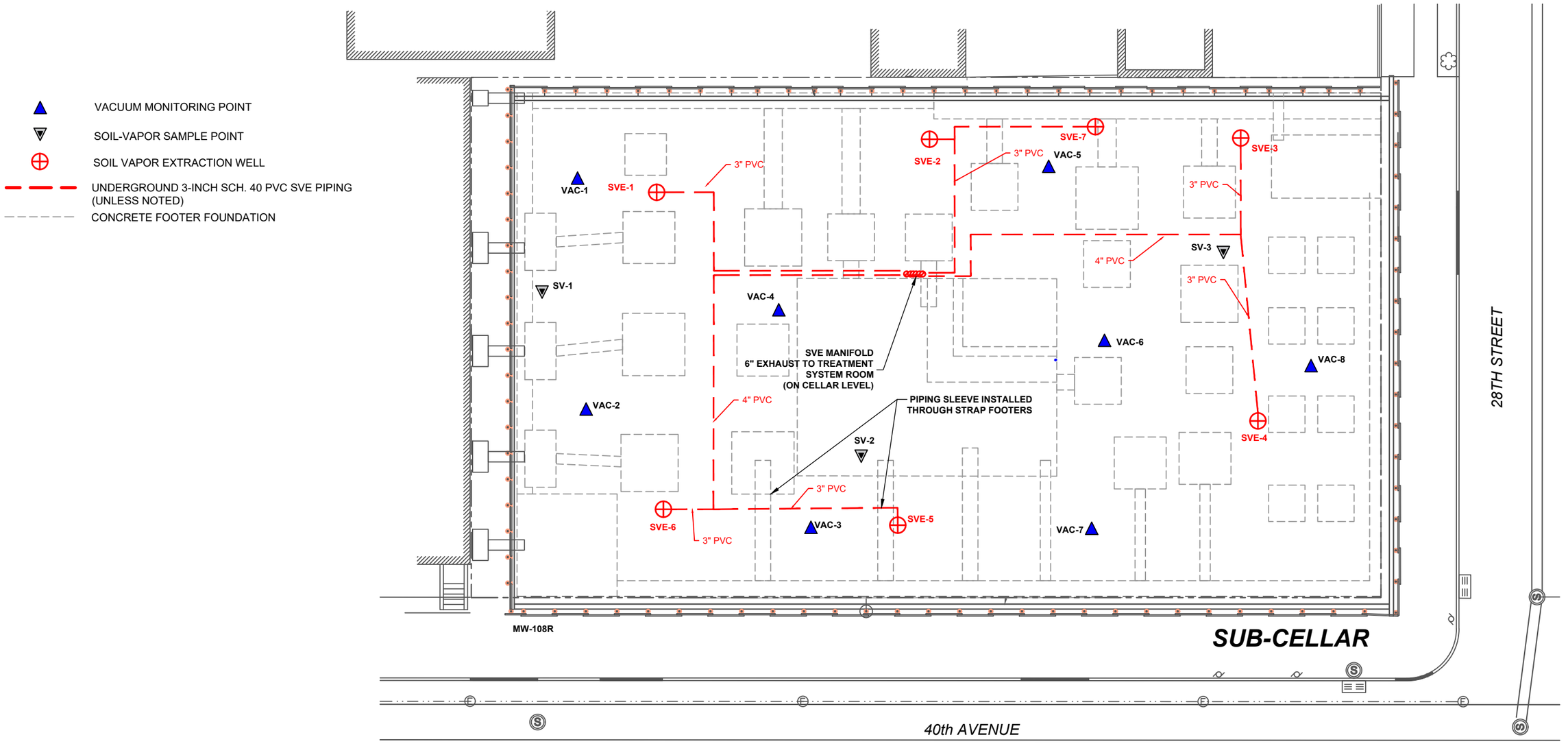
WELL CONSTRUCTION LOG

Project #: 220192	**Project Name:** 27-09 40th Avenue	**Driller:** EPhase-2
Boring #: SVE-6	**Date:** 11-09-2023	**Page** 1 **of** 1
Method: Geoprobe, Push-Point	**Geologist:** Andre Matthews	**Boring Location:**

Depth (ft)	PID (ppm)	Recovery (ft)	Blow Counts	Sample I.D.	Description	USCS	Remarks
	N/A	N/A	N/A	N/A	13' below grade well depth Refusal met @ 13'.		Depth-to-first-water-bearing-zone: 0'
							Depth-to-bedrock: 13'
							Depth-to-saturation: 15.5' below grade
							Borehole Diameter: 2 ½"
							Well Construction:
							Riser Type: sch. 40 PVC solid, 2" diam
							10 feet of riser
							Screen Type: sch. 40 PVC slotted, 2" diam
							5 feet of screen
							Sand Pack Type: FilPro coarse grained
							From: 13'+23' = 36' bgs
							To: 6'+23' = 29' bgs
							Bags: 1/4
							Bentonite Type: Bentonite Chips/Plugs
							From: 6'+23' = 29' bgs
							To: 1'+23' = 24' bgs
							Bags: 1/4
							Grout Type:
							Concrete Type: N/A
							From:
							To:
							Bags:

APPENDIX E

SSDS AND SVE SYSTE LAYOUT EXHIBITS



NO.	DATE	REVISION
2	8/12/24	ADDED SVE-7
1	3/12/24	REVISED WELL AND PIPING LOCATION

ENGINEER'S SEAL

NOTE: DRAWING INTENDED FOR ILLUSTRATIVE PURPOSED ONLY, AS PART OF A SITE CHARACTERIZATION. NOT TO BE USED AS A BASIS FOR ENGINEERING OR DESIGN.
NOTE: BUILDING FOOTPRINT AND PROPERTY BOUNDARY GATHERED FROM HCN ARCHITECTS.

N

0 20′ 40′

Liberty Environmental, Inc.
600 Third Avenue, Second Floor
New York, NY 10016
Phone: 212-255-0374
www.libertyenviro.com

A-001 - SVE SYSTEM LAYOUT

27-09 40th Avenue
Borough of Queens, City of New York, New York

PROJECT NO.: 220192	REV: 2	PREPARED BY: JRY
DATE: FEBRUARY 12, 2024	SCALE: 1" = 20'	APPROVED BY: JPC

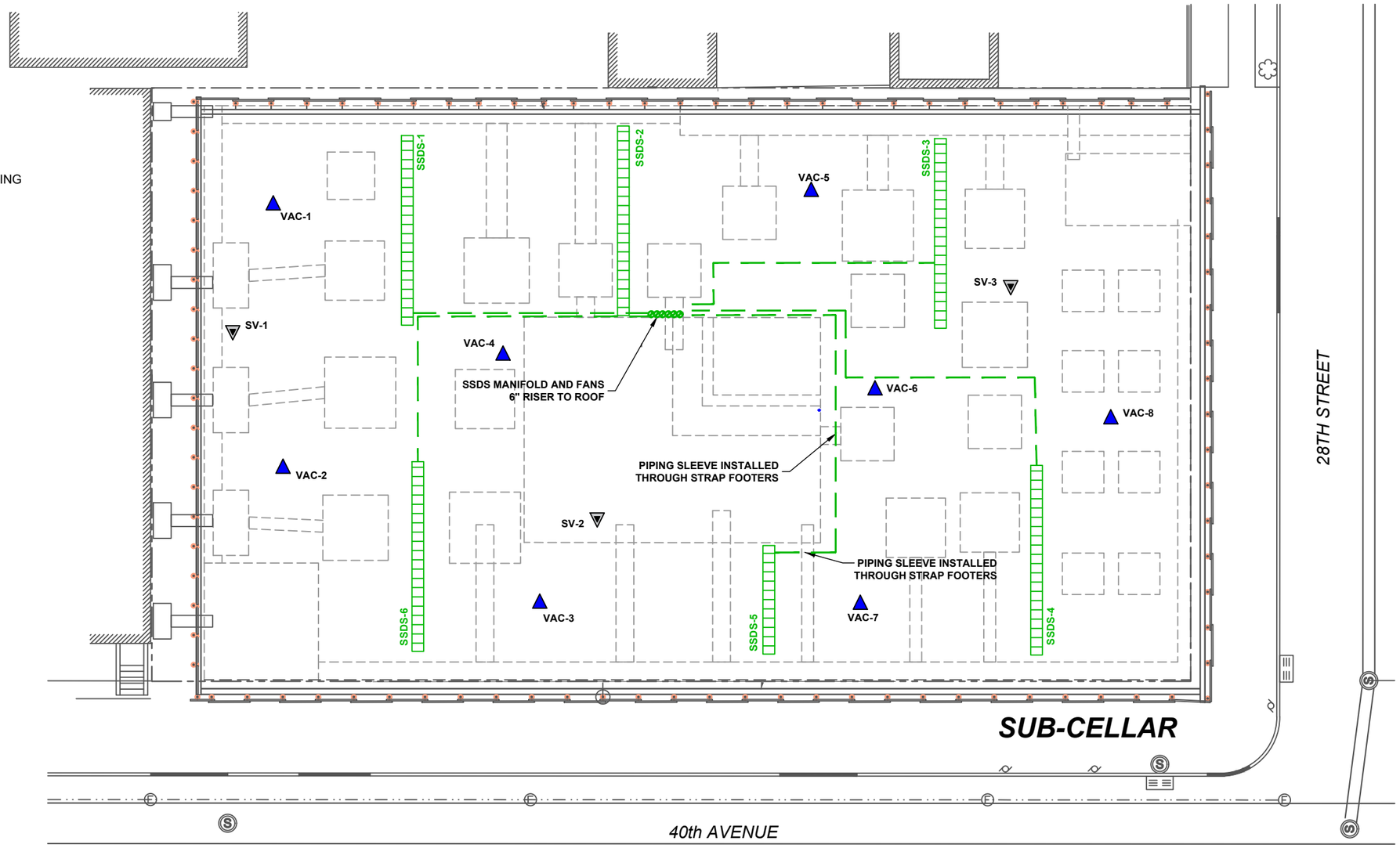
VACUUM MONITORING POINT

SOIL-VAPOR SAMPLE POINT

UNDERGROUND 3-INCH SCH. 40 PVC SSDS PIPING

3-INCH PERFORATED PVC SSDS PIPING

CONCRETE FOOTER FOUNDATION



NO.	DATE	REVISION
1	3/12/24	AS-BUILT EDITS PER JPC AND JRY DISCUSSION

ENGINEER'S SEAL

NOTE: DRAWING INTENDED FOR ILLUSTRATIVE PURPOSED ONLY, AS PART OF A SITE CHARACTERIZATION. NOT TO BE USED AS A BASIS FOR ENGINEERING OR DESIGN.
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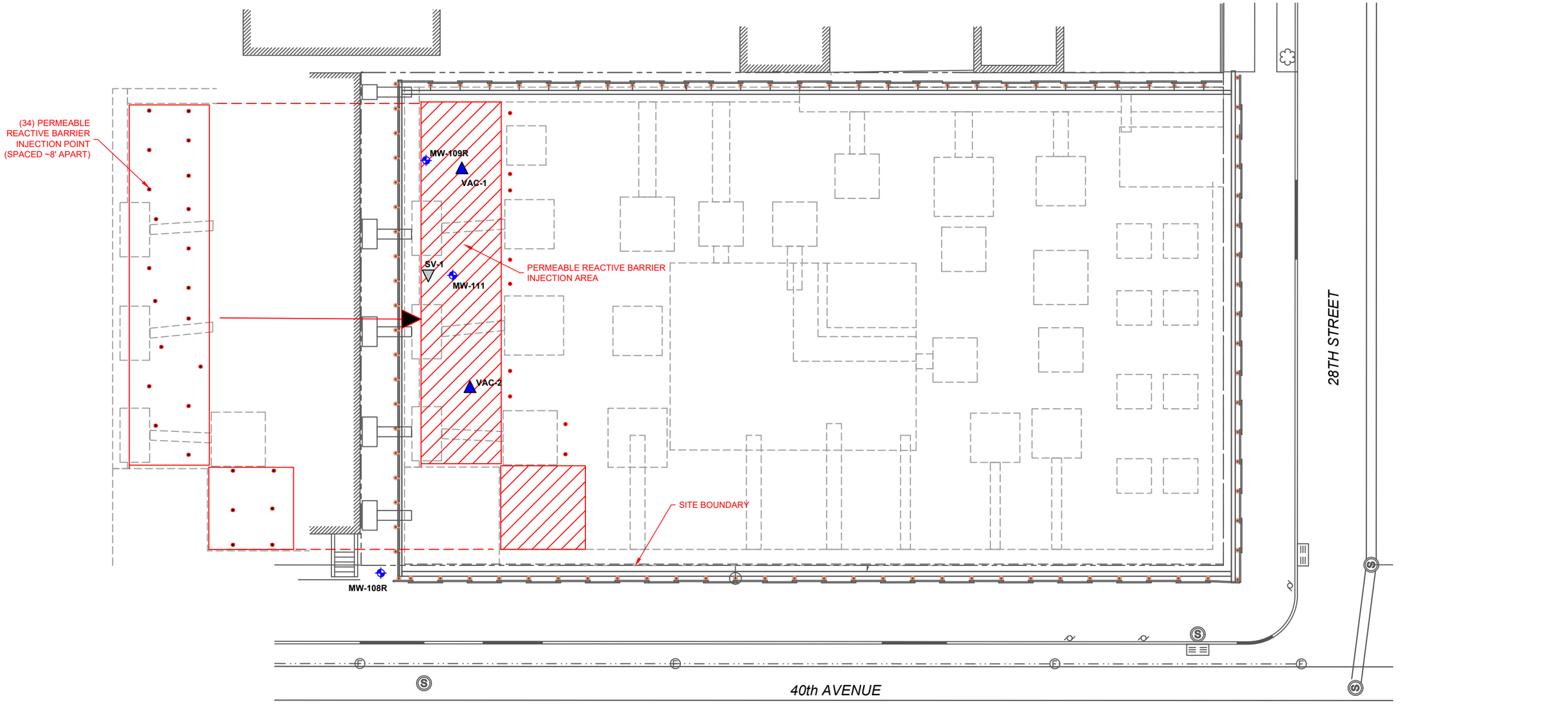
New York, NY 10016
Phone: 212-255-0374
www.libertyenviro.com

A-003 - SSDS SYSTEM LAYOUT

27-09 40th Avenue
Borough of Queens, City of New York, New York

PROJECT NO.: 220192	REV: 1	PREPARED BY: JRY
DATE: FEBRUARY 12, 2024	SCALE: 1" = 20'	APPROVED BY: JPC



NO.	DATE	REVISION
2	12/11/25	PRB INJECTION LOCATION ADDITIONS
1	3/12/24	PRB INJECTION LOCATION EDITS

ENGINEER'S SEAL

NOTE: DRAWING INTENDED FOR ILLUSTRATIVE PURPOSED ONLY, AS PART OF A SITE CHARACTERIZATION. NOT TO BE USED AS A BASIS FOR ENGINEERING OR DESIGN.
NOTE: BUILDING FOOTPRINT AND PROPERTY BOUNDARY GATHERED FROM HCN ARCHITECTS.

N

0 20′ 40′

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New York, NY 10016
Phone: 212-255-0374
www.libertyenviro.com

Permeable Reactive Barrier Injection Locations

27-09 40th Avenue
Borough of Queens, City of New York, New York

PROJECT NO.: 220192	REV: 2	PREPARED BY: JRY
DATE: DECEMBER 11, 2025	SCALE: 1" = 20'	APPROVED BY: JPC

APPENDIX F
O&M MANUAL (FOR EACH ACTIVE EC)
AND
COMMUNITY AIR MONITORING PLAN

Rn4EC
High Suction EC Radon Fan

When to use it

Our new Rn4EC radon fan is specifically designed for mitigation systems requiring high suction air performance, with the built-in flexibility to provide greater air flow rates at lower suction pressures as well.

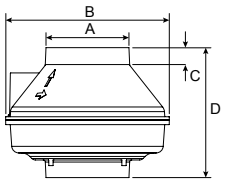
What makes it different

As the most powerful model in Fantech's family of Radon Mitigation fans, the Rn4EC can create 4.3" of suction while moving 20 cfm, as well as, move 490 cfm when operating at only 0.5" of suction.

The Rn4EC features an electronically commutated (EC) motor. Inherently efficient and operationally stable at full and reduced speeds, the EC motor arms the radon professional with installation methods not previously practical. Located in the wiring box, an integral speed control potentiometer can be used to "dial in" the fan speed necessary to achieve either the required sub-slab depressurization or required system air flow rate.

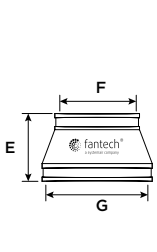
LDVI Couplings Included

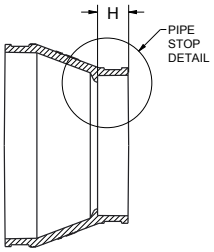
Included with every Rn4EC is a pair of Fantech's new LDVI (Low Durometer Vibration Isolating) couplings - available in 6x3 or 6x4. Designed specifically for radon mitigation applications, LDVI couplings are molded with a more flexible, more easily installed, low durometer material as compared to standard plumbing couplings.



Fan Dimensions

A	5 7/8
B	11 1/2
C	1 1/4
D	9 1/4





Coupling Dimensions

	Rn4EC-3	Rn4EC-4
E	4	4
F	3 1/2	4 1/2
G	6	6
H	1	1

Product and Performance Data

Fan Model	Couplers Included (Pair)	Fan Style	Pressure Category	Application Pressure Range[1] (in w.c.)	Max. Pressure[2] (in w.c.)	Electrical (V - ~ - Hz)	Rated Power (Watts)	RRNC 2.0 Fan Type
Rn4EC-3	LDVI 6x3	Inline	High	0 - 4.35	4.4	120 - 1 - 60	172	RF1 & RF2
Rn4EC-4	LDVI 6x4							

Cross Reference / Replacement Guide[3, 4]

Fantech		RadonAway	AMG / Festa
Recent	Older		
FR 200	R/F 200	GP301	Prowler
FR 225	R/F 225	GP401	Eagle
FR 250	R/F 250	GP501	Fury

Contact Us
Learn more and get in touch online at **fantech.net**

fantech®
a systemair company

[1] Where the fan moves approximately 20 CFM or more. [2] Where the fan operates, but creates no air movement. [3] Fan substitution/replacement based on pressure capability; pipe/connection sizes vary, and may require size transition couplings. [4] Referenced models are indicated for the Fantech model covering the majority of its application range.

Systemair Inc. • July, 2018 • Art. E1789

Item #: 142001
Rev Date: 2023-04-21
No. d'article #: 142001
Date de révision: 2023-04-21

Installation, Operations, and Maintenance Manual
Manuel d'installation, de fonctionnement et de maintenance

Rn2EC / Rn4EC

Inline EC Radon Fan • Ventilateur pour radon en ligne EC

PARTS IN THE BOX (Rn2EC)
Inline Radon Fan Rn, 1 pc
Installation, Operations, and Maintenance Manual, 1 pc

PARTS IN THE BOX (Rn4EC)
Inline Radon Fan Rn, 1 pc
LDVI™ Couplings, 2 pcs
Installation, Operations, and Maintenance Manual, 1 pc

PIÈCES DANS LA BOÎTE (Rn2EC)
Ventilateur pour radon en ligne Rn, 1 pc
Manuel d'installation, de fonctionnement et de maitenance, 1 pc

PIÈCES DANS LA BOÎTE (Rn4EC)
Ventilateur pour radon en ligne Rn, 1 pc
Couplages LDVI™, 2 pcs
Manuel d'installation, de fonctionnement et de maitenance, 1 pc

Rn2EC **Rn4EC**

Technical / Customer Support:
Support technique et service à la clientèle
United States 800.747.1762 **Canada** 800.565.3548

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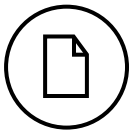
a systemair company

				
Note	Warning / Important note Avertissement / Note importante	Information	Technical information Information technique	Practical tip Conseil pratique

DO NOT CONNECT POWER SUPPLY until fan is completely installed.
Make sure electrical service to the fan is in the locked "OFF" position.

1. Fantech recommends installation of this product by a trained, licensed, certified mitigation professional. Incorrect installation will void any and all product warranties or liability. Verification of safe/acceptable radon levels after installation is required.

   Check your local code restrictions for additional safety measures that may be needed for proper code compliant installation.

2. This fan has rotating parts and safety precaution should be exercised during installation, operation and maintenance.

3. WARNING! TO REDUCE THE RISK OF FIRE, ELECTRIC SHOCK, OR INJURY TO PERSONS - OBSERVE THE FOLLOWING:
   a. Use this unit in the manner intended by the manufacturer. If you have any questions, contact your manufacturer's representative or contact us directly.

   b. CAUTION: Before installation, servicing or cleaning unit, switch power off at service panel and lock the service disconnection means to prevent power from being switched on accidentally. When the service disconnection means cannot be locked, securely fasten a prominent warning device, such as tag, to the panel.

   c. Installation work and electrical wiring must be done by qualified person(s) in accordance with all applicable codes and standards, including fire-rated construction.

   d. The combustion airflow needed for safe operation of fuel burning equipment may be affected by this unit's operation. Follow the heating equipment manufacturer's guidelines and safety standards such as those published by the National Fire Protection Association (NFPA), the American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) and the local code authorities.

   e. When cutting or drilling into wall and ceiling, do not damage electrical wiring and other hidden utilities.

   f. Ducted fans must always be vented to the outdoors.

4. WARNING! Check voltage at the fan to see if it corresponds to the motor name plate.

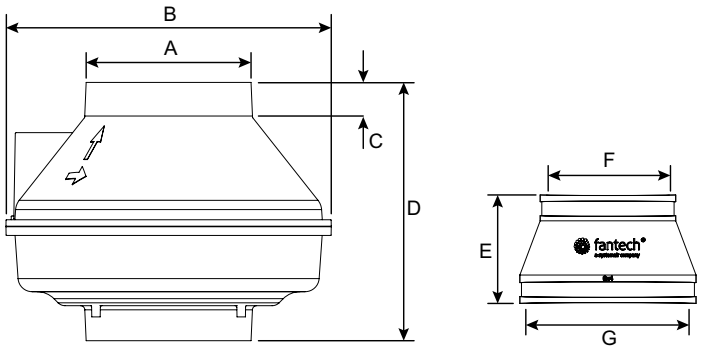
5. For radon mitigation use only. DO NOT use to exhaust hazardous or explosive materials and vapors.

6. Do not use this fan with any solid state speed control device.

GUARDS MUST BE INSTALLED WHEN FAN IS WITHIN REACH OF PERSONNEL OR WITHIN SEVEN (7) FEET OF WORKING LEVEL OR WHEN DEEMED ADVISABLE FOR SAFETY.

The ducting from this fan to the outside of the building has a strong effect on the air flow, noise and energy use of the fan. Use the shortest, straightest duct routing possible for best performance, and avoid installing the fan with smaller ducts than recommended. Insulation around the ducts can reduce energy loss and inhibit mold growth. Fans installed with existing ducts may not achieve their rated air flow.

DIMENSIONS



Model/ Modèle	A	B	C	D	E	F	G
Rn2EC	4 15/32 (114)	10 (254)	1 1/4 (32)	9 1/4 (235)	-	-	-
Rn4EC-3	5 7/8 (149)	11 1/2 (292)	1 1/4 (32)	9 1/4 (235)	4 (102)	3 1/2 (89)	6 (152)
Rn4EC-4	5 7/8 (149)	11 1/2 (292)	1 1/4 (32)	9 1/4 (235)	4 (102)	4 1/2 (114)	6 (152)

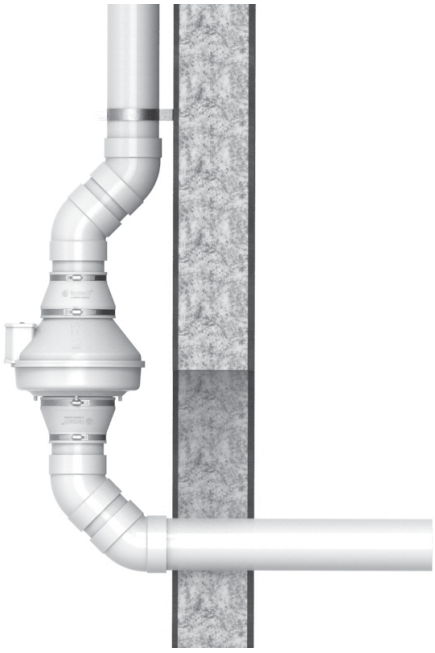
Dimensions in inches (mm).
Dimensions en pouces (mm)

INSTALLATION

Rn2EC-3 & Rn4EC-3 are designed for use with 3" schedule 40 PVC pipe.
Rn2EC-4 & Rn4EC-4 are designed for use with 4" schedule 40 PVC pipe.

Prior to installation, the suction pipe should be terminated at the exterior wall. The suction pipe should be installed with slight incline to drain water from the fan.

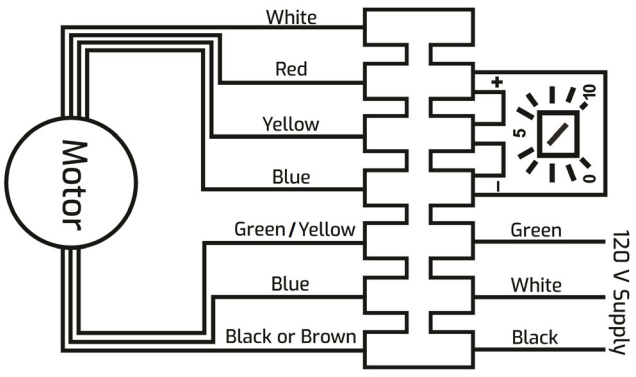
! Radon fans are to be installed in the vertical orientation ONLY.

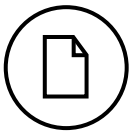
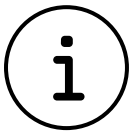


! DO NOT connect fan directly to building structure

WIRING DIAGRAM

To reduce fan speed use a small screwdriver and turn potentiometer knob counter clockwise



				
Note	Avertissement / Note imortante	Information	Information technique	Conseil pratique

NE PAS BRANCHER À L'ALIMENTATION ÉLECTRIQUE avant l'installation complète du ventilateur.
Assurez-vous que l'alimentation électrique du ventilateur est en position hors tension verrouillée (OFF).

1. Fantech recommande l'installation de ce produit par un professionnel de l'atténuation formé, agréé et certifié. Une installation incorrecte entraînera l'annulation de toutes les garanties ou responsabilités du produit. La vérification des niveaux de radon sécuritaires / acceptables après l'installation est requise.

   Vérifiez les restrictions de votre code local pour les mesures de sécurité supplémentaires qui peuvent être nécessaires pour une installation conforme au code approprié.
2. Ce ventilateur comporte des pièces rotatives; il est essentiel de faire preuve de prudence pendant l'installation, le fonctionnement et l'entretien.
3. AVERTISSEMENT! POUR RÉDUIRE LE RISQUE D'INCENDIE, D'ÉLECTROCUTION OU DE BLESSURES, VEUILLEZ RESPECTER LES RÈGLES SUIVANTES :
   a. Utilisez cet appareil de la manière prévue par le fabricant. Si vous avez des questions, communiquez avec le représentant du fabricant ou directement avec nous.
   b. MISE EN GARDE : Avant d'installer, de réparer ou de nettoyer l'appareil, coupez l'alimentation électrique au panneau de service et bloquez les dispositifs de sectionnement pour éviter que l'alimentation ne soit rétablie par accident. Si les dispositifs de sectionnement ne peuvent pas être bloqués, apposez une note d'avertissement bien visible, comme une étiquette, sur le panneau de service.
   c. Tous les travaux relatifs à l'installation et aux fils électriques devraient être effectués par un technicien qualifié, conformément aux normes et aux règlements en vigueur, y compris les travaux de construction classés résistants au feu.
   d. Le fonctionnement de cet appareil pourrait modifier la circulation d'air de combustion nécessaire au fonctionnement sécuritaire des appareils de combustion. Suivez les consignes du fabricant pour les appareils de chauffage et respectez les normes de sécurité comme celles établies par la National Fire Protection Association (NFPA), la American Society for Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) ainsi que les codes des autorités locales.
   e. Lorsque vous coupez ou percez un mur ou un plafond pour l'installation de l'appareil, assurez-vous de ne pas endommager le câblage électrique et les autres services publics cachés.
   f. Les conduits d'air des ventilateurs doivent toujours être éventés à l'extérieur.
4. AVERTISSEMENT! Vérifiez la tension du ventilateur pour confirmer qu'elle correspond à celle inscrite sur la plaque signalétique du moteur.
5. Uniquement pour la mise en oeuvre de mesures d'atténuation du radon. NE PAS utiliser pour évacuer des vapeurs ou des substances dangereuses ou explosives.
6. Ne pas utiliser cet appareil avec une commande de vitesse à semiconducteurs.

DES DISPOSITIFS PROTECTEURS DOIVENT ÊTRE INSTALLÉS SI LE VENTILATEUR SE TROUVE À PORTÉE DE MEMBRES DU PERSONNEL OU À SEPT (7) PIEDS OU MOINS DU NIVEAU DE FONCTIONNEMENT OU LORSQU'ILS SONT JUGÉS NÉCESSAIRES POUR DES RAISONS DE SÉCURITÉ

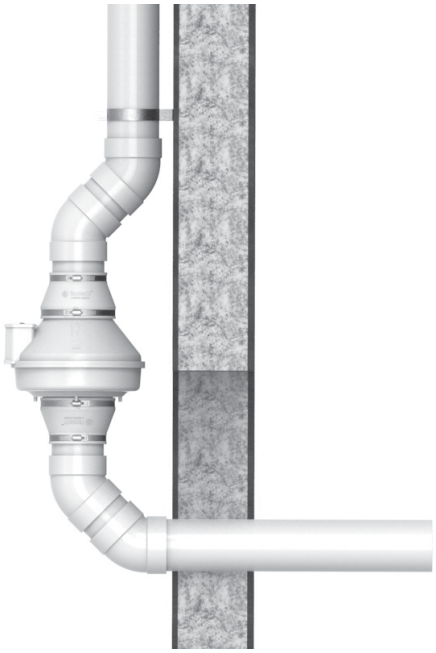
Le conduit de raccordement de ce ventilateur avec l'extérieur de l'immeuble a un effet important sur le débit d'air, le bruit et la consommation d'énergie du ventilateur. Veuillez utiliser le conduit le plus court et le plus droit possible pour obtenir un rendement optimal, et évitez d'installer des conduits plus petits que ceux recommandés pour le ventilateur. L'isolation autour des conduits peut réduire les pertes d'énergie et empêcher la moisissure. Les ventilateurs installés avec des conduits existants pourraient ne pas offrir le débit d'air nominal.

INSTALLATION

Le modèle Rn2EC-3 & Rn4EC-3 est conçu pour un usage avec des conduits de PVC de série 40 de 3 po.
Le modèle Rn2EC-4 & Rn4EC-4 est conçu pour un usage avec des conduits de PVC de série 40 de 4 po.

Avant l'installation, il faut prévoir une sortie pour le tuyau d'aspiration sur un mur extérieur. Le tuyau d'aspiration devrait être installé avec une pente légère pour drainer l'eau du ventilateur.

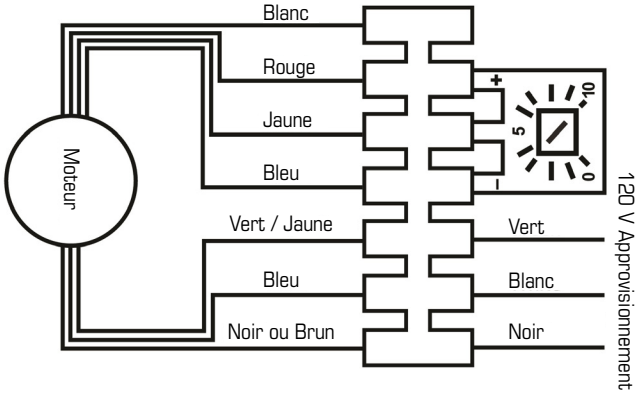
Les ventilateurs à radon doivent être installés dans le sens vertical SEULEMENT.



NE PAS attacher le ventilateur directement dans la structure du bâtiment.

SCHÉMA ÉLECTRIQUE

Pour réduire la vitesse du ventilateur, utilisez un petit tournevis et tournez le bouton du potentiomètre dans le sens inverse des aiguilles d'une montre.



Fantech reserves the right to make technical changes.
For updated documentation please refer to www.fantech.net

Fantech se réserve le droit de faire des changements techniques. Pour de la documentation à jour, s'il vous plaît se référer au www.fantech.net

Fantech®

Make a scan of the QR code above to access Fantech's warranty in English, French, or Spanish. Includes a 5y warranty.

If additional support is needed to retrieve the warranty, visit fantech.net; call (800) 747–1762 (US), (800) 565–3548 (Canada), or +52 55 1328–7328 (Latin America); email support@fantech.net; or mail us at 10048 Industrial Blvd, Lenexa, KS 66215 United States or at 50 Kanalläkt Way, Bouctouche, NB E4S 3M5 Canada.

Scannez le code QR ci-dessus pour accéder à la garantie de Fantech en anglais, français ou espagnol. Garantie the 5 ans inclue

Si vous avez besoin d'une assistance supplémentaire pour récupérer la garantie, visitez fantech.net; appelez au (800) 747-1762 (États-Unis), (800) 565-3548 (Canada) ou +52 55 1328-7328 (Amérique latine); envoyez un courriel à support@fantech.net; ou envoyez-nous un courrier à 10048 Industrial Blvd, Lenexa, KS 66215 États-Unis ou à 50 Kanalläkt Way, Bouctouche, NB E4S 3M5 Canada.

fantech®
a systemair company

GEIGER PUMP & EQUIPMENT

Operations Manual

For:
LIBERTY ENVIRONMENTAL
505 PENN STREET
READING, PA 19601

Quote # 230926JG.4
PO #

CUSTOM SSDS VACCUM PACKAGE TO INCLUDE:

AMETEK ROTRON REGENERATIVE BLOWER DR979BE72W WITH 15HP, GX-125 SKID WITH MANUAL HAND PUMP, DRAIN VALVE, GEAR PUMP WITH 1HP, VACUUM RELIEF VALVE, LOW VACUUM SWITCH, HIGH TEMPERATURE SWITCH, NEMA 3R CONTROL PANEL 460/3/60, 3" DILUTION VALVE ASSEMBLY, 5 LEG MANIFOLD WITH VACUUM GAUGES, GATE VALVES, PORTS AND ISOLVATION VALVES

Supplier:
Geiger Pump and Equipment.
830 Tryens Road
Aston, PA 19014

D23J-3652
February 27, 2024

GEIGER PUMP & EQUIPMENT

Liberty Environmental

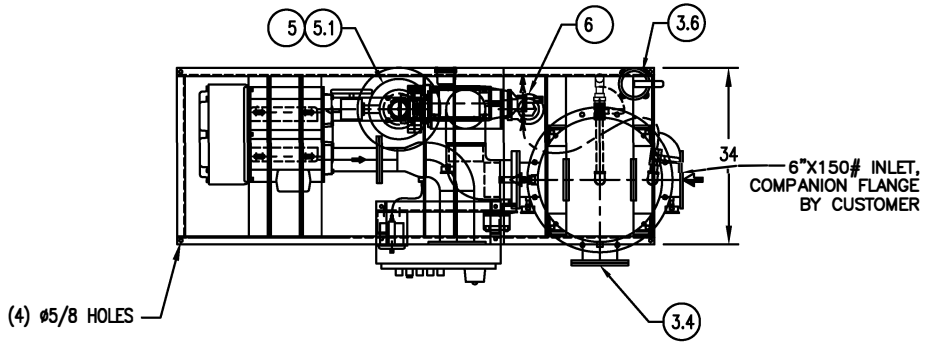
D23J-3652

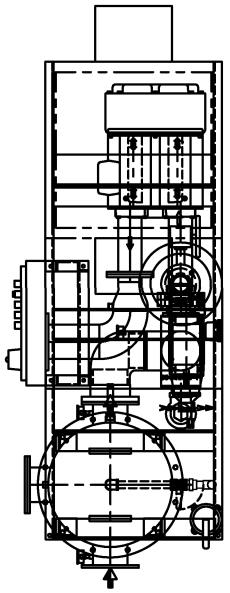
GEIGER CUSTOM SSDS PACKAGE

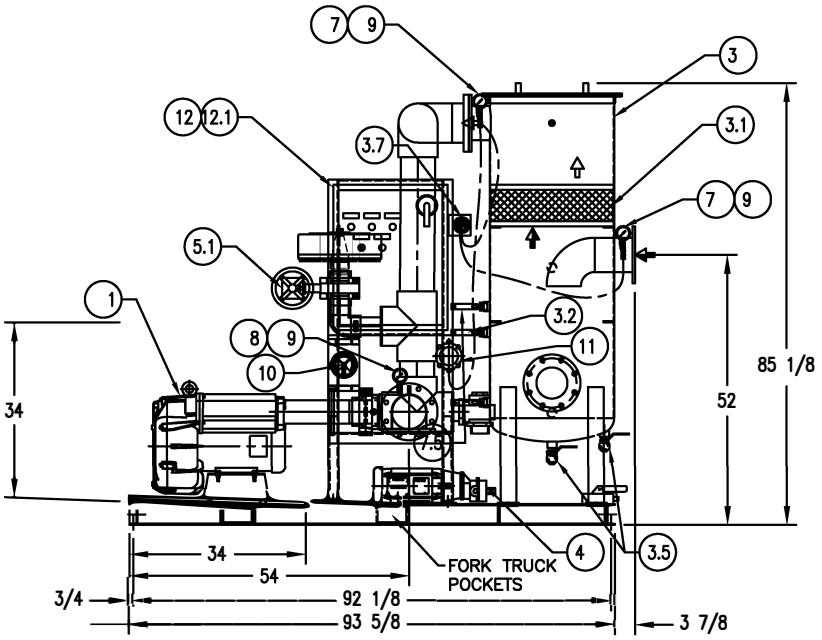
700 scfm at 20" H20

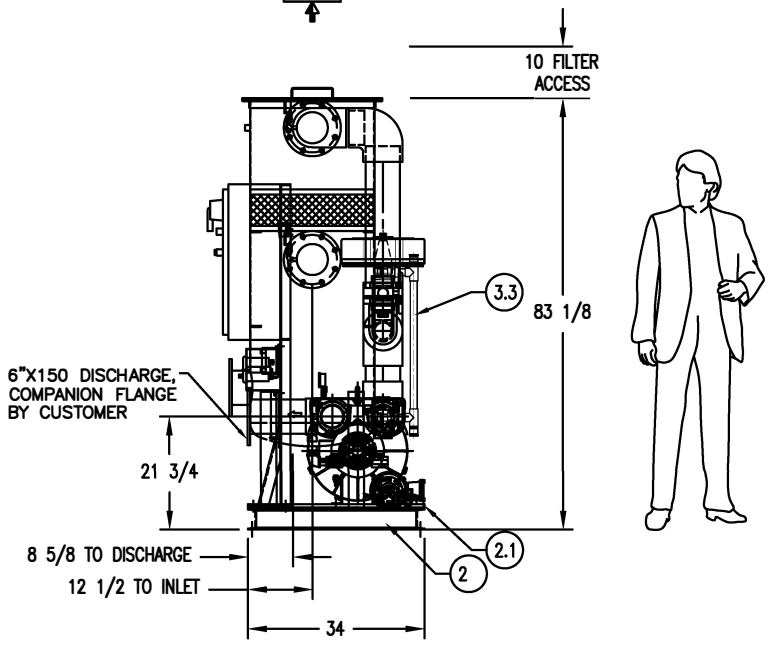
Description	Date	Revision
#230926JG.4		
Liberty		

Item	Qty.	Supplier	Component	Description	Geiger Part Number	Misc ID	Weight
1	1	Ametek Rotron	Blower	Regenerative Blower, #080704	A5DR979BE72W-0000	4", 15 HP, TEFC, 230/460/3/60	300
2	1	Geiger	Base	Base Weldment, 93 X 34	Custom		275
2.1	1	Geiger	Vibration Mat	Vibration Mat	Z2GVM-4.0X6.0-0000		45
3	1	Geiger	Moisture Seperator	GX-125 DL	Z4TK-C-9270-0000	6" port	320
3.1	1	CWI	Demister Material	SS Demister Material	Z24SC-6-23.75-0000		15
3.2	3	Dwyer	Level Switch	Level Switch	Z2SW-L7-1.0-BSR-0100		3
3.3	1	Geiger	Sight Gauge	Sight Gauge	Custom		4
3.4	1	Geiger	Cover	6" Clear Cover	Custom	6"	1
3.5	2	Apollo	Ball Valve	Drain Valve	Z2VBL-1.00-BT-0000	1"	4
3.6	1	McMaster	Sludge Pump	Manual Hand Pump	Z2MSP-10-1.00-0000	1"	3
3.7	1	Dwyer	Demister DP Gauge	Minihelic Gauge	Z2GD-2.1-0-020WC-1004		1
4	1	Oberdorfer	Gear Pump	Gear Pump, 1HP, 1750 RPM, TEFC/3P	Z1PMPA-BG10-1.00-0002	10gmp @ 25psi	22
5	1	Solberg	Inlet Filter Silencer	2 1/2" Inlet Filter Silencer	Z2FS-SL-2.5-P-1050	2 1/2"	14
5.1	1	Dilution Valve	Butterfly Valve	PPS BFV-3 Gear	Z2VBF-3.00-W-IEG-0100	3"	10
6	1	Nasvi	Kunkle Vacuum Relief Valve	3" Vacuum Relief Valve	Z2RV-3.00-V-S-0025	3", set at 5" HG (100" H20)	20
7	2	Geiger	Vacuum Gauge	Vacuum Gauge	Z2GV-2.5-0-012HG/160WC	0-160" H20	2
8	1	Geiger	Gauge	Pressure Gauge	Z2GP-2.5-0-06PSI/160WC	0-160" H20	1
9	3	SMC Specialties	Isolation Valve	Isolation Valves	Z2VIS-0.25-FM-B-0000		1
10	1	Jumo	Temperature Gauge/Switch	Hi Temp Gauge/ Switch	Z2SW-T4-0.0/200C-0300		3
11	1	Dwyer	Vacuum Switch	Low Vacuum Switch	Z2SW-D7-4.0/20.0W-0000	Nema 7, Set 10" WC Decr.	2
12	1	ICP	Control Panel	Nema 3R Control Panel	CPINT-Q110323-SG-1-3652	Standard Relay Logic, Dead Face, 460/3/60	100
12.1	1	Geiger	Control Panel Support	Support	Custom		65
							1211
MANIFOLD							
20	5	Harrington	Slice Gate Valve	3" CPVC	Custom	3"	
21	5	Geiger	Vacuum Gauge	Vacuum Gauge	Z2GV-2.5-0-012HG/160WC	0-160" H20	
22	10	SMC Specialties	Isolation Valve	Isolation Valves	Z2VIS-0.25-FM-B-0000		
23	5	SMC Specialties	Sample Port	Sample Port Valve	Z2VSP-0.25-FB-B-0000		









NOTES:
1. CUSTOMER PIPING TO BE INDEPENDENTLY SUPPORTED. PACKAGE PIPE SUPPORTS PROVIDED BUT MAY NOT BE SHOWN.
2. PACKAGE IS TO BE MOUNTED SECURELY TO A LEVEL CONCRETE PAD OR EQUAL
3. TOLERANCE ± 1/2"
4. (DIM) ARE CRITICAL DIMENSIONS
5. 900 ITEMS SHIP LOOSE

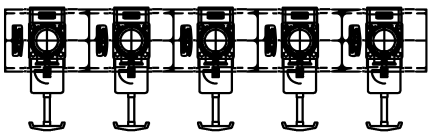
REV.	DATE	DESCRIPTION

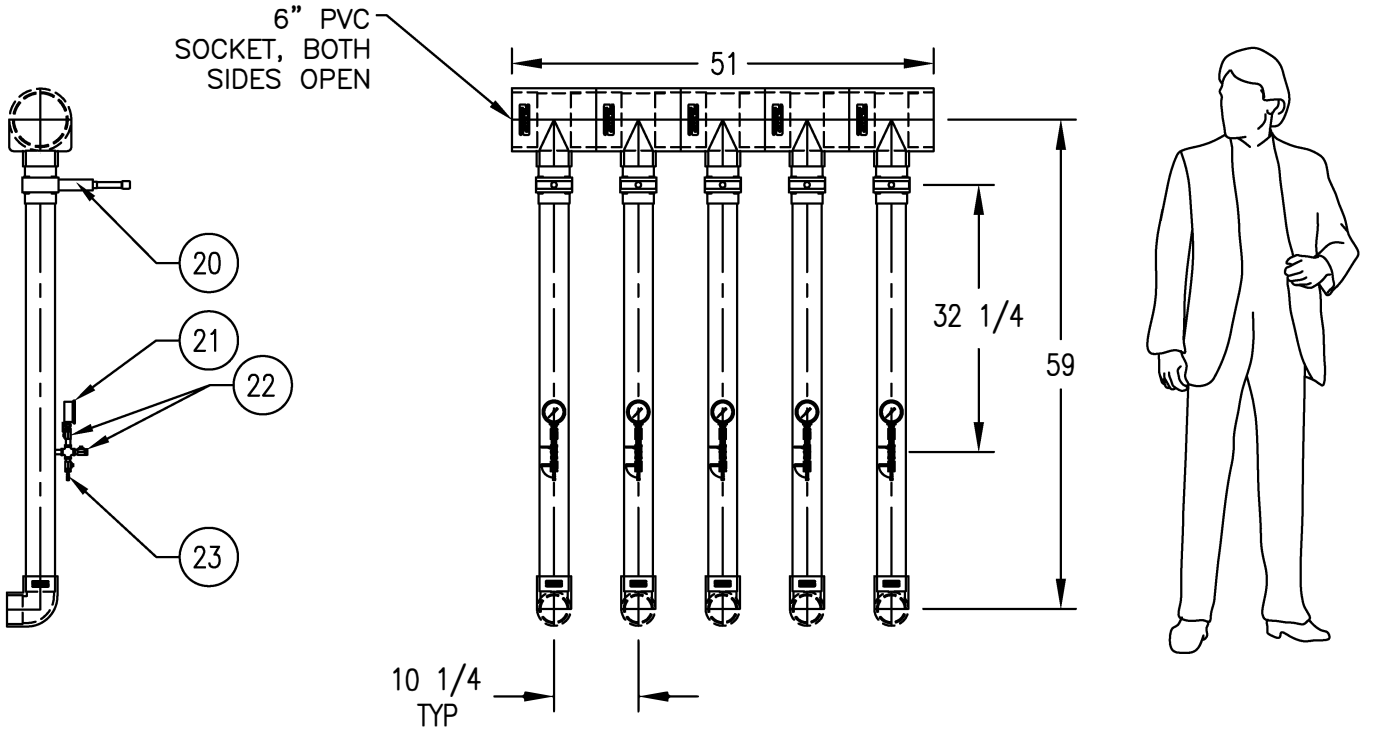
DRAWN BY: JJH
DATE: 11/7/23
APPROVED BY:
DATE:
DIMENSIONS IN INCHES
SCALE: NA
TOLERANCE: ±1/2"
ANGULAR TOLERANCE:
MATERIAL:
WEIGHT: 1300
SHEET 1 OF 2

GEIGER PUMP & EQUIP.
830 TRYENS RD
ASTON, PENNSYLVANIA 19014

SSDS BLOWER PACKAGE
DR979BE72W 15HP
GX125 M.S. CTRL PNL

D23-K-3652 | –





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APPROVED BY: | DATE:
DIMENSIONS IN INCHES
SCALE: NA
TOLERANCE: ±1/2" | ANGULAR TOLERANCE:
MATERIAL: | WEIGHT:
SHEET 2 OF 2

GEIGER PUMP & EQUIP.
830 TRYENS RD
ASTON, PENNSYLVANIA 19014

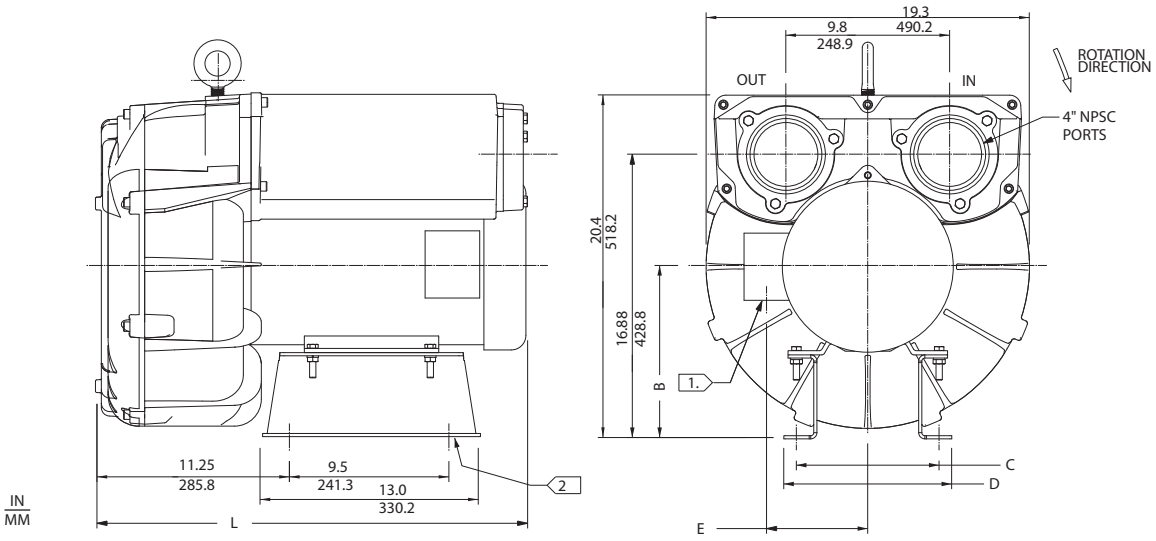
SSDS BLOWER PACKAGE
DR979BE72W 15HP
GX125 M.S. CTRL PNL

D23-K-3652 | –

DR 979 & CP 979

ROTRON®

15.0 / 20.0 HP Regenerative Blower



NOTES
1. TERMINAL BOX CONNECTOR HOLE 1.09 DIA. (DR979BE72W) 1.375 DIA. (DR979BH72W).
2. .75 (19.1) X 2.00 (50.8) 4X MOUNTING SLOTS.
2 DRAWING NOT TO SCALE, CONTACT FACTORY FOR SCALE CAD DRAWING.
3 CONTACT FACTORY FOR BLOWER MODEL LENGTHS NOT SHOWN.

MODEL	L (IN/MM)	B (IN/MM)	C (IN/MM)	D (IN/MM)	E (IN/MM)
DR979BH72W	29.0/736.6	12.25/311.2	11.50/292.1	13.19/335	8.09/205.5
DR979BE72W	25.38/644.6	10.25/260.4	8.38/212.9	9.88/250.9	6.88/174.8
DR979BE86W	25.81/655.6	10.25/260.4	8.38/212.9	9.88/250.9	6.88/174.8

		Part/ Model Number					
		DR979BH72W	DR979BE72W	DR979BE86W	DR979BH86W	CP979FJ72WLR	HiE979BE72W
Specification	Units	080718	080704	080702	080719	081777	
Motor Enclosure - Shaft Mtl.	-	TEFC-CS	TEFC-CS	TEFC-CS	TEFC-CS	CHEM TEFC-SS	TEFC-CS
Horsepower	-	20	15	15	20	15	20
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	-	H	H	H	H	H	H
NEMA Rated Motor Amps	Amps (A)	46/23	44/22	14.6	46/23	44/22	44/22
Service Factor	-	1.15	1.25	1.15	1.15	1.25	1.25
Max. Blower Amps	Amps (A)	60/30	52/26	21	66/33	52/26	52/26
Locked Rotor Amps	Amps (A)	294/147	290/145	93	294/147	290/145	290/145
NEMA Starter Size	-	3/2	2/2	2	3/2	2/2	2/2
Shipping Weight	Lbs	350	300	300	350	300	300
	Kg	158.8	136.1	136.1	158.8	136.1	136.1

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 ±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.

AMETEK DYNAMIC FLUID SOLUTIONS
75 North Street, Saugerties, NY 12477
USA: +1 215-256-6601 - Europe: +49 7703 930909 - Asia: +86 21 5763 1258
Customer Service Fax: +1 215.256.1338
www.ametekdfs.com

AMETEK®
PRECISION MOTION CONTROL
DYNAMIC FLUID SOLUTIONS

Industrial / Chemical Processing Blowers

DR 979 & CP 979

ROTRON®

15.0 / 20.0 HP Regenerative Blower

FEATURES

- Manufactured in the USA - ISO 9001 and NAFTA compliant
- CE compliant - Declaration of Conformity on file
- Maximum flow: 1100 SCFM
- Maximum pressure: 80 IWG
- Maximum vacuum: 87 IWG
- Standard motor: 15 HP, TEFC
- 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

MOTOR OPTIONS

- International voltage & frequency (Hz)
- Chemical duty, high efficiency, inverter duty or industry-specific designs
- Vairous horsepowers for application-specific needs

BLOWER OPTIONS

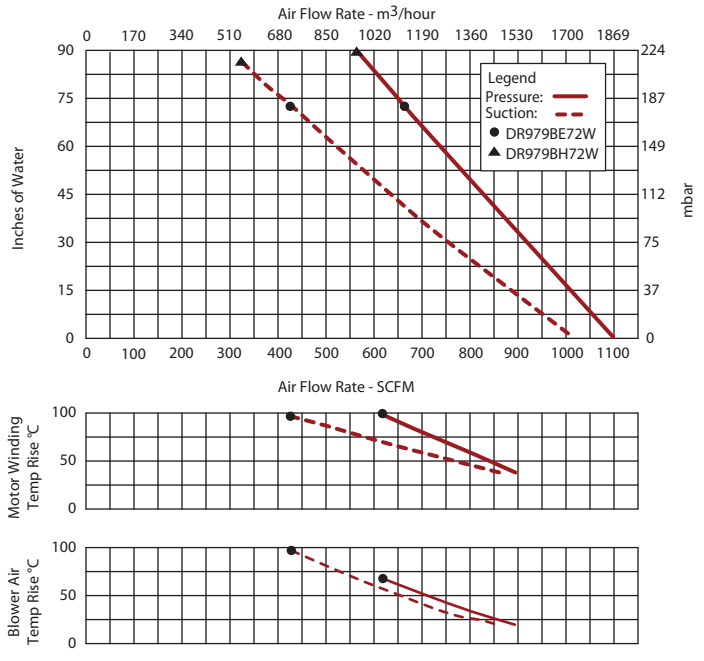
- Corrosion resistant surface treatments & sealing options
- Remote drive (motorless) models
- Slip-on or face flanges for application-specific needs

ACCESSORIES

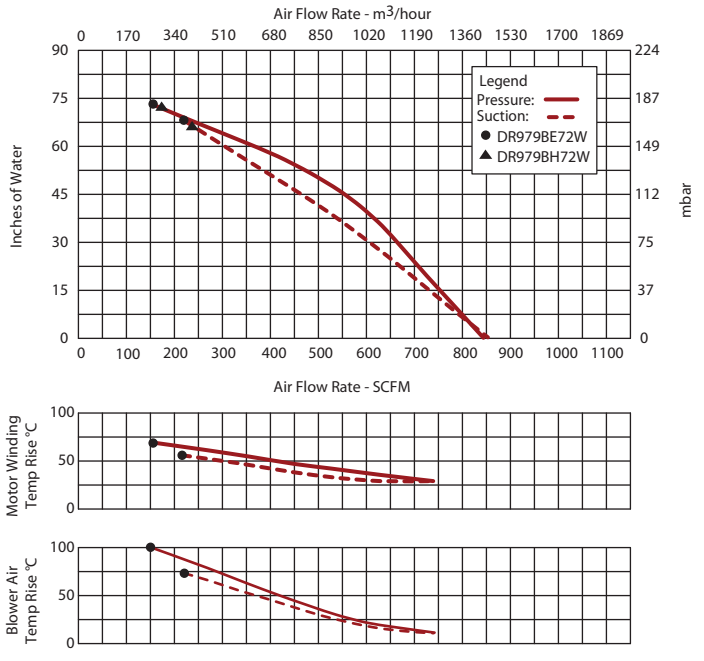
- Flowmeters reading in SCFM
- Filters & moisture separators
- Pressure gauges, vacuum gauges, & relief valves
- Switches - air flow, pressure, vacuum, or temperature
- External mufflers for additional silencing
- Air knives (used on blow-off applications)
- Variable frequency drive package

Blower Performance at Standard Conditions

60 Hz



50 Hz



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AMETEK®
PRECISION MOTION CONTROL
DYNAMIC FLUID SOLUTIONS

SERVICE AND PARTS MANUAL
FOR
BLOWER MODEL

DR6, 858, 909, 979, 14

DIRECT DRIVE REGENERATIVE BLOWER

AMETEK Dynamic Fluid Solutions
100 East Erie St., Kent, Ohio 44240
Telephone: 330-673-3452 Fax: 330-677-3306
email: dfs.information@ametek.com
internet: www.ametekdfs.com

Your Choice. Our Commitment.™

WARRANTY, INSTALLATION, MAINTENANCE AND TROUBLESHOOTING INSTRUCTIONS

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1. AMETEK Rotron DR, EN and HiE regenerative direct drive blowers are guaranteed for one full year from the date of installation (limited to 18 months from the date of shipment) to the original purchaser only. Should the blower fail we will evaluate the failure If failure is determined to be workmanship or material defect related, we will at our option repair or replace the blower.

2. AMETEK Rotron Minispiral, Revaflow, Multiflow, Nautilair, remote drive blowers, moisture separators, packaged units, CP blowers, Nasty Gas™ models and special built (EO) products are guaranteed for one full year from date of shipment for workmanship and material defect to the original purchaser only. Should the blower fail, If failure is determined to be workmanship or material defect related, we will at our option repair or replace the blower.

3. **Parts Policy** - AMETEK Rotron spare parts and accessories are guaranteed for three months from date of shipment for workmanship and material defect to the original purchaser only. If failure is determined to be workmanship or material defect related we will at our option repair or replace the part.

Corrective Action - A written report will be provided indicating reason(s) for failure, with suggestions for corrective action. Subsequent customer failures due to abuse, misuse, misapplication or repeat offense will not be covered. AMETEK Rotron will then notify you of your options. Any failed unit that is tampered with by attempting repair or diagnosis will void the warranty, unless authorized by the factory.

Terms and Conditions - Our warranty covers repairs or replacement of regenerative blowers only, and will not cover labor for installation, outbound and inbound shipping costs, accessories or other items not considered integral blower parts. Charges may be incurred on products returned for reasons other than failures covered by their appropriate warranty. Out-of-warranty product and in warranty product returned for failures determined to be caused by abuse, misuse, or repeat offense will be subject to an evaluation charge. Maximum liability will in no case exceed the value of the product purchased. Damage resulting from mishandling during shipment is not covered by this warranty. It is the responsibility of the purchaser to file claims with the carrier. Other terms and conditions of sale are stated on the back of the order acknowledgement.

Installation Instructions for SL, DR, EN, CP, and HiE Series Blowers

1. **Bolt It Down** - Any blower must be secured against movement prior to starting or testing to prevent injury or damage. The blower does not vibrate much more than a standard electric motor.

2. **Filtration** - All blowers should be filtered prior to starting. Care must be taken so that no foreign material enters the blower. If foreign material does enter the blower, it could cause internal damage or may exit at extremely high velocity.

   Should excessive amounts of material pass through the blower, it is suggested that the cover(s) and impeller(s) be removed periodically and cleaned to avoid impeller imbalance. Impeller

imbalance greatly speeds bearing wear, thus reducing blower life. Disassembling the blower will void warranty, so contact the factory for cleaning authorization.

3. **Support the Piping** - The blower flanges and nozzles are designed as connection points only and are not designed to be support members.

   Caution: Plastic piping should not be used on blowers larger than 1 HP that are operating near their maximum pressure or suction point. Blower housing and nearby piping temperatures can exceed 200ºF. Access by personnel to the blower or nearby piping should be limited, guarded, or marked, to prevent danger of burns.

4. **Wiring** - Blowers must be wired and protected/fused in accordance with local and national electrical codes. All blowers must be grounded to prevent electrical shock. Slo-Blo or time delay fuses should be used to bypass the first second of start-up amperage.

5. **Pressure/Suction Maximums** - The maximum pressure and/or suction listed on the model label should not be exceeded. This can be monitored by means of a pressure or suction gage (available from Rotron), installed in the piping at the blower outlet or inlet. Also, if problems do arise, the Rotron Field representative will need to know the operating pressure/suction to properly diagnose the problem.

6. **Excess Air** - Bleed excess air off. DO NOT throttle to reduce flow. When bleeding off excess air, the blower draws less power and runs cooler.

   Note: Remote Drive (Motorless) Blowers - Properly designed and installed guards should be used on all belts, pulleys, couplings, etc. Observe maximum remote drive speed allowable. Due to the range of uses, drive guards are the responsibility of the customer or user. Belts should be tensioned using belt gauge.

Maintenance Procedure

When properly piped, filtered, and applied, little or no routine maintenance is required. Keep the filter clean. Also, all standard models in the DR, EN, CP, and HiE series have sealed bearings that require no maintenance. Bearing should be changed after 15,000 to 20,000 hours, on average. Replacement bearing information is specified on the chart below.

Bearing Part Number	Size	Seal Material	Grease	Heat Stabilized
510217 510218 510219	205 206 207	Polyacrylic	Nye Rheotemp 500 30% +/- 5% Fill	Yes – 325 F
510449 516440 516648	203 202 307	Buna N	Exxon Polyrex Grease	NO
516840 516841 516842 516843 516844 516845 516846 516847	206 207 208 210 309 310 311 313	Buna N	Exxon Polyrex Grease	NO

Troubleshooting

		POSSIBLE CAUSE	OUT OF WARRANTY REMEDY ***
IMPELLER DOES NOT TURN	Humming Sound	1. * One phase of power line not connected 2. * One phase of stator winding open 3. Bearings defective 4. Impeller jammed by foreign material 5. Impeller jammed against housing or cover 6. ** Capacitor open	1. Connect 2. Rewind or buy new motor 3. Change bearings 4. Clean and add filter 5. Adjust 6. Change capacitor
	No Sound	1. * Two phases of power line not connected 2. * Two phases of stator winding open	1. Connect 2. Rewind or buy new motor
IMPELLER TURNS	Blown Fuse	1. Insufficient fuse capacity 2. Short circuit	1. Use time delay fuse of proper rating 2. Repair
	Motor Overheated Or Protector Trips	1. High or low voltage 2. * Operating in single phase condition 3. Bearings defective 4. Impeller rubbing against housing or cover 5. Impeller or air passage clogged by foreign material 6. Unit operating beyond performance range 7. Capacitor shorted 8. * One phase of stator winding short circuited	1. Check input voltage 2. Check connections 3. Check bearings 4. Adjust 5. Clean and add filter 6. Reduce system pressure/vacuum 7. Change capacitor 8. Rewind or buy new motor
	Abnormal Sound	1. Impeller rubbing against housing or cover 2. Impeller or air passages clogged by foreign material 3. Bearings defective	1. Adjust 2. Clean and add filter 3. Change bearings
	Performance Below Standard	1. Leak in piping 2. Piping and air passages clogged 3. Impeller rotation reversed 4. Leak in blower 5. Low voltage	1. Tighten 2. Clean 3. Check wiring 4. Tighten cover, flange 5. Check input voltage

*** 3 phase units**

**** 1 phase units**

***** Disassembly and repair of new blowers or motors will void the Rotron warranty. Factory should be contacted prior to any attempt to field repair an in-warranty unit.**

Blower Disassembly:

WARNING: Attempting to repair or diagnose a blower may void Rotron's warranty. It may also be difficult to successfully disassemble and reassemble the unit.

1) Disconnect the power leads. **CAUTION:** Be sure the power is disconnected before doing any work whatsoever on the unit.

2) Remove or separate piping and/or mufflers and filters from the unit.

3) Remove the cover bolts and then the cover. **NOTE:** Some units are equipped with seals. It is mandatory that these seals be replaced once the unit has been opened.

4) Remove the impeller bolt and washers and then remove the impeller. **NOTE:** Never pry on the edges of the impeller. Use a puller as necessary.

5) Carefully note the number and location of the shims. Remove and set them aside. NOTE: If the disassembly was for inspection and cleaning the unit may now be reassembled by reversing the above steps. If motor servicing or replacement and/or impeller replacement is required the same shims may not be used. It will be necessary to re-shim the impeller according to the procedure explained under assembly.

6) Remove the housing bolts and remove the motor assembly (arbor/.housing on remote drive models).

7) Arbor disassembly (Applicable on remote drive models only):
   a) Slide the bearing retraining sleeve off the shaft at the blower end.
   b) Remove the four (4) screws and the bearing retaining plate from the blower end.
   c) Lift the shaft assembly far enough out of the arbor to allow removal of the blower end snap ring.
   d) Remove the shaft assembly from the arbor.
   e) If necessary, remove the shaft dust seal from the pulley end of the arbor.

Muffler Material Replacement:

1) Remove the manifold cover bolts and them manifold cover.

2) The muffler material can now be removed and replaced if necessary. On blowers with fiberglass acoustical wrap the tubular retaining screens with the fiberglass matting before sliding the muffler pads over the screens.

3) Reassemble by reversing the procedure.

NOTE: On DR068 models with tubular mufflers it is necessary to remove the cover and impeller accessing the muffler material from the housing cavity.

Blower Reassembly:

1) Place the assembled motor (assembled arbor assembly for remote drive models) against the rear of the housing and fasten with the bolts and washer.

2) To ensure the impeller is centered within the housing cavity re-shim the impeller according to the procedure outlined below.

3) If blower had a seal replace the seal with a new one.

4) Place the impeller onto the shaft making sure the shaft key is in place and fasten with the bolt, washer and spacer as applicable. Torque the impeller bolt per the table below. Once fastened carefully rotate the impeller to be sure it turns freely.

5) Replace the cover and fasten with bolts.

6) Reconnect the power leads to the motor per the motor nameplate.

Bolt Size	Torque Pound-Force-Foot
1/4-20	6.25 +/- 0.25
5/16-18	11.5 +/- 0.25
3/8-16	20.0 +/- 0.5
½-13	49.0 +/- 1
5/8 –11	90.0 +/- 2

Impeller Shimming Procedure:

WARNING: This unit may be difficult to shim. Extreme care may be exercised.

Tools Needed: Machinist's Parallel Bar
Vernier Caliper with depth measuring capability
Feeler gauges or depth gauge

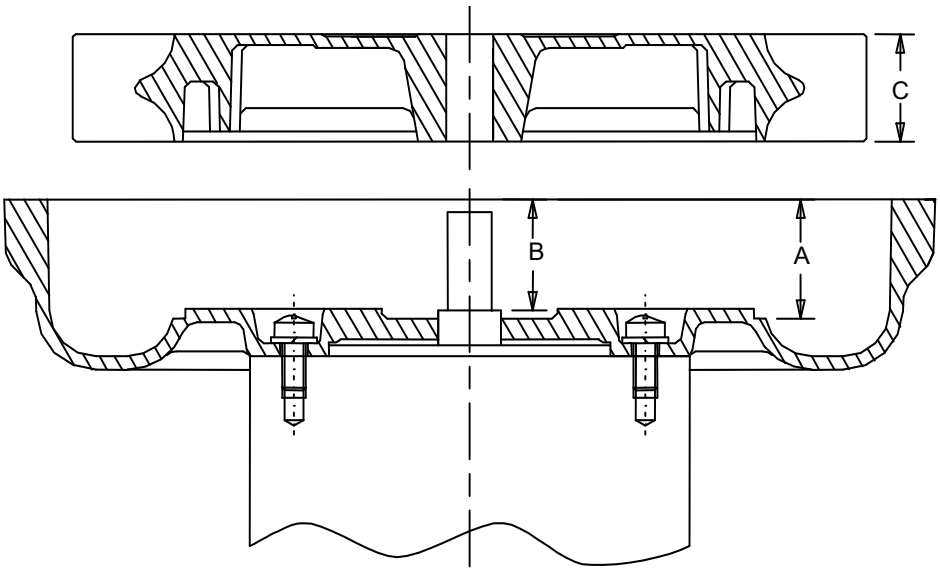
Measure the Following:

Distance from the flange face to the housing (A)
Distance from the flange face to the motor shaft shoulder (B)
Impeller Thickness (C)

Measurements (A) and (B) are made by laying the parallel bar across the housing flange face and measuring to the proper points. Each measurement should be made at three points, and the average of the readings should be used.

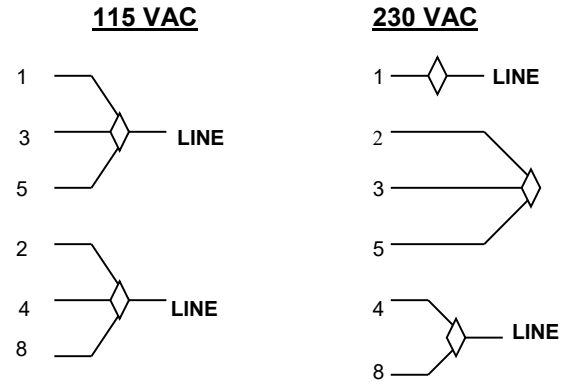
Shim Thickness = B – (A+C)/2

After the impeller installation (step #4 above) the impeller/cover clearance can be checked with feeler gauges, laying the parallel bar across the housing flange face. This clearance should nominally be (A-C)/2.



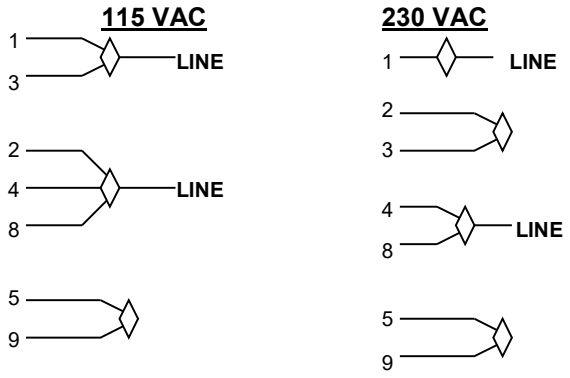
WIRING DIAGRAMS, TEFC and ODP MOTORS

A. 1Ø, 6 WIRE



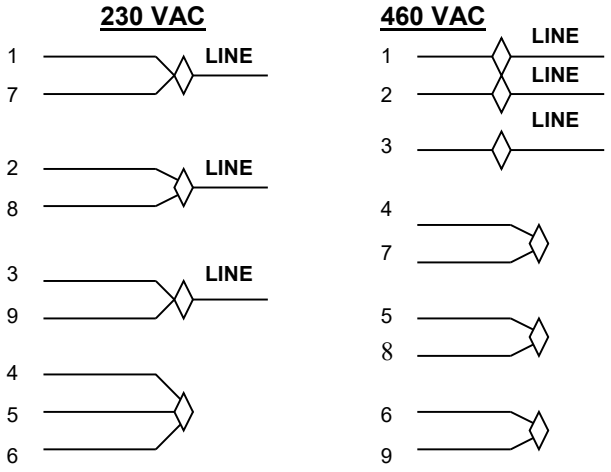
INTERCHANGE LEADWIRES 5 & 8 to REVERSE ROTATION

B. 1Ø, 7 WIRE



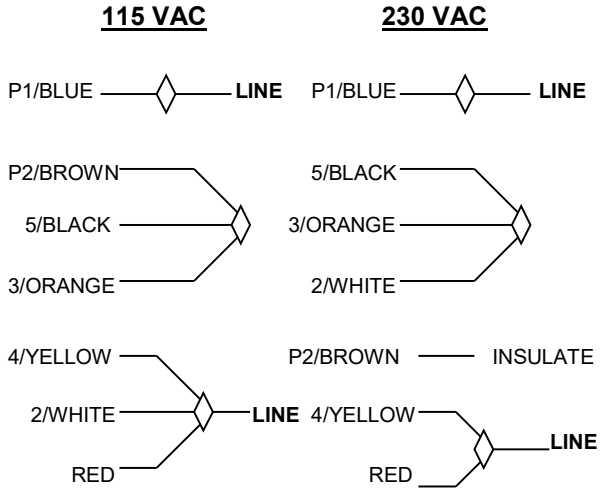
INTERCHANGE LEADWIRES 5 & 8 to REVERSE ROTATION

C. 3Ø, 9 WIRE



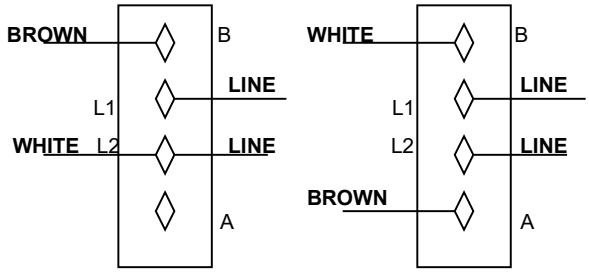
INTERCHANGE ANY TWO LEAD LINES TO REVERSE ROTATION

D. 1Ø, EMERSON 1/8 HP MOTOR



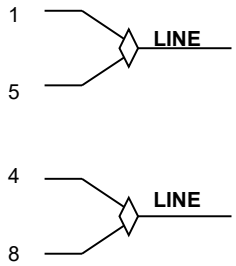
INTERCHANGE RED AND BLACK TO REVERSE ROTATION

E. 1Ø, SPA DUTY WITH TERMINAL STRIPS



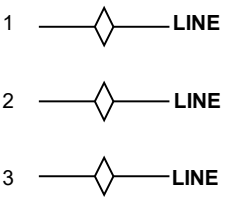
F. 1Ø, 230 VAC

SINGLE VOLTAGE



INTERCHANGE LEAD WIRES 5 & 8 TO REVERSE ROTATION

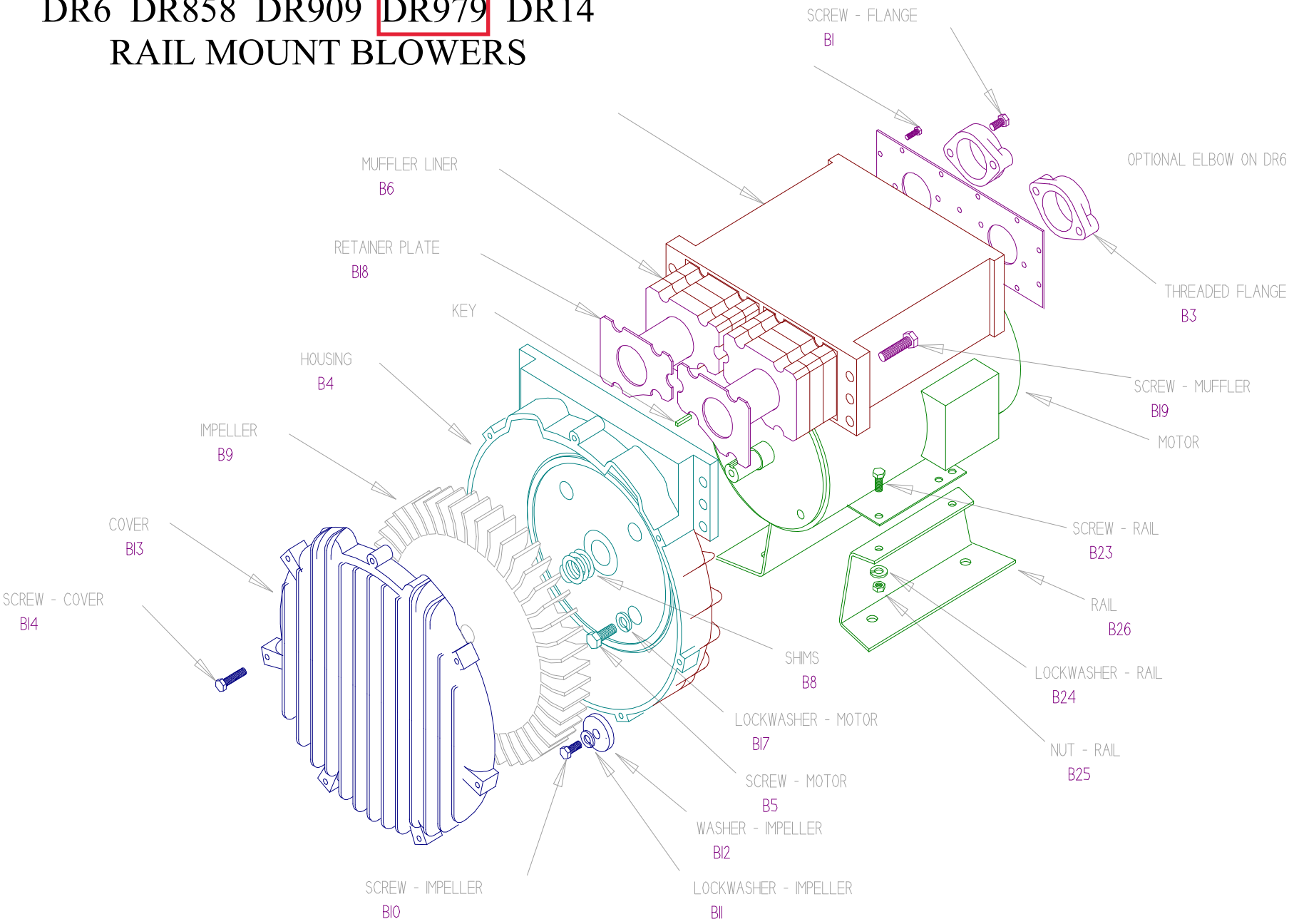
G. 3Ø, 575 VAC



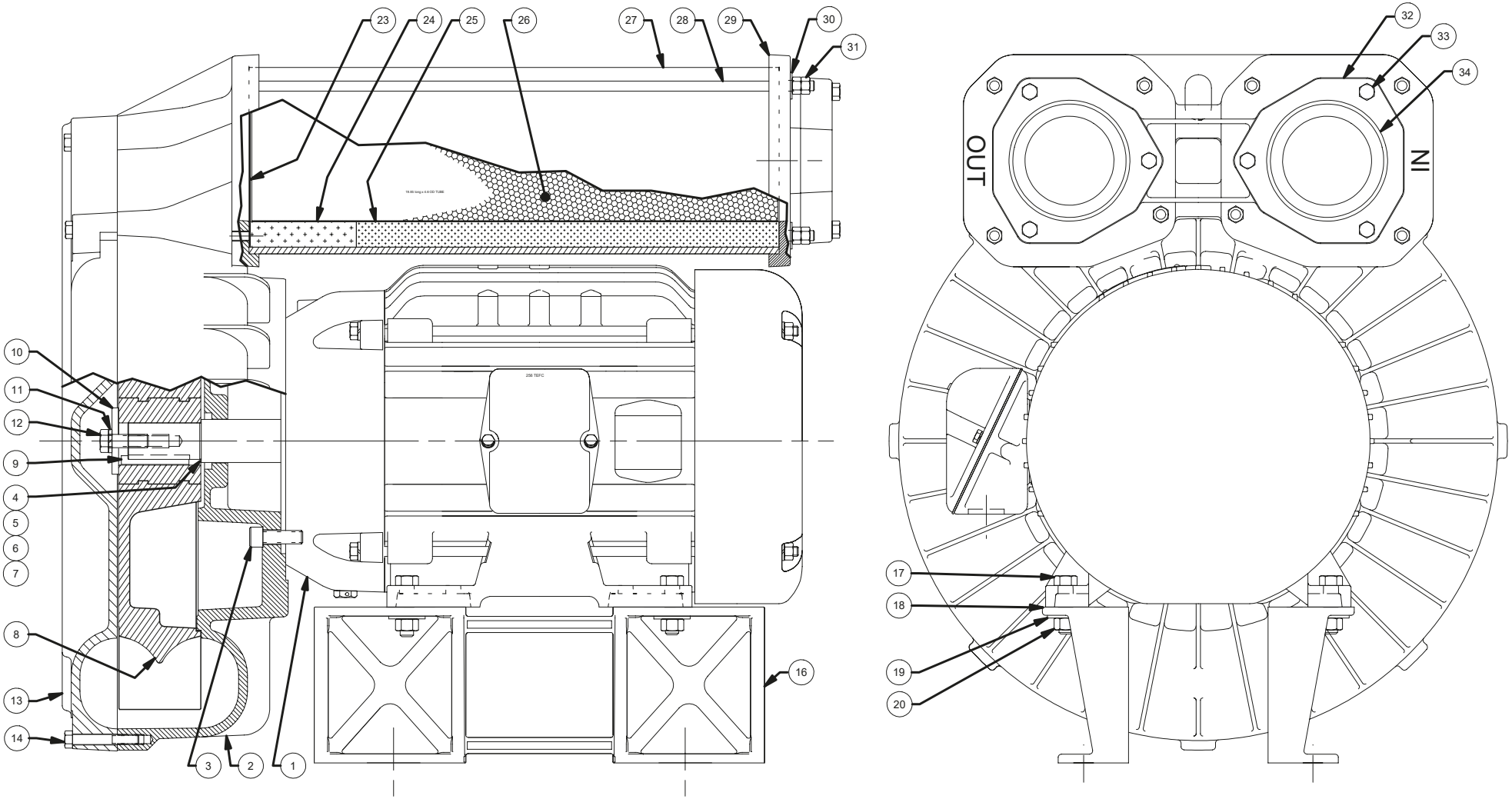
INTERCHANGE ANY TWO LEAD LINES TO REVERSE ROTATION

ASSEMBLY DIAGRAM

ASSEMBLY DIAGRAM
DR6 DR858 DR909 DR979 DR14
RAIL MOUNT BLOWERS



ASSEMBLY DIAGRAM "B"



Parts Breakdown

Item No.	Qty. Req'd	Description	DR6	DR858 - Rail	DR858 - Base	DR909 - Rail	DR909 - Base	DR909 - Rail	DR979	DR14
		Model:								
		Part No.:	**027578**	**038738**	**038735**	**038620**	**038622**	**081737**	**080702**	**038750**
			027579	**038740**	**038736**	**038621**	**038623**	**081739**	**080704**	**038751**
			027600	**038742**	**038737**	**038625**	**038626**	**081738**	**080632**	**038759**
			036212	**038743**	**080173**	**080300**	**080183**	**081744**	**080718**	**080451**
			038071	**080022**		**038633**				**080612**
				080172						
						OBSOLETE		NEW		OBSOLETE
M3	1	Key Motor Shaft	510212	511532	511532	511532	511532	511532	551570	155066
B1	6	Screw, Flange	(4 pcs) 120065	(4 pcs) 155067	(4 pcs) 155067	140016	140016	140016	140016	140016
B3	2	Flange	478341	511614	511614	529912	**553003**	529912	529912	529912
	2	Screen, Flange Guard	511479	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used
		Elbow 90º	See Next Page	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used
B4	1	Housing	515497	515410	515410	515356	553039	552409	See Next Page	515975
B5	4	Screw, Hsg /Motor	251792	155034	155034	140014	140014	**120205**	120205	120205
B6		Muffler Material	Not Used	(7 pcs) 551736	(7 pcs) 551736	(10 pcs) 551738	(10 pcs) 551738	(2 pcs) 552477	(8 pcs) 551571	(12 pcs) 551740
		Muffler Material	Not Used	(2 pcs) 551737	(2 pcs) 551737	(2 pcs) 551739	(2 pcs) 551739	552483	Not Used	(2 pcs) 551741
	2	Muffler Screen guard	Not Used	Not Used	Not Used	551730	551730	Not Used	Not Used	551744
B8	*	Shim .002"	272703	511547	511547	511547	511547	511547	511547	515991
	*	Shim .005"	272704	511548	511548	511548	511548	511548	511548	515992
	*	Shim .010"	272705	511549	511549	511549	511549	511549	511549	515993
	*	Shim .020"	272706	511550	511550	511550	511550	511550	511550	515994
B9	1	Impeller	515484	515249	515249	552544	**552431**	552431	551566	515509
B10	1	Bolt, Impeller	251791	120210	120210	140015	140015	120210	140015	155068
B11	1	Lockwasher, Impeller	251787	251788	251788	251788	251788	251788	251788	251788
B12	1	Washer, Impeller	Not Used	511529	511529	Not Used	Not Used	Not Used	Not Used	Not Used
B13	1	Cover	515488	515247	515247	515359	515359	515359	551409	515910
B14	8	Screw, Cover	155170	140016	140016	140016	140016	140016	155512	155069
B15	1	Eye Bolt	Not Used	140019	Not Used	140019	Not Used	Not Used	See Next Page	140019
B16	1	Spacer, Impeller Bolt	478336	515555	515555	511529	511529	511529	511529	515990
		Shaft Sleeve	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used
B17	4	Lockwasher, Housing	251788	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used
B18	2	Screen, Muffler	Not Used	551723	551723	551725	551725	552479	551611	551727
	2	Finger guard	Not Used	Not Used	Not Used	551730	**Not Used**	Not Used	Not Used	Not Used
B19	6	Bolt, Muffler Hsg/Hsg	Not Used	155025	155025	155025	155025	(3) 120251	155512	155067
B19A	4	Bolt, Muffler Hsg/Hsg	Not Used	120214	Not Used	120214	Not Used	**(4) 155025**	Not Used	120214
B20	1	Muffler Housing	Not Used	550019	550017	529932	552976	552428	See Next Page	550039
	1	Muffler Discrete	522948	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used
	2	Bolt, Motor/Muffler	Not Used	Not Used	Not Used	Not Used	**Not Used**	Not Used	Not Used	Not Used
	2	Lockwasher, Motor/Mu	Not Used	Not Used	Not Used	Not Used	**Not Used**	Not Used	Not Used	Not Used
	2	Washer, Motor/Muffler	Not Used	Not Used	Not Used	Not Used	**Not Used**	Not Used	Not Used	Not Used

B23	4	Bolt, Rail	251791	120007	Not Used	See Next Page	Not Used	140016	See Next Page	120256
B24	4	Lockwasher Rail	251787	251787	Not Used	251787	Not Used	251787	See Next Page	251788
	8	Washer Rail/Motor	Not Used	Not Used	Not Used	See Next Page	Not Used	**(8) 155091**	See Next Page	Not Used
B25	4	Nut, Rail	251789	251789	Not Used	251789	Not Used	251789	See Next Page	155070
B26	2	Rail Mounting	478338	595301	Not Used	See Next Page	Not Used	**551658**	See Next Page	551658

Model	Part #	Motor	Wiring Diagram	Specific Parts	Bearing, Rear (M1)	Bearing, Impeller End (M2)
DR6D89	027578	500291	C	Elbow - not used	510217	510218
DR6D86	027579	500292	G			
DR6K72	027600	500293	C			
DR6D5	036212	510459	F	Elbow - (1 pc) 120153		
HiE6D89	038071	529325	C			
DR858AY72W	038738	511570	C		516840	516844
DR858AY86W	080172	515568	G			
DR858AY86X	080173	515568	G			
HIE858AY72W	080022	529599	c			
DR858BB72W	038740	511571	C			
DR858BB86W	038742	515567	G			
HiE858BB72W	038743	529600	C			
DR858BB72X	038735	511571	C			
DR858AY72X	038736	511570	C			
DR858BB86X	038737	515567	G			
DR909BE72W	038620	**553286**	C	B23 (4 pcs) 140016 (16 pcs) 155091 B26 (2 pcs) 595301		
DR909BB72W	038621	511571	C			
DR909BE86W	038625	**TBD**	G			
DR909BB86W	080300	515567	G			
HiE909BE72W	038633	529601	C	B23 (4 pcs) 120256 (8 pcs) 155091 B26 (2 pcs) 516242		
DR909BE72X	038622	**553066**	C	Note 511572 replaced by 553286 with cut down fins		
DR909BB72X	038623	511571	C			
DR909BE86X	038626	**TBD**	G	(note was 511601 but that motor no longer fits)		
DR909BB86X	080183	515567	G			
DR909BE72W	081737	**553286**	C	Note 511572 replaced by 553286 with cut down fins		
DR909BB72W	081738	511571	C			
DR909BE86W	081739	TBD	G	(note was 511601 but that motor no longer fits)		
DR909BB86W	081744	515567	G			
DR979BE86W	080702	551605	G	B4 = 551383, B15 = 140019 B19A = Not used, B23 = 155095, B26 = 595301 B24 = (4pcs) 251787 & (8 pcs) 155091, B25 =595301, B20 = 551422		
DR979BE72W	080704	551604	C			
DR979BE72W	080632	551603	C			
DR979BH72W	080718	551635	C	B4 = 551560 B15 = Not used B19A = 155070, B23 = 120256 B26 = 551658 B24= (4 pcs) 251788 & (8 pcs) 120211, (4) 155091, B20 = 551422 B25 = 155070		
DR14DW72MW	038750	516096	C		516844	516846
DR14DW86MW	038751	516097	G			
DR14BH72MW	038752	510463	C		516842	516844
DR14BH86MW	038753	511511	G			

Model	Part #	Motor	Wiring Diagram	Specific Parts	Bearing, Rear (M1)	Bearing, Impeller End (M2)
DR14DT72MW	080451	551037	C		516844	516846
DR14DT86MW	080612	516100	G			
HiE14DW72MW	038759	529603	C			

eded **Viewed looking atinlet/outlet ports

Use Assembly Diagram "B" for non obsolete DR14

~~*DR 14*~~
~~***Service and Parts Manual***~~

Parts Breakdown

REF #	QTY	Description	DR14 081476 081479 081483 081497	DR14 081480 081484
1	1	Motor	See Below	See Below
2	1	Housing	552309	552304
3	4	Housing to mtr bolts	120256	155025
4	*	Shim	515991	511547
5	*	Shim	515992	511548
6	*	Shim	515993	511549
7	*	Shim	515994	511550
8	1	Impeller	515509	515683
9	1	Mtr shaft Key	155066	511532
10	1	Impeller washer	515990	515990
11	1	Impeller lockwasher	251788	251788
12	1	Impeller bolt	155068	120251
13	1	Cover	515910	515910
14	8	Cover screws	155069	155069
15		Not used	Not used	Not used
16	2	Mounting Rails	551658	551658
17	4	Rail Bolts	120205	120205
18	4	Rail spacers	Not used	Not used
19	4	Rail lockwashers	251788	251788
20	4	Rail -Nuts	155070	155070
21	4	Rail washers	155091	155091
22		Not used	Not used	Not used
23	2	Finger guard screen	552322	552322
24	2	Muffler foam (hi temp)	552328	552328
25	2	Muffler foam (regular)	552327	552327
26	2	Retainer	552332	552332
27	2	Muffler tube	552324	552324
28	8	Muffler Tie Rod	552325	552325
29	1	Connector plate	552298	552298
30	8	Muffler washer	155091	155091
31	16	Muffler tie rod nuts	251789	251789

REF #	QTY	Description	DR14 038752 038753 OBSOLETE
M3	1	Key Motor Shaft	511532
B1	6	Screw, Flange	140016
B3	2	Flange	529912
	2	Screen, Flange Guard	Not Used
		Elbow 90º	Not Used
B4	1	Housing	515983
B5	4	Screw, Hsg /Motor	120205
B6	28	Muffler Material	(12 pcs) 551740
	2	Muffler Material	(2 pcs) 551741
	2	Muffler Screen guard	551744
B8	*	Shim .002"	511547
	*	Shim .005"	511548
	*	Shim .010"	511549
	*	Shim .020"	511550
B9	1	Impeller	515683
B10	1	Bolt, Impeller	120251
B11	1	Lockwasher, Impeller	251788
B12	1	Washer, Impeller	Not Used
B13	1	Cover	515910
B14	8	Screw, Cover	155069
B15	1	Eye Bolt	140019
B16	1	Spacer, Impeller Bolt	515990
		Shaft Sleeve	Not Used
B17	4	Lockwasher, Housing	Not Used
B18	2	Screen, Muffler Retaining, Right	551727
	2	Finger guard	Not Used
B19	6	Bolt, Muffler Hsg/Hsg	155067
B19A	4	Bolt, Muffler Hsg/Hsg	120214
B20	1	Muffler Housing	550039
	1	Muffler Discrete	Not Used
	2	Bolt, Motor/Muffler	Not Used

eeded **Viewed looking atinlet/outlet ports

32	2	Flange	529912	529912		2	Lockwasher, Motor/Muffler	Not Used	
33	6	Flange bolts	140016	140016		2	Washer, Motor/Muffler	Not Used	
34		Flange Cap.	Not used	Not used	B23	4	Bolt, Rail	155025	
35		Not used	Not used	Not used	B24	4	Lockwasher Rail	251788	
36		Nameplate- Blower	Not used	Not used		8	Washer Rail/Motor	Not Used	
37		Rotation Sticker	Not used	Not used	B25	4	Nut, Rail	155070	
38		Not used	Not used	Not used	B26	2	Rail Mounting	551658	
39									
40									
41									
42									

Model	Part #	Motor	Wiring Diagram	Specific Parts	Bearing, Rear (M1)	Bearing, Impeller End (M2)
DR14DW72MW	081476	516096	C		516844	516846
DR14DW86MW	081479	516097	G			
DR14BH72MW	081480	510463	C		516842	516844
DR14BH86MW	081481	511511	G			
DR14DT72MW	081483	551037	C		516844	516846
DR14DT86MW	081484	516100	G			
HiE14DW72MW	081497	529603	C			

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	

GEIGER PUMP & EQUIPMENT
830 Tryens Road
Aston, PA 19014

CS@Geigerinc.com

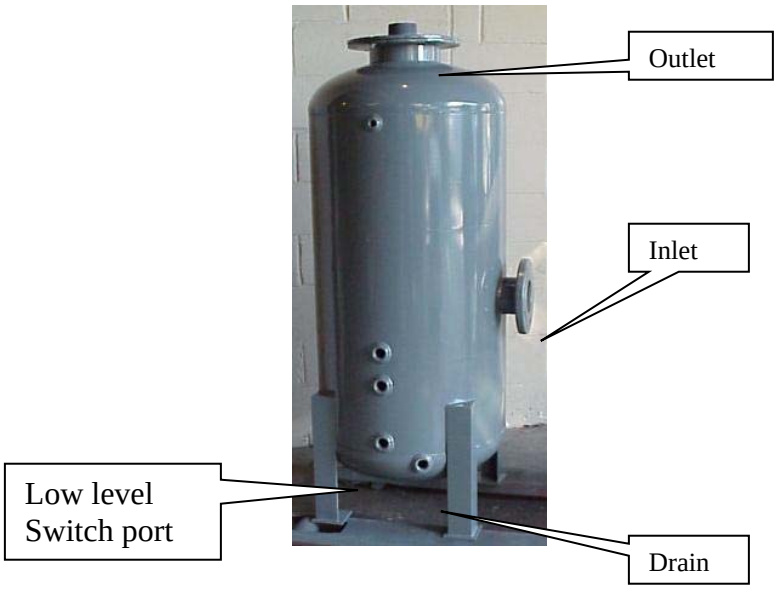
Moisture Separators

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.

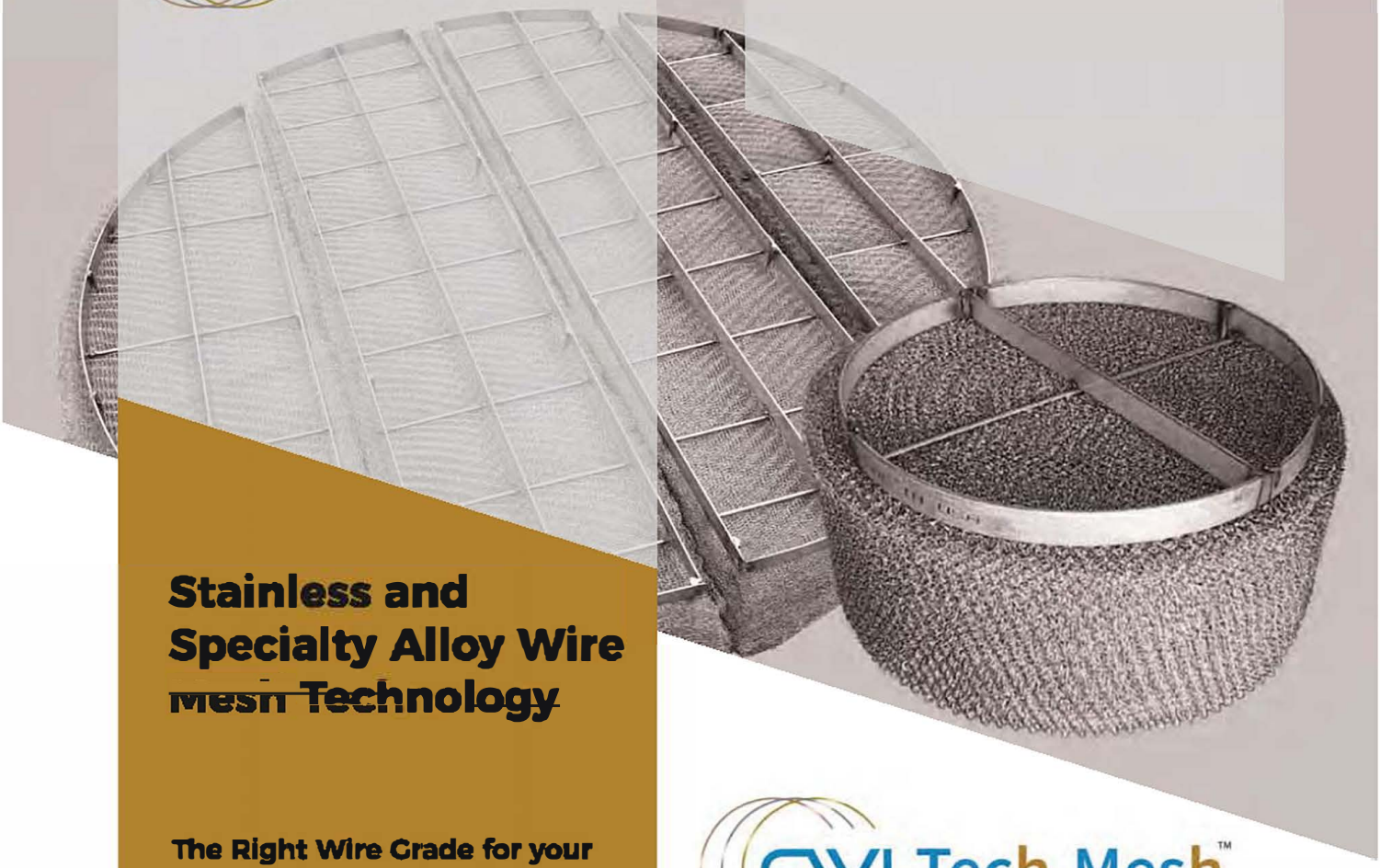
Options include: 1 to 3 level switches, hand operated sludge pump, automatic pump down systems, heat tracing, vacuum gauges, and thermometers.

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™

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.

CWI Tech-Mesh™

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.

www.centralwire.com

Made in the USA

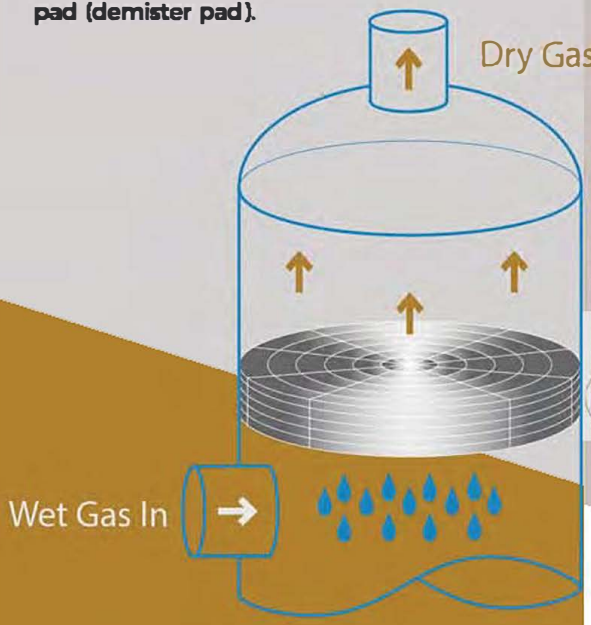
CONTACT US TODAY!

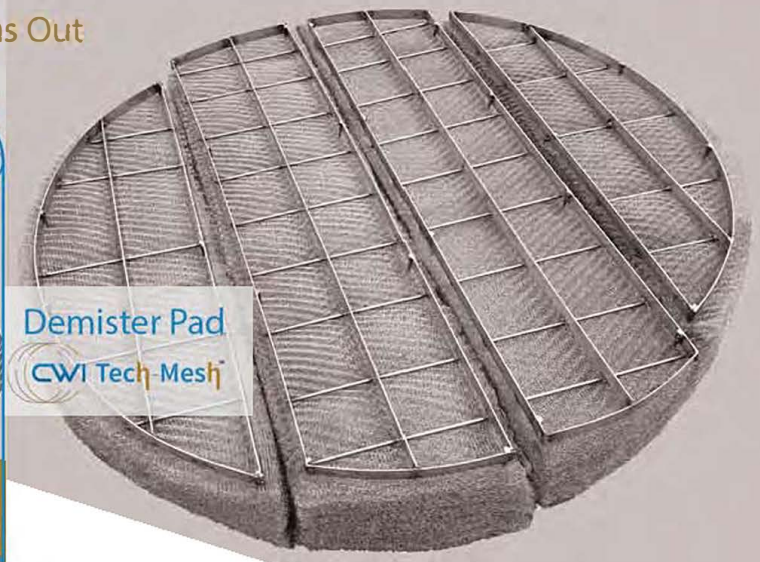
HOUSTON, Tx
800-325-5861

CWI Tech-Mesh™

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.

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

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 eliminaton 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.

CONTACT US TODAY!
HOUSTON, Tx / 800-325-5861

CWI Tech-Mesh™

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

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**

Mist eliminators are configured and constructed to ensure minimum liquid entrainment at maximum flow conditions.

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

CWI Tech-Mesh™

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.

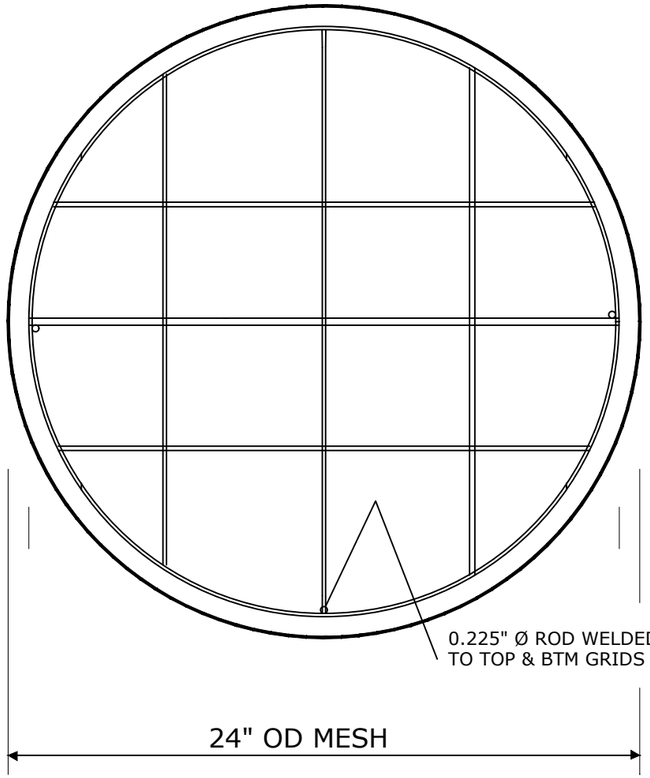
We can also design "co-knits" using a range of non-metallic synthetic materials such as fiberglass, polypropylene, Dacron, Teflon, and other polymers.

Contact our engineering team to discuss your special mist elimination challenge.

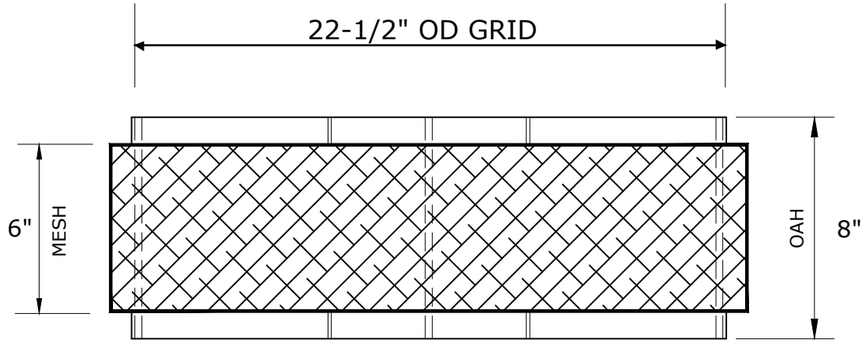
If you have any additional questions about our products, check out the Live Chat Option on our website. **www.centralwire.com**

CONTACT US TODAY!
HOUSTON, Tx / 800-325-5861

Central Wire Industries Ltd. © 2018 | Produced by Sunfish Intuitive Inc.



PLAN VIEW



ELEVATION VIEW

MATERIAL DESCRIPTION	
MESH STYLE	CWI-USA-655
MESH MATERIAL	316L SS
GRID MATERIAL	316L SS
No. of SEGMENTS	ONE (1)
MANWAY SIZE	N/A
QUANTITY	SIX (6)
TIE WIRE	YES

NOTES:
1. MESH WILL BE OVERSIZED FOR A SNUG FIT.
2. DIMENSIONS ARE SPECIFIED IN INCHES.
3. DIMENSIONS SHOWN ARE AFTER INSTALLATION.
4. STANDARD DIMENSIONAL TOLERANCES +/- 0.25"

REV	DATE	DETAILS
0	1/26/22	ISSUED TO PRODUCTION

STATUS:

FOR FABRICATION

CWI TECH-MESH™ CENTRAL WIRE INDUSTRIES
18430 Kieth Harrow Blvd
Houston, TX 77084
(800) 325-5861

CUSTOMER:

GEIGER PUMP (aka GASHO)

PO# 72200056

MIST ELIMINATOR

ORDER # 3RSO-12075

SCALE	CWI Item No.	SHEET	Rev.
NTS	Item 105723	1 of 1	0

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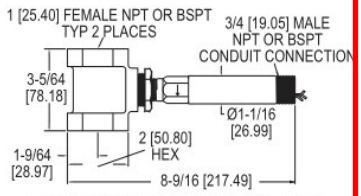
Dwyer

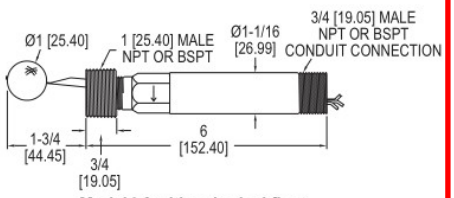
SERIES L6 | W.E. ANDERSON™ BY DWYER

FLOTECT® LIQUID LEVEL SWITCHES

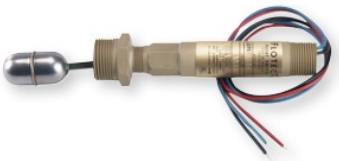
Easy In-wall or External Installation, Up to 2000 psig (138 bar), Compact Size

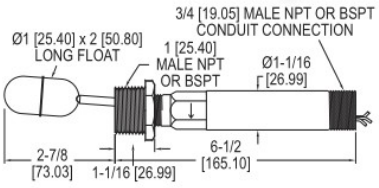


Model L6 with external float chamber



Model L6 with spherical float





Model L6 with cylindrical float

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.

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 Temps≤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 Temps≤ 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 Temps≤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.

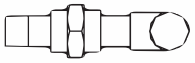
MODEL CHART

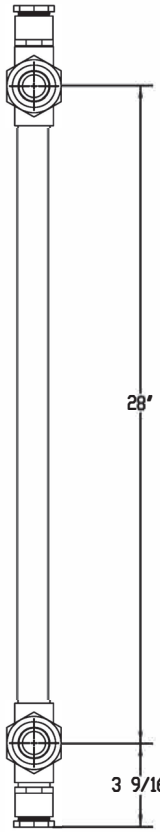
Model	Body	Installation	Float Material	Process Connection	Max. Pressure psig (bar)	Min. S.G.
L6EPB-B-S-3-O	Brass	Side wall mounting	Polypropylene spherical	NPT	1000 (69)	0.9
L6EPB-B-S-3-A	Brass	Side wall mounting	304 SS cylindrical	NPT	200 (13.8)	0.5
L6EPB-B-S-3-C	Brass	Side wall mounting	304 SS spherical	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

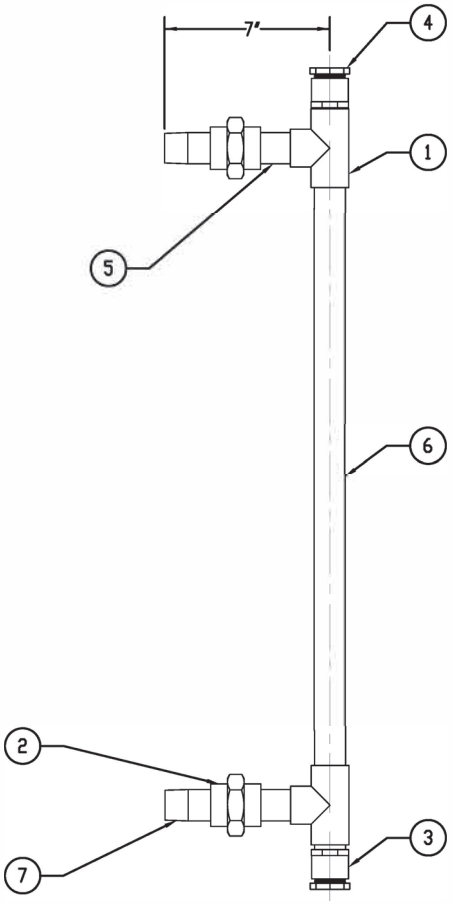
BSPT process connection and M25 conduit connection. **Note:** To order, change eighth character in model to "4". **Example:** L6EPB-B-S-4-A

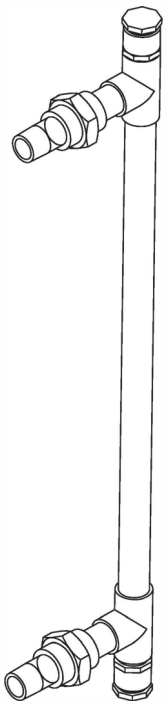
USA: California Proposition 65
⚠WARNING: Cancer and Reproductive Harm - www.P65Warnings.ca.gov

	ITEM NO.	Description	QTY.	
	1	TEE, PVC, 1" DIA., SCHEDULE 80, SOCKET CONNECTION	2	
	2	UNION, PVC, 1" DIA., CLASS 150#, SOCKET CONNECTION	2	
	3	STRAIGHT ADAPTER, PVC, 1" DIA. SPIGOT X 1" DIA. FEMALE NPT	2	
	4	PLUG, PVC, 1" DIA., SCHEDULE 80, THREADED CONNECTION, HEX HEAD	2	
	5	PIPE, PVC, 1" DIA. SCHEDULE 80, UNTHREADED	2	
	6	PIPE, CLEAR PVC, 1" DIA. SCHEDULE 80, UNTHREADED	1	
	7	PIPE, PVC, 1" DIA. SCHEDULE 80, TOE	2	
	8	PIPE, PVC, 1" DIA. SCHEDULE 80, UNTHREADED	2	
	9	PIPE, PVC, 1" DIA. SCHEDULE 80, UNTHREADED	1	







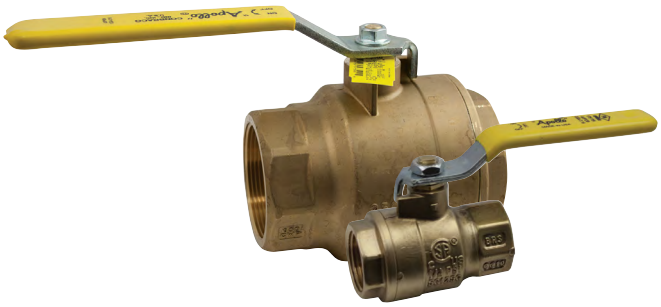


DRAWN BY: DJC	DATE: 01/21/16	J.E.GASHO & Assoc., Inc.
APPROVED BY:	DATE:	460 W. GAY ST. WEST CHESTER, PENNSYLVANIA 19380
DIMENSIONS IN INCHES		1" DIA. SIGHT TUBE GS-28-0006
SCALE: NA		
TOLERANCES: ±1/8"	ANGULAR TOLERANCES:	
MATERIAL:	WEIGHT:	
SHEET 1 OF 1		1500-C-9539 —

"Apollo" Valves SUBMITTAL SHEET

77F-100 Series

Full Port Threaded End Brass Ball Valve



Job Name:	
Job Location:	
Engineer:	
Contractor:	
Tag:	
PO#:	
Rep:	
Wholesale Dist.:	

DESCRIPTION

The Apollo 77F-100 Series is a full port forged brass ball valve suitable for a wide range of flow control applications including HVAC, fuel gas, fire protection, irrigation etc. These NPT threaded, 2-piece valves combine reliable operation with maximum economy. Valves include most pertinent agency approvals. Proudly Made in the USA.

FEATURES

- Heavy Pattern Forged Design
- Corrosion Resistant Materials
- Full-Port Flow
- Premium RPTFE Seats and Packing
- Adjustable Stem Packing
- Blowout-Proof Stem
- 2-1/2" - 4" Sizes Now Feature 316SS Ball and Stem (Standard)
- Silicone Free Assembly
- 100% Factory Tested
- **Made in USA, ARRA Compliant**

PERFORMANCE RATING

- Rating: 600 CWP (1/4" – 2")
- Rating: 400 CWP (2-1/2" – 4")
- Steam Rating: 150 psi SWP
- Temperature Range: 0°F - 400°F
- Vacuum Service to 29 in. Hg

Not intended for potable water in USA

OPTIONS

• (-01) Standard Lever	
• (-04) 2-1/4" Stem Extension	1/4" – 2-1/2"
• (-07) Tee Handle	1/4" – 2"
• (-10) Stainless Steel Lever & Nut	1/4" – 2"
• (-11) Therma-Seal™ Insulating Tee Handle	1/4" – 2"
• (-27) Locking Handle SS	1/4" – 2-1/2"
• (77F140 Series) – SS Ball & Stem	
• (77FLF Series) Lead Free (0.25% Lead Max)	

STANDARD MATERIALS LIST

BODY	Brass, ASTM B283 alloy C37700
SEAT	RPTFE
BALL	Brass, ASTM B16, C36000 or B283, C37700 Chrome Plated 316 SS (2-1/2" - 4")
STEM PACKING	RPTFE
NUT	Corrosion Resistant Plated Steel
STEM	Brass, ASTM B16, C36000 316 SS (2-1/2" - 4")
RETAINER	Brass, ASTM B283 alloy C37700 or ASTM B16, C3600
HANDLE	Plated Steel / Insulated Polyvinyl
GLAND	Brass, ASTM B16, C36000

APPROVALS

- MSS SP-110
- IAPMO/ANSI Z1157

FM LISTED

- FM 1140 (<175 PSI) (1/4" – 2")

CSA LISTED

- CGA 3.16 (125 PSI)
- CGA CR91-002 (5 PSI)
- ANSI Z21.15/CSA 9.1 (1/2 PSI)
- ASME B16.44 (5 PSI)
- ASME B16.33 (125 PSI) (1/2" – 2")

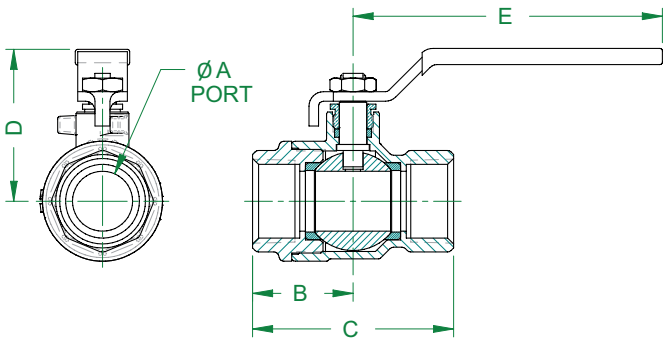
UL LISTED

- UL 125 - Flow Control Valves for LP-Gas, Guide YSDT to 250 psi max
- UL 258 - Fire Protection Trim & Drain, Guide VQGU to 175psi max (1/4" – 2")
- UL 842 - Valves for Flammable Fluids, Guides YRBX, YRPV, and MHKZ to 250 psi max. (1/4" - 4" NPT only)
- UL 1477 - Compressed Gas Shutoff Valves, Guide YQNZ to 250 psi max (1/4" - 4" NPT only)

***Gas approvals apply to NPT models only**

DIMENSIONS

PART NUMBER	SIZE (IN.)	DIMENSIONS (IN.)					WT. (LB.)
		A	B	C	D	E	
77F-101-01	1/4"	0.38	0.81	1.62	1.61	2.85	0.3
77F-102-01	3/8"	0.38	0.85	1.70	1.61	2.85	0.3
77F-103-01	1/2"	0.50	1.14	2.25	1.66	2.85	0.5
77F-104-01	3/4"	0.75	1.29	2.57	1.91	3.86	0.8
77F-105-01	1"	1.00	1.60	3.20	2.11	3.86	1.3
77F-106-01	1-1/4"	1.25	1.73	3.46	2.44	4.75	2.1
77F-107-01	1-1/2"	1.50	2.00	4.00	2.91	5.42	3.2
77F-108-01	2"	2.00	2.37	4.74	3.69	7.77	5.6
77F-149-01	2-1/2"	2.50	2.99	5.98	4.14	7.77	12.8
77F-140-01	3"	3.00	3.52	7.05	5.03	9.92	19.7
77F-14A-01	4"	4.00	3.83	7.65	5.70	14.78	25.5



This specification is provided for reference only. Apollo reserves the right to change any portion of this specification without notice and without incurring obligation to make such changes to Apollo products previously or subsequently sold. Most current information available at apollovalves.com.

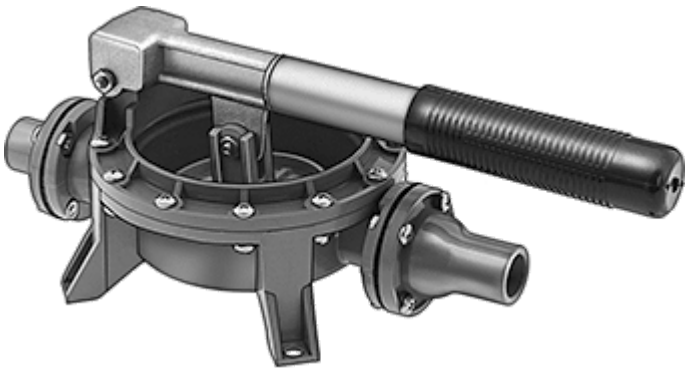
aalberts integrated piping systems

McMASTER-CARR®

Hand-Operated Water-Removal Pump

4332K31

14 oz./Stroke Maximum Flow Rate



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
Diaphragm Material	Buna-N Rubber
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	304 Stainless Steel, Acetal
Material	Plastic, Buna-N Rubber
RoHS	RoHS 3 (2015/863/EU) compliant

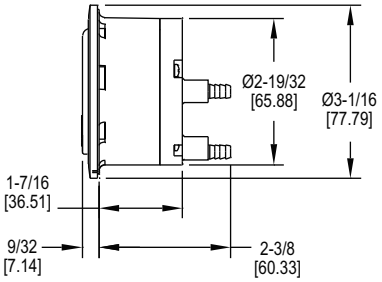
Install these pumps right in your line and engage the lever handle to start pumping. They have few moving parts that can fail for an extended service life.

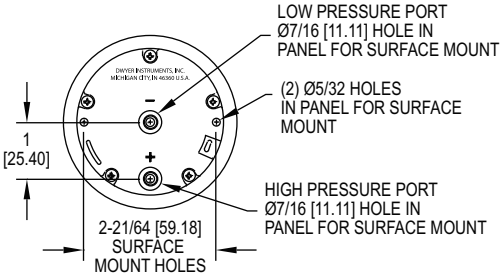
Dwyer

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: ±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.

Dwyer

SERIES 2-5000

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.

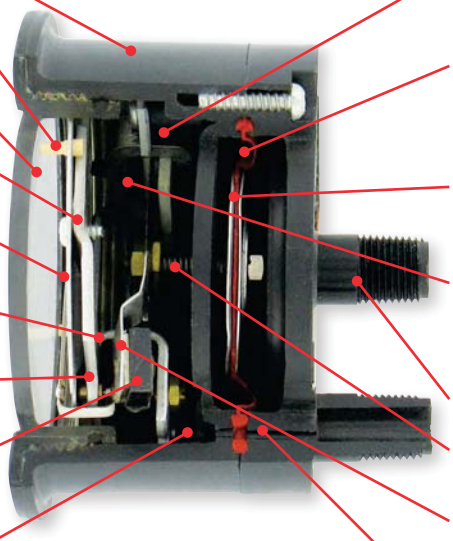
Red tipped aluminum pointer, rigidly mounted to helix is easy to see.

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	**Model**	**Range, Pascals**
2-5005	0-5.0	**2-5000-125PA**	0-125
2-5010	0-10	**2-5000-250PA**	0-250
2-5020	0-20	**2-5000-500PA**	0-500
2-5040	0-40	**Model**	**Range, kPa**
2-5060	0-60	**2-5000-1KPA**	0-1
2-5100	0-100	**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.

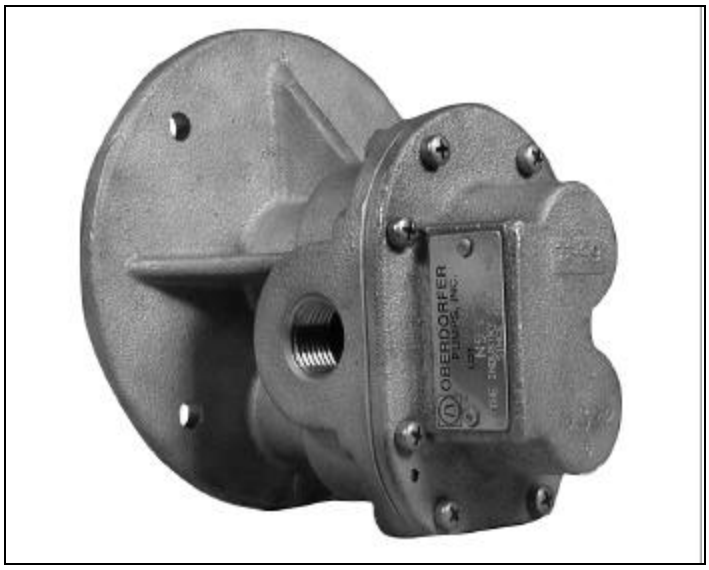
Process Tubing Options: See page 455 (Gage Tubing Accessories)

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^{0}F to 140^{0}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 70^0 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.

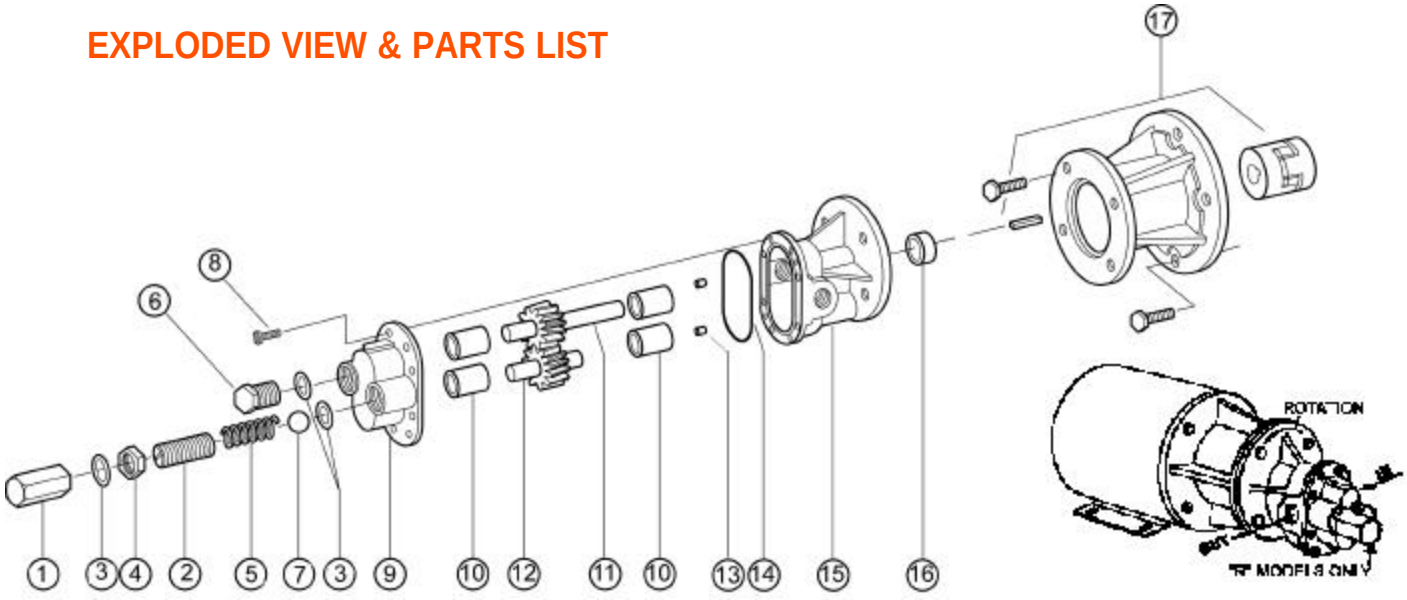
Three phase motors are not wired for any particular rotation. They can be reversed by interchanging any two (2) wires of the three (3) wire leads.

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	1Req'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

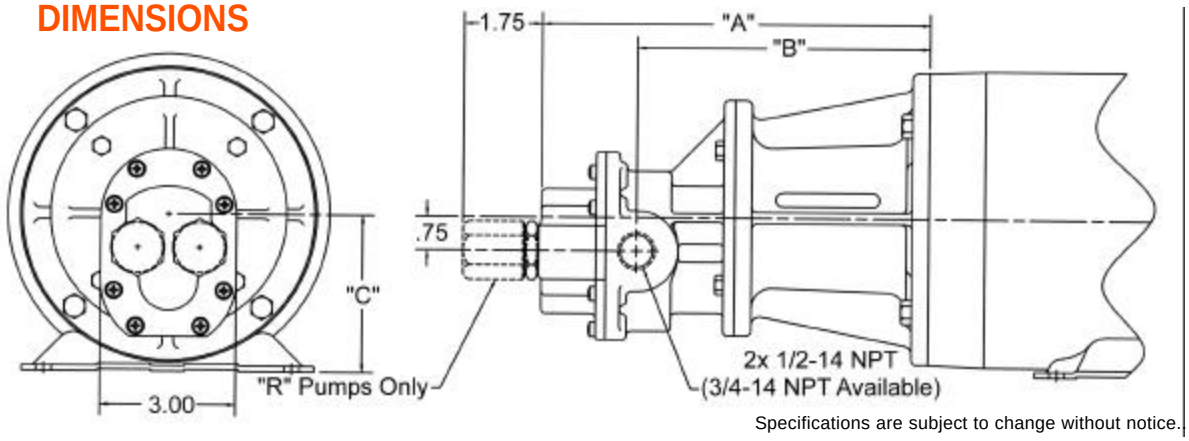
Variations

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



Specifications are subject to change without notice.

*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.

6/00

SOLBERG®
Filtration • Separation• Silencing

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” H_2O over initial Δ P
- Pressure drop graphs available upon request
- Polyester: 99%+ removal efficiency standard to 5 micron
- Paper: 99%+ removal efficiency standard to 2 micron

Options

ATEX Available

- 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)

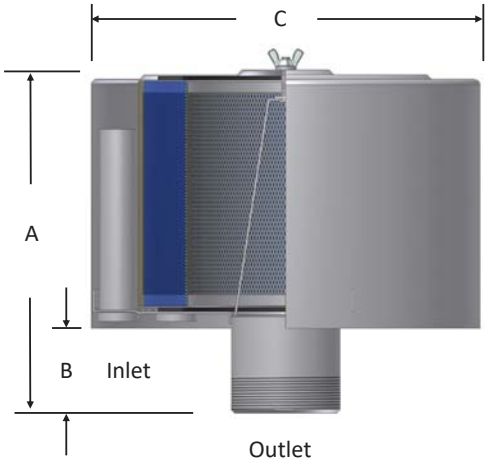
Threaded Outlet Assembly

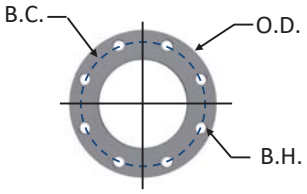
Flange Outlet Assembly

Rev: FS .5-6-US1903K

Sales/Service: 630.773.1363
sales@solbergmfg.com

FS Series 1/2” - 6”





O.D.: Outside Diameter
B.C.: Bolt Circle
B.H.: Bolt Hole

125/150# Pattern Flange	Dimensions - inches			No. of Holes	Flange Thickness
	O.D.	B.C.	B.H.		
4”	9	7 ½	0.75	8	0.5
5”	10	8 ½	0.88	8	0.5
6”	11	9 ½	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	
½”	10	FS-15-050	FS-14-050	3 7/16	1	6	3	1	2	15	14	35
¾”	25	FS-15-075	FS-14-075	4	1 ¼	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 ⅜	1 7/16	6	5	3	3	19P	18P	100
1 ¼”	70	FS-19P-125	FS-18P-125	6 ¾	1 ⅝	6	5	5	3	19P	18P	100
1 ½”	85	FS-19P-150	FS-18P-150	6 ¾	1 ⅝	6	5	5	4	19P	18P	100
2”	135	FS-31P-200	FS-30P-200	7 ½	2 ¼	10	5	5	8	31P	30P	195
2”	135	FS-231P-200	FS-230P-200	12	2 ⅜	10	10	5	14	231P	230P	300
2 ½”	195	FS-31P-250	FS-30P-250	7 ½	2 ½	10	5	5	8	31P	30P	195
2 ½”	195	FS-231P-250	FS-230P-250	12 ⅜	2 ⅝	10	10	9	15	231P	230P	300
3”	300	FS-231P-300	FS-230P-300	12 ¾	3 ⅛	10 ¼	10	9	15	231P	230P	300
3”	300	FS(12)-235P-300	FS(12)-234P-300	12 ⅞	2 11/16	12 ¼	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 ⅞	3 11/16	12 ¼	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 ⅛	16	10	14	33	245P	244P	880
5”	800	FS-275P-500	FS-274P-500	14	4 ⅛	16	10	14	36	275P	274P	1100
6”	1100	FS-275P-600	FS-274P-600	15	5 ⅛	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 ⅞	3 11/16	12 ¼	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 ⅛	16	10	14	38	245P	244P	880
5”	800	FS-275P-500F	FS-274P-500F	14	4 ⅛	16	10	14	41	275P	274P	1100
6”	1100	FS-275P-600F	FS-274P-600F	15	5 ⅛	16	10	18	42	275P	274P	1100

See Filter Silencer Technical Data for sizing guidelines.

All model offerings and design parameters are subject to change without prior notice.
Contact your representative or Solberg for the most current information.

VALUE
VALVE USA

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.tuv.com TÜV ID:9105016048

www.bvcusa.com

VALUE VALVE

RESILIENT SEATED BUTTERFLY VALVES

DESIGN DETAILS AND SPECIFICATIONS

VF-730 (WAFER TYPE)
VF-733 (LUG TYPE)
VF-737 (FLANGE TYPE)

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)

DESIGN DETAILS AND SPECIFICATIONS

VF-730 (WAFER TYPE)
VF-733 (LUG TYPE)
VF-737 (FLANGE TYPE)

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 Kv = Cv/1.17

Expected Seating/ Unseating Torque (in Lbs)

Size		Lubricating (Non-corrosive) ΔP (psig)				Dry (Non-Lubricating) Δ P (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

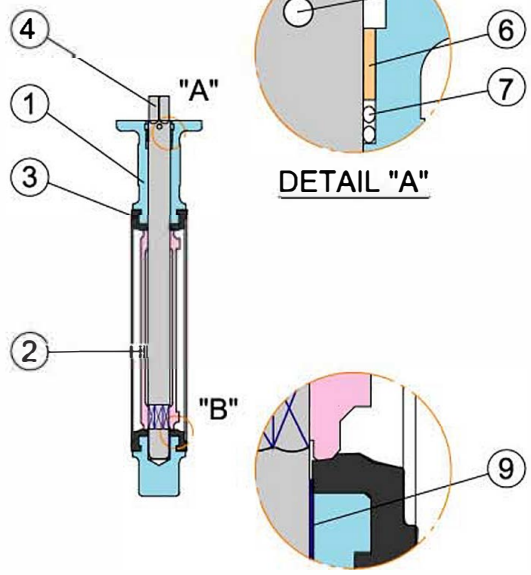
To Use The Torque Chart, Note The Following

1) Seating/Unseating torque values above include friction bearing torque for stated Δ P.
2) Do not apply a safety factor to above torque values when determining actuator output torque requirement.

VALUE
Value in Valving

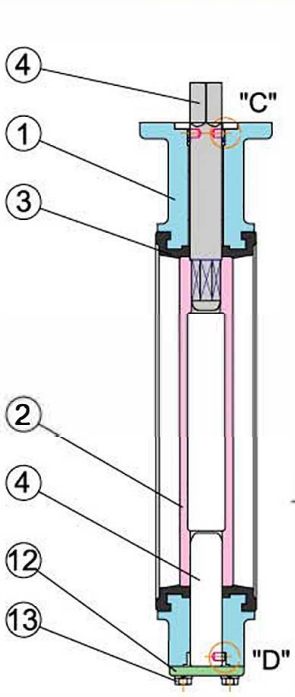
MATERIALS
1.5"~24.0"

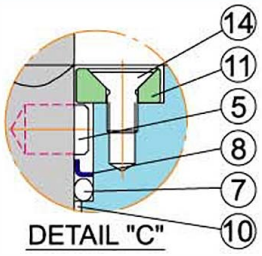
VF-730 (WAFER TYPE)
VF-733 (LUG TYPE)
VF-737 (FLANGE TYPE)



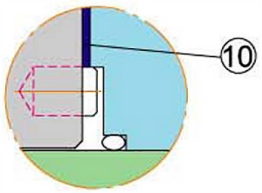
DETAIL "A"

Size 1.5" to 12.0" DETAIL "B"

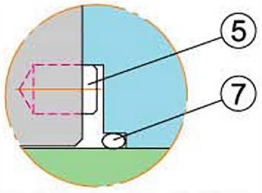




DETAIL "C"



DETAIL "D" For St / St Body



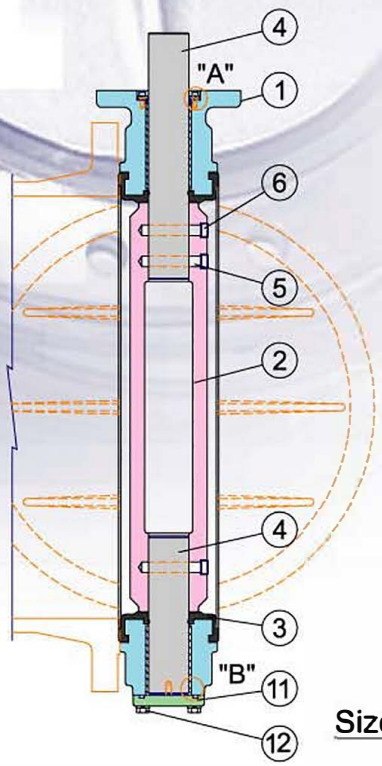
Size 14.0" to 24.0" DETAIL "D" For DI. & CI. Body

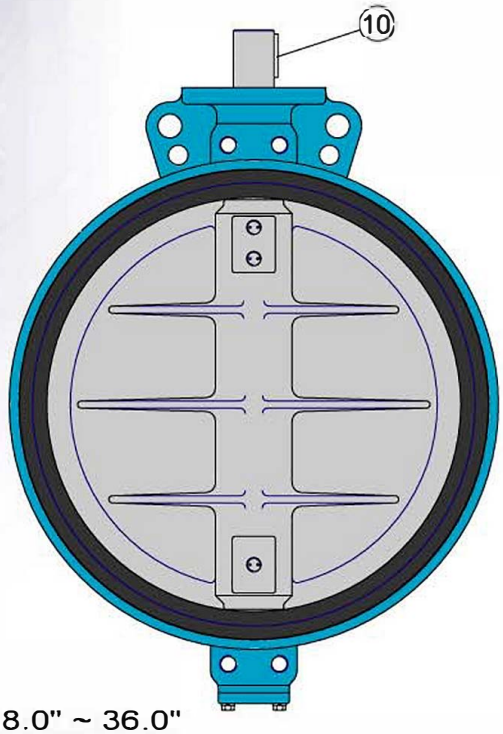
No.	Name	Materials	Specifications JIS	Specifications ASTM	Remark
1	Body	CAST IRON	FC 200	A126 Cl. B	
		DUCTILE IRON	FCD 400	A395	
		STAINLESS STEEL	SCS 13A	A351 Gr. CF8	
			SCS 14A	A351 Gr. CF8M	
2	DISC	DUCTILE IRON	FCD 400	A395	Nylon 11 coated
		STAINLESS STEEL	SCS 13A	A351 Gr. CF8	
			SCS 14A	A351 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	DELRIN			
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			

VALUE
Value in Valving

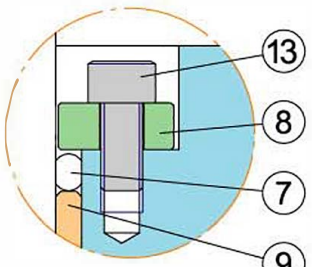
MATERIALS
28.0"~36.0"

VF-730 (WAFER TYPE)
VF-737 (FLANGE TYPE)

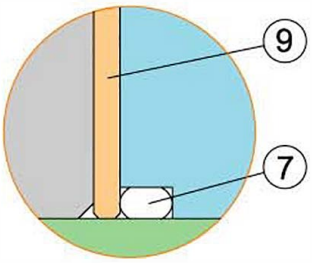




Size 28.0" ~ 36.0"



DETAIL "A"



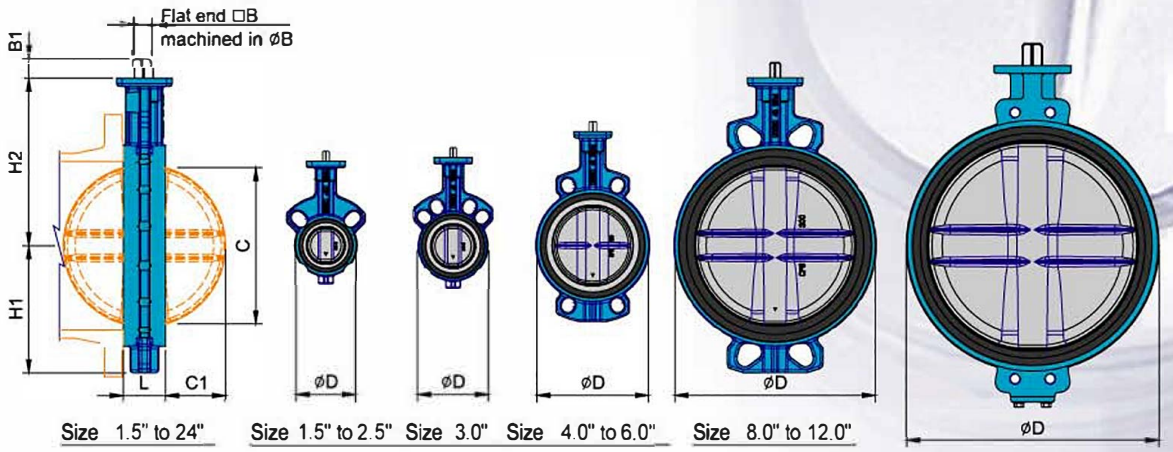
DETAIL "B"

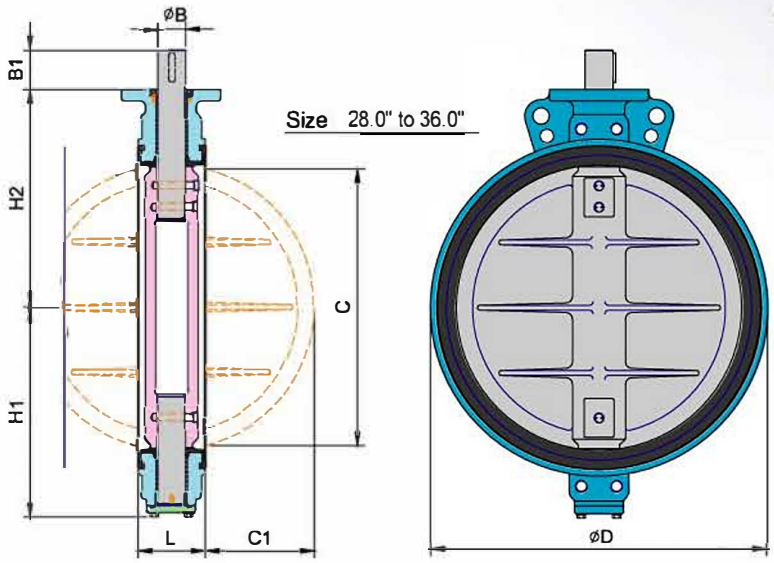
No.	Name	Materials	Specifications JIS	Specifications ASTM	Remark
1	Body	DUCTILE IRON	FCD 400	A395	
		STAINLESS STEEL	SCS 13A	A351 Gr. CF8	
			SCS 14A	A351 Gr. CF8M	
2	DISC	DUCTILE IRON	FCD 400	A395	Nylon 11 coated
		STAINLESS STEEL	SCS 13A	A351 Gr. CF8	
			SCS 14A	A351 Gr. CF8M	
		ALU-BRONZE	ALBC2	B148 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	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			

VALUE
Value in Valving

DIMENSIONS
VF-730 WAFER TYPE
1.5"~36.0"

PRESSURE RATING:
1.5"~12.0" 230psig
14.0"~36.0" 150psig



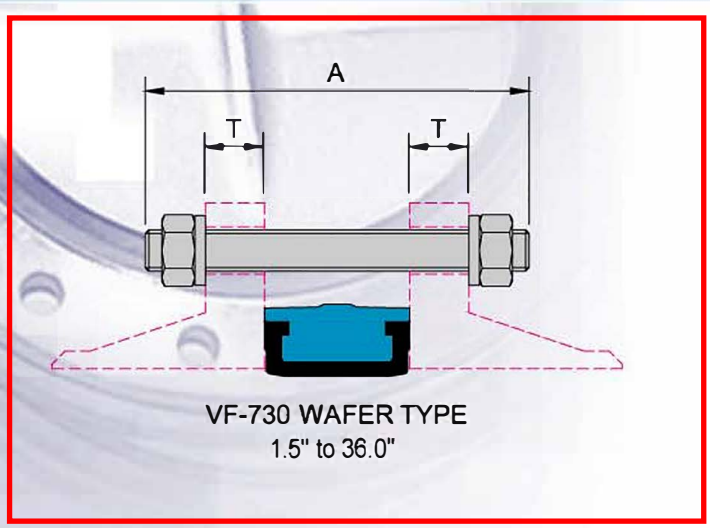


Size		Face to Face				Mounting Flange (ISO 5211)		Shaft End			Key	Disc Clearance		Weight
mm	inch	L	H1	H2	D	Type	PCD	øB	□B	B1		C	C1	lbs
40	1 1/2	1.30	2.36	4.72	3.19	F07	2.76	0.55	0.43	0.75		1.34	0.28	4.40
50	2	1.69	2.56	5.63	3.78	F07	2.76	0.55	0.43	0.75		1.54	0.32	6.60
65	2 1/2	1.81	2.80	6.10	4.33	F07	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

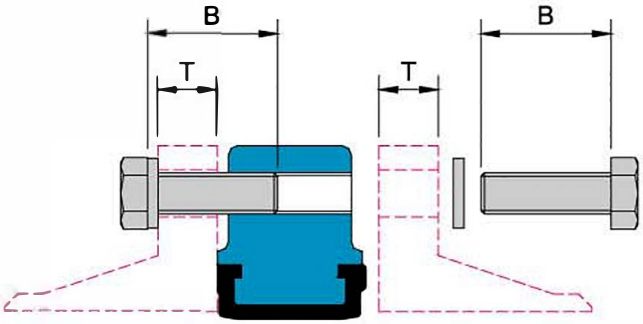
VALUE
Value in Valving

BOLTING FOR INSTALLATION

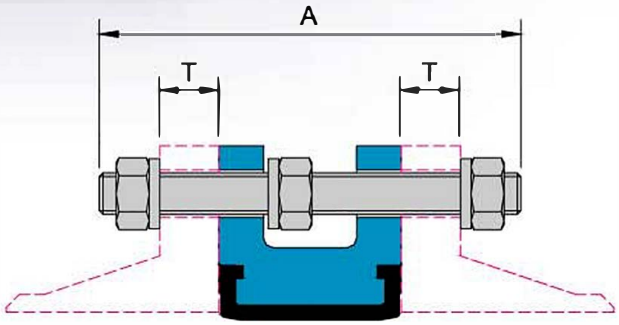
VF-730 (WAFER TYPE)
VF-733 (LUG TYPE)
VF-737 (FLANGE TYPE)



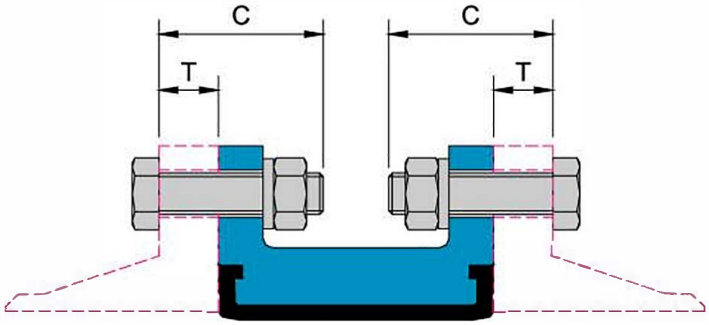
VF-730 WAFER TYPE
1.5" to 36.0"



VF-733 FULL LUG TYPE
1.5" to 24.0"



VF-737 FLANGE TYPE
20.0"



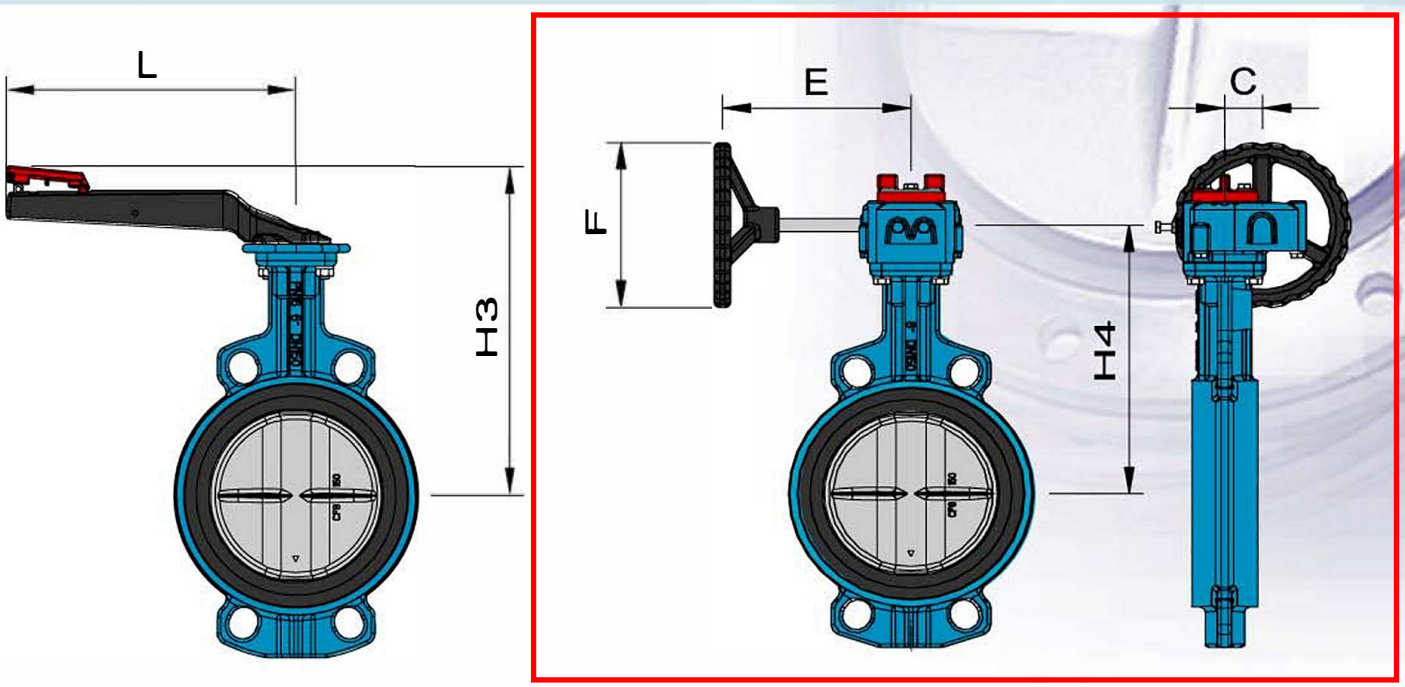
VF-737 FLANGE TYPE
24.0" to 40.0"

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

VALUE
Value in Valving

LEVER & GEAR OPERATED

VF-730 (WAFER 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	N	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

Butterfly Valve Numbering System

Ordering Matrix

4.0"	VF730	-	2	-	4	-	3			-	D	-		-	A
SIZE	STYLE		BODY		SEAT		DISC	STEM	OPERATOR (*see legend)		LIMIT SWITCH		SOLENOID / MOTOR		POSITIONER
	WAFER		CAST IRON		BU N		31 SS	41 SS	Air Operated& SIG, U/C, D/A		SPDT, NE BEACON		120 AC		
								(NOTE 2)							
1.5"	730-WAFER RS		1-DUCTILE IRON		1-VITON		0-ENP DUCTILE IRON	410SS STANDARD ON ALL IRON BODY VALVES	0-BARE STEM		A-NONE		0- NONE		A-NONE
2.0"	VF-733-LUG RS		2 AST IRON		EPDM		YLON / DUCTILE IRO		1-INFINITE POSITION		B-SPDT, NEMA4, FLAT TOP		1 - 120/1/60 VAC		B-3-15 PSIG
2.5"	VF-737 FLANGED RS		3-CARBON STEEL		3-EPT-WHITE		2-NYLON/ DUCTILE IRON U/C	F-304SS	2-10 POSITION HANDLE		C-DPDT, NEMA4, FLAT TOP		2- 220/1/60 VAC		C-4-20 Ma
3.0"	VF-810 WAFER H.P.		4-316SS		4-BUNA N		3-316SS	M-316SS	3 EAR OPERATOR WITH WH		D-S PDT, NEMA4, BEACON		3- 24/1/60 VAC		D-1-5 VDC
4.0"	VF-813 LUG H.P.		5-304SS		5-EPT		4-316SS U/C	P- 17-4 Ph	4-A/O@80 PSIG, U/C, D/A		E-DPDT, NEMA4, BEACON		4- 220/3/60 VAC		E-2-10 VDC
5.0"	VF-910 WAFER H.P.		6-CAST IRON NYLON COATED		6-SILICONE		5-ALUMINUM BRONZE	X-XM19	5-A/O@60 PSIG, U/C, D/A		F-SPDT, NEMA7, FLAT TOP		5-380/3/60 VAC		
6.0"	VF-913 LUG H.P.		7-DUCTILE IRON NYLON COATED		7-HYPALON		6-ALUMINUM BRONZE U/C	L-316L SS	6-A/0@80 PSIG, F/P, D/A		G-DPDT, NEMA7, FLAT TOP		6-440/3/60 VAC		
8.0"	VF-920 WAFER H.P.				8-NEOPRENE		7-HAYLAR / DUCTILE IRON		7-A/O@60 PSIG, F/P, D/A		H-SPDT, NEMA7, BEACON		7-12 VDC		
10.0"	VF-923 LUG H.P.				9-PTFE / BUNA		8-NYLON COATED 316SS		8-A/O@80 PSIG, U/C, S/R		J-DPDT, NEMA7, BEACON		8-24 VDC		
12.0"	VF-930 WAFER H.P.				10-PTFE		9-ENP SS		9-A/O@60 PSIG, U/C, S/R		K-E/O 2 SPDT		9-12 VAC		
14.0"	VF-933 LUG H.P.				11-GRTFE		10-304 SS		10-A/O@80 PSIG, F/P, S/R		L-E/O 4 SPDT		10-24 VAC		
16.0"	VF-940 WAFER H.P				12-GLTFE		11-304 SS U/C		11-A/O@60 PSIG, F/P, S/R		S-PLEASE SPECIFY				
18.0"	VF-943 LUG H.P.				13-FS FIRE SAFE/PTFE		12-316 SS U/C POLISHED		12-E/O FULL PRESSURE						
20.0"	VF-264 AWWA				14-FS FIRE SAFE/GLTFE		13-316 SS POLISHED		13-E/O U/C						
24.0"	VF-504 AWWA				15-PTFE / EPDM		14-DUCTILE IRON								
28.0"	VF-870 WAFER TRIPLE ECC				16-FS FIRE SAFE/GRTFE		15-PTFE COATED 316SS DISK								
30.0"	VF-873 LUG TRIPLE ECC				17-(S) METAL - (NOTE 1)										
32.0"	VF-877 FLANGED TRIPLE ECC														
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 *Value in Valving*

VALUE
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 (CH3CHO)	E	E	E	U	E	U	E
Acetamide	G	-	E	E	G	U	E
Acetic Acid (CH3COOH) 50%, <80°F	G	U	E	U	U	G	E
Acetic Anhydride [(CH3CO)2O] <80°F	G	U	E	U	G	U	E
Acetone (CH3COCH3)<70°F	E	E	E	U	G	U	E
Acetophenone	G	-	E	U	G	U	E
Acetylene (C2H2)<80°F	E	G	E	-	E	E	E
Acrylonitrile (CH2CHCN)	G	E	E	U	G	G	E
Air (Dry)	E	E	E	E	E	E	E
Alcohol ñ V Amyl	E	E	E	G	E	E	E
Alcohol ñ V Butyl	E	E	E	G	E	E	E
Alcohol ñ Methyl	E	E	E	G	E	U	E
Aluminum Sulfate [Al2(SO4)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 (NH4OH)	E	U	A	U	G	-	E
Amyl Acetate (CH3COOC5H11)	E	G	E	U	E	U	E
Aniline Dye (C6H5NH2)	G	U	E	U	G	G	E
Aqua Regia (HCl+HNO3)	G	U	U	U	U	G	E
Arsenic Acid (H3AsO4. 1/2 H2O)	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 (C6H6)<70°F	E	E	E	U	U	G	E
Benzoic Acid (C6H5COOH)	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(C4H6)	E	E	E	U	U	E	E
Butyl Acetate (CH3COOC4H9)	E	G	E	U	U	U	E
Butyric Acid<5%, ≤100°F	G	U	E	U	G	G	E
Calcium Bisulfite (Ca(H2SO3) 2	E	U	E	U	G	E	E
Cane Sugar Liquors	E	E	E	E	E	E	E
Carbolic Acid (C6H5OH)<10%, <80°F	U	U	E	U	U	U	E
Carbon Dioxide - Dry (CO2)	E	E	E	E	E	E	E
Carbon Dioxide - Wet (CO2)	E	U	E	G	E	E	E
Carbon Disulfide (CS2)	E	E	E	U	U	E	E
Carbon Monoxide (CO)	E	E	E	E	E	E	E
Carbon Tetrachloride (CCl4)	G	E	E	U	U	E	E
Carbonic Acid (CO2.H2O)	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) (Cl2)<70°F	U	U	U	U	U	G	E
Chlorbenzene (C6H5Cl)	G	E	E	U	U	G	E
Chloroform (CHCl3)	G	E	E	U	U	G	E
Chromic Acid (H2CrO4)<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

VALUE
Value in Valving

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 (C16H22O4)	G	U	E	U	G	U	E
Diesel Fuel	E	E	E	E	U	E	E
Diethyl Ether {(C2H5)2O}	G	U	E	U	U	U	E
Diethylene Glycol {(HOCH2CH2)2O}	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 (CH3COOC2H5)	E	E	E	U	U	U	E
Ethyl Chloride (C2H5Cl) < 5%, < 60°F	E	G	E	G	E	-	E
Ethylene Glycol [C2H4(OH)2] < 100 °F	E	E	E	E	E	E	E
Fatty Acids	E	U	E	E	U	E	E
Ferric Sulfate [Fe2(SO4)3] < 10%, < 70°F	E	U	G	E	E	E	E
Flue Gas	G	U	G	E	U	E	E
Fluoboric Acid (HBF4)	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 (C4H3OCHO)	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 (C6H12O6.H2O)	E	E	E	E	E	E	E
Glue	G	E	E	E	E	E	E
Glycols (CH2OHCH2OH)	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(C6H14) 100%, < 75°F	E	E	E	E	U	G	E
Hexyl Alcohol	E	E	E	E	U	E	E
Hydrazine(H2N.NH2) < 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 (H2O2) < 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(CH3CHOHCOOH)	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(C2H3O2)2.3H2O]	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(MgCO3) < 50%	E	U	E	E	G	E	E
Magnesium Chloride (MgCl2/6H2O)	E	U	G	E	E	E	E
Magnesium Oxide (MgO)	G	U	E	E	G	E	E
Magnesium Sulfate (MgSO4) < 25%, < 150°F	E	E	E	E	E	E	E

VALUE
Value in Valving

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 (CH4)	E	E	E	E	U	G	E
Methyl Alcohol (CH3OH)	E	E	E	G	E	G	E
Methyl Ethyl Ketone (CH3COC2H5) < 70°F	E	E	E	U	G	U	E
Methylene Chloride (CH2CL2)	U	U	E	U	U	U	E
Milk	E	E	E	G	G	-	E
Molasses	E	G	E	E	E	E	E
Monochlorobenzene (CH2ClCOOH)	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 (HNO3) < 5%, < 100°F	G	U	E	G	E	E	E
Nitrobenzene(C6H5NO2)	G	U	E	U	U	G	E
Nitrogen Gas (N2)	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 (C2H2O4.2H2O) < 10%, < 80°F	E	U	E	U	E	E	E
Oxygen – Gas (O2)	E	E	E	G	E	E	E
Ozone (O3)	G	-	E	U	G	G	E
Paint (Water Base)	G	E	E	E	U	E	E
Paraffin	E	E	E	E	U	G	E
Penrchlorethylene (C2Cl4)	E	E	E	U	U	U	E
Perchloric Acid (HClO4)	-	-	-	U	G	G	E
Phosphoric Acid (H3PO4) < 80%, < 150°F	G	U	E	U	E	E	E
Potassium Hydroxide (KOH) < 50%, < 100°F	E	U	E	U	G	U	E
Propane (C3H8) < 70°F	E	E	E	E	U	G	E
Propyl Alcohol	E	E	E	G	E	E	E
Propylene Glycol (C3H8O2) < 150°F	E	G	G	G	U	U	E
Pulp Stock < 5%	G	U	E	G	E	G	U
Pyridine Oil (C5H5N)	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 (NaSO4)	E	E	E	E	E	E	E

VALUE
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 (Na2SO3)	E	U	E	E	E	E	E
Sodium Thiosulfate (Na2S2O3.5H2O)	G	U	E	E	E	E	E
Stannic Chloride < 10%, < 120°F	E	U	U	E	G	U	E
Starch Solution (C6H11O5) 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 (SO2) (Dry)	G	E	E	G	E	E	E
Sulfur Dioxide (SO2) (Wet)	G	U	E	U	U	G	E
Sulfuric Acid (H2SO4) < 20%, < 70°F	E	U	E	U	E	E	E
Sulfuric Acid (Fuming)	G	U	E	U	U	G	E
Tannic Acid (C14H10O9)	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 (CH3C6H5)	E	E	E	U	U	U	G
Turpentine	G	E	E	G	U	U	E
Urea [CO(NH2)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 (C8H10)	E	E	E	U	U	U	E
Zinc Acetate [Zn(C2H3O2)2.2H2O]	E	U	E	U	E	E	E

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)

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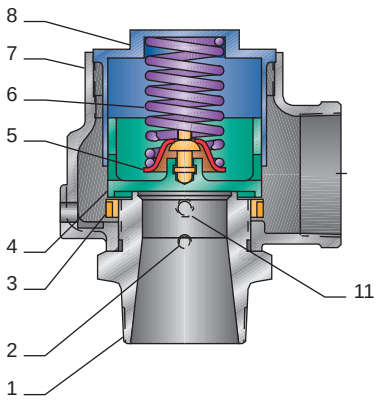
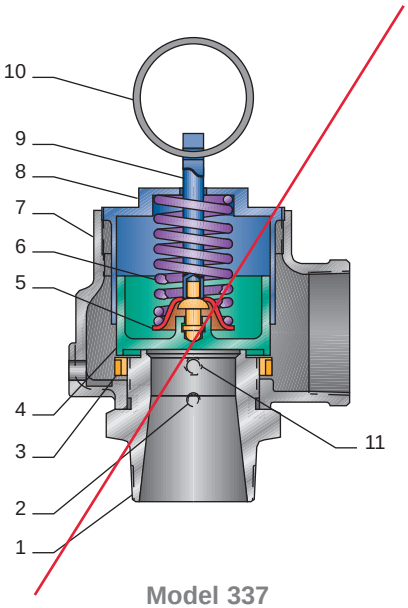
Models 215V, 337



Model 215V



Model 337

Parts and Materials - Models 215V, 337

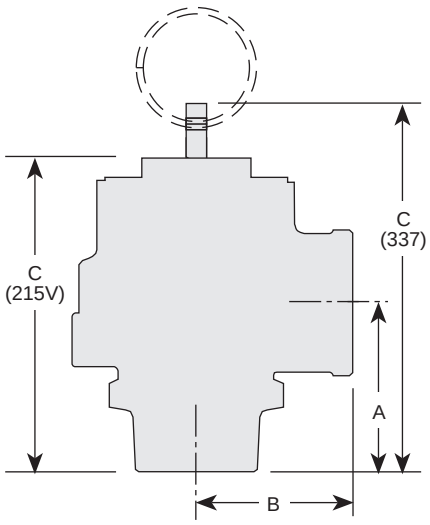
No.	Part Name	215V	337
1	Nozzle[1]	Bronze, B62	Bronze, B62
2	Set Screw	Steel A108-1018 Brass Plated	Steel A108-1018 Brass Plated
3	Regulator Ring	Bronze B584 Alloy 84400	Bronze B584-C84400
4	Disc[1]	Bronze B584 Alloy 84400	Bronze B584-C84400
5	Spring Step	Steel A-109 Cadmium Plated	Steel A109, CAD Plated
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

Notes

1. Disc and nozzle available in SSA-479 TY 316.
2. Stem and lift ring available on Model 337 only.

Specifications

Size Inlet and Outlet	Dimensions, in [mm] A	B	C 215V	C 337	Weight 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]



Model 337

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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, Nm^3/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

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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

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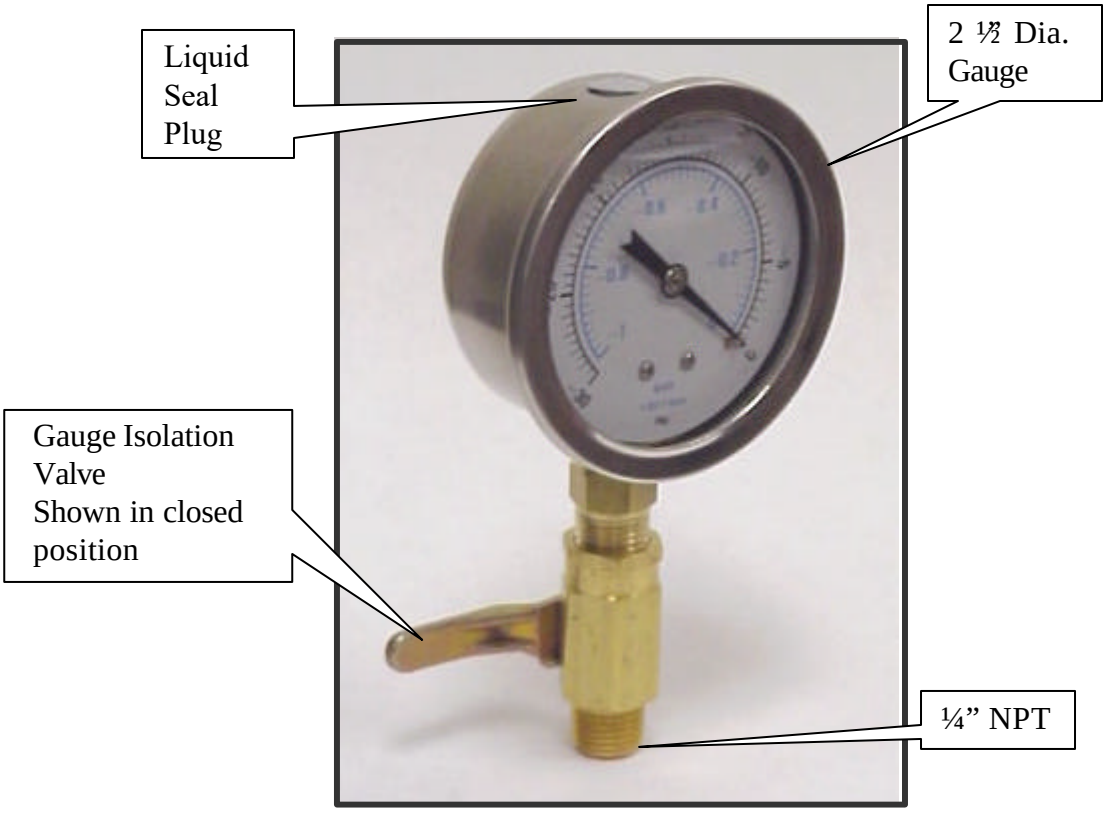
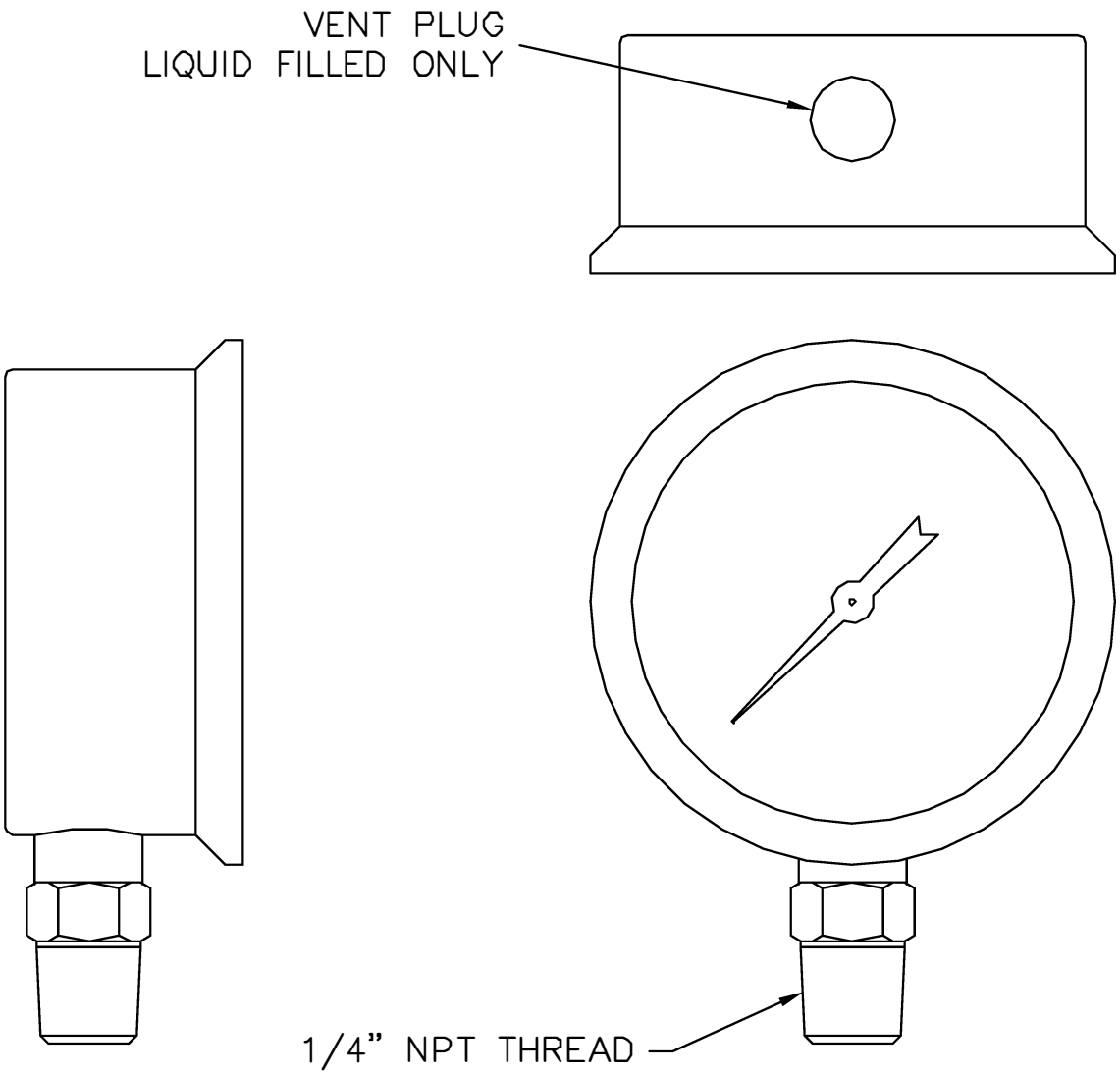
GEIGER PUMP & EQUIPMENT
830 TRYENS ROAD
ASTON, PA 19014
PHONE: 610-692-5650 FAX: 610-692-5837

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.





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:

ITEM 8
PRESSURE: 0-6 PSI & 0-160 IWC
0-15 PSI
0-30 PSI

ITEM 7 & 21
VACUUM: 0-12 IN. HG. & 0-160 IWC
0-30 IN., HG.

REV.	DATE	DESCRIPTION

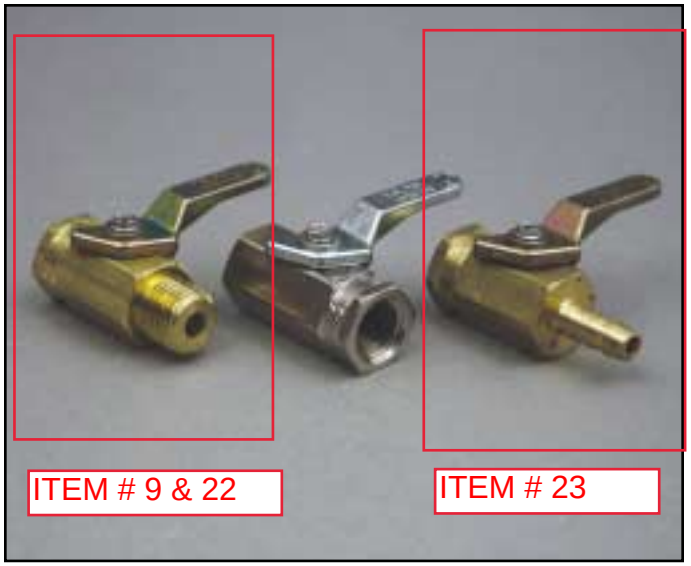
DRAWN BY: M. WITTE	DATE 8-18-00
APPROVED BY:	DATE
DIMENSIONS IN INCHES	
SCALE	
TOLERANCE	ANGULAR TOLERANCE
MATERIAL	WEIGHT
SHEET 1 OF 1	

J. E. GASHO & Assoc., Inc.
460 W. GAY ST.
WEST CHESTER, PENNSYLVANIA 19380

PRESSURE GAUGE NUMBERING SYSTEM

—

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:	Inlet End	Outlet End	Seal	Handle	Plating
	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

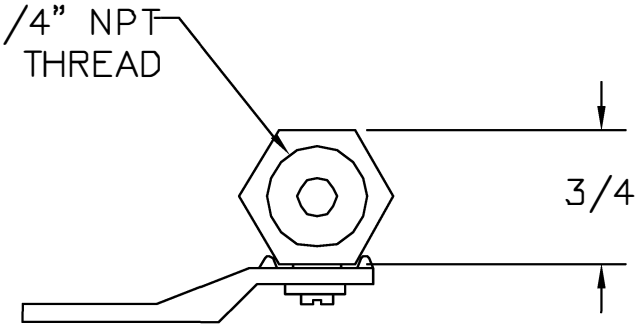
Body Options

1/4 Female x 1/4 Female NPT
1/4 Female x 1/4 Male NPT
1/4 Female x 1/8 Female NPT
1/4 Female x 1/8 Male NPT
1/4 Female x 1/4 Hose Barb
1/4 Female x 11/16-16 Male
1/4 Female x 7/16-24 Female
1/4 Female x 1/4 Female Flare
1/4 Female x 3/8 Compression

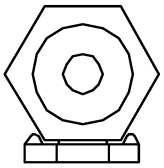
Handle Options Zinc Die Cast Lever (Standard), Zinc Die Cast Lever with Red Vinyl Sleeve, Steel Lever, Steel Lever, Round Handle, Steel Lever, Steel Lever with Red Vinyl Sleeve, Round Zinc Die Cast Handle, Black Nylon T-Handle, Blue Nylon Knob, .312 x 1" Stem, Screw Slot Headed Ball

Plating Options Electroless Nickel, Black Zinc

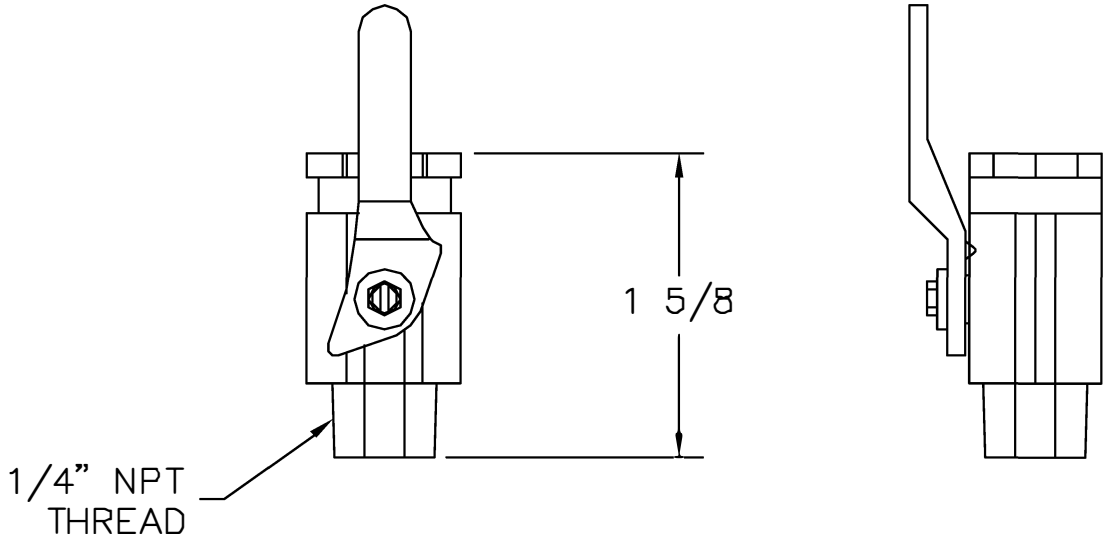
SMC will quote alternate materials or customize our standard products when quantities ensure competitive pricing.
Contact Customer Service at (651) 653-0599, FAX - (651) 653-0989, E-Mail - info@specialtymfg.com



PLAN VIEW – CLOSED



PLAN VIEW – OPEN



			DRAWN BY: M. WITTE	DATE: 8–17–00
			APPROVED BY:	DATE
			DIMENSIONS IN INCHES	
			SCALE	
			TOLERANCE	ANGULAR TOLERANCE
			MATERIAL	WEIGHT
REV.	DATE	DESCRIPTION	SHEET 1 OF 1	

J. E. GASHO & Assoc., Inc.
460 W. GAY ST.
WEST CHESTER, PENNSYLVANIA 19380

GAUGE ISOLATION VALVE
SMC
VA BRS 025–4F4M–BT

—

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Internet: www.jumousa.com

Contact Dial Thermometer

Special features

- Class 1.5
- Display range -40° C to +600° C
- Temperature controller with actual value display as built-in or add-on device in the stainless steel case with a bayonet connection
- Case size ∅: 100 mm
- Protection type IP 65

Brief description

Contact dial thermometers are devices with an actual value display for temperature measurement, control, and monitoring and can be used universally.

The temperature-dependent volume change in a measuring system filled with liquid or the temperature-dependent pressure change in a measuring system filled with gas is converted to a rotational movement of the actual value indicator by a bourdon tube; no transmission gear is required. The microswitch is actuated by the rotational movement of the indicator shaft via a tap system.

Technical data

Basic type extension	0210, 1010, 2010, 2210, 2310
Case	Stainless steel case with bayonet connection (1.4301)
Protection type	IP 65 according to DIN EN 60529
Front pane	Polycarbonate
Scale	White, with black lettering
Display	Class 1.5 similar to DIN EN 13190
Strain relief spring	For capillary devices on the case and the temperature probe
Setpoint value adjustment	By setpoint adjuster in the front pane; with screwdriver, protected by the bolted cover.
Display correction	On the rear, no display correction with design type 20
Limit value temperatures	For transport and storage -20°C to +70°C (for display range 0 to +60°C up to max. 65°C; -40 to +40°C up to max. 50°C; -30 to +50°C up to max. 60°C)
Rated position (NL)	Any

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Internet: www.jumousa.com

Technical data

Display range (AB)	Display range in °C	Measuring range in °C	Tolerance in °C (+/-)
469	-40 to +40	-30 to +30	1.5
566	-30 to +50	-20 to +40	1.5
643	-20 to +120	0 to +100	3.0
807	0 to +60	+10 to +50	1.5
810	0 to +80	+10 to +70	1.5
814	0 to +100	+10 to +90	1.5
818	0 to +120	+20 to +100	3.0
826	0 to +160	+20 to +140	3.0
832	0 to +200	+20 to +180	3.0
834	0 to +250	+30 to +220	4.0
926	+50 to +250	+70 to +230	3.0
840	0 to +300	+30 to +270	6.0
927	+50 to +300	+80 to +270	4.0
843	0 to +350	+50 to +300	6.0
932	+50 to +350	+80 to +320	6.0
848	0 to +400	+50 to +350	6.0
851	0 to +450	+50 to +400	6.0
854	0 to +500	+50 to +450	8.0
858	0 to +600	+100 to +500	10.0

	Liquid filling	**Gas filling**
Measuring system	Display range (AB) ≤ 350°C	Display range (AB) ≥ 400°C
Time constant $t_{0.632}$	Approx. 12 s, measured in water, with a probe Ø of 6 mm made of Cu.	Approx. 4 s, measured in oil, with a probe Ø of 10 mm made of stainless steel.
Ambient temperature influence effect	In % of the display range (referring to the deviation from the reference value +23°C)	
On case	0.15% of the display range per K ambient temperature change	0.05% of the display range per K ambient temperature change
On capillary (per m)	0.03% of the display range per K ambient temperature change	No influence
	At higher ambient temperature – higher temperature display – lower switching point	

	Standard	**Extra code (TZ) 650**
Electrical contact		
Contact type	Single-pole microswitch with mechanically actuated changeover contact	
Switching capacity	AC 230V, +10/-15%, 48 to 63Hz, cos φ = 1 (0.6)	
	5 (1.5) A	10 (3) A
Switching differential	Approx. 1.5% of the display range	1.5 to 3% of the display range
Switching point accuracy	± 0.5% of the display range referring to the switch-off point with rising temperature	
Switching reliability	To ensure a high switching reliability, we recommend a minimum voltage of 24 V and a minimum current of 100 mA	

Electrical connection	Junction box: conductor cross-section up to 2.5 mm^2, suitable for cable Ø from 6.5 to 13 mm

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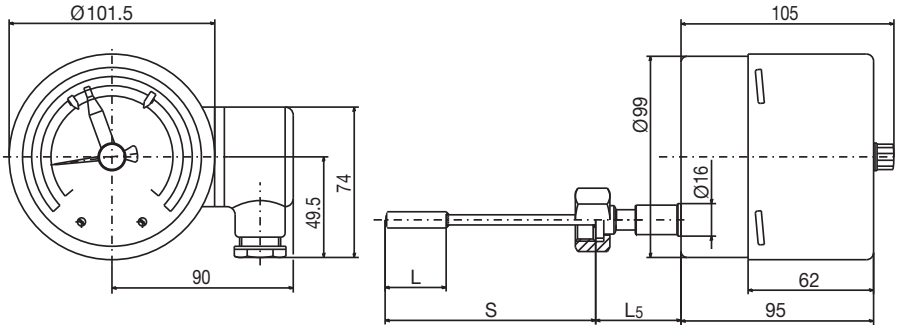
Dimensions

Type:
608523/0210



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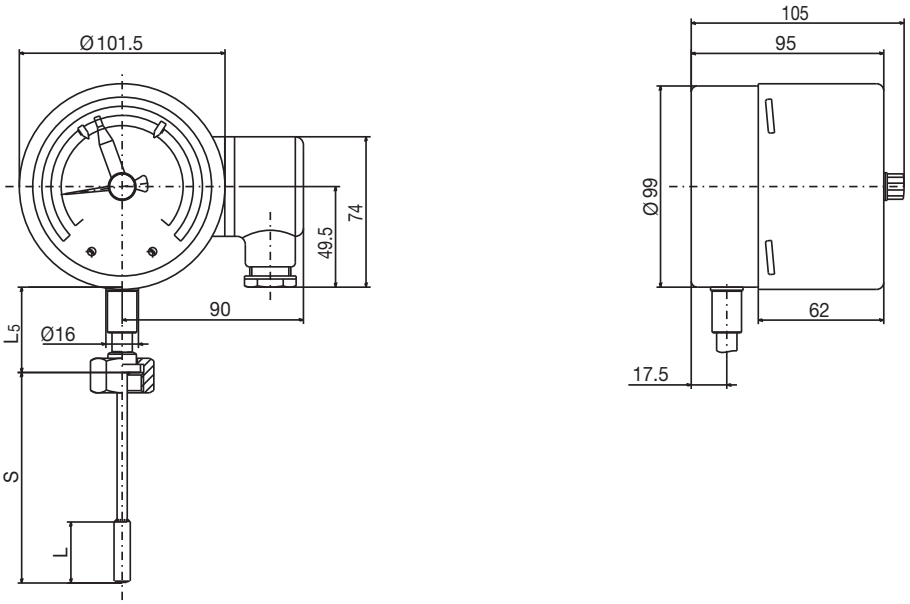

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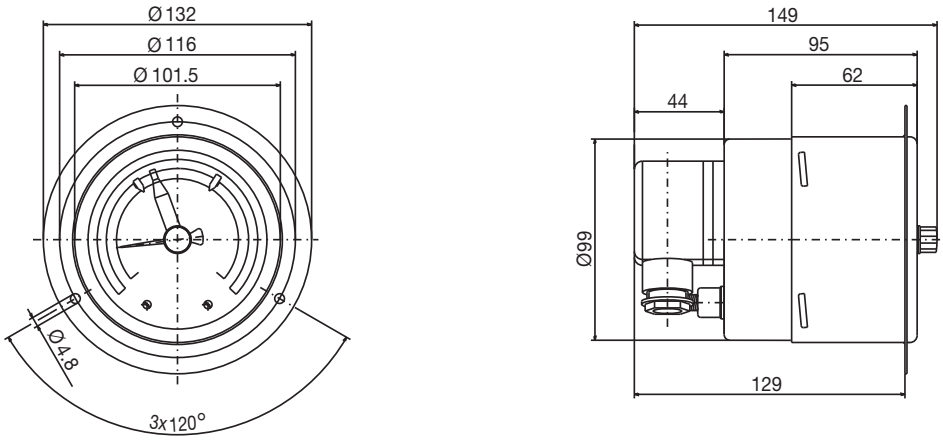

Panel cut-out Ø 105 $^{+0,5}_{0}$ mm

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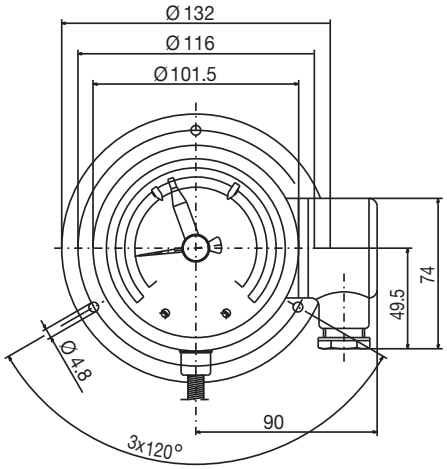
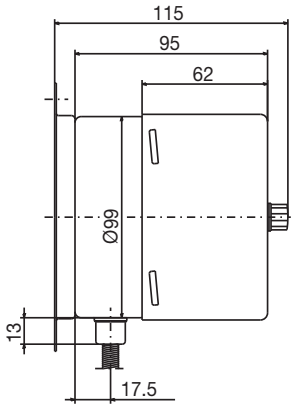
608523/2210





Panel cut-out Ø 105 $^{+0,5}_{0}$ mm

Type:
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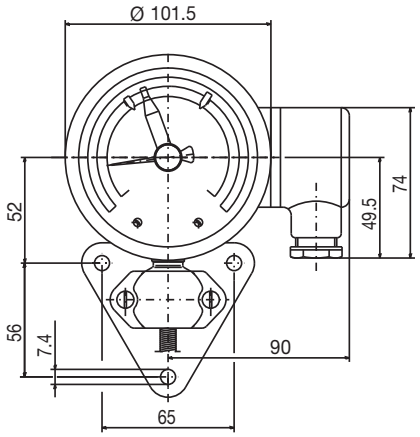
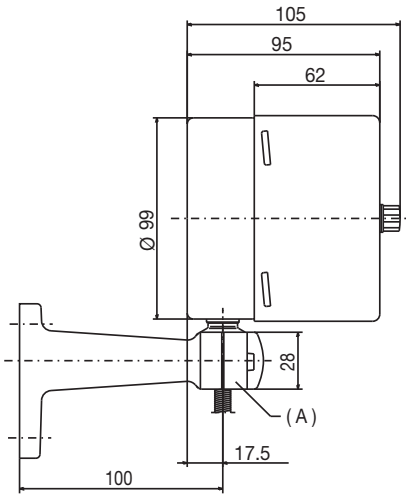


Bracket for measuring device according to DIN 16281



(A) Spigot Ø 26 mm

L_5	Protection tube connection type
40 mm	TA 03, TA 30
≤ 69 mm	TA 02
42.5 mm	TA 21
51.5 mm	TA 22, TA 31

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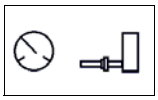
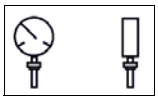
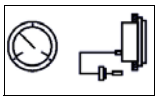
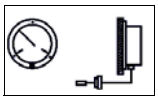
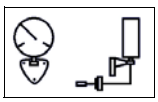
Order details

Order code	(1)	Basic type	
608523		Mechanical contact dial thermometer class 1.5	
	(2)	**Basic type extension**	Case size Ø
0210		Design type 02 	100 mm
1010		Design type 10 	100 mm
2010		Design type 20 	100 mm
2210		Design type 22 	100 mm
2310		Design type 23 	100 mm

	(3)	**Display range in °C**
469		-40 to +40
566		-30 to +50
643		-20 to +120
807		0 to +60
810		0 to +80
814		0 to +100
818		0 to +120
826		0 to +160
832		0 to +200
834		0 to +250
926		+50 to +250
840		0 to +300
927		+50 to +300
843		0 to +350
932		+50 to +350
848		0 to +400
851		0 to +450
854		0 to +500
858		0 to +600

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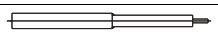
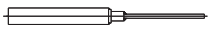
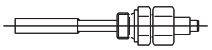
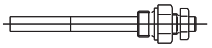
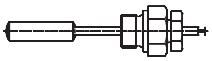
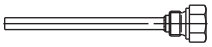
6733 Myers Road
East Syracuse, NY 13057, USA
Phone: 315-437-5866
1-800-554-5866
Fax: 315-437-5860
E-mail: info.us@jumo.net
Internet: www.jumousa.com

Order code	(4)	Capillary type (FL) [a]
00		Without (with rigid connection)
02		FL 02 Cu capillary with Cu textile braiding, approx. Ø 2.5 mm (up to AB end value +300°C)
11		FL 11 Cu capillary with PE coating, approx. ø 3.5 mm (up to AB end value +120°C)
17		FL 17 Stainless steel capillary, approx. Ø 1.5 mm
21		FL 21 Cu capillary, approx. Ø 1.0 mm (up to AB end value +300°C)

	(5)	Capillary length [b]
0		Without (with rigid connection)
1000		1000 mm
2000		2000 mm
3000		3000 mm
4000		4000 mm
5000		5000 mm
. . . .		Special length (specification in plain text: 1,000 mm increments, maximum length 10,000 mm), additional lengths upon request

	(6)	Process connection (PC)[a]		
750	TF 01	Temperature probe with stepped support tube		
752	TF 11	Temperature probe without support tube		
843	TA 02	Protection tube with union nut and loose screw connection [b]		
161	TA 03	Protection tube with loose screw connection		
847	TA 06	Protection tube with displaceable threaded fitting on support tube [b]		
311	TA 20	Protection tube with loose screw connection and connection collar [b]		
872	TA 21	Protection tube with loose pressure screw and conical seal (only G 3/8 possible)		
873	TA 22	Protection tube with loose pressure screw, conical seal, and loose screw connection [b]		
401	TA 23	Protection tube with pressure screw and contact pressure spring (only M 10x1 possible)		
913	SH 07	Screw-in protection tube, multi-sectional, with clamping piece and fixing screw (suitable for TF 01 and TF 11)		
820	SH 09	Weld-in protection tube, multi-sectional, with clamping piece and fixing screw[b] (not for FL 21 – welding collar with steel 1.4515)		
876	SH 10	Screw-in protection tube, multi-sectional[b] (suitable for TA 21)		
871	SH 11	Screw-in protection tube, multi-sectional[b] (suitable for TA 21)		

[a] For the description and special features refer to data sheet 608730.
[b] Screw-in spigot according to DIN 3852, form A.

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Internet: www.jumousa.com

Order code	(7)	Ø Process connection (PC) [a]
6		6 mm
8		8 mm
10		10 mm
11		11 mm
12		12 mm

	(8)	Thread type of process connection (PC)[a]
000		Without thread (for TA 01 and TF 11)
103		Screw connection G 3/8
104		Screw connection G 1/2
105		Screw connection G 3/4
114		Screw connection M 10 x 1 (only with TA 23 and SH 11)

	(9)	Material, probe / support tube [a]
26		Stainless steel (CrNi, 1.4571)
96		Copper (Cu) / Brass (CuZn) (up to 200°C)
95		Stainless steel (CrNi, 1.4571) - probe / Brass (CuZn) - support tube from 250°C)

	(10)	Material of process connection (PC)[a]
00		Without (only TF 01 and TF 11)
26		Stainless steel (CrNi, 1.4571)
46		Brass (CuZn)

	(11)	Insertion length, process connection (PC) [a] (dimension "EL" or "S")
0		Minimum insertion length TF 11 (active probe dimension)
50		50 mm
100		100 mm
150		150 mm
200		200 mm
. . .		Special length (specifications in plain text – 50 mm increments)

[a] For the description and special features refer to data sheet 608730.

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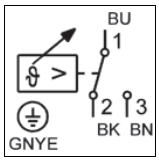
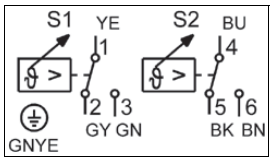
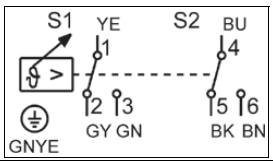
1-800-554-5866
Fax: 315-437-5860
E-mail: info.us@jumo.net
Internet: www.jumousa.com

Order code	(12)	Switching output	
28		1 switch	
27		2 switches	
19		2 switches in fixed sequence	

	(13)	Extra codes (TZ)
000		Without extra code
434		Drag indicator can be adjusted with a screwdriver, protected by a cover
650		Microswitch 10 (3) A (AC/DC 230 V, +10/-15%, 48 to 63 Hz, cos φ = 1 (0.6))
518		Stop for Min. — or Max. — setpoint value limitation, default setting
522		Customized scale

Special versions upon request!

Order code

(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)		(10)		(11)		(12)		(13)	
608523	/	. . . .	-	. . .	-	. .	-	. . . .	-	. . .	-	. .	-	. . .	-	. .	-	. .	-	. . .	-	. .	/	. . .	, . . .

Order example

608523 / 2010 - 818 - 21 - 2000 - 750 - 10 - 000 - 26 - 00 - 100 - 28 / 000[a] , . . .

[a] List extra codes in sequence, separated by commas.

SERIES 1950 | EXPLOSION-PROOF DIFFERENTIAL PRESSURE SWITCH

FEATURES/BENEFITS

- **Explosion-proof and weatherproof housing provides device protection for outdoor use or harsh environment operation**
- **External set point screw provides easy access without opening or disassembling enclosure**
- **Easily accessible electrical connection simplifies the installation**

APPLICATIONS

- HVAC applications
- Process applications
- All-weather applications

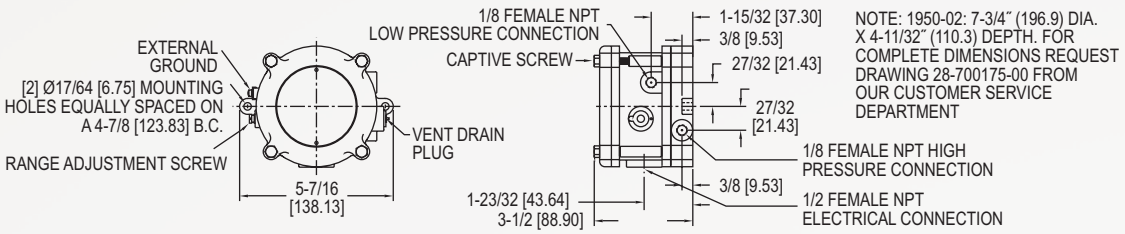
DESCRIPTION

The **Series 1950 Explosion-Proof Differential Pressure Switch** combines the best features of the popular Dwyer® Series 1900 Pressure Switch with an integral explosion-proof and weatherproof housing, making it an exceptional value for either application. It is CE, UL and CSA listed, FM approved for use in Class I, Div 1, Groups C and D, Class II Groups E, F, and G and Class III hazardous atmospheres NEMA 7 & 9. Rain tight NEMA 3 (IP54), weatherproof features include a drain plug and O-ring seal in cover. Electrical connections are easily made by removing front cover. For convenience the set point adjustment screw is located on the outside of the housing. Twelve models offer set points from .03 to 20 in w.c. (0.0075 to 5 kPa) and from .5 to 60 psi (0.035 to 3.5 bar). The unit is very light and compact - about half the weight and bulk of other explosion-proof or weatherproof switches with separate enclosures.

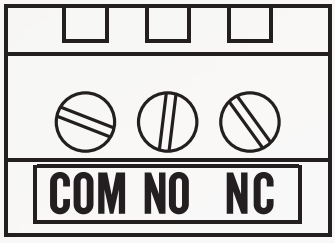
SPECIFICATIONS

Service	Air and non-combustible, compatible gases.
Wetted Materials	Consult factory.
Temperature Limits	-40 to 140°F (-40 to 60°C); 0 to 140°F (-17.8 to 60°C) for 1950P-8, 15, 25, and 50. -30 to 130°F (-34.4 to 54.4°C) for 1950-02.
Pressure Limits (Continuous)	1950's - 45 in w.c. (0.11 bar); 1950P's - 35 psi (2.41 bar); 1950P-50 only - 70 psi (4.83 bar). Surge: 1950's - 10 psi (0.69 bar), 1950P's - 50 psi (3.45 bar), 1950P-50 only - 90 psi (6.21 bar).
Enclosure Rating	NEMA 3 (IP54), NEMA 7 & 9.
Switch Type	Single-pole double-throw (SPDT).
Electrical Rating	15 A @, 125, 250, 480 VAC, 60 Hz. Resistive 1/8 HP @ 125 VAC, 1/4 HP @ 250 VAC, 60 Hz.
Electrical Connections	3 screw type, common, normally open and normally closed.
Process Connections	1/8″ female NPT.
Mounting Orientation	Diaphragm in vertical position. Consult factory for other position orientations.
Set Point Adjustment	Screw type on top of housing.
Weight	3.25 lb (1.5 kg); 1950-02 model, 4.4 lb (2 kg).
Agency Approvals	CE, CSA, FM, UL.

DIMENSIONS



WIRING DIAGRAM



HOW TO ORDER

Use the **bold** characters from the chart below to construct a product code.

1950 **-02** **-2** **S** **-AT**

SWITCH TYPE
1950: Pressure switch - inches w.c.
1950P: Pressure switch - PSID

RANGE
-02: 0.03 - 0.10 in w.c.
-00: 0.07 - 0.15 in w.c.
-0: 0.15 - 0.5 in w.c.
-1: 0.4 - 1.6 in w.c.
-5: 1.4 - 5.5 in w.c.
-10: 3.0 - 11.0 in w.c.
-20: 4.0 - 20.0 in w.c.
-2: 0.5 - 2.0 psid
-8: 1.5 - 8.0 psid
-15: 3.0 - 15.0 psid
-25: 4.0 - 25.0 psid
-50: 15.0 - 50.0 psid

MICRO SWITCH TYPE
-2: 10G mica silver contact*
-6: 10G phenolic gold contact
-M: 10C phenolic silver contact

DIAPHRAGM MATERIAL
B: Buna-N
F: Flurosilicone*
N: Neoprene
S: Silicone
V: Fluroelastomer

OPTIONS
-AT: Aluminum tag
-PRESET: Preset
-ST: Stainless steel tag

*The 2F is standard

ORDER ONLINE TODAY
dwyer-inst.com/Product/SeriesRHP

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DS-1950 Rev. 2

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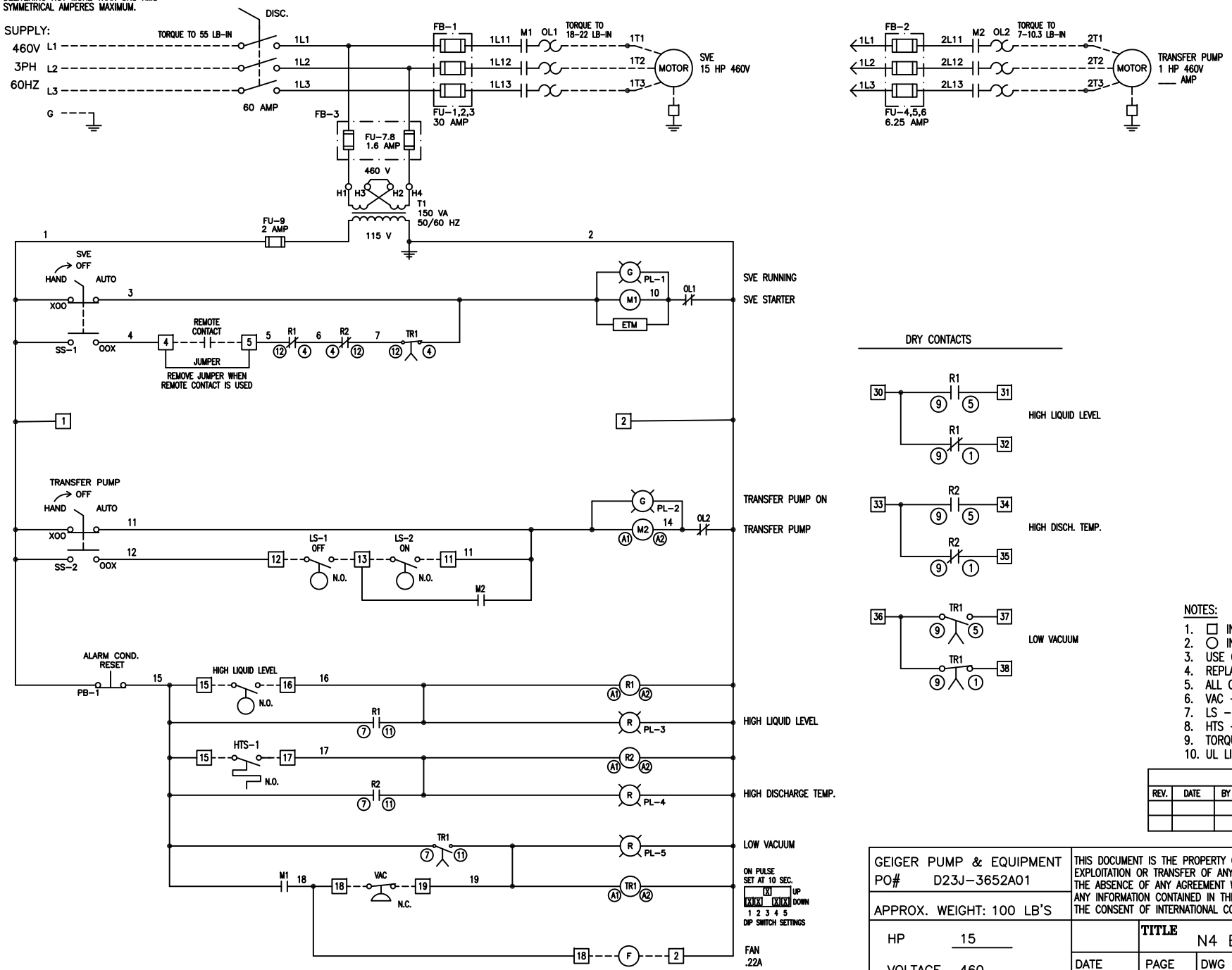
SUITABLE FOR USE ON A CIRCUIT CAPABLE OF DELIVERING NOT MORE THAN 5Kα RMS SYMMETRICAL AMPERES MAXIMUM.



DRY CONTACTS

NOTES:

1. □ INDICATES TERMINAL BLOCK
2. ○ INDICATES COMPONENT TERMINAL POINT
3. USE COPPER WIRE ONLY MIN. 60 DEGREES C
4. REPLACE WITH LIKE FUSES ONLY
5. ALL CONTACTS SHOWN WITH POWER OFF
6. VAC – INDICATES VACUUM SWITCH
7. LS – INDICATES LEVEL SWITCH
8. HTS – INDICATES HIGH TEMP. SWITCH
9. TORQUE TERMINAL BLOCKS TO 5-7 LB-IN
10. UL LISTED CONTROL PANEL

REVISIONS				
REV.	DATE	BY	CHKD.	DESCRIPTION

GEIGER PUMP & EQUIPMENT
PO# D23J-3652A01

APPROX. WEIGHT: 100 LB'S

HP 15

VOLTAGE 460

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TITLE: N4 BLOWER CONTROL PANEL

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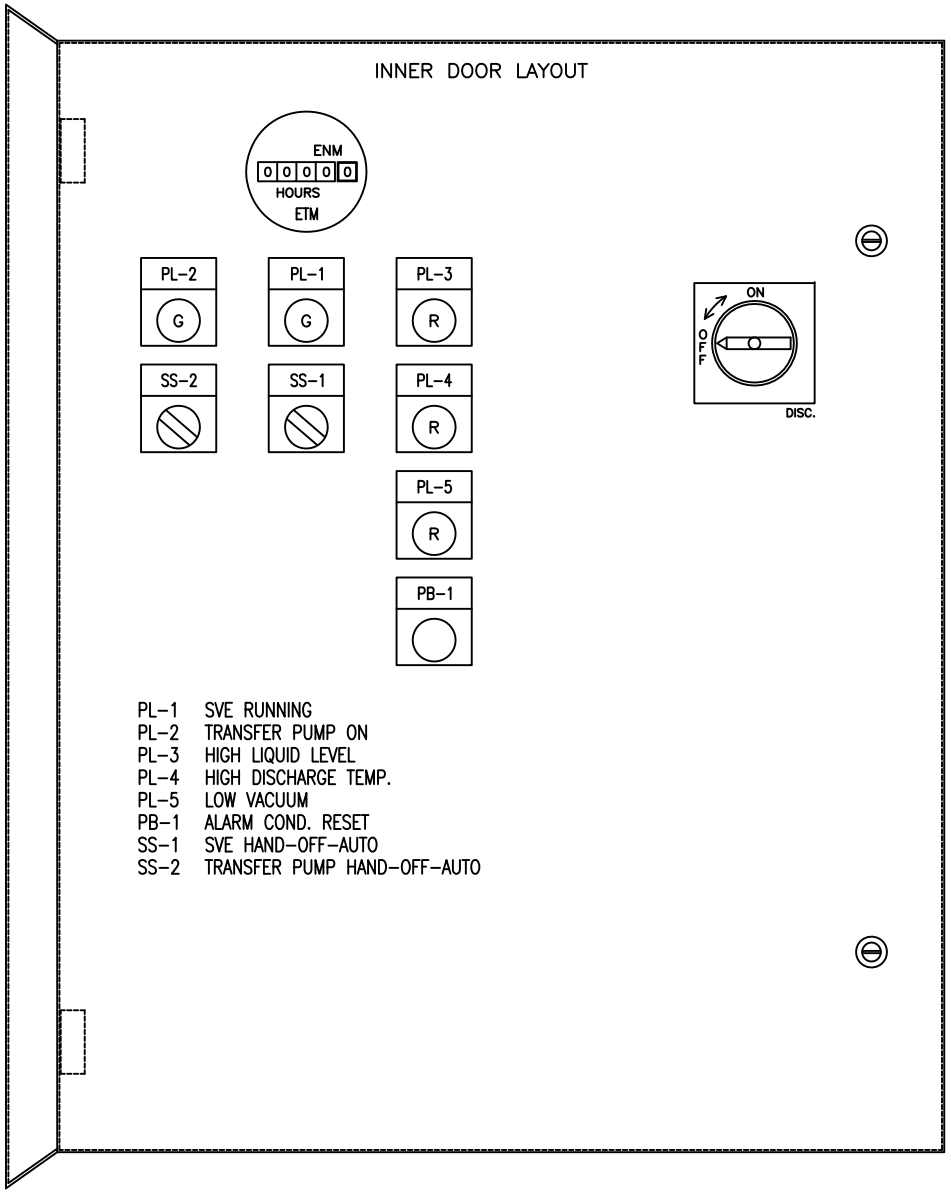
INNER DOOR LAYOUT



PL-1 SVE RUNNING
PL-2 TRANSFER PUMP ON
PL-3 HIGH LIQUID LEVEL
PL-4 HIGH DISCHARGE TEMP.
PL-5 LOW VACUUM
PB-1 ALARM COND. RESET
SS-1 SVE HAND-OFF-AUTO
SS-2 TRANSFER PUMP HAND-OFF-AUTO

BILL OF MATERIALS

ITEM	QTY	ITEM LABEL	MFG.	DESCRIPTION	PART NUMBER
1	1	ENCL	SCE	30x24x8 NEMA 4 ENCLOSURE	SCE-30EL2410LP
2	1	ENCL	SCE	17x21 STEEL BACK PANEL	SCE-30P24
3	1	ENCL	SCE	17x21 STEEL INNER DOOR	SCE-DF30EL24
4	1	ENCL	SCE	PADLOCK ATTACHEMENT	SCE-PLHG
5	1	DISC.	ABB	60A 3P NON-FUSED DISC. SWITCH	OT60F3
6	1	DISC.	ABB	NEMA 3R DISCONNECT HANDLE	OHBS2AJ
7	1	DISC.	ABB	DISCONNECT SHAFT	OXS6X180
8	1	FB-1	MERSEN	3P 30A CLASS J FUSE BLOCK	60308SJ
9	3	FU1,2,3	BUSSMANN	30 AMP CLASS J FUSE	AJT30N
10	1	FB-2	BUSSMANN	3P 30A CLASS J FUSE BLOCK	BC6033P
11	3	FU4,5,6	BUSSMANN	6 1/4 AMP CLASS CC FUSE	FNQ-R-6 1/4
12	1	M1	SIEMENS	32 AMP IEC CONTACTOR	3RT2027-1AK60
13	1	OL1	SIEMENS	OVERLOAD RELAY (20-25 FLA)	3RU2126-4DB0
14	1	M2	SIEMENS	6 AMP IEC CONTACTOR	3RT2015-1AK61
15	1	OL2	SIEMENS	OVERLOAD RELAY (1.8-2.5 FLA)	3RU2116-1CB0
16	2	SS-1,2	ABB	3 POS. S.S. SPRG. RET. L TO C (2 N.O.)	M3SS7-10B-20
17	2	PL-1,2	ABB	GREEN F.V. PILOT LIGHT - 120V	CL-100G
18	3	PL-3,4,5	ABB	RED F.V. PILOT LIGHT - 120V	CL-100R
19	1	PB-1	ABB	BLACK FLUSH P.B. (1 N.C.)	MP1-30B-01
20	1	ETM	ENM	ELAPSED TIME METER	T50B2-12
21	1	T1	SIEMENS	150VA CONTROL TRANSFORMER	MT0150A
22	1	FB-3	BUSSMANN	2P 30A CLASS CC FUSE BLOCK	BC6032PQ
23	2	FU-7,8	BUSSMANN	1 6/10 AMP CLASS CC FUSE	FNQ-R-1 6/10
24	1	FU-9	MERSEN	2 AMP TIME DELAY FUSE	TRM2
25	3	R1,R2,R3	FINDER	4 POLE RELAY - 120V	55.34.8.120.0050
26	3	R1,R2,R3	FINDER	4 POLE RELAY SOCKET	94.74
27	1	TR1	FINDER	2 POLE TIMER - 120V	85.02.0.125.000
28	1	TR1	FINDER	2 POLE TIMER SOCKET	94.82
29	26	T.B.'S	PHOENIX	TERMINAL BLOCK	3004362
30	1	T.B.'S	PHOENIX	TERMINAL BLOCK END COVER	3003020
31	2	T.B.'S	PHOENIX	DIN RAIL END RETAINER	0800886
32	2	GROUND	BURNDY	14-2 AWG GROUND LUG	DLA2

REVISIONS				
REV.	DATE	BY	CHKD.	DESCRIPTION

GEIGER PUMP & EQUIPMENT
PO# D23J-3652A01

APPROX. WEIGHT: 100 LB'S

HP 15

VOLTAGE 460

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TITLE: N4 BLOWER CONTROL PANEL

DATE	PAGE	DWG NO.	
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Slice Gate Valves - PVC

VSGV Uni-Body

VSGV 3 piece body

VSGV 3 piece body with union

PVC Slice Gate Valve Features:

NO LEAD ✓ LEAD-FREE

- Designed for pool & spa, irrigation, plumbing, waste water and agricultural applications.
- Stainless steel shaft prevent rust and corrosion.
- Ozone & chemical resistant Santoprene™ materials.
- Santoprene™ seals are integrated to the paddle to eliminate any chance of torn or punctured gaskets.
- Maximum working pressure 50 psi (through 2").
- Solvent cement traps to catch excess glue.
- Every valve tested at double recommended working pressure.
- Valterra's patent pending triple o-ring neck seal to ensure against any chance of shaft leakage.

Unibody Design

- One piece uni-body design.
- Combination socket ID x spigot OD for installation flexibility.
- Locking handle provides positive shut-off and easy gate opening.

3 Piece body

- Three piece configuration allows for repair or can be used as a union.
- Three piece configuration easily disassembles for inline service.

Part Number	Description	Max PSI	Ctn Qty
Uni-Body			
VSGV2101	1 1/2" slip x slip	45	30
VSGV2201	2" slip x slip	40	20
*** Unibody 2" slip hubs are 2" slip or 2 1/2" spig**			
Three Piece Body			
VSGV150SL	1 1/2" slip x slip	45	30
VSGV150FIPTXMIPT	1 1/2" fipt x mipt	45	40
VSGV150SLU	1 1/2" slip x union slip	45	38
VSGV150MTU	1 1/2" mipt x union slip	45	38
VSGV150SP	1 1/2" slip x spigot	45	30
VSGV150SD	1 1/2" step down pool hose x mipt ABS		40
VSGV200SL	2" slip x slip	40	20
VSGV200SP	2" slip x spigot	40	34
VSGV300SL	3" slip x slip	30	15
VSGV400SL	4" slip x slip w/ metal handle	20	6
VSGV600SL	6" slip x slip w/ stainless handle	10	1
VSGV800SL	8" slip x slip w/ stainless handle	10	1
VSGV1000SL	10" slip x slip w/ stainless handle	10	1
VSGV1200SL	12" slip x slip w/ stainless handle	10	1

APPENDIX G – QUALITY ASSURANCE PROJECT PLAN

QUALITY ASSURANCE PROJECT PLAN

27-09 40th Avenue
Long Island City, Queens, New York
NYSDEC Site No. C241241

Prepared for:

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38-08 30th Avenue
Astoria, NY 11103

Prepared by:

Liberty Environmental
600 Third Avenue, Second Floor
New York, NY 10016

Liberty Project No. 220192

December 11, 2023

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1. PROJECT DESCRIPTION

This Quality Assurance Project Plan (QAPP) specifies analytical methods to be used to ensure that data from the proposed remedial action is precise, accurate, representative, comparable, and complete.

1.1 INTRODUCTION

This QAPP has been prepared by Equity Environmental Engineering, LLC (Equity) for the Williamsburg Bridgeview Apartments (WBA) to investigate soil and groundwater at the Site, located at 337 Berry Street, Brooklyn, New York, Site #C224233.

1.2 PROJECT OBJECTIVES

The objectives of this project are as follows:

1. Installation of soil borings, temporary groundwater monitoring wells, and soil-gas sampling points.
2. Collection of soil, groundwater, soil-gas, and indoor air samples to assist with the delineation of VOC contamination association with past Site operations.

1.3 SCOPE OF WORK

The scope of work includes the installation of monitoring well(s) and the collection of soil-gas, indoor air, and groundwater samples as part of the Site Management Plan (SMP) for the WBA site.

1.4 DATA QUALITY OBJECTIVES AND PROCESSES

The quality assurance and quality control (QA/QC) objectives for all measurement data include:

- ***Precision*** - an expression of the reproducibility of measurements of the same parameter under a given set of conditions. Field sampling precision will be determined by analyzing coded duplicate samples and analytical precision will be determined by analyzing internal QC duplicates and matrix spike duplicates.

- ***Accuracy*** - a measure of the degree of agreement of a measured value with the true or expected value of the quantity of concern. Sampling accuracy will be determined through the assessment of the analytical results of field blanks and trip blanks for each sample set. Analytical accuracy will be assessed by examining the percent recoveries of surrogate compounds that are added to each sample (organic analyses only), and the percent recoveries of matrix spike compounds added to selected samples and laboratory blanks.

- ***Representativeness*** - expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness will be determined by assessing a number of investigation procedures, including chain of custody, decontamination, and analysis of field blanks and trip blanks.

- ***Completeness*** - the percentage of measurements made which are judged to be valid. Completeness will be assessed through data validation. The QC objective for completeness is generation of valid data for at least 90 percent of the analyses requested.

- ***Comparability*** - expresses the degree of confidence with which one data set can be compared to another. The comparability of all data collected for this project will be ensured using several procedures, including standard methods for sampling and analysis, instrument calibrations, using standard reporting units and reporting formats.

Each of the above objectives is discussed in detail in Section 3.

2. PROJECT ORGANIZATION

This Remedial Investigation will be completed for WBA site. Equity Environmental Engineering, LLC (Equity) will coordinate the field activities and provide an on-site field representative to perform the site Health & Safety, soil, soil vapor, and groundwater sampling. Equity will perform the data analysis and all reporting tasks. The analytical services will be performed by an ELAP approved laboratory.

Key contacts for this project are as follows:

40TH Avenue Dutch Kills Realty	Mr. Gus Vorillas Telephone: (917)538-2656 gus@firstelitenyc.com
Liberty Environmental ProjectManager:	Mr. Jim Cinelli, P.E. Telephone: (610)633-9780 jcinelli@libertyenviro.com
York Laboratories	Mr. Rich August Telephone: (800)306-9675, x834 raugust@yorklab.com

3. QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) OBJECTIVES FOR MEASUREMENT OF DATA

3.1 INTRODUCTION

The quality assurance and quality control (QA/QC) objectives for all measurement data include precision, accuracy, representativeness, completeness, and comparability. These objectives are defined in following subsections. They are formulated to meet the requirements of the USEPA SW-846. The analytical methods are given in Section 7.

3.2 PRECISION

Precision is an expression of the reproducibility of measurements of the same parameter under a given set of conditions. Specifically, it is a quantitative measurement of the variability of a group of measurements compared to their average value (USEPA, 1987). Precision is usually stated in terms of standard deviation, but other estimates such as the coefficient of variation (relative standard deviation), range (maximum value minus minimum value), relative range, and relative percent difference (RPD) are common.

For this project, field sampling precision will be determined by analyzing coded duplicate samples (labeled so that the laboratory does not recognize them as duplicates) for the same parameters, and then, during data validation (Section 8), calculating the RPD for duplicate sample results.

Analytical precision will be determined by the laboratory by calculating the RPD for the results of the analysis of internal QC duplicates and matrix spike duplicates. The formula for calculating RPD is as follows:

$$RPD = \frac{|V1 - V2|}{(V1 + V2)/2} \times 100$$

where:

RPD	=	Relative Percent Difference.
V1, V2	=	The two values to be compared.
|V1 - V2|	=	The absolute value of the difference between the two values.
(V1 + V2)/2	=	The average of the two values.

The data quality objectives for analytical precision, calculated as the RPD between duplicate analyses, are presented in the following tables.

3.3 ACCURACY

Accuracy is a measure of the degree of agreement of a measured value with the true or expected value of the quantity of concern (Taylor, 1987), or the difference between a measured value and the true or accepted reference value. The accuracy of an analytical procedure is best determined by the analysis of a sample containing a known quantity of material, and is expressed as the percent of the known quantity which is recovered or measured. The recovery of a given analyte is dependent upon the sample matrix, method of analysis, and the specific compound or element being determined. The concentration of the analyte relative to the detection limit of the analytical method is also a major factor in determining the accuracy of the measurement. Concentrations of analytes which are close to the detection limits are less accurate because they are more affected by such factors as instrument "noise". Higher concentrations will not be as affected by instrument noise or other variables and thus will be more accurate.

Sampling accuracy may be determined through the assessment of the analytical results of field blanks and trip blanks for each sample set. Analytical accuracy is typically assessed by examining the percent recoveries of surrogate compounds that are added to each sample (organic analyses only), and the percent recoveries of matrix spike compounds added to selected samples and laboratory blanks. Additionally, initial and continuing calibrations must be performed and accomplished within the established method control limits to define the instrument accuracy before analytical accuracy can be determined for any sample set.

Accuracy is normally measured as the percent recovery (%R) of a known amount of analyte, called a spike, added to a sample (matrix spike) or to a blank (blank spike). The %R is calculated as follows:

$$\%R = \frac{SSR - SR}{SA} \times 100$$

where:

%R	=	Percent recovery.
SSR	=	Spike sample result: concentration of analyte obtained

by analyzing the sample with the spike added.

SR = Sample result: the background value, i.e., the concentration of the analyte obtained by analyzing the sample.

SA = Spiked analyte: concentration of the analyte spike added to the sample.

The acceptance limits for accuracy for each parameter are presented in Table 3.

3.4 REPRESENTATIVENESS

Representativeness expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is a qualitative parameter which is most concerned with the proper design of the sampling program (USEPA, 1987). Samples must be representative of the environmental media being sampled. Selection of sample locations and sampling procedures will incorporate consideration of obtaining the most representative sample possible.

Field and laboratory procedures will be performed in such a manner as to ensure, to the degree that is technically possible, that the data derived represents the in-place quality of the material sampled. Every effort will be made to ensure chemical compounds will not be introduced into the sample via sample containers, handling, and analysis. Decontamination of sampling devices and digging equipment will be performed between samples as outlined in the Health and Safety Plan, and according to the NYSDEC DER-10 requirements. Analysis of field blanks, trip blanks, and method blanks will also be performed to monitor for potential sample contamination from field and laboratory procedures.

The assessment of representativeness also must consider the degree of heterogeneity in the material from which the samples are collected. Sampling heterogeneity will be evaluated during data validation through the analysis of coded field duplicate samples. The analytical laboratory will also follow acceptable procedures to assure the samples are adequately homogenized prior to taking aliquots for analysis, so the reported results are representative of the sample received.

Chain-of-custody procedures will be followed to document that contamination of samples has not occurred during container preparation, shipment, and sampling. Details of blank, duplicate and Chain-of-custody procedures are presented in Sections 4 and 5.

3.5 COMPLETENESS

Completeness is defined as the percentage of measurements made which are judged to be valid (USEPA, 1987). The QC objective for completeness is generation of valid data for at

least 90 percent of the analyses requested. Completeness is defined as follows for all sample measurements:

$$\%C = \frac{V}{T} \times 100$$

where:

%C = Percent completeness.

V = Number of measurements judged valid.

T = Total number of measurements.

3.6 COMPARABILITY

Comparability expresses the degree of confidence with which one data set can be compared to another (USEPA, 1987). The comparability of all data collected for this project will be ensured by:

- Using identified standard methods for both sampling and analysis phases of this project;
- Requiring traceability of all analytical standards and/or source materials to the U.S. Environmental Protection Agency (USEPA) or National Institute of Standards and Technology (NIST);
- Requiring that all calibrations be verified with an independently prepared standard from a source other than that used for calibration (if applicable);
- Using standard reporting units and reporting formats including the reporting of QC data;
- Performing a complete data validation on a representative fraction of the analytical results, including the use of data qualifiers in all cases where appropriate; and
- Requiring that all validation qualifiers be used any time an analytical result is used for any purpose.

These steps will ensure all future users of either the data or the conclusions drawn from them will be able to judge the comparability of these data and conclusions.

4. SAMPLING PROGRAM

4.1 INTRODUCTION

The sampling program will provide data concerning the presence and the nature and extent of soil, groundwater, soil-gas, and indoor air contamination. This section presents sample container preparation procedures, sample preservation procedures, sample holding times, and field QC sample requirements. Sample locations, and the number of environmental and QC samples to be taken are given in Table 4.1. The sampling procedures are presented in the Remedial Investigation Workplan.

4.2 SAMPLE CONTAINER PREPARATION AND SAMPLE PRESERVATION

Sample containers will be properly washed and decontaminated prior to their use by either the analytical laboratory or the container vendor to the specifications required by the NYSDEC. Copies of the sample container QC analyses will be provided by the laboratory for each container lot used to obtain samples. The containers will be tagged and the appropriate preservatives will be added. The types of containers are listed in Tables 4.2 and 4.3.

Samples shall be preserved according to the preservation techniques given in Tables 4.2 and 4.3. Preservatives will be added to the sample bottles by the laboratory prior to their shipment in sufficient quantities to ensure that proper sample pH is met. Following sample collection, the sample bottles should be placed on ice in the shipping cooler, cooled to 4°C with ice, and delivered to the laboratory within 24 hours of collection. Chain-of-custody procedures are described in Section 7.

Soil-gas and indoor air samples will be shipped to the laboratory at ambient temperatures with no preservative.

4.3 SAMPLE HOLDING TIMES

The sample holding times for organic and inorganic parameters are given in Tables 4.2 and 4.3 and must be in accordance with the NYSDEC requirements. The holding times must be strictly adhered to by the laboratory. Any holding time exceedances must be reported to WBA.

4.4 FIELD QC SAMPLES

To assess field sampling and decontamination performance, two types of "blanks" will be collected and submitted to the laboratory for analyses. In addition, the precision of field sampling procedures will be assessed by collecting coded field duplicates. Matrix

spike/matrix spike duplicates (MS/MSDs) will be completed by Accutest Laboratories and in accordance with Accutest's Quality System precision, accuracy, and completeness objectives. The blanks will include:

a. Trip Blanks - A Trip Blank will be prepared before the sample containers are sent by the laboratory. The trip blank will consist of a 40-ml VOA vial containing distilled, deionized water, which accompanies the other water sample bottles into the field and back to the laboratory. A trip blank will be included with each shipment of water samples VOC analysis. The Trip Blank will be analyzed for VOCs to assess any contamination from sampling and transport, and internal laboratory procedures.

b. Field Blanks - Field Blanks will be taken at a minimum frequency of one per 20 field samples per sample matrix, or one per day. Field blanks are used to determine the effectiveness of the decontamination procedures for sampling equipment. It is a sample of deionized, distilled water provided by the laboratory that has passed through a decontaminated bailer or other sampling apparatus. It is usually collected as a last step in the decontamination procedure, prior to taking an environmental sample. The field blank may be analyzed for all or some of the parameters of interest.

The duplicates will consist of:

a. Coded Field Duplicate - To determine the representativeness of the sampling methods, coded field duplicates will be collected. The samples are termed "coded" because they will be labeled in such a manner that the laboratory will not be able to determine that they are a duplicate sample. This will eliminate any possible bias that could arise.

b. Matrix Spike/Matrix Spike Duplicate (MS/MSD) - MS/MSD samples (MS/MSD for organics; MS and laboratory duplicate for inorganics) will be completed by the analytical laboratory and/or taken at a frequency of one pair per 20 field samples and/or in accordance with Accutest's Quality System objectives.. These samples are used to assess the effect of the sample matrix on the recovery of target compounds or target analytes. The percent recoveries and RPDs are given in Section 3 tables.

TABLE 4-1: SUMMARY OF SAMPLES AND ANALYSES

Matrix	Parameter	Analytical Method	Field Samples				QC Blanks		Total
			Field Samples	Field Duplicate	MS/MSD[(a)] (Total)	Sub-Total	Trip Blank	Rinse Blank	
Groundwater Samples	TCL VOCs, SVOCs, Pesticides, PCBs, and TAL Metals	EPA SW846 8260, 8270, 8081, 8082 EPA 200.7/SW84	9	1	1	11	1	1	13
Soil Vapor and Indoor Air	VOCs	TO+15	6	1	1	8			8

(a) Matrix spike/matrix spike duplicate for organic analyses; matrix spike and laboratory duplicate for inorganic analysis; to be completed by York Laboratories.

Figure 4-1 shows the locations of the monitoring wells and 4-2 shows the indoor air sampling points listed in Table 4-1.

TABLE 4-2
WATER SAMPLE CONTAINERIZATION, PRESERVATION, AND HOLDING TIMES

Analysis	Bottle Type	Preservation [a]	Holding Time [b]
Volatile Organic Method (8260) Compounds (VOCs)	3-40 mL glass vial w/ Teflon septum	Cool to 4°C	24 hrs-field/14 days

(a) All samples to be preserved in ice during collection and transport.

(b) Days from time of sample receipt at the laboratory. Maximum field holding time for all samples is 48-hours.

TABLE 4-3
AIR SAMPLE CONTAINERIZATION, PRESERVATION, AND HOLDING TIMES

Analysis	Bottle Type	Preservation	Holding Time [a]
TO+15	Stainless Steel Summa Canister	None	

(a) Days from time of sample receipt at the laboratory. Maximum field holding time for all samples is 48-hours.

5. SAMPLE TRACKING AND CUSTODY

5.1 INTRODUCTION

This section presents sample custody procedures for both the field and laboratory. Implementation of proper custody procedures for samples generated in the field is the responsibility of field personnel. Both laboratory and field personnel involved in the Chain-of-custody (COC) and transfer of samples will be trained as to the purpose and procedures prior to implementation.

Evidence of sample traceability and integrity is provided by COC procedures. These procedures document the sample traceability from the selection and preparation of the sample containers by the laboratory, to sample collection, to sample shipment, to laboratory receipt and analysis. The sample custody flowchart is shown in Figure 5-1. A sample is considered to be in a person's custody if the sample is:

- In a person's possession;
- Maintained in view after possession is accepted and documented;
- Locked and tagged with Custody Seals so that no one can tamper with it after having been in physical custody; or
- In a secured area which is restricted to authorized personnel.

5.2 FIELD SAMPLE CUSTODY

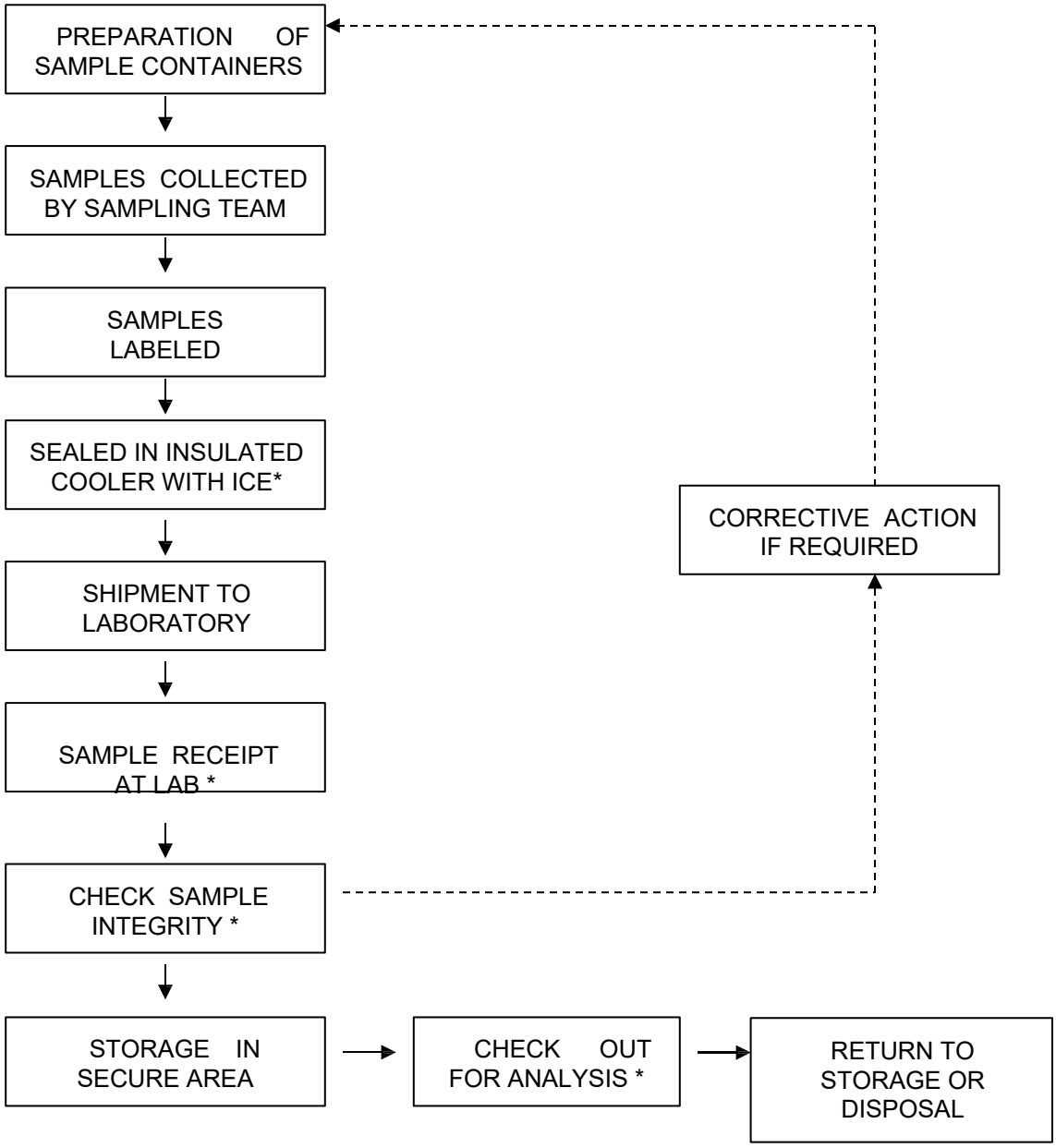
A COC record (Figure 5.2 or similar) accompanies the sample containers from selection and preparation at the laboratory, during shipment to the field for sample containment and preservation, and during return to the laboratory. Triplicate copies of the COC must be completed for each sample set collected.

The COC lists the field personnel responsible for taking samples, the project name and number, the name of the analytical laboratory to which the samples are sent, and the method of sample shipment. The COC also lists a unique description of every sample bottle in the set. If samples are split and sent to different laboratories, a copy of the COC record will be sent with each sample.

The REMARKS space on the COC is used to indicate if the sample is a matrix spike, matrix spike duplicate, or any other sample information for the laboratory. Since they are not specific to any one sample point, trip and field blanks are indicated on separate rows. Once all bottles are properly accounted for on the form, a sampler will write his or her signature and the date and time on the first RELINQUISHED BY space. The sampler will also write the method of shipment and the shipper air bill number of the top of the COC, if applicable. Mistakes will be crossed out with a single line in ink and initialed.

FIGURE 5-1

SAMPLE CUSTODY



* REQUIRES SIGN-OFF ON CHAIN-OF-CUSTODY FORM

One copy of the COC is retained by sampling personnel (notations identifying blind duplicate samples will be added to this copy of the COC but not the others that will go to the laboratory) and the other two copies are put into a sealable plastic bag and taped inside the lid of the shipping cooler. The cooler lid is closed, custody seals provided by the laboratory are affixed to the latch and across the back and front lids of the cooler, and the person relinquishing the samples signs their name across the seal. The seal is taped, and the cooler is wrapped tightly with clear packing tape. It is then relinquished by field personnel to personnel responsible for shipment, typically an overnight carrier. The COC seal must be broken to open the container. Breakage of the seals before receipt at the laboratory may indicate tampering. If tampering is apparent, the laboratory will contact the Project Manager, and the sample will only be analyzed pending further investigation.

5.3 LABORATORY SAMPLE CUSTODY

The Project Manager or Field Team Leader will notify the laboratory of upcoming field sampling activities, and the subsequent shipment of samples to the laboratory. This notification will include information concerning the number and type of samples to be shipped as well as the anticipated date of arrival.

The following laboratory sample custody procedures will be used:

- The laboratory will designate a sample custodian who will be responsible for maintaining custody of the samples, and for maintaining all associated records documenting that custody.
- Upon receipt of the samples, the custodian will check cooler temperature, and check the original COC documents and compare them with the labeled contents of each sample container for correctness and traceability. The sample custodian will sign the COC record and record the date and time received.
- Care will be exercised to annotate any labeling or descriptive errors. In the event of discrepant documentation, the laboratory will immediately contact the Project Manager or Field Team Leader as part of the corrective action process. A qualitative assessment of each sample container will be performed to note any anomalies, such as broken or leaking bottles. This assessment will be recorded as part of the incoming chain-of-custody procedure.
- The samples will be stored in a secured area at a temperature of approximately 4 degrees Celsius until analyses commence.
- A laboratory tracking record will accompany the sample or sample fraction through final analysis for control.
- A copy of the tracking record will accompany the laboratory report and will become a permanent part of the project records.

6. CALIBRATION PROCEDURES

6.1 FIELD INSTRUMENTS

All field analytical equipment will be calibrated immediately prior to each day's use. The calibration procedures will conform to manufacturer's standard instructions and are described in the Field Sampling Plan. This calibration will ensure that the equipment is functioning within the allowable tolerances established by the manufacturer and required by the project. Records of all instrument calibration will be maintained by the Field Team Leader. Copies of all the instrument manuals will be maintained on-site by the Field Team Leader.

Calibration procedures for instruments used for monitoring health and safety hazards (e.g., photoionization detector; dataRam dust monitors) are provided in the Health and Safety Plan.

6.2 LABORATORY INSTRUMENTS

The laboratory will follow all calibration procedures and schedules as specified in the sections of the USEPA SW-846 and subsequent updates that apply to the instruments used for the analytical methods given in Section 7.

7. ANALYTICAL PROCEDURES

Samples will be analyzed according to the USEPA SW-846 "Test Methods for Evaluating Solid Waste," February 2007, revision 6 and subsequent updates. The methods to be used for the laboratory analysis of soil, groundwater, and soil-gas/indoor air samples are referenced in Section 3 (Tables 4-1 through 4-3).

8. DATA REDUCTION, VALIDATION, AND REPORTING

8.1 INTRODUCTION

Data collected during the field investigation will be reduced and reviewed by the laboratory QA personnel, and a report on the findings will be tabulated in a standard format. The criteria used to identify and quantify the analytes will be those specified for the applicable methods in the USEPA SW-846 and subsequent updates. The data package provided by the laboratory will contain all items specified in the USEPA SW-846 appropriate for the analyses to be performed, and be reported in standard format.

The completed copies of the Chain-of-custody records (both external and internal) accompanying each sample from time of initial bottle preparation to completion of analysis shall be attached to the analytical reports.

8.2 DATA REDUCTION

One copy of the analytical data packages and an electronic disk deliverable (EDD) will be provided by the laboratory approximately 30 days after receipt of a complete sample delivery group. The Project Manager will immediately arrange for filing one package; a second copy, and the CD-ROM, may be used to generate summary tables. These tables will form the database for assessment of the site contamination condition (if present).

The electronic deliverable format required is a tab delimited text file with the fields and character lengths summarized in Table 8-1. EDDs will be processed regardless of the sampling date.

The Project Manager or Task Manager will maintain close contact with the laboratory QA reviewer to ensure all non-conformance issues are acted upon prior to data manipulation and assessment routines. Once the QA review has been completed, the Project Manager may direct the Team Leaders or others to initiate and finalize the analytical data assessment.

Table 8-1

Field and Character Lengths for Electronic Disk Deliverable

Description	Length	Format
Site ID	12	Character
Site Name	40	Character
Initial Date Sampled	8	Date
Received at Lab Date	8	Date
Analysis Complete Date	8	Date
Laboratory	30	Character
Number of Samples	3	Integer
Contract	6	Character
Report Format	10	Character
Field ID (for each sample)	15	Numeric
Laboratory ID (for each sample)	15	Character
Date Sampled (for each sample)	8	Date
Matrix (for each sample)	10	Character

8.3 DATA VALIDATION

Laboratory data validation may be performed in accordance with the USEPA Region II validation guidelines for organic and inorganic data review. These validation guidelines are regional modifications to the National Functional Guidelines for organic and inorganic data review (USEPA 1994). Validation will include the following:

- Verification of 100% of all QC sample results (both qualitative and quantitative),
- Verification of the identification of 100% of all sample results (both positive hits and non-detects),
- Recalculation of 10% of all investigative sample results, and
- Data Validation/Usability Report
- A third party data validator will not be used on this project.

The determination to validate data will be made based on the presence of data anomalies, suspect data, or laboratory issues. A data validation report will be prepared and reviewed by the laboratory quality assurance officer (QAO) before issuance. The data validation report will present the results of data validation, including a summary assessment of laboratory data packages, sample preservation and COC procedures, and a summary assessment of precision, accuracy, representativeness, comparability, and completeness for each analytical method. A detailed assessment of each SDG will follow. For each of the organic analytical methods, the following will be assessed:

- Holding times;
- Instrument tuning;
- Instrument calibrations;
- Blank results;
- System monitoring compounds or surrogate recovery compounds (as applicable);
- Internal standard recovery results;
- MS and MSD results;
- Target compound identification;
- Chromatogram quality;
- Compound quantization and reported detection limits;
- System performance; and
- Results verification.

For each of the inorganic compounds, the following will be assessed:

- Holding times;

- Calibrations;
- Blank results;
- Interference check sample;
- Laboratory check samples;
- Duplicates;
- Matrix Spike;
- Furnace atomic absorption analysis QC;
- ICP serial dilutions; and
- Results verification and reported detection limits.

Based on the results of data validation, the validated analytical results reported by the laboratory will be assigned one of the following usability flags:

- "U" - Not detected at given value;
- "UJ" - Estimated not detected at given value;
- "J" - Estimated value;
- “N” – Presumptive evidence at the value given;
- "R" - Result not useable; and
- No Flag - Result accepted without qualification.

9. INTERNAL QUALITY CONTROL CHECKS AND FREQUENCY

9.1 QUALITY ASSURANCE BATCHING

Each set of samples will be analyzed concurrently with calibration standards, method blanks, matrix spikes (MS), matrix spike duplicates (MSD) or laboratory duplicates, and QC check samples (if required by the protocol). MS/MSD samples will be designated by the laboratory and are not proposed to be collected in the field as part of this RIWP.

9.2 CALIBRATION STANDARDS AND SURROGATES

All organic standard and surrogate compounds are checked by the method of mass spectrometry for correct identification and gas chromatography for degree of purity and concentration. All standards are traceable to a source of known quality certified by the USEPA or NIST, or other similar program. When the compounds pass the identity and purity tests, they are certified for use in standard and surrogate solutions. Concentrations of the solutions are checked for accuracy before release for laboratory use. Standard solutions are replaced monthly or more frequently, based upon data indicating deterioration.

9.3 ORGANIC BLANKS AND MATRIX SPIKE

Analysis of blank samples verifies that the analytical method does not introduce contaminants or detect "false positives". The blank water can be generated by reverse osmosis and Super-Q filtration systems, or distillation of water containing $KMnO_4$. The matrix spike is generated by addition of surrogate standard to each sample.

9.4 TRIP AND FIELD BLANKS

Trip blanks and field blanks will be utilized in accordance with the specifications in Section 4. These blanks will be analyzed to provide a check on sample bottle preparation and to evaluate the possibility of atmospheric or cross contamination of the samples.

10. QUALITY ASSURANCE PERFORMANCE AUDITS AND SYSTEM AUDITS

10.1 INTRODUCTION

Quality assurance audits may be performed by the project quality assurance group under the direction and approval of the project Quality Assurance Officer (QAO). These audits will be implemented to evaluate the capability and performance of project and subcontractor personnel, items, activities, and documentation of the measurement system(s). Functioning as an independent body and reporting directly to corporate quality assurance management, the QAO may plan, schedule, and approve system and performance audits based upon procedures customized to the project requirements. At times, the QAO may request additional personnel with specific expertise from company and/or project groups to assist in conducting performance audits. However, these personnel will not have responsibility for the project work associated with the performance audit.

10.2 SYSTEM AUDITS

System audits may be performed by the QAO or designated auditors, and encompass a qualitative evaluation of measurement system components to ascertain their appropriate selection and application. In addition, field and laboratory quality control procedures and associated documentation may be system audited. These audits may be performed once during the performance of the project. However, if conditions adverse to quality are detected or if the Project Manager requests additional audits may occur.

10.3 PERFORMANCE AUDITS

The laboratory may be required to conduct an analysis of Performance Evaluation (PE) samples or provide proof that Performance Evaluation samples submitted by USEPA or a state agency have been analyzed within the past twelve months.

10.4 FORMAL AUDITS

Formal audits refer to any system or performance audit that is documented and implemented by the QA group. These audits encompass documented activities performed by qualified lead auditors to a written procedure or checklists to objectively verify that quality assurance requirements have been developed, documented, and instituted in accordance with contractual and project criteria. Formal audits may be performed on project and subcontractor work at various locations.

Audit reports will be written by auditors who have performed the site audit after gathering and evaluating all data. Items, activities, and documents determined by lead auditors to be in noncompliance shall be identified at exit interviews conducted with the through audit findings which are attached to and are a part of the integral audit report. These audit finding forms are directed to management to satisfactorily resolve the noncompliance in a specified and timely manner.

The Project Manager has overall responsibility to ensure that all corrective actions necessary to resolve audit findings are acted upon promptly and satisfactorily. Audit reports must be submitted to the Project Manager within fifteen days of completion of the audit. Serious deficiencies will be reported to the Project Manager within 24 hours. All audit checklists, audit reports, audit findings, and acceptable resolutions are approved by the QAO prior to issue. Verification of acceptable resolutions may be determined by re-audit or documented surveillance of the item or activity. Upon verification acceptance, the QAO will close out the audit report and findings.

11. PREVENTIVE MAINTENANCE PROCEDURES AND SCHEDULES

11.1 PREVENTIVE MAINTENANCE PROCEDURES

Equipment, instruments, tools, gauges, and other items requiring preventive maintenance will be serviced in accordance with the manufacturer's specified recommendations and written procedure developed by the operators.

A list of critical spare parts will be established by the operator. These spare parts will be available for use in order to reduce the downtime. A service contract for rapid instrument repair or backup instruments may be substituted for the spare part inventory.

11.2 SCHEDULES

Written procedures will establish the schedule for servicing critical items in order to minimize the downtime of the measurement system. The laboratory will adhere to the maintenance schedule, and arrange any necessary and prompt service. Required service will be performed by qualified personnel.

11.3 RECORDS

Logs shall be established to record and control maintenance and service procedures and schedules. All maintenance records will be documented and traceable to the specific equipment, instruments, tools, and gauges. Records produced shall be reviewed, maintained, and filed by the operators at the laboratories. The QAO may audit these records to verify complete adherence to these procedures.

12. CORRECTIVE ACTION

12.1 INTRODUCTION

The following procedures have been established to ensure that conditions adverse to quality, such as malfunctions, deficiencies, deviations, and errors, are promptly investigated, documented, evaluated, and corrected.

12.2 PROCEDURE DESCRIPTION

When a significant condition adverse to quality is noted at site, laboratory, or subcontractor location, the cause of the condition will be determined and corrective action will be taken to preclude repetition. Condition identification, cause, reference documents, and corrective action planned to be taken will be documented and reported to the QAO, Project Manager, Field Team Leader and involved contractor management, at a minimum. Implementation of corrective action is verified by documented follow-up action.

All project personnel have the responsibility, as part of the normal work duties, to promptly identify, solicit approved correction, and report conditions adverse to quality. Corrective actions will be initiated as follows:

- When predetermined acceptance standards are not attained;
- When procedure or data compiled are determined to be deficient;
- When equipment or instrumentation is found to be faulty;
- When samples and analytical test results are not clearly traceable;
- When quality assurance requirements have been violated;
- When designated approvals have been circumvented;
- As a result of system and performance audits;
- As a result of a management assessment;
- As a result of laboratory/field comparison studies; and
- As required by USEPA SW-846, and subsequent updates, or by the NYSDEC.

Project management and staff such as field investigation teams, remedial response planning personnel, and laboratory groups, monitor on-going work performance in the normal course of daily responsibilities. Work may be audited at the sites, laboratories, or contractor locations. Activities, or documents ascertained to be noncompliant with quality assurance requirements will be documented. Corrective actions will be mandated through audit finding sheets attached to the audit report. Audit findings are logged, maintained, and controlled by the Task Manager.

Personnel assigned to quality assurance functions will have the responsibility to issue and control Corrective Action Request (CAR) Forms (Figure 12-1 or similar). The CAR identifies the out-of-compliance condition, reference document(s), and recommended corrective action(s) to be administered. The CAR is issued to the personnel responsible for the affected item or activity. A copy is also submitted to the Project Manager. The individual to whom the CAR is addressed returns the requested response promptly to the QA personnel, affixing his/her signature and date to the corrective action block, after stating the cause of the conditions and corrective action to be taken. The QA personnel maintain the log for status of CARs, confirms the adequacy of the intended corrective action, and verifies its implementation. CARs will be retained in the project file for the records.

Any project personnel may identify noncompliance issues; however, the designated QA personnel are responsible for documenting, numbering, logging, and verifying the close out action. The Project Manager will be responsible for ensuring that all recommended corrective actions are implemented, documented, and approved.

FIGURE 12-1

CORRECTIVE ACTION REQUEST

Number: _____ Date: _____

TO:

You are hereby requested to take corrective actions indicated below and as otherwise determined by you to (a) resolve the noted condition and (b) to prevent it from recurring. Your written response is to be returned to the project quality assurance manager by

CONDITION:

REFERENCE DOCUMENTS:

RECOMMENDED CORRECTIVE ACTIONS:

_____	_____	_____	_____	_____	_____
Originator	Date	Approval	Date	Approval	Date

RESPONSE

CAUSE OF CONDITION

CORRECTIVE ACTION

(A) RESOLUTION

(B) PREVENTION

(C) AFFECTED DOCUMENTS

C.A. FOLLOWUP:

CORRECTIVE ACTION VERIFIED BY: _____ DATE:_____

13. REFERENCES

NYSDEC 2010. DER-10, "*Technical Guidance for Site Investigation and Remediation" revised 2017. New York State Department of Environmental Conservation.*

NYSDOH 2024. *Guidance for Evaluating Soil Vapor Intrusion in the State of New York*. New York State Department of Health.

USEPA, 2002. "Guidance *for Quality Assurance Project Plans*," dated December 2002. U.S. Environmental Protection Agency, Washington, D.C.

USEPA, 2007. SW-846 *"Test Method for Evaluating Solid Waste,"* dated February 2007. U.S. Environmental Protection Agency, Washington, D.C.

Taylor, J. K., 1987. *"Quality Assurance of Chemical Measurements."* Lewis Publishers, Inc., Chelsea, Michigan

USEPA, 1987. *"Data Quality Objectives for Remedial Response Actions Activities: Development Process, EPA/540/G-87/003, OSWER Directive 9355.0-7."* U.S. Environmental Protection Agency, Washington, D.C.

USEPA, 1992a. *"CLP Organics Data Review and Preliminary Review. SOP No. HW-6, Revision #8,"* dated January 1992. USEPA Region II.

USEPA, 1992b. *"Evaluation of Metals Data for the Contract Laboratory Program (CLP) based on SOW 3/90. SOP No. HW-2, Revision XI,"* dated January 1992. USEPA Region II.

APPENDIX H
SITE MANAGEMENT FORMS

Summary of Green Remediation Metrics for Site Management

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

Initial Report Period (Start Date of period covered by the Initial Report submittal)
Start Date: _____

Current Reporting Period
Reporting Period From: _____ To: _____

Contact Information
Preparer's Name: _____ Phone No.: _____
Preparer's Affiliation: _____

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

	Current Reporting Period	**Total to Date**
Fuel Type 1 (e.g. natural gas (cf))		
Fuel Type 2 (e.g. fuel oil, propane (gals))		
Electricity (kWh)		
Of that Electric usage, provide quantity:		
Derived from renewable sources (e.g. solar, wind)		
Other energy sources (e.g. geothermal, solar thermal (Btu))		

Provide a description of all energy usage reduction programs for the site in the space provided on Page 3.

II. Solid Waste Generation: Quantify the management of solid waste generated on-site.

	Current Reporting Period (tons)	**Total to Date (tons)**
Total waste generated on-site		
OM&M generated waste		
Of that total amount, provide quantity:		
Transported off-site to landfills		
Transported off-site to other disposal facilities		
Transported off-site for recycling/reuse		
Reused on-site		

Provide a description of any implemented waste reduction programs for the site in the space provided on Page 3.

III. Transportation/Shipping: Quantify the distances travelled for delivery of supplies, shipping of laboratory samples, and the removal of waste.

	Current Reporting Period (miles)	**Total to Date (miles)**
Standby Engineer/Contractor		
Laboratory Courier/Delivery Service		
Waste Removal/Hauling		

Provide a description of all mileage reduction programs for the site in the space provided on Page 3. Include specifically any local vendor/services utilized that are within 50 miles of the site.

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

	Current Reporting Period (gallons)	**Total to Date (gallons)**
Total quantity of water used on-site		
Of that total amount, provide quantity:		
Public potable water supply usage		
Surface water usage		
On-site groundwater usage		
Collected or diverted storm water usage		

Provide a description of any implemented water consumption reduction programs for the site in the space provided on Page 3.

V. Land Use and Ecosystems: Quantify the amount of land and/or ecosystems disturbed and the area of land and/or ecosystems restored to a pre-development condition (i.e. Green Infrastructure).

	Current Reporting Period (acres)	**Total to Date (acres)**
Land disturbed		
Land restored		

Provide a description of any implemented land restoration/green infrastructure programs for the site in the space provided on Page 3.

Description of green remediation programs reported above (Attach additional sheets if needed)
Energy Usage:
Waste Generation:
Transportation/Shipping:
Water usage:
Land Use and Ecosystems:
Other:

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

APPENDIX I – FIELD SAMPLING PLAN

FIELD SAMPLING PLAN

27-09 40th Avenue
Long Island City, Queens, New York
NYSDEC Site No. C241241

Prepared for:

40th Ave Dutch Kills Realty, LLC
38-08 30th Avenue
Astoria, NY 11103

Prepared by:

Liberty Environmental
600 Third Avenue, Second Floor
New York, NY 10016

Liberty Project No. 220192

December 11, 2023

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1. INTRODUCTION

This Field Sampling Plan (FSP) present the methods and procedures to be used for any ground intrusive, maintenance, and monitoring activities covered under the 27-09 40th Avenue, Queens, New York Site Management Plan.

1.1 PROJECT DESCRIPTION

The site is located in Queens, Queens County, New York and is identified as Block 397 and Lots 33, 35 and 39 on the New York City Tax Map. The site is an approximately 0.4-acre (see Figures 1 and 2). The Site has been redeveloped with a mixed use building. Previous uses included a dry-cleaner, automotive repair shop, machine shop, glass factory, woodworking, and a photo-engraving shop.

1.2 SCOPE OF WORK

The scope of work at the Site covered under this FSP includes.

- Monitoring well installation and development
- Groundwater sampling and analysis
- Indoor air and ambient air sampling and analysis
- Investigation-derived waste management
- Data validation, evaluation, and reporting
- Community air monitoring (addressed in a separate appendix)

This FSP will be modified for specialized work if necessary. Any modification to the FSP will require approval in writing from the DEC. The property owner or its representative must notify utilities of any scheduled ground intrusive work at least 15 days prior to the start of field activity.

2. GENERAL FIELD GUIDELINES

2.1 SITE HAZARDS

Potential Site surface hazards, such as sharp objects, overhead power lines, energized areas, vehicular traffic, and building hazards will be identified prior to initiation of the fieldwork. Generally, potential hazards at the project site will be identified during a project site reconnaissance by the project team on the first day of any field activity. Additional safety measures to be undertaken for the work performed during the investigation are addressed in the Health and Safety Plan [(HASP), Appendix L of the SMP].

2.2 UNDERGROUND UTILITIES

Underground utilities, including electric lines, gas lines, water lines, storm and sanitary sewers, and communication lines will be identified prior to initiation of any subsurface work. Underground utility location will be accomplished as follows:

- All work areas will be flagged or marked out with white paint.
- Dig Safely of New York (800) 272-4480 will be contacted to initiate the locating activities. New York State law requires that Dig Safely of New York be notified at least three working days, and not more than 10 working days, before subsurface work is conducted.
- Companies with subsurface utilities present will locate and mark out all subsurface utility lines.
- Geophysical methods may be used to further evaluate the potential presence of underground utilities in the area of each proposed investigation location.
- Subsurface investigation locations may be hand cleared to five feet below ground surface (bgs) prior to advancing borings with mechanized equipment.

2.3 FIELD LOG BOOKS

All field activities will be carefully documented in field log books. Entries will be of sufficient detail that a complete daily record of significant events, observations, and measurements is developed. The field log book will provide a legal record of the activities conducted at the site. Accordingly:

- Field books will be assigned a unique identification number.
- Field books will be bound with consecutively numbered pages.
- Field books will be controlled by the Site Manager while fieldwork is in progress.
- Entries will be written with waterproof ink.
- Entries will be signed and dated at the conclusion of each day of fieldwork.
- Erroneous entries made while fieldwork is in progress will be corrected by the field person that made the entries. Corrections will be made by drawing a line through the error, entering the correct information, and initialing the correction.
- Corrections necessary after departing the field will be made by the person who entered the original information. Corrections will be made by drawing a line through the error, entering the correct information, and initialing and dating the time of the correction.

At a minimum, daily field book entries will include the following information:

- Location of field activity;
- Date and time of entry;
- Names and titles of field team members on site and site contacts;
- Names, titles of any site visitors, as well as the date and time entering and leaving the site;
- Weather information, for example: temperature, cloud coverage, wind speed, and direction;
- Purpose of field activity;
- A detailed description of the fieldwork conducted;
- Sample media (soil, sediment, groundwater, etc.);
- Sample collection method;
- Number and volume of sample(s) taken;
- Description of sampling point(s);
- Volume of groundwater removed before sampling;
- Preservatives used;
- Analytical parameters;
- Date and time of collection;
- Sample identification number(s);
- Sample distribution (e.g., laboratory);
- Field observations;
- All field measurements made, such as volatile organic compounds (VOCs) using a PID, pH, temperature, conductivity, water level, etc.;
- References for all maps and photographs of the sampling site(s); and
- Information pertaining to sample documentation such as:
  - Bottle lot numbers;
  - Dates and method of sample shipments;
  - Chain-of-custody (COC) record numbers; and
  - Federal Express air bill number.

3. FIELD EQUIPMENT DECONTAMINATION AND MANAGEMENT OF INVESTIGATION-DERIVED RESIDUALS

3.1 DECONTAMINATION AREA

A temporary decontamination area lined with polyethylene sheeting will be constructed on the project site for use during decontamination of the drilling equipment. Water collected from the decontamination of activities will be collected in 55-gallon drums or a bulk tank and managed as described in Section 3.3.

3.2 EQUIPMENT DECONTAMINATION

The following procedures will be used to decontaminate equipment used during any activities.

- All drilling equipment including the augers, bits, rods, tools, and tremie pipes will be cleaned with a high-pressure, hot water pressure washing unit between locations and following completion of activities.
- Tools, drill rods, and augers will be placed on something other than the ground following pressure washing.
- The back of the drill rig and all tools, augers, and rods will be decontaminated at the completion of the work and prior to leaving the project site.

3.2.1 Sampling Equipment Decontamination

Suggested Materials:

- Potable water;
- Phosphate-free detergent (such as Alconox™);
- Distilled water;
- Aluminum foil;
- Plastic/polyethylene sheeting;
- Plastic buckets and brushes; and
- Personal protective equipment (PPE) in accordance with the HASP.

Procedures:

- Prior to sampling, all non-dedicated sampling equipment (bowls, spoons, interface probes, etc.) will be washed with potable water and a phosphate-free detergent (such as Alconox™). Decontamination may take place at the sampling location as long as all liquids are contained in pails, buckets, etc.
- The sampling equipment will then be rinsed with potable water followed by a de-ionized water rinse.
- Between rinses, equipment will be placed on polyethylene sheets, if necessary. At no time will washed equipment be placed directly on the ground.
- Equipment will be wrapped in polyethylene plastic for storage or transportation from the designated decontamination area to the sampling location.

3.3 MANAGEMENT OF INVESTIGATION-DERIVED RESIDUALS

3.3.1 Decontamination Fluids

Hot water pressure wash and decontamination fluids will be collected in 55-gallon drums or a bulk tank. The storage drums or tank will be labelled as "pending analysis – investigation-derived residual decon water" and temporarily stored in a plastic-lined containment area pending characterization and proper disposal.

3.3.2 Drill Cuttings

Drill cuttings will be contained in 55-gallon drums. The drums will be labelled as "pending analysis – investigation-derived residual – soil from drill cuttings" and temporarily stored in a plastic-lined containment area pending characterization and proper disposal.

3.3.3 Development and Purge Water

All development and purge water will be contained in 55-gallon drums or a bulk tank. The drums or tank will be labelled as "pending analysis - investigation derived residual development and purge water" and temporarily stored in a plastic-lined containment area pending characterization and proper disposal.

3.3.4 Personal Protective Equipment

All PPE will be placed in thick mil plastic bags for proper disposal.

3.3.5 Dedicated Sampling Equipment

All dedicated groundwater sampling equipment will be placed in thick mil plastic bags or 55-gallon drums for disposal. No sampling material will be left in the well for future sampling events.

4. SOIL SAMPLING AND WELL INSTALLATION PROCEDURES

4.1 INTRODUCTION

Surface and subsurface activities to be conducted at the Site may consist of utility work; excavation; the installation of groundwater monitoring wells and soil vapor intrusion and indoor air sampling. These activities will require the use of the following equipment and material:

- Field book;
- Project plans;
- PPE in accordance with the HASP;
- Tape measure;
- Decontamination supplies;
- Water level indicator;
- Electronic oil/water interface probe
- Stainless steel bailers;
- Submersible electric pump for well development (the pump will be NYSDEC approved);
- Horiba multi-meter for field parameters (well development);
- PID with a 10.2 or 10.6 eV lamp;
- Camera;
- Clear tape, duct tape;
- Laboratory sample bottles;
- Coolers and ice; and

Procedures for these activities are described in the following sections.

4.2 EXCAVATION

Excavation activities, if any, will be dictated by the Contractor hired to conduct the work and will follow the Excavation Work Plan included as Appendix E of the SMP. During field activities, personnel will stand upwind of the excavation area to the extent possible. Air monitoring and odor mitigation (if necessary) will be conducted in accordance with the Community Air Monitoring Project (CAMP) and HASP. Excavation materials will be photographed and logged for future reference. Material removed from the excavation will be placed on polyethylene sheeting. The location and size of the excavation will be measured and described in the field logbook.

Visually clean soils, such as surface soils, will be segregated from soils that may be impacted. The visually clean soils may be placed back in the excavation. At a minimum, the top 2 feet of backfilled soil will be visually clean. The excavation will be backfilled as soon as possible after completion and in general prior to the cessation of activities at the end of the day. If excavation resulted in removal of any remaining contamination, a demarcation layer as detailed in Appendix E of the SMP will be placed over the surface prior to backfilling. Following restoration of the excavation, the excavation will be staked/marked to facilitate subsequent location by surveying crews.

4.2.1 Soil Borings

Soil borings, if any, will be advanced with the appropriate drilling equipment for the work. Typically a direct-push (Geoprobe™) drilling rig equipped with 4-foot long, 2-inch diameter Macro-Core™ samplers will be used. A sonic drill rig may be used based on the depth of the boring based on previous onsite work. All drilling equipment will be decontaminated between each boring in accordance with methods specified in Section 3.2.

All locations will be properly abandoned following the collection of samples. Boreholes for the direct-push borings will be filled with the soil cuttings and topped off with bentonite chips if necessary. The borings will be filled using a cement/bentonite grout mixture with the following specifications:

- Bentonite will be powdered sodium montmorillonite furnished in moisture resistant sacks without additives.
- Cement shall be a low-alkaline Portland cement, Type I in conformance with ASTM C-150 and without additives.
- The cement/bentonite grout mixture shall be to the following proportion:
  - Three sacks (94 pounds) of Type I Portland cement;
  - 14 pounds of granular bentonite (5% mix); and
  - 25 gallons of water.

The cement will be mechanically mixed, above ground, with water from a potable water source. Bentonite will be added to ensure a lump-free consistency. The mixture will be pumped through a tremie pipe as the drill is being withdrawn.

4.2.2 Geologic Logging Methods

The field technician will log borehole geology and headspace measurements, and any other observations (e.g., odors, non-aqueous phase liquid (NAPL), soil staining, etc.), in the field book and the soil boring log. Soil samples retrieved from the borehole will be visually described for: 1) percent recovery, 2) soil type, 3) color, 4) moisture content, 5) texture, 6) grain size and shape, 7) consistency, 8) visible evidence of staining or other hydrocarbon-related impacts, and 9) any other relevant observations. The descriptions will be in accordance with the Unified Soil Classification System (USCS) and the American Society for Testing and Materials (ASTM) guidelines.

4.2.3 Collection of Samples

The number and frequency of samples to be collected from each boring and the associated analytical parameters will be based on the field activity. The sample locations, descriptions, and depths will be recorded on the bore logs in the field book.

Samples for laboratory analyses will be collected directly from the sampling device and placed into appropriate containers for all grab sample analyses or homogenized for composite samples (except for VOC analyses); and compacted to minimize headspace and pore space. Dedicated sampling equipment will be used for soil sampling. Soil remaining after completion of sample description, collection, and field screening will be properly disposed.

The sample containers will be labelled, placed in a laboratory-supplied cooler, and packed with ice. The coolers will then be shipped to the laboratory for analysis. COC procedures will be followed as outlined in Appendix

H Quality Assurance Project Plan (QAPP) of the SMP. If there is a delay of sample shipment due to insufficient samples to warrant overnight delivery, the samples will be stored in a cool, secure place with sufficient ice to maintain a temperature of 4° C.

4.3 MONITORING WELL INSTALLATION AND DEVELOPMENT

The following methods will be used for drilling, installing, and developing the monitoring wells. Figure 3 and 4 illustrates the construction details for a typical overburden soil boring and monitoring well respectively. Specific details regarding the depth and anticipated screened interval of proposed monitoring wells is provided in the SMP. In general, monitoring wells will be installed according to the following specifications:

- The monitoring well borings will be advanced using a sonic drill rig
- Wells will be constructed with 2-inch ID, threaded, flush-joint, Schedule 40 PVC casings and screens.
- Screens will be 10-feet long with 0.01-inch slot openings (or 0.02-inch, if NAPL present) with a 2-foot DNAPL sump at the base. Alternative screen lengths up to 20 feet long may be used at the discretion of the field geologist and with the approval of DEC, based on site conditions.
- The annulus around the screens will be backfilled with clean silica sand having appropriate size (e.g., Morie No. 1) to a minimum height of 2 feet above the top of the screen.

  A bentonite chip seal with a minimum thickness of 2 feet will be placed above the sand pack. The bentonite seal will be hydrated with clean, potable water before placement of grout above the seal layer.
- The remainder of the annular space will be filled with cement-bentonite grout to ground surface. The grout will be allowed to set for a minimum of 24 hours before wells are developed.
- Each monitoring well will be a flush-mounted installation with a locking cap.
- The concrete seal or pad will be sloped to channel water away from the well, and be deep enough to remain stable during freezing and thawing of the ground.
- The top of the PVC well casing and ground surface will be marked and surveyed to 0.01 foot, and the elevation will be determined relative to a fixed benchmark or datum.
- The measuring point on all wells will be on the innermost PVC casing.
- Monitoring well construction details will be recorded in the field book and on the Construction Log shown in Appendix D of the SMP.
- If commercially available nested wells are considered to sample multiple aquifer depth zones in the same borehole, they will be discussed with DEC prior to installation.

4.3.1 Monitoring Well Development

- After a minimum of 24 hours after installation, the monitoring wells will be developed by surging and pumping. Surging will be performed periodically, across the lengths of screen in 2-foot increments prior to, at interim periods of pumping, and immediately before the final pumping. Pumping methods may include using a centrifugal, submersible, or peristaltic pump and dedicated polyethylene tubing.
- Water levels will be measured in each well to the nearest 0.01 foot prior to development.

- The wells will be developed llllltil the water in the well is reasonably free of visible sediment (50 NTU if possible or until pH, temperature, and specific conductivity stabilize). A multi-meter probe will be used for all field parameter measurements.
- Development water will be contained in and properly disposed of.

Following development, wells will be allowed to recover for at least 14 days before groundwater is purged and sampled. All monitoring well development will be performed or overseen by a field geologist and recorded in the field book.

5. GROUNDWATER SAMPLING PROCEDURES

5.1 INTRODUCTION

Procedures for collecting groundwater samples of groundwater are described in this section. Groundwater samples will be collected using low-flow, low-stress purge and sampling methods. The NYSDEC approved sampling protocol and appropriate equipment for PFAs will be followed/used for groundwater sampling.

5.2 GROUNDWATER SAMPLING

The following method will be used to collect groundwater samples from monitoring wells.

5.2.1 Required Equipment and Supplies

- Field book
- Project plans
- PPE in accordance with the HASP
- Electronic oil/water interface probe
- Stainless steel bailers and low-flow sampling pump
- Polypropylene rope
- Multi-meter for all filed parameters
- Flow-through cell
- Decontamination supplies
- Peristaltic or NYSDEC approved submersible pump capable of achieving low-flow rates (i.e., 0.5 liters per minute or less)
- HDPE plastic tubing
- Plastic sheeting
- PID
- Clear tape, duct tape
- Coolers and ice
- Laboratory sample bottles

5.2.2 Groundwater Sampling Method

5.2.2.1 Purging

- Prior to sampling, the static water level and thickness of any light non-aqueous phase liquid (LNAPL) or dense non-aqueous phase liquid (DNAPL) will be measured to the nearest 0.01 foot from the surveyed well elevation mark on the top of the PVC casing with a decontaminated oil/water interface probe. NAPL thickness will be confirmed using a clear bailer or a weighted string. The measurement will be recorded in the field book.
- The probe will be decontaminated between uses.

- Groundwater from the well will be purged until field parameters stabilize, up to three well volumes are removed, or 1 hour of continuous purging is performed. Field parameters are considered to be stable when three consecutive readings are within the stabilization criteria for that parameter. The stabilization criteria are as follows: 10% or below 10 NTUs for turbidity, 3% for conductivity and temperature, 0.1 unit for pH, and 10 mV for ORP. Purging will be conducted using the low-flow sampling technique specified by the United States Environmental Protection Agency (USEPA) Region 1 in its guidance document entitled "Low-Stress (low flow) Purging and Sampling for the Collection of Groundwater Samples from Monitoring Wells".
- The flow rate measurement will be approximately 0.5 liter per minute or less.
- If a well goes dry before the required volumes are removed, it will be allowed to recover, purged a second time until dry or the required parameters are met, and sampled when it recovers sufficiently, in accordance with low-flow sampling protocol.
- Purge water will be managed and disposed of properly.
- Peristaltic pumps will not be used to collect VOC samples.

5.2.2.2 Sampling

- Samples will be collected using equipment included and/or approved by the DEC in their guidance for "Groundwater Sampling for Emerging Contaminants" dated July 2018.
- Prior to filling the sample bottles, the temperature, pH, conductivity, dissolved oxygen, and oxidation reduction potential (ORP), and turbidity will be measured within a flow-through cell. All measurements will be recorded in the field book.
- The sample container and preservative requirements are provided in the QAPP in Appendix H of the SMP.
- The sample containers will be labelled, placed in a laboratory-supplied cooler, and packed on ice (to maintain a temperature of 4ºC). The cooler will be shipped overnight or delivered to the laboratory for analysis.
- COC procedures will be followed as outlined in the QAPP (Appendix H of the SMP).
- Well sampling data will be recorded on the Groundwater Sampling Record shown in Figure 5 or similar form.

6. INDOOR AIR SAMPLING

An indoor air evaluation will be performed at the Site to establish post remedy conditions. The work will be performed in accordance with *Guidance for Evaluating Soil Vapor Intrusion in the State of New York* [DOH, 2024] and the USEPA document entitled *Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils, Office of Solid Waste and Emergency Response* [USEPA, 2002].

A pre-sampling survey and a product inventory will be conducted on the day of sampling (Figure 6). The surveys and inventories will be completed in accordance with the NYDOH guidance. The chemical inventory check will be performed at each location to document current conditions with the regard to the storage of chemicals. The previous surveys will be reviewed and any changes in conditions from the previous sampling will be noted. As with previous surveys, a screening for total volatiles will be conducted with a PID. An ambient air sample will be collected concurrently with the indoor air samples for each property.

The methods to be used for the collection of the indoor air samples and the ambient air sample are summarized as follows:

- The indoor air sample will be collected from a minimum of two feet above the floor surface.
- The ambient air sample will be collected at a location determined to be upwind at time of sampling.
- The indoor air and ambient air samples will be collected as an integrated sample. A laboratory-provided flow controller fixed to a negative pressure vessel (a batch certified clean 6-liter Summa canister) will be used to collect the integrated sample. The controller will be a fixed-rate flow controller and the approximate length of the sample time will be set by the laboratory. The flow controllers are fitted with an internal filter to prevent particulates from entering the Summa canisters.
- The sample time for the canisters will be set from 8-24 hours depending on the use of the data. The collection of the samples in 6-liter canisters over an approximate time interval will ensure that the samples are collected at the rate specified by the NYSDOH (less than 0.2 liters per minute).
- The sample tubing will be attached to the sampling canister with Swagelok™ fittings.
- Prior to sampling, the initial vacuum in each canister will be checked prior to use to ensure mechanical integrity of the canister. The initial vacuum should be approximately 30 inches mercury (in. Hg).
- To start sampling, the canister ball valve is opened and the initial time and vacuum is recorded.
- The final vacuum should be between 10 and 4 in. Hg, with a target of 5 in. of Hg. The initial and final vacuum in each canister will be recorded on the laboratory chain-of-custody form to be returned to the laboratory with the samples. The gauges provided with the canisters are accurate only for “indication of change”, and are not sufficiently accurate to provide gauge- to- gauge comparisons. The final vacuum will also be measured in the laboratory.
- Following collection of the sample, the canister will be sealed by closing the ball valve and fitting on the canister inlet. The inlet will then be capped with a laboratory-provided threaded end cap.

- Following collection of the sample, the PID will be used to obtain a final reading from the probe assembly or tubing for the concentration of total organic vapors.
- Quality assurance and quality control samples will include one field duplicate, one trip blank, a laboratory blank and laboratory quality control samples as required by the analytical method.
- The site name, sample identification, canister number, canister certification number, sampler's name, sample times and date will be recorded on a tag that is attached to each canister.
- The indoor air samples will be shipped overnight to a NY ELAP-certified laboratory for analysis.

The field sampling team will record all information regarding the sampling chain of custody. Information to be recorded will include the following: sample identification, date and times of sample collection, identity of the field personnel, sampling methods and equipment, purge volumes and rates, and any other relevant observations made during the sampling. A DOH indoor air quality questionnaire and building inventory form will also be filled out prior to indoor air sampling.

7. AIR MONITORING

7.1 INTRODUCTION

Two types of air monitoring will be performed during the site investigation: 1) work zone monitoring for protection of the workers performing the site investigation, and 2) community air monitoring at the perimeter of the work site for protection of the local community.

7.1.1 Breathing Zone Air Monitoring During Drilling and Sampling

Monitoring of air in the breathing zone within the work site will be conducted periodically during all drilling and sampling activities. A PID will be used to monitor for VOCs or other organic vapors in the breathing zone and borehole, and to screen the samples.

The PID readings will be recorded in the field book and on the boring log during drilling activities. The procedure for the PID operation and calibration is included in the HASP. Note that equipment calibration will be performed as often as needed to account for changing conditions or instrument readings. The minimum frequency of calibration is specified in the HASP; more frequent calibration will be performed if spurious readings are observed or there are other problems with the instruments.

7.1.2 Community Air Monitoring

The procedures and action levels for community air monitoring are presented in Appendix F of the SMP.

8. FIELD INSTRUMENTS AND CALIBRATION

All field analytical equipment will be calibrated immediately prior to each day's use and more frequently if required. The calibration procedures will conform to manufacturer's standard instructions. This calibration will ensure that the equipment is functioning within the allowable tolerances established by the manufacturer and required by the project. All instrument calibrations will be documented in the project field book and in an instrument calibration log. Records of all instrument calibration will be maintained by the Site Safety Coordinator (SSC). Copies of all of the instrument manuals will be maintained on site by the SSC. All changes to instrumentation will be noted in the field log book.

The following field instruments will be used during the investigation:

- PID
- Particulate monitors
- Multi-parameter meter (pH, specific conductivity, dissolved oxygen, oxidation reduction, turbidity, and temperature meter)

8.1 PORTABLE PHOTO-IONIZATION DETECTOR (PID)

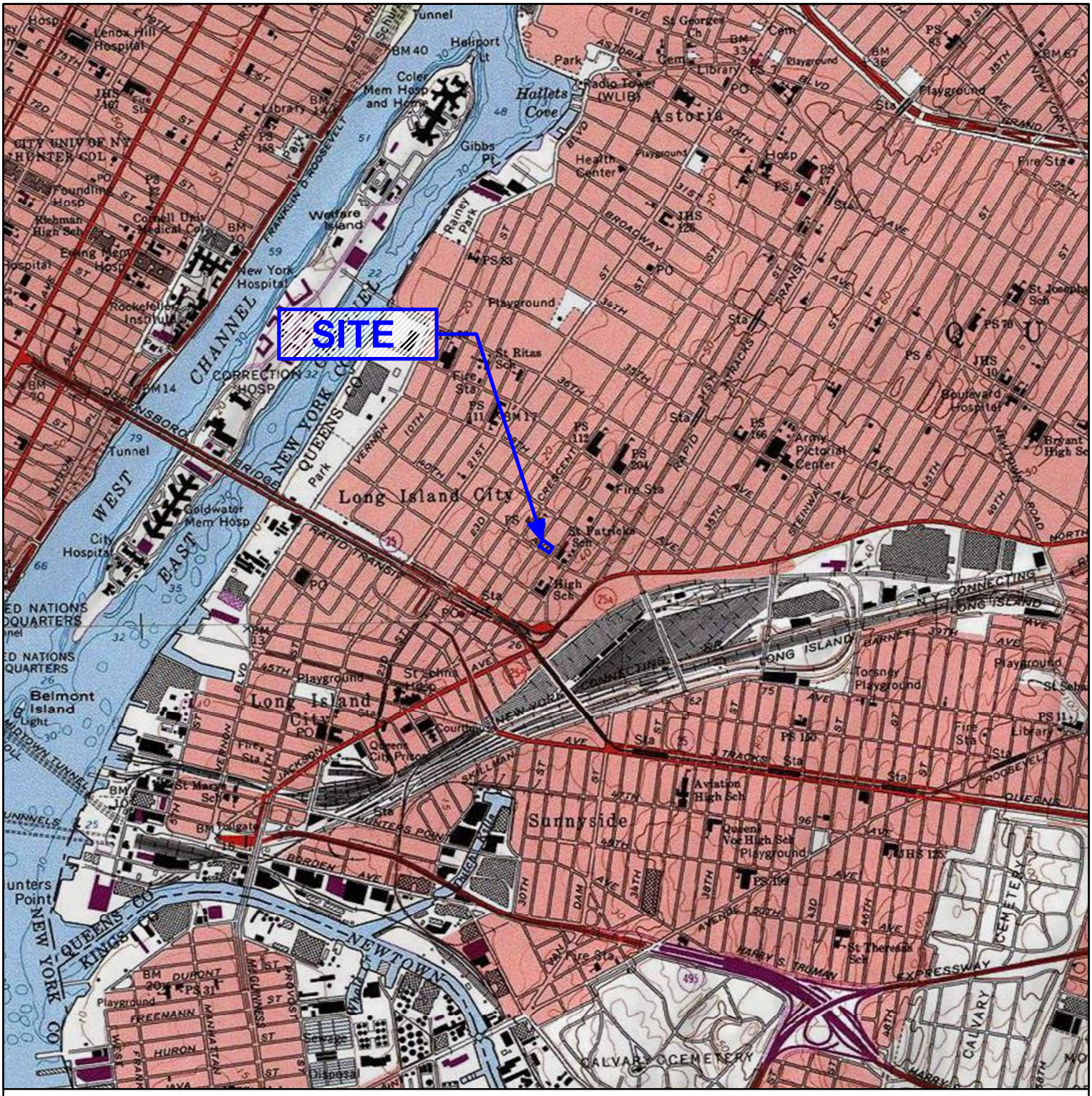
- The photo-ionization detector will be equipped with either a 10.2 or 10.6 eV lamp. In this configuration, the PID is capable of ionizing and detecting compounds that account for over 70% of the VOCs on the USEPA Target Compound List.
- Calibration must be performed at the beginning of each day of use with a standard calibration gas having a concentration of 100 parts per million of isobutylene. If the unit experiences abnormal perturbation or erratic readings, more frequent or additional calibration will be required.
- All calibration data must be recorded in the project field notebooks.
- A battery check must be completed at the beginning and end of each working day.
- All changes to the PID will be noted in the field notes (such as lamp or filter cleaning or replacement or change of instrument).

8.2 MULTI-PARAMETER METER

- Calibration of the meter (YSI or equivalent) must be performed at the start of each day of use, and after very high or low readings as required by this Plan, according to manufacturer's instructions.
- National Institute of Standards and Technology - traceable standard calibration solutions will be used (where applicable). At least one backup meter will also be present on-site in the event of a malfunction.
- The calibration data must be recorded in the project field book each time it is performed.

9. ANALYTICAL PROGRAM

The analytical procedures for the site are provided the QAPP in Appendix H of the SMP.



SOURCE: USA TOPO MAPS - COPYRIGHT © 2013 NATIONAL GEOGRAPHIC SOCIETY, I-CUBED. CENTRAL PARK (SITE - 1995)) AND BROOKLYN (1995) NEW YORK 7.5-MINUTE QUADRANGLES.

SCALE: 1 " = 2,000 '

0 1,000 2,000 4,000'

N

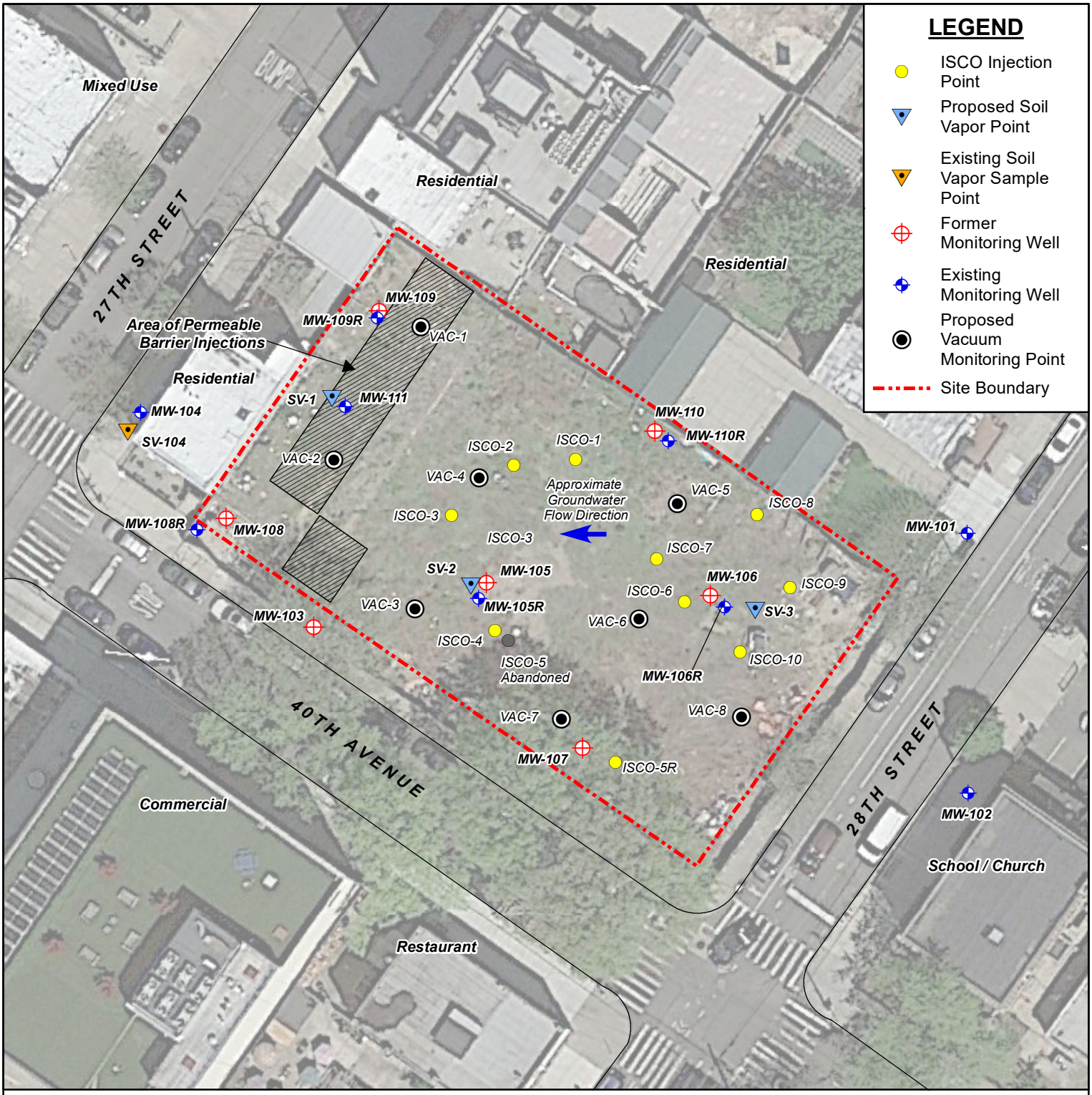
Liberty Environmental, Inc.

600 Third Avenue, Second Floor
New York, NY 10016
Phone: 800-305-6019
www.libertyenviro.com

Figure 1 - Site Location Map

27-09 40th Avenue
Long Island City, Queens, New York

PROJECT NO.: 220192	REV: 0	PREPARED BY: JRY
DATE: SEPTEMBER 6, 2022	SCALE: 1" = 2,000'	APPROVED BY: CNH



NOTE: THIS DRAWING INTENDED FOR ILLUSTRATIVE PURPOSES ONLY, AS PART OF A SITE CHARACTERIZATION.
NOT TO BE USED AS A BASIS FOR ENGINEERING OR DESIGN
IMAGE SOURCE: GOOGLE EARTH. PHOTO DATE: APRIL 2022.

SCALE: 1 " = 40 '

0 20 40 80'

N

Figure 2 - Site Diagram

27-09 40th Avenue
Borough of Queens, City of New York, New York

Liberty Environmental, Inc.
600 Third Avenue, Second Floor
New York, NY 10016
Phone: 212-255-0374
www.libertyenviro.com

PROJECT NO.: 220192	REV: 1	PREPARED BY: JRY
DATE: FEBRUARY 14, 2024	SCALE: 1" = 40'	APPROVED BY: JPC

APPENDIX J

GREEN REMEDIATION MATRICS FORMS

Environmental Footprint Summary

Core Element	Metric		Unit of Measure	Footprint						
				Soil Vapor Extraction System	Sub-Slab Depressurization System	Groundwater Treatment	< Component 4 >	< Component 5 >	< Component 6 >	Total
Materials & Waste	M&W-1	Refined materials used on-site	Tons	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	M&W-2	% of refined materials from recycled or reused material	%							
	M&W-3	Unrefined materials used on-site	Tons	0.000	0.000	0.000	0.000	0.000	0.000	0.0
	M&W-4	% of unrefined materials from recycled or reused material	%							
	M&W-5	On-site hazardous waste disposed of off-site	Tons	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	M&W-6	On-site non-hazardous waste disposed of off-site	Tons	0.8	0.0	0.0	0.0	0.0	0.0	0.8
	M&W-7	Recycled or reused waste	Tons	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	M&W-8	% of total potential waste recycled or reused	%	0.0%						0.0%
Water (used on-site)	W-1	Public water use	MG	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	W-2	Groundwater use	MG	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	W-3	Surface water use	MG	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	W-4	Reclaimed water use	MG	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	W-5	Storm water use	MG	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	W-6	User-defined water resource #1	MG	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	W-7	User-defined water resource #2	MG	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	W-8	Wastewater generated	MG	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Energy	E-1	Total energy used (on-site and off-site)	MMBtu	5,272.9	120.7	17.3	0.0	0.0	0.0	5,411.0
	E-2	Energy voluntarily derived from renewable resources								
	E-2A	On-site renewable energy generation or use + on-site biodiesel use + biodiesel and other renewable resource use for transportation	MMBtu	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	E-2B	Voluntary purchase of renewable electricity	MWh	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	E-3	Voluntary purchase of RECs	MWh	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	E-4	On-site grid electricity use	MWh	418.728	9.671	0.000	0.000	0.000	0.000	428.4
Air	A-1	On-site NOx, SOx, and PM emissions	Pounds	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	A-2	On-site HAP emissions	Pounds	262.0	0.0	0.0	0.0	0.0	0.0	262.0
	A-3	Total NOx, SOx, and PM emissions	Pounds	3,979.0	88.3	57.5	0.0	0.0	0.0	4,124.8
	A-3A	Total NOx emissions	Pounds	512.2	10.2	17.1	0.0	0.0	0.0	539.4
	A-3B	Total SOx emissions	Pounds	3,436.2	77.5	35.0	0.0	0.0	0.0	3,548.7
	A-3C	Total PM emissions	Pounds	30.7	0.6	5.4	0.0	0.0	0.0	36.7
	A-4	Total HAP emissions	Pounds	272.0	0.2	3.9	0.0	0.0	0.0	276.1
	A-5	Total greenhouse gas emissions	Tons CO2e*	240.9	5.5	1.1	0.0	0.0	0.0	247.5
Land & Ecosystems	Qualitative Description									

** Total greenhouse gases emissions (in CO2e) include consideration of CO2, CH4, and N2O (Nitrous oxide) emissions.*
"MMBtu" = millions of Btus
"MG" = millions of gallons
"CO2e" = carbon dioxide equivalents of global warming potential
"MWh" = megawatt hours (i.e., thousands of kilowatt-hours or millions of Watt-hours)
"Tons" = short tons (2,000 pounds)

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

Notes: The Environmental Footprint Summary is based on 4 years of system operation of Remedy Components 1, 2, and 3.

Soil Vapor Extraction System - On-Site Footprint (Scope 1)

Contributors to Footprints	Units	Usage	Energy		GHG		NOx		SOx		PM		HAPs	
			Conv. Factor	MMBtus	Conv. Factor	lbs CO2e	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs
On-Site														
On-site Renewable Energy														
Renewable electricity generated on-site	MWh	0	3.413	0										
Landfill gas combusted on-site for energy use	ccf CH4	0	0.103	0	13.1	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
On-site biodiesel use	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
On-site biodiesel use - User Defined	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
User-defined on-site renewable energy use #1	gal	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined on-site renewable energy use #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
On-site Renewable Energy Subtotals				**0**		**0**		**0**		**0**		**0**		**0**
Notes:														
On-site Conventional Energy														
On-site grid electricity	MWh	418.728	3.413	1429.1187										
On-site diesel use - Other	Gal	0	0.139	0	22.5	0	0.17	0	0.0054	0	0.0034	0	0.0000052	0
On-site diesel use <75 hp	Gal	0	0.139	0	22.21	0	0.1565	0	0.000145	0	0.0145	0	0.00004	0
On-site diesel use 75<hp<750	Gal	0	0.139	0	22.24	0	0.101	0	0.00013	0	0.009	0	0.00004	0
On-site diesel use >750 hp	Gal	0	0.139	0	22.24	0	0.149	0	0.00013	0	0.006	0	0.00004	0
On-site gasoline use - Other	Gal	0	0.124	0	19.6	0	0.11	0	0.0045	0	0.00054	0	0.000039	0
On-site gasoline use <25 hp	Gal	0	0.124	0	17.48	0	0.037	0	0.00025	0	0.165	0	0.00008	0
On-site gasoline use >25 hp	Gal	0	0.124	0	19.93	0	0.032	0	0.00029	0	0.002	0	0.00009	0
On-site natural gas use	ccf	0	0.103	0	13.1	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
On-site compressed natural gas use - Other	ccf	0	NP		1957.835	0	16.0325	0	0.023045	0	0.2775	0	0	0
On-site compressed natural gas use	ccf	0	NP		1957.835	0	16.0325	0	0.023045	0	0.2775	0	0	0
On-site liquified petroleum gas use - Other	gal	0	NP		12.69	0	0.021	0	0.00013	0	0.001	0	0	0
On-site liquified petroleum gas use	gal	0	NP		12.69	0	0.021	0	0.00013	0	0.001	0	0	0
Other forms of on-site conventional energy use #1	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
Other forms of on-site conventional energy use #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
On-site Conventional Energy Subtotals				**1,429**		**0**		**0**		**0**		**0**		**0**
Notes:														
Other On-site Emissions														
On-site HAP process emissions	lbs	262											1	262
On-site GHG emissions	lbs CO2e	0			1	0								
On-site carbon storage	lbs CO2e	0			1	0								
GHG avoided by flaring on-site landfill methane	Lbs	0			-262	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
Other on-site NOx emissions or reductions	lbs	0					1	0						
Other on-site SOx emissions or reductions	lbs	0							1	0				
Other on-site PM emissions or reductions	lbs	0									1	0		
User-defined recycled/reused on-site #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined recycled/reused on-site #3	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined recycled/reused off-site #1	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
Notes:														
On-site Totals				**1,429.12**		**0**		**0**		**0**		**0**		**262**

Soil Vapor Extraction System - Electricity Generation Footprint (Scope 2)

Contributors to Footprints	Units	Usage	Energy		GHG		NOx		SOx		PM		HAPs	
			Conv. Factor	MMBtus	Conv. Factor	lbs CO2e	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs
Electricity Generation														
Grid electricity	MWh	418.728	6.929	2901.3663	870	364293.36	0.77	322.42056	0.14396	60.280083	0.0545	22.820676	0.0183	7.6627224
Voluntary purchase of renewable electricity	MWh	0												
Voluntary purchase of RECs	MWh	0												

Notes: Grid electricty is based on an estimate for New York City of approximately 60% natural gas, 25% renewable sources (mostly hydro), 10% nuclear, and the remaining 5% from oil.

Soil Vapor Extraction System - Transportation Footprint (Scope 3a)

Category	Units	Usage	Energy		Greenhouse Gas		NOx		SOx		PM		HAPs	
			Conv. Factor	MMBtus	Conv. Factor	lbs CO2e	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs
Conventional Energy														
Transportation diesel use	gal	123.4	0.139	17.1526	22.5	2776.5	0.17	20.978	0.0054	0.66636	0.0034	0.41956	0.0000052	0.0006417
Transportation diesel use - car	gal	0	0.139	0	22.57	0	0.015	0	0.0002	0	0.003	0	0.00252	0
Transportation diesel use - passenger truck	gal	0	0.139	0	22.545	0	0.0585	0	0.0002	0	0.007	0	0.002605	0
Transportation diesel use - User Defined	gal	0	0.139	0	22.5	0	0.17	0	0.0054	0	0.0034	0	0.0000052	0
Transportation gasoline use	gal	0	0.124	0	19.6	0	0.11	0	0.0045	0	0.00054	0	0.000039	0
Transportation gasoline use - car	gal	24.2	0.124	3.0008	19.77	478.434	0.027	0.6534	0.00036	0.008712	0.003	0.0726	0.0067	0.16214
Transportation gasoline use - passenger truck	gal	0	0.124	0	19.79	0	0.035	0	0.00036	0	0.003	0	0.00661	0
Transportation gasoline use - User Defined	gal	0	0.124	0	19.6	0	0.11	0	0.0045	0	0.00054	0	0.000039	0
Transportation natural gas use	ccf	0	0.103	0	13.1	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
Transportation natural gas use - User Defined	ccf	0	0.103	0	13.1	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
User-defined conventional energy transportation #1	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined conventional energy transportation #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
Conventional Energy Subtotals				**20**		**3,255**		**22**		**1**		**0**		**0**
Notes:														
Renewable Energy														
Transportation biodiesel use	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
Transportation biodiesel use - User Defined	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
User-defined renewable energy transportation #1	TBD	0	Biodiesel		0	0	0	0	0	0	0	0	Ref.	
User-defined renewable energy transportation #2	TBD	0	npg or pmp		0	0	0	0	0	0	0	0	0	0
Renewable Energy Subtotals				**0**		**0**		**0**		**0**		**0**		**0**
Notes:														
Transportation Totals				**20**		**3255**		**22**		**1**		**0**		**0**

Soil Vapor Extraction System - Off-Site Footprint (Scope 3b)

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

Notes:

Soil Vapor Extraction System - Off-Site Footprint (Scope 3b)

Category	Units	Usage	Energy		Greenhouse Gas		NOx		SOx		PM		HAPs	
			Conv. Factor	MMBtus	Conv. Factor	lbs CO2e	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs
Treatment Materials & Chemicals														
Cheese Whey	lbs	0	0.0025	0	0.031	0	0.000062	0	0.000033	0	0.000002	0	NP	
Emulsified vegetable oil	lbs	0	0.0077	0	3.44	0	0.0066	0	0.0019	0	0.000033	0	NP	
Granular activated carbon, primary	lbs	560	0.0356	19.936	4.82	2699.2	0.0793	44.408	0.128	71.68	0.000987	0.55272	0.000657	0.36792
Granular activated carbon, regenerated	lbs	0	0.00873	0	1.7	0	0.00733	0	0.0129	0	0.000886	0	0.000671	0
Hydrogen Peroxide, 50% in H2O	lbs	0	0.00979	0	1.19	0	0.00142	0	0.0024	0	0.000308	0	0.0000629	0
Iron (II) Sulfate	lbs	0	0.00147	0	0.167	0	0.000316	0	0.000589	0	0.000103	0	0.000023	0
Lime, Hydrated, Packed	lbs	0	0.00206	0	0.762	0	0.000513	0	0.000358	0	0.00013	0	6.57E-06	0
Molasses	lbs	0	0.0044	0	0.48	0	0.0011	0	0.00024	0	0.0000041	0	NP	
Phosphoric Acid, 70% in H2O	lbs	0	0.0067	0	0.882	0	0.00282	0	0.0294	0	0.00171	0	0.000163	0
Potassium Permanganate	lbs	0	0.00981	0	1.16	0	0.00234	0	0.0032	0	0.000422	0	0.000122	0
Sodium Hydroxide, 50% in H2O	lbs	0	0.00977	0	1.09	0	0.00194	0	0.00352	0	0.000403	0	0.000129	0
Other Treatment Chemicals & Materials	lbs	0	0.015	0	1.67	0	0.003	0	0.0065	0	0.00061	0	0.000016	0
Notes:														
Fuel Processing														
Biodiesel produced	gal	0	0.029	0	-16.8	0	0.018	0	0.033	0	0.00082	0	NP	
Diesel produced	gal	123.4	0.017	2.0978	3.02	372.668	0.0051	0.62934	0.0062	0.76508	0.0017	0.20978	0.0011	0.13574
Gasoline produced	gal	24.2	0.033	0.7986	2.8	67.76	0.0046	0.11132	0.005	0.121	0.0015	0.0363	0.001	0.0242
Liquefied Petroleum Gas Produced	gal	0	0.088	0	1.47	0	0.0016	0	0.0024	0	0.0007	0	0.0003	0
Natural Gas - Compressed Produced	ccf	0	19.983	0	343.92	0	0.4732	0	2.1651	0	0.1846	0	0.2895	0
Natural Gas Produced	ccf	0	0.0052	0	2.2	0	0.0037	0	0.0046	0	0.000072	0	0.0000061	0
Fuel Processing Subtotals				**2.8964**		**440.428**		**0.74066**		**0.88608**		**0.24608**		**0.15994**
Notes:														
Public water	gal x 1000	0	0.0092	0	5	0	0.0097	0	0.0059	0	0.016	0	0.000015	0
User-defined water resource #1	gal x 1000	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined water resource #2	gal x 1000	0	0	0	0	0	0	0	0	0	0	0	0	0
Notes:														

Soil Vapor Extraction System - Off-Site Footprint (Scope 3b)

Category	Units	Usage	Energy		Greenhouse Gas		NOx		SOx		PM		HAPs	
			Conv. Factor	MMBtus	Conv. Factor	lbs CO2e	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs
Off-Site Services														
Hazardous waste incineration	lb	0	0.00609	0	2.43	0	0.0016	0	0.00167	0	0.000209	0	0.000087	0
Off-site waste water treatment (POTW)	gal x 1000	0.5	0.015	0.0075	4.4	2.2	0.016	0.008	0.015	0.0075	NP		NP	
Off-site non-hazardous waste landfill	ton	0.8	0.16	0.128	25	20	0.14	0.112	0.075	0.06	0.4	0.32	0.0014	0.00112
Off-site hazardous waste landfill	ton	0	0.18	0	27.5	0	0.154	0	0.0825	0	0.44	0	0.00154	0
Off-site Laboratory Analysis - Other	sample	0	0.058071	0	6.8534384	0	0.131402	0	0.3038758	0	0.0455698	0	0.0330165	0
Off-site Laboratory Analysis - Metals	sample	0	0.212	0	27.4693	0	0.6423	0	1.5072	0	0.2264	0	0.1643	0
Off-site Laboratory Analysis - Mercury	sample	0	0.0731715	0	9.325458	0	0.2127439	0	0.4982396	0	0.0747359	0	0.0542332	0
Off-site Laboratory Analysis - Inorganic Anions	sample	0	0.0074025	0	0.6459478	0	0.0067681	0	0.0147929	0	0.0022024	0	0.0015542	0
Off-site Laboratory Analysis - Alkalinity	sample	0	0.0174398	0	1.3381922	0	0.0070106	0	0.0132496	0	0.00194	0	0.0012831	0
Off-site Laboratory Analysis - Perchlorate	sample	0	0.023885	0	1.8717054	0	0.0079807	0	0.0141535	0	0.0020547	0	0.0012875	0
Off-site Laboratory Analysis - Nitrogen/Nitrate	sample	0	0.0336475	0	4.29897	0	0.0954592	0	0.2226646	0	0.0335099	0	0.0242506	0
Off-site Laboratory Analysis - Sulfate	sample	0	0.0141225	0	1.4726728	0	0.0079807	0	0.0136024	0	0.0019797	0	0.0012015	0
Off-site Laboratory Analysis - PCBs	sample	0	0.0512769	0	5.224902	0	0.0833339	0	0.1904774	0	0.0284393	0	0.0212083	0
Off-site Laboratory Analysis - VOCs	sample	0	0.0762045	0	9.016814	0	0.104498	0	0.2270738	0	0.0339508	0	0.0235892	0
Off-site Laboratory Analysis - SVOCs	sample	24	0.0715602	1.7174444	7.870422	188.89013	0.1459445	3.5026685	0.3373038	8.0952912	0.0504853	1.2116482	0.0372577	0.8941858
Notes:														
Resource Extraction for Electricity														
Coal extraction and processing	MWh	0	3.1	0	180.0	0	0.8	0	0.2	0	0.0	0	NP	
Natural gas extraction and processing	MWh	251.2368	1.6	409.96821	270.0	67833.936	0.2	45.222624	13.0	3266.0784	0.0	1.7837813	NP	
Nuclear fuel extraction and processing	MWh	41.8728	0.2	6.510048	25.0	1046.82	0.2	6.28092	0.5	20.9364	0.0	0.0628092	NP	
Oil extraction and processing	MWh	20.9364	2.3	48.057413	270.0	5652.828	1.7	35.59188	0.1	1.4446116	0.0	0.8793288	NP	
Other fuel extraction and processing	MWh	0	0	0	0	0	0	0	0	0	0	0	0	0
Resource Extraction Subtotals				**464.53567**		**74533.584**		**87.095424**		**3288.4594**		**2.7259193**		**0**
Notes:														
Electricity Transmission														
Transmission and distribution losses	MWh	418.728	1.0342	433.0485	87	36429.336	0.077	32.242056	0.014396	6.0280083	0.00545	2.2820676	0.00183	0.7662722
Notes:														

Soil Vapor Extraction System - Off-Site Footprint (Scope 3b)

Category	Units	Usage	Energy		Greenhouse Gas		NOx		SOx		PM		HAPs	
			Conv. Factor	MMBtus	Conv. Factor	lbs CO2e	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs
User-defined Materials														
User-defined material #1	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #3	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #4	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #5	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #6	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #7	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #8	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #9	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #10	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #11	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #12	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #13	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #14	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #15	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #16	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #17	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #18	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #19	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #20	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
Notes:														
User-defined Waste Destinations														
User-defined recycled/reused off-site #1	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined recycled/reused off-site #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined recycled/reused off-site #3	TBD	0	y(MMBtu/u		(lbs CO2e/u		Ox(lbs/unit)		Ox(lbs/unit)		M(lbs/unit)		APs(lbs/unit	
User-defined non-hazardous waste destination #1	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined non-hazardous waste destination #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined non-hazardous waste destination #3	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined hazardous waste destination #1	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined hazardous waste destination #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined hazardous waste destination #3	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
Notes:														
Off-site Totals				**922.26951**		**114313.64**		**168.10881**		**3375.2163**		**7.338435**		**2.189438**

Soil Vapor Extraction System - Intermediate Totals

Category	Units	Usage	Energy		Greenhouse Gas		NOx		SOx		PM		HAPs	
			Conv. Factor	MMBtus	Conv. Factor	lbs CO2e	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs
Total Grid Electricity Footprint														
On-site grid electricity	MWh	418.728	3.413	1429.1187										
Electricity Generation														
Grid electricity	MWh	418.728	6.929	2901.3663	870	364293.36	0.77	322.42056	0.14396	60.280083	0.0545	22.820676	0.0183	7.6627224
Resource Extraction for Electricity														
Coal extraction and processing	MWh	0	3.1	0	180.0	0	0.8	0	0.2	0	0.0	0	NP	
Natural gas extraction and processing	MWh	251.2368	1.6	409.96821	270.0	67833.936	0.2	45.222624	13.0	3266.0784	0.0	1.7837813	NP	
Nuclear fuel extraction and processing	MWh	41.8728	0.2	6.510048	25.0	1046.82	0.2	6.28092	0.5	20.9364	0.0	0.0628092	NP	
Oil extraction and processing	MWh	20.9364	2.3	48.057413	270.0	5652.828	1.7	35.59188	0.1	1.4446116	0.0	0.8793288	NP	
Other fuel extraction and processing	MWh	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
Electricity Transmission														
Transmission and distribution losses	MWh	418.728	1.0342	433.0485	87	36429.336	0.077	32.242056	0.014396	6.0280083	0.00545	2.2820676	0.00183	0.7662722
Total Grid Electricity Footprint				**5228**		**475256**		**442**		**3355**		**28**		**8**
Total Fuel Footprints														
Total Gasoline Footprint														
On-site gasoline use - Other	gal	0	0.124	0	19.6	0	0.11	0	0.0045	0	0.00054	0	0.000039	0
On-site gasoline use <25 hp	gal	0	0.124	0	17.48	0	0.037	0	0.00025	0	0.165	0	0.00008	0
On-site gasoline use >25 hp	gal	0	0.124	0	19.93	0	0.032	0	0.00029	0	0.002	0	0.00009	0
Transportation gasoline use	gal	0	0.124	0	19.6	0	0.11	0	0.0045	0	0.00054	0	0.000039	0
Transportation gasoline use - car	gal	24.2	0.124	3.0008	19.77	478.434	0.027	0.6534	0.00036	0.008712	0.003	0.0726	0.0067	0.16214
Transportation gasoline use - passenger truck	gal	0	0.124	0	19.79	0	0.035	0	0.00036	0	0.003	0	0.00661	0
Transportation gasoline use - User Defined	gal	0	0.124	0	19.6	0	0.11	0	0.0045	0	0.00054	0	0.000039	0
Gasoline produced	gal	24.2	0.033	0.7986	2.8	67.76	0.0046	0.11132	0.005	0.121	0.0015	0.0363	0.001	0.0242
Total Gasoline Footprint		**24.2**		**3.7994**		**546.194**		**0.76472**		**0.129712**		**0.1089**		**0.18634**
Total Diesel Footprint														
On-site diesel use - Other	gal	0	0.139	0	22.5	0	0.17	0	0.0054	0	0.0034	0	0.0000052	0
On-site diesel use <75 hp	gal	0	0.139	0	22.21	0	0.1565	0	0.000145	0	0.0145	0	0.00004	0
On-site diesel use 75<hp<750	gal	0	0.139	0	22.24	0	0.101	0	0.00013	0	0.009	0	0.00004	0
On-site diesel use >750 hp	gal	0	0.139	0	22.24	0	0.149	0	0.00013	0	0.006	0	0.00004	0
Transportation diesel use	gal	123.4	0.139	17.1526	22.5	2776.5	0.17	20.978	0.0054	0.66636	0.0034	0.41956	0.0000052	0.0006417
Transportation diesel use - car	gal	0	0.139	0	22.57	0	0.015	0	0.0002	0	0.003	0	0.00252	0
Transportation diesel use - passenger truck	gal	0	0.139	0	22.545	0	0.0585	0	0.0002	0	0.007	0	0.002605	0
Transportation diesel use - User Defined	gal	0	0.139	0	22.5	0	0.17	0	0.0054	0	0.0034	0	0.0000052	0
Diesel produced	gal	123.4	0.017	2.0978	3.02	372.668	0.0051	0.62934	0.0062	0.76508	0.0017	0.20978	0.0011	0.13574
Total Diesel Footprint		**123.4**		**19.2504**		**3149.168**		**21.60734**		**1.43144**		**0.62934**		**0.1363817**
Total Biodiesel Footprint														
On-site biodiesel use	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
On-site biodiesel use - User Defined	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
Transportation biodiesel use	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
Transportation biodiesel use - User Defined	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
Biodiesel produced	gal	0	0.029	0	-16.8	0	0.018	0	0.033	0	0.00082	0	NP	
Total Biodiesel Footprint		**0**		**0**		**0**		**0**		**0**		**0**		**0**
Total Natural Gas Footprint														
On-site natural gas use	ccf	0	0.103	0	13.1	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
Transportation natural gas use	ccf	0	0.103	0	13.1	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
Transportation natural gas use - User Defined	ccf	0	0.103	0	13.1	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
Natural gas produced	ccf	0	0.0052	0	2.2	0	0.0037	0	0.0046	0	0.000072	0	0.0000061	0
Total Natural Gas Footprint		**0**		**0**		**0**		**0**		**0**		**0**		**0**
Total Liquified Petroleum Gas Footprint														
On-site liquified petroleum gas use - Other	ccf	0	NP		12.69	0	0.021	0	0.00013	0	0.001	0	0	0
On-site liquified petroleum gas use	ccf	0	NP		12.69	0	0.021	0	0.00013	0	0.001	0	0	0
Liquified petroleum gas produced	ccf	0	0.088	0	1.47	0	0.0016	0	0.0024	0	0.0007	0	0.0003	0
Total Natural Gas Footprint		**0**		**0**		**0**		**0**		**0**		**0**		**0**
Total Compressed Gas Footprint														
On-site compressed gas use - Other	ccf	0	NP		1957.835	0	16.0325	0	0.023045	0	0.2775	0	0	0
On-site compressed gas use	ccf	0	NP		1957.835	0	16.0325	0	0.023045	0	0.2775	0	0	0
Compressed gas produced	ccf	0	19.983	0	343.92	0	0.4732	0	2.1651	0	0.1846	0	0.2895	0
Total Natural Gas Footprint		**0**		**0**		**0**		**0**		**0**		**0**		**0**

Notes: Grid electricty is based on an estimate for New York City of approximately 60% natural gas, 25% renewable sources (mostly hydro), 10% nuclear, and the remaining 5% from oil.

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

Space below available for notes and calculations:

Sub-Slab Depressurization System - On-Site Footprint (Scope 1)

Contributors to Footprints	Units	Usage	Energy		GHG		NOx		SOx		PM		HAPs	
			Conv. Factor	MMBtus	Conv. Factor	lbs CO2e	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs
On-Site														
On-site Renewable Energy														
Renewable electricity generated on-site	MWh	0	3.413	0										
Landfill gas combusted on-site for energy use	ccf CH4	0	0.103	0	13.1	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
On-site biodiesel use	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
On-site biodiesel use - User Defined	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
User-defined on-site renewable energy use #1	gal	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined on-site renewable energy use #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
On-site Renewable Energy Subtotals				**0**		**0**		**0**		**0**		**0**		**0**
Notes:														
On-site Conventional Energy														
On-site grid electricity	MWh	9.67104	3.413	33.00726										
On-site diesel use - Other	Gal	0	0.139	0	22.5	0	0.17	0	0.0054	0	0.0034	0	0.0000052	0
On-site diesel use <75 hp	Gal	0	0.139	0	22.21	0	0.1565	0	0.000145	0	0.0145	0	0.00004	0
On-site diesel use 75<hp<750	Gal	0	0.139	0	22.24	0	0.101	0	0.00013	0	0.009	0	0.00004	0
On-site diesel use >750 hp	Gal	0	0.139	0	22.24	0	0.149	0	0.00013	0	0.006	0	0.00004	0
On-site gasoline use - Other	Gal	0	0.124	0	19.6	0	0.11	0	0.0045	0	0.00054	0	0.000039	0
On-site gasoline use <25 hp	Gal	0	0.124	0	17.48	0	0.037	0	0.00025	0	0.165	0	0.00008	0
On-site gasoline use >25 hp	Gal	0	0.124	0	19.93	0	0.032	0	0.00029	0	0.002	0	0.00009	0
On-site natural gas use	ccf	0	0.103	0	13.1	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
On-site compressed natural gas use - Other	ccf	0	NP		1957.835	0	16.0325	0	0.023045	0	0.2775	0	0	0
On-site compressed natural gas use	ccf	0	NP		1957.835	0	16.0325	0	0.023045	0	0.2775	0	0	0
On-site liquified petroleum gas use - Other	gal	0	NP		12.69	0	0.021	0	0.00013	0	0.001	0	0	0
On-site liquified petroleum gas use	gal	0	NP		12.69	0	0.021	0	0.00013	0	0.001	0	0	0
Other forms of on-site conventional energy use #1	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
Other forms of on-site conventional energy use #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
On-site Conventional Energy Subtotals				**33**		**0**		**0**		**0**		**0**		**0**
Notes:														
Other On-site Emissions														
On-site HAP process emissions	lbs	0											1	0
On-site GHG emissions	lbs CO2e	0			1	0								
On-site carbon storage	lbs CO2e	0			1	0								
GHG avoided by flaring on-site landfill methane	Lbs	0			-262	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
Other on-site NOx emissions or reductions	lbs	0					1	0						
Other on-site SOx emissions or reductions	lbs	0							1	0				
Other on-site PM emissions or reductions	lbs	0									1	0		
User-defined recycled/reused on-site #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined recycled/reused on-site #3	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined recycled/reused off-site #1	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
Notes:														
On-site Totals				**33.01**		**0**		**0**		**0**		**0**		**0**

Sub-Slab Depressurization System - Electricity Generation Footprint (Scope 2)

Contributors to Footprints	Units	Usage	Energy		GHG		NOx		SOx		PM		HAPs	
			Conv. Factor	MMBtus	Conv. Factor	lbs CO2e	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs
Electricity Generation														
Grid electricity	MWh	9.67104	6.929	67.010636	870	8413.8048	0.77	7.4467008	0.14396	1.3922429	0.0545	0.5270717	0.0183	0.17698
Voluntary purchase of renewable electricity	MWh	0												
Voluntary purchase of RECs	MWh	0												

Notes: Grid electricty is based on an estimate for New York City of approximately 60% natural gas, 25% renewable sources (mostly hydro), 10% nuclear, and the remaining 5% from oil.

Sub-Slab Depressurization System - Transportation Footprint (Scope 3a)

Category	Units	Usage	Energy		Greenhouse Gas		NOx		SOx		PM		HAPs	
			Conv. Factor	MMBtus	Conv. Factor	lbs CO2e	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs
Conventional Energy														
Transportation diesel use	gal	0	0.139	0	22.5	0	0.17	0	0.0054	0	0.0034	0	0.0000052	0
Transportation diesel use - car	gal	0	0.139	0	22.57	0	0.015	0	0.0002	0	0.003	0	0.00252	0
Transportation diesel use - passenger truck	gal	0	0.139	0	22.545	0	0.0585	0	0.0002	0	0.007	0	0.002605	0
Transportation diesel use - User Defined	gal	0	0.139	0	22.5	0	0.17	0	0.0054	0	0.0034	0	0.0000052	0
Transportation gasoline use	gal	0	0.124	0	19.6	0	0.11	0	0.0045	0	0.00054	0	0.000039	0
Transportation gasoline use - car	gal	0	0.124	0	19.77	0	0.027	0	0.00036	0	0.003	0	0.0067	0
Transportation gasoline use - passenger truck	gal	0	0.124	0	19.79	0	0.035	0	0.00036	0	0.003	0	0.00661	0
Transportation gasoline use - User Defined	gal	0	0.124	0	19.6	0	0.11	0	0.0045	0	0.00054	0	0.000039	0
Transportation natural gas use	ccf	0	0.103	0	13.1	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
Transportation natural gas use - User Defined	ccf	0	0.103	0	13.1	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
User-defined conventional energy transportation #1	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined conventional energy transportation #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
Conventional Energy Subtotals				**0**		**0**		**0**		**0**		**0**		**0**
Notes:														
Renewable Energy														
Transportation biodiesel use	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
Transportation biodiesel use - User Defined	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
User-defined renewable energy transportation #1	TBD	0	Biodiesel		0	0	0	0	0	0	0	0	Ref.	
User-defined renewable energy transportation #2	TBD	0	npg or pmp		0	0	0	0	0	0	0	0	0	0
Renewable Energy Subtotals				**0**		**0**		**0**		**0**		**0**		**0**
Notes:														
Transportation Totals				**0**		**0**		**0**		**0**		**0**		**0**

Sub-Slab Depressurization System - Off-Site Footprint (Scope 3b)

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

Notes:

Sub-Slab Depressurization System - Off-Site Footprint (Scope 3b)

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

Sub-Slab Depressurization System - Off-Site Footprint (Scope 3b)

Category	Units	Usage	Energy		Greenhouse Gas		NOx		SOx		PM		HAPs	
			Conv. Factor	MMBtus	Conv. Factor	lbs CO2e	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs
Off-Site Services														
Hazardous waste incineration	lb	0	0.00609	0	2.43	0	0.0016	0	0.00167	0	0.000209	0	0.000087	0
Off-site waste water treatment (POTW)	gal x 1000	0	0.015	0	4.4	0	0.016	0	0.015	0	NP		NP	
Off-site non-hazardous waste landfill	ton	0	0.16	0	25	0	0.14	0	0.075	0	0.4	0	0.0014	0
Off-site hazardous waste landfill	ton	0	0.18	0	27.5	0	0.154	0	0.0825	0	0.44	0	0.00154	0
Off-site Laboratory Analysis - Other	sample	0	0.058071	0	6.8534384	0	0.131402	0	0.3038758	0	0.0455698	0	0.0330165	0
Off-site Laboratory Analysis - Metals	sample	0	0.212	0	27.4693	0	0.6423	0	1.5072	0	0.2264	0	0.1643	0
Off-site Laboratory Analysis - Mercury	sample	0	0.0731715	0	9.325458	0	0.2127439	0	0.4982396	0	0.0747359	0	0.0542332	0
Off-site Laboratory Analysis - Inorganic Anions	sample	0	0.0074025	0	0.6459478	0	0.0067681	0	0.0147929	0	0.0022024	0	0.0015542	0
Off-site Laboratory Analysis - Alkalinity	sample	0	0.0174398	0	1.3381922	0	0.0070106	0	0.0132496	0	0.00194	0	0.0012831	0
Off-site Laboratory Analysis - Perchlorate	sample	0	0.023885	0	1.8717054	0	0.0079807	0	0.0141535	0	0.0020547	0	0.0012875	0
Off-site Laboratory Analysis - Nitrogen/Nitrate	sample	0	0.0336475	0	4.29897	0	0.0954592	0	0.2226646	0	0.0335099	0	0.0242506	0
Off-site Laboratory Analysis - Sulfate	sample	0	0.0141225	0	1.4726728	0	0.0079807	0	0.0136024	0	0.0019797	0	0.0012015	0
Off-site Laboratory Analysis - PCBs	sample	0	0.0512769	0	5.224902	0	0.0833339	0	0.1904774	0	0.0284393	0	0.0212083	0
Off-site Laboratory Analysis - VOCs	sample	0	0.0762045	0	9.016814	0	0.104498	0	0.2270738	0	0.0339508	0	0.0235892	0
Off-site Laboratory Analysis - SVOCs	sample	0	0.0715602	0	7.870422	0	0.1459445	0	0.3373038	0	0.0504853	0	0.0372577	0
Notes:														
Resource Extraction for Electricity														
Coal extraction and processing	MWh	0	3.1	0	180.0	0	0.8	0	0.2	0	0.0	0	NP	
Natural gas extraction and processing	MWh	5.802624	1.6	9.4687218	270.0	1566.7085	0.2	1.0444723	13.0	75.434112	0.0	0.0411986	NP	
Nuclear fuel extraction and processing	MWh	0.967104	0.2	0.1503576	25.0	24.1776	0.2	0.1450656	0.5	0.483552	0.0	0.0014507	NP	
Oil extraction and processing	MWh	0.483552	2.3	1.1099453	270.0	130.55904	1.7	0.8220384	0.1	0.0333651	0.0	0.0203092	NP	
Other fuel extraction and processing	MWh	0	0	0	0	0	0	0	0	0	0	0	0	0
Resource Extraction Subtotals				**10.729025**		**1721.4451**		**2.0115763**		**75.951029**		**0.0629585**		**0**
Notes:														
Electricity Transmission														
Transmission and distribution losses	MWh	9.67104	1.0342	10.00179	87	841.38048	0.077	0.7446701	0.014396	0.1392243	0.00545	0.0527072	0.00183	0.017698
Notes:														

Sub-Slab Depressurization System - Off-Site Footprint (Scope 3b)

Category	Units	Usage	Energy		Greenhouse Gas		NOx		SOx		PM		HAPs	
			Conv. Factor	MMBtus	Conv. Factor	lbs CO2e	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs
User-defined Materials														
User-defined material #1	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #3	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #4	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #5	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #6	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #7	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #8	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #9	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #10	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #11	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #12	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #13	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #14	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #15	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #16	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #17	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #18	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #19	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Notes:														
User-defined Waste Destinations														
User-defined recycled/reused off-site #1	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined recycled/reused off-site #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined recycled/reused off-site #3	TBD	0	y(MMBtu/u		(lbs CO2e/u		Ox(lbs/unit)		Ox(lbs/unit)		M(lbs/unit)		APs(lbs/unit	
User-defined non-hazardous waste destination #1	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined non-hazardous waste destination #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined non-hazardous waste destination #3	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined hazardous waste destination #1	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined hazardous waste destination #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined hazardous waste destination #3	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
Notes:														
Off-site Totals				**20.730814**		**2562.8256**		**2.7562464**		**76.090253**		**0.1156656**		**0.017698**

Sub-Slab Depressurization System - Intermediate Totals

Category	Units	Usage	Energy		Greenhouse Gas		NOx		SOx		PM		HAPs	
			Conv. Factor	MMBtus	Conv. Factor	lbs CO2e	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs
Total Grid Electricity Footprint														
On-site grid electricity	MWh	9.67104	3.413	33.00726										
Electricity Generation														
Grid electricity	MWh	9.67104	6.929	67.010636	870	8413.8048	0.77	7.4467008	0.14396	1.3922429	0.0545	0.5270717	0.0183	0.17698
Resource Extraction for Electricity														
Coal extraction and processing	MWh	0	3.1	0	180.0	0	0.8	0	0.2	0	0.0	0	NP	
Natural gas extraction and processing	MWh	5.802624	1.6	9.4687218	270.0	1566.7085	0.2	1.0444723	13.0	75.434112	0.0	0.0411986	NP	
Nuclear fuel extraction and processing	MWh	0.967104	0.2	0.1503576	25.0	24.1776	0.2	0.1450656	0.5	0.483552	0.0	0.0014507	NP	
Oil extraction and processing	MWh	0.483552	2.3	1.1099453	270.0	130.55904	1.7	0.8220384	0.1	0.0333651	0.0	0.0203092	NP	
Other fuel extraction and processing	MWh	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
Electricity Transmission														
Transmission and distribution losses	MWh	9.67104	1.0342	10.00179	87	841.38048	0.077	0.7446701	0.014396	0.1392243	0.00545	0.0527072	0.00183	0.017698
Total Grid Electricity Footprint				**121**		**10977**		**10**		**77**		**1**		**0**
Total Fuel Footprints														
Total Gasoline Footprint														
On-site gasoline use - Other	gal	0	0.124	0	19.6	0	0.11	0	0.0045	0	0.00054	0	0.000039	0
On-site gasoline use <25 hp	gal	0	0.124	0	17.48	0	0.037	0	0.00025	0	0.165	0	0.00008	0
On-site gasoline use >25 hp	gal	0	0.124	0	19.93	0	0.032	0	0.00029	0	0.002	0	0.00009	0
Transportation gasoline use	gal	0	0.124	0	19.6	0	0.11	0	0.0045	0	0.00054	0	0.000039	0
Transportation gasoline use - car	gal	0	0.124	0	19.77	0	0.027	0	0.00036	0	0.003	0	0.0067	0
Transportation gasoline use - passenger truck	gal	0	0.124	0	19.79	0	0.035	0	0.00036	0	0.003	0	0.00661	0
Transportation gasoline use - User Defined	gal	0	0.124	0	19.6	0	0.11	0	0.0045	0	0.00054	0	0.000039	0
Gasoline produced	gal	0	0.033	0	2.8	0	0.0046	0	0.005	0	0.0015	0	0.001	0
Total Gasoline Footprint		**0**		**0**		**0**		**0**		**0**		**0**		**0**
Total Diesel Footprint														
On-site diesel use - Other	gal	0	0.139	0	22.5	0	0.17	0	0.0054	0	0.0034	0	0.0000052	0
On-site diesel use <75 hp	gal	0	0.139	0	22.21	0	0.1565	0	0.000145	0	0.0145	0	0.00004	0
On-site diesel use 75<hp<750	gal	0	0.139	0	22.24	0	0.101	0	0.00013	0	0.009	0	0.00004	0
On-site diesel use >750 hp	gal	0	0.139	0	22.24	0	0.149	0	0.00013	0	0.006	0	0.00004	0
Transportation diesel use	gal	0	0.139	0	22.5	0	0.17	0	0.0054	0	0.0034	0	0.0000052	0
Transportation diesel use - car	gal	0	0.139	0	22.57	0	0.015	0	0.0002	0	0.003	0	0.00252	0
Transportation diesel use - passenger truck	gal	0	0.139	0	22.545	0	0.0585	0	0.0002	0	0.007	0	0.002605	0
Transportation diesel use - User Defined	gal	0	0.139	0	22.5	0	0.17	0	0.0054	0	0.0034	0	0.0000052	0
Diesel produced	gal	0	0.017	0	3.02	0	0.0051	0	0.0062	0	0.0017	0	0.0011	0
Total Diesel Footprint		**0**		**0**		**0**		**0**		**0**		**0**		**0**
Total Biodiesel Footprint														
On-site biodiesel use	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
On-site biodiesel use - User Defined	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
Transportation biodiesel use	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
Transportation biodiesel use - User Defined	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
Biodiesel produced	gal	0	0.029	0	-16.8	0	0.018	0	0.033	0	0.00082	0	NP	
Total Biodiesel Footprint		**0**		**0**		**0**		**0**		**0**		**0**		**0**
Total Natural Gas Footprint														
On-site natural gas use	ccf	0	0.103	0	13.1	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
Transportation natural gas use	ccf	0	0.103	0	13.1	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
Transportation natural gas use - User Defined	ccf	0	0.103	0	13.1	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
Natural gas produced	ccf	0	0.0052	0	2.2	0	0.0037	0	0.0046	0	0.000072	0	0.0000061	0
Total Natural Gas Footprint		**0**		**0**		**0**		**0**		**0**		**0**		**0**
Total Liquified Petroleum Gas Footprint														
On-site liquified petroleum gas use - Other	ccf	0	NP		12.69	0	0.021	0	0.00013	0	0.001	0	0	0
On-site liquified petroleum gas use	ccf	0	NP		12.69	0	0.021	0	0.00013	0	0.001	0	0	0
Liquified petroleum gas produced	ccf	0	0.088	0	1.47	0	0.0016	0	0.0024	0	0.0007	0	0.0003	0
Total Natural Gas Footprint		**0**		**0**		**0**		**0**		**0**		**0**		**0**
Total Compressed Gas Footprint														
On-site compressed gas use - Other	ccf	0	NP		1957.835	0	16.0325	0	0.023045	0	0.2775	0	0	0
On-site compressed gas use	ccf	0	NP		1957.835	0	16.0325	0	0.023045	0	0.2775	0	0	0
Compressed gas produced	ccf	0	19.983	0	343.92	0	0.4732	0	2.1651	0	0.1846	0	0.2895	0
Total Natural Gas Footprint		**0**		**0**		**0**		**0**		**0**		**0**		**0**

Notes: Grid electricty is based on an estimate for New York City of approximately 60% natural gas, 25% renewable sources (mostly hydro), 10% nuclear, and the remaining 5% from oil.

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

Space below available for notes and calculations:

Groundwater Treatment - On-Site Footprint (Scope 1)

Contributors to Footprints	Units	Usage	Energy		GHG		NOx		SOx		PM		HAPs	
			Conv. Factor	MMBtus	Conv. Factor	lbs CO2e	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs
On-Site														
On-site Renewable Energy														
Renewable electricity generated on-site	MWh	0	3.413	0										
Landfill gas combusted on-site for energy use	ccf CH4	0	0.103	0	13.1	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
On-site biodiesel use	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
On-site biodiesel use - User Defined	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
User-defined on-site renewable energy use #1	gal	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined on-site renewable energy use #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
On-site Renewable Energy Subtotals				**0**		**0**		**0**		**0**		**0**		**0**
Notes:														
On-site Conventional Energy														
On-site grid electricity	MWh	0	3.413	0										
On-site diesel use - Other	Gal	0	0.139	0	22.5	0	0.17	0	0.0054	0	0.0034	0	0.0000052	0
On-site diesel use <75 hp	Gal	0	0.139	0	22.21	0	0.1565	0	0.000145	0	0.0145	0	0.00004	0
On-site diesel use 75<hp<750	Gal	0	0.139	0	22.24	0	0.101	0	0.00013	0	0.009	0	0.00004	0
On-site diesel use >750 hp	Gal	0	0.139	0	22.24	0	0.149	0	0.00013	0	0.006	0	0.00004	0
On-site gasoline use - Other	Gal	0	0.124	0	19.6	0	0.11	0	0.0045	0	0.00054	0	0.000039	0
On-site gasoline use <25 hp	Gal	0	0.124	0	17.48	0	0.037	0	0.00025	0	0.165	0	0.00008	0
On-site gasoline use >25 hp	Gal	0	0.124	0	19.93	0	0.032	0	0.00029	0	0.002	0	0.00009	0
On-site natural gas use	ccf	0	0.103	0	13.1	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
On-site compressed natural gas use - Other	ccf	0	NP		1957.835	0	16.0325	0	0.023045	0	0.2775	0	0	0
On-site compressed natural gas use	ccf	0	NP		1957.835	0	16.0325	0	0.023045	0	0.2775	0	0	0
On-site liquified petroleum gas use - Other	gal	0	NP		12.69	0	0.021	0	0.00013	0	0.001	0	0	0
On-site liquified petroleum gas use	gal	0	NP		12.69	0	0.021	0	0.00013	0	0.001	0	0	0
Other forms of on-site conventional energy use #1	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
Other forms of on-site conventional energy use #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
On-site Conventional Energy Subtotals				**0**		**0**		**0**		**0**		**0**		**0**
Notes:														
Other On-site Emissions														
On-site HAP process emissions	lbs	0											1	0
On-site GHG emissions	lbs CO2e	0			1	0								
On-site carbon storage	lbs CO2e	0			1	0								
GHG avoided by flaring on-site landfill methane	Lbs	0			-262	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
Other on-site NOx emissions or reductions	lbs	0					1	0						
Other on-site SOx emissions or reductions	lbs	0							1	0				
Other on-site PM emissions or reductions	lbs	0									1	0		
User-defined recycled/reused on-site #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined recycled/reused on-site #3	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined recycled/reused off-site #1	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
Notes:														
On-site Totals				**0.00**		**0**		**0**		**0**		**0**		**0**

Groundwater Treatment - Electricity Generation Footprint (Scope 2)

Contributors to Footprints	Units	Usage	Energy		GHG		NOx		SOx		PM		HAPs	
			Conv. Factor	MMBtus	Conv. Factor	lbs CO2e	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs
Electricity Generation														
Grid electricity	MWh	0	6.929	0	870	0	0.77	0	0.14396	0	0.0545	0	0.0183	0
Voluntary purchase of renewable electricity	MWh	0												
Voluntary purchase of RECs	MWh	0												

Notes: Grid electricty is based on an estimate for New York City of approximately 60% natural gas, 25% renewable sources (mostly hydro), 10% nuclear, and the remaining 5% from oil.

Groundwater Treatment - Transportation Footprint (Scope 3a)

Category	Units	Usage	Energy		Greenhouse Gas		NOx		SOx		PM		HAPs	
			Conv. Factor	MMBtus	Conv. Factor	lbs CO2e	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs
Conventional Energy														
Transportation diesel use	gal	0	0.139	0	22.5	0	0.17	0	0.0054	0	0.0034	0	0.0000052	0
Transportation diesel use - car	gal	0	0.139	0	22.57	0	0.015	0	0.0002	0	0.003	0	0.00252	0
Transportation diesel use - passenger truck	gal	0	0.139	0	22.545	0	0.0585	0	0.0002	0	0.007	0	0.002605	0
Transportation diesel use - User Defined	gal	0	0.139	0	22.5	0	0.17	0	0.0054	0	0.0034	0	0.0000052	0
Transportation gasoline use	gal	0	0.124	0	19.6	0	0.11	0	0.0045	0	0.00054	0	0.000039	0
Transportation gasoline use - car	gal	33.6	0.124	4.1664	19.77	664.272	0.027	0.9072	0.00036	0.012096	0.003	0.1008	0.0067	0.22512
Transportation gasoline use - passenger truck	gal	0	0.124	0	19.79	0	0.035	0	0.00036	0	0.003	0	0.00661	0
Transportation gasoline use - User Defined	gal	0	0.124	0	19.6	0	0.11	0	0.0045	0	0.00054	0	0.000039	0
Transportation natural gas use	ccf	0	0.103	0	13.1	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
Transportation natural gas use - User Defined	ccf	0	0.103	0	13.1	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
User-defined conventional energy transportation #1	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined conventional energy transportation #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
Conventional Energy Subtotals				**4**		**664**		**1**		**0**		**0**		**0**
Notes:														
Renewable Energy														
Transportation biodiesel use	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
Transportation biodiesel use - User Defined	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
User-defined renewable energy transportation #1	TBD	0	Biodiesel		0	0	0	0	0	0	0	0	Ref.	
User-defined renewable energy transportation #2	TBD	0	npg or pmp		0	0	0	0	0	0	0	0	0	0
Renewable Energy Subtotals				**0**		**0**		**0**		**0**		**0**		**0**
Notes:														
Transportation Totals				**4**		**664**		**1**		**0**		**0**		**0**

Groundwater Treatment - Off-Site Footprint (Scope 3b)

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

Notes:

Groundwater Treatment - Off-Site Footprint (Scope 3b)

Category	Units	Usage	Energy		Greenhouse Gas		NOx		SOx		PM		HAPs	
			Conv. Factor	MMBtus	Conv. Factor	lbs CO2e	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs
Treatment Materials & Chemicals														
Cheese Whey	lbs	0	0.0025	0	0.031	0	0.000062	0	0.000033	0	0.000002	0	NP	
Emulsified vegetable oil	lbs	0	0.0077	0	3.44	0	0.0066	0	0.0019	0	0.000033	0	NP	
Granular activated carbon, primary	lbs	0	0.0356	0	4.82	0	0.0793	0	0.128	0	0.000987	0	0.000657	0
Granular activated carbon, regenerated	lbs	0	0.00873	0	1.7	0	0.00733	0	0.0129	0	0.000886	0	0.000671	0
Hydrogen Peroxide, 50% in H2O	lbs	0	0.00979	0	1.19	0	0.00142	0	0.0024	0	0.000308	0	0.0000629	0
Iron (II) Sulfate	lbs	0	0.00147	0	0.167	0	0.000316	0	0.000589	0	0.000103	0	0.000023	0
Lime, Hydrated, Packed	lbs	0	0.00206	0	0.762	0	0.000513	0	0.000358	0	0.00013	0	6.57E-06	0
Molasses	lbs	0	0.0044	0	0.48	0	0.0011	0	0.00024	0	0.0000041	0	NP	
Phosphoric Acid, 70% in H2O	lbs	0	0.0067	0	0.882	0	0.00282	0	0.0294	0	0.00171	0	0.000163	0
Potassium Permanganate	lbs	0	0.00981	0	1.16	0	0.00234	0	0.0032	0	0.000422	0	0.000122	0
Sodium Hydroxide, 50% in H2O	lbs	0	0.00977	0	1.09	0	0.00194	0	0.00352	0	0.000403	0	0.000129	0
Other Treatment Chemicals & Materials	lbs	0	0.015	0	1.67	0	0.003	0	0.0065	0	0.00061	0	0.000016	0
Notes:														
Fuel Processing														
Biodiesel produced	gal	0	0.029	0	-16.8	0	0.018	0	0.033	0	0.00082	0	NP	
Diesel produced	gal	0	0.017	0	3.02	0	0.0051	0	0.0062	0	0.0017	0	0.0011	0
Gasoline produced	gal	33.6	0.033	1.1088	2.8	94.08	0.0046	0.15456	0.005	0.168	0.0015	0.0504	0.001	0.0336
Liquefied Petroleum Gas Produced	gal	0	0.088	0	1.47	0	0.0016	0	0.0024	0	0.0007	0	0.0003	0
Natural Gas - Compressed Produced	ccf	0	19.983	0	343.92	0	0.4732	0	2.1651	0	0.1846	0	0.2895	0
Natural Gas Produced	ccf	0	0.0052	0	2.2	0	0.0037	0	0.0046	0	0.000072	0	0.0000061	0
Fuel Processing Subtotals				**1.1088**		**94.08**		**0.15456**		**0.168**		**0.0504**		**0.0336**
Notes:														
Public water	gal x 1000	0	0.0092	0	5	0	0.0097	0	0.0059	0	0.016	0	0.000015	0
User-defined water resource #1	gal x 1000	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined water resource #2	gal x 1000	0	0	0	0	0	0	0	0	0	0	0	0	0
Notes:														

Groundwater Treatment - Off-Site Footprint (Scope 3b)

Category	Units	Usage	Energy		Greenhouse Gas		NOx		SOx		PM		HAPs	
			Conv. Factor	MMBtus	Conv. Factor	lbs CO2e	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs
Off-Site Services														
Hazardous waste incineration	lb	0	0.00609	0	2.43	0	0.0016	0	0.00167	0	0.000209	0	0.000087	0
Off-site waste water treatment (POTW)	gal x 1000	0	0.015	0	4.4	0	0.016	0	0.015	0	NP		NP	
Off-site non-hazardous waste landfill	ton	0	0.16	0	25	0	0.14	0	0.075	0	0.4	0	0.0014	0
Off-site hazardous waste landfill	ton	0	0.18	0	27.5	0	0.154	0	0.0825	0	0.44	0	0.00154	0
Off-site Laboratory Analysis - Other	sample	0	0.058071	0	6.8534384	0	0.131402	0	0.3038758	0	0.0455698	0	0.0330165	0
Off-site Laboratory Analysis - Metals	sample	0	0.212	0	27.4693	0	0.6423	0	1.5072	0	0.2264	0	0.1643	0
Off-site Laboratory Analysis - Mercury	sample	0	0.0731715	0	9.325458	0	0.2127439	0	0.4982396	0	0.0747359	0	0.0542332	0
Off-site Laboratory Analysis - Inorganic Anions	sample	144	0.0074025	1.0659529	0.6459478	93.016483	0.0067681	0.9746096	0.0147929	2.1301727	0.0022024	0.3171449	0.0015542	0.223811
Off-site Laboratory Analysis - Alkalinity	sample	0	0.0174398	0	1.3381922	0	0.0070106	0	0.0132496	0	0.00194	0	0.0012831	0
Off-site Laboratory Analysis - Perchlorate	sample	0	0.023885	0	1.8717054	0	0.0079807	0	0.0141535	0	0.0020547	0	0.0012875	0
Off-site Laboratory Analysis - Nitrogen/Nitrate	sample	0	0.0336475	0	4.29897	0	0.0954592	0	0.2226646	0	0.0335099	0	0.0242506	0
Off-site Laboratory Analysis - Sulfate	sample	0	0.0141225	0	1.4726728	0	0.0079807	0	0.0136024	0	0.0019797	0	0.0012015	0
Off-site Laboratory Analysis - PCBs	sample	0	0.0512769	0	5.224902	0	0.0833339	0	0.1904774	0	0.0284393	0	0.0212083	0
Off-site Laboratory Analysis - VOCs	sample	144	0.0762045	10.973446	9.016814	1298.4212	0.104498	15.047718	0.2270738	32.698627	0.0339508	4.888921	0.0235892	3.3968477
Off-site Laboratory Analysis - SVOCs	sample	0	0.0715602	0	7.870422	0	0.1459445	0	0.3373038	0	0.0504853	0	0.0372577	0
Notes:														
Resource Extraction for Electricity														
Coal extraction and processing	MWh	0	3.1	0	180.0	0	0.8	0	0.2	0	0.0	0	NP	
Natural gas extraction and processing	MWh	0	1.6	0	270.0	0	0.2	0	13.0	0	0.0	0	NP	
Nuclear fuel extraction and processing	MWh	0	0.2	0	25.0	0	0.2	0	0.5	0	0.0	0	NP	
Oil extraction and processing	MWh	0	2.3	0	270.0	0	1.7	0	0.1	0	0.0	0	NP	
Other fuel extraction and processing	MWh	0	0	0	0	0	0	0	0	0	0	0	0	0
Resource Extraction Subtotals				**0**		**0**		**0**		**0**		**0**		**0**
Notes:Grid electricty is based on an estimate for New York City of approximately 60% natural gas, 25% renewable sources (mostly hydro), 10% nuclear, and the remaining 5% from oil.														
Electricity Transmission														
Transmission and distribution losses	MWh	0	1.0342	0	87	0	0.077	0	0.014396	0	0.00545	0	0.00183	0
Notes:														

Groundwater Treatment - Off-Site Footprint (Scope 3b)

Category	Units	Usage	Energy		Greenhouse Gas		NOx		SOx		PM		HAPs	
			Conv. Factor	MMBtus	Conv. Factor	lbs CO2e	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs
User-defined Materials														
User-defined material #1	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #3	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #4	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #5	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #6	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #7	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #8	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #9	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #10	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #11	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #12	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #13	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #14	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #15	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #16	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #17	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #18	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #19	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #20	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
Notes:														
User-defined Waste Destinations														
User-defined recycled/reused off-site #1	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined recycled/reused off-site #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined recycled/reused off-site #3	TBD	0	y(MMBtu/t		(lbs CO2e/u		Ox(lbs/unit)		Ox(lbs/unit)		M(lbs/unit)		APs(lbs/unit	
User-defined non-hazardous waste destination #1	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined non-hazardous waste destination #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined non-hazardous waste destination #3	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined hazardous waste destination #1	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined hazardous waste destination #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined hazardous waste destination #3	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
Notes:														
Off-site Totals				**13.148199**		**1485.5177**		**16.176887**		**34.9968**		**5.2564659**		**3.6542587**

Groundwater Treatment - Intermediate Totals

Category	Units	Usage	Energy		Greenhouse Gas		NOx		SOx		PM		HAPs	
			Conv. Factor	MMBtus	Conv. Factor	lbs CO2e	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs
Total Grid Electricity Footprint														
On-site grid electricity	MWh	0	3.413	0										
Electricity Generation														
Grid electricity	MWh	0	6.929	0	870	0	0.77	0	0.14396	0	0.0545	0	0.0183	0
Resource Extraction for Electricity														
Coal extraction and processing	MWh	0	3.1	0	180.0	0	0.8	0	0.2	0	0.0	0	NP	
Natural gas extraction and processing	MWh	0	1.6	0	270.0	0	0.2	0	13.0	0	0.0	0	NP	
Nuclear fuel extraction and processing	MWh	0	0.2	0	25.0	0	0.2	0	0.5	0	0.0	0	NP	
Oil extraction and processing	MWh	0	2.3	0	270.0	0	1.7	0	0.1	0	0.0	0	NP	
Other fuel extraction and processing	MWh	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
Electricity Transmission														
Transmission and distribution losses	MWh	0	1.0342	0	87	0	0.077	0	0.014396	0	0.00545	0	0.00183	0
Total Grid Electricity Footprint				**0**		**0**		**0**		**0**		**0**		**0**
Total Fuel Footprints														
Total Gasoline Footprint														
On-site gasoline use - Other	gal	0	0.124	0	19.6	0	0.11	0	0.0045	0	0.00054	0	0.000039	0
On-site gasoline use <25 hp	gal	0	0.124	0	17.48	0	0.037	0	0.00025	0	0.165	0	0.00008	0
On-site gasoline use >25 hp	gal	0	0.124	0	19.93	0	0.032	0	0.00029	0	0.002	0	0.00009	0
Transportation gasoline use	gal	0	0.124	0	19.6	0	0.11	0	0.0045	0	0.00054	0	0.000039	0
Transportation gasoline use - car	gal	33.6	0.124	4.1664	19.77	664.272	0.027	0.9072	0.00036	0.012096	0.003	0.1008	0.0067	0.22512
Transportation gasoline use - passenger truck	gal	0	0.124	0	19.79	0	0.035	0	0.00036	0	0.003	0	0.00661	0
Transportation gasoline use - User Defined	gal	0	0.124	0	19.6	0	0.11	0	0.0045	0	0.00054	0	0.000039	0
Gasoline produced	gal	33.6	0.033	1.1088	2.8	94.08	0.0046	0.15456	0.005	0.168	0.0015	0.0504	0.001	0.0336
Total Gasoline Footprint		**33.6**		**5.2752**		**758.352**		**1.06176**		**0.180096**		**0.1512**		**0.25872**
Total Diesel Footprint														
On-site diesel use - Other	gal	0	0.139	0	22.5	0	0.17	0	0.0054	0	0.0034	0	0.0000052	0
On-site diesel use <75 hp	gal	0	0.139	0	22.21	0	0.1565	0	0.000145	0	0.0145	0	0.00004	0
On-site diesel use 75<hp<750	gal	0	0.139	0	22.24	0	0.101	0	0.00013	0	0.009	0	0.00004	0
On-site diesel use >750 hp	gal	0	0.139	0	22.24	0	0.149	0	0.00013	0	0.006	0	0.00004	0
Transportation diesel use	gal	0	0.139	0	22.5	0	0.17	0	0.0054	0	0.0034	0	0.0000052	0
Transportation diesel use - car	gal	0	0.139	0	22.57	0	0.015	0	0.0002	0	0.003	0	0.00252	0
Transportation diesel use - passenger truck	gal	0	0.139	0	22.545	0	0.0585	0	0.0002	0	0.007	0	0.002605	0
Transportation diesel use - User Defined	gal	0	0.139	0	22.5	0	0.17	0	0.0054	0	0.0034	0	0.0000052	0
Diesel produced	gal	0	0.017	0	3.02	0	0.0051	0	0.0062	0	0.0017	0	0.0011	0
Total Diesel Footprint		**0**		**0**		**0**		**0**		**0**		**0**		**0**
Total Biodiesel Footprint														
On-site biodiesel use	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
On-site biodiesel use - User Defined	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
Transportation biodiesel use	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
Transportation biodiesel use - User Defined	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
Biodiesel produced	gal	0	0.029	0	-16.8	0	0.018	0	0.033	0	0.00082	0	NP	
Total Biodiesel Footprint		**0**		**0**		**0**		**0**		**0**		**0**		**0**
Total Natural Gas Footprint														
On-site natural gas use	ccf	0	0.103	0	13.1	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
Transportation natural gas use	ccf	0	0.103	0	13.1	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
Transportation natural gas use - User Defined	ccf	0	0.103	0	13.1	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
Natural gas produced	ccf	0	0.0052	0	2.2	0	0.0037	0	0.0046	0	0.000072	0	0.0000061	0
Total Natural Gas Footprint		**0**		**0**		**0**		**0**		**0**		**0**		**0**
Total Liquified Petroleum Gas Footprint														
On-site liquified petroleum gas use - Other	ccf	0	NP		12.69	0	0.021	0	0.00013	0	0.001	0	0	0
On-site liquified petroleum gas use	ccf	0	NP		12.69	0	0.021	0	0.00013	0	0.001	0	0	0
Liquified petroleum gas produced	ccf	0	0.088	0	1.47	0	0.0016	0	0.0024	0	0.0007	0	0.0003	0
Total Natural Gas Footprint		**0**		**0**		**0**		**0**		**0**		**0**		**0**
Total Compressed Gas Footprint														
On-site compressed gas use - Other	ccf	0	NP		1957.835	0	16.0325	0	0.023045	0	0.2775	0	0	0
On-site compressed gas use	ccf	0	NP		1957.835	0	16.0325	0	0.023045	0	0.2775	0	0	0
Compressed gas produced	ccf	0	19.983	0	343.92	0	0.4732	0	2.1651	0	0.1846	0	0.2895	0
Total Natural Gas Footprint		**0**		**0**		**0**		**0**		**0**		**0**		**0**

Notes: Grid electricty is based on an estimate for New York City of approximately 60% natural gas, 25% renewable sources (mostly hydro), 10% nuclear, and the remaining 5% from oil.

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

Space below available for notes and calculations:

All Components - On-Site Footprint (Scope 1)

Contributors to Footprints	Units	Usage	Energy		GHG		NOx		SOx		PM		HAPs	
			Conv. Factor	MMBtus	Conv. Factor	lbs CO2e	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs
On-Site														
On-site Renewable Energy														
Renewable electricity generated on-site	MWh	0	3.413	0										
Landfill gas combusted on-site for energy use	ccf CH4	0	0.103	0	13.1	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
On-site biodiesel use	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
On-site biodiesel use - User Defined	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
User-defined on-site renewable energy use #1	gal	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined on-site renewable energy use #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
On-site Renewable Energy Subtotals				**0**		**0**		**0**		**0**		**0**		**0**
Notes:														
On-site Conventional Energy														
On-site grid electricity	MWh	428.39904	3.413	1462.1259										
On-site diesel use - Other	Gal	0	0.139	0	22.5	0	0.17	0	0.0054	0	0.0034	0	0.0000052	0
On-site diesel use <75 hp	Gal	0	0.139	0	22.21	0	0.1565	0	0.000145	0	0.0145	0	0.00004	0
On-site diesel use 75<hp<750	Gal	0	0.139	0	22.24	0	0.101	0	0.00013	0	0.009	0	0.00004	0
On-site diesel use >750 hp	Gal	0	0.139	0	22.24	0	0.149	0	0.00013	0	0.006	0	0.00004	0
On-site gasoline use - Other	Gal	0	0.124	0	19.6	0	0.11	0	0.0045	0	0.00054	0	0.000039	0
On-site gasoline use <25 hp	Gal	0	0.124	0	17.48	0	0.037	0	0.00025	0	0.165	0	0.00008	0
On-site gasoline use >25 hp	Gal	0	0.124	0	19.93	0	0.032	0	0.00029	0	0.002	0	0.00009	0
On-site natural gas use	ccf	0	0.103	0	13.1	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
On-site compressed natural gas use - Other	ccf	0	NP		1957.835	0	16.0325	0	0.023045	0	0.2775	0	0	0
On-site compressed natural gas use	ccf	0	NP		1957.835	0	16.0325	0	0.023045	0	0.2775	0	0	0
On-site liquified petroleum gas use - Other	gal	0	NP		12.69	0	0.021	0	0.00013	0	0.001	0	0	0
On-site liquified petroleum gas use	gal	0	NP		12.69	0	0.021	0	0.00013	0	0.001	0	0	0
Other forms of on-site conventional energy use #1	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
Other forms of on-site conventional energy use #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
On-site Conventional Energy Subtotals				**1,462**		**0**		**0**		**0**		**0**		**0**
Notes:														
Other On-site Emissions														
On-site HAP process emissions	lbs	262											1	262
On-site GHG emissions	lbs CO2e	0			1	0								
On-site carbon storage	lbs CO2e	0			1	0								
GHG avoided by flaring on-site landfill methane	Lbs	0			-262	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
Other on-site NOx emissions or reductions	lbs	0					1	0						
Other on-site SOx emissions or reductions	lbs	0							1	0				
Other on-site PM emissions or reductions	lbs	0									1	0		
User-defined recycled/reused on-site #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined recycled/reused on-site #3	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined recycled/reused off-site #1	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
Notes:														
On-site Totals				**1,462.13**		**0**		**0**		**0**		**0**		**262**

All Components - Electricity Generation Footprint (Scope 2)

Contributors to Footprints	Units	Usage	Energy		GHG		NOx		SOx		PM		HAPs	
			Conv. Factor	MMBtus	Conv. Factor	lbs CO2e	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs
Electricity Generation														
Grid electricity	MWh	428.39904	6.929	2968.3769	N/A*	372707.16	N/A*	329.86726	N/A*	61.672326	N/A*	23.347748	N/A*	7.8397024
**** Conversion factors are not applied to grid electricity in the "All Components" tab since multiple fuel mixes may be used. The value for each cell shaded yellow in Row 51 is the sum of values from Components 1 - 6.***														
Voluntary purchase of renewable electricity	MWh	0												
Voluntary purchase of RECs	MWh	0												

Notes: Grid electricty is based on an estimate for New York City of approximately 60% natural gas, 25% renewable sources (mostly hydro), 10% nuclear, and the remaining 5% from oil.

All Components - Transportation Footprint (Scope 3a)

Category	Units	Usage	Energy		Greenhouse Gas		NOx		SOx		PM		HAPs	
			Conv. Factor	MMBtus	Conv. Factor	lbs CO2e	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs
Conventional Energy														
Transportation diesel use	gal	123.4	0.139	17.1526	22.5	2776.5	0.17	20.978	0.0054	0.66636	0.0034	0.41956	0.0000052	0.0006417
Transportation diesel use - car	gal	0	0.139	0	22.57	0	0.015	0	0.0002	0	0.003	0	0.00252	0
Transportation diesel use - passenger truck	gal	0	0.139	0	22.545	0	0.0585	0	0.0002	0	0.007	0	0.002605	0
Transportation diesel use - User Defined	gal	0	0.139	0	22.5	0	0.17	0	0.0054	0	0.0034	0	0.0000052	0
Transportation gasoline use	gal	0	0.124	0	19.6	0	0.11	0	0.0045	0	0.00054	0	0.000039	0
Transportation gasoline use - car	gal	57.8	0.124	7.1672	19.77	1142.706	0.027	1.5606	0.00036	0.020808	0.003	0.1734	0.0067	0.38726
Transportation gasoline use - passenger truck	gal	0	0.124	0	19.79	0	0.035	0	0.00036	0	0.003	0	0.00661	0
Transportation gasoline use - User Defined	gal	0	0.124	0	19.6	0	0.11	0	0.0045	0	0.00054	0	0.000039	0
Transportation natural gas use	ccf	0	0.103	0	13.1	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
Transportation natural gas use - User Defined	ccf	0	0.103	0	13.1	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
User-defined conventional energy transportation #1	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined conventional energy transportation #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
Conventional Energy Subtotals				**24**		**3,919**		**23**		**1**		**1**		**0**
Notes:														
Renewable Energy														
Transportation biodiesel use	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
Transportation biodiesel use - User Defined	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
User-defined renewable energy transportation #1	TBD	0	Biodiesel		0	0	0	0	0	0	0	0	Ref.	
User-defined renewable energy transportation #2	TBD	0	npg or pmp		0	0	0	0	0	0	0	0	0	0
Renewable Energy Subtotals				**0**		**0**		**0**		**0**		**0**		**0**
Notes:														
Transportation Totals				**24**		**3919**		**23**		**1**		**1**		**0**

All Components - Off-Site Footprint (Scope 3b)

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

Notes:

All Components - Off-Site Footprint (Scope 3b)

Category	Units	Usage	Energy		Greenhouse Gas		NOx		SOx		PM		HAPs	
			Conv. Factor	MMBtus	Conv. Factor	lbs CO2e	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs
Treatment Materials & Chemicals														
Cheese Whey	lbs	0	0.0025	0	0.031	0	0.000062	0	0.000033	0	0.000002	0	NP	
Emulsified vegetable oil	lbs	0	0.0077	0	3.44	0	0.0066	0	0.0019	0	0.000033	0	NP	
Granular activated carbon, primary	lbs	560	0.0356	19.936	4.82	2699.2	0.0793	44.408	0.128	71.68	0.000987	0.55272	0.000657	0.36792
Granular activated carbon, regenerated	lbs	0	0.00873	0	1.7	0	0.00733	0	0.0129	0	0.000886	0	0.000671	0
Hydrogen Peroxide, 50% in H2O	lbs	0	0.00979	0	1.19	0	0.00142	0	0.0024	0	0.000308	0	0.0000629	0
Iron (II) Sulfate	lbs	0	0.00147	0	0.167	0	0.000316	0	0.000589	0	0.000103	0	0.000023	0
Lime, Hydrated, Packed	lbs	0	0.00206	0	0.762	0	0.000513	0	0.000358	0	0.00013	0	6.57E-06	0
Molasses	lbs	0	0.0044	0	0.48	0	0.0011	0	0.00024	0	0.0000041	0	NP	
Phosphoric Acid, 70% in H2O	lbs	0	0.0067	0	0.882	0	0.00282	0	0.0294	0	0.00171	0	0.000163	0
Potassium Permanganate	lbs	0	0.00981	0	1.16	0	0.00234	0	0.0032	0	0.000422	0	0.000122	0
Sodium Hydroxide, 50% in H2O	lbs	0	0.00977	0	1.09	0	0.00194	0	0.00352	0	0.000403	0	0.000129	0
Other Treatment Chemicals & Materials	lbs	0	0.015	0	1.67	0	0.003	0	0.0065	0	0.00061	0	0.000016	0
Notes:														
Fuel Processing														
Biodiesel produced	gal	0	0.029	0	-16.8	0	0.018	0	0.033	0	0.00082	0	NP	
Diesel produced	gal	123.4	0.017	2.0978	3.02	372.668	0.0051	0.62934	0.0062	0.76508	0.0017	0.20978	0.0011	0.13574
Gasoline produced	gal	57.8	0.033	1.9074	2.8	161.84	0.0046	0.26588	0.005	0.289	0.0015	0.0867	0.001	0.0578
Liquefied Petroleum Gas Produced	gal	0	0.088	0	1.47	0	0.0016	0	0.0024	0	0.0007	0	0.0003	0
Natural Gas - Compressed Produced	ccf	0	19.983	0	343.92	0	0.4732	0	2.1651	0	0.1846	0	0.2895	0
Natural Gas Produced	ccf	0	0.0052	0	2.2	0	0.0037	0	0.0046	0	0.000072	0	0.0000061	0
Fuel Processing Subtotals				**4.0052**		**534.508**		**0.89522**		**1.05408**		**0.29648**		**0.19354**
Notes:														
Public water	gal x 1000	0	0.0092	0	5	0	0.0097	0	0.0059	0	0.016	0	0.000015	0
User-defined water resource #1	gal x 1000	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined water resource #2	gal x 1000	0	0	0	0	0	0	0	0	0	0	0	0	0
Notes:														

All Components - Off-Site Footprint (Scope 3b)

Category	Units	Usage	Energy		Greenhouse Gas		NOx		SOx		PM		HAPs	
			Conv. Factor	MMBtus	Conv. Factor	lbs CO2e	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs
Off-Site Services														
Hazardous waste incineration	lb	0	0.00609	0	2.43	0	0.0016	0	0.00167	0	0.000209	0	0.000087	0
Off-site waste water treatment (POTW)	gal x 1000	0.5	0.015	0.0075	4.4	2.2	0.016	0.008	0.015	0.0075	NP		NP	
Off-site non-hazardous waste landfill	ton	0.8	0.16	0.128	25	20	0.14	0.112	0.075	0.06	0.4	0.32	0.0014	0.00112
Off-site hazardous waste landfill	ton	0	0.18	0	27.5	0	0.154	0	0.0825	0	0.44	0	0.00154	0
Off-site Laboratory Analysis - Other	sample	0	0.058071	0	6.8534384	0	0.131402	0	0.3038758	0	0.0455698	0	0.0330165	0
Off-site Laboratory Analysis - Metals	sample	0	0.212	0	27.4693	0	0.6423	0	1.5072	0	0.2264	0	0.1643	0
Off-site Laboratory Analysis - Mercury	sample	0	0.0731715	0	9.325458	0	0.2127439	0	0.4982396	0	0.0747359	0	0.0542332	0
Off-site Laboratory Analysis - Inorganic Anions	sample	144	0.0074025	1.0659529	0.6459478	93.016483	0.0067681	0.9746096	0.0147929	2.1301727	0.0022024	0.3171449	0.0015542	0.223811
Off-site Laboratory Analysis - Alkalinity	sample	0	0.0174398	0	1.3381922	0	0.0070106	0	0.0132496	0	0.00194	0	0.0012831	0
Off-site Laboratory Analysis - Perchlorate	sample	0	0.023885	0	1.8717054	0	0.0079807	0	0.0141535	0	0.0020547	0	0.0012875	0
Off-site Laboratory Analysis - Nitrogen/Nitrate	sample	0	0.0336475	0	4.29897	0	0.0954592	0	0.2226646	0	0.0335099	0	0.0242506	0
Off-site Laboratory Analysis - Sulfate	sample	0	0.0141225	0	1.4726728	0	0.0079807	0	0.0136024	0	0.0019797	0	0.0012015	0
Off-site Laboratory Analysis - PCBs	sample	0	0.0512769	0	5.224902	0	0.0833339	0	0.1904774	0	0.0284393	0	0.0212083	0
Off-site Laboratory Analysis - VOCs	sample	144	0.0762045	10.973446	9.016814	1298.4212	0.104498	15.047718	0.2270738	32.698627	0.0339508	4.888921	0.0235892	3.3968477
Off-site Laboratory Analysis - SVOCs	sample	24	0.0715602	1.7174444	7.870422	188.89013	0.1459445	3.5026685	0.3373038	8.0952912	0.0504853	1.2116482	0.0372577	0.8941858
Notes:														
Resource Extraction for Electricity														
Coal extraction and processing	MWh	0	3.1	0	180.0	0	0.8	0	0.2	0	0.0	0	NP	
Natural gas extraction and processing	MWh	257.03942	1.6	419.43693	270.0	69400.644	0.2	46.267096	13.0	3341.5125	0.0	1.8249799	NP	
Nuclear fuel extraction and processing	MWh	42.839904	0.2	6.6604056	25.0	1070.9976	0.2	6.4259856	0.5	21.419952	0.0	0.0642599	NP	
Oil extraction and processing	MWh	21.419952	2.3	49.167358	270.0	5783.387	1.7	36.413918	0.1	1.4779767	0.0	0.899638	NP	
Other fuel extraction and processing	MWh	0	0	0	0	0	0	0	0	0	0	0	0	0
Resource Extraction Subtotals				**475.2647**		**76255.029**		**89.107**		**3364.4104**		**2.7888778**		**0**
Notes:														
Electricity Transmission														
Transmission and distribution losses	MWh	428.39904	1.0342	443.05029										
Notes:														

All Components - Off-Site Footprint (Scope 3b)

Category	Units	Usage	Energy		Greenhouse Gas		NOx		SOx		PM		HAPs	
			Conv. Factor	MMBtus	Conv. Factor	lbs CO2e	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs
User-defined Materials														
User-defined material #1	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #3	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #4	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #5	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #6	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #7	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #8	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #9	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #10	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #11	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #12	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #13	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #14	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #15	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #16	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #17	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #18	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #19	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #20	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
Notes:														
User-defined Waste Destinations														
User-defined recycled/reused off-site #1	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined recycled/reused off-site #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined recycled/reused off-site #3	TBD	0	y(MMBtu/u		(lbs CO2e/u		Ox(lbs/unit)		Ox(lbs/unit)		M(lbs/unit)		APs(lbs/unit	
User-defined non-hazardous waste destination #1	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined non-hazardous waste destination #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined non-hazardous waste destination #3	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined hazardous waste destination #1	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined hazardous waste destination #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined hazardous waste destination #3	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
Notes:														
Off-site Totals				**956.14853**		**81091.265**		**154.05522**		**3480.1361**		**10.375792**		**5.0774244**

All Components - Intermediate Totals

Category	Units	Usage	Energy		Greenhouse Gas		NOx		SOx		PM		HAPs	
			Conv. Factor	MMBtus	Conv. Factor	lbs CO2e	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs
Total Grid Electricity Footprint														
On-site grid electricity	MWh	428.39904	3.413	1462.1259										
Electricity Generation														
Grid electricity	MWh	428.39904	6.929	2968.3769	870	372707.16	0.77	329.86726	0.14396	61.672326	0.0545	23.347748	0.0183	7.8397024
Resource Extraction for Electricity														
Coal extraction and processing	MWh	0	3.1	0	180.0	0	0.8	0	0.2	0	0.0	0	NP	
Natural gas extraction and processing	MWh	257.03942	1.6	419.43693	270.0	69400.644	0.2	46.267096	13.0	3341.5125	0.0	1.8249799	NP	
Nuclear fuel extraction and processing	MWh	42.839904	0.2	6.6604056	25.0	1070.9976	0.2	6.4259856	0.5	21.419952	0.0	0.0642599	NP	
Oil extraction and processing	MWh	21.419952	2.3	49.167358	270.0	5783.387	1.7	36.413918	0.1	1.4779767	0.0	0.899638	NP	
Other fuel extraction and processing	MWh	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
Electricity Transmission														
Transmission and distribution losses	MWh	428.39904	1.0342	443.05029	87	37270.716	0.077	32.986726	0.014396	6.1672326	0.00545	2.3347748	0.00183	0.7839702
Total Grid Electricity Footprint				**5349**		**486233**		**452**		**3432**		**28**		**9**
Total Fuel Footprints														
Total Gasoline Footprint														
On-site gasoline use - Other	gal	0	0.124	0	19.6	0	0.11	0	0.0045	0	0.00054	0	0.000039	0
On-site gasoline use <25 hp	gal	0	0.124	0	17.48	0	0.037	0	0.00025	0	0.165	0	0.00008	0
On-site gasoline use >25 hp	gal	0	0.124	0	19.93	0	0.032	0	0.00029	0	0.002	0	0.00009	0
Transportation gasoline use	gal	0	0.124	0	19.6	0	0.11	0	0.0045	0	0.00054	0	0.000039	0
Transportation gasoline use - car	gal	57.8	0.124	7.1672	19.77	1142.706	0.027	1.5606	0.00036	0.020808	0.003	0.1734	0.0067	0.38726
Transportation gasoline use - passenger truck	gal	0	0.124	0	19.79	0	0.035	0	0.00036	0	0.003	0	0.00661	0
Transportation gasoline use - User Defined	gal	0	0.124	0	19.6	0	0.11	0	0.0045	0	0.00054	0	0.000039	0
Gasoline produced	gal	57.8	0.033	1.9074	2.8	161.84	0.0046	0.26588	0.005	0.289	0.0015	0.0867	0.001	0.0578
Total Gasoline Footprint		**57.8**		**9.0746**		**1304.546**		**1.82648**		**0.309808**		**0.2601**		**0.44506**
Total Diesel Footprint														
On-site diesel use - Other	gal	0	0.139	0	22.5	0	0.17	0	0.0054	0	0.0034	0	0.0000052	0
On-site diesel use <75 hp	gal	0	0.139	0	22.21	0	0.1565	0	0.000145	0	0.0145	0	0.00004	0
On-site diesel use 75<hp<750	gal	0	0.139	0	22.24	0	0.101	0	0.00013	0	0.009	0	0.00004	0
On-site diesel use >750 hp	gal	0	0.139	0	22.24	0	0.149	0	0.00013	0	0.006	0	0.00004	0
Transportation diesel use	gal	123.4	0.139	17.1526	22.5	2776.5	0.17	20.978	0.0054	0.66636	0.0034	0.41956	0.0000052	0.0006417
Transportation diesel use - car	gal	0	0.139	0	22.57	0	0.015	0	0.0002	0	0.003	0	0.00252	0
Transportation diesel use - passenger truck	gal	0	0.139	0	22.545	0	0.0585	0	0.0002	0	0.007	0	0.002605	0
Transportation diesel use - User Defined	gal	0	0.139	0	22.5	0	0.17	0	0.0054	0	0.0034	0	0.0000052	0
Diesel produced	gal	123.4	0.017	2.0978	3.02	372.668	0.0051	0.62934	0.0062	0.76508	0.0017	0.20978	0.0011	0.13574
Total Diesel Footprint		**123.4**		**19.2504**		**3149.168**		**21.60734**		**1.43144**		**0.62934**		**0.1363817**
Total Biodiesel Footprint														
On-site biodiesel use	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
On-site biodiesel use - User Defined	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
Transportation biodiesel use	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
Transportation biodiesel use - User Defined	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
Biodiesel produced	gal	0	0.029	0	-16.8	0	0.018	0	0.033	0	0.00082	0	NP	
Total Biodiesel Footprint		**0**		**0**		**0**		**0**		**0**		**0**		**0**
Total Natural Gas Footprint														
On-site natural gas use	ccf	0	0.103	0	13.1	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
Transportation natural gas use	ccf	0	0.103	0	13.1	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
Transportation natural gas use - User Defined	ccf	0	0.103	0	13.1	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
Natural gas produced	ccf	0	0.0052	0	2.2	0	0.0037	0	0.0046	0	0.000072	0	0.0000061	0
Total Natural Gas Footprint		**0**		**0**		**0**		**0**		**0**		**0**		**0**
Total Liquified Petroleum Gas Footprint														
On-site liquified petroleum gas use - Other	ccf	0	NP		12.69	0	0.021	0	0.00013	0	0.001	0	0	0
On-site liquified petroleum gas use	ccf	0	NP		12.69	0	0.021	0	0.00013	0	0.001	0	0	0
Liquified petroleum gas produced	ccf	0	0.088	0	1.47	0	0.0016	0	0.0024	0	0.0007	0	0.0003	0
Total Natural Gas Footprint		**0**		**0**		**0**		**0**		**0**		**0**		**0**
Total Compressed Gas Footprint														
On-site compressed gas use - Other	ccf	0	NP		1957.835	0	16.0325	0	0.023045	0	0.2775	0	0	0
On-site compressed gas use	ccf	0	NP		1957.835	0	16.0325	0	0.023045	0	0.2775	0	0	0
Compressed gas produced	ccf	0	19.983	0	343.92	0	0.4732	0	2.1651	0	0.1846	0	0.2895	0
Total Natural Gas Footprint		**0**		**0**		**0**		**0**		**0**		**0**		**0**

Notes: Grid electricty is based on an estimate for New York City of approximately 60% natural gas, 25% renewable sources (mostly hydro), 10% nuclear, and the remaining 5% from oil.

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

Space below available for notes and calculations:

APPENDIX K

REMEDIAL SYSTEM OPTIMIZATION TABLE OF CONTENTS

REMEDIAL SYSTEM OPTIMIZATION FOR 27-09 40th AVENUE, LONG ISLAND CITY, NEW YORK

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APPENDIX L – HEALTH AND SAFETY PLAN

Liberty Environmental
Site Health & Safety Plan

1. General Information

Project Name: 27-09 40th Ave.
Site Address: 27-09 40th Avenue, Long Island City, New York
Project Manager: Craig Herr
HASP Prepared By: Andre Matthews
Date Prepared: 10/25/2022.
HASP Approved By: Craig Herr and James P. Cinelli
Date Approved: 12/11/2022

TEAM MEMBER	RESPONSIBILITIES
David Coyne	Health and Safety Coordinator
Craig Herr	Project Manager
James P. Cinelli	Site Health and Safety Representative/Geologist
Brian Exley	Field Tech

Is a One Call/Dig Safe Required? Yes

2. Training and Medical Surveillance

Training Level Required:
HAZWOPER 40/8 hour, First Aid, CPR

Medical Surveillance Level Required:
HAZWOPER physical

3. Personal Protection

Based on evaluation of potential hazards, the following levels of personal protection have been designated for the applicable work areas or tasks:

LOCATION	JOB FUNCTION	LEVEL OF PROTECTION
Soil Borings	Sampling/Screening/Oversight	**D** C B A
Monitoring Wells	Gauging/Sampling	**D** C B A
Soil Vapor Point	Installation and sampling	**D** C B A
Surface Water	Sampling	**D** C B A
Soil Excavation	Sampling/Screening/Oversight	**D** C B A

Specific protective equipment for each level are as follows: [1]

Level A
Respiratory:
SCBA
Air-Line Supplied Air Respirator
Other (describe)

Level B
Respiratory:
SCBA
Air-Line Supplied Air Respirator
Other – Level C-D plus the following exceptions/modifications

Level C
Respiratory – Air-purifying respirator with
cartridge/canister type:
HEPA, acid gas, organic vapors
(e.g., MSA GMC-H)
HEPA only
Other – Level D plus the following exceptions/modifications –

Level D
Respiratory – None
Other:
Safety glasses
Hard hat
Safety shoes
Hearing protection
Snake chaps/Gaiters
Protective clothing and/or gloves required (i.e., modified Level D)
Other (describe):

Other skin, eyes, and fall protection required:

Gloves:	Protective clothing:
Butyl rubber	Tyvek ® or equivalent
PVC-coated	Tyvek ® polyethylene-coated or equivalent
Neoprene	Tyvek ® Saranex® or equivalent
Nitrile	Other (describe)
Other (describe)	

Radiation Safety:
Dosimeter Badge
Other (describe)

1 See Liberty Health and Safety Manual for minimum criteria.

2 Hard hats are only required when overhead hazards are expected, such as when drilling, advancing soil borings, and performing soil excavation activities.
3 Hearing protection is required when site activities produce sounds greater than 85dB, such as when drilling, advancing soil borings, inside remediation systems, operating generators, activities around large machinery (vacuum trucks).
4 Snake chaps are only required when site activities include walking through undeveloped areas where snake activity is known or when visibility is limited.

Criteria for changing protection levels are as follows:

	Approvals Required		
Change	HSR	PM	CHSM
To Level C when PID deflections in the breathing zone consistently exceed 10 ppm for a period of 60 minutes and engineering measures do not resolve the vapor issue.		X	
To level when			
To level when			
To level when			
Evacuate the area when continuous PID reading is:			

[1] HSR: On-site Health & Safety Representative
PM: Project Manager
CHSM: Corporate Health & Safety Manager
Changes to the level of protection shall be made after the required approvals are obtained. All changes shall be recorded in the field log and reported to the HSC as soon as possible.

4. Air Monitoring
The following monitoring instruments shall be used on-site to measure airborne containment concentrations in the breathing zone:

Instrument	Frequency of Monitoring
Combustible Gas Indicator	
O_2 Monitor	
Colorimetric Tubes (type)	
PID	Periodic
FID	
Other (specify)	

5. Site Control (Describe or attach sketch)

Work Zones:

Support Zone: Greater than 10 feet of heavy equipment or sampling area.

Contamination Reduction Zone (area used for decontamination): Within 10 feet of heavy equipment or sampling area.

Exclusion Zone (area considered contaminated or otherwise hazardous to safety): Within 10 feet of heavy equipment or sampling area.

Site Entry Procedures:

X Notify Site Health and Safety Representative.
X Read Health & Safety Plan and sign Acknowledgment Statement.
Check in with the facility security guard.
X Wear proper personal protective equipment.
Attend facility orientation.
X Conduct "Toolbox" safety meeting.
Other (specify):

Decontamination Procedures:

Personnel: shower as soon as practical
Equipment: wipe PID with paper towel; clean equipment with Alconox/potable water

Investigation-derived Material Disposal:

X Leave on site for disposal.
Other (describe)

Work Limitations (time of day, buddy system, etc.): none

Troxler Radiation Safety:

X Radiation information is not applicable to this project.
Notify RSO.
Wear dosimeter badge when handling gauge.
Post applicable radiation signs.
Post emergency numbers.
Provide at least two lock systems for overnight storage.
Maintain storage at least 15 feet from full-time workstations.
Block and brace gauge during "all" transportation.
Limit "public" exposure to gauge while in use.
Provide sketch of gauge storage to RSO.

6. Contingency Planning

LOCAL EMERGENCY RESOURCES:

Ambulance: 911
Hospital Emergency Room: 911
Poison Control Center Pennsylvania (800) 521-6110
Police: 911
Fire Department: 911
USEPA Contact:
Other (Troxler, NRC, Agreement State Agency, etc.):

SITE RESOURCES:

Water Supply (Type/Location):
Liberty Cell:
Other:

EMERGENCY CONTACTS:

Liberty Technical Contact: James P. Cinelli (610) 633-9780
Liberty Project Manager Craig Herr (717) 203-1852
Liberty Corporate Health & Safety Manager: David Coyne (484) 955-7884
Radiation Safety Officer: David Coyne (484) 955-7884
Liberty Health & Safety Coordinator: David Coyne (484) 955-7884
Contractor Office Contact:
Field Contact: Andre Matthews 347-262-2740
Client Contact:
Facility Manager:

EMERGENCY ROUTES (give directions or attach map):

Nearest Hospital Name and Address: Mount Sinai Queens
3019 Crescent Street at 30th Rd., Astoria, NY 11102
Emergency Room Phone Number 7189321000
Other Nearby Facility (Urgent Care,
Patient First, …):
Other Phone Number:

If an emergency develops at the site, the discoverer will take the following course of action:

- Notify the proper emergency services (fire, police, ambulance, etc.) for assistance. Dial 911
- Notify other affected personnel at the site.
- Contact Liberty and the client representative to inform them of the incident as soon as possible.
- Prepare a summary report of the incident for Liberty and the client representative.

Emergency Equipment Required On-site:

X First Aid/Bloodborne Pathogens Kit Fire Extinguisher
Eye Wash Spill Control Media
Shower Other: (describe)
Other: (describe) Other: (describe)

7. Acknowledgement

Acknowledgement Statement:

I have reviewed the Hazard Assessment and Site Health & Safety Plan. I hereby acknowledge that I have received the required level of training and medical surveillance, that I am knowledgeable about the contents of this site-specific Health & Safety Plan, and that I will use personal protective equipment and follow procedures specified in the Health & Safety Plan.

Signatures of Liberty and Subcontractor Site Personnel (Required):

Date:
Date:
Date:
Date:
Date:
Date:
Date:
Date:

Attachments: Hazard Assessment
Map to Hospital

Attachment A
Hazard Assessment

1. General Information
Proposed Scope of Work and Specific Tasks (include all that apply):

Site Assessment
Drilling of Soil Borings
Collection of Soil Samples
Installation of Monitoring Wells
Groundwater Sampling
Management of Investigation-Derived Waste

Liberty Role
On-site:

	Resident project representative (e.g., observe and document)
	Construction manager (e.g., managing contractor/general contractor)
X	Representative for client (e.g., agent for owner)
	Other (describe)

Proposed Dates of On-site Work: _____

Background Information Review:	X Preliminary	Moderate	Substantial
Documentation of Overall Hazard: Low	X Moderate	Serious	Unknown

2. Site Characterization

Facility Description: Commercial/residential
Facility Status: Active Inactive Unknown
Operations (current and past): Dry cleaner, automotive repair and machine shop businesses, Glass factory, wood-working and a photo-engraving shop
Unusual Features (utilities, terrain, etc.): N/A
History (worker or nonworker injury, complaints from public, previous agency action): N/A

3. Site Classification

Site Type Allocated:
1 Known or controlled hazards 2 Unknown hazards 3 Regulated by 29 CFR 1910.120

4. Hazard Evaluation

Substance Name	Physical State	Known Concentration levels present	Potential Routes of Exposure	ACGIH TLV	NYSDEC PEL
tetrachloroethylene (PCE)	Liquid/Vapor	SV-1,600,000 µ/m3 GW-100 µg/L	inhalation, skin absorption, ingestion, skin and/or eye contact		5 µg/L

This list is based on our preliminary evaluation, indicating that these are the major risks identified. Blanks indicate data not available.

Ionizing Radiation:

Did the "client" use radioactive materials on site, past or present: No

Possibility of contamination or exposure due to past or present use of radioactive materials: No

Will a nuclear moisture/density or XRF gauge be used on site? No

If yes, will it be a Liberty gauge? No

Physical Safety Hazards On-Site and Control Measures

Hazard	Control Measure
Heat Stress	Consume proper fluids and monitor for heat stress/exhaustion
Cold Exposure	Wear appropriate clothing and monitor for signs of hypothermia
Heavy Equipment	Stay out of way of heavy equipment
Utilities	Clear utilities prior to drilling
Noise	Wear hearing protection if noise levels exceed 85 db.
Organic Vapor Exposure	Monitor per Plan.
Confined Space	Confined space entry protocols and training per 29 CFR 1910.146 must be followed.

APPENDIX M - FIRE ALARM SYSTEM PLAN

EXAMINED FOR COMPLIANCE WITH BUILDING CODE SECTIONS BC 907 & BC 908 AND FIRE CODE SECTIONS FC 907 & FC 908 ONLY. APPLICANT IS RESPONSIBLE FOR COMPLIANCE WITH BUILDING CODE APPENDIX Q 107 AND ROUTING OF WIRES IN ACCORDANCE WITH NYC ELECTRICAL CODE

FDNY FIRE ALARM PLAN ACCEPTED
Subject to audibility & visibility throughout the premises
FINAL APPROVAL SUBJECT TO INSPECTION
FDNY REFERENCE #: 2023-TMFALM-008427-PLAN
ACCEPTED WITH CONDITION(S): NO
If yes, specify:
DATE: 02/22/2024 **EXAMINER:** Sandeep Machhal

SYSTEM OUTPUTS / INDICATING/CONTROLLED DEVICES — SYSTEM INPUTS / INITIATING DEVICES

CONTROL UNIT ANNUNCIATION | NOTIFICATION | REQUIRED FIRE SAFETY CONTROL

		A: ACTUATE COMMON ALARM SIGNAL INDICATOR ON FIRE ALARM CONTROL PANEL & OUTLYING ANNUNCIATORS.	B: ACTUATE COMMON SUPERVISORY SIGNAL INDICATOR ON FIRE ALARM CONTROL PANEL & OUTLYING ANNUNCIATORS	C: ACTUATE COMMON TROUBLE SIGNAL INDICATOR ON LCD OF FIRE ALARM CONTROL PANEL & OUTLYING ANNUNCIATORS.	D: SOUND INTERNAL BUZZER AT FIRE ALARM CONTROL PANEL & OUTLYING ANNUNCIATORS.	E: TEXT MESSAGE DISPLAY DEVICE TYPE & LOCATION OF INITIATING DEVICE ON THE ACTUATING LEVEL & LCD OF FIRE ALARM CONTROL PANEL & OUTLYING ANNUNCIATORS	F: NOT USED	G: NOT USED	H: TRANSMIT "ALARM" SIGNAL TO CENTRAL STATION LOCATION VIA TELEPHONE COMPANY LINES.	I: TRANSMIT "SMOKE" ALARM SIGNAL TO CENTRAL STATION LOCATION VIA TELEPHONE COMPANY LINES.	J: TRANSMIT "DETECTOR" ALARM SIGNAL TO CENTRAL STATION LOCATION VIA TELEPHONE COMPANY LINES.	K: TRANSMIT "SUPERVISORY" SIGNAL TO CENTRAL STATION LOCATION VIA TELEPHONE COMPANY LINES.	L: TRANSMIT "SPRINKLER" SIGNAL TO CENTRAL STATION LOCATION VIA TELEPHONE COMPANY LINES.	M: TRANSMIT "DETECTOR" SIGNAL TO CENTRAL STATION LOCATION VIA COMPUTER, DIALER & TONE MODULE AND TELEPHONE LINES AND SOUND IN LOCAL SOUNDER ZONE	N: TRANSMIT "FIRE PUMP TROUBLE" SIGNAL TO CENTRAL STATION LOCATION VIA TELEPHONE COMPANY LINES.	O: TRANSMIT "FIRE PUMP FAILURE" SIGNAL TO CENTRAL STATION LOCATION VIA TELEPHONE COMPANY LINES.	P: TRANSMIT "FIRE PUMP PHASE REVERSAL" SIGNAL TO CENTRAL STATION LOCATION VIA TELEPHONE COMPANY LINES.	Q: RECALL ELEVATOR TO STREET LEVEL	R: SHUT DOWN ALL GAS EQUIPMENT IN THIS BUILDING
1	MANUAL STATION	●			●	●			●										
2	HIGH AND LOW PRESSURE SWITCHES		●		●	●						●							
3	AREA SMOKE DETECTOR	●			●	●				●									
4	HEAT DETECTOR	●			●	●				●									
5	CO DETECTOR		●		●	●								●					●
6	ELEVATOR LOBBY, ELEVATOR MACHINE ROOM OR TOP OF ELEVATOR SHAFT DETECTORS	●			●	●				●								●	
7	WATERFLOW SWITCH	●			●	●					●							●	
8	SPRINKLER CONTROL VALVE/ TAMPER SWITCH		●		●	●						●							
9	TOP OF STAIR SMOKE DETECTORS	●			●	●				●									
10	"POWER FAILURE" CONTACT IN FIRE PUMP CONTROLLER		●		●	●										●			
11	"PUMP RUNNING" CONTACT IN FIRE PUMP CONTROLLER		●		●	●									●				
12	"PHASE REVERSAL" CONTACT IN FIRE PUMP CONTROLLER		●		●	●											●		
13	FIRE ALARM AC POWER FAILURE			●	●	●							●						
14	FIRE ALARM SYSTEM LOW BATTERY			●	●	●							●						
15	OPEN CIRCUIT			●	●	●							●						
16	GROUND CIRCUIT			●	●	●							●						
17	NOTIFICATION APPLIANCE CIRCUIT SHORT			●	●	●							●						

FIRE ALARM SYSTEM GENERAL AND INSTALLATION NOTES

1. THE FUSED DISCONNECT PANEL, FIRE COMMAND CENTER, FUSE CUTOUT PANELS, CENTRAL STATION TRANSMITTER, DATA GATHERING PANEL(S) AND BOOSTER POWER SUPPLY PANEL(S), SHALL BE GROUNDED TO THE METALLIC HOUSING USING AN APPROVED LUG WITH A MINIMUM #1 AWG, GREEN SOLID THHN OR EQUIVALENT IN 3/4" RGS/IMC CONNECTED TO THE GROUND BAR IN THE FUSE DISCONNECT OR CUTOUT. THE MAIN FUSE DISCONNECT SHALL BE GROUNDED TO STREET SIDE OF COLD WATER MAIN WITH A MINIMUM #8 AWG GREEN THHN WITH AN APPROVED CLAMP AND INSTALLED IN 3/4" MINIMUM RGS/IMC. ADDITIONALLY THE NEUTRAL IN THE MAIN DISCONNECT SHALL BE BONDED TO THE METALLIC HOUSING OF THE DISCONNECT IN ACCORDANCE WITH NYC ELECTRIC CODE UNLESS SHOWN ON THE PLANS OTHERWISE. SEE DETAILS ON PLAN AND IN SPECIFICATIONS AS APPLICABLE FOR SPECIFIC REQUIREMENTS OF THIS PROJECT.
2. FIRE ALARM EQUIPMENT SHALL BE POWERED THROUGH AN APPROVED FUSE DISCONNECT PANEL CONNECTED AHEAD OF THE MAIN SERVICE SWITCH. FUSE DISCONNECT TO BE LOCATED WITHIN 5 FEET OF THE CONNECTION POINT, PANTED RED AND SUPPLIED WITH A LOCK TO SECURE IT IN THE ON POSITION. ALL-WIRING SHALL BE MINIMUM #10 AWG SOLID THHN OR EQUIVALENT RUN IN 3/4" MINIMUM RGS/IMC AND IN ACCORDANCE WITH NYC ELECTRIC CODE, WHICHEVER IS MORE STRINGENT. FUSES SHALL BE CARTRIDGE TYPE AND A NEUTRAL BAR WITH SCREW DOWN LUGS PROVIDED. IF CON EDISON REQUIRES A METER TO BE INSTALLED THEN CONTRACTOR SHALL PROVIDED AND INSTALL A TRANS-S METER THAT ALLOWS FOR THE REMOVAL OF THE METER WITHOUT INTERRUPTING POWER TO FIRE ALARM SYSTEM. SEE DETAILS ON PLANS AND IN SPECIFICATIONS AS APPLICABLE FOR SPECIFIC REQUIREMENTS OF THIS PROJECT.
3. ALL FIRE ALARM CONTROL PANEL(S), FIRE COMMAND CENTER, CABINETS, DATA GATHERING PANELS, BATTERY CABINETS, EACH RELAY AND ADDRESSABLE MODULE TO INDICATE ITS PURPOSE AND BEING USED TO CONTROL OR MONITOR, JUNCTION BOXES, BOOSTER POWER SUPPLIES, FUSE DISCONNECTS, FUSE CUTOUT PANELS ETC. SHALL BE CLEARLY LABELED USING A RED LAMINATE TYPE ENGRAVED LABEL WITH MINIMUM 1 INCH HIGH ENGRAVED WHITE LETTERS. THE LABEL SHALL STATE THE SPECIFIC PURPOSE OF THE PANEL, CABINET AND/OR MODULE AND WHAT FLOORS IT SERVES. ALL MAIN PANELS, CENTRAL STATION TRANSMITTERS AND FIRE PUMP CONTROLLER POWERED WITH 120VAC OR GREATER SHALL HAVE A LABEL INDICATING WHERE THE MAIN DISCONNECT IS LOCATED.
4. LOCATIONS OF ALL FIRE ALARM EQUIPMENT SHALL BE SUBJECT TO NYC DEPARTMENT OF BUILDING AND FIRE DEPARTMENT APPROVAL. NO CHANGE OR MODIFICATION TO THE SYSTEM OR PLANS SHALL BE PERMITTED WITHOUT WRITTEN APPROVAL FROM THE ENGINEER OF RECORD. IF ANY SUBSTANTIAL CHANGES ARE MADE TO THE DRAWINGS PRIOR TO OR DURING INSTALLATION, AS BUILD PLANS SHALL BE PREPARED BY THE ENGINEER AND FILED WITH THE APPROPRIATE NYC AGENCIES FOR FINAL ACCEPTANCE.
5. THE FIRE ALARM SYSTEM SHALL BE PROVIDED WITH BATTERY BACKUP FOR A MINIMUM OF 24 HOURS STANDBY FOLLOWED BY 15 MINUTES OF SYSTEM IN FULL ALARM PLUS 25 PERCENT SPARE FOR DEGRAGATION OF BATTERIES. BATTERY CABINETS SHALL BE PROVIDED AS REQUIRED FOR EACH PANEL PAINTED RED, PROVIDED WITH A LOCK AND PROPERTY LABELED.
6. CONTRACTOR SHALL INCLUDE ALL PIPE, WIRE AND INSTALLATION IN ACCORDANCE WITH THE LATEST REQUIREMENT OF THE 2022 BUILDING AND ELECTRIC CODE, WHICHEVER IS MORE STRINGENT. ALL NEW SYSTEM SHALL FOLLOW THE LATEST 2022 CODES AND STANDARDS UNLESS SPECIFICALLY STATED OTHERWISE.
7. LICENSED ELECTRICAL CONTRACTOR SHALL PROVIDE THE SIGNED AND SEALED A-433 AS REQUIRED BY AND ACCEPTABLE TO THE NYC FIRE DEPARTMENT AND SHALL SIGN AND SEAL THE FUNCTIONALITY STATEMENT ON THE AS-BUILD RISER PROVIDED BY THE APPLICANT OF RECORD AS PART OF THE SCOPE OF HIS SERVICES AND AT NO ADDITIONAL COST TO OWNER. ADDITIONALLY CONTRACTOR SHALL INCLUDE AT NO ADDITIONAL COST ALL PRE-INSPECTIONS NECESSARY TO BE CONDUCTED DURING ACCEPTABLE HOURS TO THE OWNER, ANY AND ALL PRE-INSPECTIONS REQUIRED BY ENGINEER/APPLICANT OF RECORD, ANY AUDITS CONDUCTED BY THE NYC FIRE DEPARTMENT EVEN AFTER THE FDNY LETTER OF APPROVAL IS RECEIVED AND ANY AND ALL FDNY INSPECTIONS REQUIRED TO OBTAIN THE FINAL FDNY LETTER OF APPROVAL. AT A MINIMUM ONE ELECTRICIAN AND TWO FIRE ALARM TECHNICIANS WILL BE REQUIRED AT EACH OF THESE INSPECTIONS.
8. CONTRACTOR SHALL PROVIDE A NON-PROPRIETARY TYPE ADDRESSABLE SYSTEM ACCEPTABLE TO THE ENGINEER AND OWNER. SYSTEM SHALL BE PURCHASED FROM AN AUTHORIZED DISTRIBUTOR AND INSTALLED BY A LICENSED ELECTRICAL CONTRACTOR.
9. INSTALLATION SHALL COMPLY WITH THE 2022 NYC BUILDING CODES AND LATEST NYC ELECTRICAL CODE
10. ANY DISCREPANCIES BETWEEN THE PLANS OR SPECIFICATIONS SHALL REQUIRE THE MOST STRINGENT REQUIREMENT UNLESS DETERMINED OTHERSWISE IN WRITING FROM THE ENGINEER.
11. CONTRACTOR SHALL BE REQUIRED TO MAINTAIN THE FIRE ALARM SYSTEM IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 10 OF NFPA72 AND NYC FIRE CODE WHICHEVER IS MORE STRINGENT.
12. THE SIGN SHALL BE PROVIDED ON THE SMOKE DETECTION CONTROL PANEL INDICATING WHERE THE MAIN FUSE DISCONNECT IS LOCATED "MEANS OF DISCONNECT POWER IS FROM THE MAIN FUSE DISCONNECT SWITCH LOCATED IN THE ELECTRICAL ROOM IN BASEMENT.
13. DISCONNECT SWITCHES FOR FOR THE FIRE ALARM SYSTEM AND FIRE PUMP WILL BE LOCKED IN THE CLOSED AND ENERGIZED POSITION AS REQUIRED BY CODE.
14. PROVIDE MODULES TO ISOLATE EACH FIRE ZONE/FLOOR FROM SINGLE FAULT AS PER NFPA 72 2016 EDITION – SECTION 23.6

NOTES:

1. ALL NEW SMOKE DETECTION SYSTEM WIRING SHALL BE THHN INSTALLED IN RIGID THREADED ALUMINUM CONDUIT OR TEFLON SMOKE DETECTION CABLE INSTALLED IN EMT.
2. THE SYSTEM PROVIDED FOR BY THESE DRAWINGS IS A SMOKE DETECTION SYSTEM WITH MONITORING OF SPRINKLER WATERFLOW SWITCHES AND VALVE TAMPER SWITCHES.
3. THE INSTALLATION SHALL COMPLY WITH THE 2022 NYC CONSTRUCTION CODES, EQUIPMENT/DEVICES USED ARE APPROVED MANUFACTURERS

NOTES:

1) RISER DIAGRAM AND OUTPUT MATRIX SHALL BE MOUNTED IN A FRAME ADJACENT TO FIRE ALARM CONTROL PANEL.
2) THE FIRE ALARM SYSTEM SHALL BE PROVIDED WITH AND CAPABLE OF SENDING SEPARATE SIGNALS TO CENTRAL OFFICE FOR MANUAL ALARM (MANUAL PULL STATION), AUTOMATIC ALARM (SMOKE, DUCT OR HEAT DETECTOR), SPRINKLER ALARM (WATERFLOW SWITCH), TROUBLE, AND SUPERVISORY (TAMPER SWITCH), CARBON MONOXIDE DETECTOR AND FIRE PUMP RUN, POWER FAILURE OR PHASE REVERSAL.

DRAWING LIST

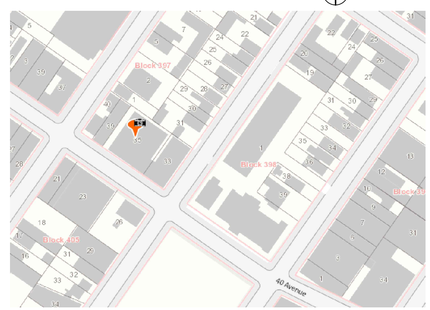
FA-001.00 FIRE ALARM SYMBOLS, NOTES & ABBREVIATIONS
FA-002.00 FIRE ALARM DETAILS AND RISER DIAGRAM
FA-101.00 FIRE ALARM SUB-CELLAR PLAN
FA-102.00 FIRE ALARM CELLAR PLAN
FA-103.00 FIRE ALARM FIRST FLOOR PLAN
FA-104.00 FIRE ALARM SECOND FLOOR PLAN
FA-105.00 FIRE ALARM THIRD FLOOR PLAN
FA-106.00 FIRE ALARM TYPICAL (4-6) FLOOR PLAN
FA-107.00 FIRE ALARM ROOF PLAN

SMOKE DETECTION SYSTEM SYMBOLS

- WF – SPRINKLER WATERFLOW SWITCH
- TS – SPRINKLER TAMPER SWITCH
- S/R – CEILING MOUNTED AREA SMOKE DETECTOR "R" DENOTES FOR ELEVATOR RECALL.
- H – HEAT DETECTOR
- P – PULL STATION
- M – ADDRESSABLE CONTROL MODULE
- LFDS – SMOKE DETECTION LOCKABLE FUSED DISCONNECT SWITCH
- SDCP (FACP) – SMOKE DETECTION CONTROL PANEL WITH REFLECTIVE SMOKED GLASS COVER DOOR WITH TRIM. THIS PANEL MONITORS WATER FLOW/TAMPER SWITCHES AND SYSTEM SMOKE DETECTORS THOUGHOUT THE BUILDING. THIS PANEL IS EQUIVALENT TO THE FIRE ALARM CONTROL PANEL (FACP) AND IS REQUIRED FOR THIS TYPE OF APPLICATION.
- IR – INTERFACE RELAY
- CO – CO DETECTOR
- FARA – FIRE ALARM REMOTE ANNUNCIATOR
- PS – ALARM PRESSURE SWITCH

27-09 40th Ave
LONG ISLAND CITY, NY 111.01
BLOCK:397
LOT:35

NORTH



PLOT PLAN

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CONTRACTOR SHALL VERIFY ALL FIELD CONDITIONS AND DIMENSIONS AND BE RESPONSIBLE FOR FIELD FITAND QUALITY OF WORK. NO ALLOWANCES SHALL BE MADE IN BEHALF OF THE CONTRACTOR FOR ANY ERROR OR NEGLECT ON HIS PART.

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PROJECT TILE
27-09 40TH AVE
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SYMBOLS, NOTES AND ABBREVIATIONS

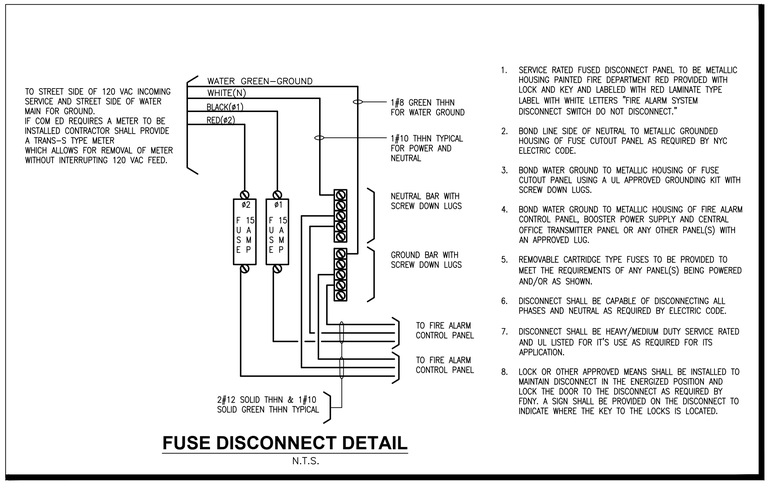
ARCHITECT STAMP
STATE OF NEW YORK – DAVID PRENTICE – 100164 – LICENSED PROFESSIONAL ENGINEER

DATE:	2/21/19
DRAWING BY:	DP
CHK BY:	PJ
DGW No.:	FA-001.00

FILENAME:

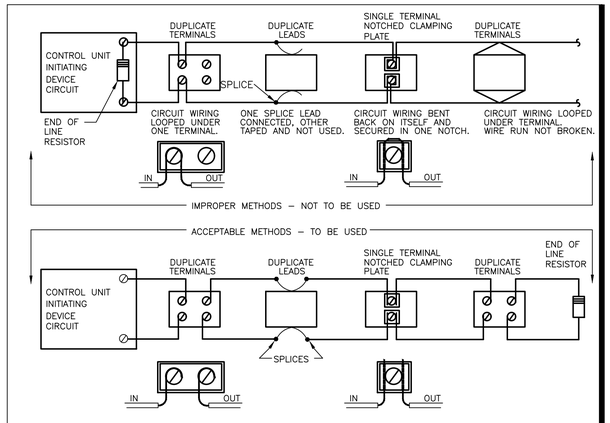
EXAMINED FOR COMPLIANCE WITH BUILDING CODE SECTIONS BC 907 & BC 908 AND FIRE CODE SECTIONS FC 907 & FC 908 ONLY. APPLICANT IS RESPONSIBLE FOR COMPLIANCE WITH BUILDING CODE APPENDIX Q 107 AND ROUTING OF WIRES IN ACCORDANCE WITH NYC ELECTRICAL CODE

FDNY FIRE ALARM PLAN ACCEPTED
Subject to audibility & visibility throughout the premises
FINAL APPROVAL SUBJECT TO INSPECTION
FDNY REFERENCE #: 2023-TMFALM-008427-PLAN
ACCEPTED WITH CONDITION(S): NO
If yes, specify:
DATE: 02/22/2024 **EXAMINER:** Sandeep Machhal

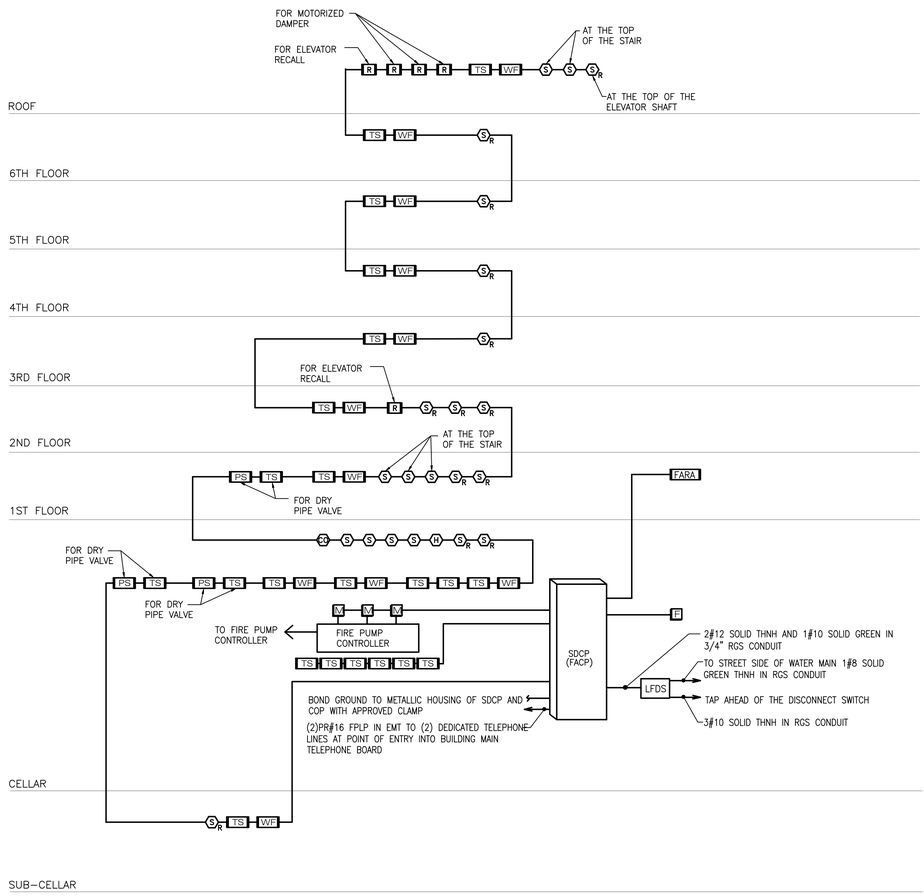


1. SERVICE RATED FUSED DISCONNECT PANEL TO BE METALLIC HOUSING PAINTED FIRE DEPARTMENT RED PROVIDED WITH LOCK AND KEY AND LABELED WITH RED LAMINATE TYPE LABEL WITH WHITE LETTERS "FIRE ALARM SYSTEM DISCONNECT SWITCH DO NOT DISCONNECT."
2. BOND LINE SIDE OF NEUTRAL TO METALLIC GROUNDED HOUSING OF FUSE CUTOUT PANEL AS REQUIRED BY NYC ELECTRIC CODE.
3. BOND WATER GROUND TO METALLIC HOUSING OF FUSE CUTOUT PANEL USING A UL APPROVED GROUNDING KIT WITH SCREW DOWN LUGS.
4. BOND WATER GROUND TO METALLIC HOUSING OF FIRE ALARM CONTROL PANEL, BOOSTER POWER SUPPLY AND CENTRAL OFFICE TRANSMITTER PANEL OR ANY OTHER PANEL(S) WITH AN APPROVED LUG.
5. REMOVABLE CARTRIDGE TYPE FUSES TO BE PROVIDED TO MEET THE REQUIREMENTS OF ANY PANEL(S) BEING POWERED AND/OR AS SHOWN.
6. DISCONNECT SHALL BE CAPABLE OF DISCONNECTING ALL PHASES AND NEUTRAL AS REQUIRED BY ELECTRIC CODE.
7. DISCONNECT SHALL BE HEAVY/MEDIUM DUTY SERVICE RATED AND UL LISTED FOR IT'S USE AS REQUIRED FOR ITS APPLICATION.
8. LOCK OR OTHER APPROVED MEANS SHALL BE INSTALLED TO MAINTAIN DISCONNECT IN THE ENERGIZED POSITION AND LOCK THE DOOR TO THE DISCONNECT AS REQUIRED BY FDNY. A SIGN SHALL BE PROVIDED ON THE DISCONNECT TO INDICATE WHERE THE KEY TO THE LOCKS IS LOCATED.

FUSE DISCONNECT DETAIL
N.T.S.



WIRING TERMINATION METHODS



PROVIDE CLASS "B" CIRCUITS AS PER BC.907.1.1 REQUIREMENTS

SMOKE DETECTION SYSTEM RISER DIAGRAM
NOT TO SCALE

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SCHEDULES

ARCHITECT STAMP
STATE OF NEW YORK · CHANGSHENG REN · LICENSED PROFESSIONAL ENGINEER · 100784

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DGW No.:	FA-002.00

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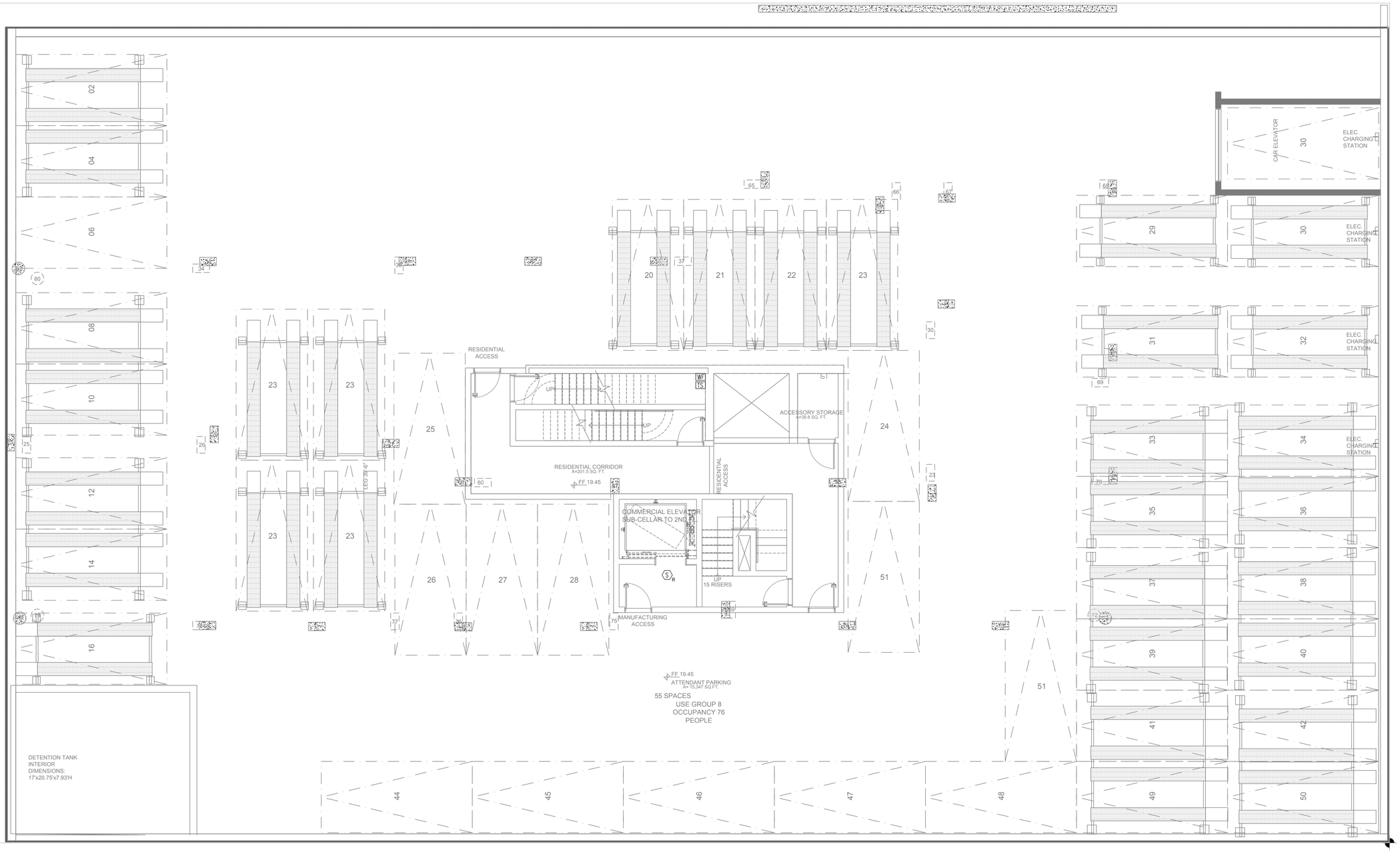

01 SUBCELLAR PLAN
SCALE 3/16" = 1'-0"

NOTE:

ELECTRICAL CONTRACTOR TO ISOLATE EACH FIRE ZONE/FLOOR FROM SINGLE FAULT AS PER NFPA 72, 2016 EDITION SECTION 23.6

EXAMINED FOR COMPLIANCE WITH BUILDING CODE SECTIONS BC 907 & BC 908 AND FIRE CODE SECTIONS FC 907 & FC 908 ONLY. APPLICANT IS RESPONSIBLE FOR COMPLIANCE WITH BUILDING CODE APPENDIX Q 107 AND ROUTING OF WIRES IN ACCORDANCE WITH NYC ELECTRICAL CODE

FDNY FIRE ALARM PLAN ACCEPTED
Subject to audibility & visibility throughout the premises
FINAL APPROVAL SUBJECT TO INSPECTION
FDNY REFERENCE #: 2023-TMFALM-008427-PLAN
ACCEPTED WITH CONDITION(S): NO
If yes, specify:
DATE: 02/22/2024 **EXAMINER:** Sandeep Machhal

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SUBCELLAR PLAN

ARCHITECT STAMP

DATE:	2/21/19
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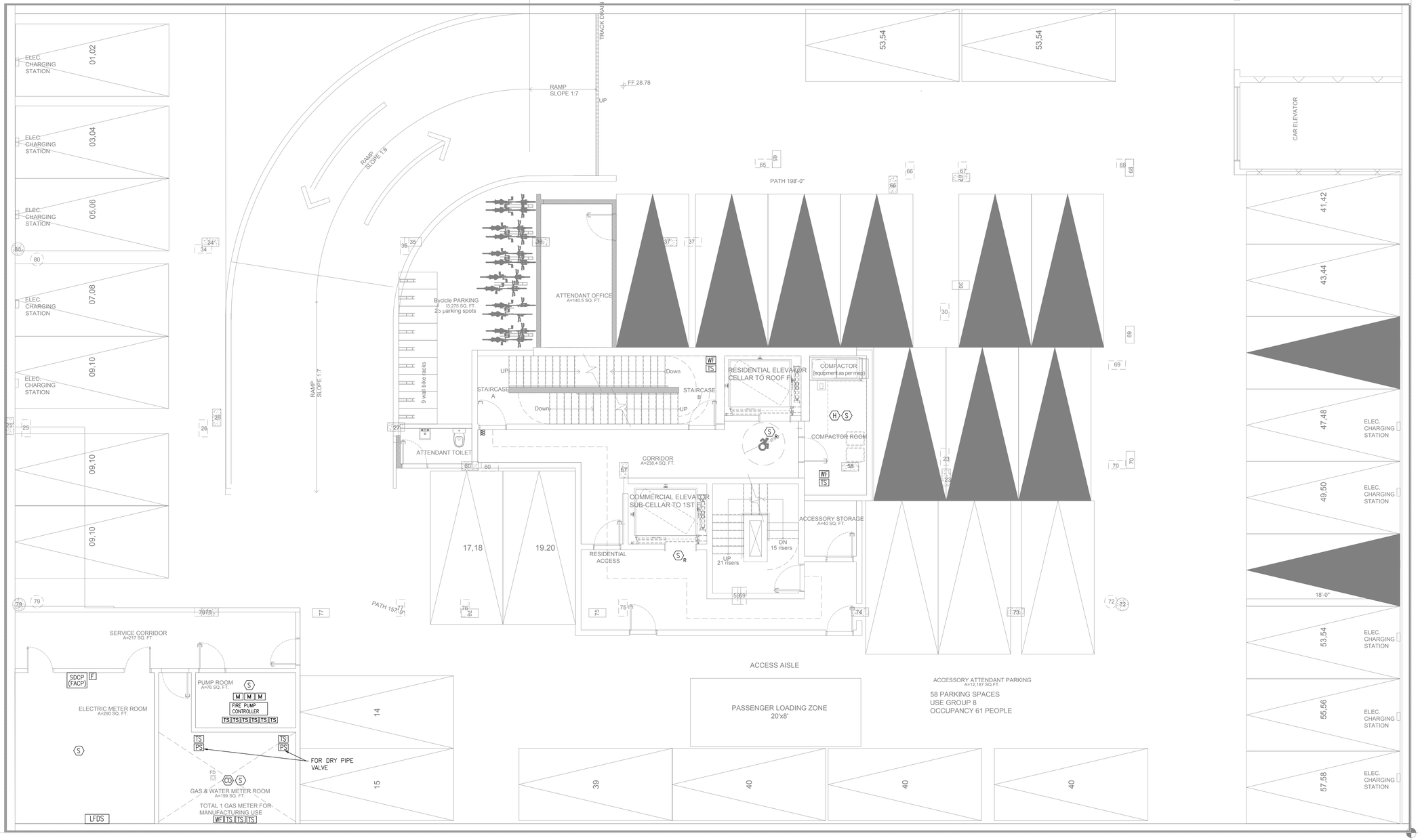

01 CELLAR PLAN

SCALE 3/16" = 1'-0"

NOTE:

ELECTRICAL CONTRACTOR TO ISOLATE EACH FIRE ZONE/FLOOR FROM SINGLE FAULT AS PER NFPA 72, 2016 EDITION SECTION 23.6

EXAMINED FOR COMPLIANCE WITH BUILDING CODE SECTIONS BC 907 & BC 908 AND FIRE CODE SECTIONS FC 907 & FC 908 ONLY. APPLICANT IS RESPONSIBLE FOR COMPLIANCE WITH BUILDING CODE APPENDIX Q 107 AND ROUTING OF WIRES IN ACCORDANCE WITH NYC ELECTRICAL CODE

FDNY FIRE ALARM PLAN ACCEPTED

Subject to audibility & visibility throughout the premises

FINAL APPROVAL SUBJECT TO INSPECTION

FDNY REFERENCE #: 2023-TMFALM-008427-PLAN

ACCEPTED WITH CONDITION(S): NO

If yes, specify:

DATE: 02/22/2024 **EXAMINER:** Sandeep Machhal

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REVISIONS:

DATE	ISSUE	DESCRIPTION
	1	

NOTES:

KEY PLAN

PROJECT TILE

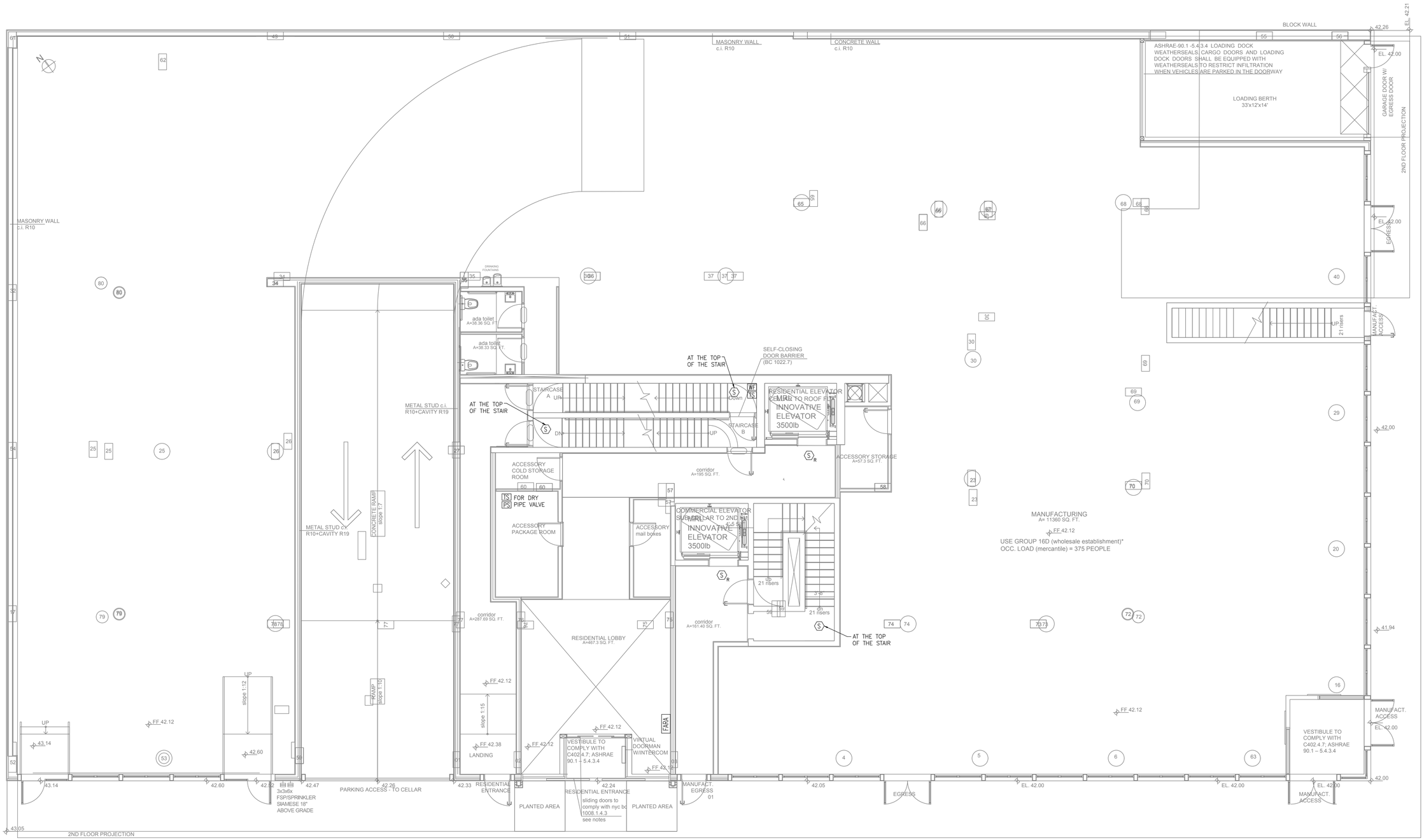
27-09 40TH AVE
LONG ISLAND CITY - NY

CELLAR PLAN

ARCHITECT STAMP

DATE:	2/21/19
DRAWING BY:	DP
CHK BY:	PJ
DGW No.:	FA–102.00

FILENAME:



01 FIRST FLOOR PLAN

SCALE 3/16" = 1'-0"

NOTE:

ELECTRICAL CONTRACTOR TO ISOLATE EACH FIRE ZONE/FLOOR FROM SINGLE FAULT AS PER NFPA 72, 2016 EDITION SECTION 23.6

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FDNY FIRE ALARM PLAN ACCEPTED
Subject to audibility & visibility throughout the premises
FINAL APPROVAL SUBJECT TO INSPECTION
FDNY REFERENCE #: 2023-TMFALM-008427-PLAN
ACCEPTED WITH CONDITION(S): NO
If yes, specify:
DATE: 02/22/2024 EXAMINER: Sandeep Machhal

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KEY PLAN

PROJECT TILE

27-09 40TH AVE
LONG ISLAND CITY - NY

FIRST FLOOR PLAN

ARCHITECT STAMP

STATE OF NEW YORK · CHOMSHENG FENG · LICENSED PROFESSIONAL ENGINEER · 100704

DATE:	2/21/19
DRAWING BY:	DP
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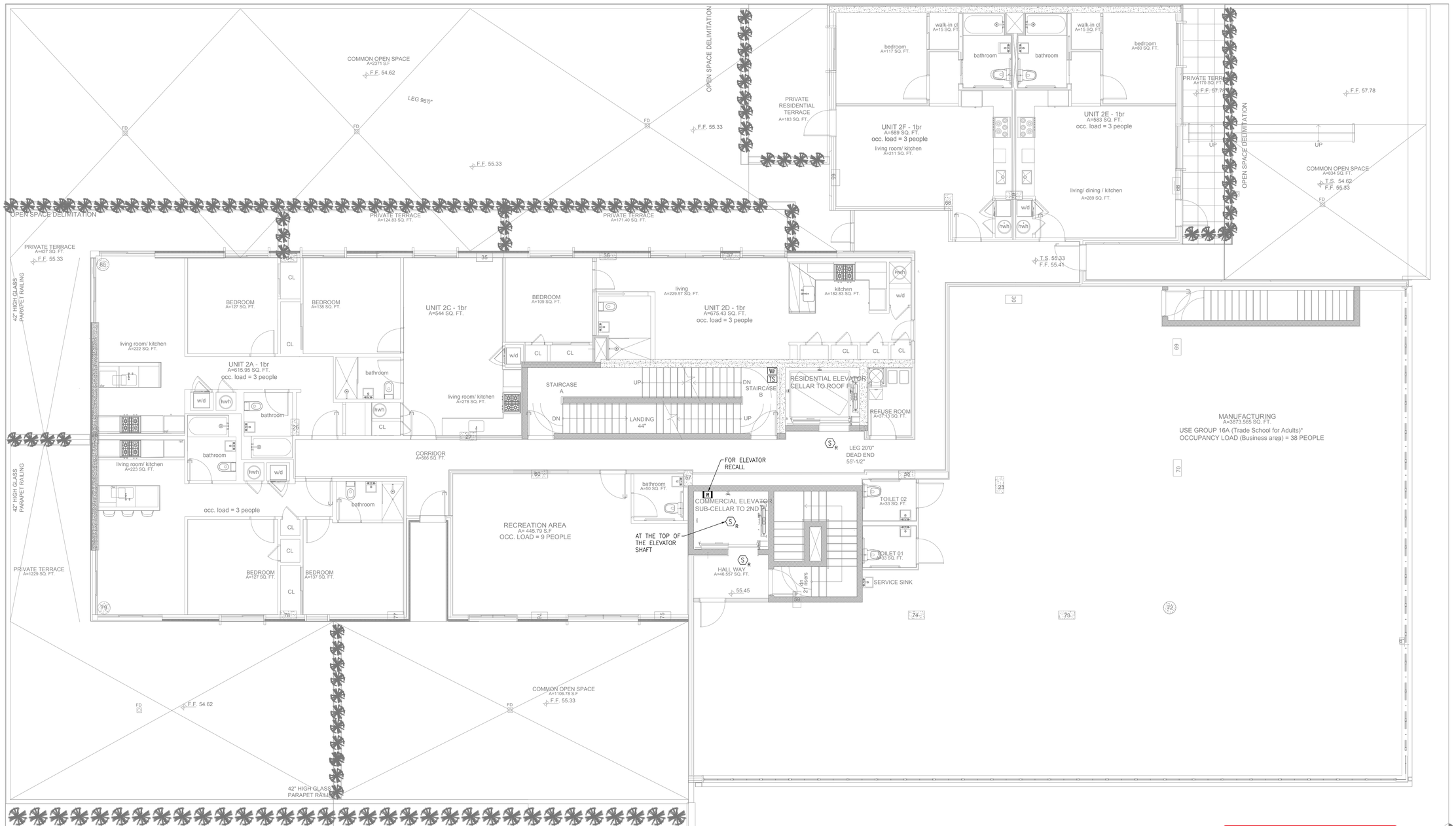
DGW No.:	FA–103.00

FILENAME:



01 SECOND FLOOR PLAN
SCALE 3/16" = 1'-0"

NOTE:

ELECTRICAL CONTRACTOR TO ISOLATE EACH FIRE ZONE/FLOOR FROM SINGLE FAULT AS PER NFPA 72, 2016 EDITION SECTION 23.6

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FDNY FIRE ALARM PLAN ACCEPTED
Subject to audibility & visibility throughout the premises
FINAL APPROVAL SUBJECT TO INSPECTION
FDNY REFERENCE #: 2023-TMFALM-008427-PLAN
ACCEPTED WITH CONDITION(S): NO
If yes, specify:
DATE: 02/22/2024 **EXAMINER:** Sandeep Machhal

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KEY PLAN

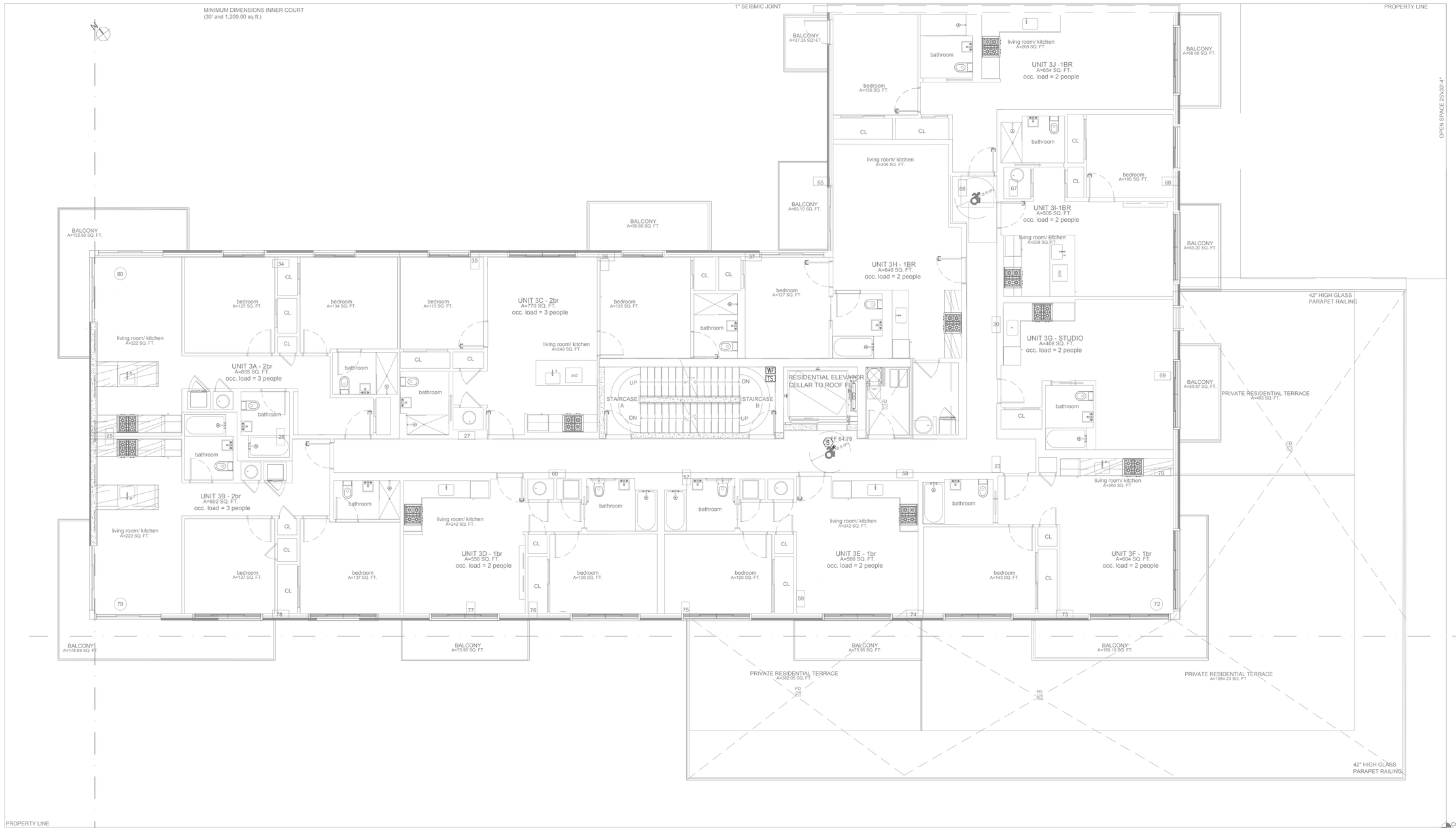
PROJECT TILE
27-09 40TH AVE
LONG ISLAND CITY - NY

SECOND FLOOR PLAN

ARCHITECT STAMP
STATE OF NEW YORK
CHRISHENG FENG
LICENSED PROFESSIONAL ENGINEER
100764

DATE: 2/21/19
DRAWING BY: DP
CHK BY: PJ
DGW No.: FA–104.00

FILENAME:



01 THIRD FLOOR PLAN
SCALE 3/16" = 1'-0"

NOTE:

ELECTRICAL CONTRACTOR TO ISOLATE EACH FIRE ZONE/FLOOR FROM SINGLE FAULT AS PER NFPA 72, 2016 EDITION SECTION 23.6

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FINAL APPROVAL SUBJECT TO INSPECTION
FDNY REFERENCE #: 2023-TMFALM-008427-PLAN
ACCEPTED WITH CONDITION(S): NO
If yes, specify:
DATE: 02/22/2024 **EXAMINER:** Sandeep Machhal

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KEY PLAN

PROJECT TILE
27-09 40TH AVE
LONG ISLAND CITY - NY

THIRD FLOOR PLAN

ARCHITECT STAMP

DATE:	2/21/19
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DGW No.:	

FA–105.00

FILENAME:

01 TYPICAL (4-6) FLOOR PLAN
SCALE 3/16" = 1'-0"

NOTE:

ELECTRICAL CONTRACTOR TO ISOLATE EACH FIRE ZONE/FLOOR FROM SINGLE FAULT AS PER NFPA 72, 2016 EDITION SECTION 23.6

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FDNY FIRE ALARM PLAN ACCEPTED
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FINAL APPROVAL SUBJECT TO INSPECTION
FDNY REFERENCE #: 2023-TMFALM-008427-PLAN
ACCEPTED WITH CONDITION(S): NO
If yes, specify:
DATE: 02/22/2024 **EXAMINER:** Sandeep Machhal

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KEY PLAN

PROJECT TILE
27-09 40TH AVE
LONG ISLAND CITY - NY

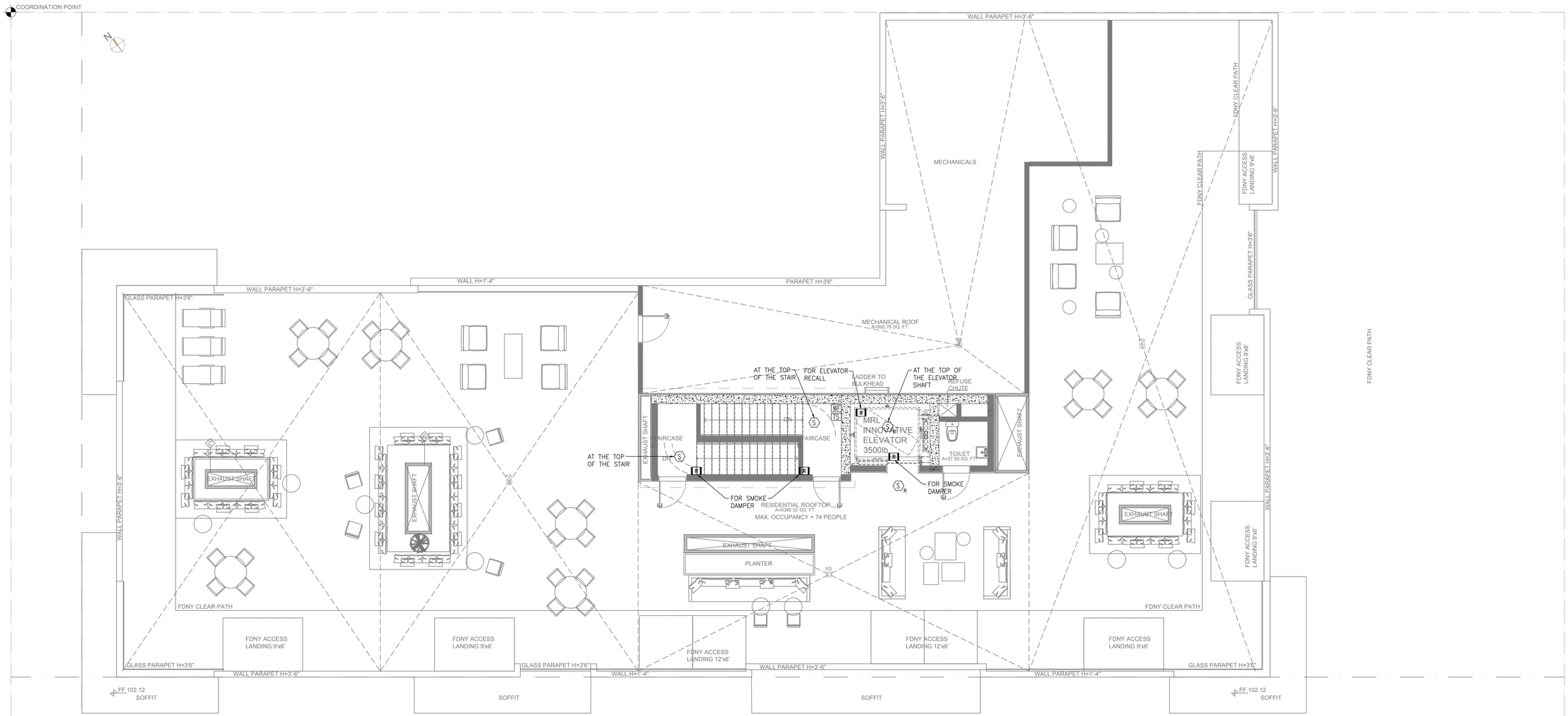
TYPICAL (4-6)
FLOOR PLAN

ARCHITECT STAMP

STATE OF NEW YORK
CHRISTOPHER PENZA
100176
LICENSED PROFESSIONAL ENGINEER

DATE:	2/21/19
DRAWING BY:	DP
CHK BY:	PJ
DGW No.:	FA–106.00

FILENAME:



NOTE:

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01 ROOF PLAN
SCALE 3/16" = 1'-0"

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FDNY FIRE ALARM PLAN ACCEPTED
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FINAL APPROVAL SUBJECT TO INSPECTION
FDNY REFERENCE #: 2023-TMFALM-008427-PLAN
ACCEPTED WITH CONDITION(S): NO
If yes, specify:
DATE: 02/22/2024 **EXAMINER:** Sandeep Machhal

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DATE	ISSUE	DESCRIPTION
	1	

NOTES:

KEY PLAN

PROJECT TILE
27-09 40TH AVE
LONG ISLAND CITY - NY

ROOF PLAN

ARCHITECT STAMP
STATE OF NEW YORK
DIONYSHENG FENG
100760
LICENSED PROFESSIONAL ENGINEER

DATE:	2/21/19
DRAWING BY:	DP
CHK BY:	PJ
DGW No.:	FA–107.00

FILENAME:

APPENDIX N - SSDS Monitoring Field Log

27-09 40th Ave, Queens, NY
SSDS System Monitoring

	Riser #1	Riser #2	Riser #3	Riser #4	Riser #5	Vac-1	Vac-2	Vac-3	Vac-4	Vac-5	Vac-6	Vac-7	Vac-8
	In. H20	In. H20	In. H20	In. H2O	In. H2O	In. H20	In. H20	In. H20	In. H20	In. H2O	In. H2O	In. H2O	In. H2O
	1.3	1.3	2.0	1.8	1.6	0.98	0.66	0.40	0.58	0.48	0.29	0.39	0.38

NOTES

Liberty Staff: Brian Exley

Date: 8-12-24

APPENDIX O – COMMUNITY AIR MONITORING PLAN

COMMUNITY AIR MONITORING PLAN

27-09 40th AVENUE SITE
LONG ISLAND CITY, NEW YORK 11101
BROWNFIELDS ID: C241241-03-20

APRIL 22, 2021
***LAUREL* PROJECT # 19-410**

PREPARED FOR:

LAW OFFICES OF THEODORE W. FIRETOG
111 THOMAS POWELL BOULEVARD
FARMINGDALE, NEW YORK, 11735-2251
On behalf its client: 40th Ave Dutch Kills Realty LLC

PREPARED BY:

LAUREL ENVIRONMENTAL GEOSCIENCES, DPC.
53 WEST HILLS ROAD, SUITE 1 HUNTINGTON STATION, NEW YORK

COMMUNITY AIR MONITORING PLAN
FOR USE DURING INVESTIGATIVE AND REMEDIAL ACTIONS

Due to the nature of the identified contaminants at the property referred to as 27-09 40th Avenue, Long Island City, New York("Site"), real-time air monitoring for volatile organic compounds ("VOCs") and/or particulate levels at the perimeter of the work area is necessary. The scope of work for the Site will require VOC and particulate monitoring. Due to the proximity of the Site to residential properties, continuous air monitoring will be completed during all ground intrusive activities. For this program, ground intrusive activities include, but are not limited to, excavation, product recovery, manipulation of soil piles, extraction of sheet piling, etcetera. Continuous monitoring within the work zone is a requirement given the Site conditions.

Periodic monitoring for VOCs will be completed during all non-ground intrusive activities, such as purging and sample collection from groundwater monitoring wells. "Periodic" monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while conducting non-ground intrusive activities, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. All readings will be submitted for State (NYSDEC and NYSDOH) personnel to review on a weekly basis or as soon as possible if/when an exceedance occurs. All data from the CAMP will be included in the Remedial Action Report ("RAR").

VOC Monitoring, Response Levels, and Actions

VOCs will be monitored at the at the down-wind perimeter of the work zone on a continuous basis and within the work zone during ground intrusive activities. The monitoring work will be performed using equipment appropriate to measure the types of contaminants known or suspected to be present (e.g. photoionization devices ("PIDs") and particulate monitoring stations). As applicable, the equipment will be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below. Prior to work beginning for the day, the equipment will be setup and allow to run for a 15-minute period to allow for background readings to be recorded.

- If the ambient air concentration of total organic vapors at the down-wind perimeter or within the work zone exceeds 5 parts per million ("ppm") above background for the 15-minute average, work activities will be temporarily halted and monitoring

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continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities will resume with continued monitoring.

- If total organic vapor levels at the down-wind perimeter or within the work zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities will cease, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After which, work activities will resume provided that the total organic vapor level 200 feet downwind of the work zone or half the distance to the nearest potential receptor or residential structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

All 15-minute readings will be recorded and be available for State (NYSDEC and/or NYSDOH) personnel to review. Instantaneous readings used for decision purposes, if any, will also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations will be monitored continuously at the down-wind perimeter of the work zone or within the work zone at particulate monitoring stations. The particulate monitoring will be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size ("PM-10") and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment will be fitted with an audible alarm or modem with notification to email/text to indicate exceedance of the action level. In addition, fugitive dust migration will be visually assessed during all work activities.

- If the PM-10 particulate level at the down wind perimeter is 150 micrograms per cubic meter ("mcg/m^3") greater than background for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work will continue with dust suppression techniques provided that the down-wind perimeter PM-10 particulate levels do not exceed 150 mcg/m^3 above the background level and provided that no visible dust is migrating from the work area.

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- If, after implementation of dust suppression techniques, PM-10 particulate levels at the down-wind perimeter of the work zone are greater than 150 mcg/m3 above the background level, work will be stopped and a re-evaluation of activities initiated. Work will resume provided that dust suppression measures and other controls are successful in reducing the PM-10 particulate concentration to within 150 mcg/m3 of the background level and in preventing visible dust migration.

All 15-minute readings will be recorded and be available for State (NYSDEC and/or NYSDOH) personnel to review. Instantaneous readings used for decision purposes, if any, will also be recorded.

VOC and Particulate Monitoring 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 will be considered to prevent exposures related to the work activities and to control dust and odors.

- 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.

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